MS-XLSB:
Excel Binary File Format (.xlsb) Structure Specification

Revision Summary			
Author	**Date**	**Version**	**Comments**
Microsoft Corporation	June 27, 2008	1.0	First release

Table of Contents

1 Introduction

The Excel Binary File Format (.xlsb) Structure Specification specifies the Excel Binary File Format (.xlsb). The Excel Binary File Format (.xlsb) is a collection of records and structures that specify **workbook** content, which can include unstructured or semi-structured tables of numbers, text, or both numbers and text, formulas, external data connections, charts and images. Workbook content is typically organized in a grid based layout, and often includes numeric data, structured data, and formulas.

1.1 Glossary

The following terms are defined in [MS-GLOS]:

ANSI character set

ASCII

Augmented Backus-Naur Form (ABNF)

big-endian

code page

Component Object Model (COM)

language code identifier (LCID)

little-endian

object

Unicode

XML (Extensible Markup Language)

The following terms are defined in [MS-OFCGLOS]:

A1

absolute reference

active cell

active sheet

ActiveX control

ActiveX Data Objects (ADO)

ActiveX object

add-in

add-in function

ADO

aggregation function

ALL

alternate startup directory

ascending order

attribute drilldown

attribute hierarchy

AutoFilter

AutoFormat

automatic calculation mode

AutoRecover

AutoShow

background color

Binary Interchange File Format (BIFF)

border

border formatting

border style

build number

built-in name

calculated column

calculation mode

caption

cascading style sheet (CSS)

cell

cell reference

cell value

center-across-selection alignment

character set

chart sheet

chart sheet view

child element

class identifier (CLSID)

collapsed outline state

color scale

comment

compact axis

conditional formatting

connection string

cube

cube function

custom list

custom view

DAO

data bar

data consolidation

data provider

data recovery

data region

data source

data table

data validation

date system

DDE

DDE server

DDE topic

defined name

diagonal-down

diagonal-up

dialog sheet

dimension

display folder

distributed alignment

double accounting

drawing object

drillthrough

drop zone

Dynamic Data Exchange (DDE)

embedded object

expand/collapse button

expression

external data

external link

external workbook

file extension

file format compatibility checker

fill

fill alignment

fill color

fill down

fill pattern

filter

fit to page

floating-point number

folder

font

font face color

font face weight

font family

font scheme

foreground color

format string

formula

formula bar

fragment identifier

friendly name

frozen panes

function

function category

general alignment

gradient fill

gradient stop

gradient vector

grand total

gridline

GUID

hash

header

header row

hidden

hidden column

hidden protection

hidden row

hierarchy

horizontal alignment

HTML (HyperText Markup Language)

hyperlink

icon

icon set

indentation level

Information Rights Management (IRM)

ink

inner rectangle

input cell

Input Method Editor (IME)

insert row

iterative calculation

justify alignment

justify distributed

key performance indicator (KPI)

left-to-right

level

library directory

line style

linear gradient

linked object

locale

locked

locked protection

logical left

logical right

logical top-left

logical top-right

long file name

macro

macro sheet

major scheme

Mandarin phonetic symbols

manifest

manual calculation mode

MDX

MDX query

MDX unique name

measure

measure group

member

member property

merged cell

minimal save

minor scheme

module

module sheet

multidimensional expression (MDX)

named range

ninched

non-contiguous range

Normal view

number format

object model

ODBC

OLAP

OLAP calculated member

OLAP cube

OLAP hierarchy

OLAP KPI

OLAP level

OLAP measure

OLAP member

OLAP member property

OLAP named set

OLAP set

OLAP subselect

OLAP tuple

OLE (object linking and embedding)

OLE DB

OLE object

OLE1

OLE2

one-variable data table

outline

outline level

outline state

outline symbol

page break

Page Break Preview view

Page Layout view

page margin

palette color

pane

phonetic guide

phonetic information

phonetic string

phonetic text run

PivotChart filter pane

PivotTable field list

placeholder

precision as displayed

print area

print scale

print settings

print titles

ProgID

protected

protection

publish to server

published

query

query table

R1C1

range

reading order

read-only recommended

real-time data (RTD)

rectangular gradient

refresh

relative reference

relative security descriptor

revision

revision history

RGB (red-green-blue)

RGBA (red-green-blue-alpha)

right-to-left

RTD server

RTD topic

ruler

safe load

scenario

Scenario Manager

security descriptor

selected

selection

server name

session

shade

shape

shared workbook

sheet

sheet tab

sheet view

shrink to fit

single accounting

single sign-on (SSO)

smart document

smart tag

smart tag actions button

smart tag indicator

smart tag recognizer

sort

sort condition

sort order

source data

split pane

SQL (Structured Query Language)

startup directory

strikethrough formatting

stripe band

stripe formatting

stroke order

style

summary

table

table header

text importation

text run

theme

time hierarchy

ToolTip

top N filter

total row

transfer protocol

transition formula entry

transition formula evaluation

tuple

twip

two-variable data table

type library

UNC volume

unlock

URI (Uniform Resource Identifier)

URL (Uniform Resource Locator)

user-defined function (UDF)

VBA

VBA project

vertical alignment

visible

Visual Basic for Applications (VBA)

VML

volatile

watched cell

Web query

window protection

workbook

workbook view

worksheet

write reservation

XLL (Excel Linked Library)

XLM (Excel macro)

XML map

XML namespace

XML node

XML Path Language (XPath)

XML Schema

XOR obfuscation

XPath expression

zoom level

MAY, SHOULD, MUST, SHOULD NOT, MUST NOT: These terms (in all caps) are used as described in [RFC2119]. All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

1.2 References

1.2.1 Normative References

We conduct frequent surveys of the normative references to assure their continued availability. If you have any issue with finding a normative reference, please contact dochelp@microsoft.com. We will

assist you in finding the relevant information. Please check the archive site, http://msdn.microsoft.com/en-us/library/cc136647.aspx, as an additional source.

[DEVMODE] Microsoft Corporation, "DEVMODE", http://msdn.microsoft.com/en-us/library/ms535771.aspx.

[ECMA-376] Ecma International, "Standard ECMA-376 Office Open XML File Formats", December 2006, http://www.ecma-international.org/publications/standards/Ecma-376.htm.

[IEEE754] Institute of Electrical and Electronics Engineers, "Standard for Binary Floating-Point Arithmetic", IEEE 754-1985, October 1985, http://ieeexplore.ieee.org/servlet/opac?punumber=2355.

[ISO-8859-1] International Organization for Standardization, "Information Technology -- 8-Bit Single-Byte Coded Graphic Character Sets -- Part 1: Latin Alphabet No. 1", ISO/IEC 8859-1, 1998, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=28245.

[MS-DTYP] Microsoft Corporation, "Windows Data Types", March 2008.

[MS-GLOS] Microsoft Corporation, "Windows Protocols Master Glossary", June 2008.

[MS-OFCGLOS] Microsoft Corporation, "Microsoft Office Client Master Glossary", June 2008.

[MS-OFFCRYPTO] Microsoft Corporation, "Office Document Cryptography Structure Specification", June 2008.

[MS-OFORMS] Microsoft Corporation, "Office Forms Binary File Format Structure Specification", June 2008.

[MS-OSHARED] Microsoft Corporation, "Office Common Data Types and Objects Structure Specification", June 2008.

[MS-OVBA] Microsoft Corporation, "Office VBA File Format Structure Specification", June 2008.

[MS-XLS] Microsoft Corporation, "Excel Binary File Format (.xls) Structure Specification", June 2008.

[RFC3066] Alvestrand, H., "Tags for the Identification of Language", RFC 3066, January 2001, http://www.ietf.org/rfc/rfc3066.txt.

[RFC5234] Crocker, D., Ed., Overell, P., "Augmented BNF for Syntax Specifications: ABNF", RFC 5234, January 2008, http://www.ietf.org/rfc/rfc5234.txt.

[UNICODE4.0] The Unicode Consortium, "Unicode 4.0.0", http://www.unicode.org/versions/Unicode4.0.0/.

[XMLNS] World Wide Web Consortium, "Namespaces in XML 1.0 (Second Edition)", August 2006, http://www.w3.org/TR/REC-xml-names/.

[XMLSCHEMA1] Thompson, H.S., Ed., Beech, D., Ed., Maloney, M., Ed., and Mendelsohn, N., Ed., "XML Schema Part 1: Structures", W3C Recommendation, May 2001, http://www.w3.org/TR/2001/REC-xmlschema-1-20010502/.

[XMLSCHEMA2] Biron, P.V., Ed. and Malhotra, A., Ed., "XML Schema Part 2: Datatypes", W3C Recommendation, May 2001, http://www.w3.org/TR/2001/REC-xmlschema-2-20010502/.

[RFC2119] Bradner, S., "Key Words for Use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, http://www.ietf.org/rfc/rfc2119.txt.

1.2.2 Informative References

[CODEPG] Microsoft Corporation, "Code Pages", http://www.microsoft.com/globaldev/reference/cphome.mspx.

[MSDN-FONTS] Microsoft Corporation, "About Fonts", http://msdn.microsoft.com/en-us/library/ms533976.aspx.

[MSDN-MDXFS] Microsoft Corporation, "FORMAT_STRING Contents (MDX)", September 2007, http://msdn.microsoft.com/en-us/library/ms146084.aspx.

[MSDN-ODBC] Microsoft Corporation, "Microsoft Open Database Connectivity (ODBC)", http://msdn.microsoft.com/en-us/library/ms710252.aspx.

[MSDN-OLEDBP] Microsoft Corporation, "OLE DB Programming", http://msdn.microsoft.com/en-us/library/502e07a7(VS.80).aspx.

[MSFT-ODBCODCO] Microsoft Corporation, "ODBC--Open Database Connectivity Overview", March 2007, http://support.microsoft.com/kb/110093.

[MS-ODRAW] Microsoft Corporation, "Office Drawing Binary File Format Structure Specification", June 2008.

[MS-OLEDS] Microsoft Corporation, "Object Linking and Embedding (OLE) Data Structures: Structure Specification", June 2008.

[XPATH] Clark, J. and DeRose, S., "XML Path Language (XPath), Version 1.0", W3C Recommendation, November 1999, http://www.w3.org/TR/xpath.

1.3 Structure Overview (Synopsis)

This document specifies workbook data contained in a ZIP package conforming to the Open Packaging Conventions as specified in [ECMA-376]. Individual files stored in the ZIP package, called parts, contain information about the content and structure of a workbook including workbook data such as **worksheet** definitions. Some parts store information using **XML** and other parts store information by using binary records. The binary record structure and content are specified in this document. Each binary record contains its record type, information about the record size, and zero or more type-specific fields depending on its record type, which is specified in the Record Enumeration section. Type-specific fields contain information further specifying the workbook data. Specifications of the fields for a given record type can be found in the Records section.

See File Structure for a more detailed overview of specific file architecture and content.

1.3.1 Byte Ordering

Some computer architectures number bytes in a binary word from left to right, which is referred to as **big-endian**. The bit diagram for this documentation is big-endian. Other architectures number the bytes in a binary word from right to left, which is referred to as **little-endian**. The underlying file format enumerations, objects, and records are little-endian.

Using big-endian and little-endian methods, the number 0x12345678 would be stored as shown in the following:

Byte order	Byte 0	Byte 1	Byte 2	Byte 3
Big-endian	0x12	0x34	0x56	0x78
Little-endian	0x78	0x56	0x34	0x12

Unless otherwise specified, all data in files of the type specified by this document are stored in little-endian format.

1.3.2 Organization of This Documentation

Section 2 of this documentation is arranged with overviews of higher-level concepts being followed by more detailed concepts. Sections 2.1 and 2.2, in particular, specify higher-level concepts that are required to understand the remainder of the documentation, and should be read before reading the remainder of Section 2.

Section 2.1 specifies the structures and concepts that are used to organize and structure the file itself. Subsection 2.1.7 further specifies the valid parts allowed within this package.

Section 2.2 specifies higher-level concepts that need to be normatively described for use in this documentation.

Section 2.3 specifies the record name associated with a given record type. For more information on record types, see the section on records. These associations are listed by record name as well as by record type.

Section 2.4 specifies the details of individual records.

Section 2.5 specifies the details of structures used by records and other structures.

Section 3 provides specific examples intended to illustrate the concepts, records, and structures of this file format.

Section 4 discusses encryption, obfuscation and other security issues relating to files of the type specified by this document.

Section 5 is a list of version-specific behaviors. It is not intended to be read alone, but rather to be understood in the context of specifications in Section 2. Specifications in Section 2 provide links to the relevant items in Section 5.

1.4 Relationship to Protocols and Other Structures

The Excel Binary File Format is a package containing a set of related parts as specified in [ECMA-376] Part 2. It is dependent on the structures defined in the following references:

- [MS-ODRAW] for the persistence format for **shapes**.
- [MS-OFFCRYPTO] for the persistence format for document signing, information rights management, document encryption and obfuscation.
- [MS-OSHARED] for the persistence format for additional common structures.
- [MS-OVBA] for the persistence format for a **VBA project**.
- [MS-XLS] for command bar information and number formatting.

1.5 Applicability Statement

This document specifies a persistence format for workbook content and templates, which can include unstructured or semi-structured tables of numbers, text, or both numbers and text, formulas, external

data connections, charts and images. This persistence format is applicable for persistence of documents with a grid based layout, including those with numeric data, structured data, and formulas.

This persistence format is applicable for use as stand-alone document, and for containment within other documents as an embedded object as specified by [MS-OLEDS].

This persistence format provides interoperability with applications that create or read documents conforming to this structure <1>.

1.6 Versioning and Localization

This document covers versioning issues in the following areas:

Structure Versions: There is only one version of the Excel Binary File Format (.xlsb) Structure Specification.

Localization: The following records and structures contain fields that specify locale-dependent meaning:

- BrtBeginHeaderFooter
- BrtFmt
- CodeName
- BrtFont

The Security Considerations, Password Verifier Algorithm, Encryption and International Macro Sheet sections also specify processes and data that are locale-dependent. See each record, structure, and section description for more information.

1.7 Vendor-Extensible Fields

This persistence format can be extended by storing information in parts not specified in section 2. Implementations are not required to preserve or remove additional parts when modifying an existing document. Implementations can extend the XML as specified in [ECMA-376] Part 5: Markup Compatibility and Extensibility.

2 Structures

2.1 File Structure

This section specifies the overall structure of a file that conforms to this specification.

A file of the type specified by this document is a package that contains a collection of related parts. Parts contain information about the contents of a workbook, including workbook data and the structure of the package. Some parts contain information stored using binary records, some parts contain information stored using XML, and other parts contain information stored as a binary stream of bytes. Each binary record contains zero or more structured fields that contain the workbook data.

2.1.1 Package

A file of the type specified by this document is a package that is a ZIP archive that conforms to the Open Packaging Conventions as specified in [ECMA-376] Part 2: Open Packaging Conventions, the further packaging restrictions specified in [ECMA-376] Part 1: Fundamentals, section 9, and this specification.

A file of the type specified by this document MUST contain exactly one workbook part, and that part MUST be the target of a relationship in the package relationship part. The workbook part is the main or starting part in a file of the type specified by this document.

2.1.2 Part

A part is a stream of bytes as specified in [ECMA-376] Part 2: Open Packaging Conventions, section 8.2. Each part has an associated content type that specifies the nature and type of content stored in the part. Some parts store information using binary records. Some parts store information using XML.

The valid parts, content types, and required and optional relationships between all parts in a package are specified in Part Enumeration. Each part that contains binary records MUST be written as a series of binary records as specified in the record sequence **ABNF** for that part, as specified in Part Enumeration.

This document uses Augmented Backus-Naur Form (ABNF) as specified in [RFC5234] to specify the record sequence for parts that contain binary records.

2.1.3 Relationship

A relationship specifies a connection between a source and a target resource as specified in [ECMA-376] Part 2: Open Packaging Conventions, section 8.3. Relationship identifiers are used in binary and XML part content to reference unique relationship elements in relationship parts that in turn target other resources. There are several different types of relationships:

- A package relationship is a relationship where the target is a part and the source is the package as a whole.
- A part-to-part relationship is a relationship where the target is a part and the source is a part in the package.
- An explicit relationship is a relationship where a resource is referenced from the contents of a source part by referencing the ID attribute value of a relationship element.
- An implicit relationship is a relationship that is not explicit.
- An internal relationship is a relationship where the target is a part in the package.
- An external relationship is a relationship where the target is an external resource not in the package.

2.1.4 Record

A record is the basic building block used to store information about features in a workbook. Each binary record is a variable-length sequence of bytes. A binary record consists of three components: a record type, a record size, and the record data that is specific to that record type.

The record type is an integer that specifies what type of information is specified by the record and how the structure of the record data specific to this record is ordered and structured. Each valid record type is listed in the Record Enumeration section. The record type MUST be either one or two bytes. The record type MUST be two bytes if and only if the high bit in the low byte is equal to 1; otherwise, the record type MUST be one byte. If the record type is two bytes, the value consists of seven low bits of the high byte combined with the seven low bits of the low byte. This value MUST be greater than or equal to 128 and less than 16384. For performance reasons, one-byte record types are reserved for commonly used records. Record type values MUST be a value from Record Enumeration or the record MUST make use of the future record architecture.

The record size specifies the count of bytes that specifies the total size of the record data. This value MUST be one to four bytes. This value MUST be one byte if the high bit in the low byte is equal to 0; otherwise, this value MUST be greater than one byte. If the count of bytes is greater than one byte, the high bit in each successive byte specifies whether an additional byte is used. If the high bit of the second byte is equal to 1, then this value MUST use an additional third byte. If the high bit of the third byte is equal to 1, then this value MUST use an additional fourth byte. The high bit of the fourth byte MUST be ignored. The value consists of the seven low bits of each byte combined. The low, least significant bits are contained within the first byte, and each successive byte contains higher order bits than the previous byte.

The record data component contains fields that correspond to a particular record type and comprise the remainder of the record. The order and structure of the fields for a given record type listed in the Record Enumeration section are specified in the corresponding section for that record type in the Records section. The total size of the record data component MUST be equal to the record size. Fields in the record data component can contain simple values, arrays of values, structures of several fields, arrays of fields, and arrays of structures.

For example, the following record type and record size specify a BrtCommentText record with a size of 200 bytes:

```
11111101 00000100 11001000 00000001 [Record Fields]
```

The first byte is 11111101, specifying a low value of 125 and that the record type requires a second byte. The second byte is 00000100, specifying a high value of 4 * 128, which equals 512. The record type value is 125 + 512, or 637, which corresponds to a BrtCommentText record type. The next byte is 11001000, specifying a low value of 72 and that the record size requires a second byte. The second byte is 00000001, specifying a higher value of 1 * 128 and that the record size does not require an additional byte. The record size is 72 + 128, or 200, which specifies the total size, in bytes, of the record data component. The fields in the record data component are specified by BrtCommentText.

2.1.5 Collection of Records

A collection of records is a series of related records that are treated as a single set. Records in a collection do not have to share the same record type. A collection of records can further contain other collections of records. The beginning of a collection of records is sometimes indicated by a different type of record, as specified in the record sequence ABNF where the rule that contains that record is specified. Similarly the end of a collection of records is sometimes indicated by a different type of record, as specified by the record sequence ABNF where the rule that contains that record is specified. Each record or collection within the collection can be referred to by index, and the index count starts over for each collection.

In this document, record A precedes record B when record A is the last record of that type to appear before record B, in the part that contains those records.

In this document, record B follows record A when record A is the last record of that type to appear before record B, in the part that contains those records.

2.1.6 Future Record

The future record architecture enables an application that does not support certain records to open and save the file while ignoring but preserving those records in the file. Applications use the **productVersion.version** and **productVersion.product** fields of the BrtFRTBegin record to determine whether that application supports the records following that BrtFRTBegin record. In the case of nested BrtFRTBegin/BrtFRTEnd pairs, once an application encounters a BrtFRTBegin record that indicates that the records that follow are not supported, all records following that BrtFRTBegin record are not supported until that BrtFRTBegin record's corresponding BrtFRTEnd record is encountered. Records saved following a BrtFRTBegin record and preceding a BrtFRTEnd record are future records and can be treated as such by an application implementing the future record architecture. Future records that are not supported by an application can be cached on load and persisted on save, enabling the data to be retained in the file for an application that does support those records. When loading and caching these unsupported records, an application can process **range** references and formulas associated with the unsupported records as specified in the FRTHeader fields **FRTHeader.rgRefs**, **FRTHeader.rgSqrefs** and **FRTHeader.rgFormulas**. The application can adjust these range references and formulas as **cells** are inserted, deleted, or moved in the **sheets** to preserve the correctness and validity of these range references and formulas associated with unsupported records when saving the workbook along with the unsupported records.

2.1.7 Part Enumeration

This section specifies the parts of the Excel Binary File Format (.xlsb) package. Refer to the File Structure and Relationships section for information about packages, parts, implicit relationships, explicit relationships, and the package relationship part.

If a part is in **BIFF** format, the record sequence is specified using ABNF grammar. The first rule in each rule list comprises the entire record sequence for that part. Subsequent rules are fragments of the first rule.

Parts and their relationships are summarized in the following table:

Part	Relationship Target of
ActiveX	Worksheet
ActiveX Binary	Worksheet
Attached Toolbars	Workbook
Calculation Chain	Workbook
Chart	Drawings
Chart Drawing	Chart

Chart Sheet	Workbook
Comments	Macro Sheet, Worksheet
Custom Property	Macro Sheet, Worksheet
Custom XML Data Storage	Workbook
Custom XML Data Storage Properties	Custom XML Data Storage
Custom XML Maps	Workbook
Diagram Colors	Drawings
Diagram Data	Drawings
Diagram Layout Definition	Drawings
Diagram Styles	Drawings
Dialog Sheet	Workbook
Digital Signature Origin	Package
Digital Signature XML Signature	Digital Signature Origin
Drawings	Chart Sheet, Worksheet, Macro Sheet
External Data Connections	Workbook
External Link	Workbook
File Properties, Core	Package
File Properties, Custom	Package
File Properties, Extended	Package
File Properties, Thumbnail	Package

Images	Chart Sheet, Macro Sheet, Theme, VML Drawings, Worksheet
International Macro Sheet	Workbook
Macro Sheet	Workbook
Macro Sheet Binary Index	Macro Sheet
Metadata	Workbook
OLE Object	Dialog Sheet, External Link, Macro Sheet, Worksheet
OLE Package	Dialog Sheet, Macro Sheet, Worksheet
PivotCache Definition	PivotTable, Workbook
PivotCache Records	PivotCache Definition
PivotTable	Worksheet
Printer Settings	Chart Sheet, Dialog Sheet, Macro Sheet, Worksheet
Query Table	Table, Worksheet
Revision Headers	Workbook
Revision Log	Revision Headers
Shared Strings	Workbook
Single Cell Tables	Worksheet
Sort Map	Macro Sheet, Worksheet
Styles	Workbook
Table	Worksheet
Theme	Workbook

User Names	Workbook
VBA Project	Workbook
VBA Project Signature	VBA Project
VML Drawings	Worksheet, Chart Sheet, Dialog Sheet, Macro Sheet
Volatile Dependencies	Workbook
Workbook	Package
Worksheet	Workbook
Worksheet Binary Index	Worksheet

2.1.7.1 ActiveX

Content Type:	application/vnd.ms-office.activeX+xml
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/control

An instance of this part specifies an **ActiveX control**.

An ActiveX part MUST be the target of an explicit relationship from the worksheet part.

An ActiveX part is permitted to have explicit relationships to the following parts specified by this document:

- ActiveX Binary

An ActiveX part MUST NOT have implicit or explicit relationships to any other part specified by this document.

The syntax of the structures contained in this part uses **XML Schema (1)**, as specified in [XMLSCHEMA1] and [XMLSCHEMA2].

This specification defines and references various **XML namespaces** using the mechanisms specified in [XMLNS].

The content of the ActiveX part is XML as specified by the following XML Schema (1).

```
<?xml version="1.0" encoding="utf-8"?>
<xsd:schema
   targetNamespace="http://schemas.microsoft.com/office/2006/activeX"
   xmlns:xsd="http://www.w3.org/2001/XMLSchema"
   xmlns="http://schemas.microsoft.com/office/2006/activeX"
```

```
xmlns:r="http://schemas.openxmlformats.org/officeDocument/2006/relationships"
elementFormDefault="qualified"
attributeFormDefault="qualified"
blockDefault="#all">

<xsd:import id="r"
  namespace="http://schemas.openxmlformats.org/officeDocument/2006/
  relationships" />

<xsd:element name="ocx" type="CT_Ocx" maxOccurs="1" minOccurs="1"/>

<xsd:complexType name="CT_Ocx">
   <xsd:sequence>
       <xsd:element name="ocxPr" type="CT_OcxPr" minOccurs="0"
         maxOccurs="unbounded"/>
   </xsd:sequence>
   <xsd:attribute name="classid" type="ST_String" use="required"/>
   <xsd:attribute name="license" type="ST String" use="optional" />
   <xsd:attribute ref="r:id" use="optional" />
   <xsd:attribute name="persistence" type="ST Persistence" use="required" />
</xsd:complexType>

<xsd:simpleType name="ST String">
   <xsd:restriction base="xsd:string" />
</xsd:simpleType>

<xsd:simpleType name="ST_Persistence">
   <xsd:restriction base="ST String">
      <xsd:enumeration value="persistPropertyBag"/>
      <xsd:enumeration value="persistStream"/>
      <xsd:enumeration value="persistStreamInit"/>
      <xsd:enumeration value="persistStorage"/>
   </xsd:restriction>
</xsd:simpleType>

<xsd:complexType name="CT_OcxPr">
   <xsd:sequence>
      <xsd:choice>
         <xsd:element name="font" type="CT_Font" maxOccurs="1" minOccurs="0" />
         <xsd:element name="picture" type="CT_Picture" maxOccurs="1"
           minOccurs="0"/>
      </xsd:choice>
   </xsd:sequence>
   <xsd:attribute name="name" type="ST_String" use="required" />
   <xsd:attribute name="value" type="ST_String" use="optional" />
</xsd:complexType>

<xsd:complexType name="CT_Font">
   <xsd:sequence>
      <xsd:element name="ocxPr" type="CT_OcxPr" minOccurs="0"
        maxOccurs="unbounded" />
   </xsd:sequence>
   <xsd:attribute name="persistence" type="ST_Persistence" use="optional"/>
   <xsd:attribute ref="r:id" use="optional"/>
</xsd:complexType>

<xsd:complexType name="CT_Picture">
   <xsd:attribute ref="r:id" use="optional"/>
</xsd:complexType>
```

```
</xsd:schema>
```

The XML Schema (1) associated with the imported namespace, "http://schemas.openxmlformats.org/officeDocument/2006/relationships", is specified in [ECMA-376] part 4, section 7.8.

2.1.7.1.1 Elements

This section specifies the XML Schema (1) elements used for persisting ActiveX controls, specifically font, ocx, ocxPr, and picture.

2.1.7.1.1.1 font

This element specifies the persistence of a standard font object (StdFont), as specified in [MS-OFORMS], section 2.4.9.

The following XML Schema (2) fragment specifies the contents of this element:

```
<xsd:complexType name="CT_Font">
   <xsd:sequence>
      <xsd:element name="ocxPr" type="CT_OcxPr" minOccurs="0"
        maxOccurs="unbounded"/>
   </xsd:sequence>
   <xsd:attribute name="persistence" type="ST_Persistence" use="optional"/>
   <xsd:attribute ref="r:id" use="optional"/>
</xsd:complexType>
```

Attributes	Description
persistence	Specifies the method used to store properties of the font object.
r:id	An ST_RelationshipID, as specified in [ECMA-376] part 4, section 7.8.2.1, that specifies the relationship identifier to the ActiveX Binary part that contains the persisted font object. The target of the relationship MUST be an ActiveX Binary part. **id** MUST exist if and only if **persistence** is equal to either persistStorage, persistStream, or persistStreamInit.

2.1.7.1.1.2 ocx

This element specifies the persistence of an ActiveX control.

The following XML Schema (2) fragment specifies the contents of this element:

```
<xsd:complexType name="CT_Ocx">
   <xsd:sequence>
         <xsd:element name="ocxPr" type="CT_OcxPr" minOccurs="0"
           maxOccurs="unbounded"/>
   </xsd:sequence>
   <xsd:attribute name="classid" type="ST_String" use="required"/>
   <xsd:attribute name="license" type="ST_String" use="optional"/>
   <xsd:attribute ref="r:id" use="optional"/>
```

```
   <xsd:attribute name="persistence" type="ST_Persistence" use="required"/>
</complexType>
```

Attributes	Description
classid	Specifies the **class identifier (CLSID)** of the ActiveX control.
license	Specifies the license string for the ActiveX control.
persistence	Specifies the method used to store properties of the ActiveX control.
r:id	An ST_RelationshipID, as specified in [ECMA-376] part 4, section 7.8.2.1, that specifies the relationship identifier to the ActiveX Binary part that contains the persisted ActiveX control. The target of the relationship MUST be an ActiveX Binary part. **id** MUST exist if and only if **persistence** is equal to either persistStorage, persistStream, or persistStreamInit.

2.1.7.1.1.3 ocxPr

This element specifies a single name and value pair used to persist a property of an ActiveX control that uses the persistPropertyBag method as specified by ST_Persistence.

The following XML Schema (2) fragment specifies the contents of this element:

```
<xsd:complexType name="CT_OcxPr">
   <xsd:sequence>
      <xsd:choice>
         <xsd:element name="font" type="CT_Font" maxOccurs="1" minOccurs="0"/>
         <xsd:element name="picture" type="CT_Picture" maxOccurs="1"
           minOccurs="0"/>
      </xsd:choice>
   </xsd:sequence>
   <xsd:attribute name="name" type="ST_String" use="required"/>
   <xsd:attribute name="value" type="ST_String" use="optional"/>
</complexType>
```

Attributes	Description
name	Specifies the name of the property. **name** MUST be unique in its collection.
value	Specifies the value of the property. **value** MUST not exist if the **font** or **picture** child elements exist.

2.1.7.1.1.4 picture

This element specifies the persistence of a standard picture object (StdPicture), as specified in [MS-OFORMS], section 2.4.5.

The following XML Schema (2) fragment specifies the contents of this element:

```
<xsd:complexType name="CT_Picture">
   <xsd:attribute ref="r:id" use="optional" />
</xsd:complexType>
```

Attributes

Attributes	Description
r:id	An ST_RelationshipID, as specified in [ECMA-376] part 4, section 7.8.2.1, that specifies the relationship identifier to the ActiveX Binary part that contains the persisted picture object. The target of the relationship MUST be an ActiveX Binary part.

2.1.7.1.2 Simple Types

This section specifies the XML Schema (1) simple types used for persisting ActiveX controls, specifically ST_Persistence and ST_String.

2.1.7.1.2.1 ST_Persistence

This simple type specifies the persistence method used to persist an ActiveX control.

The following XML Schema (2) fragment specifies the contents of this simple type:

```
<xsd:simpleType name="ST_Persistence">
   <xsd:restriction base="ST_String">
      <xsd:enumeration value="persistPropertyBag"/>
      <xsd:enumeration value="persistStream"/>
      <xsd:enumeration value="persistStreamInit"/>
      <xsd:enumeration value="persistStorage"/>
   </xsd:restriction>
</xsd:simpleType>
```

The following are possible enumeration values for this type:

Enumeration Value	Description
persistPropertyBag	Specifies that the ActiveX control is persisted using property-bag-based persistence. Property-bag-based persistence stores an ActiveX control by means of a collection of name and value pairs which specify the data persisted by the ActiveX control. A child ocxPr element MUST appear within the element that contains this simple type if and only if persistePropertyBag is used.
persistStorage	Specifies that the ActiveX control is persisted using storage-based persistence. The **id** attribute of the element that contains this simple type MUST specify a relationship to an ActiveX Binary part if persistStorage is used.
persistStream	Specifies that the ActiveX control is persisted using a stream-based persistence that does not support initialization of the ActiveX control to a

	default state. The **id** attribute of the element that contains this simple type MUST specify a relationship to an ActiveX Binary part if persistStream is used.
persistStreamInit	Specifies that the ActiveX control is persisted using a stream-based persistence that supports initialization of the ActiveX control to a default state. The **id** attribute of the element that contains this simple type MUST specify a relationship to an ActiveX Binary part if persistStreamInit is used.

2.1.7.1.2.2 ST_String

This simple type specifies a string.

The following XML Schema (2) fragment specifies the contents of this simple type:

```
<xsd:simpleType name="ST_String">
   <xsd:restriction base="xsd:string"/>
</xsd:simpleType>
```

2.1.7.2 ActiveX Binary

Content Type:	application/vnd.ms-office.activeX
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/activeXControlBinary

An instance of this part specifies the persistence of an ActiveX control when the method used to persist is either persistStream, persistStreamInit, or persistStorage, as specified in ActiveX.

An ActiveX Binary part MUST be the target of an explicit relationship from the ActiveX part.

An ActiveX Binary part MUST NOT have implicit or explicit relationships to any other part specified by this document.

The contents of this part consist of an individual ActiveX control. The internal structure of the ActiveX control is not specified in this document. See ActiveX for more information on general ActiveX control persistence.

2.1.7.3 Attached Toolbars

Content Type:	application/vnd.ms-excel.attachedToolbars
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/attachedToolbars

An instance of this part type specifies the custom toolbars attached to the file. The internal structure of this part is the same as the structure of the XCB binary stream specified in [MS-XLS] section 2.1.7.10.

An Attached Toolbars part MUST be the target of an implicit relationship from the workbook part.

An Attached Toolbars part MUST NOT have implicit or explicit relationships to any part specified in this document.

2.1.7.4 Calculation Chain

Content Type:	application/vnd.ms-excel.calcChain
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/calcChain

This part consists of an application-specific cache of information. This cache exists for performance reasons only, and can be rebuilt based on information stored elsewhere in the file without affecting calculation results. A package SHOULD NOT <2> contain this part.

A package MUST contain no more than one Calculation Chain part. If it exists, that part MUST be the target of an implicit relationship from the workbook part.

A Calculation Chain part MUST NOT have implicit or explicit relationships to any other part.

2.1.7.5 Chart

This part is specified in [ECMA-376] part 1, section 14.2.1. The content associated with this part is specified in [ECMA-376] part 4, section 5.7.

2.1.7.6 Chart Drawing

This part is specified in [ECMA-376] part 1, section 14.2.2. The content associated with this part is specified in [ECMA-376] part 4, section 5.8.

2.1.7.7 Chart Sheet

Content Type:	application/vnd.ms-excel.chartsheet
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/chartsheet

An instance of this part type specifies a **chart sheet**.

A Chart Sheet part MUST be the target of an explicit relationship from the workbook part.

A Chart Sheet part is permitted to have explicit relationships to the following parts specified by this document:

- Drawings
- Images
- Printer Settings
- VML Drawings

A Chart Sheet part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
CHARTSHEET = BrtBeginSheet [BrtCsProp] CSVIEWS [BrtCsProtection] [USERCSVIEWS]
       [BrtMargins] [BrtCsPageSetup] [HEADERFOOTER] BrtDrawing [BrtLegacyDrawing]
       [BrtLegacyDrawingHF] [BrtBkHim] [WEBPUBITEMS] *FRT BrtEndSheet

CSVIEWS = BrtBeginCsViews 1*CSVIEW *FRT BrtEndCsViews

CSVIEW = BrtBeginCsView *FRT BrtEndCsView

USERCSVIEWS = BrtBeginUserCsViews *USERCSVIEW BrtEndUserCsViews

USERCSVIEW = BrtBeginUserCsView [BrtMargins] [BrtCsPageSetup] [HEADERFOOTER]
       BrtEndUserCsView
```

For ABNF rules not listed here, see Common Productions.

2.1.7.8 Comments

Content Type:	application/vnd.ms-excel.comments
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/comments

An instance of this part type specifies the **comments** for a given sheet, as well as the names of the authors of those comments.

A package MUST contain at most one Comments part per worksheet or macro sheet part, and each such part MUST be the target of an implicit relationship from a worksheet or macro sheet part.

A Comments part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
COMMENTS = BrtBeginComments COMMENTAUTHORS COMMENTLIST *FRT BrtEndComments

COMMENTAUTHORS = BrtBeginCommentAuthors *BrtCommentAuthor BrtEndCommentAuthors

COMMENTLIST = BrtBeginCommentList *COMMENT BrtEndCommentList

COMMENT = BrtBeginComment [BrtCommentText] BrtEndComment
```

2.1.7.9 Custom Property

This part is specified in [ECMA-376] part 1, section 12.3.5.

In addition to the explicit relationships specified in [ECMA-376] part 1, section 12.3.5, a Custom Property part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- Macro Sheet

2.1.7.10 Custom XML Data Storage

This part is specified in [ECMA-376] part 1, section 15.2.4.

Additional XML namespaces are specified in [MS-OSHARED] section 2.3.6.1.

2.1.7.11 Custom XML Data Storage Properties

This part is specified in [ECMA-376] part 1, section 15.2.5. The content associated with this part is specified in [ECMA-376] part 4, section 7.5.

2.1.7.12 Custom XML Maps

This part is specified in [ECMA-376] part 1, section 12.3.6. The content associated with this part is specified in [ECMA-376] part 4, section 3.16.

2.1.7.13 Diagram Colors

This part is specified in [ECMA-376] part 1, section 14.2.3. The content associated with this part is specified in [ECMA-376] part 4, section 5.9.4.

2.1.7.14 Diagram Data

This part is specified in [ECMA-376] part 1, section 14.2.4. The content associated with this part is specified in [ECMA-376] part 4, section 5.9.3.

2.1.7.15 Diagram Layout Definition

This part is specified in [ECMA-376] part 1, section 14.2.5. The content associated with this part is specified in [ECMA-376] part 4, section 5.9.2.

2.1.7.16 Diagram Styles

This part is specified in [ECMA-376] part 1, section 14.2.6. The content associated with this part is specified in [ECMA-376] part 4, section 5.9.5.

2.1.7.17 Dialog Sheet

Content Type:	application/vnd.ms-excel.dialogsheet
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/dialogsheet

An instance of this part type contains information about a custom dialog box.

A Dialog Sheet part MUST be the target of an explicit relationship from the workbook part.

A Dialog Sheet part is permitted to have explicit relationships to the following parts specified by this document:

- OLE Object
- OLE Package
- Printer Settings
- VML Drawing

A Dialog Sheet part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
DIALOGSHEET = BrtBeginSheet [BrtWsProp] [WSVIEWS] [BrtWsFmtInfo] [BrtSheetProtection]
       [USERSHVIEWS] [BrtPrintOptions] [BrtMargins] [BrtPageSetup] [HEADERFOOTER]
       [BrtDrawing] [BrtLegacyDrawing] [BrtLegacyDrawingHF] [OLEOBJECTS] *FRT
       BrtEndSheet
```

For ABNF rules not listed here, see Common Productions.

2.1.7.18 Digital Signature Origin

This part is specified in [ECMA-376] part 1, section 15.2.6. Further information about digital signatures is specified in [ECMA-376] part 2, section 12.

2.1.7.19 Digital Signature XML Signature

This part is specified in [ECMA-376] part 1, section 15.2.7. The content associated with this part is specified in [ECMA-376] part 2, section 12.

2.1.7.20 Drawings

This part is specified in [ECMA-376] part 1, section 12.3.8. The content associated with this part is specified in [ECMA-376] part 4, section 5.6.

In addition to the explicit relationships specified in [ECMA-376] part 1, section 12.3.8, a Drawings part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- Macro Sheet

2.1.7.21 External Data Connections

Content Type:	application/vnd.ms-excel.connections
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/connections

An instance of this part type specifies external connections for the workbook.

A package MUST contain at most one External Data Connections part, which MUST be the target of an implicit relationship from the workbook part.

An External Data Connections part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
EXTCONNECTIONS = BrtBeginExtConnections 1*EXTCONNECTION BrtEndExtConnections
```

```
EXTCONNECTION = BrtBeginExtConnection [(ECDBPROPS [ECOLAPPROPS / ECPARAMS]) /
       (ECWEBPROPS [ECPARAMS]) / ECTXTWIZ] *FRT BrtEndExtConnection

ECDBPROPS = BrtBeginECDbProps BrtEndECDbProps

ECOLAPPROPS = BrtBeginECOlapProps BrtEndECOlapProps

ECWEBPROPS = BrtBeginECWebProps [ECWPTABLES] BrtEndECWebProps

ECWPTABLES = BrtBeginEcWpTables *PCDI BrtEndECWPTables

PCDI = BrtPCDIMissing / BrtPCDIIndex / BrtPCDIString

ECTXTWIZ = BrtBeginECTxtWiz ECTWFLDINFOLST BrtEndECTxtWiz

ECTWFLDINFOLST = BrtBeginECTWFldInfoLst 1*BrtBeginECTwFldInfo BrtEndECTWFldInfoLst

ECPARAMS = BrtBeginECParams 1*ECPARAM BrtEndECParams

ECPARAM = BrtBeginECParam BrtEndECParam
```

2.1.7.22 External Link

Content Type:	application/vnd.ms-excel.externalLink
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/externalLink

An instance of this part specifies an external link.

An External Link part MUST be the target of an explicit relationship in the workbook part.

If the External Link part specifies an external link that is of type external workbook, then the part MUST specify an explicit external relationship to an external workbook. If the External Link part specifies an external link that is of type OLE data source, then the part MUST specify an explicit external relationship to an OLE object. If the External Link part specifies an external link that is of type DDE data source, then the part MUST not specify any relationship.

An External Link part MUST NOT have any implicit or explicit relationships to any other parts specified by this document.

Record sequence ABNF:

```
EXTERNALLINK = BrtBeginSupBook (EXTERNALBOOK / DDEOLELINK) *FRT BrtEndSupBook

EXTERNALBOOK = BrtSupTabs *EXTERNNAME *EXTERNTABLE

DDEOLELINK = *DDEOLEITEM

EXTERNNAME = BrtSupNameStart BrtSupNameFmla BrtSupNameBits BrtSupNameEnd

DDEOLEITEM = BrtSupNameStart BrtSupNameBits [DDEOLEITEMVALUES] BrtSupNameEnd

DDEOLEITEMVALUES = BrtSupNameValueStart *DDEOLEITEMVALUE BrtSupNameValueEnd
```

```
DDEOLEITEMVALUE = BrtSupNameNum / BrtSupNameBool / BrtSupNameErr / BrtSupNameSt /
      BrtSupNameNil

EXTERNTABLE = BrtExternTableStart *EXTERNROW BrtExternTableEnd

EXTERNROW = BrtExternRowHdr 1*EXTERNVALUE

EXTERNVALUE = [BrtExternValueMeta] EXTERNVALUEDATA

EXTERNVALUEDATA = BrtExternCellBlank / BrtExternCellReal / BrtExternCellBool /
      BrtExternCellError / BrtExternCellString
```

2.1.7.23 File Properties, Core

This part is specified in [ECMA-376] part 1, section 15.2.11.1. The content associated with this part is specified in [ECMA-376] part 2, section 10.

2.1.7.24 File Properties, Custom

This part is specified in [ECMA-376] part 1, section 15.2.11.2. The content associated with this part is specified in [ECMA-376] part 4, section 7.3.

In addition, the custom properties, used by the version of the workbook that is **published** to or rendered on a Web or application server, are specified in the following table:

Name Attribute	Meaning
PROP_*ParameterName*	Specifies a parameter, where *ParameterName* is a name specified by the user. The parameter corresponds to the **named range** specified by the BrtName element that has a **name** field equal to *ParameterName*. The contents are an empty lpwstr element. The **lpwstr** element is specified in [ECMA-376] part 4, section 7.4.2.19.
PROP_MULTVAL_*ParameterName*	Specifies a **filter** parameter, where *ParameterName* is a name specified by the user. The parameter corresponds to the named range specified by the BrtName element that has a **name** field equal to *ParameterName*. The contents are an empty lpwstr element. The **lpwstr** element is specified in [ECMA-376] part 4, section 7.4.2.19

2.1.7.25 File Properties, Extended

This part is defined in [ECMA-376] part 1, section 15.2.11.3. The content associated with this part is specified in [ECMA-376] part 4, section 7.2.

In addition, this document specifies the following name value pairs for the HeadingPairs element specified in [ECMA-376] part 4, section 7.2.2.8:

Name Value Pair	Meaning
SheetType, *n*	There are *n* of these type of sheets in the workbook. *SheetType* MUST be one of the following: "Worksheets", "Excel 4.0 Macros",

	"Charts", or "Dialogs".
"Named Ranges", *n*	There are *n* named ranges in the workbook.

2.1.7.26 File Properties, Thumbnail

This part is specified in [ECMA-376] part 1, section 15.2.15. The content associated with this part is specified in [ECMA-376] part 2, section 11.

2.1.7.27 Images

This part is specified in [ECMA-376] part 1, section 15.2.13.

In addition to the explicit relationships specified in [ECMA-376] part 1, section 15.2.13, an Image part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- Chart Sheet
- Macro Sheet
- Theme
- Worksheet

2.1.7.28 International Macro Sheet

Content Type:	application/vnd.ms-excel.intlmacrosheet
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/xlIntlMacrosheet

An instance of this part type specifies the same information as a macro sheet part type. When this part type is present, the associated **macro sheet** will display and operate with US English **locale**, regardless of what the product locale, user locale, or system locale is. This will maximize compatibility when running under various locales.

International Macrosheet records and record sequence ABNF are identical to macro sheet.

2.1.7.29 Macro Sheet

Content Type:	application/vnd.ms-excel.macrosheet
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/xlMacrosheet

An instance of this part type specifies a macro sheet. References to the Macro Sheet part in this document include international macro sheet as well.

A Macro Sheet part MUST be the target of an explicit relationship in the workbook part.

A Macro Sheet part is permitted to have implicit relationships to the following parts specified by this document:

- Comments

- Macro Sheet Binary Index
- Sort Map

A Macro Sheet part is permitted to have explicit relationships to the following parts specified by this document:

- Custom Property
- Drawings
- OLE Object
- OLE Package
- Images
- Printer Settings
- VML Drawing

A Macro Sheet part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
MACROSHEET = BrtBeginSheet [BrtWsProp] [BrtWsDim] [WSVIEWS] [BrtWsFmtInfo] *COLINFOS
       CELLTABLE [BrtSheetCalcProp] [BrtSheetProtection] [AUTOFILTER] [SORTSTATE]
       [DCON] [USERSHVIEWS] [BrtPhoneticInfo] *CONDITIONALFORMATTING [BrtPrintOptions]
       [BrtMargins] [BrtPageSetup] [HEADERFOOTER] [RWBRK] [COLBRK] *BrtBigName
       [BrtDrawing] [BrtLegacyDrawing] [BrtLegacyDrawingHF] [BrtBkHim] [OLEOBJECTS]
       *FRT BrtEndSheet
```

For ABNF rules not listed here, see Common Productions.

2.1.7.30 Macro Sheet Binary Index

Content Type:	application/vnd.ms-excel.binIndexMs
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/xlBinaryIndex

An instance of this part type specifies a binary index for a macro sheet, as specified by the macro sheet part. This part is identical to the worksheet binary index part, except that it applies to a macro sheet.

2.1.7.31 Metadata

Content Type:	application/vnd.ms-excel.sheetMetadata
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/sheetMetadata

An instance of this part type specifies metadata information for a workbook.

A package MUST contain at most one Metadata part, and that part MUST be the target of an implicit relationship from the workbook part.

A Metadata part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
METADATA = BrtBeginMetadata ESMDTINFO [ESSTR] [ESMDX] *ESFMD 1*2ESMDB *FRT
       BrtEndMetadata

ESMDTINFO = BrtBeginEsmdtinfo 1*BrtMdtinfo BrtEndEsmdtinfo

ESSTR = BrtBeginEsstr 1*BrtStr BrtEndEsstr

ESMDX = BrtBeginEsmdx 1*MDX BrtEndEsmdx

MDX = BrtBeginMdx (MDXTUPLE / MDXSET / MDXMBRPROP / MDXKPI) BrtEndMdx

MDXTUPLE = BrtBeginMdxTuple *BrtMdxMbrIstr BrtEndMdxTuple

MDXSET = BrtBeginMdxSet *BrtMdxMbrIstr BrtEndMdxSet

MDXMBRPROP = BrtBeginMdxMbrProp BrtEndMdxMbrProp

MDXKPI = BrtBeginMdxKPI BrtEndMdxKPI

ESFMD = BrtBeginEsfmd 1*FMD *FRT BrtEndEsfmd

FMD = BrtBeginFmd FRT BrtEndFmd

ESMDB = BrtBeginEsmdb 1*BrtMdb BrtEndEsmdb
```

2.1.7.32 OLE Object

This part is specified in [ECMA-376] part 1, section 15.2.9.

In addition to the explicit relationships specified in [ECMA-376] part 1, section 15.2.9, an OLE Object part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- Macro Sheet
- Dialog Sheet
- External Link
- Worksheet

2.1.7.33 OLE Package

This part is specified in [ECMA-376] part 1, section 15.2.10.

In addition to the explicit relationships specified in [ECMA-376] part 1, section 15.2.10, an OLE Package part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- Macro Sheet
- Dialog Sheet
- Worksheet

2.1.7.34 PivotCache Definition

Content Type:	application/vnd.ms-excel.pivotCacheDefinition
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/pivotCacheDefinition

An instance of this part type specifies a PivotCache for one or more PivotTables or **cube functions**.

A package MUST contain one PivotCache Definition part per BrtBeginPivotCacheID record in the workbook part, and each such part MUST be the target of an explicit relationship from a workbook part. In addition, if the **idCache** field of the BrtBeginSXView record in a PivotTable part is equal to the **idSx** field of any BrtBeginPivotCacheID record in the workbook part, then the PivotCache Definition part corresponding to that BrtBeginPivotCacheID record MUST be the target of an implicit relationship from that PivotTable part.

A PivotCache Definition part is permitted to have an explicit relationship to the following part specified by this document:

- PivotCache Records

A PivotCache Definition part MUST NOT have any implicit or explicit relationships to any other parts specified by this document.

Record sequence ABNF:

```
PIVOTCACHEDEF = BrtBeginPivotCacheDef PCDSOURCE PCDFIELDS [PCDCALCITEMS]
       [PCDHIERARCHIES] [PCDKPIS] [PCDCALCMEMS] [PCDSDTUPLECACHE] [DIMS] [MGS
       [MGMAPS]] *FRT BrtEndPivotCacheDef

PCDSOURCE = BrtBeginPCDSource [PCDSRANGE / PCDSCONSOL] *FRT BrtEndPCDSource

PCDSRANGE = BrtBeginPCDSRange BrtEndPCDSRange

PCDSCONSOL = BrtBeginPCDSConsol [PCDSCPAGES] PCDSCSETS BrtEndPCDSConsol

PCDSCPAGES = BrtBeginPCDSCPages *4PCDSCPAGE BrtEndPCDSCPages

PCDSCPAGE = BrtBeginPCDSCPage *PCDSCPITEM BrtEndPCDSCPage

PCDSCPITEM = BrtBeginPCDSCPItem BrtEndPCDSCPItem

PCDSCSETS = BrtBeginPCDSCSets 1*PCDSCSET BrtEndPCDSCSets

PCDSCSET = BrtBeginPCDSCSet BrtEndPCDSCSet

PCDFIELDS = BrtBeginPCDFields *PCDFIELD BrtEndPCDFields

PCDFIELD = BrtBeginPCDField [PNAMES] [PCDFATBL] [PCDFGROUP] *FRT BrtEndPCDField

PNAMES = BrtBeginPNames *PNAME BrtEndPNames

PNAME = BrtBeginPName [PNPAIRS] BrtEndPName

PNPAIRS = BrtBeginPNPairs PNPAIR BrtEndPNPairs

PNPAIR = BrtBeginPNPair BrtEndPNPair

PCDFATBL = BrtBeginPCDFAtbl *(PCDI / PCDIA) BrtEndPCDFAtbl
```

```
PCDI = BrtPCDIMissing / BrtPCDINumber / BrtPCDIBoolean / BrtPCDIError / BrtPCDIString
       / BrtPCDIDatetime / PCDIRUN

PCDIA = BrtPCDIAMissing / BrtPCDIANumber / BrtPCDIABoolean / BrtPCDIAError /
       BrtPCDIAString / BrtPCDIADatetime

PCDIRUN = BrtBeginPCDIRun BrtEndPCDIRun

PCDFGROUP = BrtBeginPCDFGroup [PCDFGRANGE / PCDFGDISCRETE] [PCDFGITEMS]
       BrtEndPCDFGroup

PCDFGRANGE = BrtBeginPCDFGRange BrtEndPCDFGRange

PCDFGDISCRETE = BrtBeginPCDFGDiscrete 1*BrtPCDIIndex BrtEndPCDFGDiscrete

PCDFGITEMS = BrtBeginPCDFGItems *PCDI BrtEndPCDFGItems

PCDCALCITEMS = BrtBeginPCDCalcItems 1*PCDCALCITEM BrtEndPCDCalcItems

PCDCALCITEM = BrtBeginPCDCalcItem PIVOTRULE [PNAMES] *FRT BrtEndPCDCalcItem

PCDHIERARCHIES = BrtBeginPCDHierarchies 1*PCDHIERARCHY BrtEndPCDHierarchies

PCDHIERARCHY = BrtBeginPCDHierarchy [PCDHFIELDSUSAGE] [PCDHGLEVELS] *FRT
       BrtEndPCDHierarchy

PCDHFIELDSUSAGE = BrtBeginPCDHFieldsUsage BrtEndPCDHFieldsUsage

PCDHGLEVELS = BrtBeginPCDHGLevels 1*PCDHGLEVEL BrtEndPCDHGLevels

PCDHGLEVEL = BrtBeginPCDHGLevel [PCDHGLGROUPS] *FRT BrtEndPCDHGLevel

PCDHGLGROUPS = BrtBeginPCDHGLGroups 1*PCDHGLGROUP BrtEndPCDHGLGroups

PCDHGLGROUP = BrtBeginPCDHGLGroup PCDHGLGMEMBERS BrtEndPCDHGLGroup

PCDHGLGMEMBERS = BrtBeginPCDHGLGMembers 1*PCDHGLGMEMBER BrtEndPCDHGLGMembers

PCDHGLGMEMBER = BrtBeginPCDHGLGMember BrtEndPCDHGLGMember

PCDKPIS = BrtBeginPCDKPIs *PCDKPI BrtEndPCDKPIs

PCDKPI = BrtBeginPCDKPI BrtEndPCDKPI

PCDCALCMEMS = BrtBeginPCDCalcMems 1*PCDCALCMEM BrtEndPCDCalcMems

PCDCALCMEM = BrtBeginPCDCalcMem *FRT BrtEndPCDCalcMem

PCDSDTUPLECACHE = BrtBeginPCDSDTupleCache [PCDSDTCENTRIES] [PCDSDTCSETS]
       [PCDSDTCQUERIES] [PCDSFCIENTRIES] *FRT BrtEndPCDSDTupleCache

PCDSDTCENTRIES = BrtBeginPCDSDTCEntries *PCDSDTCENTRY BrtEndPCDSDTCEntries

PCDSDTCENTRY = (BrtPCDIMissing / BrtPCDINumber / BrtPCDIError / BrtPCDIString)
       [PCDSDTCEMEMBERS]
```

```
PCDSDTCEMEMBERS = BrtBeginPCDSDTCEMembers 1*PCDSDTCEMEMBER BrtEndPCDSDTCEMembers

PCDSDTCEMEMBER = BrtBeginPCDSDTCEMember BrtEndPCDSDTCEMember

PCDSDTCSETS = BrtBeginPCDSDTCSets 1*PCDSDTCSET BrtEndPCDSDTCSets

PCDSDTCSET = BrtBeginPCDSDTCSet *PCDSDTCEMEMBERS [PCDSDTCEMEMBERSSORTBY]
       BrtEndPCDSDTCSet

PCDSDTCEMEMBERSSORTBY = BrtBeginPCDSDTCEMembersSortBy 1*PCDSDTCEMEMBER
       BrtEndPCDSDTCEMembers

PCDSDTCQUERIES = BrtBeginPCDSDTCQueries 1*PCDSDTCQUERY BrtEndPCDSDTCQueries

PCDSDTCQUERY = BrtBeginPCDSDTCQuery [PCDSDTCEMEMBERS] BrtEndPCDSDTCQuery

PCDSFCIENTRIES = BrtBeginPcdSFCIEntries 1*BrtPCDSFCIEntry BrtEndPCDSFCIEntries

DIMS = BrtBeginDims 1*DIM BrtEndDims

DIM = BrtBeginDim BrtEndDim

MGS = BrtBeginMgs *MG BrtEndMGs

MG = BrtBeginMG BrtEndMG

MGMAPS = BrtBeginMGMaps *MAP BrtEndMGMaps

MAP = BrtBeginMap BrtEndMap
```

2.1.7.35 PivotCache Records

Content Type:	application/vnd.ms-excel.pivotCacheRecords
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/spreadsheetml/pivotCacheRecords

An instance of this part type specifies cache records for a PivotTable.

A package MUST contain at most one PivotCache Records part per PivotCache Definition part, and each such part MUST be the target of an explicit relationship from the PivotCache Definition part.

A PivotCache Records part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
PIVOTCACHERECORDS = BrtBeginPivotCacheRecords *PIVOTCACHERECORD *FRT
       BrtEndPivotCacheRecords

PIVOTCACHERECORD = BrtPCRRecord / PIVOTCACHERECORDDT

PIVOTCACHERECORDDT = BrtPCRRecordDt 1*PCDIDT
```

```
PCDIDT = BrtPCDIMissing / BrtPCDINumber / BrtPCDIBoolean / BrtPCDIError /
       BrtPCDIString / BrtPCDIDatetime / BrtPCDIIndex
```

2.1.7.36 PivotTable

Content Type:	application/vnd.ms-excel.pivotTable
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/pivotTable

An instance of this part type specifies a PivotTable view.

A PivotTable part MUST be the target of an implicit relationship from a worksheet part.

A PivotTable part is permitted to have implicit relationships to the following parts specified by this document:

- PivotCache Definition

A PivotTable part MUST NOT have any implicit or explicit relationships to any other parts specified by this document.

Record sequence ABNF:

```
PIVOTTABLE = BrtBeginSXView SXLOCATION [SXVDS] [ISXVDRWS] [SXLIRWS] [ISXVDCOLS]
       [SXLICOLS] [SXPIS] [SXDIS] [SXFORMATS] [SXCONDFMTS] [SXCRTFORMATS] [SXTHS]
       BrtTableStyleClient [SXFILTERS] [ISXTHRWS] [ISXTHCOLS] *FRT BrtEndSXView

SXLOCATION = BrtBeginSXLocation BrtEndSXLocation

SXVDS = BrtBeginSXVDs 1*SXVD BrtEndSXVDs

ISXVDRWS = BrtBeginISXVDRws BrtEndISXVDRws

SXVD = BrtBeginSXVD [SXVIS] [AUTOSORTSCOPE] *FRT BrtEndSXVD

AUTOSORTSCOPE = BrtBeginAutoSortScope PIVOTRULE BrtEndAutoSortScope

SXVIS = BrtBeginSXVIs 1*SXVI BrtEndSXVIs

SXVI = BrtBeginSXVI BrtEndSXVI

SXLIRWS = BrtBeginSXLIRws 1*SXLI BrtEndSXLIRws

SXLI = BrtBeginSXLI [ISXVIS] BrtEndSXLI

ISXVIS = BrtBeginISXVIs BrtEndISXVIs

ISXVDCOLS = BrtBeginISXVDCols BrtEndISXVDCols

SXLICOLS = BrtBeginSXLICols 1*SXLI BrtEndSXLICols

SXPIS = BrtBeginSXPIs 1*256SXPI BrtEndSXPIs
```

```
SXPI = BrtBeginSXPI *FRT BrtEndSXPI

SXDIS = BrtBeginSXDIs 1*SXDI BrtEndSXDIs

SXDI = BrtBeginSXDI *FRT BrtEndSXDI

SXFORMATS = BrtBeginSXFormats 1*SXFORMAT BrtEndSxFormats

SXFORMAT = BrtBeginSXFormat PIVOTRULE *FRT BrtEndSXFormat

SXCONDFMTS = BrtBeginSXCondFmts 1*SXCONDFMT BrtEndSXCondFmts

SXCONDFMT = BrtBeginSXCondFmt PIVOTRULES *FRT BrtEndSXCondFmt

SXCRTFORMATS = BrtBeginSXCrtFormats 1*SXCRTFORMAT BrtEndSXCrtFormats

SXCRTFORMAT = BrtBeginSXCrtFormat PIVOTRULE BrtEndSXCrtFormat

SXTHS = BrtBeginSXTHs 1*SXTH BrtEndSXTHs

SXTH = BrtBeginSXTH [SXTDMPS] *SXTHITEMS *FRT BrtEndSXTH

SXTHITEMS = BrtBeginSXTHItems 1*SXTHITEM BrtEndSXTHItems

SXTHITEM = BrtBeginSXTHItem BrtEndSXTHItem

SXTDMPS = BrtBeginSXTDMPS *SXTDMP BrtEndSXTDMPs

SXTDMP = (BrtSXTDMPOrder / BrtBeginSXTDMP) BrtEndSXTDMP

ISXTHRWS = BrtBeginISXTHRws BrtEndISXTHRws

ISXTHCOLS = BrtBeginISXTHCols BrtEndISXTHCols

SXFILTERS = BrtBeginSXFilters 1*SXFILTER BrtEndSXFilters

SXFILTER = BrtBeginSXFILTER AFILTER *FRT BrtEndSXFilter

AFILTER = BrtBeginAFilter 1*PIVOTFILTERCOLUMN BrtEndAFilter

PIVOTFILTERCOLUMN = BrtBeginFilterColumn (BrtDynamicFilter / BrtTop10Filter /
       CUSTOMFILTERS / PIVOTFILTERS) *FRT

PIVOTFILTERS = BrtBeginFilters *BrtFilter BrtEndFilters

PIVOTRULES = BrtBeginSXRules 1*PIVOTRULE BrtEndSxRules
```

For ABNF rules not listed here, see Common Productions.

2.1.7.37 Printer Settings

Content Type:	application/vnd.openxmlformats-officedocument.spreadsheetml.printerSettings

Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/printerSettings

An instance of this part type specifies information about the initialization and environment of a printer or a display device. It MUST contain exactly one [DEVMODE] structure with a **dmSize** greater than 0, including printer driver specific data.

A package MUST contain at most one Printer Settings part per chart sheet, dialog sheet, worksheet, or macro sheet part, and that part MUST be the target of an explicit relationship from a chart sheet, dialog sheet, worksheet, or macro sheet part.

A Printer Settings part MUST NOT have implicit or explicit relationships to any part specified by this document.

2.1.7.38 Query Table

Content Type:	application/vnd.ms-excel.queryTable
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/queryTable

An instance of this part type specifies a **query table** that is associated with a **table** or range.

If a Query Table part is the target of an implicit relationship from a table part, this relationship specifies that the query table is associated with that table. If a Query Table part is the target of an implicit relationship from a worksheet part, this relationship specifies that the query table is associated with a range on that sheet.

A Query Table part MUST be the target of exactly one implicit relationship from either a worksheet part or a table part.

A Query Table part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
QSI = BrtBeginQSI [QSIR] *FRT BrtEndQSI

QSIR = BrtBeginQSIR QSIFS [DELETEDNAMES] [SORTSTATE] *FRT BrtEndQSIR

QSIFS = BrtBeginQSIFs *QSIF BrtEndQSIFs

QSIF = BrtBeginQSIF *FRT BrtEndQSIF

DELETEDNAMES = BrtBeginDeletedNames 1*DELETEDNAME BrtEndDeletedNames

DELETEDNAME = BrtBeginDeletedName BrtEndDeletedName
```

For ABNF rules not listed here, see Common Productions.

2.1.7.39 Revision Headers

Content Type:	application/vnd.ms-excel.revisionHeaders
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/revisionHeaders

An instance of this part type specifies the revision header logs for a shared workbook.

If the workbook is a shared workbook, then the package MUST contain exactly one Revision Headers part, and that part MUST be the target of an implicit relationship from the workbook part. If the workbook is not a shared workbook, then the package MUST NOT contain a Revision Headers part.

A Revision Headers part is permitted to have explicit relationships to the following parts specified by this document:

- Revision Log

A Revision Headers part MUST NOT have any implicit or explicit relationships to any other parts specified by this document.

Record sequence ABNF:

```
REVISIONHEADERS = BrtInfo *(BrtRRHeader *FRT) BrtEOF
```

2.1.7.40 Revision Log

Content Type:	application/vnd.ms-excel.revisionLog
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/revisionLog

An instance of this part type specifies the revision logs for a shared workbook.

A package MUST contain one Revision Log part for each revision headers log specified in the revision headers part, and each part MUST be the target of an explicit relationship from the revision headers part.

A Revision Log part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
REVISIONLOG = *(RRINSDEL / RRINSMOVE / RRCHGCELL / RRFORMAT / RRMISC) BrtEOF

RRINSDEL = BrtRRInsDel *BrtUCR *RRCF BrtRREndInsDel

RRINSMOVE = BrtRRMove *BrtUCR *RRCF BrtRREndMove

RRCF = RRCHGCELL / RRFORMAT

RRCHGCELL = BrtRRChgCell 1*2CELL 0*2DXF *FRT BrtRREndChgCell

CELL = BrtCellBlank / BrtCellRk / BrtCellError / BrtCellBool / BrtCellReal / BrtCellSt
       / BrtCellIsst / BrtFmlaString / BrtFmlaNum / BrtFmlaBool / BrtFmlaError /
       BrtCellRString

RRFORMAT = BrtRRFormat [DXF] *FRT BrtRREndFormat
```

```
RRMISC = BrtCUsr / BrtUsr / BrtBeginUsers / BrtRRUserView / (BrtRRRenSheet *FRT) /
       BrtRRInsertSh / (BrtRRDefName *FRT) / BrtRRNote / BrtRRConflict / BrtRRTQSIF /
       BrtRRAutoFmt

DXF = BrtBeginDXFs BrtDXF BrtEndDXFs
```

2.1.7.41 Shared Strings

Content Type:	application/vnd.ms-excel.sharedStrings
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/sharedStrings

An instance of this part type specifies the unique strings that occur on all sheets in a workbook.

A package MUST contain at most one Shared Strings part, and that part MUST be the target of an implicit relationship from the workbook part.

A Shared Strings part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
SHAREDSTRINGS = BrtBeginSst *BrtSSTItem *FRT BrtEndSst
```

2.1.7.42 Single Cell Tables

Content Type:	application/vnd.ms-excel.tableSingleCells
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/tableSingleCells

An instance of this part type specifies how elements and attributes in an **XML map**, as specified by the Custom XML Maps part, are associated with sheet cells. Sheet cells are used for elements and attributes in an XML map that are specified as occurring only once, or when a user forces an otherwise repeating element or attribute to occur only once. Use tables, as specified by the table part, for elements and attributes in an XML map that are specified as occurring more than once, or to force an otherwise non-repeating element or attribute to repeat more than once.

A package MUST contain at most one Single Cell Tables part per worksheet part, and that part MUST be the target of an implicit relationship from a worksheet part.

A Single Cell Tables part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
SINGLECELLTABLES = BrtBeginSingleCells *LIST BrtEndSingleCells

LIST = BrtBeginList LISTCOLS *FRT BrtEndList

LISTCOLS = BrtBeginListCols LISTCOL BrtEndListCols
```

```
LISTCOL = BrtBeginListCol [LISTXMLCPR] *FRT BrtEndListCol

LISTXMLCPR = BrtBeginListXmlCPr *FRT BrtEndListXmlCPr
```

2.1.7.43 Sort Map

Content Type:	http://schemas.microsoft.com/office/2006/relationships/wsSortMap
Source Relationship:	application/vnd.ms-excel.wsSortMap

An instance of this part specifies a series of before and after row or column mappings to resolve different **sort** operations performed on the same range by different users in a shared workbook.

A package MUST contain at most one Sort Map part for each worksheet or macro sheet part in a shared workbook, and that part MUST be the target of an implicit relationship from the worksheet or macro sheet part.

A Sort Map part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
SORTMAP = BrtBeginWsSortMap *RRSORT BrtEndWsSortMap

RRSORT = BrtBeginRRSort *BrtRRSortItem BrtEndRRSort
```

2.1.7.44 Styles

Content Type:	application/vnd.ms-excel.styles
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/styles

An instance of this part type specifies style information for a workbook.

A package MUST contain at most one Styles part, and that part MUST be the target of an implicit relationship from the workbook part.

A Styles part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
STYLESHEET = BrtBeginStyleSheet [FMTS] [FONTS] [FILLS] [BORDERS] CELLSTYLEXFS CELLXFS
       STYLES DXFS TABLESTYLES [COLORPALETTE] *FRT BrtEndStyleSheet

FMTS = BrtBeginFmts 1*BrtFmt BrtEndFmts

FONTS = BrtBeginFonts 1*65491BrtFont BrtEndFonts

FILLS = BrtBeginFills 1*65431BrtFill BrtEndFills
```

```
BORDERS = BrtBeginBorders 1*65430BrtBorder BrtEndBorders

CELLSTYLEXFS = BrtBeginCellStyleXFs 1*65430(BrtXF *FRT) BrtEndCellStyleXFs

CELLXFS = BrtBeginCellXFs 1*65430(BrtXF *FRT) BrtEndCellXFs

STYLES = BrtBeginStyles 1*65430(BrtStyle *FRT) BrtEndStyles

DXFS = BrtBeginDXFs *2147483647(BrtDXF *FRT) BrtEndDXFs

TABLESTYLES = BrtBeginTableStyles *TABLESTYLE BrtEndTableStyles

TABLESTYLE = BrtBeginTableStyle *28BrtTableStyleElement BrtEndTableStyle

COLORPALETTE = BrtBeginColorPalette [INDEXEDCOLORS] [MRUCOLORS] BrtEndColorPalette

INDEXEDCOLORS = BrtBeginIndexedColors 64BrtIndexedColor BrtEndIndexedColors

MRUCOLORS = BrtBeginMRUColors 1*10BrtMRUColor BrtEndMRUColors
```

2.1.7.45 Table

Content Type:	application/vnd.ms-excel.table
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/tableSingleCells

An instance of this part type specifies a single table and its **AutoFilter** information. The data contained within the table is stored in the corresponding worksheet part.

A Table part MUST be the target of an explicit relationship from a worksheet part.

A Table part is permitted to have implicit relationships to the following parts specified by this document:

- Query Table

A Table part MUST NOT have any implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
TABLE = BrtBeginList [AUTOFILTER] [SORTSTATE] LISTCOLS BrtTableStyleClient *FRT
       BrtEndList

LISTCOLS = BrtBeginListCols 1*LISTCOL BrtEndListCols

LISTCOL = BrtBeginListCol [BrtListCCFmla] [BrtListTrFmla] [LISTXMLCPR] *FRT
       BrtEndListCol

LISTXMLCPR = BrtBeginListXmlCPr *FRT BrtEndListXmlCPr
```

For ABNF rules not listed here, see Common Productions.

2.1.7.46 Theme

This part is specified in [ECMA-376] part 1, section 14.2.7. The content associated with this part is specified in [ECMA-376] part 4, section 5.1.8.

2.1.7.47 User Names

Content Type:	application/vnd.ms-excel.userNames
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/usernames

An instance of this part type specifies the user log for a shared workbook.

The presence of the User Names part indicates the workbook is a shared workbook. The User Names part MUST be the target of an implicit relationship from the workbook part.

A User Names part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
USERNAMES = BrtCUsr BrtBeginUsers *255(BrtUsr *FRT) BrtEOF
```

2.1.7.48 VBA Project

Content Type:	application/vnd.ms-office.vbaProject
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/vbaProject

This part is specified in [MS-OVBA].

A package MUST contain at most one VBA Project part, which MUST be the target of an implicit relationship from the workbook part.

A VBA Project part is permitted to contain implicit relationships to the following parts specified by this document:

- VBA Project Signature

A VBA Project part MUST NOT have implicit or explicit relationships to any other part specified by this document.

2.1.7.49 VBA Project Signature

Content Type:	application/vnd.ms-office.vbaProjectSignature
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/vbaProjectSignature

This part is specified in [MS-OSHARED] section 2.3.2.

A package MUST contain at most one VBA Project Signature part. That part MUST be the target of an implicit relationship from the VBA project part.

A VBA Project Signature part MUST NOT have implicit or explicit relationships to any part specified by this document.

2.1.7.50 VML Drawings

This part is specified in [ECMA-376] part 1, section 15.2.17. The content associated with this part is specified in [ECMA-376] part 4, section 6.4.

In addition to the explicit relationships specified in [ECMA-376] part 1, section 15.2.17, a VML Drawings part is permitted to be the target of an explicit relationship from the following parts specified by this document:

- Chart Sheet
- Dialog Sheet
- Macro Sheet

2.1.7.51 Volatile Dependencies

Content Type:	application/vnd.ms-excel.volatileDependencies
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/volatileDependencies

An instance of this part type specifies the volatile dependencies for a workbook.

A package MUST contain at most one Volatile Dependencies part, and that part MUST be the target of an implicit relationship from the workbook part.

A Volatile Dependencies part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
VOLATILEDEPENDENCIES = BrtBeginVolDeps 1*VOLTYPE *FRT BrtEndVolDeps

VOLTYPE = BrtBeginVolType 1*VOLMAIN BrtEndVolType

VOLMAIN = BrtBeginVolMain 1*VOLTOPIC BrtEndVolMain

VOLTOPIC = BrtBeginVolTopic VOLDATA *BrtVolSubtopic 1*BrtVolRef BrtEndVolTopic

VOLDATA = BrtVolNum / BrtVolErr / BrtVolStr / BrtVolBool
```

2.1.7.52 Workbook

Content Type:	application/vnd.ms-excel.main
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/officeDocument

An instance of this part type specifies workbook data and references to all of its sheets.

A package MUST contain exactly one Workbook part, and that part MUST be the target of a relationship in the package relationship part, as specified in File Structure and Relationships.

A Workbook part is permitted to have implicit relationships to the following parts specified by this document:

- Attached Toolbars
- Calculation Chain
- Metadata
- External Data Connections
- Custom XML Maps
- Custom XML Data Storage
- Shared Strings
- Revision Headers
- User Names
- Styles
- Theme
- VBA Project
- Volatile Dependencies

A Workbook part is permitted to have explicit relationships to the following parts specified by this document:

- Chart Sheet
- Dialog Sheet
- External Links
- Macro Sheet
- International Macro Sheet
- PivotCache Definition
- Worksheet

A Workbook part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
WORKBOOK = BrtBeginBook [BrtFileVersion] [BrtFileSharing] [BrtWbProp]
       [BrtBookProtection] [BOOKVIEWS] BUNDLESHS [FNGROUP] [EXTERNALS] *BrtName
       [BrtCalcProp] [BrtOleSize] *(BrtUserBookView *FRT) [PIVOTCACHEIDS]
       [BrtWbFactoid] [SMARTTAGTYPES] [BrtWebOpt] *BrtFileRecover [WEBPUBITEMS]
       [CRERRS] *FRT BrtEndBook

BOOKVIEWS = BrtBeginBookViews 1*(BrtBookView *FRT) BrtEndBookViews

BUNDLESHS = BrtBeginBundleShs 1*BrtBundleSh BrtEndBundleShs

FNGROUP = BrtBeginFnGroup *BrtFnGroup BrtEndFnGroup

EXTERNALS = BrtBeginExternals *SUP BrtExternSheet BrtEndExternals

SUP = BrtSupSelf / SUPSAME / SUPADDIN / BrtSupBookSrc

SUPSAME = BrtSupSame *BrtPlaceholderName

SUPADDIN = BrtSupAddin 1*BrtPlaceholderName
```

```
PIVOTCACHEIDS = BrtBeginPivotCacheIDs 1*PIVOTCACHEID BrtEndPivotCacheIDs

PIVOTCACHEID = BrtBeginPivotCacheID BrtEndPivotCacheID

SMARTTAGTYPES = BrtBeginSmartTagTypes 1*BrtSmartTagType BrtEndSmartTagTypes

CRERRS = BrtBeginCRErrs *BrtCrashRecErr BrtEndCRErrs
```

For ABNF rules not listed here, see Common Productions.

2.1.7.53 Worksheet

Content Type:	application/vnd.ms-excel.worksheet
Source Relationship:	http://schemas.openxmlformats.org/officeDocument/2006/relationships/worksheet

An instance of this part type specifies a worksheet.

A Worksheet part MUST be the target of an explicit relationship from the workbook part.

A Worksheet part is permitted to contain implicit relationships to the following parts specified by this document:

- Comments
- PivotTable Definitions
- Query Table
- Single Cell Tables
- Worksheet Binary Index
- Sort Map

A Worksheet part is permitted to contain explicit relationships to the following parts specified by this document:

- ActiveX
- Custom Property
- Drawings
- OLE Object
- OLE Package
- Hyperlinks
- Images
- Printer Settings
- Table Definition
- VML Drawing

A Worksheet part MUST NOT have implicit or explicit relationships to any other part specified by this document.

Record sequence ABNF:

```
WORKSHEET = BrtBeginSheet [BrtWsProp] [BrtWsDim] [WSVIEWS2] [BrtWsFmtInfo] *COLINFOS
       CELLTABLE [BrtSheetCalcProp] [BrtSheetProtection] *BrtRangeProtection [SCENMAN]
       [AUTOFILTER] [SORTSTATE] [DCON] [USERSHVIEWS] [MERGECELLS] [BrtPhoneticInfo]
       *CONDITIONALFORMATTING [DVALS] *BrtHLink [BrtPrintOptions] [BrtMargins]
       [BrtPageSetup] [HEADERFOOTER] [RWBRK] [COLBRK] *BrtBigName [CELLWATCHES]
       [IGNOREECS] [SMARTTAGS] [BrtDrawing] [BrtLegacyDrawing] [BrtLegacyDrawingHF]
       [BrtBkHim] [OLEOBJECTS] [ACTIVEXCONTROLS] [WEBPUBITEMS] [LISTPARTS] *FRT
       BrtEndSheet

WSVIEWS2 = BrtBeginWsViews 1*WSVIEW2 *FRT BrtEndWsViews

WSVIEW2 = BrtBeginWsView [BrtPane] *4BrtSel *4SXSELECT *FRT BrtEndWsView

SXSELECT = BrtBeginSxSelect PIVOTRULE BrtEndSxSelect

SCENMAN = BrtBeginScenMan 1*32767SCT BrtEndScenMan

SCT = BrtBeginSct 1*32BrtSlc BrtEndSct

MERGECELLS = BrtBeginMergeCells 1*BrtMergeCell BrtEndMergeCells

DVALS = BrtBeginDVals 1*65534BrtDVal BrtEndDVals

CELLWATCHES = BrtBeginCellWatches 1*BrtCellWatch BrtEndCellWatches

IGNOREECS = BrtBeginCellIgnoreECs 1*BrtCellIgnoreEC *FRT BrtEndCellIgnoreECs

SMARTTAGS = BrtBeginSmartTags 1*CELLSMARTTAGS BrtEndSmartTags

CELLSMARTTAGS = BrtBeginCellSmartTags 1*CELLSMARTTAG BrtEndCellSmartTags

CELLSMARTTAG = BrtBeginCellSmartTag *BrtCellSmartTagProperty BrtEndCellSmartTag

ACTIVEXCONTROLS = BrtBeginActiveXControls 1*BrtActiveX BrtEndActiveXControls

LISTPARTS = BrtBeginListParts *BrtListPart BrtEndListParts
```

For ABNF rules not listed here, see Common Productions.

2.1.7.54 Worksheet Binary Index

Content Type:	application/vnd.ms-excel.binIndexWs
Source Relationship:	http://schemas.microsoft.com/office/2006/relationships/xlBinaryIndex

An instance of this part type specifies a binary index for a worksheet, as specified by the worksheet part.

A Worksheet Binary Index part MUST be the target of an implicit relationship from a worksheet part.

A Worksheet Binary Index part MUST NOT have implicit or explicit relationships to any part specified by this document.

Record sequence ABNF:

```
SHEETINDEX = 1*(BrtIndexBlock [BrtIndexRowBlock]) 1*2BrtIndexPartEnd
```

2.1.8 Common Productions

Record sequence fragments that are common to multiple parts are specified here. If a fragment cannot be found under its part, look for it in this ABNF grammar.

The FRT rule can contain any number of other of valid Records in between BrtFRTBegin and BrtFRTEnd.

```
WSVIEWS = BrtBeginWsViews 1*WSVIEW *FRT BrtEndWsViews

WSVIEW = BrtBeginWsView [BrtPane] *4BrtSel *FRT BrtEndWsView

COLINFOS = BrtBeginColInfos 1*BrtColInfo BrtEndColInfos

CELLTABLE = BrtBeginSheetData *1048576(BrtRowHdr *16384CELL *FRT) BrtEndSheetData

CELL = (DATACELL / FMLACELL / SHRFMLACELL / TABLECELL) *FRT

DATACELL = CELLMETA (BrtCellBlank / BrtCellRk / BrtCellError / BrtCellBool /
       BrtCellReal / BrtCellIsst / BrtCellSt)

FMLACELL = CELLMETA (BrtFmlaString / BrtFmlaNum / BrtFmlaBool / BrtFmlaError)

SHRFMLACELL = FMLACELL (BrtShrFmla / BrtArrFmla)

TABLECELL = BrtTable CELLMETA (BrtCellRk / BrtCellError / BrtCellBool / BrtCellReal /
       BrtCellSt)

CELLMETA = [BrtCellMeta] [BrtValueMeta]

AUTOFILTER = BrtBeginAFilter *FILTERCOLUMN [SORTSTATE] *FRT BrtEndAFilter

FILTERCOLUMN = BrtBeginFilterColumn [BrtDynamicFilter / BrtTop10Filter /
       BrtColorFilter / BrtIconFilter / CUSTOMFILTERS / FILTERS] *FRT
       BrtEndFilterColumn

CUSTOMFILTERS = BrtBeginCustomFilters 1*2BrtCustomFilter BrtEndCustomFilters

FILTERS = BrtBeginFilters *BrtFilter *BrtAFilterDateGroupItem BrtEndFilters

SORTSTATE = BrtBeginSortState *64SORTCOND *FRT BrtEndSortState

SORTCOND = BrtBeginSortCond BrtEndSortCond

DCON = BrtBeginDCon [DREFS] BrtEndDCon

DREFS = BrtBeginDRefs *BrtDRef BrtEndDRefs

USERSHVIEWS = BrtBeginUserShViews 1*USERSHVIEW BrtEndUserShViews

USERSHVIEW = BrtBeginUserShView [BrtPane] [BrtSel] [RWBRK] [COLBRK] [BrtMargins]
       [BrtPrintOptions] [BrtPageSetup] [HEADERFOOTER] [AUTOFILTER] *FRT
       BrtEndUserShView
```

```
HEADERFOOTER = BrtBeginHeaderFooter BrtEndHeaderFooter

CONDITIONALFORMATTING = BrtBeginConditionalFormatting 1*65534CFRULE *FRT
      BrtEndConditionalFormatting

CFRULE = BrtBeginCFRule [COLORSCALE / DATABAR / ICONSET] *FRT BrtEndCFRule

COLORSCALE = BrtBeginColorScale ((2CFVO 2BrtColor) / (3CFVO 3BrtColor))
      BrtEndColorScale

DATABAR = BrtBeginDatabar 2CFVO BrtColor BrtEndDatabar

ICONSET = BrtBeginIconSet 3*5CFVO BrtEndIconSet

CFVO = BrtCFVO *FRT

RWBRK = BrtBeginRwBrk *BrtBrk BrtEndRwBrk

COLBRK = BrtBeginColBrk *BrtBrk BrtEndColBrk

OLEOBJECTS = BrtBeginOleObjects 1*BrtOleObject BrtEndOleObjects

WEBPUBITEMS = BrtBeginWebPubItems 1*WEBPUBITEM BrtEndWebPubItems

WEBPUBITEM = BrtBeginWebPubItem BrtEndWebPubItem

PIVOTRULE = BrtBeginPRule [PRFILTERS] *FRT BrtEndPRule

PRFILTERS = BrtBeginPRFilters 1*PRFILTER BrtEndPRFilters

PRFILTER = BrtBeginPRFilter *PRFITEM BrtEndPRFilter

PRFITEM = BrtBeginPRFItem BrtEndPRFItem

FRT = BrtFRTBegin BrtFRTEnd
```

2.1.9 Hyperlinks

Storage of hyperlinks is specified in [ECMA-376] part 1, section 15.3.

2.1.10 External Workbooks

Source Relationship:	See External Workbook Base Paths

When a package uses an **external workbook**, it MUST store the location of the workbook using one of the relationships specified in External Workbook Base Paths, and that relationship MUST be an explicit relationship from the external link part.

An external workbook MUST be located external to the package containing the source relationship (expressed syntactically, the TargetMode attribute of the Relationship element MUST be "External").

2.1.10.1 External Workbook Base Paths

The source relationship specifies the base path to use for the path to the external workbook.

Source Relationship	Relationship Base Path
http://schemas.openxmlformats.org/officeDocument/2006/relationships/externalLinkPath	Specifies that the path is relative to the location of the package containing the relationship.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlStartup	Specifies that the path is relative to the **startup directory**.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlAlternateStartup	Specifies that the path is relative to the **alternate startup directory**.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlLibrary	Specifies that the path is relative to the **library directory**.
http://schemas.microsoft.com/office/2006/relationships/xlExternalLinkPath/xlPathMissing	No base path is inferred.

2.2 Conceptual Overview

This section specifies how higher-level features of the file format are represented by combinations of records.

2.2.1 Cell Table

Text, formulas, and numerical data within worksheets are primarily stored in the cells that make up worksheets and macro sheets. Cells are the fundamental building blocks that contain data, formulas, and formatting to form the worksheets. The data structure associated with the grid of cells is called the cell table.

The cell table is stored in the sequence of records that conform to the CELLTABLE rule within the Common Productions part ABNF. The cells are contained between BrtBeginSheetData and BrtEndSheetData records. They are stored in a row-major order, with a BrtRowHdr record saved for every *non-empty row*, where a *non-empty row* is a row that contains data, formatting, metadata, or **phonetic information**.

Every row is divided into 16 column blocks, and each column block spans 1024 columns. Each BrtRowHdr record contains an array of BrtColSpan structures that specifies the column blocks in that row that have *non-empty cells*, where a *non-empty cell* is a cell that contains data, individual cell formatting, metadata, or phonetic information. Formatting information for a cell can be derived from individual cell formatting, row formatting, column formatting, or the default cell format as specified by the Normal Style. The order of precedence for formatting is individual cell formatting with the highest precedence, followed by row formatting, and then column formatting, and lastly the default cell format.

Cells are specified by BrtCellBlank, BrtCellRk, BrtCellError, BrtCellBool, BrtCellReal, BrtCellSt, BrtCellIsst, BrtFmlaString, BrtFmlaNum, BrtFmlaBool, BrtFmlaError, or BrtCellRString records. Each of these records contains a Cell structure that specifies which column the cell belongs to.

The sequence of records that conform to the CELLTABLE rule begin with the BrtBeginSheetData record, followed by the first BrtRowHdr representing the first *non-empty row*. The BrtRowHdr is followed by records representing every *non-empty cell* in that row in column-major order, including any of the records in the CELL rule. This series of records is repeated for every *non-empty row* and *non-empty cell*, and ends with the BrtEndSheetData record.

A cell in the cell table is referred to by its row and column indexes, which are zero based. The maximum row index is 1048575; the maximum column index is 16383. The bounding box of the actual non-empty cells is stored in the BrtWsDim record. Information pertaining to each column is specified in the COLINFOS collection.

2.2.1.1 Retrieval of Last-Calculated Cell Values Without Loading Cell Table

The only way to retrieve formulas, formats and other cell data is to read the cell table normally as defined previously. However, in certain situations (for example when resolving external references to values) it is beneficial to retrieve only the last calculated value from a cell, without actually loading the cell table. For this reason, a binary index exists within the file that specifies data used to improve the performance of a random read access to the cell table data in a worksheet part or macro sheet part. To find a position of a particular cell within a file, an application can perform the following:

1. Open the worksheet binary index part (or macro sheet binary index part) corresponding to the sheet to which the cell belongs.
2. Read BrtIndexBlock records to find one such that the zero-based cell row is greater than or equal to **rwMic** and less than **rwMac**.
3. If no such BrtIndexBlock record exists, then the row has no data or formatting.
4. Read a BrtIndexRowBlock record that immediately follows this BrtIndexBlock record, and compute the data offset according to the description of the BrtIndexRowBlock record.
5. Open the corresponding worksheet part (or macro sheet part).
6. Read cell table data starting from the previously computed position to find the cell record for the target cell.
7. If the end of the row in the cell table or a record whose column is greater than the column of the target cell is reached, then the cell is blank and has no formatting.

2.2.2 Formulas

A formula is sequence of values, **cell references**, names, functions, or operators in a cell that together produce a new value. Formulas are stored in a tokenized representation known as a parsed expression. In this section, formula is a synonym for parsed expression. A parsed expression is converted into a textual formula at runtime for display and user editing. Cell formulas are specified by the BrtFmlaBool, BrtFmlaError, BrtFmlaNum and BrtFmlaString records. Array formulas are specified by the BrtArrFmla record. Shared formulas are specified by the BrtShrFmla record.

Formulas that are part of a **revision** as specified in the Shared Workbooks overview are specified by the **rgce**.**rgce** field or the **rgceOld**.**rgce** field of the BrtRRDefName record, or by the sequence of records that conform to the CELL rule within the BrtRRChgCell collection.

A parsed **expression** contains a sequence of parse tokens, each of which is either an operand token, an operator token, a control token, a display token or a mem token. All tokens are stored as Parse Things (Ptgs).

With the exception of control tokens, display tokens and mem tokens that are described in subsequent sections, parsed expressions are stored in Rgce using Reverse-Polish notation. Reverse-Polish notation is a logical system for the specification of mathematical formulas in which operands are followed by operators. Inside an Rgce, the operands and operators are represented by an array of Ptg structures of variable lengths. The first one or two bytes of a Ptg structure contain the token type that determines which specific Ptg type the Ptg is, as specified in the Ptg structure. The remainder of the structure varies according to the token type.

Evaluation of a formula specified in Reverse-Polish notation is usually based around an evaluation stack. The expression is parsed from beginning to end, and operands are pushed onto the stack as they are encountered. When operators are encountered, the required number of operands is popped

from the stack and the result of the operation is pushed back onto the stack. Evaluation begins with an empty stack, and when the evaluation is finished, there will be exactly one value left on the stack. The value is the result of the evaluation. Subsequent subsections refer to a stack as described by this model.

2.2.2.1 Operator Tokens

Unary Operator Tokens

Unary operator tokens specify operations that are performed on the previous element in the grammar specified by Rgce. For example, PtgPercent divides the last expression on the stack by 100.

Binary Operator Tokens

Binary operator token specify operations that are performed on the previous two elements in the grammar specified by Rgce. For example, PtgIsect intersects the topmost two expressions on the stack.

2.2.2.2 Operand Tokens

Operand tokens represent values and references that are used by operators and functions. Operands fall into one of two classes, reference class or value class, depending on what result type the formula expects from the operand.

2.2.2.2.1 Value Class

This is the most common type of operand, and represents a single value or array of values. When Ptgs with reference contents are used by an operator that requires value class operands, the Ptgs can be stored as value class operands rather than reference class operands. For example, in a formula where the contents of A1 is added to the integer value 1, the value of cell A1 is pushed onto the stack as a value class operand PtgRef because the subsequent PtgAdd operator requires value class operands. Arrays are stored in a similar fashion. For example, when adding the array of values {1,2,3,4,5,6}, the values are stored in a PtgArray operand.

2.2.2.2.2 Reference Class

When operands are stored as reference class operands, any references contained in the operand are not de-referenced and do not return the underlying value or values. They are pushed onto the stack in reference form.

2.2.2.3 Control Tokens

Control tokens do not perform operations or push values onto the stack. Conditional control tokens (PtgAttrIf, PtgAttrChoose, PtgAttrIfError, and PtgAttrGoTo) are used at runtime to prescribe short-circuit evaluation inside conditional functions and can be ignored when converting parsed expressions into textual formulas.

2.2.2.4 Display Tokens

Display tokens, like control tokens, do not perform operations or push values onto the stack. Display tokens (PtgParen and PtgAttrSpace) are used at runtime to represent parentheses and space characters in a formula when parsed expressions are converted into textual formulas. Display tokens do not affect the order of operations of the formula.

2.2.2.5 Mem Tokens

Mem tokens have two purposes: they cache the results of reference class expressions and they can return the results of reference class expressions as value class expressions. Mem tokens act on binary-reference-expressions that follow them in a mem-area-expression.

2.2.2.6 Formula Elements

Some Ptgs require extra data that is not stored in the Rgce. When an Rgce contains one or more of these Ptgs, the containing formula structure includes an RgbExtra containing the data for those Ptgs. The size of these components is specified by the RgbExtra structures. The Ptgs do not contain an offset into the RgbExtra for their data. The Ptgs that require a corresponding structure in RgbExtra are speficed in RgbExtra.

2.2.3 Charts

2.2.3.1 Chart Part

A chart part is specified in [ECMA-376] part 1, section 14.2.1. The content associated with this part is specified in [ECMA-376] part 4, section 5.7.

2.2.3.2 Pivot Chart

A pivot chart is a specific type of chart part that uses a PivotTable as its data source.

2.2.4 Metadata

Metadata is additional data associated with a particular cell or its content.

All metadata information is located in the metadata part, within the BrtBeginMetadata and BrtEndMetadata records.

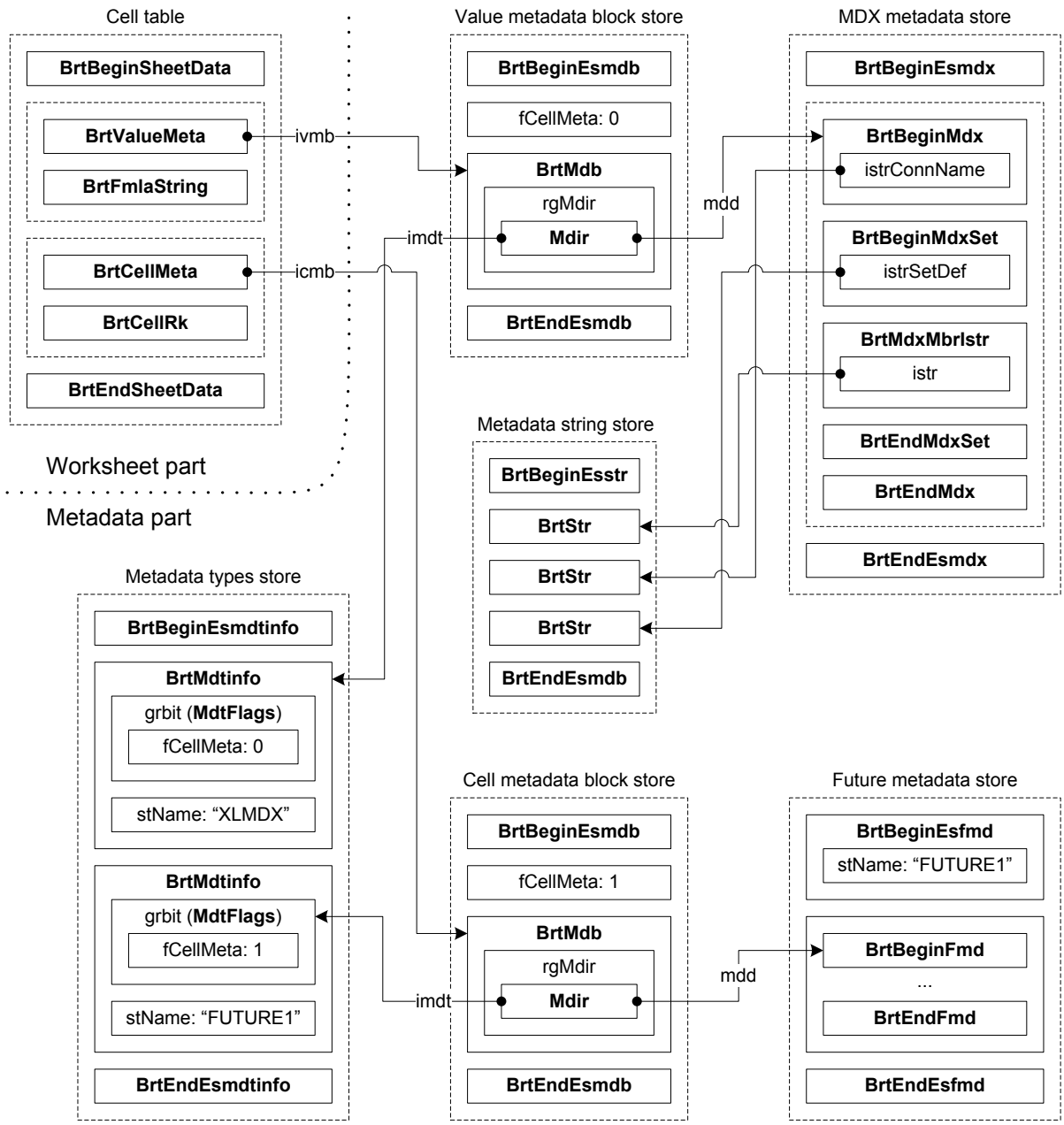


Figure 1: Metadata

The following sections define terms used in this diagram.

2.2.4.1 Metadata Types

The architecture of metadata allows for multiple types of metadata.

Each type of metadata has a metadata store inside the metadata part, a unique name, and a set of predefined properties. Those properties describe whether the metadata propagates with the cell or its content during runtime operations (for example, insert, shift, copy/paste, merge, or unmerge operations), as well as whether the metadata is cell metadata or value metadata.

A metadata type is represented by a BrtMdtinfo record. All metadata types are located within the BrtBeginEsmdtinfo and BrtEndEsmdtinfo records inside the metadata part.

2.2.4.2 Cell Metadata

Cell metadata is metadata associated with a cell itself. Cell metadata is associated with a cell through a BrtCellMeta record referencing a cell metadata block within the metadata part.

2.2.4.3 Value Metadata

Value metadata is metadata associated with the value of a particular cell. Value metadata is associated with a cell through a BrtValueMeta record, or with an External Cell through a BrtExternValueMeta record. Either record references a value metadata block within the metadata part.

2.2.4.4 Metadata Stores

Actual metadata values are stored in metadata record stores. There are two types of metadata records stores: **MDX** metadata store for holding MDX metadata, and future metadata store for holding non-MDX metadata known as future metadata.

2.2.4.5 Metadata Block

Cells are associated with actual metadata values using a metadata mapping table, known as a metadata block. A metadata block contains a collection of indexes into a metadata store, along with the corresponding metadata types.

2.2.4.6 Metadata Block Stores

Metadata blocks are stored within collections of metadata blocks called metadata block stores inside the metadata part. There can be two of these metadata block collections: one for cell metadata and another for value metadata.

The collection of records that specifies the metadata for an metadata block store starts with a BrtBeginEsmdb record and ends with a BrtEndEsmdb record. Within each collection is a set of BrtMdb records that each specifies a metadata block.

2.2.4.7 Metadata String Store

Metadata-related text strings are assembled in a single metadata string store. The stored strings are unique, and each string can be indexed by one or more metadata records. The metadata string store is a performance optimization for reading and writing repetitive information only once. For example, a metadata string can be a connection name to an **OLAP** **cube** that is used in several cube functions in the workbook.

A metadata string is represented by a BrtStr record. All metadata strings are located within the BrtBeginEsstr and BrtEndEsstr records inside the metadata part.

2.2.4.8 MDX Metadata

MDX is the only defined metadata type. MDX metadata is used to maintain cached state for cube functions.

The metadata type of MDX metadata MUST have the following properties:

- The **grbit** field of the BrtMdtinfo record MUST have the following values:

MdtFlags Properties	Value
fGhostRw	0
fGhostCol	0
fEdit	0
fDelete	0
fCopy	1
fPasteAll	1
fPasteFmlas	0
fPasteValues	1
fPasteFmts	0
fPasteComments	0
fPasteDv	0
fPasteBorders	0
fPasteColWidths	0
fPasteNumFmts	0
fMerge	1
fSplitFirst	1
fSplitAll	0
fRwColShift	1
fClearAll	0
fClearFmts	1
fClearContents	0
fClearComments	1
fAssign	1
fCanCoerce	1
fAdjust	0
fCellMeta	0

- The **metadataID** field of the BrtMdtinfo record MUST be 120000.
- The **stName** field of the BrtMdtinfo record MUST be "XLMDX".

MDX metadata records are stored in the MDX metadata store. An MDX metadata record references the connection name and the cube function used to calculate the cell value.

An MDX metadata record also contains one additional record that further describes the MDX metadata record. That additional record depends on the type of cube function used, and MUST be an MDX tuple metadata record, an MDX set metadata record, an MDX member property metadata record, or an MDX KPI metadata record.

An MDX metadata is specified by a BrtBeginMdx record and ends with a BrtEndMdx record. All MDX metadata records are stored in the MDX metadata store specified by the BrtBeginEsmdx record and ends with a BrtEndEsmdx record.

2.2.4.8.1 MDX Tuple Metadata

An MDX **tuple** is the intersection between two or more **members** from different **dimensions (1)**.

MDX tuple metadata is used by cube functions returning a member or a value.

MDX tuple metadata is represented within an MDX metadata record as an ordered collection of members.

An MDX tuple is specified by a BrtBeginMdxTuple record and ends with a BrtEndMdxTuple record. Members are specified by BrtMdxMbrIstr records.

2.2.4.8.2 MDX Set Metadata

An MDX set is an ordered collection of members within the same dimension (1).

MDX set metadata is used by cube functions returning a set or the number of items in a set.

An MDX set is specified by a BrtBeginMdxSet record and ends with BrtEndMdxSet record within an MDX metadata store. Members are specified by BrtMdxMbrIstr records.

2.2.4.8.3 MDX Member Property Metadata

An MDX **member property** represents the property value of a member.

MDX member property metadata references a member name and a property name.

An MDX member property is specified by a BrtBeginMdxMbrProp record and a BrtEndMdxMbrProp record within an MDX metadata store.

2.2.4.8.4 MDX KPI Metadata

An MDX Key Performance Indicator (KPI) represents the KPI property value of a KPI member.

MDX KPI metadata references a KPI name, a KPI property, and a member name.

An MDX KPI is specified by a BrtBeginMdxKPI record and a BrtEndMdxKPI record within an MDX metadata store.

2.2.4.9 Future Metadata

Future metadata is non-MDX metadata.

Each metadata type of future metadata, inside the metadata part, has its own metadata store that is uniquely identified by its name and that contains future metadata records.

Each future metadata can be indexed by either a cell metadata or a value metadata metadata block.

A future metadata is specified by a BrtBeginFmd record and ends with a BrtEndFmd record within a metadata store.

2.2.5 PivotTables

A PivotTable is a mechanism for summarizing source data to get an overview of the distribution of that data. In a PivotTable, applicable columns of the source data become fields that can be used to summarize data. In the case of using OLAP source data, **OLAP hierarchies** and some other OLAP entities become fields in the PivotTable.

A PivotTable has two major parts, a PivotCache and a PivotTable view. There can be multiple PivotTable views based on a single PivotCache.

OLAP PivotTables have one PivotTable view based one a PivotCache, see Relationship to PivotCache for details. See Source Data for the specification of an OLAP PivotCache. See PivotTable view for the specification of an OLAP PivotTable view.

The values produced by a PivotTable are placed in cells of a sheet and these cells make up a PivotTable report.

The PivotTable structures are not needed to obtain values from a PivotTable report because those values are available in the sheet cells. The structures are needed for the following purposes:

1. To show extra information related to a PivotTable in an application, such as sort and filter information.

2. To recalculate a PivotTable view, incorporating changes made to it such as sort and filter, and update the corresponding PivotTable report accordingly.

3. To refresh a PivotCache, incorporating changes made to the source data, and then recalculate any PivotTable views associated with the PivotCache and update the corresponding PivotTable reports accordingly.

In addition to being used by PivotTable views, a PivotCache is used by cube functions for caching data. For details, see PivotCache and Tuple Cache.

2.2.5.1 Data Functionality Level

A data functionality level is a number that represents a set of features and runtime behaviors in areas related to data manipulation and display, which includes PivotTable view, query tables and external connections.

The data functionality level that a PivotCache is created with is specified by the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record. The data functionality level that a PivotTable view is created with is specified by the **bVerSxMacro** field of the BrtBeginSXView record.

The following table specifies various restrictions based on the value of the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record:

Restriction	Restriction for data functionality level <3	Restriction for data functionality level >=3
Maximum number of cache fields	1024	16384
Maximum number of cache items of a cache field	32500	1048576
Maximum string length of a cache item name	256	32767
Maximum number of pivot items to show in an AutoFilter	255	2147483647
Maximum string length of the MDX **formula** specified by the **stMdx** field of the BrtBeginPCDCalcMem record	2048	32767

The **bVerSxMacro** field of the BrtBeginSXView record MUST be greater than or equal to 3 if and only if the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3.

2.2.5.2 PivotCache

The PivotCache contains cached information about source data. The cached information is used by PivotTable views to generate PivotTable reports, or it is used by cube functions to display OLAP data

sets and values. The same PivotCache MUST NOT be used by both a PivotTable view and a cube function. The information contained in a PivotCache includes organization, data types and the values of the source data.

The PivotCache is divided into two parts. The first part consists of the optional cache record structures, as specified by the PivotCache record part. The cache record structures represent a snapshot of the source data and enable a PivotTable view that uses a PivotCache to be recalculated without retrieving the source data. The cache record structures do not exist for OLAP source data.

The second part of a PivotCache is the set of structures that describe metadata about the source data, such as where it comes from, the data entities it has, and the unique values of those entities, as specified by the PivotCache definition part.

See Source Data for the specification of an OLAP PivotCache.

2.2.5.2.1 Source Data

A PivotCache can be based on four different types of source data. The type of source data is specified by the **iSrcType** field of the BrtBeginPCDSource record.

When the source data type is range, which occurs when **iSrcType** is equal to 0x00000000, the source data is read from a range specified by the BrtBeginPCDSRange record. If the range specified by the BrtBeginPCDSRange record is a table then the PivotCache has one cache field for each column of the table, using the column header captions for cache field names, and the **data region** of the table as source data values, specified by cache records. If the range specified by the BrtBeginPCDSRange record is not a table then the PivotCache has one cache field for each column of the range, using the values in the first row of the range for cache field names, and all other rows are used as source data values, specified by cache records.

When the source data type is scenario, which occurs when **iSrcType** is equal to 0x00000003, no new source data is available for the PivotCache and the PivotCache cannot be refreshed. A snapshot of the source data might be available in the cache records.

When the source data type is multiple consolidation ranges, which occurs when **iSrcType** is equal to 0x00000002, the source data is read from one or more ranges. For more details, see Multiple Consolidation Ranges.

When the source data type is external, which occurs when **iSrcType** is equal to 0x00000001, the source data is read from an external data source. The **dwConnID** field of the BrtBeginPCDSource record specifies the associated external connection that is used to obtain data from the external data source. An external data source can either be an OLAP or non-OLAP data source.

An OLAP PivotCache is specified to be a PivotCache has an associated external connection that is an OLAP connection. For an OLAP PivotCache, the source data is handled by the data provider specified by the associated OLAP connection, see OLAP Data Model for more information. An OLAP PivotCache MUST NOT have cache records.

For a non-OLAP PivotCache the source data is always a rectangular set of data and the PivotCache has one cache field for each column of data, using the source field names for cache field names, and the rows of the source data as data values, specified by cache records.

When a pivot field is on the page axis of the PivotTable view, it is a server-based page field if the **fServerBased** field of the BrtBeginSXVD record is equal to 1 and the **fServerBased** field of the associated BrtBeginPCDField record is equal to 1. A server-based page field is a pivot field on the page axis that causes the query that is used to retrieve source data for populating the PivotCache to be parameterized. The query is parameterized according to the page filter criteria, as specified in Page Axis. This feature can only be used for a PivotCache with **ODBC** external source data.

2.2.5.2.1.1 Multiple Consolidation Ranges

A multiple consolidation ranges PivotCache is used for summarizing multiple ranges containing source data in cross-tab format. Each range is specified by the **rfx** field or the **irstName** field of the BrtBeginPCDSCSet record. The sequence of records that conform to the PCDSCONSOL rule specify information that only exists for a multiple consolidation ranges PivotCache.

An example of a range in cross-tab format is illustrated in the following figure. The first column of the range contains names of sales people (George and Allan). The first row in the range contains product groups (Cars and Bikes) and the rest of the cells in the range contain numeric values representing how many products in a certain product group that each sales person sold.

	Cars	Bikes
George	1	2
Allan	3	4

Figure 2: Example of a range in cross-tab format

A multiple consolidation ranges PivotCache is used to summarize multiple such cross-tab ranges as illustrated in the next figure which shows eight cross-tab ranges.

	A	B	C	D	E	F	G
1	2006 Q1				2007 Q1		
2		Cars	Bikes			Cars	Bikes
3	George	1	2		George	17	18
4	Allan	3	4		Allan	19	20
5							
6	2006 Q2				2007 Q2		
7		Cars	Bikes			Cars	Bikes
8	George	5	6		George	21	22
9	Allan	7	8		Allan	23	24
10							
11	2006 Q3				2007 Q3		
12		Cars	Bikes			Cars	Bikes
13	George	9	10		George	25	26
14	Allan	11	12		Allan	27	28
15							
16	2006 Q4				2007 Q4		
17		Cars	Bikes			Cars	Bikes
18	George	13	14		George	29	30
19	Allan	15	16		Allan	31	32

Figure 3: Example of eight ranges in cross-tab format

The values in the first column of each range are used to create a cache field with the default name "Row" (or corresponding localized name); each cache item of this cache field corresponds to one of the values in the first column of the ranges, eliminating duplicates. This cache field is the first cache field in the BrtBeginPCDFields collection.

The values in the first row of each range are used to create a cache field with the default name "Column" (or corresponding localized name); each cache item of this cache field corresponds to one of

the values in the first row of the ranges, eliminating duplicates. This cache field is the second cache field in the BrtBeginPCDFields collection.

The values in all other cells of each range are used to create a cache field with the default name "Value" (or corresponding localized name); each cache item of this cache field corresponds to one of the values in the ranges that are not in the first column or first row, eliminating duplicates. This cache field is the third cache field in the BrtBeginPCDFields collection.

Up to four additional cache fields can optionally exist with the default names "Page1", "Page2", "Page3" and "Page4" (or corresponding localized names). The number of optional cache fields created is user defined and is equal to the **cPages** field of the BrtBeginPCDSCPages record. Each optional cache field corresponds to a BrtBeginPCDSCPage record.

The first through fourth BrtBeginPCDSCPage record in the BrtBeginPCDSCPages collection corresponds to the fourth through seventh cache field in the BrtBeginPCDFields collection and each cache item of this cache field corresponds to the BrtBeginPCDSCPItem record in that BrtBeginPCDSCPage collection with the same index.

The **rgiItem** field of the BrtBeginPCDSCSet record is an array of indexes that specifies BrtBeginPCDSCPItem records in the PCDSCPAGE rule. Each BrtBeginPCDSCPItem record specifies the value of a cache item associated with a range.

The first element in the **rgiItem** array corresponds to the first BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

The second element in the **rgiItem** array corresponds to the second BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

The third element in the **rgiItem** array corresponds to the third BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

The fourth element in the **rgiItem** array corresponds to the fourth BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

Each cache record for a multiple consolidation ranges PivotCache corresponds to the intersection of a value in the first row of one of the ranges, a value in the first column of one of the ranges and the set of BrtBeginPCDSCPItem records associated with that range.

In the preceding example with the eight ranges and with two of the optional BrtBeginPCDSCPage records specified ("Page1" and "Page2"); the corresponding cache records are illustrated by the following table.

Row	Column	Value	Page1	Page2
Allan	Bikes	4	2006	Q1
Allan	Cars	3	2006	Q1
George	Bikes	2	2006	Q1
George	Cars	1	2006	Q1
Allan	Bikes	8	2006	Q2
Allan	Cars	7	2006	Q2
George	Bikes	6	2006	Q2
George	Cars	5	2006	Q2
Allan	Bikes	12	2006	Q3
Allan	Cars	11	2006	Q3
George	Bikes	10	2006	Q3
George	Cars	9	2006	Q3
Allan	Bikes	16	2006	Q4
Allan	Cars	15	2006	Q4
George	Bikes	14	2006	Q4
George	Cars	13	2006	Q4
Allan	Bikes	20	2007	Q1
Allan	Cars	19	2007	Q1
George	Bikes	18	2007	Q1
George	Cars	17	2007	Q1
Allan	Bikes	24	2007	Q2
Allan	Cars	23	2007	Q2
George	Bikes	22	2007	Q2
George	Cars	21	2007	Q2
Allan	Bikes	28	2007	Q3
Allan	Cars	27	2007	Q3
George	Bikes	26	2007	Q3
George	Cars	25	2007	Q3
Allan	Bikes	32	2007	Q4
Allan	Cars	31	2007	Q4
George	Bikes	30	2007	Q4
George	Cars	29	2007	Q4

Figure 4: Representation of cache records based on eight consolidation ranges

The following figure illustrates a multiple consolidation ranges PivotTable report with 2 pivot fields on the page axis. The PivotTable report is based on the eight ranges in the preceding figure and is summarizing the values from all the ranges because no manual filter has been applied to any of the pivot fields on the page axis ("Page1" and "Page2" are both set to summarize all values).

Page1	(All)		
Page2	(All)		
Sum of Value	Column		
Row	Bikes	Cars	Grand Total
Allan	144	136	280
George	128	120	248
Grand Total	272	256	528

Figure 5: Multiple consolidation ranges PivotTable

2.2.5.2.2 Cache Fields

A cache field represents an entity by which data can be summarized. An example of such an entity is country. Having a country cache field enables users to summarize data by country.

Consider a PivotCache based on the following source data:

Country	Product	Date	Sales
USA	Bicycle	6/5/2007	500
USA	Car	8/3/2007	20000
Canada	Bicycle	9/2/2007	300
Canada	Car	10/5/2007	35000

In this example, four cache fields exist in the PivotCache. Each cache field corresponds to one of the columns in the source data: Country, Product, Date and Sales.

The sequence of records that conform to the PCDFIELD rule specifies a cache field. A cache field is contained in a PivotCache.

The sequence of records that conform to the PCFIELDS rule specifies all cache fields of the PivotCache.

A cache field index is a zero-based index of a PCDFIELD rule in the sequence of records specified by the PCDFIELDS rule.

A cache field typically corresponds to a source data column or to a level of an OLAP hierarchy. However, grouping cache fields and cache fields representing calculated fields do not correspond to source data entities. Such cache fields are fully specified by information in the PivotCache.

The **fSrcField** field of the BrtBeginPCDField record specifies whether the cache field corresponds to a source data entity. A non-OLAP PivotCache MUST have one or more cache fields corresponding to source data columns. An OLAP PivotCache MUST NOT have cache fields that do not correspond to source data entities.

All cache fields that do not correspond to source data entities MUST be located after cache fields that do correspond to source data entities in the sequence of records that conform to the PCDFIELDS rule.

In a non-OLAP PivotCache, a cache field corresponds to one column in the source data and contains information about that column. The cache field name is specified by the **stFldName** field of the BrtBeginPCDField record. The cache field name of a cache field corresponding to a source data column

is derived from the name of the column in the source data and is used to associate the cache field with the source data column.

A cache field name MUST be valid as specified by the **stFldName** field of the BrtBeginPCDField record.

Except for grouping cache fields in non-OLAP PivotCaches, all cache field names MUST be unique, when using a case-insensitive comparison, within the PivotCache.

In an OLAP PivotCache, each cache field is associated with a cache hierarchy. Each cache hierarchy has an associated sequence of records that conform to the PCDHFIELDSUSAGE rule which specify the cache field indexes of the cache fields that are associated with that cache hierarchy. The cache hierarchy to which cache fields are associated is specified by the BrtBeginPCDHierarchy record preceding the sequence of records that conform to the PCDHFIELDSUSAGE rule.

If a cache hierarchy is not a measure or a named set there can be more than one cache field associated with it. Each cache field corresponds to an **OLAP level** or to a member property of the associated OLAP hierarchy in the source data. The **fOlapMemPropField** of the BrtBeginPCDField record specifies whether a cache field is a member property.

2.2.5.2.2.1 Member Properties

A member property is the PivotTable representation of an **OLAP member property**. Member properties can have properties that are associated with the PivotCache and a PivotTable view.

A member property is associated with one OLAP member property of the OLAP hierarchy specified by the associated cache hierarchy of the member property.

A member property can be associated with a cache field and a pivot field. The **fOlapMemPropField** field of the BrtBeginPCDField record of a cache field specifies whether a cache field is a member property cache field. The associated pivot field of a member property cache field is a member property pivot field.

A member property with an associated member property cache field and member property pivot field is associated with the cache hierarchy and pivot hierarchy of the associated member property cache field and member property pivot field.

If a member property is associated with a member property cache field, the association of the member property and an OLAP member property is specified by the **stFldName** field of the BrtBeginPCDField record of the member property cache field, which specifies the **MDX unique name** of the OLAP member property.

An association between a member property and a cache field or pivot field is not required. If the value of the **isxvd** field of the BrtBeginSXTDMP record for a member property -1, then the member property is not associated with any cache field or pivot field. Such a member property is not displayed on the row axis or column axis. A member property that is not associated with any cache field is associated with the pivot hierarchy that contains the member property, and with the cache hierarchy associated with the pivot hierarchy. If a member property is not associated with a cache field, the association between the member property and an OLAP member property is specified by the **irstProperty** field of the BrtBeginSXTDMP record specifying the unique name of the OLAP member property.

If the value of the **bVerSxMacro** field of the BrtBeginSXView record of the PivotTable view containing the member property is less than 3, BrtSXTDMPOrder records MUST NOT be present in the PivotTable view. If the value of the **bVerSxMacro** field of the BrtBeginSXView record of the PivotTable view containing the member property is greater than or equal to 3, BrtBeginSXTDMP records MUST NOT be present in the PivotTable view. The **isxvd** field of a BrtSXTDMPOrder record MUST refer to the member property pivot field associated with the pivot hierarchy that contains the BrtSXTDMPOrder record.

A member property pivot field can be shown only in the row area or column area of a PivotTable view. A member property pivot field can only be shown after the last visible OLAP level of the corresponding pivot hierarchy. The order of member property pivot fields shown in the PivotTable view is the same as the order of member properties in the BrtBeginSXTDMPS collection of the corresponding pivot hierarchy, as specified by the SXTDMPS rule in the PivotTable part ABNF

2.2.5.2.3 Cache Items

Cache items represent specific instances of the entities represented by cache fields. For example, an instance of a Country cache field might be the USA cache item. Having a USA cache item in the Country cache field enables the associated PivotTable view to display data by USA.

Each cache item specifies a value and a type. In some cases, a cache item can have additional information associated with it as well.

A cache item is contained in a cache field. A cache field can have zero cache items if the cache field is not in use in the PivotTable view.

A cache item index can be used to reference a cache item within the cache field. Referencing a cache item by index requires an implicit or explicit reference to that cache field because a cache item collection is associated with a specific cache field. A cache field can be referenced by a cache field index, as specified by Cache Field.

If the records that specify the cache field include a sequence of records that conform to the PCDFATBL rule, then the records that conform to the PCDFATBL rule specify the raw cache items of the cache field.

If the records that specify the cache field include a sequence of records that conform to the PCDFGITEMS rule, then the records that conform to the PCDFGITEMS rule specify the grouping cache items of the cache field. These are used for some grouping cache fields in non-OLAP PivotCaches.

If there are no grouping cache items but there are raw cache items, the cache item index is a zero-based index into the raw cache items.

If there are grouping cache items, then the cache item index is a zero-based index into the grouping cache items.

For raw cache items (records in PCDFATBL), each raw cache item is specified by one of the following:

- A record that conforms to the PCDI rule, excluding the records specified by the sequence of records that conform to the PCDIRUN rule.
- A record that conforms to the PCDIA rule. These raw cache items have additional information.
- An entry in the **rgPCDINumber**, **rgPCDIString**, **rgPCDIError** or **rgPCDIDatetime** fields of the BrtBeginPCDIRun record.

There can be multiple entries of source data that have the same combination of value and type for a cache field. Each raw cache item within a cache field MUST have a unique combination of value and type.

For grouping cache items (records in PCDFGITEMS), each grouping cache item is specified by one of the following:

- A PCDI rule, excluding the records specified by the PCDIRUN rule.
- An entry in the **rgPCDINumber**, **rgPCDIString**, **rgPCDIError** or **rgPCDIDatetime** fields of the BrtBeginPCDIRun record.

A BrtBeginPCDIRun record specifies multiple sequential cache items of the same type and is used to reduce file size.

A grouping cache field MUST have grouping cache items.

A grouping cache field with the **fSrcField** field of the BrtBeginPCDField record of the cache field equal to 1 MUST have raw cache items.

A cache field that is not a grouping cache field MUST NOT have grouping cache items.

If there are one or more references by index to cache items of a particular cache field, that cache field MUST have cache items.

For an OLAP PivotCache, a measure cache field associated with a cache hierarchy MUST NOT have cache items.

For an OLAP PivotCache, a cache item with a string value specifies the unique name of an **OLAP member**, unless the cache field is a member property cache field.

Raw cache items can contain unused cache items, each specified by a sequence of records that conform to the PCDIA rule. Unused cache items are values that did not exist in the source data when the PivotCache was last refreshed, but existed when the PivotCache was refreshed previously. The PivotCache can retain such unused cache items to preserve information associated with them in order to reapply that information if the value corresponding to the cache item is added back to the source data. The **fGhost** field of the PCDIAddlInfo structure specifies whether a cache item is unused.

An example of cache items and their association with source data is provided here.

Consider a PivotCache based on the following source data table:

Country	**Product**	**Date**	**Sales**
USA	Bicycle	6/5/2007	500
USA	Car	8/3/2007	20000
Canada	Bicycle	9/2/2007	500
Canada	Car	10/5/2007	35000

Four cache fields exist, each corresponding to one of the columns Country, Product, Date and Sales. Each of the four cache fields can have cache items corresponding to the unique values in the source data columns as illustrated in the following tables.

Cache items for the **Country** cache field
Canada
USA

Cache items for the **Product** cache field
Bicycle
Car

Cache items for the **Date** cache field
6/5/2007
8/3/2007
9/2/2007
10/5/2007

Cache items for the **Sales** cache field
500
20000
3500

2.2.5.2.4 Grouping

Grouping is used to combine a set of cache items, typically ones that are related in some logical way, into a group. There are three different types of grouping: numeric grouping, date grouping and discrete grouping. Numeric grouping combines numeric cache items into ranges of values. Date grouping combines date cache items into date ranges. Discrete grouping combines specifically selected cache items into groups.

The cache field that contains the cache items that are to be grouped is called the base cache field. The resultant cache field that contains the groups of cache items is called the parent grouping cache field. Each group of cache items in the base cache field is associated with a single cache item in the parent grouping cache field. Often cache items in parent grouping cache fields can be further grouped, creating a hierarchy of parent grouping cache fields. The base cache field is at the lowest level of the hierarchy.

Grouping is specified by a sequence of records that conform to the PCDFGROUP rule.

Numeric grouping and date grouping are specified by records in the PivotCache Definition part that conform to the PCDFGRANGE rule.

Discrete grouping is specified by records in the PivotCache Definition part that conform to the PCDFGDISCRETE rule.

A numeric grouping or date grouping cache field is specified by the presence of a BrtBeginPCDFGRange record following the BrtBeginPCDField record associated with that cache field. For a numeric grouping cache field, the **iByType** field of the associated BrtBeginPCDFGRange record is equal to 0. For a date grouping cache field, the **iByType** field of the BrtBeginPCDFGRange record is greater than or equal to 1 and less than or equal to 7.

A discrete grouping cache field is specified by the presence of a BrtBeginPCDFGDiscrete record following the BrtBeginPCDField record associated with the cache field.

The **ifdbBase** field of the BrtBeginPCDFGroup record that follows the BrtBeginPCDField record specifies a cache field index to the base cache field for a grouping cache field.

The **ifdbParent** field of the BrtBeginPCDFGroup record that follows the BrtBeginPCDField record specifies a cache field index to the parent grouping cache field of a grouping cache field or of a base cache field.

For numeric grouping, there is only one cache field associated with the grouping and it serves as both the grouping cache field and the base cache field. Therefore, for a numeric grouping cache field, the **ifdbBase** field of the BrtBeginPCDFGroup record that follows the BrtBeginPCDField record MUST specify a cache field index to that same BrtBeginPCDField record. For numeric grouping, the **ifdbParent** field of the BrtBeginPCDFGroup record MUST be -1.

For date grouping, there can be up to seven levels of grouping hierarchy. The grouping level for a cache field is specified by the **iByType** field of the BrtBeginPCDFGRange record. The cache field with the lowest **iByType** value is at the lowest level of the hierarchy, the cache field with the next lowest **iByType** value is at the next lowest level of the hierarchy, and so on. See the specification of the BrtBeginPCDFGRange record for the list of levels of date grouping hierarchy. Each cache field in the hierarchy MUST have an BrtBeginPCDFGRange record with a unique **iByType** value.

The cache field corresponding to the lowest level of the date grouping hierarchy serves as both a grouping cache field and the base cache field. Therefore, in the cache field corresponding to the lowest level of the date grouping hierarchy, the **ifdbBase** field of the BrtBeginPCDFGroup record that follows the BrtBeginPCDField record MUST specify a cache field index to that same BrtBeginPCDField record.

The cache items of a grouping cache field, each corresponding to a single group, are specified by the sequence of records that conform to the PCDFGITEMS rule.

For discrete grouping, the mapping between each group in a grouping cache field and the cache items of the base cache field that are in each group, is specified by the PCDFGDISCRETE rule in the following way: there MUST be one BrtPCDIIndex record corresponding to every cache item in the cache items collection of the base cache field. Each BrtPCDIIndex record specifies a cache item in the PCDFGITEMS rule that is the parent grouping cache item of the cache item in the cache items collection for the base cache field with the same index as that BrtPCDIIndex record in the PCDFGDISCRETE rule.

The following paragraphs explain the three different types of grouping and provide examples of them.

Numeric grouping combines numeric cache items into ranges. For example, consider the following PivotTable report where the number of people (represented by "Count of Name") of a certain age are listed.

Age	Count of Name
5	1
11	1
20	2
34	2
45	1
50	1
Grand Total	**8**

Figure 6: PivotTable report with ages

Analysis of specific ages might not be particularly meaningful. Instead, looking at age groups can be more interesting. The following PivotTable report shows numeric grouping applied to the "Age" cache field. In this example, the numeric grouping is set to start at 0, end at 100 and have groups of 20 years.

Age	Count of Name
<0	
0-19	2
20-39	4
40-59	2
60-79	
80-100	
>100	
Grand Total	**8**

Figure 7: PivotTable report with age groups

Date grouping is similar to numeric grouping and is used to group cache items into date ranges.

One to seven grouping cache fields can exist when date grouping is applied to a cache field, each corresponding to a different level of detail of date and time information. The cache field to which the date grouping is originally applied is included in the set of grouping cache fields and is considered the base cache field of the grouping cache fields. For date grouping, the base cache field represents the lowest level of the date grouping hierarchy. The following levels of detail of date information are available, each corresponding to one cache field:

- Years
- Quarters
- Months
- Days
- Hours
- Minutes
- Seconds

For example, consider the following PivotTable report where the number of sales is listed for each individual date.

Date	# of Sales
1/1/2007	1
1/1/2008	16
2/2/2007	2
3/3/2007	3
4/4/2007	4
5/5/2007	5
6/6/2007	6
7/7/2007	7
8/8/2007	8
9/9/2007	9
10/10/2007	10
11/11/2007	11
12/12/2007	12
2/2/2008	17
3/3/2008	18
4/4/2008	19
5/5/2008	20
6/6/2008	21
7/7/2008	22
8/8/2008	23
9/9/2008	24
10/10/2008	25
11/11/2008	26
12/12/2008	27
Grand Total	**336**

Figure 8: PivotTable report with dates

This information could be too granular for some analytical purposes. With date grouping, a more useful higher level summary can be created. The following PivotTable report shows the result of applying date grouping to the "Date" cache field and including two levels of grouping ("Years" and "Quarters"). In this example, the "Quarters" cache field represents the lowest hierarchical level of date information included and is therefore the base cache field for this date grouping. The "Years" cache field is a grouping cache field with the "Quarters" cache field as its base cache field. The items "<1/1/2007" in the two cache fields represent dates before 1/1/2007, the start date specified by the **xnumStart** field of the BrtBeginPCDFGRange record. The items ">12/13/2008" in the two cache fields represent dates after 12/13/2008, the end date specified by the **xnumEnd** field of the BrtBeginPCDFGRange record.

Years - Quarters	# of Sales
<1/1/2007	
<1/1/2007	
2007	**78**
Qtr1	6
Qtr2	15
Qtr3	24
Qtr4	33
2008	**258**
Qtr1	51
Qtr2	60
Qtr3	69
Qtr4	78
>12/13/2008	
>12/13/2008	
Grand Total	**336**

Figure 9: PivotTable report with date groups

Discrete grouping combines specifically selected cache items into groups. When discrete grouping is applied to a cache field, a separate grouping cache field is created and the cache field that the grouping is applied to is the base cache field for that grouping cache field. Multiple grouping cache fields can exist for one base cache field, forming a hierarchy of grouping cache fields. A grouping cache field higher in the hierarchy is considered a parent grouping cache field of the grouping cache field or base cache field immediately following it in the hierarchy. For a grouping cache field, each cache item in the cache items collection represents one group.

For example, consider the following PivotTable report listing sales by states in the United States.

Row Labels	Sum of Sales Amount
Alabama	$37.29
Arizona	$2,104.02
California	$5,714,257.69
Florida	$7,760.91
Georgia	$1,658.92
Illinois	$2,828.09
Kentucky	$216.96
Massachusetts	$2,049.10
Minnesota	$91.28
Mississippi	$82.59
Missouri	$81.46
Montana	$92.08
New York	$4,124.19
North Carolina	$7.28
Ohio	$359.18
Oregon	$1,170,991.54
South Carolina	$2,434.92
Texas	$1,789.10
Utah	$4,419.58
Virginia	$39.98
Washington	$2,467,248.34
Wyoming	$7,115.01
Grand Total	**$9,389,789.51**

Figure 10: PivotTable report with state names

Discrete grouping can be used to group sets of states, for example, into geographical areas. The following PivotTable report shows the result of applying six groups ("Group1" through "Group6") to the cache field representing states. The cache field representing states is considered the base cache field for the discrete grouping in this example. Each group in the example, represented by a cache item in the grouping cache field, combines states in the same geographical area.

Row Labels	Sum of Sales Amount
Group1	**$3,000.83**
Illinois	$2,828.09
Minnesota	$91.28
Missouri	$81.46
Group2	**$6,532.47**
Massachusetts	$2,049.10
New York	$4,124.19
Ohio	$359.18
Group3	**$1,171,083.62**
Montana	$92.08
Oregon	$1,170,991.54
Group4	**$2,478,782.93**
Utah	$4,419.58
Washington	$2,467,248.34
Wyoming	$7,115.01
Group5	**$12,238.85**
Alabama	$37.29
Florida	$7,760.91
Georgia	$1,658.92
Kentucky	$216.96
Mississippi	$82.59
North Carolina	$7.28
South Carolina	$2,434.92
Virginia	$39.98
Group6	**$5,718,150.81**
Arizona	$2,104.02
California	$5,714,257.69
Texas	$1,789.10
Grand Total	**$9,389,789.51**

Figure 11: PivotTable report with state groups

2.2.5.2.5 Calculated Fields

Calculated fields allow users to add calculations to a PivotTable report. For example, if a PivotTable report contains values for sales and cost by products but no profit values, a calculated field with the formula "=sales-cost" can be added so that profit values are calculated and can be analyzed in the PivotTable report.

A calculated field is a cache field that does not correspond to a column in the source data. The values for a calculated field are calculated based on the formula specified for the calculated field. A calculated field is specified by the **fLoadFmla** field of the BrtBeginPCDField record being equal to 1. The formula is specified by the **fldFmla** field of the BrtBeginPCDField record.

The sequence of records that conforms to the PNAMES rule specifies any cache fields referenced by the formula.

For calculated fields, the **fSrcField** record of the BrtBeginPCDField record MUST be 0.

A pivot field associated with a calculated field MUST NOT appear on the row axis, column axis or page axis of a PivotTable view.

An OLAP PivotCache MUST not have calculated fields.

2.2.5.2.6 Calculated Items

Calculated items allow users to add cache items to a cache field that do not exist in a column in the source data. For example, consider a PivotTable report displaying sales for the 4 quarters of 2007. If there are no source data rows for sales in 2008, a calculated item can be used to add an additional cache item as a calculated item that calculates the projected sales for the 1st quarter of the year 2008 as being 25% higher than the sales for the 4th quarter of 2007. The following figure illustrates a PivotTable report with such a calculated item ("2008 Q1 projected").

Date	Sum of Sales
2007 Q1	$4,000,000.00
2007 Q2	$3,500,000.00
2007 Q3	$5,000,000.00
2007 Q4	$5,200,000.00
2008 Q1 projected	$6,500,000.00
Grand Total	**$24,200,000.00**

Figure 12: A PivotTable report with a calculated item

A calculated item is a cache item that does not correspond to values in the source data. The values for a calculated item are calculated based on the formula specified for the calculated item. The **fFmla** field of the PCDIAddlInfo record specifies if a cache item specified by the PCDIA rule is a calculated item.

The sequence of records that conforms to the PCDCALCITEMS rule specifies the calculations for all calculated items of a PivotCache. Each PCDCALCITEM rule in the sequence of records that conforms to the PCDCALCITEMS rule specifies one calculation for a specific calculated item. Each calculated item can have multiple calculations associated with it and in that case, there are multiple elements in the PCDCALCITEMS rule corresponding to the same calculated item. The calculated item that a calculation is associated with is specified by the sequence of records that conforms to the PIVOTRULE rule in the PCDCALCITEM rule. The PIVOTRULE rule can also specify additional scoping information; for example, if one calculation for a calculated item named "2008 Q1 projected" only applies to the "Cars" product group, the PIVOTRULE rule will specify the cache field corresponding to "product group" and the cache item corresponding to "Cars".

The **fmla** field of the BrtBeginPCDCalcItem record specifies the formula that is used for a calculation.

Any cache fields and associated cache items, or pivot fields and associated pivot items, that are referenced by the formula of a calculation are specified by the sequence of records that conforms to the PNAMES rule in each PCDCALCITEM rule.

An OLAP PivotCache MUST not have calculated items.

2.2.5.2.7 Cache Hierarchies

A cache hierarchy corresponds to one of the following entities in the OLAP source data associated with an OLAP PivotCache:

- OLAP hierarchy
- **OLAP measure**
- **OLAP named set**
- OLAP **key performance indicator (KPI)**

Cache hierarchies are only present in OLAP PivotCaches and MUST NOT exist in a non-OLAP PivotCache.

The sequence of records that conforms to the PCDHIERARCHY rule specifies a cache hierarchy that corresponds to an OLAP hierarchy, an OLAP measure or an OLAP named set, as specified in the following table.

fMeasure field of BrtBeginPCDHierarchy	**fSet field of** BrtBeginPCDHierarchy	**Meaning**
0	0	OLAP hierarchy
0	1	OLAP named set
1	0	OLAP measure

The sequence of records that conforms to the PCDKPI rule specifies a cache hierarchy that corresponds to an **OLAP KPI**.

The association between a cache hierarchy and the corresponding OLAP entity in the OLAP source data is specified by the **stUnique** field of the BrtBeginPCDHierarchy record or by the **stUnique** field of the BrtBeginPCDKPI record.

For a cache hierarchy that corresponds to an OLAP hierarchy, OLAP measure or OLAP named set, the cache hierarchy index is the zero-based index of a BrtBeginPCDHierarchy record in the BrtBeginPCDHierarchies collection.

For a cache hierarchy that corresponds to an OLAP KPI, the cache hierarchy index is the *n*-based index of a BrtBeginPCDKPI record in the BrtBeginPCDKPIs collection, where *n* is the number of BrtBeginPCDHierarchy records in the BrtBeginPCDHierarchies collection, as specified by the PivotCache Definition part ABNF.

A cache field can be associated with a cache hierarchy as specified by the **ihdb** field of the BrtBeginPCDField record of the cache field.

A cache hierarchy that corresponds to an OLAP hierarchy represents one or more OLAP levels related via hierarchical relationships. For example, an OLAP hierarchy consisting of country, province and city can be used to summarize national, regional and municipal sales data. For a cache hierarchy that corresponds to an OLAP hierarchy, and is not a single field page hierarchy, each cache field associated with the cache hierarchy corresponds to an OLAP level of the OLAP hierarchy or is a member property cache field.

A single field page hierarchy is a cache hierarchy that corresponds to an OLAP hierarchy in a PivotCache that has a **bVerCacheCreated** field of the BrtBeginPivotCacheDef less than 3 and has a PivotTable view that has the associated pivot hierarchy on the page axis. For a single field page hierarchy a single cache field is associated with the cache hierarchy.

2.2.5.2.7.1 Measures

A measure cache hierarchy is a cache hierarchy that is associated with an OLAP measure. The **fMeasure** field of the BrtBeginPCDHierarchy record specifies if a cache hierarchy is a measure cache hierarchy. An OLAP measure MUST NOT have more than one cache field associated with it. A pivot hierarchy corresponding to a measure cache hierarchy MUST NOT be located on the row axis, column axis or page axis.

2.2.5.2.7.2 KPIs

A key performance indicator (KPI) cache hierarchy is a cache hierarchy that is associated with an OLAP KPI. A KPI cache hierarchy includes the four main components of an OLAP KPI; value, goal, status and trend. KPI cache hierarchies are specified by the BrtBeginPCDKPI record as specified by the sequence of records that conform to the PCDKPI rule in the PivotCache Definition part ABNF.

2.2.5.2.7.3 Named Sets

A named set cache hierarchy is a cache hierarchy that is associated with an OLAP named set. The **fSet** field of the BrtBeginPCDHierarchy record specifies if a cache hierarchy is a named set cache hierarchy. An OLAP named set MUST NOT have more than one cache field associated with it. A pivot hierarchy corresponding to a named set cache hierarchy MUST NOT be located on the data axis or page axis.

2.2.5.2.8 OLAP Grouping

Grouping in an OLAP PivotCache is the associating of multiple OLAP members that belong to the same OLAP level of an OLAP hierarchy and have the same OLAP member parent. When OLAP members in a particular OLAP level are grouped, a parent grouping OLAP level exists. Each group is represented in the parent grouping OLAP level by one parent grouping OLAP member, and one or more child OLAP members in the OLAP level that the grouping is applied to.

The sequence of records that conforms to the PCDHGLEVELS rule specifies grouping for the associated cache hierarchy, which MUST be associated with an OLAP hierarchy. Each sequence of records that conforms to the PCDHGLEVEL rule specifies a grouping for one OLAP level with the same zero-based ordinal as the zero-based index of the PCDHGLEVEL rule in the PCDHGLEVELS rule.

The set of groups for one OLAP level is specified by a sequence of records that conforms to the PCDHGLGROUPS rule in the PCDHGLEVEL rule. Each individual group is specified by a sequence of records that conforms to the PCDHGLGROUP rule in the PCDHGLGROUPS rule. The set of OLAP members for a group is specified by the sequence of records that conforms to the PCDHGLGMEMBERS rule within a PCDHGLGROUP rule. Membership in the group is specified by the sequence of records that conforms to the PCDHGLGMEMBER rule within the PCDHGLGMEMBERS rule.

2.2.5.2.9 OLAP Calculated Members

A calculated member is specified by the sequence of records that conform to the PCDCALCMEM rule and is used to create an **OLAP calculated member** or an OLAP named set with an associated user-specified MDX expression for a custom calculation.

The **stMdx** field of the BrtBeginPCDCalcMem record specifies the user-specified MDX expression.

The **fSet** field of the BrtBeginPCDCalcMem record specifies whether the associated calculated member creates an OLAP named set or an OLAP calculated member.

If the user-specified MDX expression associated with a calculated member defines an OLAP measure, then this calculated member will be associated with a measure cache hierarchy as specified in Measures.

If the user-specified MDX expression associated with a calculated member specifies an OLAP member in an OLAP hierarchy other than the OLAP measure hierarchy, then this calculated member can only be associated with a cache item.

If a calculated member specifies an OLAP named set, then this calculated member is associated with a named set cache hierarchy as specified in Named Sets.

2.2.5.2.10 Cache Records

Cache records represent a snapshot of the source data of a PivotCache and allow for PivotTable views using a PivotCache to be recalculated without retrieving the source data.

Cache records are specified by the PivotCache Records part, which contains sequences of records that conform to the PIVOTCACHERECORD rule. Each PIVOTCACHERECORD rule specifies one cache record and corresponds to one row in the source data. The PIVOTCACHERECORD rules each specify a sequence of values. Each of these values MUST correspond to a different cache field as defined by the PivotCache Definition part ABNF. The order of the values, corresponding to different cache fields, in each PIVOTCACHERECORD rule MUST be the same as the order of the cache fields in the collection of cache fields specified by the BrtBeginPCDFields collection. The number of values, corresponding to different cache fields, in each PIVOTCACHERECORD rule MUST be equal to the number of BrtBeginPCDField records, for which the **fSrcField** field is equal to 1, in the BrtBeginPCDFields collection.

If a pivot field associated with a cache field exists in the PivotTable view, the cache field MUST have associated cache items; if not, associated cache items are optional.

For cache fields that have cache items, the cache items of the cache fields are referenced by an index. For sequences of records that conform to the PIVOTCACHERECORDDT rule, the index is specified by the BrtPCDIIndex record. For BrtPCRRecord records, the index is stored in the **rgb** field of the BrtPCRRecord record.

For cache fields that do not have cache items, the sequence of records that conform to a PCDIDT rule in a PIVOTCACHERECORD rule specify individual values of the corresponding source data row. For BrtPCRRecord records, the values of the corresponding source data row are stored in the **rgb** field of the BrtPCRRecord record.

An OLAP PivotCache MUST NOT have cache records. Cache records are optional for a non-OLAP PivotCache.

2.2.5.2.11 Tuple Cache

An OLAP PivotCache can contain cached data called a tuple cache which is used by cube functions for recalculation without accessing the data provider specified by the associated OLAP connection.

A tuple cache is specified by a sequence of records that conforms to the PCDSDTUPLECACHE rule.

If the OLAP PivotCache contains a tuple cache, the **fSheetData** field in the BrtBeginPivotCacheDef record MUST be equal to 1.

A tuple cache can contain a cache of cube values (specified by a sequence of records that conforms to the PCDSDTCENTRIES rule), a cache of cube members (specified by a sequence of records that conforms to the PCDSDTCQUERIES rule), a cache of cube sets (specified by a sequence of records that conforms to the PCDSDTCSETS rule), and a cache of cube value server formats (specified by a sequence of records that conforms to the PCDSFCIENTRIES rule).

The sequence of records that conforms to the PCDSDTCEMEMBER rule specifies a tuple cache entry. A tuple cache entry specifies an OLAP Member or a reference to a tuple cache set. See BrtBeginPCDSDTCEMember record for details.

A cache of cube values is a collection of values (specified by the BrtPCDIMissing, BrtPCDINumber, BrtPCDIError, or BrtPCDIString records). Each of these values is optionally followed by a collection of tuple cache entries (specified by a sequence of records that conforms to the PCDSDTCEMEMBERS rule), which specify the OLAP Members or tuple cache sets corresponding to the value.

A cache of cube members is specified by a sequence of records that conforms to the PCDSDTCQUERIES rule. Each of the cube members has an MDX expression, specified by the BrtBeginPCDSDTCQuery record. Each of the BrtBeginPCDSDTCQuery records is optionally followed by

a collection of tuple cache entries (specified by a sequence of records that conforms to the PCDSDTCEMEMBERS rule) corresponding to the MDX expression.

A cache of cube sets is a collection of tuple cache sets (specified by a sequence of records that conforms to the PCDSDTCSETS rule). Each tuple cache set optionally has a collection of tuple cache entries (specified by a sequence of records that conform to the PCDSDTCEMEMBERS rule) corresponding to the MDX expression specified in the BrtBeginPCDSDTCSet record.

A cache of cube value server formats is a collection of **number formats** specified by the BrtPCDSFCIEntry record.

2.2.5.3 PivotTable View

A PivotTable view is a set of structures that specify layout, filtering, sorting and other properties. These properties are used to produce a PivotTable report based on data from the PivotCache.

A PivotTable view is specified by the sequence of records that conforms to the PIVOTTABLE rule.

An OLAP PivotTable view has an associated PivotCache (see Relationship to PivotCache) that is an OLAP PivotCache.

Functionality specified by a PivotTable view includes:

1. The arrangement of pivot fields on the row axis and/or column axis to produce a PivotTable report.
2. Using data items on the data axis to show summarized result values in the PivotTable report.
3. Filtering data in the PivotTable report by performing manual filtering, filtering by criteria or filtering in the page axis.
4. Determining the PivotTable layout.
5. Formatting the entire PivotTable report with a tables style. See the BrtTableStyleClient record for details.
6. Formatting an area of the PivotTable report in a way that logically tracks changes in the PivotTable report. Formatting settings are associated with logical parts of the PivotTable view, and not with fixed ranges on the sheet. See the sequence of records conforming to the SXFORMAT rule for details.
7. **Conditional formatting** an area of the PivotTable report in a way that logically tracks changes in the PivotTable report and performs calculations based on the fact that the area is in a PivotTable report. See the sequence of records conforming to the SXCONDFMT rule for details.
8. Sorting pivot items of pivot fields within the PivotTable report. For details, see Pivot Field Sorting.

Non-OLAP PivotTable views enable the creation of different PivotTable reports associated with the same PivotCache. This enables the creation of different visual representations without duplicating the PivotCache.

2.2.5.3.1 Relationship to PivotCache

A PivotTable view is associated with a PivotCache through the **idSx** field of a BrtBeginPivotCacheID record that matches the **idCache** field of the BrtBeginSXView record that corresponds to this PivotTable view.

A PivotTable view MUST have one and only one associated PivotCache. An OLAP PivotCache MUST NOT be associated with more than one PivotTable view. A non-OLAP PivotCache can be associated with more than one PivotTable view.

2.2.5.3.2 Pivot Fields

A pivot field corresponds to a cache field. A pivot field specifies display information of the data in the PivotTable view.

A pivot field is specified by the sequence of records that conform to the SXVD rule. A pivot field is contained in the PivotTable view. A PivotTable view contains a collection of pivot fields which is specified by the SXVDS rule.

A pivot field index, which identifies a pivot field, is specified to be the zero-based index of a sequence of records that conform to the SXVD rule in the sequence of records that conforms to the SXVDS rule.

Each pivot field is associated with the cache field with a cache field index equal to the pivot field index of this pivot field. For more details, see Cache Field. The number of pivot fields in the PivotTable view MUST equal the number of cache fields in the associated PivotCache.

The principal way that the structure of a PivotTable view is used to create a PivotTable report is that pivot fields can be part of PivotTable axes. Also, a data item can refer to a pivot field.

A pivot field can have pivot items. A pivot field can describe various information such as pivot field sorting and subtotalling settings.

Figure 1 illustrates a PivotTable report with four pivot fields displaying Sales by Product, Country, and Date.

Sum of Sales	Column Labels				
Row Labels	6/5/2007	8/3/2007	9/2/2007	10/5/2007	Grand Total
Bicycle	500		300		800
Canada			300		300
USA	500				500
Car		20000		35000	55000
Canada				35000	35000
USA		20000			20000
Grand Total	500	20000	300	35000	55800

Figure 13: PivotTable report with four pivot fields

2.2.5.3.2.1 Pivot Field Sorting

Pivot items of a pivot field appear in the PivotTable view in a specific order. This **sort order (2)** is only applicable to pivot fields in the row axis or column axis and can be based on the following entities:

- The values of the pivot items associated with this pivot field
- The values of the data items that correspond to the pivot items associated with this pivot field
- The values of the pivot items of a pivot field associated with an OLAP member property. See member properties for more details.
- The ordering of the pivot items associated with this pivot field as determined by the source data provider
- The ordering of instances of the sequence of the records that conform to the SXVI rule for this pivot field within the file

The sort order (2) of a pivot field is specified by the **fAutoSort** field of the BrtBeginSXVD record. If **fAutoSort** is equal to 1, then the sort is performed every time the PivotTable is recalculated.

If the **fAutoSort** field of the BrtBeginSXVD record is equal to 1, the sort order (2) is specified by the value of the **fAscendSort** field of the BrtBeginSXVD record which determines whether the sort is ascending or descending.

The existence of a BrtBeginAutoSortScope record following the BrtBeginSXVD record specifies the scope of the sort, as specified in the following table:

BrtBeginAutoSortScope existence	Meaning
Does not exist	Sorting is based on the values of the pivot items of this pivot field.
Exists	Sorting is either based on the values in the data area or on the values of member properties associated with this pivot field as specified by the sequence of records that conform to the PIVOTRULE rule in the sequence of records that conform to the AUTOSORTSCOPE rule.

If the **fAutoSort** field of the BrtBeginSXVD record is equal to 0, the sort order is determined by the order of instances of the sequence of the records that conform to the SXVI rule for this pivot field.

For OLAP PivotTables, if the **fTensorSort** field of the BrtBeginSXVD record is equal to 1, the sort order is determined by the OLAP source data provider.

2.2.5.3.3 Pivot Items

Pivot items represent specific instances of the entities represented by pivot fields. Each pivot item specifies its display properties. For example it can contain the user defined caption for the pivot item or information about whether this pivot item is hidden or not.

A pivot item is specified by the sequence of records that conform to the SXVI rule. A pivot item is contained in a pivot field. The collection specified by the sequence of records that conform to the SXVIS rule specifies the pivot items of a pivot field.

A pivot item can be referenced by a pivot item index. A pivot item index is specified to be the zero-based index of an SXVI rule in the collection specified by the SXVIS rule.

A pivot item can be associated with a cache item. The **iCache** field of the BrtBeginSXVI record of the pivot item specifies the cache item index of the associated cache item in the associated cache field. If the **itmtype** field of this BrtBeginSXVI record is not PITDATA, then this pivot item MUST NOT have an associated cache item. Two pivot items MUST NOT be associated with the same cache item. Note that although a pivot field index references a pivot field that corresponds to the cache field with the same cache field index, a pivot item index might not reference a pivot item that corresponds to a cache item with the same cache item index.

The number of pivot items, where the **itmtype** field of the BrtBeginSXVI record of the pivot item is PITDATA, MUST equal zero or the number of cache items in the cache field of the pivot field.

2.2.5.3.4 Pivot Hierarchies

A pivot hierarchy corresponds to a cache hierarchy.

A pivot hierarchy is specified by the sequence of records that conform to the SXTH rule. A pivot hierarchy is contained in a PivotTable view.

Pivot hierarchies MUST NOT exist in a non-OLAP PivotTable view.

A PivotTable view has a collection of pivot hierarchies as specified by the sequence of records that conform to the SXTHS rule.

A pivot hierarchy can be referenced by a pivot hierarchy index which is a zero-based index of an SXTH rule in the collection specified by the SXTHS rule.

Each pivot hierarchy is associated with a cache hierarchy with a cache hierarchy index, as specified in the Cache Hierarchies section, equal to the pivot hierarchy index of this pivot hierarchy.

A pivot hierarchy can have pivot fields associated with it. The pivot fields associated with a pivot hierarchy do not need to exist if they have not been used by the application.

The association between a pivot hierarchy and pivot fields can be determined by the following: A pivot hierarchy has an associated cache hierarchy. This associated cache hierarchy in turn has cache fields associated with it. See Cache Hierarchies for more details. These specific cache fields have pivot fields associated with them. See Pivot Fields for more details.

A pivot hierarchy can be on a PivotTable axis. When a pivot field associated with a pivot hierarchy is referenced by a data item the pivot hierarchy is on the data axis. All pivot fields associated with a pivot hierarchy that is used on a PivotTable axis MUST be placed on the same PivotTable axis as the pivot hierarchy or not on any PivotTable axis.

2.2.5.3.5 Manual Filters

A manual filter enables specific pivot items or OLAP members associated with pivot fields to be shown or **hidden** in the PivotTable view. Manual filtering affects subtotal calculations when pivot fields that have manual filters are located on the row axis, column axis, or page axis. The pivot items that are hidden for such pivot fields are not included when calculating subtotals.

At least one BrtBeginSXVI record in the BrtBeginSXVIs collection MUST have the **fHidden** field equal to 0x0.

Manual filters are applied during PivotTable report calculation prior to any of the other types of filters specified in the following sections. If there are multiple manual filters, they are not applied in a specific order.

Details about manual filtering for pivot fields on the page axis are covered in Page Axis.

2.2.5.3.5.1 Non-OLAP Manual Filters

For non-OLAP PivotTables, the state of the manual filter on a pivot field can be determined by the value of the **fHidden** field of the BrtBeginSXVI records directly following the corresponding BrtBeginSXVD. This field specifies whether the corresponding pivot item is hidden by the manual filter and therefore not displayed in the PivotTable report.

If the **fFilterInclusive** field of the BrtBeginSXVD record is equal to 0x1, pivot items corresponding to new values in the source data are not displayed by default in the PivotTable report after the associated PivotCache has been **refreshed**.

2.2.5.3.5.2 OLAP Manual Filters

For OLAP PivotTable views, manual filtering operates on pivot hierarchies. OLAP manual filtering uses filtering lists to determine what filtering to apply.

The SXTHItem list is specified to be the list of the OLAP members specified by BrtBeginSXTHItem records of the pivot hierarchy

The selected pivot items list is specified to be the list of pivot items, with the **fOlapFilterSelected** field of the BrtBeginSXVI record equal to 0x1, in the pivot fields associated with the pivot hierarchy.

If both the SXTHItem list and the selected pivot items list are empty then, no manual filtering is specified for the pivot hierarchy. Otherwise, the value of the **fFilterInclusive** field of the BrtBeginSXTH record of the pivot hierarchy determines how the lists will be used.

If the **fFilterInclusive** field of the BrtBeginSXTH record of the pivot hierarchy is equal to 0x1, the OLAP members in the SXHItem list and their ascendants and descendants are included in the manual filter, and the pivot items in the selected pivot items list and their ascendants and descendants are included in the manual filter. New OLAP members in the source data will be excluded by default when the PivotTable view is refreshed.

If the **fFilterInclusive** field of the BrtBeginSXTH record of the pivot hierarchy is equal to 0x0, the OLAP members in the SXHItem list and their descendants, are excluded in the manual filter, and the pivot items in the selected pivot items list and their descendants, are excluded in the manual filter. New OLAP members in the source data will be included by default when the PivotTable view is refreshed.

The filtering lists do not include OLAP members which are ascendants or descendants of other OLAP members in the lists.

2.2.5.3.6 Filtering by Criteria

Filtering by criteria is the ability to conditionally show pivot items of pivot fields based on user-defined criteria. For example, a criteria filter might be defined to show all products that sold for more than $30,000.

2.2.5.3.6.1 Advanced Filters

An advanced filter specifies a user-defined criterion that is used to determine the pivot items of a pivot field that are included in subtotal calculations for the PivotTable view and that are displayed in the PivotTable report.

Only advanced filters that are associated with pivot fields that are located on the row axis or the column axis are applied when the PivotTable view is calculated.

An advanced filter is specified by the sequence of records that conforms to the SXFILTER rule, and the **isxvd** field of the BrtBeginSXFILTER record specifies the pivot field associated with the advanced filter.

Advanced filters MUST NOT be applied to pivot fields of a PivotTable view if the value of the **bVerSxMacro** field of the BrtBeginSXView record corresponding to the PivotTable view is less than 3, or OLAP PivotTable views with a value of 0 for the **fSupportSubquery** field of the corresponding BrtBeginPivotCacheDef record.

There are three types of advanced filters: label filter, date filter, and value filter.

A pivot field MUST NOT have more than one associated advanced filter of the same type.

2.2.5.3.6.1.1 Label Filters

A label filter specifies criteria that are applied to pivot item captions to determine which pivot items are included in the calculation of values for the PivotTable view and displayed in the PivotTable report.

A label filter is specified by a BrtBeginSXFILTER record with the **sxft** field equal to a value in the range 0x00000004 through 0x00000011.

Label filters are applied before any value filters, but the order of label filters is not specified.

If a caption is specified for a pivot item, the label filter is applied to the **displayName** field of the BrtBeginSXVI record associated with that pivot item. If a caption is not specified for a pivot item, the label filter is applied to the value of the cache item associated with that pivot item.

A label filter can be applied to member properties. The **isxvdMProp** field of the BrtBeginSXFILTER record specifies the member property on which this label filter is applied.

2.2.5.3.6.1.2 Date Filters

A date filter specifies a criterion that is applied to pivot items of date type of a pivot field. A date filter determines which pivot items are included in the calculation of the PivotTable view and displayed in the PivotTable report.

Date filters are specified by BrtBeginSXFILTER records with the **sxft** field in the range 0x0000001A through 0x00000041.

For non- OLAP PivotTable views, a date filter can be applied if and only if the BrtBeginPCDFAtbl record associated with the corresponding cache field has the **fDateInField** field equal to 1, the **fMixedTypesIgnoringBlanks** field equal to 0, and the **fNonDates** field is equal 0. For OLAP PivotTable views, a date filter can be applied if and only if the **wAttributeMemberValueType** field of the BrtBeginPCDHierarchy record specifies that the cache hierarchy has a data type of date and the **fTimeHierarchy** field of the BrtBeginPCDHierarchy record is equal to 1, or the **fAttributeMemberValueTypeKnown** field of the BrtBeginPCDHierarchy record is equal to 0 and the **fTimeHierarchy** field of the BrtBeginPCDHierarchy record is equal to 1.

Date filters are applied before value filters and in no specific order.

2.2.5.3.6.1.3 Value Filters

A value filter specifies a criterion that is applied to values of a data item for pivot items of the pivot field that the value filter is applied to. The value filter determines which pivot items are included in the subtotal calculation of the PivotTable view and displayed in the PivotTable view report.

A value filter is specified by the sequence of records specified by the sequence of records that conforms to the SXFILTER rule that contain a BrtBeginSXFILTER record with the **sxft** field equal to a value in one of the following the ranges: 0x00000001 through 0x00000003 or 0x00000012 through 0x00000019.

Value filters are applied after manual filters, date filters and label filters are applied. Value filters are applied in the order in which they are specified in the collection specified by the sequence of records that conforms to the SXFILTERS rule. The subtotals generated as a result of a value filter being applied are used to evaluate the next value filter specified in the SXFILTERS rule.

2.2.5.3.6.2 Simple Filters

A simple filter is a **top N filter** which is also known as an **AutoShow**. The **fAutoShow** field of the BrtBeginSXVD record specifies whether a simple filter is applied for a pivot field. The **fTopAutoShow** field of the BrtBeginSXVD record specifies whether a simple filter applies to the top or bottom *N* items. The **citmAutoShow** field of the BrtBeginSXVD record specifies the number of pivot items displayed.

Simple filters MUST only be applied to pivot fields of a PivotTable view with the **bVerSxMacro** field of the corresponding BrtBeginSXView record less than or equal to 2, or to pivot fields of an OLAP PivotTable view with the **fSupportSubquery** field of the BrtBeginPivotCacheDef record of the corresponding PivotCache equal to zero.

2.2.5.3.7 PivotTable Axes

A PivotTable axis is the set of pivot fields or pivot hierarchies in a PivotTable view used to populate an area of the PivotTable report. The placement and positions of pivot fields on the axes are used to determine the PivotTable Layout. The four axes of a PivotTable view are the page axis, the row axis, the column axis, and the data axis. For non-OLAP PivotTables, a pivot field MUST NOT appear more than once on the PivotTable view, with the exception of the data axis. For non-OLAP PivotTables, a

pivot field can be placed one or more times on the data axis independently of whether it was placed on any other axis. For OLAP PivotTables, a pivot field MUST NOT be placed more than once on any axis. For both OLAP and non-OLAP PivotTables, pivot fields do not have to be placed on any PivotTable axis.

2.2.5.3.7.1 Page Axis

The page axis contains the pivot fields or pivot hierarchies used to populate the page area of the PivotTable report, as specified by PivotTable Layout, and are intended for use as filters. These pivot fields and pivot hierarchies do not affect the layout of the other areas of the PivotTable report, but rather filter the data used by the entire PivotTable view.

The page axis is specified by the sequence of records that conforms to the SXPIS rule. For non-OLAP PivotTables, each sequence of records that conforms to the SXPI rule specifies one pivot field on the page axis. For OLAP PivotTables, each SXPI rule specifies one pivot hierarchy on the page axis. The order in which the pivot fields and pivot hierarchies appear in the SXPIS rule specifies the order that the pivot fields and pivot hierarchies appear in on the page axis.

For non-OLAP PivotTables, the **isxvd** field of the BrtBeginSXPI record specifies the associated pivot field. For OLAP PivotTables, the **isxth** field of the BrtBeginSXPI record specifies the associated pivot hierarchy.

2.2.5.3.7.1.1 Non-OLAP Page Filtering

A non-OLAP PivotTable view can be filtered to not include some pivot items from the pivot fields on the page axis. The PivotTable report only includes values specified by cache items that are associated with pivot items that are filtered in.

The following table specifies how the filtering of pivot items of a pivot field is specified.

In the following table, the first column is the value of the **fEnableMultiplePageItems** field of the BrtBeginSXVD record of the corresponding pivot field, the second column is the value of the **isxvi** field of the BrtBeginSXPI record, and the third column is the value of the **fSubtotalHiddenPageItems** field of the BrtBeginSXView record.

fEnable Multiple PageIte ms	isxvi	fSubtotal HiddenPa geItems	Filtering Behavior
0	Not 0x001000FE	Any	Specifies that the **isxvi** field of the BrtBeginSXPI record specifies a pivot item index, as specified by Pivot Items, of the one pivot item of a pivot field that is filtered in.
Any	0x001000FE	0	Specifies that pivot items are filtered in if and only if the **fHidden** field of the corresponding BrtBeginSXVI records is equal to 0.
Any	0x001000FE	1	Specifies that all pivot items of a pivot field filtered in.

If the **fEnableMultiplePageItems** field of the corresponding pivot field is equal to 1, the **isxvi** field of the BrtBeginSXPI record MUST be equal to 0x001000FE and MUST be ignored.

2.2.5.3.7.1.2 OLAP Page Filtering

The following table specifies which OLAP members in the pivot hierarchy on the page axis are filtered in.

In the following table, the first column is the value of the **fEnableMultiplePageItems** field of the BrtBeginSXTH record.

fEnableMultiplePageItems	Filtering Behavior
0	Specifies that the **irstUnique** field of the BrtBeginSXPI record specifies the one OLAP member that is filtered in.
1	Specifies that the filtering is applied as specified by Manual Filters and OLAP Manual Filters for this pivot hierarchy.

2.2.5.3.7.2 Row Axis

The row axis contains the pivot fields, and an optional data field, used to populate the row area of the PivotTable report, as specified by PivotTable Layout.

The pivot fields on the row axis are specified by the BrtBeginISXVDRws record. The order that the pivot fields and the optional data field appear in that record specifies the order that the pivot fields and the optional data field appear in on the row axis. The order that the pivot fields and the optional data field appear in on the row axis corresponds to the order that the pivot fields and the optional data field are placed in on the row area of the PivotTable report.

For adjacent ISXVD records in the **rgisxvdrws** field of the BrtBeginISXVDRws record, the pivot field or data field that the first ISXVD references is defined to be an outer field with respect to the pivot field or the data field that the second ISXVD references. The pivot field or data field that the second ISXVD references is defined to be an inner field with respect to the pivot field or the data field that the first ISXVD references.

For OLAP PivotTables, all ISXVD records in the **rgisxvdrws** field of the BrtBeginISXVDRws record that reference pivot fields that are associated with the same pivot hierarchy MUST be adjacent. Pivot fields associated with member properties of the pivot hierarchy MUST be located on the row axis after other types of pivot fields associated with the same pivot hierarchy. Pivot fields not associated with member properties of the pivot hierarchy MUST appear on the row axis in an order such that the zero based index of the level of each pivot field associated with the same pivot hierarchy is ascending. The level of a pivot field is specified by the **isxtl** field of the BrtBeginPCDField record of the cache field associated with the pivot field.

For OLAP PivotTables, the **rgisxth** field of the BrtBeginISXTHRws record specifies the order of pivot hierarchies on the row axis.

See also Nesting.

2.2.5.3.7.3 Column Axis

The column axis contains the pivot fields, and an optional data field, used to populate the column area of the PivotTable report, as specified by PivotTable Layout.

The pivot fields on the column axis are specified by the BrtBeginISXVDCols record. The order that the pivot fields and the optional data field appear in that record specifies the order that the pivot fields and the optional data field appear on the column axis. The order that the pivot fields and the optional data field appear in on the column axis corresponds to the order that the pivot fields and the optional data field are placed in on the column area of the PivotTable report.

For adjacent ISXVD records in the **rgixsvdcols** field of the BrtBeginISXVDCols record, the pivot field or data field that the first ISXVD references is defined to be an outer field with respect to the pivot field or the data field that the second ISXVD references. The pivot field or data field that the second ISXVD references is defined to be an inner field with respect to the pivot field or the data field that the first ISXVD references.

For OLAP PivotTables, all ISXVD records in the **rgixsvdcols** field of the BrtBeginISXVDCols record that reference pivot fields that are associated with the same pivot hierarchy MUST be adjacent. Pivot fields associated with member properties of the pivot hierarchy MUST be located on the column axis after other types of pivot fields associated with the same pivot hierarchy. Pivot fields not associated with member properties of the pivot hierarchy MUST appear on the column axis in an order such that the zero based index of the level of each pivot field associated with the same pivot hierarchy is ascending. The level of a pivot field is specified by the **isxtl** field of the BrtBeginPCDField record of the cache field associated with the pivot field.

For OLAP PivotTables, the **rgisxth** field of the BrtBeginISXTHCols record specifies the order of pivot hierarchies on the column axis.

See also Nesting.

2.2.5.3.7.4 Nesting

This section applies to both the row axis and column axis unless otherwise specified. Within this section, axis means the row axis or the column axis as appropriate, fields mean pivot fields and/or the data field on the axis, area means the row area or column area as appropriate, items mean pivot items or data items as appropriate.

The axes specify an order in which the fields are represented in the areas, see PivotTable layout for more information on the areas. Pivot lines within the areas have references to items. Usually a pivot line including an item of an outer field only includes items in the inner fields that exist with the item of the outer field in the source data, subject to the filtering on the PivotTable view. Usually all the instances of an item in the area are grouped together, with grouping on the outer fields taking precedence over grouping on the inner fields. This process is called nesting.

A nested item group is specified to be the contiguous set of pivot lines that have the same item in an outer field.

The following example shows nested item groups for Country, State and City.

Table 1: Nested Item Groups

Country	State	City
USA	Illinois	Chicago
USA	Illinois	Springfield
USA	Louisiana	New Orleans
USA	Louisiana	Baton Rouge
Mexico	Jalisco	Guadalajara

The first two lines are a nested item group for Illinois. The next two lines are a nested item group for Louisiana. The first four lines are a nested item group for USA. The last line is both a nested item group for Jalisco and Mexico. Note that often in a PivotTable report the repeated item labels will be omitted.

For an OLAP PivotTable view, nesting can be the result of either:

- Items of an inner field that are in a different pivot hierarchy than an outer pivot field, or,
- Items of an inner field that is associated with the same pivot hierarchy as an outer pivot field and that correspond to child OLAP members of the OLAP members corresponding to the items of the outer field

2.2.5.3.7.4.1 Collapsing

Settings in the file format can specify that a pivot item of an outer pivot field, rather than having nested pivot items of inner pivot fields, is collapsed. Usually when a pivot item on an outer pivot field

is collapsed, it does not have a nested pivot item group and when it appears in a pivot line, the pivot items of the inner pivot fields for the collapsed pivot item do not appear in the pivot line.

In the example from the Nesting section, if Illinois and Mexico were collapsed, the result might look like:

Country	State	City
USA	Illinois	
USA	Louisiana	New Orleans
USA	Louisiana	Baton Rouge
Mexico		

For a non-OLAP PivotTable view, the collapsed state is specified by the **fHideDetail** field of the BrtBeginSXVI record.

For an OLAP PivotTable view, there are two types of collapsing: child collapsing and attribute hierarchy collapsing.

Child collapsing is when the child pivot items, corresponding to child OLAP members, of a pivot item corresponding to a parent OLAP member in an OLAP hierarchy are not shown.

If a pivot field is the first pivot field of the pivot hierarchy on the axis then the **fDrilledLevel** field of the BrtBeginSXVD record of the pivot field MUST be 1.

If a pivot field is not the first pivot field of the pivot hierarchy on the axis and if the **fDrilledLevel** field of the BrtBeginSXVD record of the pivot field is 1, then there is no child collapsing for the preceding pivot field of the pivot hierarchy on the axis and the **fDrilledMember** field of the BrtBeginSXVI records for the pivot items of the preceding pivot field of the pivot hierarchy on the axis MUST be 0.

If a pivot field is followed by another pivot field of the same pivot hierarchy on the axis, and the **fDrilledLevel** field of the BrtBeginSXVD record of the outer pivot field is equal to 0 and the **fDrilledMember** field of a BrtBeginSXVI record of the pivot item of the outer pivot field is 0, then the pivot item containing the BrtBeginSXVI record is collapsed using child collapsing.

Attribute hierarchy collapsing only occurs when an outer pivot field is associated with a pivot hierarchy that is an attribute hierarchy, as specified by the **fAttributeHiearachy** field of the BrtBeginPCDHierarchy record of the associated cache hierarchy, and the inner pivot field immediately following that outer pivot field is associated with a different pivot hierarchy that is an attribute hierarchy. In that case, if a pivot item is attribute hierarchy collapsed, pivot items, corresponding to OLAP members, will not be shown for the inner pivot field. The attribute hierarchy collapsed state of a pivot item is specified by the **fCollapsedMember** field of the BrtBeginSXVI record. The **fItemsDrilledByDefault** field of the BrtBeginSXVD record provides a default value for pivot items of the pivot field.

For an OLAP PivotTable view, there can be pivot items from an inner pivot field on the pivot line if either the outer pivot field is collapsed and the inner pivot field and outer pivot field are in different pivot hierarchies and attribute hierarchy collapsing is not being used or if the pivot items are member properties.

2.2.5.3.7.4.2 Subtotalling

A nested item group, as specified in Nesting, can have summaries of the values for the items in the nested item group, called subtotals. A subtotal is typically an aggregation such as a sum, count or average of the values of the items.

The creation of subtotals is specified by the **fDefault**, **fSum**, **fCounta**, **fAverage**, **fMax**, **fMin**, **fProduct**, **fCount**, **fStdev**, **fStdevp**, **fVariance** and **fVariancep** fields of the BrtBeginSXVD record of

the pivot field. If none of the fields are equal to 1, then no subtotals exist for the pivot field. If the **fDefault** field is equal to 1, the subtotal calculation for each item is done according to the **aggregation functions** of the data items on the data axis, as specified by the **iiftab** field of the BrtBeginSXDI record for each data item.

For example, the subtotal is calculated as the sum of the relevant values of the nested item group for a data item with a sum aggregation function and subtotal is calculated as the average of the relevant values of the nested item group for a data item with an average aggregation function.

The other subtotal fields are called custom subtotals because they override the data item aggregation function when calculating subtotals. In some cases, such as for certain OLAP PivotTable views, the source data is not able to provide a requested subtotal.

The **fOutline** field of the BrtBeginSXVD record specifies that an extra pivot line is added at the logical top of the nested item groups if the pivot field is on the row axis. This pivot line contains the item and any items of member property pivot fields, if they are shown, but no other items of pivot fields inner of this pivot field.

The **fOutlineData** field of the BrtBeginSXView record specifies that an extra pivot line is added at the logical top of the nested item groups if the data field is on the row axis. This pivot line contains the data item, but no other items for inner pivot fields of this data field.

If the **fDefault** field of the BrtBeginSXVD record of the pivot field is equal to 1, and the **fOutline** field of the BrtBeginSXVD record of the pivot field is equal to 1, the pivot field is on the row axis, and the data field is not placed inner of the pivot field on the row axis, then the following is specified for the **fSubtotalAtTop** field of the BrtBeginSXVD record of the pivot field:

Value of fSubtotalAtTop	Meaning
0x0	Specifies that subtotal pivot lines are added at the bottom of the nested item groups. If the **irstSub** field of the BrtBeginSXVD record is present, it specifies details for the subtotal label used. If the **irstSub** field of the BrtBeginSXVD record is not present, an application specific subtotal label is used.
0x1	Specifies that the pivot lines added, as specified by the **fOutline** field of the BrtBeginSXVD record being equal to 1, are used for displaying the subtotals in the data area.

In the following figure, the Category, Subcategory and Product columns represent pivot fields on the row axis and the Color column represents a member property pivot field associated with the Product pivot field. Subtotals are displayed at the logical top of the nested item groups for Clothing, Caps and Gloves.

Category	Subcategory	Product	Color	Internet Sales Amount
Clothing				$54,708.80
	Caps			$19,688.10
		AWC Logo Cap	Multi	$19,688.10
	Gloves			$35,020.70
		Half-Finger Gloves, S	Black	$11,951.12
		Half-Finger Gloves, M	Black	$12,220.51
		Half-Finger Gloves, L	Black	$10,849.07
Grand Total				$54,708.80

Figure 14: PivotTable report with Category and Subcategory pivot fields with fOutline and fSubtotalAtTop fields of the BrtBeginSXVD records equal to 1

2.2.5.3.7.5 Data Axis

The data axis contains the pivot field values that are used to populate the data area of the PivotTable report, as specified by PivotTable Layout. This axis also specifies additional information related to aggregation and presentation of the values, as specified by Data Items. The data axis is specified by the sequence of records that conforms to the SXDIS rule. The order in which the records appear in the SXDIS rule specifies the order that the pivot fields appear in on the data axis.

2.2.5.3.7.5.1 Data Items

A data item is a pivot field placed on the data axis. Each data item is specified by the sequence of records that conforms to the SXDI rule.

A BrtBeginSXDI record specifies the reference to the pivot field that is associated with a data item. It also specifies additional information that is used to produce or present aggregated values.

A data item can be referenced by a data item index, which is the zero-based index of the BrtBeginSXDI record in the collection of BrtBeginSXDI records, as specified by the SXDI rule in the PivotTable part ABNF, that specifies the pivot field associated with the data item.

2.2.5.3.7.5.2 Data Field

The data field is a conceptual field that represents all data items and allows them to be referenced as a single object. The data field is intended to allow all data items to be placed on the row axis or column axis.

If the PivotTable view has more than one data item, then the data field MUST be located on either the row axis, as specified by the **rgisxvdrws** field of the BrtBeginISXVDRws record, or the column axis, as specified by the **rgisxvdcols** field of the BrtBeginISXVDCols record. For an OLAP PivotTable that has the data field located on the row axis, the data field MUST be referenced in the **rgisxth** field of the BrtBeginISXTHRws record. For an OLAP PivotTable that has the data field located on the column axis, the data field MUST be referenced in the **rgisxth** field of the BrtBeginISXTHCols record.

2.2.5.3.8 PivotTable Layout

The PivotTable report in the sheet has four main areas: the row area, the column area, the data area, and the page area.

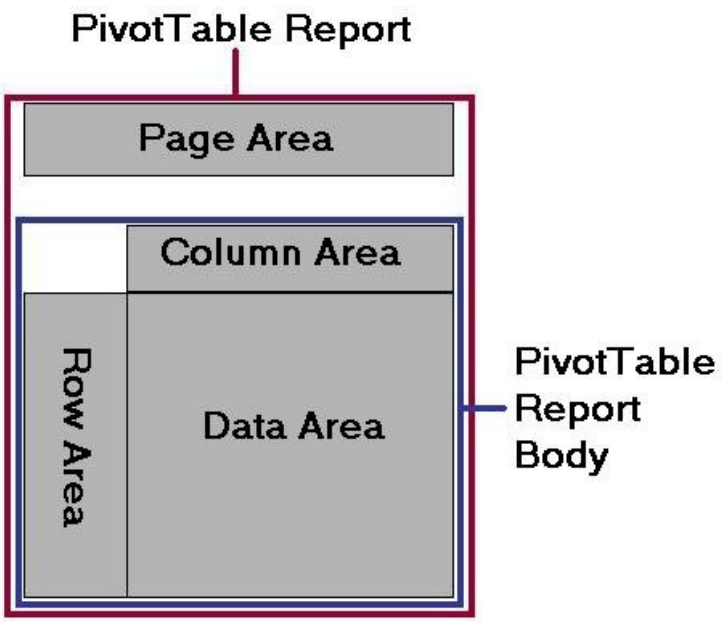


Figure 15: PivotTable report illustrating the four different areas

All the records described here MUST exist in the same PivotTable part as specified by the PivotTable part ABNF.

2.2.5.3.8.1 Location and Body

The column area is located immediately above the data area. The cell in the column area containing the pivot item **caption** or data item caption to the farthest **logical left** is in the same column as the **logical top-left** cell of the data area.

The row area is located immediately to the logical left of the data area. The cell in the row area containing the top-most pivot item caption or data item caption is in the same row as the logical top-left cell of the data area.

The PivotTable report body is the rectangular area defined by the union of the row area, column area, and data area.

The page area, if it is not empty, is located above the PivotTable report body. There is one row between the top-most cell of the PivotTable report body and the bottom-most cell of the page area.

The PivotTable report is a **non-contiguous range** containing the union of the PivotTable report body and the page area.

A BrtBeginSXLocation record specifies details about the location in the sheet and sizes of the areas of the PivotTable report as specified by the following.

The column area of the PivotTable report is specified to be the following range of cells:

Column Area	Row or Column Index
Top row	**rfxGeom.rwFirst**
Bottom row	**rwFirstData** – 1
Logical left column	**colFirstData**
Logical right column	**rfxGeom.colLast**

If **colFirstData** is greater than **rfxGeom.colLast**, the column area does not exist for this PivotTable report.

The row area of the PivotTable report is specified to be the following range of cells:

Row Area	Row or Column Index
Top row	**rwFirstData**
Bottom row	**rfxGeom.rwLast**
Logical left column	**rfxGeom.colFirst**
Logical right column	**colFirstData** – 1

If **colFirstData** – 1 is less than **rfxGeom.colFirstData**, the row area does not exist for this PivotTable report.

The data area of the PivotTable report is specified to be the following range of cells:

Data Area	Row or Column Index
Top row	**rwFirstData**
Bottom row	**rfxGeom.rwLast**
Logical left column	**colFirstData**
Logical right column	**rfxGeom.colLast**

If the row area or the column area does not exist for this PivotTable report, the data area does not exist for this PivotTable report.

The page area of the PivotTable report is specified to be the following range of cells:

Page Area	Row or Column Index
Top row	**rfxGeom.rwFirst** – **cRwPage** – 1
Bottom row	**rfxGeom.rwFirst** – 2
Logical left column	**rfxGeom.colFirst**
Logical right column	**rfxGeom.colFirst** + **cColPage** – 1

If **cRwPage** is equal to 0 and the **fNewDropZones** field of the BrtBeginSXView record is equal to 1 the page area does not exist for this PivotTable report. If **cRwPage** is equal to 0 and the **fNewDropZones** field of the BrtBeginSXView record is equal to 0, then the page area of the PivotTable report is specified to be the following range of cells:

Page Area	Row or Column Index
Top row	**rfxGeom.rwFirst** - 2
Bottom row	**rfxGeom.rwFirst** - 2
Logical left column	**rfxGeom.colFirst**
Logical right column	**rfxGeom.colLast**

2.2.5.3.8.1.1 Row Area

The row area contains pivot fields and/or the optional data field that are placed on the row axis, along with associated pivot items and data items. The first row of the row area can contain pivot field and/or data field captions as specified by the **fNoHeaders** field of the BrtBeginSXView record. If **fNoHeaders** is equal to 0, the pivot field and data field captions are located above their pivot items or data items.

Pivot items or data items of the pivot field or data field that have a position of zero on the row axis are placed in the first column of the row axis. For every other pivot field or data field on the row axis, placement of pivot items or data items are calculated as follows:

- If the previous pivot field or data field is not in **compact axis** mode, then pivot items or data items of the current pivot field or data field are placed in the next column of the row area. Pivot items or data items are grouped by the parent pivot item or data item, which is the pivot item or data item on the immediate logical left. To achieve this, pivot items or data items of the parent pivot field or data field can be repeated multiple times. In this case, when pivot items or data items are repeated, the caption is not necessarily displayed in every cell that contains a pivot item or data item. For more details, see Pivot Lines.

- If the previous pivot field or data field is in compact axis mode, then the pivot items or data items of the current pivot field or data field are placed in the same column as pivot items of the previous pivot field or data field. Pivot items or data items are grouped by the parent pivot item or data item and placed immediately under the parent pivot item or data item.

For the data field, if the **fCompactData** field and the **fOutlineData** field of the BrtBeginSXView record are equal to 1, then the data field is specified to be in compact axis mode. For pivot fields, if the **fCompact** field of the BrtBeginSXVD record is equal to 1 and the **fOutline** field of the BrtBeginSXVD record is equal to 1, then the pivot field is specified to be in compact axis mode.

The row area can have special entries at the end for **grand totals**. If there are no pivot fields and no data field on the row axis, then the row area is empty.

2.2.5.3.8.1.2 Column Area

The column area contains pivot fields and/or the optional data field placed on the column axis, along with associated pivot items and data items. The first row of the column area can contain pivot field and data field captions as specified by the **fNoHeaders** field of the BrtBeginSXView record.

If the **fNoHeaders** field and the **fCompactData** field of the BrtBeginSXView record are both equal to 0 and no pivot fields are in compact axis mode, then the pivot field and/or the data field captions are placed sequentially in cells of the first row of the column area according to their placement on the column axis.

If the **fNoHeaders** field of the BrtBeginSXView record is equal to 0 and the **fCompactData** field and the **fOutline** field of the BrtBeginSXView record are both equal to 1, or if the the **fNoHeaders** field of the BrtBeginSXView record is equal to 0 and any pivot field is in compact axis mode, then the pivot field and/or the data field captions are placed in the top logical left cell of the column area.

For the data field, if the **fCompactData** field and the **fOutlineData** field of the BrtBeginSXView record are equal to 1, then the data field is specified to be in compact axis mode. For pivot fields, if the **fCompact** field of the BrtBeginSXVD record is equal to 1 and the **fOutline** field of the BrtBeginSXVD record is equal to 1, then the pivot field is specified to be in compact axis mode.

If the **fNoHeaders** field of the BrtBeginSXView record is equal to 1, the pivot field and/or the data field captions are not displayed. The row containing pivot item or data item captions for the pivot field or data field at position *n* on the column axis is row *n* of the column area.

If the **fNoHeaders** field of the BrtBeginSXView record is equal to 0, the second row in the column area contains pivot item or data item captions for the pivot field or data field placed first on the column axis, and each subsequent row contains the pivot item or data item captions for pivot fields or data fields that occur later on the column axis. The row containing pivot item or data item captions for the pivot field or data field at position *n* is row (*n*+1) of the column area.

The column area can have special entries at the end for grand totals.

2.2.5.3.8.1.3 Page Area

The page area contains pivot fields that are placed on the page axis for non-OLAP PivotTable views and pivot hierarchies that are placed on the page axis for OLAP PivotTable views. For each pivot field or pivot hierarchy on the page axis, there are two cells in the page area. The cells are arranged in pairs with each pair having a logical left cell and a **logical right** cell that are horizontally adjacent to each other. The cell on the logical left contains the caption of the pivot field and the cell on the logical right contains information about the current filtering associated with the pivot field or pivot hierarchy. The relative position of the page area is specified by the BrtBeginSXLocation record. For more details, see Location and Body.

2.2.5.3.8.1.4 Data Area

The data area contains summarized values for the PivotTable view. Cells in the data area contain summarized values for associated data items. The summarized value in a cell is restricted by all the pivot items in the column area that are located in the same column, by all the pivot items in the row area that are located on the same row, and by any page filtering applied, as specified in Page Axis.

If the row area has a grand total, then the value in that row is not restricted by pivot items from the row area. If the column area has a grand total, then the value in that column is not restricted by pivot items from the column area. If the PivotTable view has more than one data item, then the associated data item is the one that is located in the same column in the column area or the same row in the row area as the cell with the summarized value. If a PivotTable view has zero data items then the data area is empty.

2.2.5.3.8.2 Truncation

When a PivotTable report does not fit within the boundaries of the sheet it is truncated from the logical right and the bottom. It is truncated such that a part of the PivotTable report is displayed within the sheet boundaries.

2.2.5.3.8.3 Pivot Lines

A pivot line specifies a collection of pivot line entries for a single row or column in the PivotTable report.

Each range that is an intersection of one column and cells from the column area that have pivot items, data items, or a grand total is a pivot line of the column area.

Each range that is an intersection of one row and cells from the row area that have pivot items, data items, or a grand total is a pivot line of the row area.

A pivot line is specified by the sequence of records that conforms to the SXLI rule. The sequence of records that conforms to the SXLIRWS rule specifies the collection of pivot lines for the row area. The order of the SXLIItem structures in the SXLI rules in SXLIRWS is the same as the top-to-bottom order of the pivot lines of the row area.

The sequence of records that conforms to the SXLICOLS rule specifies the collection of pivot lines for the column area. The order of SXLI rules in the SXLICOLS rule is the same as the logical left to logical right order of pivot lines of the column area.

Each pivot line contains a number of pivot line entries. The first number of pivot line entries are specified to be identical to those of the immediately preceding pivot line. These pivot line entries are not stored in the file for this pivot line. The number of pivot line entries that are identical to those of the immediately preceding pivot line is specified by the **cSic** field of the SXLIItem record. BrtBeginSXLI record. Additional pivot line entries are specified by the BrtBeginIsxvis record.

The first pivot line in the row area or the column area MUST have a **cSic** field of its associated SXLIItem structure equal to 0.BrtBeginSXLI record equal to 0.

The following shows an example of how to construct pivot lines from an SXLIRWS rule.

Country	State	City	Sales
Australia	Queensland	Brisbane	10779
		Hawthorne	13721
	Queensland Total		24500
Australia Total			24500
USA	California	San Francisco	15998
	California Total		15998
	Washington	Seattle	12335
		Tacoma	11498
	Washington Total		23833
USA Total			39831

cSic	rgisxvi	Copied	Pivot Line
0	{0,1,0}	{}	{0,1,0}
2	{1}	{0,1}	{0,1,1}
1	{1}	{0}	{0,1}
0	{0}	{}	{0}
0	{1,0,2}	{}	{1,0,2}
1	{0}	{1}	{1,0}
1	{2,3}	{1}	{1,2,3}
2	{4}	{1,2}	{1,2,4}
1	{2}	{1}	{1,2}
0	{1}	{}	{1}

Figure 16: PivotTable and the table used to create each pivot line on the row axis

In this example, the table to the right contains the different components used to construct each pivot line, and the resulting pivot line. The first column contains the value of the **cSic** field from each BrtBeginSXLI in the SXLIRWS rule. The second column contains the array of pivot line entries specified by the **rgisxvi** field in the BrtBeginIsxvis record of each SXLI rule.

The third column, labeled "Copied", represents the array of pivot line entries of the previous pivot line that are to be copied to construct the current pivot line. The values in this column are determined by copying the first *n* items, where *n* is equal to the value in the cSic column. If the value in the cSic column is 0, no items need to be copied from the preceding pivot line.

The fourth column, labeled "Pivot Line", represents the final array of pivot line entries that make up the pivot line. This array is constructed by taking the union of the array in the "Copied" column and the "rgisxvi" column, maintaining the order.

2.2.5.3.8.4 Pivot Line Entries

Pivot line entries specify references to the pivot items or data items of a pivot line. Pivot line entries are specified by the records that conform to the ISXVIS rule in the SXLI rule. A pivot line entry is an element in the array specified by the **rgisxvis** field of the BrtBeginISXVIs record.

All pivot line entries with a zero-based index in a pivot line less than the value specified by the **cSic** field of the BrtBeginSXLI record of this pivot line are specified to be identical to those of the preceding pivot line.

For the purposes of the rest of this section, *n* specifies a position of the pivot line entry on this pivot line.

If the value of *n* is less than the **cSic** field of the BrtBeginSXLI record of a given pivot line, then the pivot line entry at position *n* is identical to the corresponding pivot line entry of the pivot line preceeding the given pivot line.

If the value of *n* is greater than or equal to the **cSic** field of the BrtBeginSXLI record of this pivot line, then the value of *n* is equal to the sum of the **cSic** field of the BrtBeginSXLI record and the current index in the **rgisxvis** field of the BrtBeginISXVIs record of this pivot line.

If a pivot line entry is in a pivot line in the row area, each pivot line entry at any position *n* specifies a pivot item index of a pivot item in the *n*th pivot field on the row axis or specifies a data item index, if the *n*th field on the row axis is the data field.

If a pivot line entry is in a pivot line in the column area, each pivot line entry at any position *n* specifies a pivot item index of a pivot item in the *n*th pivot field on the column axis or specifies a data item index, if the *n*th field on the column axis is the data field.

If the *n*th pivot field on the row axis or column axis is the data field, the pivot line entry is a data item index, as specified by Data Items.

Pivot items and data items are specified sequentially from logical left to logical right for row pivot lines, and from top to bottom for column pivot lines.

A value of 0x0001000FE is used to specify the absence of a pivot item or data item.

2.2.5.3.9 PivotTable Rules

A PivotTable rule can be used to identify cells in a PivotTable report. A PivotTable rule is specified by the sequence of records that conforms to the PIVOTRULE rule. Each PivotTable rule references a specific area of a PivotTable report, pivot fields, the data field, or cache fields and optionally corresponding pivot items, data items, or cache items associated with cells in a PivotTable report. When cache items are referenced, the PivotTable rule references calculated items associated with those cache items.

Each sequence of records that conforms to the PRFILTER rule in the PIVOTRULE rule specifies a set of pivot items, data items, or cache items for an individual pivot field, data field, or cache field. This set of pivot items, data items, or cache items is specified by the sequence of records that conforms to the PRFITEM rules within the PRFILTER rule.

The **fCacheBased** and **isxvd** fields of the BrtBeginPRule record specify whether the PivotTable rule specifies cache items, pivot items, or data items.

- If **fCacheBased** field of the BrtBeginPRule record equals 1, then this PivotTable rule references cache items.
- If **fCacheBased** field of the BrtBeginPRule record equals 0 and the **isxvd** field of the BrtBeginPRule record equals -2, then this PivotTable rule references the data field.
- If **fCacheBased** field of the BrtBeginPRule record equals 0 and the **isxvd** field of the BrtBeginPRule record not equals -2, then this PivotTable rule references pivot items.

Cells that are associated with any pivot item, data item, or cache item from an individual PRFILTER rule and that meet restrictions specified by the BrtBeginPRFilter record are associated with this PRFILTER rule.

Cells that are associated with every PRFILTER rule of the PIVOTRULE rule are associated with the PRFILTERS rule in the PIVOTRULE rule. Cells that are associated with the PRFILTERS rule in the PIVOTRULE rule and that meet the restrictions specified by the BrtBeginPRule record are the cells specified by the PivotTable rule.

A cell is associated with a particular cache item if it is associated with the pivot item that has an association with that cache item.

2.2.5.4 OLAP Data Model

This section provides background information on the underlying data model for OLAP entities.

The principal unit of scope is an **OLAP cube**. See External Connections for information on how an OLAP cube is accessed. Items within an OLAP cube can be addressed by an MDX unique name string. Within an OLAP cube, there are OLAP hierarchies, OLAP measures and OLAP sets.

An OLAP hierarchy consists of one or more OLAP levels and OLAP member properties. An OLAP level consists of one or more OLAP members. An OLAP member is an atomic unit of data, for example customer "Jim Smith", or a grouping of data, for example "customers in the city of Chicago". OLAP levels contain OLAP members of similar type within an OLAP hierarchy. OLAP members can have parent and child members in OLAP levels above and below them, for example "Jim Smith" might be a child of "customers in the city of Chicago". An OLAP member property can be associated with a single OLAP level or all OLAP levels of an OLAP hierarchy, for example a "Mayor" OLAP member property might be associated with a "City" OLAP level.

An **OLAP tuple** is a way of combining multiple OLAP members to reference a particular point in an OLAP cube, for example "customers in the city of Chicago" and "2008" references data in the OLAP cube corresponding to the year 2008 and customers in Chicago.

An OLAP measure is a value that is available in the OLAP cube. Usually it is numeric, "Sales" and "Head Count" are typical examples of OLAP measures. An OLAP measure is an OLAP member in a measures OLAP hierarchy. For a PivotTable view, OLAP measures are stored differently from other OLAP members in this file format.

An OLAP tuple including an OLAP measure can be used to get a value, for example "customers in the city of Chicago", "2008" and "sales" might reference the value $659,000.

An OLAP named set is a collection of OLAP tuples. OLAP named sets are typically used for specific analytical needs that require custom logic, for example an OLAP named set might be defined as the OLAP tuples corresponding to "the top 10 customers by month and sales".

2.2.6 Styles

The styles part contains formatting and **protection** information. This information is used to describe the cell formatting in a sheet.

Cell formatting is composed of several sets of properties:

- **Font** properties (bold, italic, font color, font size, etc…)
- **Fill** properties (foreground and background colors, pattern, gradient, etc…)
- Alignment properties (left, center, right alignment, etc…)
- **Border** properties (left, right, top, bottom, thick or thin, color, etc…)
- Number formatting properties (date, time, number of decimal places, etc…)
- Protection properties (**locked**, hidden, etc…)

These properties, as a whole, describe how a particular cell is displayed and/or printed.

There are two types of objects in the styles part that contain formatting properties. They are XFs and DXFs. In general, XFs describe the formatting directly associated with a cell, and DXFs describe additional formatting properties that can be applied to one or more cells.

2.2.6.1 XFs

XFs specify formatting for cells and cell styles.

XFs are specified by BrtXF records. BrtXF records specify font, fill, border and number formatting via indices into the FONTS, FILLS, BORDERS and FMTS collections. Alignment and protection properties are specified directly in the BrtXF record.

2.2.6.1.1 Cell XFs

Cell XFs are specified by BrtXF records in the CELLXFS collection. Each cell MUST reference a cell XF. These records specify the complete set of formatting properties for the cells that reference them.

2.2.6.1.2 Cell Styles

Cell styles specify a set of formatting properties that can be associated with one or more cells. Cell styles provide two benefits:

1. The set of formatting properties in a cell style can be applied to one or more cells in a single operation.
2. Once a cell style is applied to a cell, subsequent changes to the formatting properties in the cell style can be propagated to the cell automatically.

For example, if it is desired that multiple cells in a sheet share a common set of formatting properties, like bold font with a blue fill, then cell style make it convenient to apply this set of formatting, and potentially modify the set later.

A BrtStyle record specifies a **friendly name** for a cell style.

2.2.6.1.2.1 Cell Style XFs

A cell style XF defines the set of formatting properties in a cell style, and is specified by a BrtXF record in the CELLSTYLEXFS collection. Each cell MUST reference a cell XF, and each cell XF MUST reference a cell style XF with the **ixfParent** field.

2.2.6.1.2.2 Normal Style

At least one cell style MUST be included in the STYLES collection and this cell style is called the normal style. The normal style MUST reference the first BrtXF record in the CELLSTYLEXFS collection, and this BrtXF record MUST be a cell style XF, where the **fStyle** field equals 1.

The normal style, being the only required cell style, ensures that all cells have a cell style to reference. The normal style also provides a convenient object in which to store default cell formatting properties for an entire workbook, because all cells will typically reference the normal style by default, until they are modified to reference a different cell style.

2.2.6.2 Differential Formatting (DXFs)

Like XFs, DXFs define a set of formatting properties. Unlike XFs, DXFs can define any number of formatting properties, from just one to all of them.

DXFs provide a way for features to reference a set of formatting properties. How those properties are used depends on the feature. The subsections that follow describe each of these features and how they use DXFs.

DXFs are specified by BrtDXF records in the DXFS collection.

2.2.6.2.1 Conditional Formatting

Some conditional formatting rules, as specified by BrtBeginCFRule, reference a DXF. That DXF describes additional formatting applied to cells within the bounds of the rule, if the rule's condition is TRUE for those cells.

2.2.6.2.2 Table Style Elements

Table style elements, as specified by BrtTableStyleElement, can reference a DXF. That DXF describes additional formatting applied to cells within the bounds of the table style element.

2.2.6.2.3 Table Block-Level Formatting

A table, as specified by the BrtBeginList record, can reference a DXF via the **nDxfHeader**, **nDxfData**, **nDxfAgg**, **nDxfBorder**, **nDxfHeaderBorder** or **nDxfAggBorder** fields. These DXFs represent formatting that can be applied to the cells within those areas of the table.

2.2.6.2.4 PivotTable Areas

A PivotTable format record, as specified by BrtBeginSXFormat, can reference a DXF. This DXF represents formatting that can be applied to the cells within the appropriate area of the PivotTable.

2.2.6.2.5 Sorting and Filtering

Sorting, as specified by the BrtBeginSortCond, and filtering, as specified by the BrtColorFilter record**,** can include formatting properties as part of their criteria. These properties are stored as DXFs. For example, a filter criteria that is "filter only cells with red font color" will reference a DXF with the property "font color = red".

2.2.6.3 Table Styles

Table styles specify additional formatting for cells inside tables or PivotTables.

Tables and PivotTables specify an applied table style with the BrtTableStyleClient record. For tables, this record MUST exist in the collection of records beginning with BrtBeginList. For PivotTables, this record MUST exist in the collection of records beginning with BrtBeginSXView.

A BrtTableStyleClient record references a table style by name with the **stStyleName** field.

Table styles are either built-in or custom. Built-in table styles are specified in [ECMA-376] part 4, 3.8.40. Custom table styles used in a workbook are specified in the collection of records beginning with BrtBeginTableStyles.

A table style consists of a collection of table style elements. For custom table styles, these elements are specified by the collection of BrtTableStyleElement records following BrtBeginTableStyle.

Each table style element specifies the formatting to be applied to cells in a particular region of the table or PivotTable. These regions are specified by the possible values of the **tseType** field of the BrtTableStyleElement record.

2.2.6.4 Format Conflicts

As described previously, the formatting to be displayed or printed for a particular cell can be specified in several independent records. It is up to the application to resolve conflicting formatting properties for a particular cell.

As an example, say a cell has a conditional format applied and also falls within the bounds of a table with a table style. Furthermore, say the cell XF, conditional format and table style element all specify a different font color. It is up to the application to decide the appropriate font color to use in this situation.

2.2.7 External References

The External References infrastructure exists to support formulas which reference data sources outside the scope of the sheet on which the formula resides. These sources could be other sheets in the same workbook, data in another workbook, **DDE** links or **OLE** links. A workbook which uses External References will contain a collection of supporting link records, each of which denotes a link to a **data source (1)**. Each formula which incorporates an external reference will point to the appropriate supporting link record to specify the source of the data.

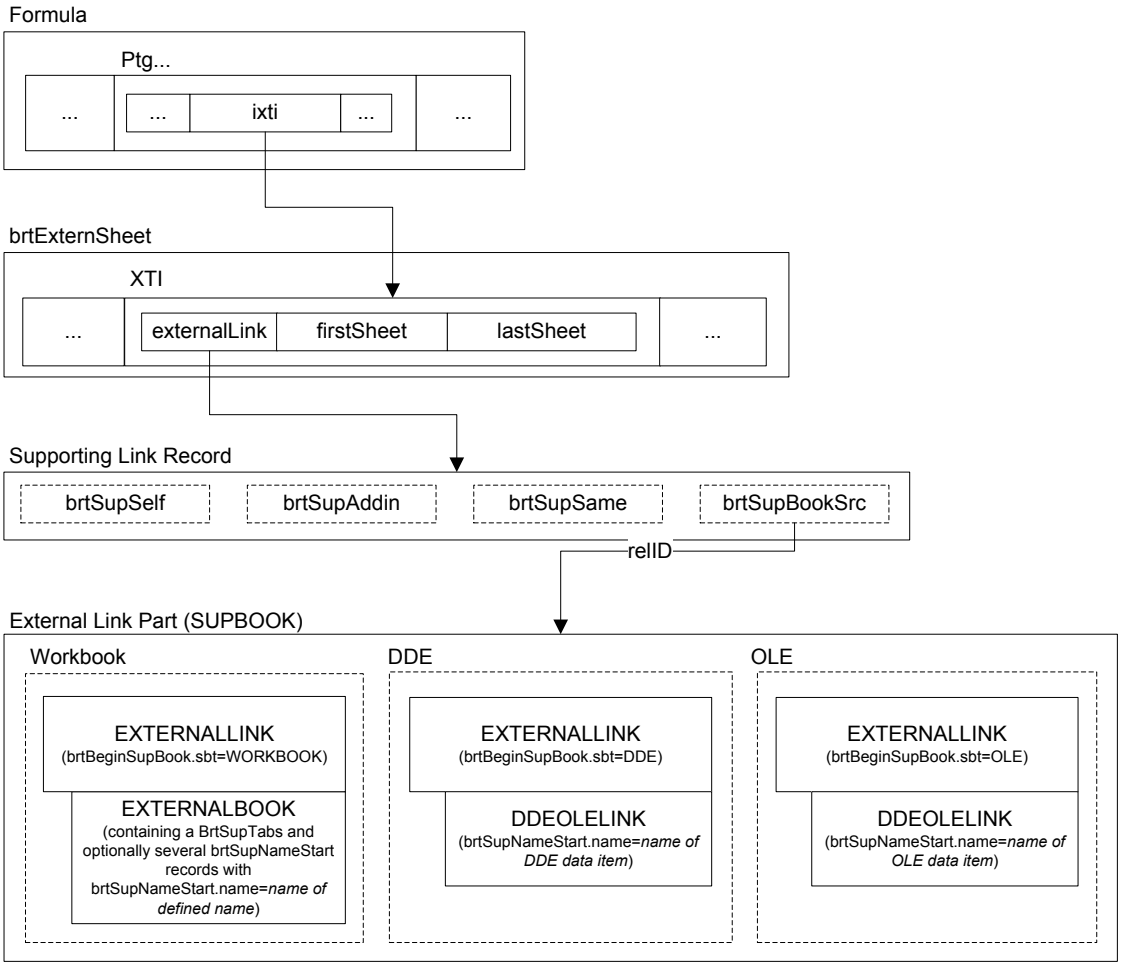


Figure 17: External References

The following sections define terms used in this diagram.

2.2.7.1 External Reference Consumers

Within the formula, only certain formula elements can contain external references. These specific formula elements contain an XtiIndex structure specifying an Xti, which in turn specifies the location and type of the external reference data. Only the following Ptgs can be external reference consumers:

- PtgRef3d
- PtgRefErr3d
- PtgArea3d
- PtgAreaErr3d
- PtgNameX
- PtgList

2.2.7.2 Supporting Link

Each formula element which references external data refers to a Xti. This Xti specifies a particular supporting link record from the collection stored in the workbook. The Xti and supporting link record

together specify where the data used by the formula element resides, and in certain cases, additional data about the supporting link.

2.2.7.3 Supporting Link Record

There are four types of supporting link, which are represented by the four types of supporting link records. The type of the supporting link used is specified by the type of supporting link record that is specified by the Xti. These supporting link types, and the corresponding supporting link record types, are defined in this table:

Supporting Link Type	Supporting Link Record Type	Meaning
Self-Referencing	BrtSupSelf	A reference back into the same workbook. This supporting link type supports cross-sheet references, where the target sheets are specified by the scope information in the Xti. This record can also support **defined name** or **UDF** reference on the same book, although using the PtgName formula element can be simpler.
Same-Sheet Referencing	BrtSupSame	A reference to the **active sheet** in the context of the consuming formula. This supporting link type is used by formula in macro sheets and in defined names to reference the sheet of the caller.
Add-in Referencing	BrtSupAddin	A reference to a UDF on any **XLL** or **COM** automation **add-in**.
External Link Referencing	BrtSupBookSrc	A reference to an external link.

2.2.7.4 External Link

An external link is a type of Supporting Link that references a data source (1) outside the current workbook. The BrtSupBookSrc record that specifies an external link that contains a relationship to an External Links part that will contain further information about this external link. There are three types of external links. The type is specified by **sbt** field in the BrtBeginSupBook record in that External Links part. These three types of external links are specified by the sequence of records that conform to the EXTERNALBOOK rule or by the sequence of records that conform to the DDEOLELINK rule in the External Links part ABNF, and are defined in the following table:

External link type	Record sequence ABNF
External Workbook	EXTERNALBOOK

DDE Data Source	DDEOLELINK
OLE Data Source	DDEOLELINK

2.2.7.4.1 External Workbook Links

An external workbook link is a reference to a workbook other than the one in which the source formula resides. It contains the referencing expression, and data relating to that expression. This data includes the workbook location, sheet names, external defined names, and an external cell cache for referenced cells in that workbook.

2.2.7.4.1.1 External Defined Name

An external defined name is a reference to a defined name in an external workbook. The records specifying the external defined name will provide the name, scope, and formula of the defined name on that workbook. The restrictions on the types of formulas supported in external defined names are described in BrtSupNameFmla.

2.2.7.4.1.2 External Cell Cache

To allow external cell references to be calculated without opening the referenced workbook, an external cell cache is stored in the file which contains cached values for cells in a sheet in an external workbook. The external cell cache contains cell values and value metadata information only about the specific cells which are referenced in that sheet.

The external cell cache is composed of a collection of rows that correspond to rows in the source sheet. These rows, and their row indexes in the source sheet, are specified by a BrtExternRowHdr record. The rows MUST be specified in order of increasing row index. Each row MUST contain one or more external cells.

2.2.7.4.1.2.1 External Cells

An external cell is cached data about a single cell in the external cell cache and is represented of the following records:

- BrtExternCellBlank
- BrtExternCellString
- BrtExternCellReal
- BrtExternCellError
- BrtExternCellBool

External Cell records specify the data type, data value, and the column location of that cell in the source sheet. The external cells in a row in an external cell cache MUST be specified in order of increasing column index. Any value metadata in that External Cell is specified by an optional BrtExternValueMeta record preceding the data records listed earlier.

2.2.7.4.2 DDE Data Source

A DDE Data Source will provide information about the **DDE server** and **DDE topic** name of a **Dynamic Data Exchange (DDE)** connection. The External Links Part specifying this DDE Data Source will also specify individual DDE data items used by this data source (1).

2.2.7.4.2.1 DDE Data Item

A DDE data item will specify the name and properties of a DDE item. It also contains cached values from the most recent DDE data update.

2.2.7.4.3 OLE Data Source

An OLE data source will provide information about an **OLE2** data connection. It will specify the path to the OLE2 data source (1), and the **ProgID** of the application handler. This also specifies the names of the OLE Data Items used in this data source (1).

2.2.7.4.3.1 OLE Data Item

An OLE data item will specify the name and properties of connection to an OLE2 data object, and optionally <3> cached values for the most recent data update.

2.2.8 External Connections

A workbook often pulls in data from external data sources(1), such as a database or an OLAP cube. An external connection represents a link between a workbook and a particular external data source (1). It contains properties about the way that the application establishes the connection to the data source (1) and retrieves the data, such as the type of **data provider** (**OLE DB**, ODBC etc), a **server name**, security information, and a command to execute on the server. In addition, the external connection contains details about the way the connection is used in the workbook, such as how often to refresh the data.

A data connection object contains external connection information for an external data source (1) that a workbook uses. Data connection objects are independent of the constructs in the workbook that display data, such as tables or PivotTables.

A connection definition can be established in an external connection file for easier sharing and reuse, but this overview describes the representation for external data connections that are directly embedded within a workbook file. This embedded representation is required whenever external data is used, and ensures portability of the document and continued operation of the external query in the most cases.

An external connection is specified by a set of records, as defined in EXTCONNECTION; the types of records in the collection are specified by the **idbtype** field of the BrtBeginExtConnection record.

The following record types refer to external connections:

- BrtBeginPCDSource
- BrtBeginQSI
- BrtBeginList

The link between a BrtBeginExtConnection record and the records referring to it is specified by the unique connection identifier. The connection identifier is specified by the **dwConnID** field in the BrtBeginExtConnection record and in the **dwConnID** fields in the records that refer to it. If the **dwConnID** field in one of the referring records is 0, this record does not refer to **external data**.

It is possible for an external connection to not be used by any workbook object. In this case there are no records referring to it.

2.2.8.1 Connection Name

Each external connection has a unique name, which can be used by the application as a friendly name for the connection, for example for UI purposes. The connection name is specified by the **stConnName** field of the BrtBeginExtConnection record.

2.2.8.2 External Connection Files

An external connection file specifies an external connection in a separate file (external to the workbook). An external connection file enables managing connection information separately from a specific workbook and sharing it among multiple workbooks. It is used for creating a new external connection in a workbook or for restoring a lost connection. The **stConnectionFile** field of the BrtBeginExtConnection record specifies a path to an external connection file.

2.2.8.3 OLE DB Connections

An OLE DB connection is a connection to an OLE DB data provider. An external connection is an OLE DB connection if the **idbtype** field of the BrtBeginExtConnection record is DBTOLEDB. Properties of an OLE DB connection are specified by a BrtBeginECDbProps record that MUST follow the BrtBeginExtConnection record. For more information about OLE DB, see [MSDN-OLEDBP].

2.2.8.3.1 OLAP Connections

An OLAP connection is a connection to an OLE DB for OLAP data provider. An OLE DB connection is an OLAP connection if the **icmdtype** field of the BrtBeginECDbProps is CMDCUBE. Properties of an OLAP connection are specified by a BrtBeginECOlapProps record that MUST follow the BrtBeginECDbProps record.

2.2.8.4 ODBC Connections

An ODBC connection is a connection to an ODBC data provider. An external connection is an ODBC connection if the **idbtype** field of the BrtBeginExtConnection record is DBTODBC. Properties of an ODBC connection are specified by a BrtBeginECDbProps record that MUST follow the BrtBeginExtConnection record. If an ODBC connection has parameters, these parameters are specified by a BrtBeginECParams record. For more information about ODBC, see [MSFT-ODBCODCO].

2.2.8.5 Web Connections

A Web connection pulls the content of a Web page, or part of a Web page (an **HTML** table), into the workbook. An external connection is a Web connection if the **idbtype** field of the BrtBeginExtConnection record is DBTWEB. Properties of a Web connection are specified by a BrtBeginECWebProps record that MUST follow the BrtBeginExtConnection record. If a Web connection has parameters, these parameters are specified by a BrtBeginECParams record.

2.2.8.6 Text Import Connections

A **text import** connection pulls in data from a structured text file into the workbook. An external connection is a text import connection if the **idbtype** field of the BrtBeginExtConnection record is DBTTEXT. Properties of a text import connection are specified by a BrtBeginECTxtWiz record that MUST follow the BrtBeginExtConnection record.

2.2.8.7 ADO Recordset Connections

An **ADO** recordset pulls in data from a set of records in an ADO data provider. An external connection is an ADO recordset connection if the **idbtype** field of the BrtBeginExtConnection record is DBTADO. The sequence of records that conforms to the EXTCONNECTION rule for this connection type MUST not contain the sequence of records that conforms to any of the following rules: ECDBPROPS, ECOLAPPROPS, ECWEBPROPS, ECTXTWIZ or ECPARAMS.

Note: For this type of connection, the file format does not contain sufficient information for establishing the connection and fetching a recordset. Data is provided to the application through another mechanism, for example by script code using an **object model**.

2.2.8.8 DAO Recordset Connections

A **DAO** recordset pulls in data from a set of records in a DAO data provider. An external connection is a DAO recordset connection if the **idbtype** field of the BrtBeginExtConnection record is DBTDAO. The sequence of records that conforms to the EXTCONNECTION rule for this connection type MUST not contain the sequence of records that conforms to any of the following rules: ECDBPROPS, ECOLAPPROPS, ECWEBPROPS, ECTXTWIZ or ECPARAMS.

Note: For this type of connection, the file format does not contain sufficient information for establishing the connection and fetching a recordset. Data is provided to the application through another mechanism, for example by script code using an object model.

2.2.9 Password Verifier Algorithm

Several protection records (BrtBookProtection, BrtSheetProtection, BrtCsProtection BrtRangeProtection, and BrtFileSharing) use a password verifier in order to provide a locking and unlocking system for viewing or editing parts of the workbook. This password verifier is used to prevent accidental editing, and is not designed to be used as a security feature. The verifier value is calculated in two stages. First, the provided **Unicode** password string is converted to a new character string in the ANSI codepage of the current system using the algorithm specified in the **revisionsPassword** attribute in [ECMA-376] part 4, 3.2.29. Second, this string is input into the **XOR obfuscation** algorithm specified in [MS-OFFCRYPTO], 2.3.7.1, Binary Document Password Verifier Derivation Method 1 to produce a 16-bit password verifier value.

See Security Considerations for information on security concerns related to the use of this algorithm for password verification in this file format.

2.2.10 Encryption (Password to Open)

Workbook files can contain sensitive information that needs to be protected. A file can be protected by encrypting it using a password. Once a file is encrypted, the data can only be accessed by decrypting the file using a password.

File encryption for this format is specified in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption.

See Security Considerations for information on security concerns relating to file encryption for this file format.

2.2.11 Shared Workbooks

The **shared workbook** infrastructure is used to enable multiple users to make changes to a workbook at the same time and track changes made by certain users. A shared workbook contains a collection of users that currently have the document open and revision logs that contain the changes that users have made to the workbook. Each of these logs has a corresponding revision header associated with it and contains either zero or more revision records that have been made to the shared workbook since it has been shared. A workbook is a shared workbook if and only if the user names stream exist.

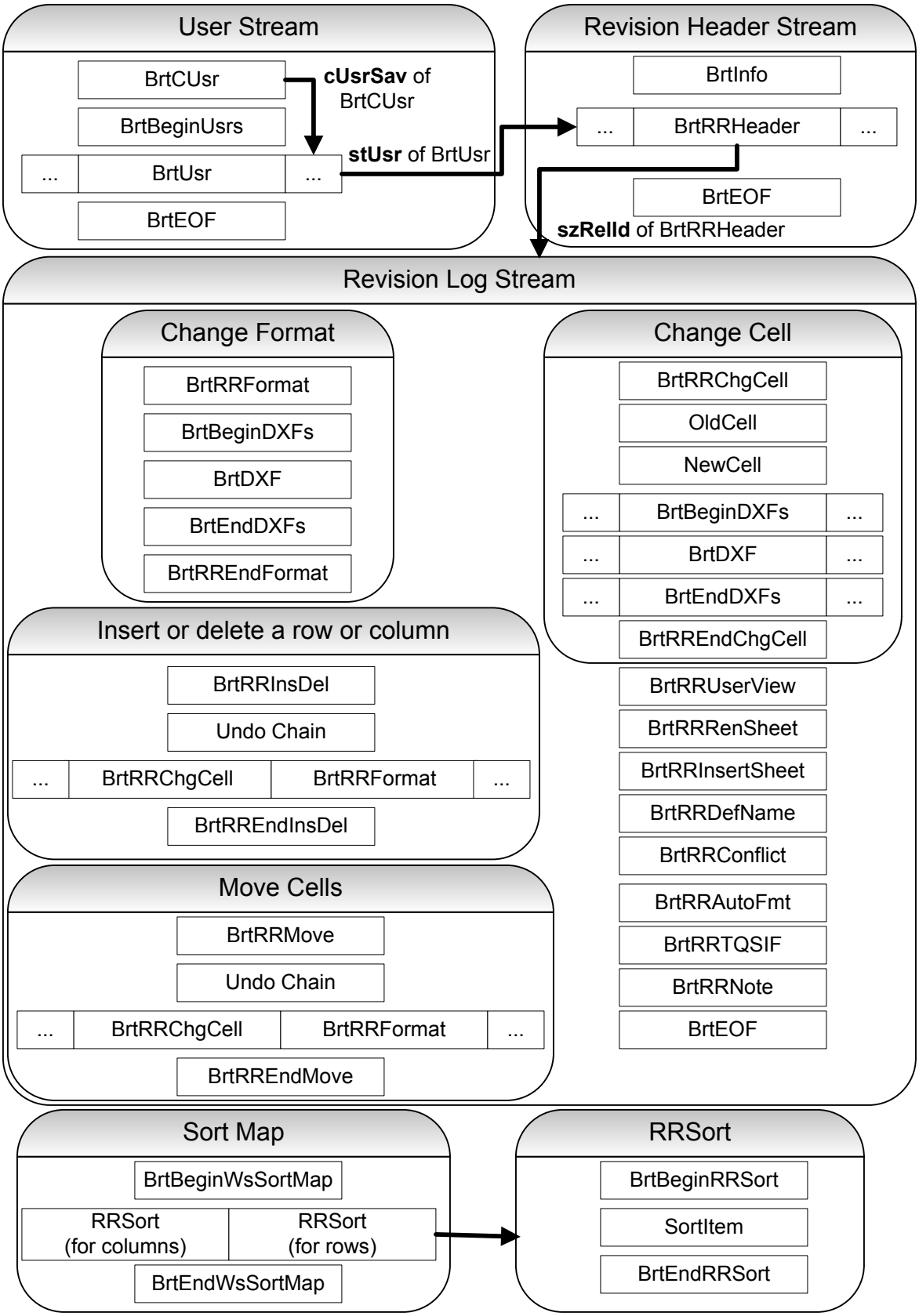


Figure 18: Shared workbooks

The following sections define terms used in this diagram.

2.2.11.1 User Log

The user log contains the set of users who currently have the workbook open. BrtCUsr specifies the number of BrtUsr records that this section contains. Each BrtUsr record corresponds to a user that currently has the workbook open. The **guid** field of BrtUsr maps to the **guid** field of BrtRRHeader to specify the latest revision header and revision logs pair that the user is currently synchronized to.

2.2.11.2 Revision Headers Log

The revision header log contains revision headers (BrtRRHeader) that are used to provide general information about the revision logs. A single revision header exists for each of the revision logs in the workbook and specifies basic information about that particular revision log. The **szRelId** field of the BrtRRHeader specifies a relationship identifier for the corresponding revision log. Each revision log and revision header specifies a user action, such as a unique user opening the workbook for the first time, or a set of changes made by a single user to the shared workbook. The user's name is specified in the **stName** field of BrtRRHeader. The Revision Headers part ABNF also contains general information about the shared workbook in BrtInfo.

2.2.11.3 Revision Logs

The revision logs contain either various revision records that a single user has made to a shared workbook or no revision records if the revision log is meant to specify a user action.

2.2.11.4 Revision Records

Revision records specify changes, or revisions, that a single user has made to a shared workbook. The following changes can be recorded by the shared workbook:

- Inserting or deleting a row or column (BrtRRInsDel)
- Moving a cell (BrtRRMove)
- Changing a cell (BrtRRChgCell)
- Adding or removing a **custom view** (BrtRRUserView)
- Renaming an existing sheet (BrtRRRenSheet)
- Inserting a new sheet (BrtRRInsertSh)
- Changing a defined name (BrtRRDefName)
- Changing a comment (BrtRRNote)
- Conflict resolution from previous conflicting changes (BrtRRConflict)
- Removing a query table (BrtRRTQSIF)
- Changing the format (BrtRRFormat)
- Changing the **AutoFormat** information for a table (BrtRRAutoFmt)

If a change is a reviewable revision, then it will have a **revid** field that is greater than or equal to the **revidMin** field and less than or equal to the **revidMax** field from the corresponding revision header to the revision log that this is contained in.

2.2.11.5 Format Revision

This revision corresponds to a change in formatting. In between BrtRRFormat and BrtRREndFormat, a BrtDXF record can appear in between a BrtBeginDXFs and a BrtEndDXFs. This record specifies the new formatting information associated with this format change.

2.2.11.6 Insertion / Deletion of Rows / Columns Revision

This revision corresponds to an insertion or deletion of a row or column. In between BrtRRInsDel and BrtRREndInsDel, any number of BrtRRFormat and BrtRRChgCell records can appear as well as the other records associated with them. These records specify the cell and format changes as a result of inserting or deleting the row or column. Immediately following BrtRRInsDel, an undo chain can appear.

2.2.11.7 Move Cells Revision

This revision corresponds to moving of a range of cells. In between BrtRRMove and BrtRREndMove, any number of BrtRRFormat and BrtRRChgCell records can appear as well as the other records associated with them. These records specify the cell and format changes as a result of moving the range of cells. Immediately following BrtRRMove, an undo chain can appear.

2.2.11.8 Change Cells Revision

This revision corresponds to a change or edit of a cell. In between BrtRRChgCell and BrtRREndChgCell, one or two cell descriptions as well as zero to two BrtDXF records can appear in between a BrtBeginDXFs and a BrtEndDXFs. The cell descriptions are one of the following records:

- BrtCellBlank
- BrtCellRk
- BrtCellError
- BrtCellBool
- BrtCellReal
- BrtCellSt
- BrtCellIsst
- BrtFmlaString
- BrtFmlaNum
- BrtFmlaBool
- BrtFmlaError

If there are two cell descriptions, the first one specifies the old cell value, where as the second one specifies the new cell value. If there is just one cell description, it specifies the new cell value. If BrtDXF records follow, the first one specifies the old formatting information associated with the cell and the second one specifies the new formatting information that is associated with the cell. If only one BrtDXF record appears, the following heuristic can be used to determine if the formatting information specifies the old or new formatting:

If the **fDxf** field of BrtRRChgCell is true and **fDxfNull** is false, then it specifies new formatting information. If the **fOldFmt** field of BrtRRChgCell is true and **fOldFmtNull** is false, then it specifies old formatting information.

2.2.11.9 Undo Chain

The undo chain is made up of a group of zero or more BrtUCR records that specify undo information for the revision that it is associated with.

2.2.11.10 Sort Map

The sort map contains changes to sorting done on the sheet level in a shared workbook; each sheet can have a sort map (BrtBeginWsSortMap / BrtEndWsSortMap). At a maximum, there are only ever two sorts (BrtBeginRRSort / BrtEndRRSort) per sort map, one specifies sheet level sort changes in rows followed by sheet level sort changes in columns. If there are not any changes in sort for rows or columns, the sort map does not exist for rows or columns respectively.

2.2.12 Volatile Dependencies

Volatile dependencies specify information necessary to update cells that depend on values provided by **real-time data (RTD)** server or cube functions. A cell has a dependency upon an **RTD server** if it contains a formula with a call to the RTD sheet **function**. A cell has a dependency upon an cube function if it contains a formula with a call to one of the cube functions.

All volatile dependencies are organized into a **hierarchy**. The first level of the hierarchy separates dependencies based on their types. Within each type, dependencies are grouped based on their main topic. Within a main topic, each particular volatile dependency on this main topic is specified in a collection.

2.2.12.1 Types

Volatile dependencies are specified in two collections, each specifying all volatile dependency information relating to a specific type of volatile dependencies. The two types of volatile dependencies are those relating to RTD servers and those relating to cube functions. Each of these collections is specified by BrtBeginVolType and BrtEndVolType records, as defined in the Volatile Dependencies part.

2.2.12.2 Main Topic

All volatile dependency information that relates to calls to an RTD or cube function that share the same first parameter value is grouped together in a collection specified by BrtBeginVolMain and BrtEndVolMain records, as defined in the Volatile Dependencies part.

2.2.12.3 Subtopic Sequences

All volatile dependency information relating to cells that contain calls to an RTD or cube function that share the same set of parameter values is specified by a collection of records specified by BrtBeginVolTopic and BrtEndVolTopic records, as defined in the Volatile Dependencies part.

A volatile dependency collection specifies the following:

- The sequence of subtopics which define the dependency, corresponding to a call's parameter values. This is specified by the sequence of BrtVolSubtopic records.
- The last value returned by the call that corresponds to the volatile dependency.
- The set of cells which depend upon the data specified by this volatile dependency, and need to be updated whenever the value cached for this dependency changes. This is specified by the set of BrtVolRef records.

2.2.12.4 Cached returned values

The type of the last value returned by the call that corresponds to a volatile dependency, as well as the value itself, are specified by the BrtVolNum, BrtVolErr, BrtVolBool, or BrtVolStr records, as defined in the Volatile Dependencies part. The value is stored with the volatile dependency until a different value is returned by the corresponding call.

2.3 Record Enumeration

This section specifies the record name associated with a given record type value. For more information on record types, see the section on records.

These associations between record name and record type are listed by record name as well as by record type.

The type-specific meaning and fields for each record type are specified in the sub-section of the Records section corresponding to the record name.

2.3.1 By Name

Name	Record type (number)
BrtActiveX	644
BrtAFilterDateGroupItem	175
BrtArrFmla	426
BrtBeginActiveXControls	643
BrtBeginAFilter	161
BrtBeginAutoSortScope	459
BrtBeginBook	131
BrtBeginBookViews	135
BrtBeginBorders	613
BrtBeginBundleShs	143
BrtBeginCellIgnoreECs	648
BrtBeginCellSmartTag	590
BrtBeginCellSmartTags	592
BrtBeginCellStyleXFs	626
BrtBeginCellWatches	605
BrtBeginCellXFs	617
BrtBeginCFRule	463
BrtBeginColBrk	394
BrtBeginColInfos	390
BrtBeginColorPalette	473
BrtBeginColorScale	469
BrtBeginComment	635
BrtBeginCommentAuthors	630
BrtBeginCommentList	633
BrtBeginComments	628
BrtBeginConditionalFormatting	461
BrtBeginCRErrs	608
BrtBeginCsView	141
BrtBeginCsViews	139
BrtBeginCustomFilters	172

BrtBigName	625
BrtBkHim	562
BrtBookProtection	534
BrtBookView	158
BrtBorder	46
BrtBrk	396
BrtBundleSh	156
BrtCalcProp	157
BrtCellBlank	1
BrtCellBool	4
BrtCellError	3
BrtCellIgnoreEC	649
BrtCellIsst	7
BrtCellMeta	49
BrtCellReal	5
BrtCellRk	2
BrtCellRString	62
BrtCellSmartTagProperty	589
BrtCellSt	6
BrtCellWatch	607
BrtCFVO	471
BrtColInfo	60
BrtColor	564
BrtColorFilter	168
BrtCommentAuthor	632
BrtCommentText	637
BrtCrashRecErr	610
BrtCsPageSetup	652
BrtCsProp	651
BrtCsProtection	669
BrtCUsr	399
BrtCustomFilter	174
BrtDrawing	550
BrtDRef	499
BrtDVal	64

BrtOleObject	639
BrtOleSize	549
BrtPageSetup	478
BrtPane	151
BrtPCDIABoolean	29
BrtPCDIADatetime	32
BrtPCDIAError	30
BrtPCDIAMissing	27
BrtPCDIANumber	28
BrtPCDIAString	31
BrtPCDIBoolean	22
BrtPCDIDatetime	25
BrtPCDIError	23
BrtPCDIIndex	26
BrtPCDIMissing	20
BrtPCDINumber	21
BrtPCDIString	24
BrtPCDSFCIEntry	659
BrtPCRRecord	33
BrtPCRRecordDt	34
BrtPhoneticInfo	537
BrtPlaceholderName	361
BrtPrintOptions	477
BrtRangeProtection	536
BrtRowHdr	0
BrtRRAutoFmt	421
BrtRRChgCell	409
BrtRRConflict	417
BrtRRDefName	415
BrtRREndChgCell	410
BrtRREndFormat	420
BrtRREndInsDel	406
BrtRREndMove	408
BrtRRFormat	419
BrtRRHeader	411

BrtTableStyleClient	513
BrtTableStyleElement	512
BrtTop10Filter	170
BrtUCR	404
BrtUserBookView	397
BrtUsr	400
BrtValueMeta	50
BrtVolBool	527
BrtVolErr	525
BrtVolNum	524
BrtVolRef	523
BrtVolStr	526
BrtVolSubtopic	522
BrtWbFactoid	154
BrtWbProp	153
BrtWebOpt	553
BrtWsDim	148
BrtWsFmtInfo	485
BrtWsProp	147
BrtXF	47

2.3.2 By Number

Name	Record type (number)
BrtRowHdr	0
BrtCellBlank	1
BrtCellRk	2
BrtCellError	3
BrtCellBool	4
BrtCellReal	5
BrtCellSt	6
BrtCellIsst	7
BrtFmlaString	8
BrtFmlaNum	9
BrtFmlaBool	10

BrtFmlaError	11
BrtSSTItem	19
BrtPCDIMissing	20
BrtPCDINumber	21
BrtPCDIBoolean	22
BrtPCDIError	23
BrtPCDIString	24
BrtPCDIDatetime	25
BrtPCDIIndex	26
BrtPCDIAMissing	27
BrtPCDIANumber	28
BrtPCDIABoolean	29
BrtPCDIAError	30
BrtPCDIAString	31
BrtPCDIADatetime	32
BrtPCRRecord	33
BrtPCRRecordDt	34
BrtFRTBegin	35
BrtFRTEnd	36
BrtName	39
BrtIndexRowBlock	40
BrtIndexBlock	42
BrtFont	43
BrtFmt	44
BrtFill	45
BrtBorder	46
BrtXF	47
BrtStyle	48
BrtCellMeta	49
BrtValueMeta	50
BrtMdb	51
BrtBeginFmd	52
BrtEndFmd	53
BrtBeginMdx	54
BrtEndMdx	55

BrtBeginMdxTuple	56
BrtEndMdxTuple	57
BrtMdxMbrIstr	58
BrtStr	59
BrtColInfo	60
BrtCellRString	62
BrtDVal	64
BrtFileVersion	128
BrtBeginSheet	129
BrtEndSheet	130
BrtBeginBook	131
BrtEndBook	132
BrtBeginWsViews	133
BrtEndWsViews	134
BrtBeginBookViews	135
BrtEndBookViews	136
BrtBeginWsView	137
BrtEndWsView	138
BrtBeginCsViews	139
BrtEndCsViews	140
BrtBeginCsView	141
BrtEndCsView	142
BrtBeginBundleShs	143
BrtEndBundleShs	144
BrtBeginSheetData	145
BrtEndSheetData	146
BrtWsProp	147
BrtWsDim	148
BrtPane	151
BrtSel	152
BrtWbProp	153
BrtWbFactoid	154
BrtFileRecover	155
BrtBundleSh	156
BrtCalcProp	157

BrtBeginPivotCacheRecords	193
BrtEndPivotCacheRecords	194
BrtBeginPCDHierarchies	195
BrtEndPCDHierarchies	196
BrtBeginPCDHierarchy	197
BrtEndPCDHierarchy	198
BrtBeginPCDHFieldsUsage	199
BrtEndPCDHFieldsUsage	200
BrtBeginExtConnection	201
BrtEndExtConnection	202
BrtBeginECDbProps	203
BrtEndECDbProps	204
BrtBeginECOlapProps	205
BrtEndECOlapProps	206
BrtBeginPCDSConsol	207
BrtEndPCDSConsol	208
BrtBeginPCDSCPages	209
BrtEndPCDSCPages	210
BrtBeginPCDSCPage	211
BrtEndPCDSCPage	212
BrtBeginPCDSCPItem	213
BrtEndPCDSCPItem	214
BrtBeginPCDSCSets	215
BrtEndPCDSCSets	216
BrtBeginPCDSCSet	217
BrtEndPCDSCSet	218
BrtBeginPCDFGroup	219
BrtEndPCDFGroup	220
BrtBeginPCDFGItems	221
BrtEndPCDFGItems	222
BrtBeginPCDFGRange	223
BrtEndPCDFGRange	224
BrtBeginPCDFGDiscrete	225
BrtEndPCDFGDiscrete	226
BrtBeginPCDSDTupleCache	227

BrtEndSXLI	298
BrtBeginSXLIRws	299
BrtEndSXLIRws	300
BrtBeginSXLICols	301
BrtEndSXLICols	302
BrtBeginSXFormat	303
BrtEndSXFormat	304
BrtBeginSXFormats	305
BrtEndSxFormats	306
BrtBeginSxSelect	307
BrtEndSxSelect	308
BrtBeginISXVDRws	309
BrtEndISXVDRws	310
BrtBeginISXVDCols	311
BrtEndISXVDCols	312
BrtEndSXLocation	313
BrtBeginSXLocation	314
BrtEndSXView	315
BrtBeginSXTHs	316
BrtEndSXTHs	317
BrtBeginSXTH	318
BrtEndSXTH	319
BrtBeginISXTHRws	320
BrtEndISXTHRws	321
BrtBeginISXTHCols	322
BrtEndISXTHCols	323
BrtBeginSXTDMPS	324
BrtEndSXTDMPs	325
BrtBeginSXTDMP	326
BrtEndSXTDMP	327
BrtBeginSXTHItems	328
BrtEndSXTHItems	329
BrtBeginSXTHItem	330
BrtEndSXTHItem	331
BrtBeginMetadata	332

BrtEndMetadata	333
BrtBeginEsmdtinfo	334
BrtMdtinfo	335
BrtEndEsmdtinfo	336
BrtBeginEsmdb	337
BrtEndEsmdb	338
BrtBeginEsfmd	339
BrtEndEsfmd	340
BrtBeginSingleCells	341
BrtEndSingleCells	342
BrtBeginList	343
BrtEndList	344
BrtBeginListCols	345
BrtEndListCols	346
BrtBeginListCol	347
BrtEndListCol	348
BrtBeginListXmlCPr	349
BrtEndListXmlCPr	350
BrtListCCFmla	351
BrtListTrFmla	352
BrtBeginExternals	353
BrtEndExternals	354
BrtSupBookSrc	355
BrtSupSelf	357
BrtSupSame	358
BrtSupTabs	359
BrtBeginSupBook	360
BrtPlaceholderName	361
BrtExternSheet	362
BrtExternTableStart	363
BrtExternTableEnd	364
BrtExternRowHdr	366
BrtExternCellBlank	367
BrtExternCellReal	368
BrtExternCellBool	369

BrtExternCellError	370
BrtExternCellString	371
BrtBeginEsmdx	372
BrtEndEsmdx	373
BrtBeginMdxSet	374
BrtEndMdxSet	375
BrtBeginMdxMbrProp	376
BrtEndMdxMbrProp	377
BrtBeginMdxKPI	378
BrtEndMdxKPI	379
BrtBeginEsstr	380
BrtEndEsstr	381
BrtBeginPRFItem	382
BrtEndPRFItem	383
BrtBeginPivotCacheIDs	384
BrtEndPivotCacheIDs	385
BrtBeginPivotCacheID	386
BrtEndPivotCacheID	387
BrtBeginISXVIs	388
BrtBeginColInfos	390
BrtEndColInfos	391
BrtBeginRwBrk	392
BrtEndRwBrk	393
BrtBeginColBrk	394
BrtEndColBrk	395
BrtBrk	396
BrtUserBookView	397
BrtInfo	398
BrtCUsr	399
BrtUsr	400
BrtBeginUsers	401
BrtEOF	403
BrtUCR	404
BrtRRInsDel	405
BrtRREndInsDel	406

BrtRRMove	407
BrtRREndMove	408
BrtRRChgCell	409
BrtRREndChgCell	410
BrtRRHeader	411
BrtRRUserView	412
BrtRRRenSheet	413
BrtRRInsertSh	414
BrtRRDefName	415
BrtRRNote	416
BrtRRConflict	417
BrtRRTQSIF	418
BrtRRFormat	419
BrtRREndFormat	420
BrtRRAutoFmt	421
BrtBeginUserShViews	422
BrtBeginUserShView	423
BrtEndUserShView	424
BrtEndUserShViews	425
BrtArrFmla	426
BrtShrFmla	427
BrtTable	428
BrtBeginExtConnections	429
BrtEndExtConnections	430
BrtBeginPCDCalcMems	431
BrtEndPCDCalcMems	432
BrtBeginPCDCalcMem	433
BrtEndPCDCalcMem	434
BrtBeginPCDHGLevels	435
BrtEndPCDHGLevels	436
BrtBeginPCDHGLevel	437
BrtEndPCDHGLevel	438
BrtBeginPCDHGLGroups	439
BrtEndPCDHGLGroups	440
BrtBeginPCDHGLGroup	441

BrtEndPCDHGLGroup	442
BrtBeginPCDHGLGMembers	443
BrtEndPCDHGLGMembers	444
BrtBeginPCDHGLGMember	445
BrtEndPCDHGLGMember	446
BrtBeginQSI	447
BrtEndQSI	448
BrtBeginQSIR	449
BrtEndQSIR	450
BrtBeginDeletedNames	451
BrtEndDeletedNames	452
BrtBeginDeletedName	453
BrtEndDeletedName	454
BrtBeginQSIFs	455
BrtEndQSIFs	456
BrtBeginQSIF	457
BrtEndQSIF	458
BrtBeginAutoSortScope	459
BrtEndAutoSortScope	460
BrtBeginConditionalFormatting	461
BrtEndConditionalFormatting	462
BrtBeginCFRule	463
BrtEndCFRule	464
BrtBeginIconSet	465
BrtEndIconSet	466
BrtBeginDatabar	467
BrtEndDatabar	468
BrtBeginColorScale	469
BrtEndColorScale	470
BrtCFVO	471
BrtExternValueMeta	472
BrtBeginColorPalette	473
BrtEndColorPalette	474
BrtIndexedColor	475
BrtMargins	476

BrtTableStyleElement	512
BrtTableStyleClient	513
BrtBeginVolDeps	514
BrtEndVolDeps	515
BrtBeginVolType	516
BrtEndVolType	517
BrtBeginVolMain	518
BrtEndVolMain	519
BrtBeginVolTopic	520
BrtEndVolTopic	521
BrtVolSubtopic	522
BrtVolRef	523
BrtVolNum	524
BrtVolErr	525
BrtVolStr	526
BrtVolBool	527
BrtBeginSortState	530
BrtEndSortState	531
BrtBeginSortCond	532
BrtEndSortCond	533
BrtBookProtection	534
BrtSheetProtection	535
BrtRangeProtection	536
BrtPhoneticInfo	537
BrtBeginECTxtWiz	538
BrtEndECTxtWiz	539
BrtBeginECTWFldInfoLst	540
BrtEndECTWFldInfoLst	541
BrtBeginECTwFldInfo	542
BrtFileSharing	548
BrtOleSize	549
BrtDrawing	550
BrtLegacyDrawing	551
BrtLegacyDrawingHF	552
BrtWebOpt	553

BrtBeginWebPubItems	554
BrtEndWebPubItems	555
BrtBeginWebPubItem	556
BrtEndWebPubItem	557
BrtBeginSXCondFmt	558
BrtEndSXCondFmt	559
BrtBeginSXCondFmts	560
BrtEndSXCondFmts	561
BrtBkHim	562
BrtColor	564
BrtBeginIndexedColors	565
BrtEndIndexedColors	566
BrtBeginMRUColors	569
BrtEndMRUColors	570
BrtMRUColor	572
BrtBeginDVals	573
BrtEndDVals	574
BrtSupNameStart	577
BrtSupNameValueStart	578
BrtSupNameValueEnd	579
BrtSupNameNum	580
BrtSupNameErr	581
BrtSupNameSt	582
BrtSupNameNil	583
BrtSupNameBool	584
BrtSupNameFmla	585
BrtSupNameBits	586
BrtSupNameEnd	587
BrtEndSupBook	588
BrtCellSmartTagProperty	589
BrtBeginCellSmartTag	590
BrtEndCellSmartTag	591
BrtBeginCellSmartTags	592
BrtEndCellSmartTags	593
BrtBeginSmartTags	594

BrtEndSmartTags	595
BrtSmartTagType	596
BrtBeginSmartTagTypes	597
BrtEndSmartTagTypes	598
BrtBeginSXFilters	599
BrtEndSXFilters	600
BrtBeginSXFILTER	601
BrtEndSXFilter	602
BrtBeginFills	603
BrtEndFills	604
BrtBeginCellWatches	605
BrtEndCellWatches	606
BrtCellWatch	607
BrtBeginCRErrs	608
BrtEndCRErrs	609
BrtCrashRecErr	610
BrtBeginFonts	611
BrtEndFonts	612
BrtBeginBorders	613
BrtEndBorders	614
BrtBeginFmts	615
BrtEndFmts	616
BrtBeginCellXFs	617
BrtEndCellXFs	618
BrtBeginStyles	619
BrtEndStyles	620
BrtBigName	625
BrtBeginCellStyleXFs	626
BrtEndCellStyleXFs	627
BrtBeginComments	628
BrtEndComments	629
BrtBeginCommentAuthors	630
BrtEndCommentAuthors	631
BrtCommentAuthor	632
BrtBeginCommentList	633

BrtEndWsSortMap	672
BrtBeginRRSort	673
BrtEndRRSort	674
BrtRRSortItem	675

2.4 Records

2.4.1 BrtActiveX

This record specifies an ActiveX control.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
shapeId																															
strRelID (variable)																															
...																															
strName (variable)																															
...																															

shapeId (4 bytes): An unsigned integer that corresponds to the spid attribute of a shape element in the VML Drawings part as specified in [ECMA-376] Part 4, Section 6.1.2.19. MUST be greater than or equal to 0x00000001 and less than or equal to 0x03FFD7FF. The value of the ObjectType attribute of the ClientData **child element** (specified in [ECMA-376] Part 4, Section 6.4.2.12) of the shape element MUST be "Pict" as specified in [ECMA-376] Part 4, Section 6.4.3.2. The total number of unique identifiers specified by all **shapeId** fields in BrtActiveX records and **shapeId** fields in BrtOleObject records in this worksheet MUST NOT exceed 65535.

strRelID (variable): A RelID that specifies a relationship that specifies an ActiveX part containing control-specific properties and state information for this ActiveX control.

strName (variable): An XLWideString that specifies a name for this ActiveX control. The length of this string MUST NOT exceed 32 characters. The name of the shape MUST correspond to the id attribute of a shape element in the VML Drawings part as specified in [ECMA-376] Part 4, Section 6.1.2.19. This name MUST be unique among all shape names specified in the VML Drawings part of this worksheet.

2.4.2 BrtAFilterDateGroupItem

This record specifies information about a criterion for a date AutoFilter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
yr																mon															

dom	
hour	min
sec	wdy
unused	
dntChecked	

yr (2 bytes): An unsigned integer that specifies the year for the AutoFilter. This value MUST be greater than or equal to 1000 and less than or equal to 9999.

mon (2 bytes): An unsigned integer that specifies the month for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000001, this value MUST be greater than or equal to 1 and less than or equal to 12.

dom (4 bytes): An unsigned integer that specifies the day of the month for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000002, this value MUST be greater than or equal to 1 and less than or equal to 31.

hour (2 bytes): An unsigned integer that specifies the hour for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000003, this value MUST be less than or equal to 23.

min (2 bytes): An unsigned integer that specifies the minute for the AutoFilter. If **dntChecked** is greater than or equal to 0x00000004, this value MUST be less than or equal to 59.

sec (2 bytes): An unsigned integer that specifies the second for the AutoFilter. If **dntChecked** is equal to 0x00000005, this value MUST be less than or equal to 59.

wdy (2 bytes): An unsigned integer that specifies the day of the week for the AutoFilter. This value MUST be one of the following values <4>.

Value	Meaning
0x0001	Monday
0x0002	Tuesday
0x0003	Wednesday
0x0004	Thursday
0x0005	Friday
0x0006	Saturday
0x0007	Sunday

unused (4 bytes): Undefined, and MUST be ignored.

dntChecked (4 bytes): An unsigned integer that specifies what comparisons are made to determine if a cell is displayed. For example, if this value is equal to DNTMONTH, only cells with the same year and month specified in this record are displayed. MUST be equal to a value from the following table:

Name	Value	Meaning
DNTYEAR	0x00000000	Group by year

DNTMONTH	0x00000001	Group by month and year
DNTDAY	0x00000002	Group by day, month and year
DNTHOUR	0x00000003	Group by hour, day, month and year
DNTMINUTE	0x00000004	Group by minute, hour, day, month and year
DNTSECOND	0x00000005	Group by second, minute, hour, day, month and year

2.4.3 BrtArrFmla

This record type specifies an array formula for a range of cells, as specified in Worksheet part ABNF and Macro Sheet part ABNF, that performs calculations on one or more sets of values, and then returns either a single result or multiple results across a continuous range of cells. This record is preceded by a single BrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError record that represents the logical top-left cell in the range that uses this array formula. Other BrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError records that use this array formula follow later in the file, not necessarily in a contiguous sequence. The BrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError records that use this array formula MUST have a **cell** field that is within the range specified in the **ref** field of this record and MUST have their **formula** begin with PtgExp.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">rfx (16 bytes)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td>A</td><td colspan="7">unused</td><td colspan="24">formula (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

rfx (16 bytes): An RfX that specifies the row and column bounds of the array formula. Every cell specified by **rfx** MUST use the array formula.

A - fAlwaysCalc (1 bit): A bit that specifies if the array formula needs to be calculated as part of the next recalculation.

Value	Meaning
0	Formula does not need to be calculated as part of the next recalculation.
1	Formula needs to be calculated as part of the next recalculation.

unused (7 bits): Undefined and MUST be ignored.

formula (variable): An ArrayParsedFormula that contains this formula.

2.4.4 BrtBeginActiveXControls

This record specifies the beginning of a collection of BrtActiveX records as defined by the Worksheet part ABNF. The collection of BrtActiveX records specifies ActiveX controls embedded in the sheet.

2.4.5 BrtBeginAFilter

This record specifies the range of cells the AutoFilter applies to and specifies the beginning of a collection of records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of records specifies an AutoFilter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfx (16 bytes)																															
...																															

rfx (16 bytes): An UncheckedRfX that specifies the range of cells the AutoFilter applies to. If this filter is applied to a PivotTable, **rwFirst**, **rwLast**, **colFirst**, and **colLast** MUST all be equal to 0.

2.4.6 BrtBeginAutoSortScope

This record specifies the beginning of a collection of records as specified by the PivotTable part ABNF. The collection specifies pivot field sorting properties.

If the value of the **isxvd** field of the first BrtBeginPRFilter record followed by this record is -2, then sorting is specified to be by values, otherwise sorting is specified to be by member property captions.

When sorting by values, the collection of records specifies the row or column that contains the values by which the pivot items of this pivot field are sorted.

When sorting by member property captions, the collection of records specifies a member property pivot field on the row axis or the column axis of the PivotTable view. The pivot items of this pivot field are sorted by the pivot item captions of the specified member property pivot field.

The BrtBeginPRFilters collection followed by this record MUST be sorted by the **isxvd** field of the BrtBeginPRFilter in ascending order.

If this record exists, the **fAutoSort** field of the BrtBeginSXVD record immediately preceding this record MUST be 1.

2.4.7 BrtBeginBook

This record specifies the beginning of a collection of records as defined by the Workbook part ABNF. The collection of records specifies properties of a workbook.

2.4.8 BrtBeginBookViews

This record specifies the beginning of a collection of BrtBookView records as defined by the Workbook part ABNF. The collection of BrtBookView records specifies **workbook views**.

2.4.9 BrtBeginBorders

This record specifies a count of BrtBorder records and specifies the beginning of a collection of BrtBorder records as defined by the Styles part ABNF. The collection of BrtBorder records specifies cell **border style**.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cborders																															

cborders (4 bytes): An unsigned integer that specifies the number of BrtBorder. MUST be less than or equal to 0x0000FF96.

2.4.10 BrtBeginBundleShs

This record specifies the beginning of a collection of BrtBundleSh records as defined by the Workbook part ABNF. The collection of BrtBundleSh records specifies the sheets in the workbook.

2.4.11 BrtBeginCellIgnoreECs

This record specifies the beginning of a collection of BrtCellIgnoreEC records as defined by the Worksheet part ABNF. The collection of BrtCellIgnoreEC records specifies the types of cell errors that are to be ignored for specific cell ranges.

2.4.12 BrtBeginCellSmartTag

This record specifies **smart tag** properties and specifies the beginning of a collection of BrtCellSmartTagProperty records as defined by the Worksheet part ABNF. The collection of BrtCellSmartTagProperty records specifies a smart tag associated with a cell.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
type																															
A	B	reserved																													

type (4 bytes): An unsigned integer that specifies a zero-based index of a BrtSmartTagType record in the collection of all records directly following BrtBeginSmartTagTypes in the workbook part. This value MUST be less than the total number of BrtSmartTagType records.

A - fDeleted (1 bit): A bit that specifies that the application does not display this smart tag because of explicit user choice.

B - fXMLBased (1 bit): A bit that specifies that smart tag recognition is triggered because the cell is associated with an XML map, where the element in the XML map has the same XML namespace and name as the **smart tag recognizer**.

reserved (14 bits): MUST be zero, and MUST be ignored.

2.4.13 BrtBeginCellSmartTags

This record specifies the row and column properties of a cell with a smart tag and specifies the beginning of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies smart tag properties of a cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rw																															
col																															

rw (4 bytes): A Rw that specifies the row of the cell.

col (4 bytes): A Col that specifies the column of the cell.

2.4.14 BrtBeginCellStyleXFs

This record specifies a count of BrtXF records and specifies the beginning of a collection of BrtXF records as defined by the Styles part ABNF. This collection specifies all cell style XFs in the workbook. The collection MUST contain at least 1 and no more than 0xFF96 BrtXF records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cxfs																															

cxfs (4 bytes): An unsigned integer that specifies the number of BrtXF records in this collection. MUST be at least 1 and no more than 0xFF96.

2.4.15 BrtBeginCellWatches

This record specifies the beginning of a collection of BrtCellWatch records as defined by the Worksheet part ABNF. The collection of BrtCellWatch records specifies a set of references to **watched cells**.

2.4.16 BrtBeginCellXFs

This record specifies a count of BrtXF records and specifies the beginning of a collection of BrtXF records as defined by the Styles part ABNF. This collection specifies all cell XFs in the workbook. The collection MUST contain at least 1 and no more than 0xFF96 BrtXF records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cxfs																															

cxfs (4 bytes): An unsigned integer that specifies the number of BrtXF records in this collection. MUST be at least 1 and no more than 0xFF96.

2.4.17 BrtBeginCFRule

This record specifies the properties of a conditional formatting rule and specifies the beginning of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a conditional formatting rule for a range.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iType																															
iTemplate																															
dxfId																															
iPri																															
iParam																															
reserved1																															
reserved2																															
A	B	C	D	E	reserved4											cbFmla1															
...																cbFmla2															
...																cbFmla3															
...																strParam (variable)															
...																															
rgce1 (variable)																															
...																															
rgce2 (variable)																															
...																															

rgce3 (variable)
...

iType (4 bytes): A CFType that specifies the way conditional formatting is displayed in the range.

When **iType** is CF_TYPE_GRADIENT, there MUST be one BrtBeginColorScale record in the collection of conditional formatting records following this record.

When **iType** is CF_TYPE_DATABAR, there MUST be one BrtBeginDatabar record in the collection of conditional formatting records following this record.

When **iType** is CF_TYPE_MULTISTATE, there MUST be one BrtBeginIconSet record in the collection of conditional formatting records following this record.

iTemplate (4 bytes): A CFTemp that specifies the type of logical condition that determines when conditional formatting is shown. The following table specifies the allowable combinations of **iType** and **iTemplate**; other combinations MUST NOT be used.

Value of **iType**	Value of **iTemplate**
CF_TYPE_CELLIS	CF_TEMPLATE_EXPR
CF_TYPE_EXPRIS	CF_TEMPLATE_FMLA
CF_TYPE_EXPRIS	CF_TEMPLATE_UNIQUEVALUES
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSTEXT
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSBLANKS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSNOBLANKS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSERRORS
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSNOERRORS
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTODAY
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTOMORROW
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODYESTERDAY
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLAST7DAYS
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTWEEK
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISMONTH
CF_TYPE_EXPRIS	CF_TEMPLATE_ABOVEAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_BELOWAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_DUPLICATEVALUES
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALABOVEAVERAGE
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALBELOWAVERAGE
CF_TYPE_GRADIENT	CF_TEMPLATE_GRADIENT
CF_TYPE_DATABAR	CF_TEMPLATE_DATABAR
CF_TYPE_FILTER	CF_TEMPLATE_FILTER
CF_TYPE_MULTISTATE	CF_TEMPLATE_MULTISTATE

dxfId (4 bytes): A DXFId that specifies the differential formatting applied to the range. If **iType** is CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, **dxfId** MUST be 0xFFFFFFFF and MUST be ignored.

iPri (4 bytes): A signed integer that specifies the relative priority of this rule compared to the other rules in this sheet. Rules are applied in order from the smallest **iPri** to the largest **iPri**. MUST be greater than zero and MUST NOT duplicate an **iPri** value in any other BrtBeginCFRule record that exists in the same worksheet or macro sheet part.

iParam (4 bytes): This structure specifies a parameter for this conditional formatting rule. The value, type, and meaning of **iParam** depend on the value of **iType** and **iTemplate**, as specified in the following table:

Value of **iType**	Value of **iTemplate**	Meaning of **iParam**
CF_TYPE_CELLIS	CF_TEMPLATE_EXPR	A CFOper that specifies the type of value comparison used.
CF_TYPE_EXPRIS	CF_TEMPLATE_CONTAINSTEXT	A CFTextOper that specifies the type of text comparison operation used.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTODAY	A CFDateOper. MUST be CF_TIMEPERIOD_TODAY.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTOMORROW	A CFDateOper. MUST be CF_TIMEPERIOD_TOMORROW.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODYESTERDAY	A CFDateOper. MUST be CF_TIMEPERIOD_YESTERDAY.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLAST7DAYS	A CFDateOper. MUST be CF_TIMEPERIOD_LAST7DAYS.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTMONTH	A CFDateOper. MUST be CF_TIMEPERIOD_LASTMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTMONTH	A CFDateOper. MUST be CF_TIMEPERIOD_NEXTMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISWEEK	A CFDateOper. MUST be CF_TIMEPERIOD_THISWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODNEXTWEEK	A CFDateOper. MUST be CF_TIMEPERIOD_NEXTWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODLASTWEEK	A CFDateOper. MUST be CF_TIMEPERIOD_LASTWEEK.
CF_TYPE_EXPRIS	CF_TEMPLATE_TIMEPERIODTHISMONTH	A CFDateOper. MUST be CF_TIMEPERIOD_THISMONTH.
CF_TYPE_EXPRIS	CF_TEMPLATE_ABOVEAVERAGE	An unsigned integer that specifies the number of standard deviations above the average to format. MUST be greater than or equal to 0 and less than 4. If **iParam** is 0, conditional formatting applies to all values greater than the average.
CF_TYPE_EXPRIS	CF_TEMPLATE_BELOWAVERAGE	An unsigned integer that specifies the number of standard deviations below the average to format. MUST be greater than or equal to 0 and less than 4. If **iParam** is 0, conditional formatting applies to all values below the average.

CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALABOVEAVERAGE	MUST be 0x00000000.
CF_TYPE_EXPRIS	CF_TEMPLATE_EQUALBELOWAVERAGE	MUST be 0x00000000.
CF_TYPE_FILTER	CF_TEMPLATE_FILTER	An unsigned integer that specifies how many cells are formatted by this rule. The value of **fPercent** specifies whether **iParam** is a percentage or a quantity of cells. When **fPercent** is 1, **iParam** MUST be greater than or equal to 1 and less than or equal to 100. Otherwise **iParam** MUST be greater than or equal to 1 and less than or equal to 1000. <5>

For all combinations of **iType** and **iTemplate** that are not specified in this table, **iParam** MUST be 0x00000000.

reserved1 (4 bytes): MUST be zero and MUST be ignored.

reserved2 (4 bytes): MUST be zero and MUST be ignored.

A - reserved3 (1 bit): MUST be zero and MUST be ignored.

B - fStopTrue (1 bit): A bit that specifies whether evaluation of additional conditional formatting rules is skipped for a cell if this rule evaluates to TRUE for that cell. MUST be 0 when **iType** is CF_TYPE_DATABAR, CF_TYPE_GRADIENT, or CF_TYPE_MULTISTATE.

Value	Meaning
0x0	After this rule has been evaluated, the rule with the next largest **iPri** value is evaluated normally.
0x1	If this rule evaluates to TRUE for a cell, rules with a larger **iPri** value are not evaluated for that cell. If this rule evaluates to FALSE for a cell, the rule with the next largest **iPri** value is evaluated normally.

C - fAbove (1 bit): A bit that specifies whether conditional formatting is applied to cells with values above or below the average value of other cells in the range. If **iTemplate** is CF_TEMPLATE_ABOVEAVERAGE or CF_TEMPLATE_EQUALABOVEAVERAGE, **fAbove** MUST be 1. Otherwise, **fAbove** MUST be 0.

D - fBottom (1 bit): A bit that specifies how cells are formatted as specified by the following table:

Value	Meaning
0x0	Conditional formatting is applied to cells whose value is in the top end of the range specified by **iParam** and **fPercent**.
0x1	Conditional formatting is applied to cells whose value is in the bottom end of the range specified by **iParam** and **fPercent**.

If **iType** is not CF_TYPE_FILTER, **fBottom** is unused and MUST be 0.

E - fPercent (1 bit): A bit that specifies how cells are formatted as specified by the following table:

Value	Meaning
0x0	Conditional formatting is applied to the number of cells specified by **iParam**.
0x1	**iParam** specifies the percentage of cells in the range to which conditional

	formatting is applied.

If **iType** is not CF_TYPE_FILTER, **fPercent** is unused and MUST be 0.

reserved4 (11 bits): MUST be zero and MUST be ignored.

cbFmla1 (4 bytes): An unsigned integer that MUST equal either **rgce1.cce** or 0x00000000. When **cbFmla1** is 0x00000000, **rgce1** MUST NOT exist.

cbFmla2 (4 bytes): An unsigned integer that MUST equal either **rgce2.cce** or 0x00000000. When **cbFmla2** is 0x00000000, **rgce2** MUST NOT exist.

cbFmla3 (4 bytes): An unsigned integer that MUST equal either **rgce3.cce** or 0x00000000. When **cbFmla3** is 0x00000000, **rgce3** MUST NOT exist.

strParam (variable): An XLNullableWideString that specifies a value used in this conditional formatting rule. If **iTemplate** is not CF_TEMPLATE_CONTAINSTEXT, **strParam** MUST be NULL and MUST be ignored. Otherwise, **strParam** MUST contain a string that specifies the value that is searched for, and **strParam** MUST be greater than 0 and less than 256 characters long.

rgce1 (variable): A CFParsedFormula that specifies the first formula used in this rule. The following table specifies the conditions for which **rgce1** MUST contain a formula. For any conditions not specified in the following table, **cbFmla1** MUST be 0x00000000 and **rgce1** MUST be omitted.

Condition	Formula in **rgce1**
iType = CF_TYPE_CELLIS	A CFParsedFormula that specifies the formula, numeric value, or cell reference that specifies the first operand for the CFOper specified by **iParam**.
iType = CF_TYPE_EXPRIS and **iTemplate**=CF_TEMPLATE_FMLA	A CFParsedFormula. When the formula returns zero, conditional formatting is not displayed. When the formula returns a nonzero value, conditional formatting is displayed.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSTEXT	A CFParsedFormula that implements the text comparison operation specified by **iParam**.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSBLANKS	A CFParsedFormula that returns a nonzero value when the cell is blank.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSNOBLANKS	A CFParsedFormula that returns a nonzero value when the cell is not blank.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSERRORS	A CFParsedFormula that returns a nonzero value when the cell contains an error.
iType = CF_TYPE_EXPRIS and **iTemplate** = CF_TEMPLATE_CONTAINSNOERRORS	A CFParsedFormula that returns a nonzero value when the cell does not contain an error.
iType = CF_TYPE_EXPRIS, and **iTemplate** greater than or equal to 0x0F and less than or equal to 0x18	A CFParsedFormula that implements the date comparison operation specified by **iParam**.

rgce2 (variable): A CFParsedFormula that specifies the second formula used in this rule. The following table specifies the conditions for which **rgce2** MUST contain a formula. For any

conditions not specified in the following table, **cbFmla2** MUST be 0x00000000 and **rgce2** MUST be omitted.

Condition	Formula in **rgce2**
iType = CF_TYPE_CELLIS, and **iParam**=CF_OPER_BN or CF_OPER_NB	A CFParsedFormula that specifies the formula, numeric value, or cell reference that specifies the second operand for the CFOper specified by **iParam**.

rgce3 (variable): A CFParsedFormula that specifies the third formula used in this rule. If **iType** is not CF_TYPE_GRADIENT, CF_TYPE_DATABAR, or CF_TYPE_MULTISTATE, **cbFmla3** MUST be 0x00000000 and **rgce3** MUST be omitted. Otherwise, **rgce3** can contain a CFParsedFormula. When this formula retuns zero, conditional formatting is not displayed. When the formula returns a nonzero value, or when **rgce3** is omitted, conditional formatting is displayed.

2.4.18 BrtBeginColBrk

This record specifies vertical **page break (2)** properties and specifies the beginning of a collection of BrtBrk records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of BrtBrk records specifies vertical page breaks (2).

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ibrkMac																															
ibrkManMac																															

ibrkMac (4 bytes): An unsigned integer that specifies the number of vertical page breaks (2) in the workbook. MUST be less than or equal to 1023.

ibrkManMac (4 bytes): An unsigned integer that specifies the number of manual vertical page breaks (2) that occur at locations specified by the user. MUST be equal to **ibrkMac**.

2.4.19 BrtBeginColInfos

This record specifies the beginning of a collection of BrtColInfo records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of BrtColInfo records specifies the column width and formatting for one or more columns of a sheet.

2.4.20 BrtBeginColorPalette

This record specifies the beginning of a collection of records as defined by the Styles part ABNF. The collection of records specifies the color information associated with this workbook.

When the color palette is modified, the BrtIndexedColor collection is updated. When a custom color has been **selected**, the BrtMRUColor collection is updated.

2.4.21 BrtBeginColorScale

This record specifies the beginning of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a **color scale** used in conditional formatting.

If this record is followed by two BrtCFVO records and two BrtColor records, this record specifies a two-color color scale. The first BrtCFVO specifies the cell value for the beginning of the color scale, and the second BrtCFVO specifies the cell value for the end of the color scale. The first BrtColor specifies the color for the beginning of the color scale, and the second BrtColor specifies the color for the end of the color scale.

If this record is followed by three BrtCFVO records and three BrtColor records, this record specifies a three-color color scale. The first BrtCFVO specifies the cell value for the beginning of the color scale, the second BrtCFVO specifies the cell value for the midpoint of the color scale, and the third BrtCFVO specifies the cell value for the end of the color scale. The first BrtColor specifies the color for the beginning of the color scale, the second BrtColor specifies the color for the midpoint of the color scale, and the third BrtColor specifies the color for the end of the color scale.

2.4.22 BrtBeginComment

This record specifies the beginning of a collection of BrtCommentText records as defined by the Comments part ABNF. The collection of BrtCommentText records specifies the text of a comment.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iauthor																															
rfx (16 bytes)																															
...																															
guid (16 bytes)																															
...																															

iauthor (4 bytes): A signed integer that specifies a zero-based index of a BrtCommentAuthor record in the collection of all records directly following BrtBeginCommentAuthors. The referenced BrtCommentAuthor specifies a comment author for this comment.

rfx (16 bytes): An UncheckedRfX that specifies the cell the comment is associated with. **rfx.rwFirst** MUST be equal to **rfx.rwLast**. **rfx.colFirst** MUST be equal to **rfx.colLast**.

guid (16 bytes): A **GUID** as specified by [MS-DTYP] that identifies this comment. If the workbook is not a shared workbook, this field is undefined and MUST be ignored.

2.4.23 BrtBeginCommentAuthors

The record specifies the beginning of a collection of BrtCommentAuthor records as defined by the Comments part ABNF. The collection of BrtCommentAuthor records specifies a list of authors of comments.

2.4.24 BrtBeginCommentList

This record specifies the beginning of a collection of records as defined by the Comments part ABNF. The collection specifies a list of comments.

2.4.25 BrtBeginComments

This record specifies the beginning of a collection of records as defined by the Comments part ABNF. The collection of records specifies lists of authors and their comments.

2.4.26 BrtBeginConditionalFormatting

This record specifies conditional formatting properties for a range and specifies the beginning of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies conditional formatting information for a range.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ccf																															
fPivot																															
sqrfx (variable)																															
...																															

ccf (4 bytes): An unsigned integer that equals the count of BrtBeginCFRule records contained in this collection.

fPivot (4 bytes): A Boolean that specifies whether this conditional formatting is applied only to a PivotTable. MUST be a value from the following table:

Value	Meaning
0x00	The area specified by **sqrfx** includes some cells that are not part of a PivotTable data area.
0x01	The area specified by **sqrfx** only includes cells that are part of a PivotTable data area.

sqrfx (variable): An UncheckedSqRfX that specifies the range this conditional formatting applies to.

2.4.27 BrtBeginCRErrs

This record specifies the file type of the document and specifies the beginning of a collection of BrtCrashRecErr records as defined by the Workbook part ABNF. The collection of BrtCrashRecErr records specify the errors that occurred during an application fault.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ft																															

ft (4 bytes): A signed integer that specifies the file type of the document before the program failure. MUST be a value from the following table:

Value	Meaning
0x00000001	SYLK (Symbolic Link) (*.slk)
0x00000002	Text (Tab delimited) (*.txt)
0x00000005	CSV (Comma delimited) (*.csv)
0x00000008	DIF (Data Interchange Format) (*.dif)
0x00000010	Excel 97-2003 Template (*.xlt)
0x00000011	Excel 97-2003 Add-In (*.xla)
0x00000012	Text (Macintosh) (*.txt)
0x00000013	Text (MS-DOS) (*.txt)
0x00000015	CSV (Macintosh) (*.csv)
0x00000016	CSV (MS-DOS) (*.csv)
0x0000001C	Microsoft Excel 3.0 Worksheet (*.xls)
0x00000020	Microsoft Excel 4.0 Worksheet (*.xls)
0x00000023	Formatted Text (Space delimited) (*.prn)
0x00000026	Microsoft Excel 5.0/95 Workbook (*.xls)
0x00000029	Unicode Text (*.txt)
0x0000002A	Microsoft Excel 97-2003 \& 5.0/95 Workbook (*.xls)
0x0000002B	Web Page (*.htm, *.html)
0x0000002C	Single File Web Page (*.mht, *.mhtml)
0x0000002D	XML Spreadsheet 2003 (*.xml)
0x00000030	XML Data (*.xml)
0x00000031	Excel Binary Workbook (*.xlsb)
0x00000032	Excel Workbook (*.xlsx)
0x00000033	Excel Macro-Enabled Workbook (*.xlsm)
0x00000034	Excel Macro-Enabled Template (*.xltm)
0x00000035	Excel Template (*.xltx)
0x00000036	Excel Add-In (*.xlam)
0x00000037	Excel 97-2003 Workbook (*.xls)

2.4.28 BrtBeginCsView

This record specifies **chart sheet view** settings for the current chart sheet. It also specifies the beginning of a collection of records as specified by the Chart Sheet part ABNF. This collection specifies additional chart sheet view settings for the current chart sheet. Chart sheet view settings and workbook view settings for the associated workbook view (specified by **iwbkview)** together define the display of a chart sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	unused															wScale															
...																iwbkview															
...																															

A - fSelected (1 bit): A bit that specifies that this chart sheet is currently selected.

unused (15 bits): Undefined and MUST be ignored.

wScale (4 bytes): An unsigned integer that specifies the window **zoom level** as a percentage value. The value MUST be greater than or equal to 10 and less than or equal to 400, or equal to zero. A value of zero specifies that there is no zoom level set.

iwbkview (4 bytes): An unsigned integer that specifies the zero-based index of a BrtBookView record in the collection of all records directly following BrtBeginBookViews in the workbook part. The referenced BrtBookView specifies the workbook view this chart sheet view is associated with.

2.4.29 BrtBeginCsViews

This record specifies the beginning of a collection of records as defined by the Chart Sheet part ABNF. The collection of records specifies the chart sheet views of this chart sheet.

2.4.30 BrtBeginCustomFilters

This record specifies a property of a filter and specifies the beginning of a collection of BrtCustomFilter records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of BrtCustomFilter records specifies custom filter criteria to be applied to a filter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fAnd																															

fAnd (4 bytes): A Boolean that specifies whether the criteria specified by the BrtCustomFilter records in this collection have an "AND" relationship if there are two criteria. This value MUST be one of the following:

Value	Meaning
0x00000000	AND relationship will be used

0x00000001	OR relationship will be used

2.4.31 BrtBeginDatabar

This record specifies **data bar** properties and specifies the beginning of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a data bar used in conditional formatting.

In the collection of records following this record, the first BrtCFVO record specifies the cell value for the shortest data bar. The second BrtCFVO record specifies the cell value for the longest data bar. The BrtColor record specifies the color of the data bar.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
bLenMin								bLenMax								fShowValue															

bLenMin (1 byte): An unsigned integer that specifies the length of the shortest data bar in this conditional formatting range, expressed as a percentage of the width of the cell being formatted. MUST be greater than or equal to 0 and less than or equal to **bLenMax**.

bLenMax (1 byte): An unsigned integer that specifies the length of the longest data bar in this conditional formatting range, expressed as a percentage of the width of the cell being formatted. MUST be greater than or equal to **bLenMin** and less than or equal to 100.

fShowValue (1 byte): A Boolean that specifies whether the cells in the conditional formatting range display both the data bar and the numeric value or only the data bar.

Value	Meaning
0x00	Only the data bar is displayed in the cell
0x01	Both the data bar and the numeric value are displayed in the cell

2.4.32 BrtBeginDCon

This record specifies **data consolidation** properties and specifies the beginning of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies data consolidation information.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iiftab								A	B	C	unused																				

iiftab (1 byte): An **IIFtab** that specifies the data consolidation function that is used.

A - fLeftCat (1 bit): A bit that specifies whether the values in the left column of the data consolidation range will be treated as labels or data.

Value	Meaning
0	Treat the left column of the data consolidation range as data that will be operated on by the data consolidation function specified by **iiftab**.
1	Treat the left column of the data consolidation range as labels that will be used to

	identify the rows operated on by the data consolidation function.

B - fTopCat (1 bit): A bit that specifies whether the values in the top row of the data consolidation range will be treated as labels or data.

Value	Meaning
0	Treat the top row of the data consolidation range as data that will be operated on by the data consolidation function specified by **iiftab**.
1	Treat the top row of the data consolidation range as labels that will be used to identify the columns operated on by the data consolidation function.

C - fLinkConsol (1 bit): A bit that specifies whether data consolidation will create references to the **source data**.

Value	Meaning
0	References are not created to the source data.
1	References are created to the source data.

unused (5 bits): Undefined and MUST be ignored.

2.4.33 BrtBeginDeletedName

This record specifies the name of a **query** field that has been deleted from a query table and specifies the beginning of an empty collection of records as defined by the Query Table part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgb (variable)																															
...																															

rgb (variable): An XLWideString that specifies the name of the deleted query field. MUST be greater than or equal to 1 character and less than or equal to 255 characters in length.

2.4.34 BrtBeginDeletedNames

This record specifies properties of query fields that have been deleted from a query table and specifies the beginning of a collection of records as defined by the Query Table part ABNF. The collection of records specifies query fields that have been deleted from the query table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
nCols																															

nCols (4 bytes): A DCol that specifies how many deleted query fields there are. This value MUST equal the number of BrtBeginDeletedName records in this collection.

2.4.35 BrtBeginDim

This record specifies a PivotCache OLAP dimension (1) and the beginning of an empty collection as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved							stName (variable)																							
...																															
stUnique (variable)																															
...																															
stDisplay (variable)																															
...																															

A - fMeasure (1 bit): A bit that that indicates whether this is a **measure** dimension (1).

reserved (7 bits): MUST be zero, and MUST be ignored.

stName (variable): An XLWideString that specifies the name of the dimension (1). The length of this value MUST be greater than 0.

stUnique (variable): An XLWideString that specifies the unique name of the dimension (1). The length of this value MUST be greater than 0 and less than 32768 characters.

stDisplay (variable): An XLWideString that specifies the display name of the dimension (1). The length of this value MUST be greater than 0.

2.4.36 BrtBeginDims

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies PivotTable OLAP dimensions. MUST exist if and only if this is an OLAP PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cDims																															

cDims (4 bytes): An unsigned integer that specifies the number of OLAP dimensions in the PivotTable. This value MUST match the number of BrtBeginDim records in the collection.

2.4.37 BrtBeginDRefs

This record specifies a count of BrtDRef records in the collection and specifies the beginning of a collection of BrtDRef records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of BrtDRef records specifies the references used by data consolidation.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cdref																															

cdref (4 bytes): An unsigned integer that specifies the number of BrtDRef records contained in this collection.

2.4.38 BrtBeginDVals

This record specifies the beginning of a collection of BrtDVal records as defined by Worksheet part ABNF. This record also specifies **data validation** properties of a worksheet that are used by the Application UI.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved															xLeft															
...																yTop															
...																unused3															
...																idvMac															
...																															

A - fWnClosed (1 bit): A Boolean that specifies whether all data validation input prompts are disabled for this sheet.

reserved (15 bits): MUST be zero, and MUST be ignored.

xLeft (4 bytes): An unsigned integer that specifies the x-coordinate (relative to the Application window) of the top-left corner of the data validation input prompt, measured in pixels. This value MUST be less than or equal to 65535.

yTop (4 bytes): An unsigned integer that specifies the y-coordinate (relative to the Application window) of the top-left corner of the data validation input prompt, measured in pixels. This value MUST be less than or equal to 65535.

unused3 (4 bytes): Undefined and MUST be ignored.

idvMac (4 bytes): An unsigned integer that specifies the number of BrtDVal records that follow this record. This value MUST be less than or equal to 65534.

2.4.39 BrtBeginDXFs

This record specifies a count of BrtDXF records and specifies the beginning of a collection of BrtDXF records as defined by the Revision Log part ABNF and the Styles part ABNF. The collection of BrtDXF records specifies a set of differential formats.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cdxfs																															

cdxfs (4 bytes): An unsigned integer that specifies the number of differential formatting records (BrtDXF). MUST be less than or equal to 0x7FFFFFFF.

2.4.40 BrtBeginECDbProps

This record specifies the properties associated with an ODBC or OLE DB external connection and specifies the beginning of an empty collection of records as defined by the External Data Connections part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
icmdtype																															
A	B	reserved						stConn (variable)																							
...																															
stCmd (variable)																															
...																															
stCmdSvr (variable)																															
...																															

icmdtype (4 bytes): A CmdType that specifies the OLE DB or ODBC command type. MUST be CMDSQL if this is an ODBC data connection (as specified in ODBC Connections).

A - fLoadCmdSvr (1 bit): A bit that specifies whether **stCmdSvr** exists after the fixed-size portion of this record. MUST be 0 if this is an OLE DB data connection (as specified in OLE DB Connections).

B - fLoadCmd (1 bit): A bit that specifies whether **stCmd** exists after the fixed-size portion of this record.

reserved (6 bits): MUST be zero, and MUST be ignored.

stConn (variable): An XLWideString that specifies the **connection string** used to connect to an OLE DB or ODBC data source (1). The length of this value MUST be less than 65536 characters. The length of this field MUST be 0 if the **fDeleted** field of the preceding BrtBeginExtConnection record is 1.

stCmd (variable): An optional XLWideString that specifies the database command to pass to the data provider. MUST exist if and only if **fLoadCmd** is 1.

stCmdSvr (variable): An optional XLWideString that specifies the database command to use instead of **stCmd** if the cache field that is used as a server-based page field, as specified in Source Data,

is removed from the page axis or made into a page field that is not a server-based page field. MUST exist if and only if **fLoadCmdSvr** is 1.

2.4.41 BrtBeginECOlapProps

This record specifies the properties of an OLAP connection and specifies the beginning of an empty collection of records as defined by the External Data Connections part ABNF. The properties that specify server formatting options are used to specify whether server formatting retrieved from the OLAP data source (1) is applied to the cells used by PivotTables or cube functions associated with the PivotCache that is associated with this external connection, as specified in Source Data. In the case of PivotTables, the formatting is applied to the cells in data area of the PivotTable report. In the case of cube functions, the formatting is applied to the cells that contain the result of the cube function. When a local cube file is used, as specified by **fLocalConn**, the OLE DB for OLAP data provider is used to connect to a file, which is a cache of the OLAP data source (1).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	nDrillthroughRows																							
...								I	reserved2							stConnLocal (variable)															
...																															

A - fLocalConn (1 bit): A bit that specifies whether data is retrieved from a local cube file. MUST be a value in the following table:

Value	Meaning
0	The data is retrieved using the connection string specified by the **stConn** field of the BrtBeginECDbProps record preceding this record.
1	The data is retrieved from the connection string specified by **stConnLocal**.

B - fNoRefreshCube (1 bit): A bit that specifies whether the OLE DB for OLAP data provider is requested to rebuild the local cube file. This value is applicable only when **fLocalConn** is equal to 1. MUST be a value in the following table:

Value	Meaning
0	The OLE DB for OLAP data provider is requested to rebuild the local cube file on refresh.

1	The OLE DB for OLAP data provider is requested to query the existing local cube file on refresh.

C - fSrvFmtBack (1 bit): A bit that specifies whether the background color retrieved from the OLAP data source (1) is used for cell formatting. MUST be a value in the following table:

Value	Meaning
0	**Fill colors** retrieved from the OLAP data source (1) are ignored.
1	Fill colors retrieved from the OLAP data source (1) are used for cell formatting.

D - fSrvFmtFore (1 bit): A bit that specifies whether the **font face color** retrieved from the OLAP data source (1) is used for cell formatting. MUST be a value in the following table:

Value	Meaning
0	Font colors retrieved from the OLAP data source (1) are ignored.
1	Font colors retrieved from the OLAP data source (1) are used for cell formatting.

E - fSrvFmtFlags (1 bit): A bit that specifies the **font family** name retrieved from the OLAP data source (1) is used for cell formatting. MUST be a value in the following table:

Value	Meaning
0	Font family names retrieved from the OLAP data source (1) are ignored.
1	Font family names retrieved from the OLAP data source (1) are used for cell formatting.

F - fSrvFmtNum (1 bit): A bit that specifies whether the format string retrieved from the OLAP data source (1) is used for cell formatting. MUST be a value in the following table:

Value	Meaning
0	Formats strings retrieved from the OLAP data source (1) are ignored.
1	Formats strings retrieved from the OLAP data source (1) are used for cell formatting.

G - fUseOfficeLcid (1 bit): A bit that specifies whether the **language code identifier (LCID)** is sent to the OLE DB for OLAP data provider in order to retrieve data in a localized manner.

H - reserved1 (1 bit): MUST be zero, and MUST be ignored.

nDrillthroughRows (4 bytes): A DRw that specifies the maximum number of **drillthrough** rows to return when the user drills through an aggregate value in a PivotTable. MUST be greater than 0 and less than 1048577.

I - bLoadConnLocal (1 bit): A bit that specifies whether **stConnLocal** exists after the fixed size portion of the record. MUST be 1 if **fLocalConn** is 1.

reserved2 (7 bits): MUST be zero, and MUST be ignored.

stConnLocal (variable): An optional XLWideString that specifies a connection string to use when a local cube file is available. MUST exist if and only if **bLoadConnLocal** is 1. The length of this value MUST be less than 65536.

2.4.42 BrtBeginECParam

This record specifies parameters of an external connection and specifies the beginning of an empty collection of records as defined by the External Data Connections part ABNF.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="3">pbt</td><td>A</td><td colspan="12">reserved</td><td colspan="16">wTypeSql</td></tr>
<tr><td colspan="32">dataType (optional)</td></tr>
<tr><td colspan="32">fLoadPrompt (optional)</td></tr>
<tr><td colspan="32">stName (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">stPrompt (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">stVal (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">xnumVal (optional)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="8">boolVal (optional)</td><td colspan="24">fmla (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

pbt (3 bits): An unsigned integer that specifies the type of the parameter. MUST be a value from the following table:

Value	Meaning
0x0	Prompt. An application collects the parameter value from the user.
0x1	Value. This record contains the value in one of the fields: **stVal**, **xnumVal** or **boolVal**.
0x2	Cell reference. **fmla** specifies the sheet cell that contains the value.

A - fAutoRefresh (1 bit): A bit that specifies whether the external data is automatically refreshed when the content of a cell containing the parameter's value changes. MUST be 0 if **pbt** is not 0x2.

Value	Meaning
0	External data is refreshed only when requested by the user or when triggered by some other event (for example, the workbook is opened).
1	External data is refreshed whenever the content of a cell containing the parameter's value changes.

reserved (12 bits): MUST be zero, and MUST be ignored.

wTypeSql (2 bytes): A TypeSql that specifies the **SQL** data type of the parameter. MUST be ignored when the external connection is not an ODBC data source (1).

dataType (4 bytes): An optional unsigned integer that specifies the data type of the parameter value. MUST exist if and only if **pbt** is not 0x0 and MUST be ignored if **pbt** is 0x2. MUST be a value from the following table:

Value	Meaning
0x00000001	Double. The parameter value is specified by **xnumVal** field.
0x00000002	String. The parameter value is specified by **stVal** field.
0x00000004	Boolean. The parameter value is specified by **boolVal** field.
0x00000800	Integer. The parameter value is specified by **xnumVal** field.

fLoadPrompt (4 bytes): An optional Boolean that specifies whether **stPrompt** exists after the fixed size portion of the record. If the value is 1, **stPrompt** exists. **fLoadPrompt** MUST exist if and only if **pbt** is 0x0.

stName (variable): An XLWideString that specifies the name of the parameter. The length of this value MUST be less than 256 characters.

stPrompt (variable): An optional XLWideString that specifies the prompt string for the parameter. The length of this value MUST be less than 65536 characters. MUST exist if and only if **pbt** is 0x0 and **fLoadPrompt** is 0x00000001.

stVal (variable): An optional XLWideString that specifies the string value of the parameter. The length of this value MUST be less than 256 characters. MUST exist if and only if **pbt** is 0x1 and **dataType** is 0x00000002.

xnumVal (8 bytes): An optional Xnum that specifies the value of the parameter. MUST exist if and only if **pbt** is 0x1 and **dataType** is 0x00000001 or 0x00008000. If **dataType** is 0x00008000, the integer value specified by this field MUST be less than or equal to 0x7FFFFFFF and greater than or equal to 0x80000000.

boolVal (1 byte): An optional BYTE that specifies the boolean value of the parameter. MUST exist if and only if **pbt** is 0x1 and **dataType** is 0x00000004.

fmla (variable): An optional ParameterParsedFormula that specifies the formula that MUST evaluate to the range containing the value or values to use for the parameter. If this is an ODBC connection, the cell range MUST specify a single cell. If this is a Web connection, the cell range MUST specify a single row or a single column of cells; each cell of the range can contain one of the parameter values. MUST exist if and only if **pbt** is 2.

2.4.43 BrtBeginECParams

This record specifies properties of connection parameters and specifies the beginning of a collection of records as defined by the External Data Connections part ABNF. The collection specifies connection parameters for an ODBC connection or for a Web connection. If this record exists for an ODBC connection, it MUST follow the BrtBeginECDbProps record. If this record exists for a Web connection, it MUST follow the BrtBeginECWebProps record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cParams																															

cParams (4 bytes): An unsigned integer that specifies the number of connection parameters. MUST match the number of BrtBeginECParam records in this collection.

2.4.44 BrtBeginECTwFldInfo

This record specifies field settings for text import and specifies the beginning of a collection of records as defined by External Data Connections part ABNF. The collection specifies field settings for text import.

A field in the context of text import is a column of data that is imported into a range in a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fieldType																															
fieldStart																															

fieldType (4 bytes): An unsigned integer that specifies the field type. Types are specified by the user, or determined algorithmically via heuristics and text analysis. MUST be a value from the following table:

Value	Meaning
0x00000000	General: The application decides how to handle the field.
0x00000001	Text: Field contains strings.
0x00000002	MDY: Field contains a date in the order: month, day, year.
0x00000003	DMY: Field contains a date in the order: day, month, year.
0x00000004	YMD: Field contains a date in the order: year, month, day.
0x00000005	MYD: Field contains a date in the order: month, year, day.
0x00000006	DYM: Field contains a date in the order: day, year, month.
0x00000007	YDM: Field contains a date in the order: year, day, month.

0x00000008	Skip: Don't import this field at all.
0x00000009	EMD: Field contains an East Asian date in the order: EA era year, month, day.

fieldStart (4 bytes): An unsigned integer that specifies, for fixed-length fields, the zero-based character position where the field begins. The subsequent BrtBeginECTwFldInfo records or carriage return characters in the text stream separate the subsequent text fields.

2.4.45 BrtBeginECTWFldInfoLst

This record specifies the number of columns of data in a text file and specifies the beginning of a collection of BrtBeginECTwFldInfo records as defined by the External Data Connections part ABNF. The collection specifies a collection of columns of data in a text file.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cFields																															

cFields (4 bytes): An unsigned integer that specifies the number of columns of data in the text file. MUST equal the number of BrtBeginECTwFldInfo records in the collection.

2.4.46 BrtBeginECTxtWiz

This record specifies text importation properties and specifies the beginning of a collection of records as defined by the External Data Connections part ABNF. The collection specifies text importation properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A		iCpidNew										B	C	D	E	F	G	H		I	J	K	reserved2								
chCustom																rowStartAt															
...																chDecimal							chThousSep								
stFile (variable)																															
...																															

A - iCpid (2 bits): An unsigned integer that specifies the type of character set to use during importation. MUST be a value from the following table:

Value	Meaning
0x00	Macintosh
0x01	Windows (ANSI)
0x02	MS-DOS (PC-8)

This value is used to determine the code page associated with the text file if **iCpidNew** is less than 3, otherwise **iCpidNew** is used**.**

iCpidNew (10 bits): An unsigned integer that specifies application-specific codepage information that exists for text importation purposes.

B - fDelimited (1 bit): A bit that specifies whether the file is tab or character delimited. If the value is 0, **fTab**, **fSpace**, **fComma**, **fSemiColon**, **fCustom**, and **chCustom** MUST be ignored.

Value	Meaning
0	The file is parsed according to fixed length fields.
1	The file is tab or character delimited.

C - fTab (1 bit): A bit that specifies whether tabs are used as field delimiters.

D - fSpace (1 bit): A bit that specifies whether space characters are used as field delimiters.

E - fComma (1 bit): A bit that specifies whether comma characters are used as field delimiters.

F - fSemiColon (1 bit): A bit that specifies whether semicolon characters are used as field delimiters.

G - fConsecutive (1 bit): A bit that specifies whether consecutive delimiters is treated as just one delimiter.

H - fTextDelim (2 bits): An unsigned integer that specifies the character used as the text string qualifier.

Value	Meaning
0x00	Double Quote
0x01	Single Quote
0x02	None
0x03	None

I - reserved1 (1 bit): MUST be 1 and MUST be ignored.

J - fPromptForFile (1 bit): A bit that specifies whether the user selected to receive a prompt for the file name on refresh.

K - fCustom (1 bit): A bit that specifies whether the custom delimiter character **chCustom** is used as a field delimiter.

reserved2 (9 bits): MUST be zero, and MUST be ignored.

chCustom (2 bytes): An unsigned integer that specifies the Unicode character to be treated as a field delimiter.

rowStartAt (4 bytes): An unsigned integer that specifies at what row of the file to start the data importation. MUST be greater than 0 and less than 100000000.

chDecimal (1 byte): An unsigned integer that specifies the decimal separator character in [ISO-8859-1] encoding.

chThousSep (1 byte): An unsigned integer that specifies the thousands separator character in [ISO-8859-1] encoding.

stFile (variable): An XLWideString that specifies the path to the text file to use to import external data. The length of the string MUST be greater than 0 <6> and less than 219 characters.

2.4.47 BrtBeginECWebProps

This record specifies the properties of a Web connection and specifies the beginning of a collection of records as defined by the External Data Connections part ABNF. The collection of records specifies the properties of a Web connection.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="8">wHTMLFmt</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td colspan="16">reserved1</td></tr>
<tr><td>J</td><td>K</td><td>L</td><td colspan="5">reserved2</td><td colspan="24">stURL (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">stWebPost (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">stEditWebPage (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

wHTMLFmt (8 bits): An unsigned integer that specifies how to handle formatting from the HTML source when bringing Web connection data into the sheet. MUST be a value from the following table:

Value	Meaning
0x00	None – no formatting at all
0x01	RTF – honor just rich text formatting
0x02	All – honor all HTML formatting

A - fSrcIsXML (1 bit): A bit that specifies whether the Web connection source is XML.

Value	Meaning
0	Web connection source is HTML
1	Web connection source is XML

B - fImportSourceData (1 bit): A bit that specifies whether the source data is imported from a specified **URL** instead of the HTML table itself. Used when a Web connection connects to an HTML table with the following attribute:

<TABLE ... o:WebQuerySourceHRef="http://..." ... > ... </TABLE>

The value of the WebQuerySourceHRef attribute specifies the URL to obtain the source data from.

Value	Meaning
0	Specifies source data is not imported
1	Specifies that source data is imported.

C - fParsePreFormatted (1 bit): A bit that specifies whether the data contained within HTML <PRE> tags in the web page is parsed into columns when the page is imported into a query table.

Value	Meaning
0	Specifies that <PRE> tags are not parsed.
1	Specifies that <PRE> tags are parsed.

D - fConsecDelim (1 bit): A bit that specifies whether consecutive delimiters are treated as just one delimiter.

Value	Meaning
0	Each delimiter is treated as separate delimiter
1	Consecutive delimiters are treated as just one delimiter.

E - fSameSettings (1 bit): A bit that specifies whether all tables inside a <PRE> block are parsed with the same width settings as the first row.

F - fXL97Format (1 bit): A bit that specifies whether this Web connection was created using a specific version of the application <7>.

G - fNoDateRecog (1 bit): A bit that specifies whether dates are imported into cells in the sheet as text rather than dates.

Value	Meaning
0	Dates are imported as date values.
1	Dates are imported as text.

H - fRefreshedInXL9 (1 bit): A bit that specifies whether this Web connection was refreshed using a version of the application newer than a specific version <8>.

I - fTablesOnlyHTML (1 bit): A bit that specifies whether this Web connection only work on HTML tables.

Value	Meaning
0	Web connection only work on the whole web page.
1	Web connection only work on HTML tables.

reserved1 (15 bits): MUST be zero, and MUST be ignored.

J - fLoadWebPost (1 bit): A bit that specifies whether the **stWebPost** field exists after the fixed size portion of this record.

K - fLoadEditWebPage (1 bit): A bit that specifies whether the **stEditWebPage** field exists after the fixed size portion of this record.

L - fLoadURL (1 bit): A bit that specifies whether the **stURL** field exists after the fixed size portion of the record. If the **fDeleted** field in the preceding BrtBeginExtConnection record is 0, this value

MUST be 1. If the **fDeleted** field in the preceding BrtBeginExtConnection record is 1 and the **fSrcIsXML** field is 0, this value MUST be 0.

reserved2 (5 bits): MUST be zero, and MUST be ignored.

stURL (variable): An optional XLWideString that specifies the URL to use to refresh external data. The length of this string MUST be greater than 0. MUST exist if and only if **fLoadURL** is 1.

stWebPost (variable): An optional XLWideString that specifies the string used with the HTTP post method of sending data to a web server. MUST exist if and only if **fLoadWebPost** is 1.

stEditWebPage (variable): An optional XLWideString that specifies the URL of the user-facing web page showing the Web connection data. This URL is persisted if **fImportSourceData** is 1 and **stURL** contains the URL specified by the o:WebQuerySourceHRef attribute in the selected HTML table. MUST exist if and only if **fLoadEditWebPage** is 1.

2.4.48 BrtBeginEcWpTables

This record specifies the beginning of a collection of records as defined by the External Data Connections part ABNF. The collection specifies a collection of tables to be returned via a **Web query** data connection. The collection of tables is specified by BrtPCDIIndex, BrtPCDIString or BrtPCDIMissing records. The BrtPCDIString record specifies the HTML table by its ID attribute and the BrtPCDIIndex record specifies the HTML table by its index (in order of the <Table> tags in the HTML page). The BrtPCDIMissing record is used when the user has specified an invalid reference to a HTML page.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cTables																															

cTables (4 bytes): An unsigned integer that specifies the number of tables to pull data from when refreshing from a Web query. MUST match the number of records in this collection.

2.4.49 BrtBeginEsfmd

This record specifies the name of the metadata type and specifies the beginning of a collection of records as defined by the Metadata part ABNF. The collection of records specifies a future metadata store.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cFmd																															
stName (variable)																															
...																															

cFmd (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

stName (variable): An XLWideString that specifies the name of the metadata type. This name MUST be equal to the **stName** of one of the BrtMdtinfo records in the collection of metadata types

specified by BrtBeginEsmdtinfo and BrtEndEsmdtinfo records. The names of future metadata types MUST be unique within the collection of metadata types and MUST NOT be equal to "XLMDX".

2.4.50 BrtBeginEsmdb

This record specifies the type of metadata block records and specifies the beginning of a collection of BrtMdb records as defined by the Metadata part ABNF. The collection of records MUST contain metadata block records of the same kind: either only cell metadata records or only value metadata records.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cMdb																															
fCellMeta																															

cMdb (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

fCellMeta (4 bytes): A Boolean that specifies whether BrtMdb records of a cell metadata or value metadata type directly follow this record. MUST be a value from the following table:

Value	Meaning
0x00000000	The collection contains value metadata records
0x00000001	The collection contains cell metadata records

2.4.51 BrtBeginEsmdtinfo

This record specifies the beginning of the collection of BrtMdtinfo records as defined by the Metadata part ABNF. The collection of records specifies the list of metadata types.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cMdtinfo																															

cMdtinfo (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

2.4.52 BrtBeginEsmdx

This record specifies the beginning of a collection of records as defined by the Metadata part ABNF. The collection of records specifies the MDX metadata store.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cMdx																															

cMdx (4 bytes): A signed integer that specifies the number of records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

2.4.53 BrtBeginEsstr

This record specifies the beginning of a collection of BrtStr records as defined by the Metadata part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cStr																															

cStr (4 bytes): A signed integer that specifies the number of BrtStr records in the collection. This number MUST be greater than or equal to 1, and MUST be equal to the number of records in the collection.

2.4.54 BrtBeginExtConnection

This record specifies the properties of an external connection and specifies the beginning of a collection of records as defined by the External Data Connections part ABNF. The collection of records specifies properties of an external connection; the records that this collection contains are specified by the connection type, as specified in External Connections.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
bVerRefreshed								bVerRefreshableMin								pc								reserved1							
wInterval																A	B	C	D	E	F	G		reserved2							
H	I	J	K	L	reserved4											idbtype															
...																irecontype															
...																dwConnID															
...																iCredMethod								stDataFile (variable)							
...																															
stConnectionFile (variable)																															
...																															
stConnDesc (variable)																															
...																															
stConnName (variable)																															

...
stSso (variable)
...

bVerRefreshed (1 byte): A DataFunctionalityLevel that specifies the data functionality level that the external connection was last refreshed with.

bVerRefreshableMin (1 byte): A DataFunctionalityLevel that specifies the minimum data functionality level that the application is required to support in order to correctly refresh the external connection.

pc (8 bits): An unsigned integer that specifies whether the password is saved as part of the connection string. MUST be ignored if **idbtype** is not DBTOLEDB and **idbtype** is not DBTODBC, otherwise MUST be a value from the following table:

Value	Meaning
0x01	The password is saved in the connection string.
0x02	The password is not saved in the connection string.

reserved1 (8 bits): MUST be zero, and MUST be ignored.

wInterval (16 bits): An unsigned integer that specifies the number of minutes between automatic refreshes of the external connection. MUST be less than 32768. If the value 0, the external connection is not automatically refreshed.

A - fMaintain (1 bit): A bit that specifies whether the external connection is maintained after the refresh. MUST be ignored if **idbtype** is not DBTOLEDB.

B - fNewQuery (1 bit): A bit that specifies whether the external connection has been refreshed for the first time.

Value	Meaning
0	The external connection has been refreshed at least once.
1	The external connection has not been refreshed for the first time.

C - fDeleted (1 bit): A bit that specifies whether the external connection has been deleted. Deleted external connection MUST contain **stConnName**.

D - fAlwaysUseConnectionFile (1 bit): A bit that specifies whether the external connection information in the external connection file specified by the **stConnectionFile** field is always used when the external connection is refreshed. MUST be ignored if **idbtype** is not DBTOLEDB and **idbtype** is not DBTODBC.

Value	Meaning
0	The procedure specified by the **irecontype** field is followed.
1	The connection information in the external

	connection file specified by the **stSourceConnectionFile** field is always used.

E - fBackgroundQuery (1 bit): A bit that specifies whether the preferred usage of the external connection is to refresh asynchronously in the background.

Value	Meaning
0	The preferred usage of the external connection is to refresh synchronously in the foreground.
1	The preferred usage of the external connection is to refresh asynchronously in the background.

If this external connection is associated with a PivotCache, this value MUST be equal to the **fBackgroundQuery** field in the BrtBeginPivotCacheDef record. If this external connection is associated with a query table, this value MUST be equal to the **fAsync** field in the BrtBeginQSI record.

F - fRefreshOnLoad (1 bit): A bit that specifies whether this external connection is refreshed when the this workbook is opened.

G - fSaveData (1 bit): A bit that specifies whether the data retrieved from the external connection is saved within the workbook. If this external connection is associated with a query table, this value MUST be equal to the **fSaveData** field in the BrtBeginQSI record.

reserved2 (9 bits): MUST be zero, and MUST be ignored.

H - fLoadSourceDataFile (1 bit): A bit that specifies whether **stDataFile** exists after the fixed size portion of the record.

I - fLoadSourceConnectionFile (1 bit): A bit that specifies whether **stConnectionFile** exists after the fixed size portion of the record.

J - fLoadConnectionDesc (1 bit): A bit that specifies whether **stConnDesc** exists after the fixed size portion of the record.

K - reserved3 (1 bit): MUST be 1, and MUST be ignored.

L - fLoadSSOApplicationID (1 bit): A bit that specifies whether **stSso** exists after the fixed size portion of the record. MUST be zero if **idbtype** is not DBTOLEDB and **idbtype** is not DBTODBC.

reserved4 (11 bits): MUST be zero, and MUST be ignored.

idbtype (4 bytes): A DBType that specifies the data source type.

irecontype (4 bytes): An unsigned integer that specifies when external connection information is retrieved from the external connection file. MUST be ignored when **fAlwaysUseConnectionFile** is 1 and MUST be ignored if **idbtype** is not DBTOLEDB, otherwise MUST be a value from the following table:

Value	Meaning
0x00000001	Retrieve external connection information as required. When external data has to be refreshed from the external connection, use the existing external connection information; if the external data refresh from the external

	connection fails then retrieve updated external connection information, if available, from the external connection file.
0x00000002	Always retrieve external connection information. When external data has to be refreshed from the external connection, retrieve updated external connection information from the external connection file, if available, and use that instead of the existing external connection information. In this case the external data refresh will fail if the external connection file is unavailable.
0x00000003	Never retrieve external connection information. Never get updated external connection information from the external connection file even if it is available and even if the existing external connection information is invalid.

dwConnID (4 bytes): An unsigned integer that specifies the unique identifier of this external connection. MUST be greater than zero.

iCredMethod (1 byte): An unsigned integer that specifies the authentication method that is used when establishing or re-establishing the external connection. MUST be zero and MUST be ignored if **idbtype** is not DBTOLEDB and **idbtype** is not DBTODBC, otherwise MUST be a value from the following table:

Value	Meaning
0x00	Integrated authentication.
0x01	No credentials.
0x02	Use credentials that are stored as part of a **single sign-on (SSO)** repository.

stDataFile (variable): An optional XLWideString that specifies the path to the file containing the data to import. The length of the string MUST be less than 256 characters. MUST exist if and only if **fLoadSourceDataFile** is 1.

stConnectionFile (variable): An optional XLWideString that specifies the path to the external connection file from which this external connection was created. As specified by **fAlwaysUseConnectionFile** and **irecontype**, the information in the external connection file can be used in place of information specified by this collection of records. The length of the string MUST be less than 256 characters. MUST exist if and only if **fLoadSourceConnectionFile** is 1.

stConnDesc (variable): An optional XLWideString that specifies the description for this external connection. The length of the string MUST be less than 256 characters. MUST exist if and only if **fLoadConnectionDesc** is 1.

stConnName (variable): An XLWideString that specifies the name of the external connection. The external connection name MUST be unique within a workbook. The length of the string MUST be greater than 0 and less than 256 characters.

stSso (variable): An optional XLWideString that specifies the identifier for single sign-on (SSO) used for authentication between an multi-tier application and the external data. The length of the string MUST be less than 256 characters. MUST exist if and only if **fLoadSSOApplicationID** is 1.

2.4.55 BrtBeginExtConnections

This record specifies the beginning of a collection of BrtBeginExtConnection records as defined by the External Data Connections part ABNF. The collection of records specifies external connections.

2.4.56 BrtBeginExternals

This record specifies the beginning of a collection of records as defined by Workbook part ABNF. The collection of records specifies a collection of Supporting Links and specifies a collection of Xti structures.

2.4.57 BrtBeginFills

This record specifies a count of BrtFill records and specifies the beginning of a collection of BrtFill records as defined by the Styles part ABNF. The collection of BrtFill records specifies cell **fill pattern**.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cfills																															

cfills (4 bytes): An unsigned integer that specifies the number of BrtFill records between BrtBeginFills record and the subsequent BrtEndFills record. MUST be greater than or equal 1 and less than or equal to 0xFF97.

2.4.58 BrtBeginFilterColumn

This record specifies properties of an AutoFilter column and specifies the beginning of a collection of records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of records specifies an AutoFilter column.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dwCol																															
A	B	reserved																													

dwCol (4 bytes): An UncheckedCol that specifies a zero-based index to the column in the AutoFilter range to which this filter information applies. This value MUST be greater than or equal to zero and less than or equal to the number of columns in the region described by the **rfx** of the BrtBeginAFilter associated with this record.

A - fHideArrow (1 bit): A bit that specifies whether the AutoFilter button for this column is hidden.

B - fNoBtn (1 bit): A bit that specifies whether the AutoFilter button for this column will appear in the next column after this one. MUST be one of the following values:

Value	Meaning
0x0	The AutoFilter button for this column will not appear in the next column after this one

0x1	The AutoFilter button for this column will appear in the next column after this one, replacing any filter button in that cell. If **fHideArrow** is equal to 1, the button will appear in the next column but the user will not be able to interact with it.

reserved (14 bits): MUST be zero, and MUST be ignored.

2.4.59 BrtBeginFilters

This record specifies the beginning of a collection of records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of records specifies information about the filter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fBlank																															
unused																															

fBlank (4 bytes): A Boolean that specifies whether to display blank values.

unused (4 bytes): Undefined and MUST be ignored.

2.4.60 BrtBeginFmd

This record specifies the beginning of a collection of records as defined by the Metadata part ABNF. The collection of records specifies Future Records.

2.4.61 BrtBeginFmts

This record specifies a count of BrtFmt records and specifies the beginning of a collection of BrtFmt records as defined by the Styles part ABNF. The collection of BrtFmt records specifies the properties of the number formats which indicate how to format and render the numeric value of the cells.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cfmts																															

cfmts (4 bytes): An unsigned integer that specifies the number of BrtFmt records in this collection. MUST be less than or equal to 0x000000CE. <9>

2.4.62 BrtBeginFnGroup

This record specifies the number of built-in **function categories** and specifies the beginning of a collection of BrtFnGroup records as defined by the Workbook part ABNF. The collection of BrtFnGroup records specifics properties of a function category.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iMac																															

iMac (1 byte): An unsigned integer that specifies the number of built-in function categories in the current workbook. The value of this field plus the count of BrtFnGroup records MUST be less than or equal to 255.

2.4.63 BrtBeginFonts

This record specifies a count of BrtFont records and specifies the beginning of a collection of BrtFont records as defined by the Styles part ABNF. The collection of BrtFont records specifies the fonts for the workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cfonts																															

cfonts (4 bytes): An unsigned integer that specifies the number of BrtFont records in this collection. MUST be less than or equal to 0x0000FFD3.

2.4.64 BrtBeginHeaderFooter

This record specifies the header and footer information for a sheet and specifies the beginning of an empty collection of records as defined by the Worksheet part ABNF, Chart Cheet part ABNF, Dialog Sheet part ABNF, and Macro Sheet part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	reserved												stHeader (variable)															
...																															
stFooter (variable)																															
...																															
stHeaderEven (variable)																															
...																															
stFooterEven (variable)																															
...																															
stHeaderFirst (variable)																															

...
stFooterFirst (variable)
...

A - fHFDiffOddEven (1 bit): A bit that specifies that the header and footer used on even-numbered printed pages are different from those used on odd-numbered printed pages.

B - fHFDiffFirst (1 bit): A bit that specifies that the header and footer used on the first printed page are different from those used on subsequent pages.

C - fHFScaleWithDoc (1 bit): A bit that specifies that the headers and footers scale with the **print scale**.

D - fHFAlignMargins (1 bit): A bit that specifies that the headers and footers align with the **page margins**.

reserved (12 bits): MUST be zero and MUST be ignored.

stHeader (variable): A HeaderFooterString that specifies the contents of the header. This header is used for odd-numbered pages except for the first page. If **fHFDiffOddEven** is 0 this header also is used for even-numbered pages. If **fHFDiffFirst** is 0 this header also is used for the first page.

stFooter (variable): A HeaderFooterString that specifies the contents of the footer. This footer is used for odd-numbered pages except for the first page. If **fHFDiffOddEven** is 0 this footer also used for even-numbered pages. If **fHFDiffFirst** is 0 this footer also is used for the first page.

stHeaderEven (variable): A HeaderFooterString that specifies the contents of the header for even-numbered printed pages. MUST be ignored if **fHFDiffOddEven** is 0.

stFooterEven (variable): A HeaderFooterString that specifies contents of the footer for even-numbered printed pages. MUST be ignored if **fHFDiffOddEven** is 0.

stHeaderFirst (variable): A HeaderFooterString that specifies the contents of the header for the first printed page. MUST be ignored if **fHFDiffFirst** is 0.

stFooterFirst (variable): A HeaderFooterString that specifies the contents of the footer for the first printed page. MUST be ignored if **fHFDiffFirst** is 0.

2.4.65 BrtBeginIconSet

This record specifies properties of a conditional formatting rule that uses an **icon set** and specifies the beginning of a collection of BrtCFVO records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of BrtCFVO records specifies the set of values that specify the thresholds used by the conditional formatting rule to determine which icons to display in the applied range. Each BrtCFVO record following this record specifies the minimum value associated with the corresponding **icon** from the icon set. The first BrtCFVO record following this record MUST be ignored.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
iSet																															

A	B	C	D	E	F	G	reserved2	

iSet (4 bytes): A KPISets which specifies the icon set used in the collection of BrtCFVO records.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - fIcon (1 bit): A bit that specifies whether the cells in the applied range display the icon and **cell value**, or the icon only.

Value	Meaning
0	The icon and cell value are shown in the cell.
1	Only the icon is shown in the cell.

C - fReverse (1 bit): A bit that specifies whether the icons in the icon set specified in **iSet** are shown in reverse order.

Value	Meaning
0	The icons specified in **iSet** are shown in reverse order.
1	The icons specified in **iSet** are shown in the order defined by the icon set.

D - unused1 (1 bit): Undefined and MUST be ignored.

E - unused2 (1 bit): Undefined and MUST be ignored.

F - unused3 (1 bit): Undefined and MUST be ignored.

G - unused4 (1 bit): Undefined and MUST be ignored.

reserved2 (9 bits): MUST be zero, and MUST be ignored.

2.4.66 BrtBeginIndexedColors

This record specifies the beginning of a collection of BrtIndexedColor records as defined by the Styles part ABNF. The collection of BrtIndexedColor records specifies indexed color. The number of BrtIndexedColor MUST be less than or equal to 64.

2.4.67 BrtBeginISXTHCols

This record specifies a collection of references to pivot hierarchies and any data fields that appear on the column axis of a PivotTable view and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF. If this record is present, the PivotTable view MUST be an OLAP PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cisxth																															
rgisxth (variable)																															
...																															

cisxth (4 bytes): An unsigned integer that specifies the count of items in the **rgisxth** array.

rgisxth (variable): An array of ISXTH structures that specifies the collection of references to pivot hierarchies and any data field that appear on the column axis of a PivotTable view. The count of items in this array MUST be equal to **cisxth**.

Each item MUST NOT equal -1. Each item MUST have a unique value. This array MUST specify pivot hierarchies and any data field reference in the same order as the pivot hierarchies associated with the pivot fields, omitting duplicates, and any data field reference specified by the BrtBeginISXVDCols record.

2.4.68 BrtBeginISXTHRws

This record specifies a collection of references to pivot hierarchies and any data field that appear on the row axis of a PivotTable view, and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF. If this record is present, the PivotTable view MUST be an OLAP PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cisxth																															
rgisxth (variable)																															
...																															

cisxth (4 bytes): An unsigned integer that specifies the count of items in the **rgisxth** array.

rgisxth (variable): An array of ISXTHs that specifies the collection of references to pivot hierarchies and any data field that appear on the row axis of a PivotTable view. The count of items in this array MUST be equal to **cisxth**.

Each item MUST NOT equal -1. Each item MUST have a unique value. This array MUST specify pivot hierarchies and any data field reference in the same order as the pivot hierarchies associated with the pivot fields, omitting duplicates, and any data field reference specified by the BrtBeginISXVDRws record.

2.4.69 BrtBeginISXVDCols

This record specifies the pivot fields that appear on the column axis of this PivotTable view and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cisxvd																															
rgisxvdcols (variable)																															
...																															

cisxvd (4 bytes): An unsigned integer that specifies the count of pivot fields, and any instance of the data field, that appear on the column axis of this PivotTable view.

rgisxvdcols (variable): An array of ISXVD that specifies the pivot fields that appear on the column axis of this PivotTable view and whether the data field appears on the column axis. Pivot fields will appear on the column axis in the order they are specified in this array.

Each item MUST NOT be equal to -1. The count of items in this array MUST equal **cisxvd**. Each item in this array MUST have a unique value.

If an item in this array has a value equal to -2, the **sxaxis4Data** field of the BrtBeginSXView record of this PivotTable view MUST be equal to 0x02.

Any BrtBeginSXVD record, of a pivot field specified by an item in this array, MUST have its **sxaxisCol** attribute equal to 1.

2.4.70 BrtBeginISXVDRws

This record specifies the pivot fields that appear on the row axis of this PivotTable view and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cisxvd																															
rgisxvdrws (variable)																															
...																															

cisxvd (4 bytes): An unsigned integer that specifies the count of pivot fields, and any instance of the data field, that appear on the row axis of this PivotTable view.

rgisxvdrws (variable): An array of ISXVD that specifies the pivot fields that appear on the row axis of this PivotTable view and whether the data field appears on the row axis. Pivot fields will appear on the row axis in the order they are specified in this array.

Each item MUST NOT be equal to -1. The count of items in this array MUST equal **cisxvd**. Each item in this array MUST have a unique value.

If an item in this array has a value equal to -2, the **sxaxis4Data** field of the BrtBeginSXView record of this PivotTable view MUST be equal to 0x01.

Any BrtBeginSXVD record, of a pivot field specified by an item in this array, MUST have its **sxaxisRw** attribute equal to 1.

2.4.71 BrtBeginISXVIs

This record specifies the pivot line entries that occur on a pivot line and specifies the beginning of an empty collection of records as defined in the PivotTable part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgisxvis (variable)																															

...

rgisxvis (variable): An array of 4-byte unsigned integers each of which specifies a pivot line entry, as specified by Pivot Line Entry. The number of elements in this array MUST be equal to the value of the **cisxvis** field of the BrtBeginSXLI record that begins this collection. If the value of the **itmtype** field in that BrtBeginSXLI record is PITGRAND, then any pivot line entries specified by this field MUST be ignored.

2.4.72 BrtBeginList

This record specifies properties of a table and specifies the beginning of a collection of records as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection of records specifies a table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfxList (16 bytes)																															
...																															
lt																															
idList																															
crwHeader																															
crwTotals																															
A	B	C	D	E	reserved																										
nDxfHeader																															
nDxfData																															
nDxfAgg																															
nDxfBorder																															
nDxfHeaderBorder																															
nDxfAggBorder																															
dwConnID																															

stName (variable)
...
stDisplayName (variable)
...
stComment (variable)
...
stStyleHeader (variable)
...
stStyleData (variable)
...
stStyleAgg (variable)
...

rfxList (16 bytes): An RfX that specifies the range of cells the table occupies. The RfX MUST NOT overlap with another table or AutoFilter on the same sheet. The RfX height MUST be greater than the sum of the values of the **crwHeader** and **crwTotals** fields. If **fSingleCell** is 1, **rfxList** MUST occupy exactly 1 cell.

lt (4 bytes): A **ListType** that specifies the table type.

idList (4 bytes): An unsigned integer that specifies the numeric identifier of the table. The value MUST be unique within the containing workbook, MUST be greater than or equal to 1 and MUST be less than or equal to 4294967294 (0xFFFFFFFE).

crwHeader (4 bytes): A Boolean that specifies whether the **table header** row is displayed at the top of the table.

Value	Meaning
0	Table header row is hidden
1	Table header row is displayed

crwTotals (4 bytes): A Boolean that specifies whether the table **total row** is displayed at the bottom of the table.

Value	Meaning

0	Total row is hidden
1	Total row is displayed

A - fShownTotalRow (1 bit): A bit that specifies whether the table total row has ever been displayed for this table.

B - fSingleCell (1 bit): A bit that specifies whether the table is a single cell table. If this value equals 1, then **lt** MUST equal LTXML (0x00000002).

C - fForceInsertToBeVisible (1 bit): A bit that specifies whether the table **insert row** is displayed.

D - fInsertRowInsCells (1 bit): A bit that specifies whether cells in the sheet were automatically inserted when the table insert row was displayed for this table.

E - fPublished (1 bit): A bit that specifies the **publish to server** state of this table.

reserved (27 bits): MUST be zero and MUST be ignored.

nDxfHeader (4 bytes): A DXFId that specifies the differential formatting applied to the table header row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfData (4 bytes): A DXFId that specifies the differential formatting applied to the table data region of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfAgg (4 bytes): A DXFId that specifies the differential formatting applied to the table total row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfBorder (4 bytes): A DXFId that specifies the differential formatting applied to the borders of the table data region of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfHeaderBorder (4 bytes): A DXFId that specifies the differential formatting applied to the borders of the table header row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

nDxfAggBorder (4 bytes): A DXFId that specifies the differential formatting applied to the borders of the table total row of this table. If **fSingleCell** is 1, the value MUST be 0xFFFFFFFF.

dwConnID (4 bytes): An unsigned integer that specifies the identifier of an External Connection used by this table. The value MUST be zero when **lt** is not LTXML. The value MUST be zero or be equal to the **dwConnID** value in one of the BrtBeginExtConnection records in the BrtBeginExtConnections collection.

stName (variable): An XLNullableWideString that specifies the string identifier of the table used for programmatic purposes. The string MUST be NULL or unique per table per sheet, MUST have less than or equal to 255 characters and MUST be NULL if **fSingleCell** is 1. If this field is NULL, the string identifier used for programmatic purposes is specified by **stDisplayName**.

stDisplayName (variable): An XLNullableWideString that specifies the string identifier of the table for use within the displayed string for formulas. **stDisplayName** MUST have a maximum length and format specified by XLNameWideString, MUST be unique per workbook, and MUST NOT have the prefix "_xl". If **fSingleCell** is 1, the string MUST be NULL.

stComment (variable): An XLNullableWideString that specifies a comment about the table. The string MUST contain less than or equal to 255 characters. If **fSingleCell** is 1, the string MUST be NULL.

stStyleHeader (variable): A CellStyleName that specifies the name of the cell style that is applied to the table header row of the table. If **fSingleCell** is 1, the value MUST be a NULL string.

stStyleData (variable): A CellStyleName that specifies the name of the cell style that is applied to the table data region of the table. If **fSingleCell** is 1, the value MUST be a NULL string.

stStyleAgg (variable): A CellStyleName that specifies the name of the cell style that is applied to the table total row of the table. If **fSingleCell** is 1, the value MUST be a NULL string.

2.4.73 BrtBeginListCol

This record specifies properties of a column in a table and specifies the beginning of a collection of records, as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection of records specifies a table column.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
idField																															
ilta																															
nDxfHdr																															
nDxfInsertRow																															
nDxfAgg																															
idqsif																															
stName (variable)																															
...																															
stCaption (variable)																															
...																															
stTotal (variable)																															
...																															
stStyleHeader (variable)																															
...																															
stStyleInsertRow (variable)																															
...																															
stStyleAgg (variable)																															

...

idField (4 bytes): An unsigned integer that specifies the numeric identifier of the table column. The value MUST be unique for all BrtBeginListCol records following the preceding BrtBeginList record. The value MUST be greater than or equal to 1.

ilta (4 bytes): A ListTotalRowFunction that specifies the table total row aggregation function for this table column. If the preceding BrtBeginList record's **crwTotals** field is equal to 1, then the formula specified by **ilta** MUST be equal to the formula of the cell intersected by the table total row and this table column.

nDxfHdr (4 bytes): A DXFId that specifies the differential formatting applied to the table header of this table column. The value MUST be 0xFFFFFFFF if the preceding BrtBeginList record's **fSingleCell** field or **crwHeader** field is equal to 1.

nDxfInsertRow (4 bytes): A DXFId that specifies the differential formatting applied to the table insert row of this table column. The value MUST be 0xFFFFFFFF if the preceding BrtBeginList record's **fSingleCell** field is equal to 1.

nDxfAgg (4 bytes): A DXFId that specifies the differential formatting applied to the table total row of this table column. The value MUST be 0xFFFFFFFF if the preceding BrtBeginList record's **fSingleCell** field is equal to 1.

idqsif (4 bytes): A QsiFieldId that specifies the numeric identifier of the query table column that corresponds to this column. The value MUST be 0 or unique for all BrtBeginListCol records following the preceding BrtBeginList record. If the preceding BrtBeginList record's **lt** field is equal to LTEXTDATA, the value MUST be greater than or equal to 1; otherwise, the value MUST be 0.

stName (variable): An XLNullableWideString that specifies a textual identifier of this table column . The string MUST be NULL or unique for all BrtBeginListCol records following the preceding BrtBeginList record. If the preceding BrtBeginList record's **fSingleCell** field is equal to 1 or its **lt** field is equal to LTRANGE, the string MUST be NULL; otherwise, the string length MUST be greater than or equal to 1 and less than or equal to 255.

stCaption (variable): An XLNullableWideString that specifies the caption of this table column to be displayed in the sheet. The string MUST be NULL or unique for all BrtBeginListCol records following the preceding BrtBeginList record. If the preceding BrtBeginList record's **fSingleCell** field is equal to 1, the string MUST be NULL; otherwise, the string length MUST be greater than or equal to 1 and less than or equal to 255. If the preceding BrtBeginList record's **crwHeader** field is equal to 1, then the string MUST equal the string of the cell intersected by the table header row and this table column.

stTotal (variable): An XLNullableWideString that specifies the text to be displayed in the table total row of this table column. The string length MUST be less than or equal to 8189. The string MUST be NULL if **ilta** is equal to ILTA_CUSTOM. If the preceding BrtBeginList record's **crwTotals** field is equal to 1, then the string MUST equal the string of the cell intersected by the table total row and this table column.

stStyleHeader (variable): A CellStyleName that specifies the name of the cell style that is applied to the table header row of this table column. The string MUST be NULL if the preceding BrtBeginList record's **fSingleCell** field or **crwHeader** field is equal to 1.

stStyleInsertRow (variable): A CellStyleName that specifies the name of the cell style that is applied to the table insert row of this table column. The string MUST be NULL if the preceding BrtBeginList record's **fSingleCell** field is equal to 1.

stStyleAgg (variable): A CellStyleName that specifies the name of the cell style that is applied to the total row of this table column <10>. The string MUST be NULL if the preceding BrtBeginList record's **fSingleCell** field is equal to 1.

2.4.74 BrtBeginListCols

This record specifies a count of table columns and specifies the beginning of a collection of records, as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection of records specifies the set of table columns for a single table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
nCols																															

nCols (4 bytes): A DCol that specifies the count of items in the collection of table columns.

2.4.75 BrtBeginListParts

This record specifies the beginning of a collection of BrtListPart records as defined by the Worksheet part ABNF. The collection of BrtListPart records specifies tables defined in the workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cParts																															

cParts (4 bytes): An unsigned integer that specifies the number of BrtListPart records in this collection.

2.4.76 BrtBeginListXmlCPr

This record specifies properties of a table column's XML map and specifies the beginning of an empty collection of records as defined by the Table part ABNF and the Single Cell Tables part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dwMapId																															
A	B	reserved																													
lfxidtDisk																															
xpath (variable)																															
...																															

dwMapId (4 bytes): An unsigned integer that specifies the XML map associated with this table column. The value MUST equal the value of the ID attribute of a **Map** element contained within the Custom XML Maps part.

A - unused (1 bit): Undefined and MUST be ignored.

B - fCanBeSingle (1 bit): A bit that specifies whether **xpath** resolves to a single **XML node** or a collection of XML nodes. When the record is contained in a Table part, this field MUST be a value from the following table:

Value	Meaning
0	Specifies that **xpath** resolves to a collection of XML nodes.
1	Specifies that **xpath** resolves to a single XML node.

When this record is contained in a Single Cell Tables part, the value MUST be 1.

reserved (30 bits): MUST be zero and MUST be ignored.

lfxidtDisk (4 bytes): An XmlDataType that specifies the data type of the XML nodes obtained by applying the **XPath** specified by **xpath** to the XML map specifies by **dwMapId.**

xpath (variable): An XmlMappedXpath that specifies the XPath of this XML map.

2.4.77 BrtBeginMap

This record specifies the mapping between BrtBeginDim and BrtBeginMG records and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
img																															
isxdh																															

img (4 bytes): An unsigned integer that specifies the zero-based index of a BrtBeginMG record that directly follows the BrtBeginMgs record in this part. The referenced BrtBeginMG record specifies **measure group**.

isxdh (4 bytes): An unsigned integer that specifies the zero-based index of a BrtBeginDim that directly follows the BrtBeginDims record in this part. The referenced BrtBeginDim record specifies OLAP dimension (1).

2.4.78 BrtBeginMdx

This record specifies properties of MDX metadata and specifies the beginning of a collection of records as defined by the Metadata part ABNF. The collection of records specifies additional properties for MDX metadata.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
istrConnName																															
tfnSrc																															

istrConnName (4 bytes): An Istr that specifies the connection name.

tfnSrc (4 bytes): A TagFnMdx that specifies the type of cube function that generated the metadata.

2.4.79 BrtBeginMdxKPI

This record specifies the properties of MDX KPI metadata and specifies the beginning of an empty collection of records as defined by the Metadata part ABNF. The preceding BrtBeginMdx record MUST have **tfnSrc** equal to TFNCUBEKPIPROPERTY, as specified by TagFnMdx.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
istrKPIName																															
kpiprop																															
istrMbrKPI																															

istrKPIName (4 bytes): An Istr that specifies the KPI name.

kpiprop (4 bytes): A KPIProp that specifies the KPI type.

istrMbrKPI (4 bytes): An Istr that specifies the MDX unique name of a KPI member.

2.4.80 BrtBeginMdxMbrProp

This record specifies the properties of an OLAP member and specifies the beginning of an empty collection of records as defined by the Metadata part ABNF. The preceding BrtBeginMdx record MUST have **tfnSrc** equal to TFNCUBEMEMBERPROPERTY, as specified by TagFnMdx.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
istrMbr																															
istrProp																															

istrMbr (4 bytes): An Istr that specifies the MDX unique name of the OLAP member.

istrProp (4 bytes): An Istr that specifies the MDX unique name of the OLAP member property.

2.4.81 BrtBeginMdxSet

This record specifies properties of MDX set metadata and specifies the beginning of a collection of BrtMdxMbrIstr records as defined by the Metadata part ABNF. The collection of BrtMdxMbrIstr records specifies MDX unique names and their properties. The preceding BrtBeginMdx record MUST have **tfnSrc** equal to TFNCUBESET or TFNCUBESETCOUNT, as specified by TagFnMdx.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
istrSetDef																															
sso																															
cMbrsSortBy																															

istrSetDef (4 bytes): An Istr that specifies the set definition.

sso (4 bytes): An SdSetSortOrder that specifies the sorting order of the set. If this field is equal to SSOASC or SSODESC, the sort order is specified by the collection of BrtMdxMbrIstr records that immediately follow this record.

cMbrsSortBy (4 bytes): A signed integer that specifies the number of coordinates in the OLAP cube that the set is sorted on. This number MUST be greater than or equal to 0.

2.4.82 BrtBeginMdxTuple

This record specifies formatting properties for MDX tuple metadata and specifies the beginning of a collection of BrtMdxMbrIstr records as defined by the Metadata part ABNF. The collection of BrtMdxMbrIstr records specifies MDX unique names and their properties. The preceding BrtBeginMdx record MUST have **tfnSrc** equal to TFNCUBEMEMBER, TFNCUBEVALUE or TFNCUBERANKEDMEMBER, as specified by TagFnMdx.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cMbrs																															
dwSrvFmtBack																															
dwSrvFmtFore																															
sff																sfnum (variable)															
...																															

cMbrs (4 bytes): A signed integer that specifies the number of member expressions in the tuple. It MUST be greater than or equal to 0.

dwSrvFmtBack (4 bytes): A SrvFmtCV that specifies the **background color**. When **sff.fSrvFmtBack** equals 1, the background color is applied.

dwSrvFmtFore (4 bytes): A SrvFmtCV that specifies the **foreground color**. When **sff.fSrvFmtFore** equals 1, the foreground color is applied.

sff (2 bytes): A SrvFmtFlags that specifies the properties of applied server-specified formatting.

sfnum (variable): A SrvFmtNum that specifies the number or currency formatting. This field is optional and MUST exist if and only if **sff.fSrvFmtNum** is set to 1.

2.4.83 BrtBeginMergeCells

This record specifies the beginning of a collection of BrtMergeCell records as defined in the Worksheet part ABNF. The collection of BrtMergeCell records specifies the **merged cells** for the sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cmcs																															

cmcs (4 bytes): An unsigned integer that specifies the number of merged cells.

2.4.84 BrtBeginMetadata

This record specifies the beginning of a collection of records as defined by the Metadata part ABNF. The collection of records specifies the metadata associated with the book.

2.4.85 BrtBeginMG

This record specifies a measure group for a Pivot Cache and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved								name (variable)																							
...																															
caption (variable)																															
...																															

reserved (1 byte): MUST be zero and MUST be ignored.

name (variable): An XLWideString value that specifies name of the measure group. The length of this string MUST be between 1 and 65535.

caption (variable): An XLWideString value that specifies the display name of the measure group. The length of this string MUST be between 1 and 65535.

2.4.86 BrtBeginMGMaps

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the mappings between OLAP dimensions (1) and the OLAP measure groups that each OLAP dimension (1) is related to.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cmaps																															

cmaps (4 bytes): An unsigned integer that specifies the number of mappings between OLAP dimensions (1) and the OLAP measure groups. MUST be equal to number of BrtBeginMap elements following this record.

2.4.87 BrtBeginMgs

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies PivotTable OLAP measure groups.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cmgs																															

cmgs (4 bytes): An unsigned integer that specifies the number of measure groups in the PivotTable OLAP measure group collection. MUST be equal to number of BrtBeginMG following this record.

2.4.88 BrtBeginMRUColors

This record specifies the beginning of a collection of BrtMRUColor records as defined by the Styles part ABNF. The collection of BrtMRUColor records specifies the collection of most recently used colors selected by the user for this workbook.

2.4.89 BrtBeginOleObjects

This record specifies the beginning of a collection of BrtOleObject records as defined by the Worksheet part ABNF, Dialog Sheet part ABNF, and Macro Sheet part ABNF. The collection of BrtOleObject records specifies information about **OLE objects** that are embedded in the workbook.

2.4.90 BrtBeginPCDCalcItem

This record specifies the formula of a calculated item within this PivotCache and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the locations in the PivotTable view to which the calculated item applies, and a reference to the cache fields and cache items that the formula of the calculated item uses.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved																															

fmla (variable)
...

reserved (4 bytes): MUST be -1 and MUST be ignored.

fmla (variable): A PivotParsedFormula that specifies the formula of the calculated item.

2.4.91 BrtBeginPCDCalcItems

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of calculated items in the PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cCalcItems																															

cCalcItems (4 bytes): An unsigned integer that specifies the number of calculated items in the PivotCache. MUST be equal to the number of BrtBeginPCDCalcItem records in this collection.

2.4.92 BrtBeginPCDCalcMem

This record specifies an OLAP calculated member or a named set in a PivotCache and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	reserved																												
wSolveOrder																															
fSet																															
stName (variable)																															
...																															
stMdx (variable)																															
...																															
stMemberName (variable)																															
...																															
stSourceHier (variable)																															

...
stParentUnique (variable)
...

A - fLoadMemberName (1 bit): A bit that specifies whether **stMemberName** exists after the fixed size portion of this record.

B - fLoadSourceHier (1 bit): A bit that specifies whether **stSourceHier** exists after the fixed size portion of this record.

C - fLoadParentUnique (1 bit): A bit that specifies whether **stParentUnique** exists after the fixed size portion of this record.

reserved (29 bits): MUST be zero, and MUST be ignored.

wSolveOrder (4 bytes): A signed integer that specifies the order in which this OLAP calculated member is calculated in relation to other OLAP calculated members. The value is used in SOLVE_ORDER property in the MDX statement for creating the calculated member. The value MUST be ignored if **fSet** is 1.

fSet (4 bytes): A Boolean that specifies whether this record specifies a name set or an OLAP calculated member.

Value	Meaning
0x00000000	This record specifies an OLAP calculated member.
0x00000001	This record specifies a named set.

stName (variable): An XLWideString that specifies the name of the OLAP calculated member. The length of this value MUST be greater than zero and MUST be less than 65536.

stMdx (variable): An XLWideString that specifies the **multidimensional expression (MDX)** of the OLAP calculated member. The length of this value MUST be greater than zero. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32767 characters, otherwise it MUST be less than 2048 characters.

stMemberName (variable): An optional XLWideString that specifies the MDX unique name for the OLAP calculated member. The length of this value MUST be less than 65536 characters. This value MUST be specified if **fSet** is 0. It MUST NOT be specified if **fSet** is 1.

MUST exist if and only if **fLoadMemberName** is 1.

stSourceHier (variable): An optional XLWideString that specifies the name of the cache hierarchy to which the OLAP calculated member belongs. MUST be specified if **fSet** is 0. It MUST NOT be specified if **fSet** is 1. The length of this value MUST be less than 65536. MUST exist if and only if **fLoadSourceHier** is 1.

stParentUnique (variable): An optional XLWideString that specifies the name of the parent OLAP member of the OLAP calculated member. MUST NOT be specified if **fSet** is 1. The length of this value MUST be less than 65536. If this value does not exist, this OLAP calculated member has no parent OLAP member. MUST exist if and only if **fLoadParentUnique** is 1.

2.4.93 BrtBeginPCDCalcMems

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the OLAP calculated members in a PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cCalcMems																															

cCalcMems (4 bytes): An unsigned integer that specifies the number of OLAP calculated members in the PivotCache. MUST be equal to the number of BrtBeginPCDCalcMem records in this collection.

2.4.94 BrtBeginPCDFAtbl

This record specifies properties of a Cache Field and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records following this record specifies a collection of Cache Items.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	I	J	reserved						citems															
...																xnumMin (optional)															
...																															
...																xnumMax (optional)															
...																															
...																															

A - fTextEtcField (1 bit): A bit that specifies whether this Cache Field contains at least one Cache Item that contains a text, blank, Boolean, or error value. MUST be equal to 1 if this collection contains at least one BrtPCDIMissing, BrtPCDIString, BrtPCDIBoolean, BrtPCDIError, BrtPCDIAMissing, BrtPCDIAString, BrtPCDIABoolean or BrtPCDIAError record, or BrtBeginPCDIRun record with a **mdSxoper** field equal to 0x0002 or 0x0010.

B - fNonDates (1 bit): A bit that specifies whether this Cache Field contains at least one Cache Item that contains a non-date value. MUST be equal to 1 if this collection contains at least one BrtPCDIMissing, BrtPCDIString, BrtPCDIBoolean, BrtPCDINumber, BrtPCDIError, BrtPCDIAMissing, BrtPCDIAString, BrtPCDIABoolean, BrtPCDIANumber or BrtPCDIAError record, or BrtBeginPCDIRun record with a **mdSxoper** field equal to 0x0001, 0x0002 or 0x0010.

C - fDateInField (1 bit): A bit that specifies whether this Cache Field contains at least one Cache Item that contains a date value. MUST be equal to 1 if this collection contains at least one BrtPCDIDatetime or BrtPCDIADatetime record, or a BrtBeginPCDIRun record with a **mdSxoper** field equal to 0x0020.

D - fHasTextItem (1 bit): A bit that specifies whether this Cache Field contains a Cache Item that contains a text, Boolean or error value. MUST be equal to 1 if this collection contains at least one

BrtPCDIString, BrtPCDIBoolean, BrtPCDIError, BrtPCDIAString, BrtPCDIABoolean or BrtPCDIAError record, or BrtBeginPCDIRun record with a **mdSxoper** field equal to 0x0002 or 0x0010.

E - fHasBlankItem (1 bit): A bit that specifies whether this Cache Field contains a Cache Item that contains a blank value. MUST be equal to 1 if this collection contains at least one BrtPCDIMissing or BrtPCDIAMissing record.

F - fMixedTypesIgnoringBlanks (1 bit): A bit that specifies whether this Cache Field contains more than one Cache Item that contains a text, numeric, or date value.

This field MUST equal 1 if any of the following three statements are true:

1. This field contains at least one of the following: a BrtPCDINumber record, a BrtPCDIANumber record, or a BrtBeginPCDIRun record with a **mdSxoper** field that equals 0x0001

   –And–

   This field contains at least one of the following: a BrtPCDIString record, a BrtPCDIBoolean record, a BrtPCDIError record, a BrtPCDIAString record, a BrtPCDIABoolean record, a BrtPCDIAError record, or a BrtBeginPCDIRun record with a **mdSxoper** field that equals 0x0002 or 0x0010

2. This field contains at least one of the following: a BrtPCDIDatetime record, a BrtPCDIADatetime record, or a BrtBeginPCDIRun record with a **mdSxoper** field that equals 0x0020

   –And–

   This field contains at least one of the following: a BrtPCDINumber record, a BrtPCDIANumber record, or a BrtBeginPCDIRun record with a **mdSxoper** field that equals 0x0001

3. This field contains at least one of the following: a BrtPCDIDatetime record, a BrtPCDIADatetime record, or a BrtBeginPCDIRun record with a **mdSxoper** field that equals 0x0020

   –And–

   This field contains at least one of the following: a BrtPCDIString record, a BrtPCDIBoolean record, a BrtPCDIError record, a BrtPCDIAString record, a BrtPCDIABoolean record, a BrtPCDIAError record, or a BrtBeginPCDIRun record with a **mdSxoper** field that equals 0x0002 or 0x0010

G - fNumField (1 bit): A bit that specifies whether this cache field contains at least one cache item that contains a numeric value, but contains no cache items that contain date values. MUST be equal to 1 if this collection contains at least one BrtPCDINumber or BrtPCDIANumber record or BrtBeginPCDIRun record with a **mdSxoper** field equal to 0x0001, and **fDateInField** is equal to 0.

H - fIntField (1 bit): A bit that specifies whether this cache field contains at least one cache item that contains an integer value, but contains no cache items that contain date values. MUST be equal to 1 if this collection contains at least one BrtPCDINumber or BrtPCDIANumber record or BrtBeginPCDIRun record with a **mdSxoper** field equal to 0x0001, and all **xnum** fields of the BrtPCDINumber records specify integer values, and all **xnum** fields of the BrtPCDIANumber records specify integer values, and all **xnum** fields of the **rgPCDINumber** field of the BrtBeginPCDIRun records specify integer values, and **fDateInField** is equal to 0.

I - fNumMinMaxValid (1 bit): A bit that specifies whether **xnumMin** and **xnumMax** exist. MUST be equal to 0 if **fDateInField** is equal to 0 and **fNumField** is equal to 0.

J - fHasLongTextItem (1 bit): A bit that specifies whether this Cache Field contains a Cache Item that contains a string longer than 255 characters. MUST be equal to 1 if this collection contains at least one BrtPCDIString record or a BrtPCDIAString record with an **st** field greater than 255 characters; or a BrtBeginPCDIRun with a **mdsxoper** field equal to 0x0001 and a **rgPCDIString** field containing a XLWideString longer than 255 characters.

reserved (6 bits): MUST be zero, and MUST be ignored.

citems (4 bytes): An unsigned integer that specifies the number of cache items in this collection as defined by the PivotCache Definition part ABNF. MUST be less than or equal to 1048576 if the data functionality level is greater than or equal to 3; otherwise MUST be less than or equal to 32500.

xnumMin (8 bytes): An Xnum or DateAsXnum that specifies the minimum value of this PivotCache field. MUST exist if and only if **fNumMinMaxValid** is equal to 1. If **fDateInField** is equal to 1 and **fMixedTypesIgnoringBlanks** is equal to 0, this value MUST be a DateAsXnum equal to the earliest date specified among all the BrtPCDIDatetime records in this collection. If **fNumField** is equal to 1, this value MUST be an Xnum equal to the smallest value specified among all the BrtPCDINumber records in this collection. Otherwise, **xnumMin** is undefined and MUST be ignored.

xnumMax (8 bytes): An Xnum or DateAsXnum that specifies the maximum value of this PivotCache field. MUST exist if and only if **fNumMinMaxValid** is equal to 1. If **fDateInField** is equal to 1 and **fMixedTypesIgnoringBlanks** is equal to 0, this value MUST be a DateAsXnum equal to the latest date specified among all the BrtPCDIDatetime records in this collection. If **fNumField** is equal to 1, this value MUST be an Xnum equal to the largest value specified amongst all the BrtPCDINumber records in this collection. Otherwise, **xnumMax** is undefined and MUST be ignored.

2.4.95 BrtBeginPCDFGDiscrete

This record specifies the beginning of a collection of BrtPCDIIndex records as defined by the PivotCache Definition part ABNF. The collection of BrtPCDIIndex records specifies a mapping from a cache item in the BrtBeginPCDFAtbl collection of the base field of this grouping field to a cache item in the BrtBeginPCDFGItems collection of the grouping field. The base field and grouping field are specified in grouping.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cItems																															

cItems (4 bytes): An unsigned integer that specifies the number of mapping indexes for this grouping field. MUST match the number BrtPCDIIndex records in the collection and MUST match the number of cache items in the BrtBeginPCDFAtbl collection of the base field of the grouping field.

2.4.96 BrtBeginPCDFGItems

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of cache items for a grouping field.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cItems																															

cItems (4 bytes): An unsigned integer that specifies the number of cache items in this collection. MUST be equal to the number cache items in this collection.

2.4.97 BrtBeginPCDFGRange

This record specifies the grouping properties of a cache field and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iByType								A	B	C	reserved					xnumStart															
...																															
...																xnumEnd															
...																															
...																xnumBy															
...																															
...																															

iByType (8 bits): An unsigned integer that specifies the type of grouping. MUST be a value from the following table:

iByType	Meaning
0x00	By numeric range
0x01	By seconds
0x02	By minutes
0x03	By hours
0x04	By days
0x05	By months
0x06	By quarters
0x07	By years

If the BrtBeginPCDFGroup record immediately preceding this record has an **ifdbParent** field that is not equal to -1, the **iByType** field of the BrtBeginPCDFGRange record directly following the BrtBeginPCDFGroup record that is directly following the BrtBeginPCDField record specified by the **ifdbParent** field in the immediately preceding BrtBeginPCDFGroup record MUST have a value that is greater than this value.

If the value is greater than 0x00 and the **fSrcField** field of the preceding BrtBeginPCDField record is 1, then the BrtBeginPCDFAtbl record of this cache field MUST have **fDateInField** field equal to 1 and **fNumField** field equal to 0. Also, the preceding BrtBeginPCDField record MUST have **fTextEtcField** equal to 0; otherwise, it MUST have **fMixedTypesIgnoringBlanks** equal to 0 and **fHasBlankItem** equal to 0.

If this value is greater than 0x00, the BrtBeginPCDFAtbl record of this cache field MUST have **fHasTextItem** equal to 0 and **fMixedTypesIgnoringBlanks** equal to 0. <11>

A - fAutoStart (1 bit): A bit that specifies whether the source data is used to set the starting range value.

Value	Meaning
0	The starting range value is set from the value specified in **xnumStart**.
1	The starting range value is set from the source data.

B - fAutoEnd (1 bit): A bit that specifies whether the source data is used to set the ending range value.

Value	Meaning
0	The ending range value is set from the value specified in **xnumEnd**.
1	The ending range value is set from the source data.

C - fDates (1 bit): A bit that specifies that **xnumStart** and **xnumEnd** are dates rather than numbers. MUST be 1 if **iByType** is greater than 0x00, and MUST be 0 otherwise.

Value	Meaning
0	**xnumStart** and **xnumEnd** are numbers.
1	**xnumStart** and **xnumEnd** are dates.

reserved (5 bits): MUST be zero and MUST be ignored.

xnumStart (8 bytes): An Xnum or DateAsXnum that specifies the starting value used for numeric or date grouping when **fAutoStart** is 0. If **fDates** is 1, this value is a DateAsXnum, otherwise it is an Xnum.

xnumEnd (8 bytes): An Xnum or DateAsXnum that specifies the ending value used for numeric or date grouping when **fAutoEnd** is 0. If **fDates** is 1, this value is a DateAsXnum, otherwise it is an Xnum. MUST be greater than or equal to **xnumStart.**

xnumBy (8 bytes): An Xnum that specifies the grouping interval for numeric range grouping. Specifies the number of days to group by in date range grouping. MUST be greater than zero. If **iByType** is not 0x00, it MUST be an integer less than 32768.

2.4.98 BrtBeginPCDFGroup

This record specifies the relation of this cache field and other cache fields with respect to grouping. This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. If this cache field is a parent of other grouping cache field as specified in Grouping, then the collection of records MUST NOT be empty.

If this collection includes one of BrtBeginPCDFGRange or BrtBeginPCDFGDiscrete records, a collection beginning with a BrtBeginPCDFGItems record MUST immediately follow, and it MUST contain at least one item.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ifdbParent																															
ifdbBase																															

ifdbParent (4 bytes): A signed integer that specifies the cache field that is the grouping parent for the cache field containing this record. Each cache item in the grouping parent cache field corresponds to a group of cache items in the cache field containing this record. MUST be a value from the following table:

Value	Meaning
-1	The cache field containing this record has no grouping parent cache field.
0+	Specifies a cache field index. The referenced instance of the sequence of records that conforms to the PCDFIELD rule specifies the grouping parent cache field for the cache field containing this record. MUST be less than the count of elements in the BrtBeginPCDFields collection that contains the referenced instance of the PCDFIELD rule.

If this collection contains a BrtBeginPCDFGRange record, the BrtBeginPCDField record in the instance of the PCDFIELD rule specified by this value MUST be followed by a BrtBeginPCDFGroup record, and the collection beginning with that BrtBeginPCDFGroup record MUST contain a BrtBeginPCDFGRange record; the value of the **ifdbBase** field of that BrtBeginPCDFGroup record MUST be equal to **ifdbBase**. If the **iByType** field of the BrtBeginPCDFGRange record is 0, **ifdbParent** MUST be -1.

If this collection contains a BrtBeginPCDFGDiscrete record, the BrtBeginPCDField record in the instance of the PCDFIELD rule specified by this value MUST be followed by a BrtBeginPCDFGroup record, and the collection beginning with that BrtBeginPCDFGroup record MUST contain a

BrtBeginPCDFGDiscrete record; the value of the **ifdbBase** field of that BrtBeginPCDFGroup record MUST be equal to **ifdbBase.**

If this cache field has **fSrcField** field in the BrtBeginPCDField record equal to 1 and the BrtBeginPCDField record in the instance of the PCDFIELD rule specified by this value is followed by BrtBeginPCDFGDiscrete record, the value of the **ifdbBase** field of the BrtBeginPCDFGroup record preceding that BrtBeginPCDFGDiscrete record MUST be equal to this cache field index, as specified by Cache Field.

ifdbBase (4 bytes): A signed integer that specifies the cache field that is the grouping base for the cache field containing this record. Each cache item in the PCDFGITEMS collection of this record corresponds to a group of cache items in the PCDFATBL collection of the grouping base cache field. MUST be a value from the following table:

Value	Meaning
-1	The cache field containing this record has no grouping base cache field.
0+	Specifies a cache field index. The referenced instance of the PCDFIELD rule specifies the grouping base cache field for the cache field containing this record. MUST be less than the count of elements in the BrtBeginPCDFields collection that contains the referenced instance of the PCDFIELD rule. The **fSrcField** field in the BrtBeginPCDField record of the referenced instance of the PCDFIELD rule MUST be equal to 1.

2.4.99 BrtBeginPCDField

This record specifies properties of a single cache field in the PivotCache and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a single cache field in the PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F			G	H	reserved2						ifmt															
...																wTypeSql															
ihdb																															
isxtl																															
cIsxtmps																															
stFldName (variable)																															
...																															
stFldCaption (variable)																															
...																															

fldFmla (variable)
...
cbRgisxtmp (optional)
rgisxtmp (variable)
...
stMemPropName (variable)
...

A - fServerBased (1 bit): A bit that specifies whether this cache field is a server-based page field when the corresponding pivot field is on the page axis of the PivotTable view, as specified in Source Data.

This value applies to an ODBC PivotCache only. MUST NOT be equal to 1 if the **fCantGetUniqueItems** field is equal to 1.

MUST be equal to 0 for a cache field in a non-ODBC PivotCache.

B - fCantGetUniqueItems (1 bit): A bit that specifies whether a list of unique values from the source data for the cache field was not available while refreshing the PivotCache. This value applies only to a PivotCache that uses ODBC and is intended to be used in conjunction with optimization features. For example, the application can optimize memory usage when populating cache records if it has a list of unique values for a cache field before all the cache records are retrieved from the ODBC connection. Or, the application can determine the appropriate setting of the **fServerBased** field based on this value.

MUST be equal to 0 for fields in a non-ODBC PivotCache.

C - fSrcField (1 bit): A bit that specifies whether this cache field corresponds to source data entity, as specified in Cache Fields.

MUST be equal to 1 for a cache field in an OLAP PivotCache.

MUST be equal to 1 for the first BrtBeginPCDField record in the sequence of records that conform to the PCDFIELDS rule. All cache fields with this value equal to 0 MUST be at the end of the PCDFIELDS rule.

D - fCaption (1 bit): A bit that specifies whether the **stFldCaption** field exists after the fixed sized portion of the record.

MUST be equal to 0 if the value of the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is less than 3.

E - fOlapMemPropField (1 bit): A bit that specifies whether this cache field is associated with an OLAP member property.

MUST be 0 for a cache field in a non-OLAP PivotCache.

F - reserved1 (3 bits): MUST be zero, and MUST be ignored.

G - fLoadFmla (1 bit): A bit that specifies whether the **fldFmla** field exists after the fixed sized portion of the record. MUST be 0 for an OLAP PivotCache and MUST be equal to 0 if the **fSrcField** field is equal to 1.

H - fLoadPropName (1 bit): A bit that specifies whether the **stMemPropName** field exists after the fixed-sized portion of the record.

MUST be 0 if the **fOlapMemPropField** field is equal to 0.

reserved2 (6 bits): MUST be zero, and MUST be ignored.

ifmt (4 bytes): A PivotNumFmtExt that specifies the number format that is used by all source data values that correspond with this cache field.

wTypeSql (2 bytes): A TypeSql that specifies the SQL data type of the cache field. This value stores an ODBC data type and only applies to an ODBC PivotCache. This value is provided by the source database.

ihdb (4 bytes): An unsigned integer that specifies a cache hierarchy index, as specified in Cache Hierarchies. The referenced cache hierarchy is associated with this cache field. For an OLAP PivotCache, this value MUST be less than the count of instances of the sequence of records that conforms to the PCDHIERARCHY rule in the BrtBeginPCDHierarchies collection. For a non-OLAP PivotCache, this value MUST be zero and MUST be ignored.

isxtl (4 bytes): An unsigned integer that specifies the zero-based ordinal of the cache hierarchy **level** that this cache field is associated with. Only used for fields in an OLAP PivotCache. For a non-OLAP PivotCache, this value MUST be zero and MUST be ignored. If the **fOlapMemPropField** field is equal to 0, this value MUST be equal to 0x00007FFF, or it MUST be less than the **cItems** field in the BrtBeginPCDHFieldsUsage record of the cache hierarchy this cache field is associated with. If this value is equal to 0x00007FFF, this cache field applies to the whole cache hierarchy specified by **ihdb** rather than to one level of this cache hierarchy. MUST be equal to 0x00007FFF if the **fMeasure** field of the BrtBeginPCDHierarchy record specified by the **ihdb** field is 1.

cIsxtmps (4 bytes): An unsigned integer that specifies the number of elements in the array specified by **rgisxtmp**; MUST be zero for a non-OLAP PivotCache.

MUST be less than the number of cache fields in this PivotCache as specified by the **cFields** field in the BrtBeginPCDFields record preceding this record.

stFldName (variable): An XLWideString that specifies the name of the cache field. This value MUST be unique (using case insensitive comparison) in the scope of all cache fields in the current PivotCache unless this cache field is a grouping cache field and **fSrcField** is 0. For more information see Grouping.

The length of this string MUST be greater than 0. If the value of the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record of this PivotCache is less than 3, the length of this string MUST be less than 256 characters; otherwise it MUST be less than 32768 characters.

stFldCaption (variable): An optional XLWideString that specifies the caption of the cache field. MUST exist if and only if **fCaption** is equal to 1.

The length of the string MUST be less than 32768 characters.

fldFmla (variable): A PivotParsedFormula that specifies the formula for this calculated field. This formula MUST exist if and only if **fLoadFmla** is equal to 1. For more information about formulas see Formulas.

cbRgisxtmp (4 bytes): An unsigned integer that specifies the number of bytes used by the **rgisxtmp** field. MUST be equal to the following formula:

cIsxtmps * 4

This value exists if and only if the value of **cIsxtmps** is greater than 0.

rgisxtmp (variable): An array of 4-byte unsigned integers. Each element in the array specifies a cache field index, as specified by Cache Fields. Each referenced cache field is a member property cache field, which is associated with this cache field. The **isxtl** field of the BrtBeginPCDField record of the referenced cache field MUST be equal to 0x00007FFF or equal to **isxtl**. The **fOlapMemPropField** field of the BrtBeginPCDField record of the referenced cache field MUST be equal to 1. The **ihdb** field of the BrtBeginPCDField record of the referenced cache field MUST be equal to **ihdb**. This field MUST exist if and only if **cIsxtmps** is greater than 0.

The value of each element in the array MUST be less than the number of cache fields in this PivotCache as specified by the **cFields** field in the BrtBeginPCDFields record preceding this record.

stMemPropName (variable): An optional XLWideString that specifies the name of the member property this cache field associated with. This value MUST exist if and only if the **fLoadPropName** field is equal to 1.

The length of the string MUST be greater than 0 and less than 32768 characters.

2.4.100 BrtBeginPCDFields

This record specifies a count of cache fields and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of recrods specifies a collection of cache fields in the PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cFields																															

cFields (4 bytes): An unsigned integer that specifies the number of cache fields in the PivotCache. MUST be equal to the number of BrtBeginPCDField records in this collection. If value of **bVerCacheCreated** field in the BrtBeginPivotCacheDef record is less than 3, this value MUST be less than 1025, otherwise it MUST be less than 16385. If this is an OLAP PivotCache, this value MUST be greater than or equal to 0, otherwise it MUST be greater than 0.

2.4.101 BrtBeginPCDHFieldsUsage

This record specifies the cache fields in the PivotCache that are associated with the cache hierarchy this record is within, and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cItems																															
rgifdb (variable)																															
...																															

cItems (4 bytes): An unsigned integer that specifies the number of elements in **rgifdb**. This value MUST match the number of elements in **rgifdb**. MUST be 1 if the **fMeasure** field of the preceding BrtBeginPCDHierarchy record is equal to 1.

rgifdb (variable): An array of 4-byte signed integers that specifies cache fields that are associated with the cache hierarchy this record is within. Each element in the array MUST be a value from the following table:

Value	Meaning
-1	The zero-based ordinal of the level specified by the zero-based index of this element in **rgifdb** is not used by this cache hierarchy and is not associated with any cache field. This element with index 0 MUST be -1 if the **fOnlyOneField** field of the preceding BrtBeginPCDHierarchy record is equal to 0 and the **stAllUnq** field of the preceding BrtBeginPCDHierarchy record exists and contains at least one character.
A value greater than or equal to zero	This array element specifies a cache field index as specified in Cache Fields. The referenced cache field is associated with the zero-based ordinal of the level specified by the zero-based index of this element in **rgifdb**. The **ihdb** field of the BrtBeginPCDField record of the specified cache field MUST reference the cache hierarchy this record is within. If the **fOnlyOneField** field of the preceding BrtBeginPCDHierarchy record is equal to 0, then the **isxtl** field of the BrtBeginPCDField record of the specified cache field MUST be equal to the zero-based index of this element in **rgifdb**.

2.4.102 BrtBeginPCDHGLevel

This record specifies properties of an OLAP grouping level, as specified in OLAP Grouping, and the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies an OLAP grouping level in a PivotCache, as specified in OLAP Grouping.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	reserved2						stUnique (variable)																							
...																															

stLevelName (variable)
...

A - fGroupLevel (1 bit): A bit that specifies whether this is a user-defined group level. MUST be a value from the following table:

Value	Meaning
0	The record specifies a group level that corresponds to the source cube level.
1	The record specifies a user-defined group level.

B - reserved1 (1 bit): MUST be zero, and MUST be ignored.

reserved2 (6 bits): MUST be zero, and MUST be ignored.

stUnique (variable): An XLWideString that specifies the MDX unique name of this grouping level. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

stLevelName (variable): An XLWideString that specifies the caption of this grouping level. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

2.4.103 BrtBeginPCDHGLevels

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of OLAP grouping levels, as specified in OLAP Grouping.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cLevels																															

cLevels (4 bytes): An unsigned integer that specifies the number of OLAP Grouping levels in the PivotCache. MUST be equal to the number of BrtBeginPCDHGLevel records in the collection.

2.4.104 BrtBeginPCDHGLGMember

This record specifies an OLAP member or name of a group in the subsequent OLAP level that is part of the associated OLAP grouping and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fGroup																															
stUnique (variable)																															
...																															

fGroup (4 bytes): A Boolean that specifies whether this record specifies the name of a group in the subsequent OLAP level.

Value	Meaning
0x00000000	This record specifies an OLAP member.
0x00000001	This record specifies the name of a group in the subsequent OLAP level.

stUnique (variable): An XLWideString that specifies the unique name of an OLAP member or name of a group in the subsequent OLAP level of the OLAP grouping that contains this record. If **fGroup** is 0, this is a MDX unique name of an OLAP member. If **fGroup** is 1, this is a group name and it MUST match the **stName** field in one of the BrtBeginPCDHGLGroup records of the PCDHGLGROUPS collection in the subsequent OLAP level that is part of the associated OLAP grouping. The length of this value MUST be greater than zero. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

2.4.105 BrtBeginPCDHGLGMembers

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. This collection of records specifies the OLAP members that are part of an OLAP grouping.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cMembers																															

cMembers (4 bytes): An unsigned integer that specifies the number of OLAP members in this OLAP grouping. MUST be equal to the number of BrtBeginPCDHGLGMember records in the collection.

2.4.106 BrtBeginPCDHGLGroup

This record specifies an OLAP group as specified in OLAP Grouping and specifies the beginning of a collection as defined by the PivotCache Definition part ABNF. The collection of records specifies the OLAP members that make up the group specified by this record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iGrpNum																															
A	reserved							stName (variable)																							
...																															
stUniqueName (variable)																															
...																															
stCaption (variable)																															
...																															
stParentUniqueName (variable)																															
...																															

iGrpNum (4 bytes): A signed integer that specifies the unique identifier of this group within the leve of the OLAP hierarchy. MUST be greater than zero.

A - fLoadParent (1 bit): A bit that specifies whether **stParentUniqueName** exists after the fixed size portion of the record.

reserved (7 bits): MUST be zero, and MUST be ignored.

stName (variable): An XLWideString that specifies the name of this group. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

stUniqueName (variable): An XLWideString that specifies the MDX unique name of the OLAP member in the parent grouping level, as specified in OLAP Grouping, associated with the group specified by this record. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

stCaption (variable): An XLWideString that specifies the caption of this group. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

stParentUniqueName (variable): An optional XLWideString that specifies an MDX unique name of the OLAP member, which is the parent of the members of this group in the OLAP cube. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters, otherwise it MUST be less than 256 characters. MUST exist if and only if **fLoadParent** is 1. If this value is not specified, it means that the members of this group have no parent in the OLAP cube.

2.4.107 BrtBeginPCDHGLGroups

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies groups as specified in OLAP grouping within the preceding cache hierarchy.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cgroups																															

cgroups (4 bytes): An unsigned integer that specifies the number of groups within the preceding cache hierarchy. This value MUST match the number of BrtBeginPCDHGLGroup records in the collection.

2.4.108 BrtBeginPCDHierarchies

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of cache hierarchies in the PivotCache. MUST exist if and only if this is an OLAP PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cHier																															

cHier (4 bytes): An unsigned integer that specifies the number of cache hierarchies in the PivotCache. MUST be equal to the number of BrtBeginPCDHierarchy records in this collection.

2.4.109 BrtBeginPCDHierarchy

This record specifies properties of a cache hierarchy and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a cache hierarchy in the PivotCache.

No more than one of the following fields of this record MUST be 1: **fMeasure**, **fSet**, **fMeasureHierarchy** and **fTimeHierarchy**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	I	J	K	L	M	N			cLevels															
...																isetParent															
...																iconSet															
...																O	P	Q	R	S	T	U	wAttributeMemberValueType								
...										stUnique (variable)																					

...
stCaption (variable)
...
stDimUnq (variable)
...
stDefaultUnq (variable)
...
stAllUnq (variable)
...
stAllDisp (variable)
...
stDispFld (variable)
...
stMeasGrp (variable)
...

A - fMeasure (1 bit): A bit that specifies whether this cache hierarchy is a measure.

If this value is 1, the **fMeasure** field of at least one of the BrtBeginDim records in the BrtBeginDims collection MUST be equal to 1. If this value is 0, the BrtBeginDim record where the **stUnique** field case-insensitively matches the **stDimUnq** field in this record MUST NOT have **fMeasure** equal to 1.

MUST be 0 if **fUnbalancedRealKnown** is 1 and **fUnbalancedReal** is 1.

MUST be 0 if **fUnbalancedGroupKnown** is 1 and **fUnbalancedGroup** is 1.

MUST be 0 if **fAttributeHierarchy** is 1 or **fKeyAttributeHierarchy** is 1.

MUST be 0 if **fSet**, **fMeasureHierarchy** or **fTimeHierarchy** is 1.

B - fSet (1 bit): A bit that specifies whether this cache hierarchy is a named set. MUST be 0, if **fUnbalancedRealKnown** is 1 and **fUnbalancedReal** is 1, or **fUnbalancedGroupKnown** is 1 and **fUnbalancedGroup** is 1. MUST be 0, if **fAttributeHierarchy** is 1 or **fKeyAttributeHierarchy** is 1. MUST be 0 if **fMeasure**, **fMeasureHierarchy** or **fTimeHierarchy** is 1.

C - fAttributeHierarchy (1 bit): A bit that specifies whether this cache hierarchy is an **attribute hierarchy**.

D - fMeasureHierarchy (1 bit): A bit that specifies whether this cache hierarchy is the measures OLAP hierarchy. MUST be 0 if **fMeasure, fSet** or **fTimeHierarchy** is 1.

E - fOnlyOneField (1 bit): A bit that specifies whether this cache hierarchy is associated with only one cache field. MUST be 1 if **fMeasure** is 1.

F - fTimeHierarchy (1 bit): A bit that specifies whether this cache hierarchy is a **time hierarchy**. MUST be 1, if **fAttributeMemberValueTypeKnown** is 1 and **wAttributeMemberValueType** is equal to 0x0007. MUST be 0 if **fMeasure, fSet** or **fMeasureHierarchy** is 1.

G - fKeyAttributeHierarchy (1 bit): A bit that specifies whether this cache hierarchy is a key attribute hierarchy. MUST be 1, if **fAttributeMemberValueTypeKnown** is 1.

H - fAttributeMemberValueTypeKnown (1 bit): A bit that specifies whether **wAttributeMemberValueType** contains the data type of an attribute.

Value	Meaning
0	The value of **wAttributeMemberValueType** is ignored**.**
1	**wAttributeMemberValueType** contains the data type of an attribute.

I - fUnbalancedRealKnown (1 bit): A bit that specifies whether it is known if this cache hierarchy is an unbalanced OLAP hierarchy when no OLAP grouping has been applied.

Value	Meaning
0	The value of **fUnbalancedReal** is ignored.
1	**fUnbalancedReal** specifies whether this cache hierarchy is an unbalanced OLAP hierarchy.

J - fUnbalancedReal (1 bit): A bit that specifies whether this cache hierarchy is an unbalanced OLAP hierarchy when no OLAP grouping has been applied. MUST be ignored if **fUnbalancedRealKnown** is 0.

K - fUnbalancedGroupKnown (1 bit): A bit that specifies whether it is known if this cache hierarchy is an unbalanced OLAP hierarchy when OLAP grouping has been applied to any OLAP members belonging to this PivotCache.

Value	Meaning
0	The value of **fUnbalancedGroup** is ignored.

1	**fUnbalancedGroup** specifies whether this cache hierarchy is an unbalanced OLAP hierarchy when OLAP members belonging to this PivotCache have been grouped.

L - fUnbalancedGroup (1 bit): A bit that specifies whether this cache hierarchy is an unbalanced OLAP hierarchy when OLAP members belonging to this PivotCache have been grouped. MUST be ignored if **fUnbalancedGroupKnown** is 0.

M - fHidden (1 bit): A bit that specifies whether this cache hierarchy is hidden.

N - reserved1 (3 bits): MUST be zero, and MUST be ignored.

cLevels (4 bytes): An unsigned integer that specifies the number of OLAP levels associated with the OLAP hierarchy associated with this cache hierarchy.

isetParent (4 bytes): A signed integer that specifies the cache hierarchy that all the OLAP members of this cache hierarchy belong to. MUST be ignored if **fSet** is 0. MUST be less than the number of BrtBeginPCDHierarchy records in BrtBeginPCDHierarchies collection. MUST be a value from the following table:

Value	Meaning
-1	The cache hierarchy that the OLAP members of this cache hierarchy belong to is unknown or does not exist in the PivotCache.
A value greater than or equal to zero	Specifies a cache hierarchy index that specifies cache hierarchy that all the OLAP members of this cache hierarchy belong to.

iconSet (4 bytes): A KPISets that specifies the icon set to use to visualize a key performance indicator (KPI) trend or status expression. MUST NOT be equal to 0xFFFFFFFF.

O - fLoadDimUnq (1 bit): A bit that specifies whether **stDimUnq** exists.

P - fLoadDefaultUnq (1 bit): A bit that specifies whether **stDefaultUnq** exists.

Q - fLoadAllUnq (1 bit): A bit that specifies whether **stAllUnq** exists.

R - fLoadAllDisp (1 bit): A bit that specifies whether **stAllDisp** exists.

S - fLoadDispFld (1 bit): A bit that specifies whether **stDispFld** exists.

T - fLoadMeasGrp (1 bit): A bit that specifies whether **stMeasGrp** exists. MUST be 0 if **fMeasure** is 0.

U - reserved2 (2 bits): MUST be zero, and MUST be ignored.

wAttributeMemberValueType (2 bytes): An unsigned integer that specifies the data type of an OLAP dimension (1) attribute returned by the OLAP provider. If the attribute is 0x0007, the attribute is treated as a date attribute; otherwise, it is not treated as a date attribute.

stUnique (variable): An XLWideString that specifies the MDX unique name of this cache hierarchy. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters.

stCaption (variable): An XLWideString that specifies a display name of this cache hierarchy. The length of this value MUST be greater than zero. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters.

stDimUnq (variable): An optional XLWideString that specifies a unique name of the OLAP dimension (1) to which this cache hierarchy belongs. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters. This value MUST be specified if **fSet** is 0 and **fMeasure** is 0 and **fHidden** is 0. This value MUST match **stUnique** (using a case-insensitive comparison) in BrtBeginDim record in the BrtBeginDims collection. MUST exist if and only if **fLoadDimUnq** is 1.

stDefaultUnq (variable): An optional XLWideString that specifies the MDX unique name of the default OLAP member of this cache hierarchy. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters. MUST exist if and only if **fLoadDefaultUnq** is 1.

stAllUnq (variable): An optional XLWideString that specifies the unique name of the **ALL** member of this cache hierarchy. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters. MUST exist if and only if **fLoadAllUnq** is 1.

stAllDisp (variable): An optional XLWideString that specifies the display name of the ALL member of this cache hierarchy. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this value MUST be less than 32768 characters; otherwise, it MUST be less than 256 characters. MUST exist if and only if **fLoadAllDisp** is 1.

stDispFld (variable): An optional XLWideString that specifies the **display folder** of this cache hierarchy. The length of this value MUST be less than 65536 characters. MUST exist if and only if **fLoadDispFld** is 1.

stMeasGrp (variable): An optional XLWideString that specifies the name of the measure group to which this cache hierarchy belongs. The length of this value MUST be less than 65536 characters. MUST exist if and only if **fLoadMeasGrp** is 1.

2.4.110 BrtBeginPCDIRun

This record specifies a sequence of cache items all of the same data type and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
mdSxoper																cItems															
...																rgPCDINumber (variable)															
...																															

rgPCDIString (variable)
...
rgPCDIError (variable)
...
rgPCDIDatetime (variable)
...

mdSxoper (2 bytes): An unsigned integer that specifies which field is used to store cache items. MUST be a value from the following table:

Value	Meaning
0x0001	Specifies that the **rgPCDINumber** field exists.
0x0002	Specifies that the **rgPCDIString** field exists.
0x0010	Specifies that the **rgPCDIError** field exists.
0x0020	Specifies that the **rgPCDIDateTime** field exists.

cItems (4 bytes): An unsigned integer that specifies the number of cache items in the array specified by the field used to store cache items, as specified by **mdSxoper**.

rgPCDINumber (variable): An array of Xnum that specifies the values of the cache items. MUST exist if and only if **mdSxoper** equals 0x0001. The number of elements in the array MUST equal **citems**.

rgPCDIString (variable): An array of XLWideString that specifies the values of the cache items. MUST exist if and only if **mdSxoper** equals 0x0002. The number of elements in the array MUST equal **citems**.

rgPCDIError (variable): An array of BErr that specifies the values of the cache items. MUST exist if and only if **mdSxoper** equals 0x0010. The number of elements in the array MUST equal **citems**.

rgPCDIDatetime (variable): An array of PCDIDateTime that specifies the values of the cache items. MUST exist if and only if **mdSxoper** equals 0x0020. The number of elements in the array MUST equal **citems**.

2.4.111 BrtBeginPCDKPI

This record specifies an OLAP key performance indicator (KPI) and the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F	G	H	stUnique (variable)																							
...																															

stCaption (variable)
...
stDispFolder (variable)
...
stMeasGrp (variable)
...
stParent (variable)
...
stValue (variable)
...
stGoal (variable)
...
stStatus (variable)
...
stTrend (variable)
...
stWeight (variable)
...
stCurTimeMbr (variable)
...

A - fLoadDispFld (1 bit): A bit that specifies whether **stDispFolder** exists after the fixed size portion of the record.

B - fLoadMeasGrp (1 bit): A bit that specifies whether **stMeasGrp** exists after the fixed size portion of the record.

C - fLoadParent (1 bit): A bit that specifies whether **stParent** exists after the fixed size portion of the record.

D - fLoadGoal (1 bit): A bit that specifies whether **stGoal** exists after the fixed size portion of the record.

E - fLoadStatus (1 bit): A bit that specifies whether **stStatus** is saved after the fixed size portion of the record.

F - fLoadTrend (1 bit): A bit that specifies whether **stTrend** exists after the fixed size portion of the record.

G - fLoadWeight (1 bit): A bit that specifies whether **stWeight** exists after the fixed size portion of the record.

H - fLoadCurTimeMbr (1 bit): A bit that specifies whether **stCurTimeMbr** exists after the fixed size portion of the record.

stUnique (variable): An XLWideString that specifies the MDX unique name of this KPI. The length of this string MUST be greater than zero. If the **bVerCacheCreated** of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters. Otherwise, it MUST be less than 256 characters.

stCaption (variable): An XLWideString that specifies the display name of this KPI. The length of this string MUST be greater than zero and MUST be less than 32768 characters.

stDispFolder (variable): An optional XLWideString that specifies the display folder of this KPI. The length of this string MUST be less than 65536 characters. MUST exist if and only if **fLoadDispFld** is 1.

stMeasGrp (variable): An optional XLWideString that specifies the name of the measure group to which this KPI belongs. The length of this string MUST be less than 65536 characters. MUST exist if and only if **fLoadMeasGrp** is 1.

stParent (variable): An optional XLWideString that specifies the MDX unique name of the parent KPI for this KPI. If not empty, MUST match the **stUnique** field in the BrtBeginPCDKPI record that specifies the parent KPI. The length of this string MUST be less than 65536 characters. MUST exist if and only if **fLoadParent** is 1.

stValue (variable): An XLWideString that specifies the MDX unique name of the measure used for the value component of this KPI. The length of this string MUST be greater than zero. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters. Otherwise, it MUST be less than 256 characters.

MUST be equal to the **stUnique** value of one of the BrtBeginPCDHierarchy records in the BrtBeginPCDHierarchies collection following the BrtBeginPivotCacheDef record preceding this record. The matching BrtBeginPCDHierarchy record MUST have **fMeasure** equal to 1.

stGoal (variable): An optional XLWideString that specifies MDX unique name of the measure used for the goal component of this KPI. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters. Otherwise, it MUST be less than 256 characters.

MUST be equal to the **stUnique** value of one of the BrtBeginPCDHierarchy records in the BrtBeginPCDHierarchies collection following the BrtBeginPivotCacheDef record preceding this record. The matching BrtBeginPCDHierarchy record MUST have **fMeasure** equal to 1. MUST exist if and only if **fLoadGoal** is 1.

stStatus (variable): An optional XLWideString that specifies the MDX unique name of the measure used for the status component of this KPI. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters, otherwise it MUST be less than 256 characters.

MUST be equal to the **stUnique** value of one of the BrtBeginPCDHierarchy records in the BrtBeginPCDHierarchies collection following the BrtBeginPivotCacheDef record preceding this

record. The matching BrtBeginPCDHierarchy record MUST have **fMeasure** equal to 1. MUST exist if and only if **fLoadStatus** is 1.

stTrend (variable): An optional XLWideString that specifies the MDX unique name of the measure used for the trend component of this KPI. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters. Otherwise, it MUST be less than 256 characters.

MUST be equal to the **stUnique** value of one of the BrtBeginPCDHierarchy records in the BrtBeginPCDHierarchies collection following the BrtBeginPivotCacheDef record preceding this record. The matching BrtBeginPCDHierarchy record MUST have **fMeasure** equal to 1. MUST exist if and only if **fLoadTrend** is 1.

stWeight (variable): An optional XLWideString that specifies the MDX expression used for the weight component of this KPI. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters. Otherwise, it MUST be less than 256 characters. MUST exist if and only if **fLoadWeight** is 1. <12>

stCurTimeMbr (variable): An optional XLWideString that specifies the MDX unique name of the current time member for this KPI. If the **bVerCacheCreated** field of the preceding BrtBeginPivotCacheDef record is greater than or equal to 3, then the length of this string MUST be less than 32768 characters. Otherwise, it MUST be less than 256 characters. MUST exist if and only if **fLoadCurTimeMbr** is 1. <13>

2.4.112 BrtBeginPCDKPIs

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the KPIs in a PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cKpis																															

cKpis (4 bytes): An unsigned integer that specifies the number of KPIs in the PivotCache. MUST be equal to the number of BrtBeginPCDKPI records in this collection.

2.4.113 BrtBeginPCDSConsol

This record specifies properties of a multiple consolidation ranges PivotCache and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the source data ranges for a multiple consolidation ranges PivotCache. The source data ranges are specified by the BrtBeginPCDSCSet records in this collection. This record MUST exist if and only if the **isrctype** field of the preceding BrtBeginPCDSource record is 2.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved																														

A - fAutoPage (1 bit): A bit that specifies whether there is one automatically created cache field with cache items qualifying each source data range of the multiple consolidation ranges PivotCache. MUST be a value from the following table:

Value	Meaning
0	The cache fields that qualify the source data ranges are not automatically created, and the number of BrtBeginPCDSCPage records in this collection MUST be greater than or equal to 0 and less than or equal to 4.
1	There is one automatically created cache field with cache items qualifying each source data range of the multiple consolidation ranges PivotCache. Each cache item qualifies one source data range. The number of BrtBeginPCDSCPage records in this collection MUST be exactly 1.

reserved (15 bits): MUST be 0 and MUST be ignored.

2.4.114 BrtBeginPCDSCPage

This record specifies a count of BrtBeginPCDSCPItem records and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies values that correspond to cache items of a cache field for a multiple consolidation ranges PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
citems																															

citems (4 bytes): An unsigned integer that specifies the number of BrtBeginPCDSCPItem records in this collection. MUST be equal to the number of BrtBeginPCDSCPItem records in this collection.

2.4.115 BrtBeginPCDSCPages

This record specifies a count of BrtBeginPCDSCPage records and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies information for optional cache fields in the PivotCache, as specified by Multiple Consolidation Ranges.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cPages																															

cPages (4 bytes): An unsigned integer that specifies the number of optional cache fields in the PivotCache, as specified by Multiple Consolidation Ranges. MUST be equal to the number of BrtBeginPCDSCPage records in the collection. MUST be less than or equal to 4.

2.4.116 BrtBeginPCDSCPItem

This record specifies a value that corresponds to a cache item, as specified by Multiple Consolidation Ranges, and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stName (variable)																															
...																															

stName (variable): An XLWideString that specifies the value that is used for creating a cache item in an optional cache field for a multiple consolidation ranges PivotCache, as specified by Multiple Consolidation Ranges. The length of this string MUST be greater than or equal to 1 character and less than or equal to 255 characters. MUST be unique case-insensitive within this collection of BrtBeginPCDSCPItem records.

2.4.117 BrtBeginPCDSCSet

This record specifies properties of a range of the source data for a multiple consolidation ranges PivotCache and specifies the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF. The range is either in this workbook or another workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgiItem (16 bytes)																															
...																															
fName								fBuiltIn								A	B	reserved2						irstSheet (variable)							
...																															
irstRelId (variable)																															
...																															
rfx (16 bytes, optional)																															
...																															
irstName (variable)																															
...																															

rgiItem (16 bytes): An array of 4-byte unsigned integers. Each element of the array specifies an index to a value for a cache item of a cache field for a multiple consolidation ranges PivotCache associated with this range. Each element of the array specifies a zero-based index to a BrtBeginPCDSCPItem record in the BrtBeginPCDSCPage collection following the BrtBeginPCDSConsol collection that precedes this record.

The first element in this array corresponds to the first BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

The second element in this array corresponds to the second BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

The third element in this array corresponds to the third BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

The fourth element in this array corresponds to the fourth BrtBeginPCDSCPage collection in the BrtBeginPCDSCPages collection following the BrtBeginPCDSConsol collection that precedes this record.

If the number of BrtBeginPCDSCPage collections in the BrtBeginPCDSCPages collection is less than four, the value for each array element that does not have a corresponding BrtBeginPCDSCPage collection MUST be 0xFFFFFFFF. If the BrtBeginPCDSCPage collection corresponding to an array element has no following BrtBeginPCDSCPItem records, the value of that array element MUST be 0xFFFFFFFF. The value of each array element MUST be either greater than or equal to 0 and less than the number of BrtBeginPCDSCPItem records in the BrtBeginPCDSCPage collection following the BrtBeginPCDSConsol collection that precedes this record, or MUST be 0xFFFFFFFF if no BrtBeginPCDSCPItem record is specified. For more details, see Multiple Consolidation Ranges.

fName (1 byte): A Boolean that specifies whether the range is specified by **irstName** or **rfx**. MUST be a value from the following table:

Value	Meaning
0	The range is specified by **rfx**. The **irstName** field MUST NOT be present. The **rfx** field MUST be present. The value of **fLoadSheet** MUST be 1.
1	The range is specified by **irstName**. The **irstName** field MUST be present. The **rfx** field MUST NOT be present.

fBuiltIn (1 byte): A Boolean that specifies whether the defined name specified by the **irstName** field refers to a **built-in name** or a user-defined name. MUST be a value from the following table:

Value	Meaning
0	**irstName** specifies a user-defined name.
1	**irstName** specifies a built-in name.

If the value of **fName** is 0, this value MUST be 0.

A - fLoadRelId (1 bit): A bit that specifies whether **irstRelId** exists.

B - fLoadSheet (1 bit): A bit that specifies whether **irstSheet** exists.

reserved2 (6 bits): MUST be zero, and MUST be ignored.

irstSheet (variable): An XLWideString that specifies the name of the sheet in which the range is located. The length of the string MUST be greater than or equal to 1, and less than or equal to 31. This field MUST exist when **fLoadSheet** is equal to 1, and MUST NOT exist when **fLoadSheet** is equal to 0.

irstRelId (variable): A RelID that specifies a path to another workbook that contains the range. This field MUST exist when **fLoadRelId** is equal to 1, and MUST NOT exist when **fLoadRelId** is equal to 0.

rfx (16 bytes): An UncheckedRfX that specifies a range that is part of the source data for a multiple consolidation ranges PivotCache. This field MUST exist when **fName** is equal to 0, and MUST NOT exist when **fName** is equal to 1.

irstName (variable): An XLWideString that specifies the defined name that is part of the source data for a multiple consolidation ranges PivotCache. The length of this string MUST be greater than or equal to 1, and less than or equal to 255. This field MUST exist when **fName** is equal to 1, and MUST NOT exist when **fName** is equal to 0.

2.4.118 BrtBeginPCDSCSets

This record specifies a count of ranges used as source data for a multiple consolidation ranges PivotCache and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies ranges used as source data for a multiple consolidation ranges PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cSets																															

cSets (4 bytes): An unsigned integer that specifies the number of ranges used as source data for a multiple consolidation ranges PivotCache. MUST be equal to the number of BrtBeginPCDSCSet records in this collection.

2.4.119 BrtBeginPCDSDTCEMember

This record specifies properties of the tuple cache entry, as specified by tuple cache, and the beginning of an empty collection of records as defined by the PivotCache Definition part ABNF. A tuple cache entry specifies either a reference to an OLAP member or a reference to a tuple cache set.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
bmbrloc								ifdbihdb																							
...								iitem																							
...																															

bmbrloc (1 byte): An unsigned integer that specifies the meaning of **iitem**. MUST be a value from the following table:

Value	Meaning
0x01	**iitem** specifies a cache item.
0x02	**iitem** specifies the default OLAP member, the ALL OLAP member or a tuple cache set.

ifdbihdb (4 bytes): An unsigned integer that specifies a zero-based index whose meaning is determined by the value of **bmbrloc**, as specified in the following table:

Value of **bmbrloc**	Meaning
0x01	The **ifdbihdb** field is a cache field index, as specified by Cache Fields, that specifies the cache field for this tuple cache entry. The **ifdbihdb** field MUST be greater than or equal to 0 and less than the count of cache fields in the tuple cache.
0x02	The **ifdbihdb** field is a cache hierarchy index, as specified by Cache Hierarchies, that specifies the cache hierarchy for this tuple cache entry. The **ifdbihdb** field MUST be greater than or equal to 0 and less than the count of cache hierarchies in the tuple cache.

iitem (4 bytes): A signed integer whose meaning is determined by the value of **bmbrloc**, as specified in the following table:

Value of **bmbrloc**	Meaning
0x01	The **iitem** field is a cache item index, as specified by Cache Items, that specifies the cache item of the cache field specified by the **ifdbihdb** field. The value of the cache item specifies the unique name of the OLAP member that this record refers to. The **iitem** field MUST be greater than or equal to 0 and less than the count of cache items for the cache field.
0x02	If **iitem** is -1, then this tuple cache entry is the reference to the default OLAP member of the cache hierarchy specified by the **ifdbihdb** field. If **iitem** is -2, then this tuple cache entry is the reference to the ALL OLAP member of the cache hierarchy specified by **ifdbihdb** field. Otherwise, **iitem** is a zero-based index of a tuple cache set in the PCDSDTCSETS collection of this tuple cache that specifies a tuple cache set that this record refer to. The **iitem** field MUST be one of the following values: -2,-1 or greater than or equal to 0 and less than the count of tuple cache sets in the PCDSDTCSETS collection of this tuple cache.

2.4.120 BrtBeginPCDSDTCEMembers

This record specifies the beginning of a collection of BrtBeginPCDSDTCEMember records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of tuple cache entries, as specified by Tuple Cache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cMembers																															

cMembers (4 bytes): An unsigned integer that specifies the number of tuple cache entries, as specified by tuple cache. MUST be equal to the number of BrtBeginPCDSDTCEMember records in the collection.

2.4.121 BrtBeginPCDSDTCEMembersSortBy

This record specifies the beginning of a collection of BrtBeginPCDSDTCEMember records. The collection of records specifies a collection of tuple cache entries, as specified by Tuple Cache, used to sort a tuple cache set.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cMembers																															

cMembers (4 bytes): An unsigned integer that specifies the number of the of tuple cache entries, as specified by tuple cache, in the collection of tuple cache entries that is used to sort the tuple cache set. MUST be equal to the number of BrtBeginPCDSDTCEMember records in this collection.

2.4.122 BrtBeginPCDSDTCEntries

This record specifies the number of cached cube values, as specified in Tuple Cache, and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a cache of cube values; each of the values is optionally followed by a collection of tuple cache entries, specified by tuple cache, used in the value calculation.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cEntries																															

cEntries (4 bytes): An unsigned integer that specifies the number of cached cube values, as specified in the tuple cache. MUST be equal to the number of records (BrtPCDIMissing / BrtPCDINumber / BrtPCDIError / BrtPCDIString) in the collection.

2.4.123 BrtBeginPCDSDTCQueries

This record specifies the beginning of a collection of BrtBeginPCDSDTCQuery records as defined by the PivotCache Definition part ABNF. The collection of records is part of Tuple Cache and specifies cached MDX expressions that evaluate to a collection of tuple cache entries, specified by tuple cache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cQueries																															

cQueries (4 bytes): An unsigned integer that specifies the number of cached MDX expressions that evaluates to a collection of tuple cache entries, as specified by tuple cache, in this collection. MUST be equal to the number of BrtBeginPCDSDTCQuery records in the collection.

2.4.124 BrtBeginPCDSDTCQuery

This record specifies the MDX expression that is used to evaluate the tuple cache entries, as specified by Tuple Cache, and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. This record is optionally followed by BrtBeginPCDSDTCEMembers collection that specifies the cached cube members in the tuple cache entry that the MDX expression evaluates to.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
irstQuery (variable)																															
...																															

irstQuery (variable): An XLWideString that specifies the MDX expression that is used to evaluate the tuple cache entries, as specified by Tuple Cache. The length of the string MUST be less than 65536.

2.4.125 BrtBeginPCDSDTCSet

This record specifies the properties of a tuple cache set, as specified by tuple cache, and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection specifies a tuple cache set in the tuple cache. The collection can include the PCDSDTCEMEMBERSSORTBY collection to specify the tuple cache entries, as specified by tuple cache, used to sort the tuple cache set. The PCDSDTCEMEMBERSSORTBY collection is present when **fLoadSortTuple** is 1.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cTuples																															
iRankMax																															
ssoType																															
A	B	reserved						irstDef (variable)																							
...																															

cTuples (4 bytes): An unsigned integer that specifies the number of OLAP tuples in the tuple cache set, as specified by tuple cache. MUST be less than 0x80000000, or MUST be 0xFFFFFFFF when the number of OLAP tuples in the tuple cache set is unknown.

iRankMax (4 bytes): An unsigned integer that specifies the number of BrtBeginPCDSDTCEMembers collections of tuple cache entries that this tuple cache set currently contains. MUST be greater than 0x00000000 and less than or equal to 0x00100000. MUST be less than or equal to **cTuples**. MUST be ignored if **fQueryFailed** is 1.

ssoType (4 bytes): An SdSetSortOrder that specifies the sort order (2) of the tuple cache entries in the tuple cache set, as specified by tuple cache. If this field is equal to SSOASC or SSODESC, the tuples which specify the sort order are specified by the sequence of records that conforms to the PCDSDTCEMEMBERSSORTBY rule following this record in the sequence of records that conforms to the PCDSDTCSET rule.

A - fQueryFailed (1 bit): A bit that specifies whether the querying on this tuple cache set failed. A value of 1 specifies that **MDX query** execution has not finished successfully.

B - fLoadSortTuple (1 bit): A bit that specifies whether tuple cache entries used to sort the tuple cache set, as specified by tuple cache, exist in the file. MUST be 1 if and only if **ssoType** is equal to SSOASC (0x00000001) or SSODESC (0x00000002).

reserved (6 bits): MUST be zero and MUST be ignored.

irstDef (variable): An XLWideString that specifies the MDX expression that was used to evaluate this tuple cache set, as specified by tuple cache. The length of the string MUST be less than 65536 characters.

2.4.126 BrtBeginPCDSDTCSets

This record specifies the beginning of a collection of BrtBeginPCDSDTCSet records as defined by the PivotCache Definition part ABNF. The collection of BrtBeginPCDSDTCSet records specifies the collection of tuple cache sets, specified by tuple cache, in the PivotCache.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cSets																															

cSets (4 bytes): An unsigned integer that specifies the number of tuple cache sets, specified by tuple cache, in the PivotCache. MUST be equal to the number of BrtBeginPCDSDTCSet records in the collection.

2.4.127 BrtBeginPCDSDTupleCache

This record specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a tuple cache within the PivotCache. Relevant information retrieved from the OLAP server as a result of using cube functions in a sheet is cached in the tuple cache. By using this cached information, client applications can avoid un-necessary communication with the OLAP server.

This record MUST exist if and only if the value of the **fSheetData** field on the BrtBeginPivotCacheDef record associated with this tuple cache is 1.

2.4.128 BrtBeginPcdSFCIEntries

This record specifies the beginning of a collection of BrtPCDSFCIEntry records as defined by the PivotCache Definition part ABNF. The collection of BrtPCDSFCIEntry records specifies the number formats provided by an OLAP server for cube values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
centry																															

centry (4 bytes): An unsigned integer that specifies the count of BrtPCDSFCIEntry records in this collection.

2.4.129 BrtBeginPCDSource

This record specifies the properties of PivotCache source data and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies properties of the source data of a PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iSrcType																															
dwConnID																															

iSrcType (4 bytes): An unsigned integer that specifies the PivotCache source data type. MUST be a value from the following table:

Value	Meaning
0x00000000	Sheet source data
0x00000001	External source data
0x00000002	Multiple consolidation range source data
0x00000003	Scenario source data

If this value is 0x00000000, the collection MUST contain the BrtBeginPCDSRange record; the source data is specified by the **range** or **namedRange** field in the BrtBeginPCDSRange record in this collection.

If this value is 0x00000002, the collection MUST contain the BrtBeginPCDSConsol record; the source data is specified by the BrtBeginPCDSConsol collection in this collection.

dwConnID (4 bytes): An unsigned integer that specifies the unique identifier of the external connection. This value MUST be ignored if **iSrcType** is not 0x00000001. If **iSrcType** is 0x00000001, it MUST be greater than 0x00000000 and it MUST match a **dwConnID** value in one of the BrtBeginExtConnection records in the External Data Connections part.

2.4.130 BrtBeginPCDSRange

This record specifies the properties of a Source Data for a PivotCache contained in the workbook and specifies beginning of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies Source Data for a PivotCache contained in the workbook. The workbook that contains the Source Data can be this workbook, or an external workbook. The location of the Source Data within the workbook is specified as a defined name, or as a range.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved1							B	reserved2							C	D	reserved3						sheetName (variable)							
...																															
relId (variable)																															
...																															
namedRange (variable)																															
...																															
range (16 bytes, optional)																															
...																															

A - fName (1 bit): A bit that specifies that the Source Data is specified by a defined name. If this value is 1, the location of this data source (1) inside a workbook is specified by **namedRange**. Otherwise, it is specified by **range**.

reserved1 (7 bits): MUST be zero and MUST be ignored.

B - fBuiltIn (1 bit): A bit that specifies that the defined name specified by **namedRange** is a built-in name. If the value of **fName** is 0, this value MUST be 0.

reserved2 (7 bits): MUST be zero and MUST be ignored.

C - fLoadRelId (1 bit): A bit that specifies that the Source Data is in an external workbook. If this value is 1, the path to the external workbook is specified by **relId**.

D - fLoadSheet (1 bit): A bit that specifies that the Source Data is scoped to a single sheet. If **fName** is 0 then the value of this bit SHOULD be 1. <14>

reserved3 (6 bits): MUST be zero and MUST be ignored.

sheetName (variable): An XLWideString that specifies the name of the sheet to which the Source Data is scoped. This field exists if and only if the value of **fLoadSheet** is 1. This string MUST comply with the restrictions specified for the **strName** field in BrtBundleSh.

relId (variable): A RelID that specifies a relationship that specifies a path to an external workbook that contains the Source Data. This field exists if and only if the value of **fLoadRelId** is 1.

namedRange (variable): An XLNameWideString that specifies the defined name that is the Source Data. This field exists if and only if the value of **fName** is 1.

range (16 bytes): An UncheckedRfX that specifies the range that is the Source Data. This field exists if and only if the value of **fName** is 0.

2.4.131 BrtBeginPivotCacheDef

This record specifies properties of a PivotCache and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a PivotCache.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
bVerCacheLastRefresh								bVerCacheRefreshableMin								bVerCacheCreated								A	B	C	D	E	F	G	H
citmGhostMax																															
xnumRefreshedDate																															
...																															
I	J	K	L	M				cRecords																							
...								stRefreshedWho (variable)																							
...																															
stRelIDRecords (variable)																															
...																															
unused (optional)																															

bVerCacheLastRefresh (1 byte): A DataFunctionalityLevel that specifies the data functionality level that the PivotCache was last refreshed with. For more details, see Data Functionality Level.

This value MUST NOT be less than **bVerCacheRefreshableMin** value.

bVerCacheRefreshableMin (1 byte): A DataFunctionalityLevel that specifies the lowest data functionality level that the application is required to support in order to refresh the PivotCache. For more details, see Data Functionality Level.

bVerCacheCreated (1 byte): A DataFunctionalityLevel that specifies the data functionality level that the PivotCache was created with. For more details, see Data Functionality Level.

A - fSaveData (1 bit): A bit that specifies whether the cache records exist. MUST be equal to 0 for OLAP PivotCaches.

B - fInvalid (1 bit): A bit that specifies whether the cache records of this PivotCache are in an invalid state, in which case they MUST be ignored.

C - fRefreshOnLoad (1 bit): A bit that specifies whether the PivotCache is refreshed on load.

D - fOptimizeCache (1 bit): A bit that specifies whether the application applies optimizations to the PivotCache to reduce memory usage. MUST be equal to 0 for non-external and non-ODBC source data.

E - fEnableRefresh (1 bit): A bit that specifies whether refresh of the PivotCache is enabled.

F - fBackgroundQuery (1 bit): A bit that specifies whether to refresh this PivotCache asynchronously. This value MUST be equal to 0 if the **iSrcType** field in the associated BrtBeginPCDSource record is not equal to 0x00000001.

G - fUpgradeOnRefresh (1 bit): A bit that specifies whether the data functionality level of this PivotCache has to be upgraded to 3 during the next refresh. MUST be zero if the data functionality level of this PivotCache is greater than or equal to 3.

H - fSheetData (1 bit): A bit that specifies whether the PivotCache is used to store information for cube functions. MUST be equal to 0 for non-OLAP PivotCaches. If the value is equal to 1, this PivotCache MUST NOT be associated with any PivotTable as specified in Relationship to PivotCache.

citmGhostMax (4 bytes): A signed integer that specifies the number of unused cache items to allow before discarding unused cache items on the next refresh. MUST be greater than -2 and less than 1048577. If this value is equal to 0, all unused cache items are discarded on the next refresh. If this value is equal to -1, the number of unused cache items retained by the application is optimized to balance memory usage on the system and future usage of cache items.

xnumRefreshedDate (8 bytes): A DateAsXnum that specifies the date when the PivotCache was last refreshed.

I - fLoadRefreshedWho (1 bit): A bit that specifies whether the **stRefreshedWho** field exists.

J - fLoadRelIDRecords (1 bit): A bit that specifies whether the **stRelIDRecords** field exists. MUST be equal to 1 if **fSaveData** is equal to 1 and **fInvalid** is equal to 0.

K - fSupportSubquery (1 bit): A bit that specifies whether the source data of the PivotCache supports **OLAP subselect**.

L - fSupportAttribDrill (1 bit): A bit that specifies whether the source data of the PivotCache supports **attribute drilldown**.

M - reserved (4 bits): MUST be zero, and MUST be ignored.

cRecords (4 bytes): An unsigned integer that specifies the number of cache records in the PivotCache. Undefined and MUST be ignored if **fSaveData** is equal to 0.

stRefreshedWho (variable): An optional XLWideString that specifies the name of the user who last refreshed the PivotCache. MUST exist if and only if **fLoadRefreshedWho** is equal to 1. The length of this value MUST be less than 256 characters. The name is an application-specific setting that is not necessarily related to the User Names part.

stRelIDRecords (variable): An optional RelID that specifies the unique identifier that corresponds to the related PivotCache records part. MUST exist and MUST be non-empty if and only if **fLoadRelIDRecords** is equal to 1.

unused (4 bytes): Undefined and MUST be ignored. MUST exist if and only if **fLoadRefreshedWho** is equal to 0.

2.4.132 BrtBeginPivotCacheID

This record specifies the relationship between a PivotCache identifier and its associated PivotCache Definition. For more information, see Relationship to PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
idSx																															
irstcacheRelID (variable)																															
...																															

idSx (4 bytes): An unsigned integer that specifies the identifier for the PivotCache Definition specified by **irstcacheRelID**. The value MUST be unique in the collection of BrtBeginPivotCacheID records directly following the immediately preceding BrtBeginPivotCacheIDs collection.

irstcacheRelID (variable): A RelID that specifies a PivotCache Definition.

2.4.133 BrtBeginPivotCacheIDs

This record specifies the beginning of a collection of PivotCache identifier records as defined by the Workbook part ABNF. The collection of records specifies the PivotCache identifiers for the workbook.

2.4.134 BrtBeginPivotCacheRecords

This record specifies the beginning of a collection of records as defined by the PivotCache Records part ABNF. The collection of records specifies the cache records for a PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
crecords																															

crecords (4 bytes): An unsigned integer that specifies the number of cache records in the PivotCache. MUST be equal to the number of BrtPCRRecord and BrtPCRRecordDt records in the collection.

2.4.135 BrtBeginPName

This record specifies information used for a calculated field or calculated item and specifies the beginning of a collection of records as specified by the PivotCache Definition part ABNF. When used for a calculated field, this record specifies a reference to a cache field used in a calculated field formula, and the specified collection of records MUST be empty. When used for a calculated item, this record specifies a reference to a pivot item used in calculated item formula, and the specified collection of records MUST NOT be empty.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ifdb																															
ifn								A	reserved																						

ifdb (4 bytes): An unsigned integer that specifies a zero-based index to a cache field used in a calculated field formula. When this record is used for a calculated item, this field MUST be equal to -1.

ifn (8 bits): An unsigned integer that specifies an aggregation function that is used to aggregate the data items in a pivot field. MUST be one of the following:

Value	Meaning
0	SUM
1	COUNTA
2	AVG
3	MAX
4	MIN
5	PRODUCT
6	COUNT
7	STDEV
8	STDEVP
9	VAR
10	VARP
255	Aggregation function not specified.

A - fErrName (1 bit): A bit that specifies whether the cache field specified by the **ifdb** field was found in the Pivot Cache after the PivotTable view was calculated. If the cache field record was not found, then this bit MUST equal 1.

reserved (7 bits): MUST be zero, and MUST be ignored.

2.4.136 BrtBeginPNames

This record specifies a count of BrtBeginPName records and specifies the beginning of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of references to cache fields used in a calculated field formula or pivot items used in a calculated item formula.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cnames																															

cnames (4 bytes): An unsigned integer that specifies the number of cache field or pivot item references in this collection. The value of **cnames** MUST be equal to the number of BrtBeginPName records in this collection.

2.4.137 BrtBeginPNPair

This record specifies a reference to a pivot item. This record is used in a calculated item formula, and specifies the beginning of an empty collection as defined by the PivotCache Definition part ABNF.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	reserved						ifield																							
...								iitem																							
...																															

A - fPhysical (1 bit): A bit that specifies whether **iitem** specifies a cache item index.

Value	Meaning
0	**iitem** specifies a cache item index.
1	**iitem** does not specify a cache item index.

B - fRelative (1 bit): A bit that specifies whether the item is referred to by relative position rather than absolute position. If **fPhysical** is 0, **fRelative** MUST be 0, and MUST be ignored. If **fPhysical** is 1, **fRelative** MUST be a value from the following table:

Value	Meaning
0	Absolute position.
1	Position relative to the calculated item referring to this item.

reserved (6 bits): MUST be zero, and MUST be ignored.

ifield (4 bytes): An unsigned integer that is a cache field index. This index specifies a cache field which contains the cache item associated with the pivot item specified by **iitem**.

iitem (4 bytes): A signed integer that specifies a pivot item of the PivotTable view associated with this record as specified by Relationship to PivotCache. This pivot item is used in a calculated item formula. If more than one PivotTable view is associated with this record, **iitem** specifies a pivot item for each such PivotTable view.

If the value of **fPhysical** is 0, **iitem** is a cache item index, and specifies the pivot item associated with that cache item.

Otherwise if the value of **fRelative** is 0 or if no pivot item in the visible item collection has a pivot item index smaller than the pivot item index of the current pivot item, **iitem** is a visible item index. Otherwise, the pivot item specified by **iitem** is the pivot item whose visible item index equals the value of **iitem** + 1 + the largest visible item index whose associated pivot item has a pivot item index smaller than the pivot item index of the current pivot item. If this value is less than 0 or greater than or equal to the number of elements in the visible item collection, no pivot item is specified.

The current pivot item is the pivot item in the current pivot field that corresponds to the calculated item that contains this record.

The current pivot field is the pivot field of the PivotTable view associated with the cache field specified by **ifield**.

The visible item collection is the ordered collection of all pivot items specified by the sequence of records that conforms to the SXVIS rule associated with the current pivot field that satisfy the following criteria:

- The value of the **fHidden** field of the BrtBeginSXVI record associated with the pivot item is 0.
- The value of the **fMissing** field of the BrtBeginSXVI record associated with the pivot item is 0 or the value of the **fShowAllItems** field of the BrtBeginSXVD record associated with the current pivot field is 1.
- The value of the **itmtype** field of the BrtBeginSXVI record associated with the pivot item is PITDATA.

A visible item index is specified to be the zero-based index of a pivot item in the visible item collection.

2.4.138 BrtBeginPNPairs

This record specifies the beginning of a collection of BrtBeginPNPair records as defined by the PivotCache Definition part ABNF. The collection of records specifies a reference to a pivot item, which is used in a calculated item formula.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cpairs																															

cpairs (4 bytes): MUST be 1, and MUST be ignored.

2.4.139 BrtBeginPRFilter

This record specifies information about the set of pivot items, data items, or cache items associated with a pivot field, the data field, or a cache field that specifies a filter for a PivotTable rule and specifies the beginning of a collection of records as defined by the PivotTable part ABNF, PivotCache Definition part ABNF, and Worksheet part ABNF. The collection of records specifies the set of pivot items, data items, or cache items included in the filter. When this record is in a worksheet part or in a PivotCache Definition part, see BrtBeginPRRule for details of how the PivotTable view for a PivotTable rule containing this filter is specified. More information about this record's function is available in the PivotTable rule section.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
isxvd																															
cItems																															
A	B	C	D	E	F	G	H	I	J	K	L	M	N		O	P	Q	reserved4													

isxvd (4 bytes): A field that specifies the pivot field, data field, or cache field associated with this filter.

If the **fCacheBased** field in the BrtBeginPRRule record that precedes this record is 1, then this field is a signed integer that specifies the cache field index, as specified by Cache Fields, for a calculated item.

If the **fCacheBased** field in the BrtBeginPRRule record that precedes this record is 0, then this field is an ISXVD that specifies a pivot field or the data field in a PivotTable view and the value of this field MUST not be -1.

cItems (4 bytes): An unsigned integer that specifies the number of pivot items, data items, or cache items included in this filter. There MUST be an equivalent number of BrtBeginPRFItem records following this record.

A - itmtypeData (1 bit): A bit that specifies whether this filter includes cells that are not subtotals, grand totals, or blank lines for the pivot field, data field, or cache field associated with this record.

B - itmtypeDEFAULT (1 bit): A bit that specifies whether the pivot field associated with this filter includes the default aggregation function, as specified by Subtotalling. MUST be 0 if **itmtypeSUM**, **itmtypeCOUNTA**, **itmtypeAVERAGE**, **itmtypeMAX**, **itmtypeMIN**, **itmtypePRODUCT**, **itmtypeCOUNT**, **itmtypeSTDEV**, **itmtypeSTDEVP**, **itmtypeVAR**, or **itmtypeVARP** is 1.

C - itmtypeSUM (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the sum of the values, as specified by Subtotalling.

D - itmtypeCOUNTA (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the count of the values, as specified by Subtotalling.

E - itmtypeAVERAGE (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the average of the values, as specified by Subtotalling.

F - itmtypeMAX (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the largest value, as specified by Subtotalling.

G - itmtypeMIN (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the smallest value, as specified by Subtotalling.

H - itmtypePRODUCT (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the product of the values, as specified by Subtotalling.

I - itmtypeCOUNT (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the count of numeric values, as specified by Subtotalling.

J - itmtypeSTDEV (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the estimated standard deviation for the values, as specified by Subtotalling.

K - itmtypeSTDEVP (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the standard deviation for the values, as specified by Subtotalling.

L - itmtypeVAR (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the estimated variance for the values, as specified by Subtotalling.

M - itmtypeVARP (1 bit): A bit that specifies whether the pivot field associated with this filter includes the aggregation function that returns the variance for the values, as specified by Subtotalling.

N - reserved1 (3 bits): MUST be zero, and MUST be ignored.

O - fSelected (1 bit): A bit that specifies whether the header of the pivot field this filter refers to is included in this filter. MUST be ignored if the PivotTable is not displayed in **outline** form, as specified by Subtotalling.

P - reserved2 (1 bit): MUST be zero, and MUST be ignored.

Q - reserved3 (1 bit): MUST be zero, and MUST be ignored.

reserved4 (5 bits): MUST be zero, and MUST be ignored.

2.4.140 BrtBeginPRFilters

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF, PivotCache Definition part ABNF, and Worksheet part ABNF. The collection of records specifies the selected pivot fields and the selected pivot items within those pivot fields.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cfilters																															

cfilters (4 bytes): An unsigned integer that specifies the number BrtBeginPRFilter records in this collection.

2.4.141 BrtBeginPRFItem

This record specifies a zero-based index to a pivot item or a cache item for a Pivot Rule, and specifies the beginning of an empty collection of records as defined by the Common Productions part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iitem																															

iitem (4 bytes): An unsigned integer that specifies a data item, pivot item, or cache item. For the BrtBeginPRFilter record in the sequence of records that conforms to the PRFILTER rule and containing this record, the following rules define what this value specifies:

If the **isxvd** field of the BrtBeginPRFilter specifies the data field, then **iitem** is a data item index.

If the **isxvd** field of the BrtBeginPRFilter specifies a pivot field, then **iitem** is a pivot item index.

If the **isxvd** field of the BrtBeginPRFilter specifies a cache field, then **iitem** is a cache item index.

2.4.142 BrtBeginPRule

This record specifies the details for a PivotTable rule for a PivotTable view or PivotCache and specifies the beginning of a collection of records as defined by the PivotTable part ABNF, PivotCache Definition part ABNF, and Worksheet part ABNF. The collection of records specifies a PivotTable rule. When this record is in a worksheet part, the PivotTable view for this PivotTable rule is specified by the BrtBeginSxSelect record that immediately precedes this record. When this record is in a PivotCache Definition part, it specifies a PivotTable rule used for a calculated item calculation and the PivotTable views associated with this record are specified by Relationship to PivotCache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
isxvd																															
isxrtype				A	B	C	D	E	F	G	H	sxaxis				iDim												I			
rfxLoc (16 bytes, optional)																															
...																															

isxvd (4 bytes): A signed integer that specifies the pivot field, data field, or cache field information for this PivotTable rule.

If this record is in a PivotCache Definition part, then **isxvd** MUST be -1. If **isxrtype** is BUTTON, then this field is an ISXVD that specifies the pivot field or data field and the value of this field MUST NOT be -1. If **isxrtype** is a value other than BUTTON and there is no BrtBeginPRFilter record in the collection of records following this record, then the value of this field MUST be -1.

If **isxrtype** is a value other than BUTTON and there is at least one BrtBeginPRFilter record in the collection of records immediately following this record, then the pivot field, data field, or cache field for this PivotTable rule is specified by the **isxvd** fields of the BrtBeginPRFilter records. The value of **isxvd** MUST be either -1 or same as the value of the **isxvd** field of one of the BrtBeginPRFilter records in the collection of BrtBeginPRFilter records following this record.

isxrtype (8 bits): An unsigned integer that specifies the area of the PivotTable specified by this PivotTable rule. MUST be a value from the following table:

Name	Value	Description
NONE	0x00	This rule specifies no area.
NORMAL	0x01	This rule specifies the cells in the row area, column area, page area, or data area of the PivotTable report that correspond to the data items or pivot items associated with the collection of BrtBeginPRFilter records that immediately follow this record. There MUST be a collection of BrtBeginPRFilter records immediately following this record.
DATA	0x02	This rule specifies the data area of the PivotTable report that correspond to the data items or pivot items associated with the collection of BrtBeginPRFilter records that immediately follow this record. There MUST be a collection of BrtBeginPRFilter records immediately following this record.
ALL	0x03	This rule specifies the entire PivotTable report. There MUST NOT exist any collection of BrtBeginPRFilter records immediately following this record.
ORIGIN	0x04	This rule specifies the cells at the logical top-left of the PivotTable report body. There MUST NOT exist any collection of BrtBeginPRFilter records immediately following this record.
BUTTON	0x05	This rule specifies the cell on the PivotTable report containing the pivot field caption. There MUST NOT exist any collection of BrtBeginPRFilter records immediately following this record.
TOPRIGHT	0x06	This rule specifies the cells at the **logical top-right** of the PivotTable report body. There MUST NOT exist any collection of BrtBeginPRFilter records immediately following this record.

A - fDataOnly (1 bit): A bit that specifies whether only the cells in the data area are included in this PivotTable rule. **fDataOnly** and **fLabelOnly** MUST NOT both be 1. MUST be 1 if **isxrtype** is DATA.

B - fLabelOnly (1 bit): A bit that specifies whether only cells in the page area, row area or column area are included in this PivotTable rule. MUST be 1 if **isxrtype** is BUTTON or TOPRIGHT. **fDataOnly** and **fLabelOnly** MUST NOT both be 1.

C - fGrandRw (1 bit): A bit that specifies whether cells in the grand total row are included in this PivotTable rule.

D - fGrandCol (1 bit): A bit that specifies whether cells in the grand total column are included in this PivotTable rule.

E - fCacheBased (1 bit): A bit that specifies whether **isxvd** specifies a cache field in the PivotCache or a pivot field or the data field in a PivotTable view.

Value	Meaning
0	**isxvd** specifies a pivot field or the data field in a PivotTable view.
1	**isxvd** specifies a cache field in the PivotCache. **sxaxis** MUST be 0.

MUST be 1 if this record is in a PivotCache Definition part.

F - fLineMode (1 bit): A bit that specifies whether the area of the PivotTable report specified by this PivotTable rule is displayed in outline form, as specified by Subtotalling.

G - fPart (1 bit): A bit that specifies whether only a partial area of the PivotTable report is specified by this PivotTable rule. If **fPart** is 1, **rfxLoc** specifies the partial area.

H - fFuzzy (1 bit): A bit that specifies whether the pivot items of the pivot field specified by this rule are treated as subtotals for the purposes of formatting when the pivot field is displayed in outline form, as specified by Subtotalling.

sxaxis (4 bits): An unsigned integer that specifies the PivotTable axis that contains the pivot field or data field specified by **isxvd**. MUST be a value from the following table:

Name	Value	Description
NULL	0x0	This rule specifies no axis.
RW	0x1	This rule specifies the row axis.
COL	0x2	This rule specifies the column axis.
PAGE	0x4	This rule specifies the page axis.
DATA	0x8	This rule specifies the data axis.

iDim (8 bits): An unsigned integer that specifies the position of the pivot field or data field specified by **isxvd** within the PivotTable axis for this record.

If **sxaxis** is RW, then the value MUST be less than the number of pivot fields on the row axis.

If **sxaxis** is COL, then the value MUST be less than the number of pivot fields on the column axis.

If **sxaxis** is PAGE, then the value MUST be less than the number of pivot fields on the page axis.

If **sxaxis** is DATA, then the value is undefined and MUST be ignored.

If **sxaxis** is NULL, then the value MUST be 0 or 255 and MUST be ignored.

I - reserved (4 bits): MUST be 0, and MUST be ignored.

rfxLoc (16 bytes): An UncheckedRfX that specifies the partial area within the PivotTable report specified by this PivotTable rule. The range is specified using a **relative reference** that specifies the offset from the logical top-left cell of the PivotTable report body as specified in PivotTable layout. This field MUST exist if and only if **fPart** is 1.

2.4.143 BrtBeginQSI

This record specifies properties of a query table and specifies the beginning of a collection of records as defined by the Query Table part ABNF. The collection of records specifies a query table.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	unused											
itblAutoFmt																dwConnID															
...																irstName (variable)															
...																															

A - fTitles (1 bit): A bit that specifies whether the first row of the query table contains column titles.

B - fRowNums (1 bit): A bit that specifies whether the first column of the query table displays row numbers.

C - fDisableRefresh (1 bit): A bit that specifies whether the query table can be refreshed.

Value	Meaning
0x0	The query table can be refreshed.
0x1	The query table cannot be refreshed.

D - fAsync (1 bit): A bit that specifies whether the query table refreshes data asynchronously. MUST be set to 1 if **fNewAsync** field is set to1.

E - fNewAsync (1 bit): A bit that specifies whether data has been refreshed for this query table. MUST be set to 0 if **fAsync** field is set to 0.

Value	Meaning
0	The first background data refresh was finished at the time the file was saved.
1	The first background data refresh was not finished at the time the file was saved.

F - fAutoRefresh (1 bit): A bit that specifies whether the query table refreshes its data automatically when the document is opened.

G - fShrink (1 bit): A bit that specifies the behavior when dealing with a variable number of rows of data in the query table between refresh operations. If **fOverwrite** is 1, this value MUST be 0. MUST be one of the following:

Value	Meaning
0x0	Unused cells are to be cleared
0x1	Unused cells are to be deleted

H - fOverwrite (1 bit): A bit that specifies the behavior when dealing with a variable number of rows of data in the query table between refresh operations. If **fShrink** is 1, this value MUST be 0. MUST be one of the following:

Value	Meaning
0x0	Insert new cells for new data
0x1	Overwrite existing cells for new data

I - fFill (1 bit): A bit that specifies whether formulas in columns adjacent to the query table are filled down whenever the query table is refreshed.

J - fSaveData (1 bit): A bit that specifies whether the query table preserves all of its data in the sheet when the document is saved. MUST be one of the following:

Value	Meaning
0x0	Data in the query table will not be saved
0x1	Data in the query table will be saved

K - fDisableEdit (1 bit): A bit that specifies whether the cell content in the query table is editable.

Value	Meaning
0x0	Content is editable.
0x1	Content is locked.

L - fPreserveFmt (1 bit): A bit that specifies whether the application will preserve formatting in the query table and copy this formatting to new rows of data added to the query table.

M - fAutoFit (1 bit): A bit that specifies whether column widths are automatically adjusted on refresh to fit the data retrieved.

N - fDummyList (1 bit): A bit that specifies whether this query table has not been fully formed and populated with data.

O - ibitAtrNum (1 bit): A bit that specifies whether numeric cell data is formatted according to the **style** specified in **itblAutoFmt** field.

P - ibitAtrFnt (1 bit): A bit that specifies whether cell text is formatted according to the style specified in **itblAutoFmt** field.

Q - ibitAtrAlc (1 bit): A bit that specifies whether cell text alignment is set according to the style specified in **itblAutoFmt** field.

R - ibitAtrBdr (1 bit): A bit that specifies whether border is set according to the style specified in **itblAutoFmt** field.

S - ibitAtrPat (1 bit): A bit that specifies whether the cell background is formatted according to the style specified in **itblAutoFmt** field.

T - ibitAtrProt (1 bit): A bit that specifies whether the cell is **protected** according to the style specified in **itblAutoFmt** field.

unused (12 bits): Undefined and MUST be ignored.

itblAutoFmt (2 bytes): An AutoFormatID that specifies the AutoFormat to be applied to the query table. MUST be less than or equal to 0x0014.

dwConnID (4 bytes): An unsigned integer that specifies the identifier number of the external connection to use to refresh data in the query table. This value MUST be greater than 0 and MUST be equal to **dwConnID** in one of the BrtBeginExtConnection records in the External Data Connections.

irstName (variable): An XLWideString that specifies the unique name of this query table. Within this workbook, there MUST be a defined name as specified by a BrtName record with its **fHidden** field equal to 1 and its **name** field matching this field's value and its **formula.rgce** field only containing a PtgArea3d referencing the range of cells for the query table fields. Spaces within **irstName** are converted to underscores for the purposes of this comparison.

2.4.144 BrtBeginQSIF

This record specifies properties of a single field of a query table and specifies the beginning of an empty collection of records as defined by the Query Table part ABNF.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	reserved																										
idField																															
idlstf																															
irstName (variable)																															
...																															

A - fUserIns (1 bit): A bit that specifies whether this field is a user-defined field or comes from the external connection. User defined fields are preserved during data refresh operations.

B - fFillDown (1 bit): A bit that specifies whether the formula in this field is **filled down** on data refresh. A value of 1 specifies that formulas is filled down. If this value is 1 **fUserIns** MUST be equal to 1.

C - fRowNums (1 bit): A bit that specifies whether this field contains row numbers for the records returned. A value of 1 indicates that the field will contain row numbers. If this value is 1 **fUserIns** MUST be equal to 0.

D - fClipped (1 bit): A bit that specifies whether this field is currently clipped and is not **visible** in the sheet. A value of 1 specifies that this field is clipped. If this value is equal to 1 **fUserIns** MUST be equal to 0.

E - fIrstName (1 bit): A bit that specifies whether this record contains **irstName**.

reserved (27 bits): MUST be zero and MUST be ignored.

idField (4 bytes): A QsiFieldId that specifies the unique identifier of this query table field. This value MUST be unique within this query table.

idlstf (4 bytes): An unsigned integer that specifies the identifier of the table field if this query table field is attached to a table object rather than a range in the sheet. This value MUST be equal to 0 if the query table field is not attached to a table field, otherwise this value MUST be equal to the **idField** field on a BrtBeginListCol record within the table associated with this query table and this record's **idField** field MUST equal the **idqsif** of that BrtBeginListCol record.

irstName (variable): An XLWideString specifying the name of this query table field. If **fIrstName** is equal to 0, **irstName** MUST NOT be present. If **fIrstName** is equal to 1, **irstName** MUST be present. This string MUST be less than or equal to 255 characters in length.

2.4.145 BrtBeginQSIFs

This record specifies the number of columns in this query table and specifies the beginning of a collection of records as defined by the Query Table part ABNF. The collection of records specifies the query table fields in this query table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
nCols																															

nCols (4 bytes): A DCol that specifies the number of columns contained in this query table. This value MUST equal the number of BrtBeginQSIF records in this collection.

2.4.146 BrtBeginQSIR

This record specifies properties of query table data refresh operations and specifies the beginning of a collection of records as defined by the Query Table part ABNF. The collection of records specifies information about the query table data refresh.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	wVerBeforeRefreshAlert					reserved						idFieldNext															
...																ccolExtraLeft															
ccolExtraRight																															

A - fPersist (1 bit): A bit that specifies whether the layout will be preserved for this query table across data refresh operations.

B - fPersistSort (1 bit): A bit that specifies whether sorting will be preserved for this query table across data refresh operations. MUST be equal to **fPersist**.

C - fPersistAutoFilter (1 bit): A bit that specifies whether AutoFilters will be preserved for this query table across data refresh operations. MUST be equal to **fPersist.**

D - fIdWrapped (1 bit): A bit that specifies whether the **idFieldNext** value cannot be unique amongst PivotTable field identifiers for this query table. A value of 1 specifies that PivotTable field identifiers need to be checked for uniqueness before assignment to avoid duplicates.

E - fTitlesOld (1 bit): A bit that specifies whether the query table had a header row the last time it was refreshed.

wVerBeforeRefreshAlert (5 bits): An unsigned integer that specifies the minimum version of the application that is expected to correctly refresh the data in the query table. If the application version is smaller than this number, the user will be alerted before any refresh operation is performed.

reserved (6 bits): MUST be zero and MUST be ignored.

idFieldNext (4 bytes): An unsigned integer that specifies the next unique query table field identifier available for use in this query table. This value MUST be less than or equal to 65535.

ccolExtraLeft (2 bytes): A DColShort that specifies the number of columns included at the beginning of the query table that are not bound to external data. This number MUST be less than 16384.

ccolExtraRight (2 bytes): A DColShort that specifies the number of columns included at the end of the query table that are not bound to external data. This number MUST be less than 16384.

2.4.147 BrtBeginRRSort

This record specifics sort map properties and specifies the beginning of a collection of records as defined by the Sort Map part ABNF. The collection of BrtRRSortItem records specifies the sort map properties of the specified cell range. For a given sort map there MUST be at most two of these records. If there are two records, one MUST have the **fCol** bit set, and the other MUST NOT have the **fCol** bit set.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
rfx (16 bytes)																															
...																															
fCol																															
cItems																															

rfx (16 bytes): An UncheckedRfX that specifies the row and column bounds of the sort map.

fCol (4 bytes): A Boolean that specifies whether this sort map refers to a column or row sort map. This value MUST be 0 or 1. If the value is 0, then this record specifies a row sort map; otherwise this record specifies a column sort map.

cItems (4 bytes): An unsigned integer that specifies the number of BrtRRSortItem records. This value MUST be equal to the number of BrtRRSortItem records between this record and the next BrtEndRRSort record. It MUST be greater than 0 and MUST be less than or equal to 0x0FFFFFFF.

2.4.148 BrtBeginRwBrk

This record specifies horizontal page break (2) properties and specifies the beginning of a collection of BrtBrk records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of BrtBrk records specifies horizontal page breaks (2).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ibrkMac																															
ibrkManMac																															

ibrkMac (4 bytes): An unsigned integer that specifies the number of horizontal page breaks (2) in the workbook. MUST be less than or equal to 1023.

ibrkManMac (4 bytes): An unsigned integer that specifies the number of manual horizontal page breaks (2) that occur at locations specified by the user. MUST be equal to **ibrkMac**.

2.4.149 BrtBeginScenMan

This record specifies the properties of a **Scenario Manager** and specifies the beginning of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies the Scenario Manager for the sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
isctCur																isctShown															
sqrfxResult (variable)																															
...																															

isctCur (2 bytes): An unsigned integer that specifies a zero-based index to a BrtBeginSct record in the collection of BrtBeginSct records directly following this record. The referenced BrtBeginSct specifies the current **scenario** selected. If this value is 0xFFFF, this indicates that no scenario is currently selected. Otherwise this value MUST be less than the total number of BrtBeginSct records in this collection.

isctShown (2 bytes): An unsigned integer that specifies a zero-based index to a BrtBeginSct record in the collection of BrtBeginSct records directly following this record. The referenced BrtBeginSct specifies the last shown scenario. If this value is 0xFFFF, this indicates that no scenario has been shown. Otherwise this value MUST be less than the total number of BrtBeginSct records in this collection.

sqrfxResult (variable): An UncheckedSqRfX that specifies the cell or cells which are results for the scenarios. If no result cells have been indicated then **sqrfxResult.crfx** MUST be set to 0xFFFFFFFF, otherwise **sqrfxResult.crfx** MUST be less than or equal to 0x00000020 (32) and the range defined by **sqrfxResult** MUST NOT contain more than 32 cells.

2.4.150 BrtBeginSct

This record specifies properties of a scenario and specifies the beginning of a collection of BrtSlc records as specified in the Worksheet part ABNF. The collection of BrtSlc records specifies the cells that are included in the scenario.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cref																fLocked															
...																fHidden															
...																Name (variable)															
...																															
Comment (variable)																															
...																															
UserName (variable)																															
...																															

cref (2 bytes): An unsigned integer that specifies the count of BrtSlc records in the collection. This number MUST be greater than or equal to 1, MUST be equal to the count of cells in the scenario, and MUST be less than or equal to 32.

fLocked (4 bytes): A Boolean that specifies if the scenario is locked for editing when the sheet is protected. MUST be a value from the following table:

Value	Meaning
0x00000000	The scenario is not locked.
0x00000001	The scenario is locked.

If the sheet is protected and the **fScenarios** field in the BrtSheetProtection record for this sheet is set to 1, then this setting is ignored.

fHidden (4 bytes): A Boolean that specifies if the scenario is hidden when the sheet is protected and the **fScenarios** field in the BrtSheetProtection record for this sheet is set to 0. MUST be a value from the following table:

Value	Meaning
0x00000000	The scenario is not hidden.
0x00000001	The scenario is hidden.

If the scenario is marked as hidden but the **fScenarios** field in the BrtSheetProtection record for this sheet is set to 1, then this setting is ignored.

Name (variable): An XLWideString that specifies the name of the scenario. MUST be unique across all BrtBeginSct in the worksheet part and MUST contain less than 256 characters.

Comment (variable): An XLWideString that specifies the comment for this scenario. MUST contain less than 256 characters. <15>

UserName (variable): An XLWideString that specifies the name of the user who last modified this scenario. MUST contain more than 1 character and less than 55 characters.

2.4.151 BrtBeginSheet

This record specifies the beginning of a collection of records as defined by the Chart Sheet part ABNF, Dialog Sheet part ABNF, Macro Sheet part ABNF, and Worksheet part ABNF. The collection of records specifies properties of the sheet.

2.4.152 BrtBeginSheetData

This record specifies the beginning of a collection of records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of records specifies the cell table data for a sheet.

2.4.153 BrtBeginSingleCells

This record specifies the beginning of a collection of records as defined by the Single Cell Tables part ABNF. The collection of records specifies XML maps to single cells.

2.4.154 BrtBeginSmartTags

This record specifies the beginning of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies the smart tag properties of this sheet.

2.4.155 BrtBeginSmartTagTypes

This record specifies the beginning of a collection of BrtSmartTagType records as defined as Workbook part ABNF. The collection of BrtSmartTagType records specifies the properties for a smart tag type that contain the identification information for the smart tag.

2.4.156 BrtBeginSortCond

This record specifies a **sort condition** to apply to a range and specifies the beginning of an empty collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, the Macro Sheet part ABNF, the Table part ABNF, and the Query Table part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	sortOn				unused											rfx (16 bytes)															

...	
...	sortCondUnion (variable)
...	
stSsList (variable)	
...	

A - fSortDes (1 bit): A bit that specifies the direction of the sort.

Value	Meaning
0x0	If **sortOn** is not 0x3, sort in ascending order. If **sortOn** is 0x3, cells in which the icon occurs are ordered at the top of the range.
0x1	If **sortOn** is not 0x3, sort in descending order. If **sortOn** is 0x3, cells in which the icon occurs are ordered at the bottom of the range.

sortOn (4 bits): An unsigned integer that specifies how the cells in a range are sorted. MUST be one of the following values:

Value	Meaning
0x0	Sort by the cell value
0x1	Sort by the cell color
0x2	Sort by the cell font color
0x3	Sort by the cell icon

unused (11 bits): Undefined and MUST be ignored.

rfx (16 bytes): An UncheckedRfX that specifies what range the sort applies to.

sortCondUnion (variable): A structure that specifies the conditional data to be evaluated. The data type of this structure depends on the value of the **sortOn** field according to the following table:

Value of sortOn	Format of structure
0x0, 0x1, 0x2	An 8-byte unsigned integer that specifies the zero-based index of a BrtDXF record in the collection of all records directly following BrtBeginDXFs. The referenced BrtDXF specifies the differential

	formatting to use for the sort.
0x3	A CFFlag that specifies the icon and icon set to use for the sort.

stSsList (variable): An XLNullableWideString that specifies a comma-delimited list of strings that specifies a custom sort order (2). The order of strings in the list specifies the sort order (2). When a cell value matches a string in the list (using a case-insensitive comparison), it is sorted ahead of the cell values that match a later string in the list, and so on for each cell in the range. MUST be ignored if **sortOn** is not equal to 0x0.

2.4.157 BrtBeginSortState

This record specifies sort properties and specifies the beginning of a collection of records as specified by the Worksheet part ABNF, the Dialog Sheet part ABNF, the Macro Sheet part ABNF, the Table part ABNF, and the Query Table part ABNF. The collection of records specifies the different sort conditions that apply to a range.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	unused													rfx (16 bytes)															
...																															
...																															

A - fCol (1 bit): A bit that specifies whether to sort by rows or columns. If AutoFilter is applied to the range then **fCol** MUST be ignored.

Value	Meaning
0x0	Sort by rows
0x1	Sort by columns

B - fCaseSensitive (1 bit): A bit that specifies whether the sort is case-sensitive.

C - fAltMethod (1 bit): A bit that specifies whether to use a sorting method other than character order such as **stroke order** or **Mandarin phonetic symbols**.

Value	Meaning
0x0	Sort using character order
0x1	Sort using a method other than character order

unused (13 bits): Undefined and MUST be ignored.

rfx (16 bytes): An UncheckedRfX that specifies the range to sort.

2.4.158 BrtBeginSst

This record specifies properties of a shared string table and specifies the beginning of a collection of BrtSSTItem records as defined by the Shared Strings part ABNF. The collection of BrtSSTItem records specifies a shared string table. **cstUnique** MUST be less than or equal to **cstTotal**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cstTotal																															
cstUnique																															

cstTotal (4 bytes): An unsigned integer that specifies the number of references in the workbook to items in the BrtSSTItem collection. MUST be less than or equal to 0x7FFFFFFF.

cstUnique (4 bytes): An unsigned integer that specifies the number of records in the BrtSSTItem collection. MUST be less than or equal to 0x7FFFFFFF.

2.4.159 BrtBeginStyles

This record specifies a count of BrtStyle records and specifies the beginning of a collection of BrtStyle records as defined by the Styles part ABNF. The collection of BrtStyle records specifies all cell styles in the workbook. The collection MUST contain at least 1 and no more than 0xFF96 BrtStyle records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cstyles																															

cstyles (4 bytes): An unsigned integer that specifies the number of BrtStyle records in the collection. MUST be at least 1 and no more than 0xFF96.

2.4.160 BrtBeginStyleSheet

This record specifies the beginning of a collection of records as defined by the Styles part ABNF. The collection of records specifies style information for a workbook.

2.4.161 BrtBeginSupBook

This record specifies the properties of an external link and specifies the beginning of a collection of records as defined by the External Link part ABNF. The collection of records specifies information about the external link.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sbt																string1 (variable)															
...																															
string2 (variable)																															
...																															

sbt (2 bytes): An ExternalReferenceType that specifies the type of the External Link.

string1 (variable): The type and meaning of this field is dependent on the value of **sbt**, and is specified in the following table.

Value of **sbt**	Meaning of **string1**
WORKBOOK	A RelID that specifies an external workbook. This value MUST NOT be a NULL string.
DDE	An XLWideString that specifies the name of a Dynamic Data Exchange (DDE) server.
OLE	A RelID that specifies an OLE (object linking and embedding) data source (1) file. This value MUST NOT be a NULL string.

string2 (variable): The type and meaning of this field is dependent on the value of **sbt**, and is specified in the following table.

Value of **sbt**	Meaning of **string2**
WORKBOOK	An XLNullableWideString that is not used. The value of this field MUST be NULL string.
DDE	An XLWideString that specifies the name of a Dynamic Data Exchange (DDE) topic.
OLE	An XLWideString that specifies the ProgID of the object(3) class associated with the OLE data source (1) file.

2.4.162 BrtBeginSXCondFmt

This record specifies the scope, type and priority of conditional formatting applied to this PivotTable view, as specified by the preceding BrtBeginSXView record, and specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies details about where this conditional formatting applies in the PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sxcondfmtScope																															
sxcondfmtType																															

ipriority

sxcondfmtScope (4 bytes): An unsigned integer that specifies the scope of this PivotTable view conditional formatting. MUST be one of the following values:

Name	Value	Description
SXCONDFMTSELECTIONSCOPE	0x00000000	This conditional formatting is applied to the cells (as specified by the PIVOTRULES of this collection).
SXCONDFMTDATASCOPE	0x00000001	This conditional formatting is applied to all cells (as specified by the PIVOTRULES of this collection) that display values for the data item.
SXCONDFMTFIELDSCOPE	0x00000002	This conditional formatting is applied to all cells (as specified by the PIVOTRULES of this collection) that display values for the pivot field intersections.

The value of **sxcondfmtScope** MUST be SXCONDFMTFIELDSCOPE if **sxcondfmtType** value is SXCONDFMTTOP10R or SXCONDFMTTOP10C.

If the value of this field is SXCONDFMTDATASCOPE or SXCONDFMTFIELDSCOPE there MUST be only one PIVOTRULE within PIVOTRULES of this SXCONDFMT as specified in the PivotTable part ABNF.

sxcondfmtType (4 bytes): An unsigned integer that specifies the type of this PivotTable view conditional formatting. MUST be one of the following values:

Name	Value	Description
SXCONDFMTTOP10NIL	0x00000000	Top N or Bottom N conditional formatting is not evaluated.
SXCONDFMTTOP10A	0x00000001	Top N or Bottom N conditional formatting is evaluated across the entire scope range.
SXCONDFMTTOP10R	0x00000002	Top N or Bottom N conditional formatting is evaluated for each row.
SXCONDFMTTOP10C	0x00000003	Top N or Bottom N conditional formatting is evaluated for each column.

The value of this field MUST be SXCONDFMTTOP10NIL or SXCONDFMTTOP10A if **sxcondfmtScope** value is SXCONDFMTSELECTIONSCOPE or SXCONDFMTDATASCOPE.

ipriority (4 bytes): An unsigned integer that specifies the priority of the PivotTable view conditional formatting. MUST be greater than or equal to 1. The sheet where this PivotTable view is located MUST have a BrtBeginConditionalFormatting collection with the **fPivot** field equal to 1, and there MUST be a BrtBeginCFRule item in that collection with the **ipri** field equal to the value of this field.

2.4.163 BrtBeginSXCondFmts

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies conditional formats that apply to this PivotTable.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxcondfmts																															

csxcondfmts (4 bytes): An unsigned integer that specifies the number of conditional formats that apply to this PivotTable. This value MUST be the same as the number of BrtBeginSXCondFmt records in this collection.

2.4.164 BrtBeginSXCrtFormat

This record specifies details for a PivotChart format and specifies the beginning of a collection records as defined by the PivotTable part ABNF. The collection specifies a reference to a PivotTable rule that specifies where in the PivotChart the formatting is applied.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dwChart																															
dwFmt																															
fSeriesFormatting																															

dwChart (4 bytes): An unsigned integer that specifies the PivotChart to which this format applies. The PivotChart is specified by a chart part. The associated chart part contains a **fmtId** element, as defined in [ECMA-376] Part 4: Markup Language Reference, section 5.7.2.70, with a **val** attribute. The attribute **val** MUST have a value equal to the value of this field.

dwFmt (4 bytes): An unsigned integer that specifies a zero-based index to a **pivotFmt** element, as defined in [ECMA-376] Part 4: Markup Language Reference, section 5.7.2.143, in the **pivotFmts** collection, as defined in [ECMA-376] Part 4: Markup Language Reference, section 5.7.2.144, in the chart part specified by **dwChart**. This value MUST be less than the number of **pivotFmt** elements in that collection.

fSeriesFormatting (4 bytes): A Boolean that specifies whether this format applies to a data series or a data point.

Value	Meaning
0x00000000	Specifies that this format applies to a data point.
0x00000001	Specifies that this format applies to a data series.

A data series is specified by a **ser** element that is a child of one of the chart elements from the list of valid child elements of the **plotArea** element, as defined in [ECMA-376] Part 4: Markup Language Reference, section 5.7.2.146, in the chart part specified by **dwChart**. A data point is specified by the **dPt** element, as defined in [ECMA-376] Part 4: Markup Language Reference, section 5.7.2.52.

2.4.165 BrtBeginSXCrtFormats

This record specifies references to PivotChart formats and specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies references to PivotChart formats.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxcrtformats																															

csxcrtformats (4 bytes): An unsigned integer that specifies the number of references to PivotChart formats. MUST match the number of BrtBeginSXCrtFormat records in this collection.

2.4.166 BrtBeginSXDI

This record specifies a data item that summarizes data in a PivotTable and specifies the beginning of a collection of records as defined by the PivotTable part ABNF. Data items use summary functions to combine values from the underlying source data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
isxvdData																															
iiftab																															
df																															
isxvd																															
isxvi																															
ifmt																															
fLoadDisplayName								stDisplayName (variable)																							
...																															

isxvdData (4 bytes): An ISXVD that specifies the pivot field that this data item summarizes. MUST NOT equal -1 or -2.

If the PivotTable view is a non-OLAP PivotTable view, the values in the source data associated with the associated cache field of the referenced pivot field are aggregated as specified in this record.

If the PivotTable view is an OLAP PivotTable view, the associated pivot hierarchy of the referenced pivot field specifies the OLAP measure for this data item and the **iiftab** field is ignored. The associated pivot hierarchy is determined as specified in Pivot Hierarchies.

The **sxaxisData** field of the referenced BrtBeginSXVD record MUST be equal to 1.

iiftab (4 bytes): A **DataConsolidationFunction** that specifies the aggregation function that applies to this data item. The valid values of this field are specified by the **DataConsolidationFunction** enumeration.

df (4 bytes): A **ShowDataAs** that specifies the data format for this data item. The valid values for this field are specified by the **ShowDataAs** enumeration.

isxvd (4 bytes): An ISXVD that specifies the pivot field the calculations specified by the **df** field are based on. When **df** is greater than 0x00000000 and less than 0x00000005, this value MUST NOT equal -1 or -2. When **df** is 0x00000000 or greater than or equal to 0x00000005 this field is ignored.

isxvi (4 bytes): An unsigned integer that specifies the pivot item the calculations as specified by the **df** field are based on. When **df** is greater than 0x00000000 and less than 0x00000004, this field MUST be a value from the following table:

Value	Meaning
0x00000000 to 0x00100000	Specifies the pivot item index in the pivot field specified by **isxvd**, as specified in Pivot Items. The referenced BrtBeginSXVI record specifies the pivot item this calculation is based on.
0x001000FC	The calculation is based on the previous pivot item.
0x001000FD	The calculation is based on the next pivot item.

When **df** is 0x00000000 or greater than or equal to 0x00000004 this field is ignored.

ifmt (4 bytes): A PivotNumFmt that specifies the format applied to this data item.

fLoadDisplayName (1 byte): A Boolean that specifies whether the **stDisplayName** field exists after the fixed size portion of the record. MUST be a value from the following table:

Value	Meaning
0x00	**stDisplayName** does not exist.
0x01	**stDisplayName** exists.

stDisplayName (variable): An optional XLWideString that specifies the name of the data item. If the value of the **bVerSxMacro** field defined in the associated BrtBeginSXView record is less than 3, the length of this value MUST be less than 256 characters, otherwise it MUST be less than 32768 characters. MUST exist if and only if **fLoadDisplayName** is 0x01.

2.4.167 BrtBeginSXDIs

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF, that specifies the data items that appear on the data axis of this PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxdis																															

csxdis (4 bytes): An unsigned integer that specifies the number of data items on the data axis of this PivotTable view. MUST be equal to the number of BrtBeginSXDI records in this collection.

2.4.168 BrtBeginSXFILTER

This record specifies properties of an advanced filter and specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a PivotTable advanced filter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
isxvd																															
isxvdMProp																															
sxft																															
unused																															
dwId																															
isxdiMeasure																															
isxthMeasure																															
A	B	C	D	reserved												stName (variable)															
...																															
stDescription (variable)																															
...																															
stVal1 (variable)																															
...																															
stVal2 (variable)																															
...																															

isxvd (4 bytes): An ISXVD that specifies the pivot field to which this advanced filter applies. MUST NOT be equal to -1 or -2.

isxvdMProp (4 bytes): An ISXVD that specifies the pivot field specifying the member property on which this advanced filter is based. This value is only used by label filters. If this advanced filter is a label filter, as specified by **sxft**, and this advanced filter is based on a member property, then this value MUST be greater than or equal to 0. Otherwise, it MUST be -1 and MUST be ignored.

sxft (4 bytes): A PivotFilterType that specifies the type of this advanced filter.

unused (4 bytes): Undefined and MUST be ignored.

dwId (4 bytes): An unsigned integer that specifies the unique identifier of this advanced filter.

isxdiMeasure (4 bytes): An ISXDI that specifies the data item on which this value filter is based. If this advanced filter is a value filter, as specified by **sxft**, and this advanced filter is associated with a non-OLAP PivotTable, then this value MUST be greater than or equal to 0. Otherwise, it MUST be -1 and MUST be ignored.

isxthMeasure (4 bytes): An ISXTH that specifies the pivot hierarchy used by this advanced filter. The pivot hierarchy this value specifies MUST have an associated cache hierarchy with the **fMeasure** field equal to 1. If this advanced filter is a value filter, as specified by **sxft**, and this advanced filter is associated with an OLAP PivotTable, then this value MUST be greater than or equal to 0. Otherwise, it MUST be -1 and MUST be ignored.

A - fLoadName (1 bit): A bit that specifies whether **stName** exists.

B - fLoadDescription (1 bit): A bit that specifies whether **stDescription** exists.

C - fLoadVal1 (1 bit): A bit that specifies whether **stVal1** exists. MUST be 1 if and only if this advanced filter is a label filter, as specified by **sxft**.

D - fLoadVal2 (1 bit): A bit that specifies whether **stVal2** exists. MUST be 1 if and only if this advanced filter is of type "is between" or "is not between", as specified by **sxft**.

reserved (12 bits): MUST be zero, and MUST be ignored.

stName (variable): An optional XLWideString that specifies the name of this filter. The length of this value MUST be less than 65536. MUST exist if and only if **fLoadName** is equal to 1.

stDescription (variable): An optional XLWideString that specifies the description of this advanced filter. The length of this value MUST be less than 65536. MUST exist if and only if **fLoadDescription** is equal to 1.

stVal1 (variable): An optional XLWideString that specifies the first string value used by label filters. The length of this value MUST be less than 65536. MUST exist if and only if **fLoadVal1** is equal to 1.

stVal2 (variable): An optional XLWideString that specifies the second string value used by label filters. The length of this value MUST be less than 65536. MUST exist if and only if **fLoadVal2** is equal to 1.

2.4.169 BrtBeginSXFilters

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a collection of advanced filters that apply to this PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxfilter																															

csxfilter (4 bytes): An unsigned integer that specifies the number of advanced filters that apply to this PivotTable view. This value MUST match the number of BrtBeginSXFILTER records in this collection.

2.4.170 BrtBeginSXFormat

This record specifies differential formatting applied to the PivotTable view and specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the

differential formatting applied to the PivotTable view area identified by the PivotTable rule as specified by the collection of records beginning with the following BrtBeginPRule record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rlType																dxfid															
...																															

rlType (2 bytes): A Boolean that specifies whether the specified differential formatting is applied to the PivotTable view area identified by the PivotTable rule as specified by the following BrtBeginPRule record. MUST be a value from the following table:

Value	Meaning
0x0	The differential formatting is cleared from the PivotTable view area.
0x1	The differential formatting is applied to the PivotTable view area.

dxfid (4 bytes): A DXFId that specifies the differential formatting applied to this PivotTable view area identified by the PivotTable rule as specified by the following BrtBeginPRule record. If **rlType** is equal to 0x0, the value of **dxfid** MUST be equal to 0xFFFFFFFF.

2.4.171 BrtBeginSXFormats

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a collection of formats that apply to this PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxformats																															

csxformats (4 bytes): An unsigned integer that specifies the number of formats that apply to this PivotTable view. MUST match the number of BrtBeginSXFormat records for this PivotTable view.

2.4.172 BrtBeginSXLI

This record specifies properties of a pivot line and specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a pivot line in a PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cSic																itmtype								reserved							
cisxvis																															
iData																															

cSic (2 bytes): An unsigned integer that specifies the number of pivot line entries to reuse from the previous pivot line, as specified by the BrtBeginISXVIs record in the previous SXLI collection, within the SXLIRWS or SXLICOLS collection that contains this record.

itmtype (1 byte): A PivotItemType that specifies the type of this pivot line.

reserved (1 byte): MUST be 0 and MUST be ignored.

cisxvis (4 bytes): An unsigned integer that specifies the count of pivot line entries specified by the BrtBeginISXVIs record contained in this SXLI collection. This value MUST be equal to the count of elements in the **rgisxvis** array in the BrtBeginISXVIs record. The pivot line entries used in this pivot line will be those reused from the previous pivot line, as specified by **cSic**, in addition to those specified by the BrtBeginISXVIs record.

iData (4 bytes): An ISXDI that specifies the data item to use for this pivot line. If the data field is on the row axis or column axis using this pivot line, this value MUST NOT equal -1. Otherwise, this value MUST be 0 and MUST be ignored.

2.4.173 BrtBeginSXLICols

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the pivot lines that appear on the column area of the PivotTable view. For details about the column area, see location and body.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
csxlis																															

csxlis (4 bytes): An unsigned integer that specifies the number of pivot lines that appear on the column area of the PivotTable view. For details about the column area, see location and body. This value MUST be equal to the number of BrtBeginSXLI records in this collection.

2.4.174 BrtBeginSXLIRws

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the pivot lines that appear on the row area of the PivotTable view. For details about the row area, see location and body.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
csxlis																															

csxlis (4 bytes): An unsigned integer that specifies the number of pivot lines that appear on the row area of the PivotTable view. For details about the row area, see location and body. This value MUST be equal to the number of BrtBeginSXLI records in this collection.

2.4.175 BrtBeginSXLocation

This record specifies the location of a PivotTable view in a sheet, and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfxGeom (16 bytes)																															
...																															
rwFirstHead																															
rwFirstData																															
colFirstData																															
crwPage																															
ccolPage																															

rfxGeom (16 bytes): An UncheckedRfX that specifies the location of the PivotTable view body in a sheet. For more details about the PivotTable view body, see Location and Body.

rwFirstHead (4 bytes): An UncheckedRw that specifies first row in a PivotTable report body that contains pivot item captions, data item captions, or data values. For more details about the PivotTable view body, see Location and Body. If no row area and no column area exists, this value MUST be equal to **rfxGeom.rwFirst** + 1, and MUST be ignored. The value of this field MUST be less than or equal to **rwFirstData**.

rwFirstData (4 bytes): An UncheckedRw that specifies the location of the topmost row of the PivotTable view body**,** where cells containing values of data items will appear. For more details about the PivotTable view body, see Location and Body.

colFirstData (4 bytes): An UncheckedCol that specifies the location of the first column of the PivotTable view body, where cells containing values of data items will appear. For more details about the PivotTable view body, see Location and Body.

crwPage (4 bytes): A DRw that specifies the number of rows with cells containing data for pivot fields on the page axis of the PivotTable view.

ccolPage (4 bytes): A DCol that specifies the number of columns with cells containing data for pivot fields on the page axis of the PivotTable view.

2.4.176 BrtBeginSXPI

This record specifies properties of a pivot field or pivot hierarchy on the page axis of the PivotTable view and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF. The collection of records specifies a pivot field or pivot hierarchy on the page axis of the PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
isxvd																															
isxvi																															
isxth																															
A	B	reserved						irstUnique (variable)																							
...																															
irstDisplay (variable)																															
...																															

isxvd (4 bytes): An ISXVD that specifies a pivot field that is displayed on the page axis area of the PivotTable view. MUST NOT equal -1 or -2. The value of the **sxaxisPage** of the **sxaxis** field of the referenced BrtBeginSXVD record MUST be equal to 1.

isxvi (4 bytes): An unsigned integer that specifies the pivot item included in the filter for this pivot field. MUST be a value from the following table:

Value	Meaning
0x00000000 to 0x00100000	Specifies a pivot item index, as specified by Pivot Items, for the pivot item included in the filter, as specified by Non-OLAP Page Filtering.
0x001000FE	Specifies that pivot items are included as specified in Non-OLAP Page Filtering and OLAP Page Filtering.

If this field is not equal to 0x001000FE, then the **fEnableMultiplePageItems** field in the BrtBeginSXVD record of the pivot field specified by **isxvd** MUST be equal to 0. If the **fEnableMultiplePageItems** field in the BrtBeginSXVD record of the pivot field specified by **isxvd** is equal to 1, this field MUST be equal to 0x001000FE. If this is an OLAP PivotTable view, this field MUST be equal to 0x001000FE.

isxth (4 bytes): An ISXTH that specifies the pivot hierarchy to which the pivot field specified by **isxvd** belongs. If this PivotTable is an OLAP PivotTable, this field MUST NOT be equal to -1 or -2. If this PivotTable is not an OLAP PivotTable, this value MUST be ignored.

A - fUnique (1 bit): A bit that specifies whether **irstUnique** is present after the fixed-length portion of this record. This value MUST be equal to 0 for PivotTables that are not OLAP PivotTables.

B - fDisplay (1 bit): A bit that specifies whether **irstDisplay** is present after the fixed-length portion of this record. This value MUST be equal to 0 for PivotTables that are not OLAP PivotTables.

reserved (6 bits): MUST be zero, and MUST be ignored.

irstUnique (variable): An XLWideString that specifies the MDX unique name of an OLAP member. If the **fEnableMultiplePageItems** field on the BrtBeginSXTH record specified by this record's **isxth** field is equal to 0, the OLAP member specified by this field is included in the manual filter.

If the **irstUnique** field is present and the **bVerCacheCreated** field on the BrtBeginPivotCacheDef record associated with this PivotTable view (for more details, see Relationship to PivotCache) is less than 3, then this string MUST be less than or equal to 255 characters in length. If the **bVerCacheCreated** field of that BrtBeginPivotCacheDef record associated with this PivotTable view is greater than or equal to 3, then this string MUST be less than or equal to 32767 characters in length.

If the **fUnique** field is 1, this **irstUnique** field MUST be present. If the **fUnique** field is 0, this **irstUnique** field MUST NOT be present. If the **fEnableMultiplePageItems** field on the BrtBeginSXTH record specified by this record's **isxth** field is equal to 1, this field MUST be ignored.

irstDisplay (variable): An XLWideString that specifies the caption of the OLAP member specified by this record's **irstUnique** field when the **fEnableMultiplePageItems** field on the BrtBeginSXTH record specified by this record's **isxth** field is equal to 0.

If the **irstDisplay** field is present and the **bVerCacheCreated** field on the BrtBeginPivotCacheDef record associated with this PivotTable view (for more details, see Relationship to PivotCache) is less than 3, then this string MUST be less than or equal to 255 characters in length. If the **bVerCacheCreated** field of that BrtBeginPivotCacheDef record associated with this PivotTable view is greater than or equal to 3, then this string MUST be less than or equal to 32767 characters in length.

If the **fDisplay** field is 1, this **irstDisplay** field MUST be present. If the **fDisplay** field is 0, this **irstDisplay** field MUST NOT be present. If the **fEnableMultiplePageItems** field on the BrtBeginSXTH record specified by this record's **isxth** field is equal to 1, this field MUST be ignored.

2.4.177 BrtBeginSXPIs

This record specifies the beginning of a collection of records as defined in the PivotTable part ABNF. The collection of records specifies the pivot fields on the page axis of the PivotTable view. If this record exists, the number of BrtBeginSXVD records in this PivotTable view MUST be greater than 0.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxpis																															

csxpis (4 bytes): An unsigned integer that specifies the count of pivot fields on the page axis. This value MUST equal the number of BrtBeginSXPI records in this collection.

2.4.178 BrtBeginSXRules

This record specifies the beginning of a collection of records as defined in the PivotTable part ABNF. The collection of records specifies a collection of PivotTable rules.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxrules																															

csxrules (4 bytes): An unsigned integer that specifies the number of PivotTable rules in this collection. <16>

2.4.179 BrtBeginSxSelect

This record specifies the **selection** properties of a PivotTable view and specifies the beginning of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies a PivotTable rule used to identify cells of the selection. This record MUST be ignored if **irstRelID** is NULL or points to an invalid PivotTable part.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">pnn</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td colspan="2">E</td><td colspan="2">F</td><td colspan="8">sxaxisAct</td><td colspan="16">iDimAct</td></tr>
<tr><td colspan="16">...</td><td colspan="16">iLiStart</td></tr>
<tr><td colspan="16">...</td><td colspan="16">iLiMic</td></tr>
<tr><td colspan="16">...</td><td colspan="16">iLiMac</td></tr>
<tr><td colspan="16">...</td><td colspan="16">rwAct</td></tr>
<tr><td colspan="16">...</td><td colspan="16">colAct</td></tr>
<tr><td colspan="16">...</td><td colspan="16">rwPrev</td></tr>
<tr><td colspan="16">...</td><td colspan="16">colPrev</td></tr>
<tr><td colspan="16">...</td><td colspan="16">cClick</td></tr>
<tr><td colspan="32">irstRelID (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

pnn (4 bytes): A Pnn that specifies the window **pane** that contains the selection in the PivotTable view <17>.

A - fLabelOnly (1 bit): A bit that specifies whether only cells in the page area, row area or column area are included in this selection. This value MUST be equal to 0 if the **fDataOnly** field is 1.

B - fDataOnly (1 bit): A bit that specifies whether only cells in the data area are included in this selection. This value MUST be equal to 0 if the **fLabelOnly** field is 1.

C - fToggleDataHeader (1 bit): A bit that specifies whether the PivotTable view selection toggle is enabled. The selection toggle enables a method for the user to select values, labels, or both values and labels.

D - fExtendable (1 bit): A bit that specifies whether the selection can be extended with additional selections.

E - fSelectionClick (2 bits): MUST be 0 and MUST be ignored.

F - reserved (2 bits): MUST be 0 and MUST be ignored.

sxaxisAct (1 byte): An unsigned integer that specifies the area of the PivotTable view in which the **active cell** of the selection lies. MUST be a value from the following table:

Value	Meaning
0x00	the area of the PivotTable view in which the active cell of the selection lies is not specified.
0x01	The row area of the PivotTable view specified by **irstRelID** contains the active cell of the selection
0x02	The column area of the PivotTable view specified by **irstRelID** contains the active cell of the selection
0x04	The page area of the PivotTable view specified by **irstRelID** contains the active cell of the selection <18>

iDimAct (4 bytes): An unsigned integer that specifies the zero-based position within the PivotTable axis of the pivot field in which the active cell of the selection lies. If each of **sxaxisAct.sxaxisRw**, **sxaxisAct.sxaxisCol**, **sxaxisAct.sxaxisPage**, **sxaxisAct.sxaxisData** is 0 then this value MUST be 0. If **sxaxisAct.sxaxisRw** is 1, then this value MUST be less than the value of the **cisxvd** field of the BrtBeginISXVDRws record of the PivotTable part specified by **irstRelID**. If **sxaxisAct.sxaxisCol** is 1, then this value MUST be less than the value of the **cisxvd** field of the BrtBeginISXVDCols record. If **sxaxisAct.sxaxisPage** is 1, then this value MUST be 0.

iLiStart (4 bytes): An unsigned integer that specifies the Pivot Line where the selection operation started. The value of this field MUST be greater than or equal to **iLiMic** and less than or equal to **iLiMac**.

If **sxaxisAct.sxaxisRw** is 1, then this value specifies a zero-based index into the collection of SXLI rules following the BrtBeginSXLIRws record in the PivotTable part specified by **irstRelID**. If **sxaxisAct.sxaxisCol** is 1, then this value specifies a zero-based index into the collection of SXLI rules following the BrtBeginSXLICols record in the PivotTable part specified by **irstRelID.** If **sxaxisAct.sxaxisPage** is 1, then the value MUST be 0.

iLiMic (4 bytes): An unsigned integer that specifies the minimum Pivot Line the selection contains.

If **sxaxisAct.sxaxisRw** is 1, then this value specifies a zero-based index into the collection of SXLI rules following the BrtBeginSXLIRws record in the PivotTable part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the BrtBeginSXLIRws record. If **sxaxisAct.sxaxisCol** is 1, then this value specifies a zero-based index into the collection of SXLI rules following the BrtBeginSXLICols record in the PivotTable part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the BrtBeginSXLICols record. If **sxaxisAct.sxaxisPage** is 1, then the value MUST be 0.

iLiMac (4 bytes): An unsigned integer that specifies the maximum Pivot Line the selection contains.

If **sxaxisAct.sxaxisRw** is 1, then this value specifies a zero-based index into the collection of SXLI rules following the BrtBeginSXLIRws record in the PivotTable part specified by **irstRelID** and MUST be less than or equal to the value of the **csxlis** field of the BrtBeginSXLIRws record. If **sxaxisAct.sxaxisCol** is 1, then this value specifies a zero-based index into the collection of SXLI rules following the BrtBeginSXLICols record in the PivotTable part specified by **irstRelID** and

MUST be less than or equal to the value of the **csxlis** field of the BrtBeginSXLICols record. If **sxaxisAct.sxaxisPage** is 1, then the value MUST be 0.

rwAct (4 bytes): An UncheckedRw that specifies the row of the active cell the selection contains. If **sxaxisAct.sxaxisRw** is 1, then this value MUST be within the row area. If **sxaxisAct.sxaxisCol** is 1, then this value MUST be within the column area. If **sxaxisAct.sxaxisPage** is 1, then this value MUST be within the page area.

colAct (4 bytes): An UncheckedCol that specifies the column of the active cell the selection contains. If **sxaxisAct.sxaxisRw** is 1, then this value MUST be within the row area. If **sxaxisAct.sxaxisCol** is 1, then this value MUST be within the column area. If **sxaxisAct.sxaxisPage** is 1, then this value MUST be within the page area.

rwPrev (4 bytes): An UncheckedRw that specifies the row that is clicked to begin the selection.

colPrev (4 bytes): An UncheckedCol that specifies the column that is clicked to begin the selection.

cClick (2 bytes): An unsigned integer that specifies the number of clicks to make this selection. The value MUST be greater than or equal to 1. The value cycles through 1 to *N*, where *N* is the number of different ways the selection can be extended.

irstRelID (variable): An XLNullableWideString that specifies the relationship identifier to the PivotTable view that the selection applies to.

2.4.180 BrtBeginSXTDMP

This record specifies properties of a member property and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>11</td><td>12</td><td>13</td><td>14</td><td>15</td><td>16</td><td>17</td><td>18</td><td>19</td><td>20</td><td>21</td><td>22</td><td>23</td><td>24</td><td>25</td><td>26</td><td>27</td><td>28</td><td>29</td><td>30</td><td>31</td></tr>
<tr><td colspan="16">cchLevelUnq</td><td colspan="16">ichPropName</td></tr>
<tr><td colspan="16">cchPropName</td><td colspan="16">isxtl</td></tr>
<tr><td colspan="16">...</td><td colspan="16">isxvd</td></tr>
<tr><td colspan="16">...</td><td>A</td><td>B</td><td>C</td><td colspan="13">reserved3</td></tr>
<tr><td colspan="32">irstProperty (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

cchLevelUnq (2 bytes): An unsigned integer that specifies the length of the MDX unique name of the associated OLAP level represented by the cache hierarchy that is associated with this pivot hierarchy. This MDX unique name comes before the member property name in **irstProperty**.

For example, if the value of **irstProperty** equals "[Store].[Store Name].[Store Manager]", **cchLevelUnq** equals 20. This refers to "[Store].[Store Name]".

ichPropName (2 bytes): An unsigned integer that specifies the zero-based position of the character where the member property name portion begins in **irstProperty**. MUST be equal to the value as specified by the following formula:

ichPropName = **cchLevelUnq** + 2

For example, if the value of **irstProperty** equals "[Store].[Store Name].[Store Manager]", **ichPropName** equals 22. This refers to the starting character of "Store Manager".

cchPropName (2 bytes): An unsigned integer that specifies the length of the member property name portion of **irstProperty**. MUST be equal to the value as specified by the following formula:

cchPropName = n – **ichPropName** – 1

where 'n' is the length of **irstProperty**

For example, if the value of **irstProperty** equals "[Store].[Store Name].[Store Manager]", **cchPropName** equals 13. This refers to the length of "Store Manager".

isxtl (4 bytes): An unsigned integer that specifies the zero-based ordinal of the associated OLAP level represented by the cache hierarchy that is associated with this pivot hierarchy. If this value is equal to 32767, this specifies that this member property will apply to all levels. If this value is not equal to 32767 and **isxvd** is not equal to -1, then this value MUST be equal to the **isxtl** field of the BrtBeginPCDField record of the cache field associated with the pivot field specified by **isxvd**.

isxvd (4 bytes): An ISXVD that specifies the pivot field that this member property is associated with. MUST NOT be equal to -2.

If this value is not equal to -1, the **fOlapMemPropField** of the BrtBeginPCDField record of the cache field associated with the pivot field specified by this field MUST be 1. If this value is not equal to -1, **irstProperty** MUST equal the **stFldName** field of the BrtBeginPCDField record of the cache field associated with the pivot field specified by this field.

If this value is equal to -1, **irstProperty** MUST NOT equal the **stFldName** of any BrtBeginPCDField records on the PivotCache associated with this PivotTable view.

A - fDisplayInReport (1 bit): A bit that specifies whether to show this member property value in a PivotTable cell.

B - reserved1 (1 bit): MUST be zero, and MUST be ignored.

C - reserved2 (1 bit): MUST be zero, and MUST be ignored.

reserved3 (13 bits): MUST be zero, and MUST be ignored.

irstProperty (variable): An XLWideString that specifies the MDX unique name of this member property.

2.4.181 BrtBeginSXTDMPS

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies member properties in this pivot hierarchy.

If the **bVerSxMacro** of the BrtBeginSXView is less than 0x03, BrtSXTDMPOrder records MUST NOT be present in this collection. If the **bVerSxMacro** of the BrtBeginSXView is greater than or equal to 0x03, BrtBeginSXTDMP records MUST NOT be present in this collection.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxtdmp																															

csxtdmp (4 bytes): An unsigned integer that specifies the count of member properties in this pivot hierarchy. This value MUST be equal to the number of SXTDMP collections specifying member properties in this collection.

2.4.182 BrtBeginSXTH

This record specifies properties of a pivot hierarchy and specifies a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a pivot hierarchy.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F	G	H	I	J	reserved1																					
K	reserved2															irstCaption (variable)															
...																															

A - fOutlineMode (1 bit): A bit that specifies whether the pivot fields representing the levels of this pivot hierarchy have the **fOutline** field of the BrtBeginSxvd record set to 1 when the pivot fields are first created. See Subtotalling for more information.

B - fEnableMultiplePageItems (1 bit): A bit that specifies whether multiple OLAP members can be selected when the pivot hierarchy is on the page axis of the PivotTable view.

C - fSubtotalAtTop (1 bit): A bit that specifies whether the pivot fields representing the levels of this pivot hierarchy have the **fSubtotalAtTop** field of the BrtBeginSxvd record set to 1 when the pivot fields are first created. See Subtotalling for more information.

D - fDontShowFList (1 bit): A bit that specifies whether this pivot hierarchy is hidden in the pivot field list, a mechanism for adding and removing pivot fields and pivot hierarchies from the PivotTable view.

E - fDragToRow (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the row axis of the PivotTable view.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the row axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the row axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field on the BrtBeginPCDHierarchy record of the associated cache hierarchy MUST be 0.

F - fDragToColumn (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the column axis of the PivotTable view.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the column axis of the PivotTable

	view.
1	Specifies that this pivot hierarchy can be placed on the column axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field on the BrtBeginPCDHierarchy record of the associated cache hierarchy MUST be 0.

G - fDragToPage (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the page axis of the PivotTable view.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the page axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the page axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field on the BrtBeginPCDHierarchy record of the associated cache hierarchy MUST be 0.

H - fDragToHide (1 bit): A bit that specifies whether this pivot hierarchy can be removed from the PivotTable view.

I - fDragToData (1 bit): A bit that specifies whether this pivot hierarchy can be placed on the data axis of the PivotTable view.

Value	Meaning
0	Specifies that this pivot hierarchy cannot be placed on the data axis of the PivotTable view.
1	Specifies that this pivot hierarchy can be placed on the data axis of the PivotTable view. If this field is equal to 1, the **fMeasure** field on the BrtBeginPCDHierarchy record of the associated cache hierarchy MUST be 1.

J - fFilterInclusive (1 bit): A bit that specifies whether manual filters applied to this pivot hierarchy are inclusive or exclusive. MUST be a value from the following table:

Value	Meaning
0	OLAP members specified in the manual filter are excluded from the PivotTable view along with their descendants.
1	OLAP members specified in the manual filter are included from the PivotTable view along with their ascendants and descendants.

For more information, see OLAP Manual Filters.

reserved1 (22 bits): MUST be zero, and MUST be ignored.

K - fLoadCap (1 bit): A bit that specifies whether an **irstCaption** is included in this record.

reserved2 (15 bits): MUST be zero, and MUST be ignored.

irstCaption (variable): An XLWideString that specifies the user-defined caption of this pivot hierarchy. MUST exist if **fLoadCap** is 1. MUST NOT exist if **fLoadCap** is 0. MUST be less than or equal to 32767 characters in length.

2.4.183 BrtBeginSXTHItem

This record specifies the MDX unique name of an OLAP member to be included or excluded in PivotTable view manual filtering and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
irstItem (variable)																															
...																															

irstItem (variable): An XLWideString that specifies the MDX unique name of an OLAP member to be included or excluded in PivotTable view OLAP manual filters.

2.4.184 BrtBeginSXTHItems

This record specifies the count of OLAP members that are included or excluded in PivotTable manual filtering and specifies the beginning of a collection of records as specified by the PivotTable part ABNF. The collection of records specifies the OLAP members that are included or excluded in PivotTable manual filtering.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csz																															
iSXTL																															

csz (4 bytes): An unsigned integer that specifies the count of MDX unique names of OLAP members that are included or excluded in PivotTable OLAP manual filters. MUST be equal to the number of BrtBeginSXTHItem records in this collection.

iSXTL (4 bytes): A signed integer that specifies the zero-based ordinal of the level associated with the BrtBeginSXTHItem records in this collection. A value of -1 specifies that the BrtBeginSXTHItem records in this collection can be from any pivot field of the corresponding pivot hierarchy as specified by the preceding BrtBeginSXTH collection.

If the data functionality level of this PivotTable view is greater than or equal to 3, or this pivot hierarchy is not on the page axis, this value MUST be greater than or equal to 0. If the data functionality level of this PivotTable view is less than 3 and this pivot hierarchy is on the page axis, this value MUST be equal to -1.

2.4.185 BrtBeginSXTHs

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies pivot hierarchies of the PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxth																															

csxth (4 bytes): An unsigned integer that specifies the number of BrtBeginSXTH records within this collection. This value MUST equal the number of BrtBeginSXTH records. This value MUST equal the number of BrtBeginPCDHierarchy records plus the number of BrtBeginPCDKPI records of the associated PivotCache.

2.4.186 BrtBeginSXVD

This record specifies pivot field properties and specifies the beginning of a collection of records as defined in the PivotTable part ABNF. This collection of records specifies a pivot field on the PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sxaxis								A	B	C	D	E	F	G	H	I	J	K	L	M				N	O	P	Q	R	S	T	U
ifmt																															
V	W	X	Y	Z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	unused						
citmAutoShow																															
isxdiAutoShow																															
irstName (variable)																															
...																															
irstSub (variable)																															
...																															
irstMemberPropertyCaption (variable)																															
...																															

sxaxis (1 byte): An SXAxis that specifies the axis or axes this field is present on. For more details, see PivotTable Axes.

If **sxaxis.sxaxisData** is equal to 1, then there MUST be a BrtBeginSXDI record in the same PivotTable view as this record with an **isxvdData** field that references this record. If **sxaxis.sxaxisData** is equal to 1 and this is an OLAP PivotTable then the BrtBeginPCDHierarchy record associated with this record MUST have its **fMeasure** field equal to 1.

If **sxaxis.sxaxisRw** is equal to 1 and this is a non-OLAP PivotTable then the BrtBeginISXVDRws collection in the same PivotTable view as this record MUST have a value within its **rgisxvdrws**

field that references this record. If **sxaxis.sxAxisRw** is equal to 1, **sxaxis.sxaxisCol** and **sxaxis.sxaxisPage** MUST be equal to 0. If **sxaxis.sxAxisRw** is equal to 1 and this is an OLAP PivotTable then the BrtBeginPCDHierarchy record associated with this record MUST have its **fMeasure** field equal to 0.

If **sxaxis.sxaxisCol** is equal to 1 and this is a non-OLAP PivotTable then the BrtBeginISXVDCols in the same PivotTable view as this record MUST have a value within its **rgisxvdcols** that references this record. If **sxaxis.sxAxisCol** is equal to 1, **sxaxis.sxaxisRw** and **sxaxis.sxaxisPage** MUST be equal to 0. If **sxaxis.sxAxisCol** is equal to 1 and this is an OLAP PivotTable then the BrtBeginPCDHierarchy record associated with this record MUST have its **fMeasure** field equal to 0.

If **sxaxis.sxaxisPage** is equal to 1, then there MUST be a BrtBeginSXPI record in the same PivotTable view as this record with an **isxvd** that references this record. If **sxaxis.sxAxisPage** is equal to 1, **sxaxis.sxaxisRw** and **sxaxis.sxaxisCol** MUST be equal to 0. If **sxaxis.sxAxisPage** is equal to 1 and this is an OLAP PivotTable then the BrtBeginPCDHierarchy record associated with this record MUST have its **fMeasure** field equal to 0.

A - fDefault (1 bit): A bit that specifies whether the default subtotal is displayed for this pivot field. The default subtotal is separately determined for each data item (as specified by the **iiftab** field in the BrtBeginSXDI record) in this PivotTable view. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITDEFAULT MUST exist within this collection. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITDEFAULT MUST NOT exist within this collection. For more information, see subtotaling.

B - fSum (1 bit): A bit that specifies whether subtotals using the sum aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITSUM MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITSUM MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

C - fCounta (1 bit): A bit that specifies whether subtotals using the count aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITCOUNTA MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITCOUNTA MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

D - fAverage (1 bit): A bit that specifies whether subtotals using the average aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITAVG MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITAVG MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

E - fMax (1 bit): A bit that specifies whether subtotals using the maximum aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITMAX MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITMAX MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

F - fMin (1 bit): A bit that specifies whether subtotals using the minimum aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITMIN MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITMIN MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

G - fProduct (1 bit): A bit that specifies whether subtotals using the product aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITPRODUCT MUST exist within this collection. If this value is equal to 1, **fDefault** MUST

be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITPRODUCT MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

H - fCount (1 bit): A bit that specifies whether subtotals using the count number aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITCOUNT MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITCOUNT MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

I - fStdev (1 bit): A bit that specifies whether subtotals using the standard deviation aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITSTDDEV MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITSTDDEV MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

J - fStdevp (1 bit): A bit that specifies whether subtotals using the standard deviation population aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITSTDDEVP MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITSTDDEVP MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

K - fVar (1 bit): A bit that specifies whether subtotals using the variance aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITVAR MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITVAR MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

L - fVarp (1 bit): A bit that specifies whether subtotals using the variance population aggregate function are displayed for this pivot field. If this value is equal to 1, a BrtBeginSXVI with an **itmType** field equal to PITVARP MUST exist within this collection. If this value is equal to 1, **fDefault** MUST be 0. If this value is equal to 0, a BrtBeginSXVI with an **itmType** field equal to PITVARP MUST NOT exist within this collection. MUST be 0 for OLAP PivotTables. For more information, see subtotaling.

M - reserved1 (4 bits): MUST be zero, and MUST be ignored.

N - fDrilledLevel (1 bit): A bit that specifies whether all pivot items in this pivot field are expanded. This value MUST be 0 and MUST be ignored for non-OLAP PivotTables. For more details, see collapsing.

O - fHideDD (1 bit): A bit that specifies whether drop down buttons (mechanisms for applying manual filters, advanced filters, and sorting options) are shown in cells where pivot field labels are displayed (for more details, see PivotTable layout).

P - fHiddenLvl (1 bit): A bit that specifies whether this pivot field is not shown in the PivotTable view. This value MUST be equal to 0 for non-OLAP PivotTables.

Q - fUseMemPropCaption (1 bit): A bit that specifies whether this record contains an **irstMemberPropertyCaption** field. This value MUST be equal to 0 for non-OLAP PivotTables. This value MUST be equal to 0 if the **bVerSxMacro** field on the immediately preceding BrtBeginSXView record is less than 3.

R - fCompact (1 bit): A bit that specifies whether this pivot field is in compact axis mode. For more details, see PivotTable layout.

S - fDisplayName (1 bit): A bit that specifies whether the **irstName** field exists.

T - fDisplaySub (1 bit): A bit that specifies whether the **irstSub** field exists.

U - fTensorSort (1 bit): A bit that specifies whether pivot items of this pivot field are displayed in the order retrieved from the source data. This value MUST be equal to 0 for non-OLAP PivotTables. For more details, see pivot field sorting.

ifmt (4 bytes): A PivotNumFmtExt that specifies the number format applied to the pivot items in this pivot field.

V - fDragToRow (1 bit): A bit that specifies whether this pivot field can be placed on the row axis. This value MUST be ignored for an OLAP PivotTable view. MUST be a value from the following table:

Value	Meaning
0x0	Specifies that the user will be prevented from placing this pivot field on the row axis.
0x1	Specifies that the user will not be prevented from placing this pivot field on the row axis.

W - fDragToColumn (1 bit): A bit that specifies whether this pivot field can be placed on the column axis. This value MUST be ignored for an OLAP PivotTable view. MUST be a value from the following table:

Value	Meaning
0x0	Specifies that the user will be prevented from placing this pivot field on the column axis.
0x1	Specifies that the user will not be prevented from placing this pivot field on the column axis.

X - fDragToPage (1 bit): A bit that specifies whether this pivot field can be placed on the page axis. This value MUST be ignored for an OLAP PivotTable view. MUST be a value from the following table:

Value	Meaning
0x0	Specifies that the user will be prevented from placing this pivot field on the page axis.
0x1	Specifies that the user will not be prevented from placing this pivot field on the page axis.

Y - fDragToHide (1 bit): A bit that specifies whether this pivot field can be removed from the PivotTable view. This value MUST be ignored for an OLAP PivotTable view. MUST be a value from the following table:

Value	Meaning
0x0	Specifies that the user will be prevented from removing this pivot field from the PivotTable view.
0x1	Specifies that the user will not be prevented from removing this pivot field from the PivotTable view.

Z - fDragToData (1 bit): A bit that specifies whether this pivot field can be placed on the data axis. MUST be ignored for an OLAP PivotTable view. MUST be a value from the following table:

Value	Meaning
0x0	Specifies that the user will be prevented from placing this pivot field on the data axis.
0x1	Specifies that the user will not be prevented from placing this pivot field on the data axis.

a - fShowAllItems (1 bit): A bit that specifies whether to show all pivot items for this pivot field, including pivot items that do not currently exist in the source data. This value MUST be 0 for an OLAP PivotTable view. For more information, see nesting. MUST be a value from the following table:

Value	Meaning
0x0	Specifies that all pivot items are not displayed.
0x1	Specifies that all pivot items are displayed.

b - fOutline (1 bit): A bit that specifies whether this pivot field is in outline form. For more details, see PivotTable layout. For more details, see subtotaling.

c - fInsertBlankRow (1 bit): A bit that specifies whether to insert a blank row after each pivot item.

d - fSubtotalAtTop (1 bit): A bit that specifies whether subtotals are displayed at the top of the group when **fOutline** is equal to 1. For more details, see PivotTable layout and subtotaling.

e - fServerBased (1 bit): A bit that specifies whether this pivot field is server-based when on the page axis. For more details, see Source Data.

MUST be 1 if and only if the **fServerBased** field of the BrtBeginPCDField that specifies the cache field associated with this pivot field is 1. If this value is 1, the BrtBeginPivotCacheDef collection that specifies the PivotCache associated with this PivotTable MUST have a BrtBeginPCDSource record with a **isrctype** field equal to 1. This value MUST be 0 for PivotTables not based on ODBC source data.

f - reserved2 (1 bit): MUST be zero, and MUST be ignored.

g - fPageBreaksBetweenItems (1 bit): A bit that specifies whether a page break (2) will be inserted after each pivot item when the PivotTable is printed.

h - fAutoSort (1 bit): A bit that specifies whether autosort (for definition see PivotTable field sorting) is applied to this pivot field.

i - fAscendSort (1 bit): A bit that specifies whether an autosort (for definition see PivotTable field sorting) applied to this pivot field will sort in ascending order. MUST be a value from the following table:

Value	Meaning
0x0	Sort in ascending order.
0x1	Sort in descending order.

j - fAutoShow (1 bit): A bit that specifies whether an AutoShow filter is applied to this pivot field. For more details, see Simple Criteria Filters.

k - fTopAutoShow (1 bit): A bit that specifies whether an AutoShow filter applied to this pivot field will show the top-ranked or bottom-ranked values. For more details, see Simple Criteria Filters. MUST be a value from the following table:

Value	Meaning
0x0	An AutoShow filter applied to this pivot field will show the bottom-ranked values.
0x1	An AutoShow filter applied to this pivot field will show the top-ranked values.

l - fHideNewItems (1 bit): A bit that specifies whether new pivot items that appear after a refresh are hidden by default. This value MUST be equal to 0 for non-OLAP PivotTables.

Value	Meaning
0x0	New pivot items will be shown by default.
0x1	New pivot items will be hidden by default.

m - fHasAdvFilter (1 bit): A bit that specifies whether this pivot field has a value filter applied to it.

n - fFilterInclusive (1 bit): A bit that specifies manual filter behavior. For non-OLAP PivotTables, this bit specifies whether new items will be excluded in manual filtering by default. For OLAP PivotTables, this bit specifies whether a manual filter applied to this pivot field specifies pivot items that are included or excluded. If this pivot field is associated with a pivot hierarchy, this value MUST equal the **fFilterInclusive** field on the BrtBeginSXTH record of the pivot hierarchy this pivot field is associated with. For OLAP PivotTables, see OLAP Manual Filters for more details.

o - fEnableMultiplePageItems (1 bit): A bit that specifies whether this pivot field can have multiple pivot items selected when it is on the page axis. MUST be 0 and MUST be ignored for OLAP PivotTables.

p - fNotAutoSortDft (1 bit): A bit that specifies whether a sort operation that will be applied to this pivot field is an autosort operation or a simple data sort.

Value	Meaning
0	A sort operation applied to this pivot field is an autosort. If this value is equal to 0, **fAutoSort** MUST be equal to 0.
1	A sort operation applied to this pivot field is a simple data sort that will only be applied once and not an autosort.

q - fMemPropDisplayInReport (1 bit): A bit that specifies whether to show member property values in the OLAP PivotTable view. The member property is only displayed if the pivot hierarchy is on the row axis as specified by **sxaxis.sxaxisRw** or on the column axis as specified by **sxaxis.sxaxisCol**. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is 1, the **fOlapMemPropField** field on the BrtBeginPCDField record of the cache field associated with this pivot field MUST be 1.

r - fMemPropDisplayInTip (1 bit): A bit that specifies whether to show member property values in a **ToolTip**. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is 1, the

fOlapMemPropField field on the BrtBeginPCDField record of the cache field associated with this pivot field MUST be 1. This value MUST be equal to 0 if the **bVerSxMacro** field on the immediately preceding BrtBeginSXView record is less than 3.

s - fMemPropDisplayInCaption (1 bit): A bit that specifies whether to show member property captions as specified by the **irstMemberPropertyCaption** field instead of the pivot item captions. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is 1, the **fOlapMemPropField** field on the BrtBeginPCDField record of the cache field associated with this pivot field MUST be 1. This value MUST be equal to 0 if the **bVerSxMacro** field on the associated BrtBeginSXView is less than 3.

t - fItemsDrilledByDefault (1 bit): A bit that specifies whether the attribute hierarchy in an OLAP PivotTable is expanded by default. This value MUST be equal to 0 for non-OLAP PivotTables. If this value is equal to 1, the **fAttributeHierarchy** field on the BrtBeginPCDHierarchy record of the cache hierarchy associated with the pivot hierarchy this pivot field is associated with MUST be equal to 1. For more information, see collapsing.

unused (7 bits): Undefined, and MUST be ignored.

citmAutoShow (4 bytes): A signed integer that specifies the number of items to show when the **fAutoShow** field is equal to 1. If the **bVerSxMacro** field on the associated BrtBeginSXView record is less than 3, this value MUST be greater than or equal to 1 and less than or equal to 255. If the **bVerSxMacro** field on the associated BrtBeginSXView record is greater than or equal to 3, this value MUST be greater than or equal to 1.

isxdiAutoShow (4 bytes): An ISXDI that specifies the data item that AutoShow ranks by when **fAutoShow** is equal to 1. If **fAutoShow** is equal to 1, this value MUST NOT equal -1.

irstName (variable): An XLWideString that specifies the name of this pivot field.

If **fDisplayName** is equal to 1, **irstName** MUST be present. If **fDisplayName** is equal to 0, **irstName** MUST NOT be present. If present MUST be greater than or equal to 1 character in length. If the **bVerSxMacro** on the BrtBeginSXView record associated with this record is less than 3, **irstName** MUST be less than or equal to 255 characters in length. Otherwise, **irstName** MUST be less than or equal to 32767 characters in length. If this is a non-OLAP PivotTable, this **irstName** MUST NOT equal the **irstName** of another BrtBeginSXVD associated with the same BrtBeginSXView that this record is associated with.

irstSub (variable): An XLWideString that specifies the custom text that is displayed for the subtotals label. A "?" character within the string specifies that the name of the pivot item will be inserted in that position when the string is displayed.

If **fDisplaySub** is equal to 1, **irstSub** MUST be present. If **fDisplaySub** is equal to 0, **irstSub** MUST NOT be present. If present, MUST be greater than or equal to 1 character in length. If the **bVerSxMacro** on the BrtBeginSXView associated with this record is less than 3, **irstSub** MUST be less than or equal to 255 characters in length. Otherwise, **irstSub** MUST be less than or equal to 32767 characters in length.

irstMemberPropertyCaption (variable): An XLWideString that specifies the MDX unique name of the member property used as a caption for the pivot field and pivot items.

If **fUseMemPropCaption** is equal to 1, **irstMemberPropertyCaption** MUST be present. If **fUseMemPropCaption** is equal to 0, **irstMemberPropertyCaption** MUST NOT be present. If present, **irstMemberPropertyCaption** MUST be less than or equal to 32767 characters in length. If present, **irstMemberPropertyCaption** MUST be greater than 0 characters in length.

2.4.187 BrtBeginSXVDs

This record specifies the beginning of a collection of records as specified by the PivotTable part ABNF. The collection of records specifies the pivot fields of the PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxvds																															

csxvds (4 bytes): An unsigned integer that specifies the number of pivot fields of the PivotTable view. This value MUST equal the number of BrtBeginSXVD records in this collection. If this PivotTable is an OLAP PivotTable, this value MUST be less than or equal to the number of BrtBeginPCDField records in the associated PivotCache. If this PivotTable is not an OLAP PivotTable, this value MUST be equal to the number of BrtBeginPCDField records in the associated PivotCache.

2.4.188 BrtBeginSXVI

This record specifies a pivot item and specifies the beginning of an empty collection of records as defined by the PivotTable part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
itmtype								A	B	C	D	E	F	G	H	I	reserved							iCache							
...																								displayName (variable)							
...																															

itmtype (1 byte): A **PivotItemType** that specifies the type of this pivot item. This value MUST NOT equal PITGRAND or PITBLANK. All BrtBeginSXVI records that have a value of PITDATA for the **itmtype** field MUST appear preceding all other BrtBeginSXVI records in the PivotTable part ABNF.

A - fHidden (1 bit): A bit that specifies whether this pivot item is hidden by a manual filter. If this record applies to an OLAP PivotTable view or the value of **itmtype** is not PITDATA, this value MUST be 0.

B - fHideDetail (1 bit): A bit that specifies whether this pivot item is collapsed. This value MUST be 0 for OLAP PivotTable views. For more details, see collapsing.

C - fFormula (1 bit): A bit that specifies whether the cache item associated with this pivot item is a calculated item. If this record applies to an OLAP PivotTable view or the value of the **itmtype** field is not PITDATA, this value MUST be 0.

D - fMissing (1 bit): A bit that specifies whether this pivot item is missing from the source data. If this record applies to an OLAP PivotTable view or the value of **itmtype** is not PITDATA, this value MUST be 0.

E - fDisplayName (1 bit): A bit that specifies whether this pivot item has a user-defined caption.

F - fDrilledMember (1 bit): A bit that specifies whether this pivot item is expanded. This value MUST be 0 for non-OLAP PivotTable views, or if the **fAttributeHierarchy** field in the

BrtBeginPCDHierarchy record in the associated cache hierarchy, as specified by pivot hierarchies, has a value of 1. If the value of **itmtype** is not PITDATA, this value MUST be 0. For more details, see collapsing.

G - fHasChildrenEst (1 bit): A bit that specifies whether the pivot item can have child objects. If this record applies to a non-OLAP PivotTable view, this value MUST be 0.

H - fCollapsedMember (1 bit): A bit that specifies whether this pivot item is collapsed when the preceding PivotTable view field is on the row axis or column axis. The value MUST be 0 for non-OLAP PivotTable views. This value MUST be 0 unless the **fAttributeHierarchy** field in the BrtBeginPCDHierarchy record in the associated cache hierarchy, as specified by pivot hierarchies, has a value of 1. This field MUST be ignored, unless there is a following pivot field for which the **fAttributeHierarchy** field in the BrtBeginPCDHierarchy record in the associated cache hierarchy, as specified by cache hierarchies, also has a value of 1. For more details, see collapsing.

I - fOlapFilterSelected (1 bit): A bit that specifies whether this pivot item is included in the manual filter applied to the corresponding pivot field specified by the preceding BrtBeginSXVD record. This value MUST be 0 for non-OLAP PivotTable views. For more details, see OLAP manual filter. The meaning of this value is specified in the following table:

Value of **fFilterInclusive** field of BrtBeginSXVD record	Value of **fOlapFilterSelected**	Meaning
1	1	This pivot item is included in the manual filter applied to the corresponding pivot field specified by the preceding BrtBeginSXVD record, and will be displayed in the corresponding PivotTable view specified by the preceding BrtBeginSXView record.
1	0	This pivot item is not included in the manual filter applied to the corresponding pivot field specified by the preceding BrtBeginSXVD record, and will not be displayed in the corresponding PivotTable view specified by the preceding BrtBeginSXView record.
0	1	This pivot item is excluded from the manual filter applied to the corresponding pivot field specified by the preceding BrtBeginSXVD record, and will not be displayed in the corresponding PivotTable view specified by the preceding BrtBeginSXView record.
0	0	This pivot item is not excluded from the manual filter applied to the corresponding pivot field specified by the preceding BrtBeginSXVD record, and will be displayed in the corresponding PivotTable view specified by the preceding BrtBeginSXView record.

reserved (7 bits): MUST be 0 and MUST be ignored.

iCache (4 bytes): A signed integer that specifies a reference to a cache item. If **itmtype** is not PITDATA, a reference to a cache item is not specified and this value MUST be -1. Otherwise, this value MUST be a cache item index, as specified by cache items, in the cache field that is associated with this pivot field.

displayName (variable): An XLWideString that specifies the user-defined caption of this pivot item. This field exists only if the value of the **fDisplayName** field is 1. If the **bVerSxMacro** field of the BrtBeginSXView record for this PivotTable view is less than or equal to 2, the length MUST be less than 256 characters. Otherwise, the length MUST be less than 32768 characters.

2.4.189 BrtBeginSXView

This record specifies PivotTable view properties and specifies the beginning of a collection of records as defined in the PivotTable part ABNF. The collection of records specifies a PivotTable view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
bVerSxMacro								A	B	C	D	E	F	G	H	I	J			K	L	M	N	cIndentInc							O
P	Q	R	S	T	U	V	W	X	Y	Z	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u
v	w	x	y	z	α	β	γ	δ	ε	ζ	η	θ	ι	κ	reserved5																
sxaxis4Data								cWrapPage								bVerSxLastUpdated								bVerSxUpdateableMin							
ipos4Data																															
itblAutoFmt																reserved6															
dwCrtFmtId																															
idCache																															
irstName (variable)																															
...																															
irstData (variable)																															
...																															
irstGrand (variable)																															
...																															
irstErrorString (variable)																															
...																															

irstNullString (variable)
...
irstPageFieldStyle (variable)
...
irstTableStyle (variable)
...
irstVacateStyle (variable)
...
irstTag (variable)
...
irstColHdrName (variable)
...
irstRwHdrName (variable)
...

bVerSxMacro (1 byte): A DataFunctionalityLevel that specifies the data functionality level that this PivotTable view was created with.

A - fDisplayImmediateItems (1 bit): A bit that specifies whether pivot item labels will be displayed in the row area and the column area when there are no data items in the PivotTable view.

B - fEnableDataEd (1 bit): A bit that specifies whether cells displaying values for data items can be edited.

C - fDisableFList (1 bit): A bit that specifies whether the pivot field list, a mechanism for adding and removing pivot fields from the PivotTable view, will not be displayed.

D - fReenterOnLoadOnce (1 bit): A bit that specifies whether the PivotTable view will be automatically updated on load.

E - fNotViewCalculatedMembers (1 bit): A bit that specifies whether OLAP calculated members will not be displayed in the PivotTable view. This value MUST be ignored for non-OLAP PivotTables.

F - fNotVisualTotals (1 bit): A bit that specifies whether hidden pivot items will be included when calculating totals. This value MUST be ignored for non-OLAP PivotTable view.

G - fPageMultipleItemLabel (1 bit): A bit that specifies whether a pivot field on the page axis with multiple pivot items selected displays "(multiple items)" instead of "All". This value MUST be ignored for OLAP PivotTable view.

H - reserved1 (1 bit): MUST be zero and MUST be ignored.

I - fHideDDData (1 bit): A bit that specifies whether a drop-down button, a mechanism for removing data items from the PivotTable view, for the data field in the PivotTable view is hidden.

J - reserved2 (3 bits): MUST be zero and MUST be ignored.

K - fHideDrillIndicators (1 bit): A bit that specifies whether **expand/collapse buttons** are hidden.

L - fPrintDrillIndicators (1 bit): A bit that specifies whether expand/collapse buttons are printed.

M - fMemPropsInTips (1 bit): A bit that specifies whether member property information is shown in PivotTable view ToolTips.

N - fNoPivotTips (1 bit): A bit that specifies whether ToolTips are not displayed for cells associated with the PivotTable view.

cIndentInc (7 bits): An unsigned integer that specifies the indentation increment that is used for pivot fields in compact axis mode. The increment is one space greater than the number specified by this field. A value of 127 specifies that indentation is not used. For more details, see PivotTable Layout.

O - fNoHeaders (1 bit): A bit that specifies whether data field captions and pivot field captions on the row axis and the column axis in the PivotTable view are not displayed.

P - fNoStencil (1 bit): A bit that specifies how **drop zones** are displayed in the PivotTable view. MUST be one of the following values:

Value	Meaning
0x0	Large drop zones are displayed when there are no data items in the PivotTable view. Small drop zones are not displayed.
0x1	Small drop zones are displayed. Large drop zones are not displayed.

Q - fHideTotAnnotation (1 bit): A bit that specifies whether an asterisk is not displayed next to the caption for subtotals and grand totals when the **fNotVisualTotals** field is equal to 1. This value MUST be ignored for non-OLAP PivotTable view.

R - fIncludeEmptyRw (1 bit): A bit that specifies whether to include rows with no data in the source data in the PivotTable view. This value MUST be ignored for non-OLAP PivotTable view.

S - fIncludeEmptyCol (1 bit): A bit that specifies whether to include columns with no data in the source data in the PivotTable view. This value MUST be ignored for non-OLAP PivotTable view.

T - fEnableWizard (1 bit): A bit that specifies whether the PivotTable wizard is available.

U - fEnableDrilldown (1 bit): A bit that specifies whether details can be shown for a cell that displays the value for a data item.

V - fEnableFieldDialog (1 bit): A bit that specifies whether pivot field properties can be displayed.

W - fPreserveFormatting (1 bit): A bit that specifies whether formatting applied by the user to PivotTable view cells is preserved on refresh.

X - fAutoFormat (1 bit): A bit that specifies whether an AutoFormat has been applied to the PivotTable view.

Y - fDisplayErrorString (1 bit): A bit that specifies what is displayed in cells that contain values for data items when an error occurs. MUST be a value from the following table:

Value	Meaning
0x0	If there are errors, error strings to display in the cells are determined by the application.
0x1	If there are errors, the string as specified by the **irstErrorString** field is displayed in the cells.

Z - fDisplayNullString (1 bit): A bit that specifies what is displayed in cells that contain values for data items that are empty. MUST be a value from the following table:

Value	Meaning
0x0	If a cell is empty, nothing is displayed.
0x1	If a cell is empty, the string as specified by the **irstNullString** field is displayed in the cell.

a - fAcrossPageLay (1 bit): A bit that specifies how pivot fields are laid out in the sheet when there are multiple pivot fields on the page axis. This value MUST be equal to one of the following:

Value	Meaning
0x0	Pivot fields will be displayed down, then over
0x1	Pivot fields will be displayed over, then down

b - fSubtotalHiddenPageItems (1 bit): A bit that specifies page-filtering behavior. See Non-OLAP Page Filtering for details.

If this is an OLAP PivotTable view, this value SHOULD <19> be equal to 1. If this is not an OLAP PivotTable view and the **bVerSxMacro** field is greater than or equal to 3, this value MUST be equal to 0.

c - fRwGrand (1 bit): A bit that specifies whether grand totals are displayed for the column axis.

d - fColGrand (1 bit): A bit that specifies whether grand totals are displayed for the row axis.

e - fPrintTitles (1 bit): A bit that specifies whether print titles are set to parts of the row area and column area when the PivotTable view is recalculated.

f - unused (1 bit): Undefined and MUST be ignored.

g - fRepeatItemsOnEachPrintedPage (1 bit): A bit that specifies whether pivot item captions on the row area are repeated on each printed page for pivot fields in tabular form.

h - fMergeLabels (1 bit): A bit that specifies whether pivot item captions on the row area and column area that span multiple cells are merged into a single cell.

i - fDisplayData (1 bit): A bit that specifies whether there is an **irstData** field after the fixed part of this record. MUST be equal to 1.

j - fDisplayGrand (1 bit): A bit that specifies whether there is an **irstGrand** field after the fixed part of this record.

k - fDisplayPageFieldStyle (1 bit): A bit that specifies whether there is an **irstPageFieldStyle** field after the fixed part of this record.

l - fDisplayTableStyle (1 bit): A bit that specifies whether there is an **irstTableStyle** field after the fixed part of this record.

m - fDisplayVacateStyle (1 bit): A bit that specifies whether there is an **irstVacateStyle** field after the fixed part of this record.

n - ibitAtrNum (1 bit): A bit that specifies whether AutoFormat number format properties are applied.

o - ibitAtrFnt (1 bit): A bit that specifies whether AutoFormat font format properties are applied.

p - ibitAtrAlc (1 bit): A bit that specifies whether AutoFormat alignment format properties are applied.

q - ibitAtrBdr (1 bit): A bit that specifies whether AutoFormat border format properties are applied.

r - ibitAtrPat (1 bit): A bit that specifies whether AutoFormat pattern format properties are applied.

s - ibitAtrProt (1 bit): A bit that specifies whether the AutoFormat style is protected.

t - fDisplayTag (1 bit): A bit that specifies whether there is an **irstTag** field after the fixed part of this record.

u - reserved3 (1 bit): MUST be zero, and MUST be ignored.

v - fDefaultCompact (1 bit): A bit that specifies whether new pivot fields are created in compact axis mode. For more details, see PivotTable Layout.

w - fDefaultOutline (1 bit): A bit that specifies whether new pivot fields are created in outline form. For more information, see Subtotalling.

x - fOutlineData (1 bit): A bit that specifies whether the data field in the PivotTable view is displayed in outline form. For more details, see Subtotalling.

y - fCompactData (1 bit): A bit that specifies whether the data field in the PivotTable view is displayed in compact axis mode. For more details, see PivotTable Layout.

z - fNewDropZones (1 bit): A bit that specifies whether in-grid drop zones are disabled.

α - fPublished (1 bit): A bit that specifies whether this PivotTable view is included in the version of the workbook that is published to or rendered on a web or application server.

β - fEmptyDisplayErrorString (1 bit): A bit that specifies whether the **irstErrorString** field does not exist after the fixed part of this record.

γ - fEmptyDisplayNullString (1 bit): A bit that specifies whether the **irstNullString** field does not exist after the fixed part of this record.

δ - fTurnOffImmersive (1 bit): A bit that specifies whether the PivotTable contextual tab, a user interface for manipulating PivotTable options, is not displayed.

ε - fSingleFilterPerField (1 bit): A bit that specifies whether the pivot fields in the PivotTable view each can have only one filter. For more details, see Manual Filters and Advanced Filters. MUST be a value from the following table:

Value	Meaning
0x0	Each pivot field can have multiple filters applied to it.
0x1	Each pivot field can have only one filter applied to it.

ζ - fUseRwHdrName (1 bit): A bit that specifies whether there is an **irstRwHdrName** field after the fixed part of this record.

η - fUseColHdrName (1 bit): A bit that specifies whether there is an **irstColHdrName** field after the fixed part of this record.

θ - fNonDefaultSortInFlist (1 bit): A bit that specifies how pivot fields in this PivotTable are sorted in the pivot field list, a mechanism for adding and removing pivot fields from the PivotTable view. MUST be a value from the following table:

Value	Meaning
0x0	Pivot fields are displayed in source data order.
0x1	Pivot fields are displayed in ascending alphabetical order.

ι - reserved4 (1 bit): MUST be zero, and MUST be ignored.

κ - fDontUseCustomLists (1 bit): A bit that specifies whether **custom lists** are not used when sorting the pivot items in the PivotTable view.

reserved5 (17 bits): MUST be zero, and MUST be ignored.

sxaxis4Data (1 byte): An unsigned integer that specifies which PivotTable axis the data field appears on. MUST be one of the following values:

Value	Meaning
0x01	The data field appears on the row axis.
0x02	The data field appears on the column axis.

cWrapPage (1 byte): An unsigned integer that specifies the number of pivot fields on the page axis to display before starting another row or column, as specified by the **fAcrossPageLay** field. A value of 0 specifies that no wrapping will occur.

bVerSxLastUpdated (1 byte): A DataFunctionalityLevel that specifies the data functionality level that this PivotTable view was last updated with.

bVerSxUpdateableMin (1 byte): A DataFunctionalityLevel that specifies the lowest data functionality level the application is allowed to update this PivotTable view with.

ipos4Data (4 bytes): A signed integer that specifies the default position of the data field on the PivotTable axis specified by **sxaxis4Data**. A value of -1 specifies that the data field appears as

the last field on the axis. All other values specify a specific zero-based position on that axis. MUST be greater than or equal to -1.

itblAutoFmt (2 bytes): An AutoFormatID that specifies which AutoFormat will be applied.

reserved6 (2 bytes): MUST be zero, and MUST be ignored.

dwCrtFmtId (4 bytes): An unsigned integer that specifies the next available chart identifier to use when creating a PivotChart for this PivotTable.

idCache (4 bytes): An unsigned integer that specifies the PivotCache identifier of the PivotCache used by this PivotTable view. This value MUST be equal to the **idSx** field of a BrtBeginPivotCacheID record. For more details, see Relationship to PivotCache.

irstName (variable): An XLWideString that specifies the unique name for this PivotTable view. This string MUST be less than or equal to 255 characters in length. This string MUST NOT equal the **irstName** field on any other PivotTable view that exists on the same sheet.

irstData (variable): An XLWideString that specifies the caption of the data field in the PivotTable view. This caption is shown when the PivotTable view has two or more data items. If **fDisplayData** is equal to 1, this field MUST be present in this record. If **fDisplayData** is equal to 0, this field MUST NOT be present in this record. This string MUST be less than or equal to 255 characters in length.

irstGrand (variable): An XLWideString that specifies a user-defined caption to display for grand totals when the PivotTable is recalculated. This string MUST be less than or equal to 255 characters in length. If the **fDisplayGrand** field is equal to 1, this field MUST be present in this record. If **fDisplayGrand** is equal to 0, this field MUST NOT be present in this record.

irstErrorString (variable): An XLWideString that specifies the string to display in cells that contain values for data items when an error occurs. This string MUST be less than or equal to 255 characters in length. If **fEmptyDisplayErrorString** is equal to 0, this field MUST be present in this record. If **fEmptyDisplayErrorString** is equal to 1, this field MUST NOT be present in this record.

irstNullString (variable): An XLWideString that specifies the string to display in cells that contain values for data items that are empty. This string MUST be less than or equal to 255 characters in length. If **fEmptyDisplayNullString** is equal to 0, this field MUST be present in this record. If **fEmptyDisplayNullString** is equal to 1, this field MUST NOT be present in this record.

irstPageFieldStyle (variable): An XLWideString that specifies the cell style to apply to each cell that contains data for pivot fields on the page axis of the PivotTable view. The style is specified by the BrtStyle record that has an **stName** field equal to the value of this field. If **fDisplayPageFieldStyle** is 1, this field MUST be present in this record. If **fDisplayPageFieldStyle** is 0, this field MUST NOT be present in this record. This string MUST be less than or equal to 255 characters in length.

irstTableStyle (variable): A XLWideString that specifies the cell style to apply to this PivotTable view. The style is specified by the BrtStyle record that has an **stName** field equal to the value of this field. For more details, see Styles. If **fDisplayTableStyle** is equal to 1, this field MUST be present in the record. If **fDisplayTableStyle** is equal to 0, this field MUST NOT be present in the record.

irstVacateStyle (variable): An XLWideString that specifies the cell style to apply to the cells left blank when a PivotTable view shrinks during a refresh operation. The style is specified by the BrtStyle record that has an **stName** field equal to the value of this field. If **fDisplayVacateStyle** is equal to 1, this field MUST be present in the record. If **fDisplayVacateStyle** is equal to 0, this field MUST NOT be present in the record. This string MUST be less than or equal to 255 characters in length.

irstTag (variable): An XLWideString that specifies a user-defined string that is associated with this PivotTable view. This string MUST be less than or equal to 255 characters in length. If **fDisplayTag** is equal to 1, this field MUST be present in the record. If **fDisplayTag** is equal to 0, this field MUST NOT be present in the record.

irstColHdrName (variable): An XLWideString that specifies the user-defined string to display in the column header when one or more pivot fields in the PivotTable view are in compact axis mode. If this field is not present, an application specific string is used in the column header. For more details, see PivotTable Layout.

If **fUseRwHdrName** is equal to 1, this field MUST be present in the record. If **fUseRwHdrName** is equal to 0, this field MUST NOT be present in the record. If **bVerSxMacro** is less than 3, this string MUST be less than or equal to 255 characters in length. If **bVerSxMacro** is greater than or equal to 3, this string MUST be less than or equal to 32767 characters in length.

irstRwHdrName (variable): An XLWideString that specifies the user-defined string to display in the row header when one or more pivot fields in the PivotTable view are in compact axis mode. If this field is not present, an application-specific string is used in the row header. For more details, see PivotTable Layout.

If **fUseRwHdrName** is equal to 1, this field MUST be present in the record. If **fUseRwHdrName** is equal to 0, this field MUST NOT be present in the record. If **bVerSxMacro** is less than 3, this string MUST be less than or equal to 255 characters in length. If **bVerSxMacro** is greater than or equal to 3, this string MUST be less than or equal to 32767 characters in length.

2.4.190 BrtBeginSXVIs

This record specifies the beginning of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a collection of pivot items.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csxvis																															

csxvis (4 bytes): An unsigned integer that specifies the count of pivot items in this collection.

2.4.191 BrtBeginTableStyle

This record specifies a single user-defined table style and specifies the beginning of a collection of BrtTableStyleElement records as defined by the Styles part ABNF. The collection of BrtTableStyleElement records specifies a table style.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	reserved2													ctse															
...																strName (variable)															
...																															

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - fIsPivot (1 bit): A bit that specifies whether this table style is intended to be available for use with PivotTable.

C - fIsTable (1 bit): A bit that specifies whether this table style is intended to be available for use with tables.

reserved2 (13 bits): MUST be zero, and MUST be ignored.

ctse (4 bytes): An unsigned integer that specifies the number of BrtTableStyleElement records in this collection. This value MUST be less than or equal to 28.

strName (variable): An XLNullableWideString that specifies the name of this table style. The length of this string MUST be greater than 0 and MUST be less than 256 characters.

2.4.192 BrtBeginTableStyles

This record specifies properties of table styles and specifies the beginning of a collection of records as defined by the Styles part ABNF. The collection of records specifies the user-defined table styles for the workbook. This record also specifies the names of the default table styles to be assigned to new tables and PivotTables, and the count of table style records that follow.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cts																															
strDefList (variable)																															
...																															
strDefPivot (variable)																															
...																															

cts (4 bytes): An unsigned integer that specifies the number of BrtBeginTableStyle records in the collection.

strDefList (variable): An XLNullableWideString that specifies the name of the default table style to be assigned to new tables. The length of this string MUST be less than 256 characters.

strDefPivot (variable): An XLNullableWideString that specifies the name of the default table style to be assigned to new PivotTables. The length of this string MUST be less than 256 characters.

2.4.193 BrtBeginUserCsView

This record specifies settings of a custom view for a chart sheet. It also specifies the beginning of a collection of records as defined by the Chart Sheet part ABNF. This collection specifies additional custom view settings. There is a companying BrtUserBookView that specifies the custom view settings that apply to a whole workbook. The set of this record and the companying BrtUserBookView record share the same GUID.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
guid (16 bytes)																															
...																															
iTabId																															
dwScale																															
A		B	reserved																												

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies the unique identifier of a BrtUserBookView record in the workbook part. The referenced BrtUserBookView specifies the custom workbook view that this custom view is associated with.

iTabId (4 bytes): An unsigned integer that specifies the active sheet in this view. MUST correspond to an existing BrtBundleSh.**itabid**.

dwScale (4 bytes): An unsigned integer that is a percentage value that specifies the zoom level of the chart sheet displayed in the view. MUST be greater than or equal to 10 and less than or equal to 400.

A - hsState (2 bits): An ST_SheetState that specifies the visibility state of the chart sheet displayed in the view.

B - fZoomToFit (1 bit): A bit that specifies that the chart sheet scales to fill the entire window displaying this view.

reserved (29 bits): MUST be zero and MUST be ignored.

2.4.194 BrtBeginUserCsViews

This record specifies the beginning of a collection of records as defined by the Chart Sheet part ABNF. The collection of records specifies custom view settings for chart sheets.

2.4.195 BrtBeginUsers

This record specifies the beginning of a collection of BrtUsr records as defined by the Revision Log part ABNF and User Names part ABNF. The collection of BrtUsr records specifies properties for users editing a shared workbook. The count of BrtUsr records following this record is specified by the BrtCUsr record.

2.4.196 BrtBeginUserShView

This record specifies custom view settings for a sheet. It also specifies the beginning of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. This collection specifies additional custom view settings. There is a companying

BrtUserBookView that specifies the custom view settings that apply to a whole workbook. The set of this record and the companying BrtUserBookView record share the same GUID.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
guid (16 bytes)																															
...																															
iTabId																															
dwScale																															
icv																															
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	a	b	c	d		
rfxTopLeft (16 bytes)																															
...																															

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies the unique identifier of a BrtUserBookView record in the workbook part. The referenced BrtUserBookView specifies the custom workbook view that this custom view is associated with.

iTabId (4 bytes): An unsigned integer that specifies the active sheet in this view. MUST equal the value of the **iTabID** field in a BrtBundleSh record. MUST be greater than or equal to 1 and less than or equal to 65535.

dwScale (4 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet displayed in the view. If the sheet is a **dialog sheet**, MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the sheet is not a dialog sheet, MUST be greater than or equal to 10 and less than or equal to 400.

icv (4 bytes): An Icv that specifies the color of the **gridlines** displayed in the view. MUST be less than or equal to 64.

A - fShowBrks (1 bit): A bit that specifies whether page breaks (2) are displayed in the view.

B - fDspFmlaSv (1 bit): A bit that specifies whether formulas are displayed in the view. MUST be 0 for dialog sheets.

C - fDspGridSv (1 bit): A bit that specifies whether gridlines are displayed in the view.

D - fDspRwColSv (1 bit): A bit that specifies whether row headings and column headings are displayed in the view. MUST be 0 for dialog sheets.

E - fDspGutsSv (1 bit): A bit that specifies whether **outline symbols** are displayed in the view. MUST be 0 for dialog sheets. MUST be 1 for macro sheets.

F - fDspZerosSv (1 bit): A bit that specifies how zero values are displayed in cells in the view. MUST be 0 for dialog sheets.

Value	Meaning
0	Cells with a zero value appear blank.
1	Cells with a zero value display the number 0 (zero).

G - fHorizontal (1 bit): A bit that specifies whether printed pages are centered horizontally.

H - fVertical (1 bit): A bit that specifies whether printed pages are centered vertically.

I - fPrintRwCol (1 bit): A bit that specifies whether row headings and column headings are printed. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

J - fPrintGrid (1 bit): A bit that specifies whether gridlines are printed. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

K - fFitToPage (1 bit): A bit that specifies whether **fit to page** is applied to printed pages. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

L - fPrintArea (1 bit): A bit that specifies whether there is a **print area** applied to the sheet. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

Additionally if **fPrintArea** is 1, there MUST exist a BrtName record for the print area as specified in the description for the **fPrintIncl** field in BrtUserBookView.

M - fOnePrintArea (1 bit): A bit that specifies whether there is exactly one print area applied to the sheet. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fPrintIncl** field value of 0.

Additionally if **fOnePrintArea** is 1, there MUST exist a BrtName record for the print area as specified in the description for the **fPrintIncl** field in BrtUserBookView.

N - fFilterMode (1 bit): A bit that specifies whether an AutoFilter range is being filtered. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fFilterMode** is 1, there MUST exist a BrtName record for the range being filtered and a BrtName record for the range containing filter criteria as specified in the description for the **fRowColIncl** field in BrtUserBookView.

O - fEzFilter (1 bit): A bit that specifies whether AutoFilter dropdown buttons are displayed in the view. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fEzFilter** is 1, there MUST exist a BrtName record for the range being filtered and a BrtName record for the range containing filter criteria as specified in the description for the **fRowColIncl** field in BrtUserBookView.

P - reserved1 (1 bit): MUST be zero and MUST be ignored.

Q - reserved2 (1 bit): MUST be zero and MUST be ignored.

R - fSplitV (1 bit): A bit that specifies whether there are **split panes** stacked vertically in the view.

S - fSplitH (1 bit): A bit that specifies whether there are split panes arranged side-by-side in the view.

T - fHiddenRw (2 bits): An unsigned integer that specifies whether any **hidden rows** exist in the sheet in this view. MUST be a value from the following table:

Value	Meaning
0x0	There are no hidden rows in the sheet in this view.
0x1	There are hidden rows in the sheet in this view.

MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fHiddenRow** is 0x1, there MUST exist a BrtName record for the hidden rows as specified in the description for the **fRowColIncl** field in BrtUserBookView.

U - fHiddenCol (1 bit): A bit that specifies whether any **hidden columns** exist in the sheet in this view. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fHiddenCol** is 1, there MUST exist a BrtName record for the hidden rows as specified in the description for the **fRowColIncl** field in BrtUserBookView.

V - hsState (2 bits): An ST_SheetState that specifies the visibility state of the sheet in this view.

W - reserved3 (1 bit): MUST be zero and MUST be ignored.

X - fFilterUnique (1 bit): A bit that specifies whether duplicate records are filtered out of a range in the sheet in this view. MUST be 0 for dialog sheets. MUST be 0 if the BrtUserBookView record with **guid** field value equal to the **guid** of this record has a **fRowColIncl** field value of 0.

Additionally if **fFilterUnique** is 1, there MUST exist a BrtName record for the range being filtered and a BrtName record for the range containing filter criteria as specified in the description for the **fRowColIncl** field in BrtUserBookView.

Y - fSheetLayoutView (1 bit): A bit that specifies whether the type of view displayed is a **Page Break Preview view**. The value of **fSheetLayoutView** and **fPageLayoutView** MUST NOT both be TRUE (1). MUST be 0 for macro sheets and dialog sheets.

Z - fPageLayoutView (1 bit): A bit that specifies whether the type of view displayed is a **Page Layout view**. The value of **fSheetLayoutView** and **fPageLayoutView** MUST NOT both be TRUE (1). MUST be 0 for macro sheets and dialog sheets.

a - reserved4 (1 bit): MUST be zero and MUST be ignored.

b - fRuler (1 bit): A bit that specifies whether the **ruler** is displayed in the view.

c - reserved5 (1 bit): MUST be zero and MUST be ignored.

d - reserved6 (1 bit): MUST be zero and MUST be ignored.

rfxTopLeft (16 bytes): An UncheckedRfX that specifies the logical top-left cell displayed in the view.

2.4.197 BrtBeginUserShViews

This record specifies the beginning of a collection of records as defined by the Worksheet part ABNF, the dialog sheet part ABNF, and the Macro Sheet part ABNF. The collection of records specifies custom view settings for sheets.

2.4.198 BrtBeginVolDeps

This record specifies the beginning of a collection of records as defined by the Volatile Dependencies part ABNF. The collection of records specifies dependency information for all cells that depend on either RTD server or cube functions.

2.4.199 BrtBeginVolMain

This record specifies properties of a volatile dependency and specifies the beginning of a collection of records as defined by the Volatile Dependencies part ABNF. The collection of records specifies dependency information for all **RTD topics** within a type that share the same first string or function argument.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
first (variable)																															
...																															

first (variable): An XLWideString that specifies the RTD server or the OLAP Connection associated with the dependencies.

If the **type** field of the associated BrtBeginVolType record is 0, **first** specifies the ProgID of the RTD server.

If the **type** field of the associated BrtBeginVolType record is 1, **first** specifies the name of the OLAP Connection.

The associated BrtBeginVolType record is the record immediately preceding this record.

2.4.200 BrtBeginVolTopic

This record specifies the beginning of a collection of records and collections as defined by the Volatile Dependencies part ABNF. The collection of records specifies a cached returned value and subtopics.

2.4.201 BrtBeginVolType

This record specifies the type of a volatile dependency and specifies the beginning of a collection of records as defined by the Volatile Dependencies part ABNF. The collection of records specifies dependency information for a set of cells that either all depend upon an RTD server, or all depend upon cube functions.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved																														

A - type (1 bit): A bit that specifies the type of dependency information. MUST be a value from the following table:

Value	Meaning
0x0	Dependency information is for an RTD server.
0x1	Dependency information is for cube functions.

reserved (31 bits): MUST be zero, and MUST be ignored.

2.4.202 BrtBeginWebPubItem

This record specifies content in the workbook that is published to the Web and specifies the beginning of an empty collection of records as defined by the Workbook part ABNF, Worksheet part ABNF, and Chart Sheet part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
tws								A	B	C	D	reserved3												unused							
...								nStyleId																							
...								rfx (16 bytes, optional)																							
...																															
...								reserved4 (optional)																							
...								reserved5 (optional)																							
...								reserved6 (optional)																							
...								reserved7 (optional)																							
...								E	F	G	H	I				stBkmk (variable)															
...																															
stName (variable)																															

...
stFile (variable)
...
stTitle (variable)
...

tws (1 byte): A **Tws** that specifies the type of the published content. If the record belongs to Workbook part ABNF, **tws** MUST be equal to TWSWORKBOOK or to TWSLABEL. If the record belongs to Worksheet part ABNF or Chart Sheet part ABNF, **tws** MUST NOT be equal to TWSWORKBOOK.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - fAutoRepublish (1 bit): A bit that specifies whether the content will be automatically published every time the workbook is saved.

C - reserved2 (1 bit): MUST be zero, and MUST be ignored.

D - fMhtml (1 bit): A bit that specifies whether the content is to be published as MIME HTML (MHTML). MHTML is used to bind resources which are typically represented by external links, such as image and sound files, along with HTML code into a single file.

reserved3 (12 bits): MUST be zero, and MUST be ignored.

unused (2 bytes): Undefined and MUST be ignored.

nStyleId (4 bytes): An unsigned integer that specifies the unique identifier for this published content. MUST be greater than 0.

rfx (16 bytes): An UncheckedRfX that specifies the rectangular cell range to be published. Exists if and only if **tws** is equal to TWSREF.

reserved4 (4 bytes): MUST be equal to 1048576 and MUST be ignored. Exists if and only if **tws** is not equal to TWSREF.

reserved5 (4 bytes): MUST be equal to 1048576 and MUST be ignored. Exists if and only if **tws** is not equal to TWSREF.

reserved6 (4 bytes): MUST be equal to 16384 and MUST be ignored. Exists if and only if **tws** is not equal to TWSREF.

reserved7 (4 bytes): MUST be equal to 16384 and MUST be ignored. Exists if and only if **tws** is not equal to TWSREF.

E - fReserved1 (1 bit): MUST be 1 and MUST be ignored.

F - fName (1 bit): A bit that specifies whether the **stName** exists. It MUST be equal to 0 if **tws** is less than 0x05, or is equal to TWSCHART and this record is contained in a Chartsheet. It MUST be equal to 1 otherwise.

G - fReserved2 (1 bit): MUST be 1 and MUST be ignored.

H - fTitle (1 bit): A bit that specifies whether the **stTitle** exists.

I - reserved8 (4 bits): MUST be zero, and MUST be ignored.

stBkmk (variable): An XLWideString that specifies the destination tag of the published content. Destination tag specifies the unique section in the published HTML the content being published is written to. The length of the string MUST NOT exceed 255 characters.

stName (variable): An XLNameWideString that specifies the name of the content to be published. It exists if and only if **fName** is equal 1. The length of the string MUST NOT exceed 255 characters.

stFile (variable): An XLWideString that specifies the name of the destination file to which the content will be published. The length of the string MUST NOT exceed 255 characters.

stTitle (variable): An XLWideString that specifies the title of the published content. It exists if and only only if **fTitle** is equal 1. The length of the string MUST NOT exceed 255 characters.

2.4.203 BrtBeginWebPubItems

This record specifies the count of BrtBeginWebPubItem records in the collection and specifies the beginning of a collection of records as defined by the Workbook part ABNF, Worksheet part ABNF, and Chart Sheet part ABNF. The collection of records specifies the content in this workbook that has been published.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cItems																															

cItems (4 bytes): An unsigned integer that specifies the number of items in the collection. MUST be equal to the number of BrtBeginWebPubItem records in the collection.

2.4.204 BrtBeginWsSortMap

This record specifies sort map properties of a sheet and specifies the beginning of a collection of records as defined by the Sort Map part ABNF. The collection of records specifies the sort map properties of a sheet.

2.4.205 BrtBeginWsView

This record specifies **sheet view** settings for the current sheet. It also specifies the beginning of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. This collection specifies additional sheet view settings for the current sheet. Sheet view settings and workbook view settings for the associated workbook view (specified by **iwbkview)** together define the display of a sheet.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F	G	H	I	J	K	reserved1					xlView															
...																rwTop															
...																colLeft															

...	icvHdr	reserved2
reserved3	wScale	
wScaleNormal	wScaleSLV	
wScalePLV	iWbkView	
...		

A - fWnProt (1 bit): A bit that specifies whether the window displaying the sheet view is locked due to **window protection**.

B - fDspFmla (1 bit): A bit that specifies whether formulas are displayed in cells in the sheet view. MUST be zero for dialog sheets.

C - fDspGrid (1 bit): A bit that specifies whether gridlines are displayed in the sheet view.

D - fDspRwCol (1 bit): A bit that specifies whether row headings and column headings are displayed in the sheet view. MUST be zero for dialog sheets.

E - fDspZeros (1 bit): A bit that specifies how zero values are displayed in cells in the sheet view. MUST be zero for dialog sheets.

Value	Meaning
0	Cells with a zero value appear blank.
1	Cells with a zero value display the number 0 (zero).

F - fRightToLeft (1 bit): A bit that specifies whether the sheet view is displayed in a **right-to-left** manner.

G - fSelected (1 bit): A bit that specifies whether the sheet is selected in the sheet view.

H - fDspRuler (1 bit): A bit that specifies whether the ruler is displayed in the sheet view. MUST be ignored if **xlView** is not equal to XLVPAGELAYOUTVIEW. MUST be one for dialog sheets and macro sheets.

I - fDspGuts (1 bit): A bit that specifies whether outline symbols are displayed in the sheet view. MUST be zero for dialog sheets.

J - fDefaultHdr (1 bit): A bit that specifies whether the default color is used for the gridlines, overriding the color specified in **icvHdr**. MUST be one for dialog sheets.

K - fWhitespaceHidden (1 bit): A bit that specifies whether the page margins, headers, and footers are hidden. MUST be ignored if **xlView** is not equal to XLVPAGELAYOUTVIEW. MUST be zero for dialog sheets and macro sheets.

reserved1 (5 bits): MUST be zero and MUST be ignored.

xlView (4 bytes): An XLView that specifies the type of sheet view.

rwTop (4 bytes): An UncheckedRw that specifies the first row that is displayed in the sheet view.

colLeft (4 bytes): An UncheckedCol that specifies the first column that is displayed in the sheet view.

icvHdr (1 byte): An Icv that specifies the color of the gridlines displayed in the sheet view.

reserved2 (1 byte): MUST be zero and MUST be ignored.

reserved3 (2 bytes): MUST be zero and MUST be ignored.

wScale (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet displayed in the sheet view. MUST be greater than or equal to 10 and less than or equal to 400.

wScaleNormal (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet when displayed in **Normal view**. MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the value is zero, the zoom level is assumed to be 100.

wScaleSLV (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet when displayed in Page Break Preview view. MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the value is zero, the zoom level is assumed to be 100.

wScalePLV (2 bytes): An unsigned integer that specifies a percentage value that specifies the zoom level of the sheet when displayed in Page Layout view. MUST be zero or a value greater than or equal to 10 and less than or equal to 400. If the value is zero, the zoom level is assumed to be 100.

iWbkView (4 bytes): An unsigned integer that specifies the zero-based index of a BrtBookView record in the collection of all records directly following BrtBeginBookViews in the workbook part. The referenced BrtBookView specifies the workbook view this sheet view is associated with.

2.4.206 BrtBeginWsViews

This record specifies the beginning of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. The collection of records specifies the sheet views for the current sheet.

2.4.207 BrtBigName

This record specifies a name/value pair of arbitrary user-defined data that is associated with the current sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
strName (variable)																															
...																															
strRelID (variable)																															
...																															

strName (variable): An XLWideString that specifies the name of the custom property. The name MUST be unique in the current sheet. The length of the name MUST NOT exceed 65535 characters.

strRelID (variable): A RelID that specifies a binary part that contains the value of the custom property in this file.

2.4.208 BrtBkHim

This record specifies the background image of the sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgb (variable)																															
...																															

rgb (variable): A RelID that specifies the relationship to the Images part. This value MUST NOT be NULL and MUST have length greater than zero.

2.4.209 BrtBookProtection

This record specifies protection options for a workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
protpwdBook																protpwdRev															
A	B	C	reserved																												

protpwdBook (2 bytes): An unsigned integer that specifies the verifier value of the password required for unlocking structure and window protection for the workbook.

Window protection is defined as preventing changes to the windows of the workbook such as moving, resizing, and closing windows.

Structure protection is defined as preventing changes to the structure of the workbook such as moving, deleting, hiding, unhiding, renaming sheets, inserting new sheets, and moving sheets to another workbook.

If the value of this field is 0x0000 then no password is required to remove structure and window protection. If the value is not 0x0000, then the field contains the password verifier of the password required to remove structure and window protection. The algorithm to generate the password verifier is specified in Password Verifier Algorithm. In addition, if the value is not 0x0000, the file is encrypted as specified in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption with the default password of "\x56\x65\x6C\x76\x65\x74\x53\x77\x65\x61\x74\x73\x68\x6F\x70".

protpwdRev (2 bytes): An unsigned integer that specifies the verifier value of the password required for unlocking change tracking information for the workbook.

If the value of this field is 0x0000 then no password is required to remove revision protection. If the value is not 0x0000, then the field contains the password verifier of the password required to remove revision protection. The algorithm to generate the password verifier is specified in Password Verifier Algorithm. In addition, if the value is not 0x0000, the file is encrypted as specified in [MS-OFFCRYPTO], section 2.3.4, ECMA-376 Document Encryption with the default password of "\x56\x65\x6C\x76\x65\x74\x53\x77\x65\x61\x74\x73\x68\x6F\x70".

A - fLockStructure (1 bit): A bit that specifies whether the structure of the workbook is protected from user change.

B - fLockWindow (1 bit): A bit that specifies whether the windows of the workbook are protected from user change.

C - fLockRevision (1 bit): A bit that specifies whether change tracking information is protected from user change.

reserved (13 bits): MUST be zero, and MUST be ignored.

2.4.210 BrtBookView

This record specifies a single workbook view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xWn																															
yWn																															
dxWn																															
dyWn																															
iTabRatio																															
itabFirst																															
itabCur																															
A	B	C	D	E	F	G	H																								

xWn (4 bytes): A signed integer that specifies the X coordinate for the left of the window that contains the workbook. The unit of measurement for this value is **twips**.

yWn (4 bytes): A signed integer that specifies the Y coordinate for the top of the window that contains the workbook. The unit of measurement for this value is twips.

dxWn (4 bytes): An unsigned integer that specifies the width of the window that contains the workbook. The value MUST be less than 2147483647. The unit of measurement for this value is twips.

dyWn (4 bytes): An unsigned integer that specifies the height of the window that contains the workbook. The value MUST be less than 2147483647. The unit of measurement for this value is twips.

iTabRatio (4 bytes): An unsigned integer that specifies the ratio of the window area used for selecting sheets to the window area used for horizontal scrolling. **iTabRatio** MUST be greater than or equal to zero and less than or equal to 1000, where 1000 means the space is entirely used for sheet selection, and 0 means the space is entirely used for horizontal scrolling.

itabFirst (4 bytes): An unsigned integer that specifies a zero-based index of a BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs. The referenced BrtBundleSh specifies the first sheet in this workbook view.

itabCur (4 bytes): An unsigned integer that specifies a zero-based index of a BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs. The referenced BrtBundleSh specifies the active sheet in this workbook view.

A - fHidden (1 bit): A bit that specifies whether the window that contains the workbook is in the list of hidden windows.

B - fVeryHidden (1 bit): A bit that specifies whether the window that contains the workbook has the properties of **fHidden**, and also that the user cannot see that the window that contains the workbook is in the list of hidden windows.

C - fIconic (1 bit): A bit that specifies whether the window that contains the workbook is minimized in the workbook view.

D - fDspHScroll (1 bit): A bit that specifies whether there is a horizontal scrollbar displayed in the workbook view.

E - fDspVScroll (1 bit): A bit that specifies whether there is a vertical scrollbar displayed in the workbook view.

F - fBotAdornment (1 bit): A bit that specifies whether the **sheet tabs** are displayed in the workbook view.

G - fAFDateGroup (1 bit): A bit that specifies whether to group dates when presenting the user with filtering options in the user interface.

H - unused (1 bit): Undefined and MUST be ignored.

2.4.211 BrtBorder

This record specifies the set of formats for the border of a cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	reserved						blxfTop																							
...																															
...																								blxfBottom							
...																															
...																															
...								blxfLeft																							
...																															
...																								blxfRight							

...	
...	
...	blxfDiag
...	
...	

A - fBdrDiagDown (1 bit): A bit that specifies a diagonal line that extends from the upper-left corner of the cell to the lower-right corner of the cell.

B - fBdrDiagUp (1 bit): A bit that specifies a diagonal line that extends from the lower-left corner of the cell to the upper-right corner of the cell.

reserved (6 bits): MUST be zero, and MUST be ignored.

blxfTop (10 bytes): A Blxf that specifies the format for the top border of the cell.

blxfBottom (10 bytes): A Blxf that specifies the format for the bottom border of the cell.

blxfLeft (10 bytes): A Blxf that specifies the format for the left border of the cell.

blxfRight (10 bytes): A Blxf that specifies the format for the right border of the cell.

blxfDiag (10 bytes): A Blxf that specifies the format for the diagonal lines in the cell. If **fBdrDiagDown** or **fBdrDiagUp** is 1, then **blxfDiag.dg** MUST NOT be 0.

2.4.212 BrtBrk

This record specifies a single page break (2).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
unRwCol																															
unColRwStrt																															
unColRwEnd																															
fMan																															
fPivot																															

unRwCol (4 bytes): A Rw_Col that specifies the row or column index of the page break (2). If this record is preceded by a BrtBeginRwBrk, then **unRwCol** specifies a row index. If this record is preceded by a BrtBeginColBrk, then **unRwCol** specifies a column index and MUST be less than 16384.

unColRwStrt (4 bytes): A Rw_Col that specifies the index of the column or row where this page break (2) begins. If this record is preceded by a BrtBeginRwBrk, then **unColRwStrt** specifies a

column index and MUST be less than 16384. If this record is preceded by a BrtBeginColBrk, then **unColRwStrt** specifies a row index.

unColRwEnd (4 bytes): A Rw_Col that specifies the index of the column or row where this page break (2) ends. If this record is preceded by a BrtBeginRwBrk, then **unColRwEnd** specifies a column index and MUST be less than 16384. If this record is preceded by a BrtBeginColBrk, then **unColRwEnd** specifies a row index. MUST be greater than or equal to **unColRwStrt**.

For example, a horizontal page break (2) at row 8 that spans between column A and column Z will be saved with values given by the following table:

Field	Value	Meaning
unRwCol	7	The zero-based index of the eighth row.
unColRwStrt	0	The zero-based index of column A.
unColRwEnd	25	The zero-based index of column Z.

fMan (4 bytes): An unsigned integer that specifies whether the page break (2) was specified by the user. MUST be a value from the following table:

Value	Meaning
0x00000000	The page break (2) occurs automatically when the printable region does not fit the page.
0x00000001	The page break (2) was specified by the user.

fPivot (4 bytes): An unsigned integer that specifies whether this page break (2) was created by a PivotTable. MUST be a value from the following table:

Value	Meaning
0x00000000	The page break (2) was not created by a PivotTable.
0x00000001	The page break (2) was created by a PivotTable.

2.4.213 BrtBundleSh

This record specifies a sheet.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
hsState																															
iTabID																															
strRelID (variable)																															
...																															
strName (variable)																															
...																															

hsState (4 bytes): An **ST_SheetState** that specifies the visibility state of the sheet.

iTabID (4 bytes): An unsigned integer that specifies the unique identifier of the sheet. MUST be between 1 and 0x0000FFFE inclusive.

strRelID (variable): A RelID that specifies the relationship that specifies the part containing sheet data. The relationship MUST be one of the following types:

Chart Sheet

Dialog Sheet

Macro Sheet

International Macro Sheet

Worksheet

If **strRelID** is NULL and **hsState** is VERYHIDDEN, then the type of sheet is a **module sheet**.

strName (variable): An XLWideString that specifies the unique case-insensitive name of the sheet. The length of this string MUST be at least 1 and MUST NOT exceed 31 characters. The string MUST NOT contain the following characters:

0x0000

0x0003

colon (:)

backslash (\)

asterisk (*)

question mark (?)

forward slash (/)

opening square bracket ([)

closing square bracket (])

The string MUST NOT begin or end with the single quote (') character.

2.4.214 BrtCalcProp

This record specifies workbook calculation properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
recalcID																															
fAutoRecalc																															
cCalcCount																															
xnumDelta																															

...										
cUserThreadCount										
A	B	C	D	E	F	G	H	I	reserved	

recalcID (4 bytes): An unsigned integer that specifies the recalculation engine identifier of the recalculation engine that performed the last recalculation. If the value is less than the recalculation engine identifier associated with the application, the application will recalculate the results of all formulas on this workbook immediately after loading the file.

fAutoRecalc (4 bytes): An unsigned integer that specifies the **calculation mode** for the workbook. MUST be one of the following values:

Value	Meaning
0	Workbook is in **manual calculation mode**.
1	Workbook is in **automatic calculation mode**.
2	Same as 1, except that tables are excluded from automatic calculation.

cCalcCount (4 bytes): An unsigned integer that specifies the number of iterations to run when calculating a workbook in **iterative calculation** mode. This value is used when **fIter** is set to one.

xnumDelta (8 bytes): An Xnum that specifies the minimum change for iterative calculations. This value is used when **fIter** is set to one. The application stops calculating after **cCalcCount** iterations or after all values in the circular reference change by less than **xnumDelta** between iterations, whichever comes first.

cUserThreadCount (4 bytes): A signed integer that specifies the number of concurrent calculation processes to be used to calculate this workbook. This value is used when **fUserSetThreadCount** and **fMTREnabled** are set to one. This value MUST be greater than zero and MUST be less than or equal to 1024.

A - fFullCalcOnLoad (1 bit): A bit that specifies whether the application performs a full calculation when the workbook is opened.

B - fRefA1 (1 bit): A bit that specifies the cell reference style used by this workbook.

Value	Meaning
0	Specifies **R1C1** reference style.
1	Specifies **A1** reference style.

C - fIter (1 bit): A bit that specifies whether to enable iterative calculation. If the value is 0, iterative calculation is disabled. If the value is 1, iterative calculation is enabled.

D - fFullPrec (1 bit): A bit that specifies whether the **precision as displayed** mode is selected.

Value	Meaning
0	Specifies that precision as displayed mode is selected.
1	Specifies that precision as displayed mode is not selected.

E - fSomeUncalced (1 bit): A bit that specifies whether the workbook was calculated before it was saved.

Value	Meaning
0	Specifies that recalculation was fully completed before save.
1	Specifies that recalculation was not fully completed before the workbook was saved.

F - fSaveRecalc (1 bit): A bit that specifies whether to recalculate the workbook before it is saved, when in manual calculation mode.

G - fMTREnabled (1 bit): A bit that specifies whether concurrent calculation processes are enabled for this workbook.

H - fUserSetThreadCount (1 bit): A bit that specifies whether the user has set the number of concurrent calculation processes for this workbook.

I - fNoDeps (1 bit): A bit that specifies whether all cells in the workbook are calculated or not.

Value	Meaning
0	Dependencies are respected and only formulas that depend on cells that changed in the workbook are calculated
1	Dependencies are ignored and all cell formulas in this workbook fully calculate every time a calculation is triggered.

reserved (7 bits): MUST be zero, and MUST be ignored.

2.4.215 BrtCellBlank

This record specifies a cell that is blank as specified in the Worksheet part ABNF, Macro Sheet part ABNF, and Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

2.4.216 BrtCellBool

This record specifies a cell containing a Boolean value as specified in the Worksheet part ABNF, Macro Sheet part ABNF and Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
fBool																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

fBool (1 byte): A Boolean that specifies the value. MUST be a value from the following table:

Value	Meaning
0x00	Boolean value FALSE
0x01	Boolean value TRUE

2.4.217 BrtCellError

This record specifies a cell containing an error value as specified in the Worksheet part ABNF, Macro Sheet part ABNF, and Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
bError																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

bError (1 byte): A BErr that specifies the type of error in this cell.

2.4.218 BrtCellIgnoreEC

This record specifies the types of error conditions that can be checked in a formula evaluation for a specific range or ranges.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	I	reserved																						
sqrfxu (variable)																															

...

A - ffecCalcError (1 bit): A bit that specifies whether to ignore calculation errors.

B - ffecEmptyCellRef (1 bit): A bit that specifies whether to ignore errors arising from references to empty cells.

C - ffecNumStoredAsText (1 bit): A bit that specifies whether to ignore errors arising from formatting of numeric values.

D - ffecInconsistRange (1 bit): A bit that specifies whether to ignore errors arising from formulas that contain references to less than the entirety of a range containing continuous data.

E - ffecInconsistFmla (1 bit): A bit that specifies whether to ignore errors arising from formulas that are inconsistent with formulas in neighboring cells.

F - ffecTextDateInsuff (1 bit): A bit that specifies whether to ignore errors arising from formatting of date/time values.

G - ffecUnprotFmla (1 bit): A bit that specifies whether to ignore errors arising from unprotected formulas.

H - ffecDataValidation (1 bit): A bit that specifies whether to ignore errors arising from data validation.

I - ffecCalcCol (1 bit): A bit that specifies whether to ignore errors arising from **calculated column** formulas.

reserved (23 bits): MUST be zero, and MUST be ignored.

sqrfxu (variable): An UncheckedSqRfX that specifies the range(s) to check for cell errors.

2.4.219 BrtCellIsst

This record specifies a cell that contains a string as specified in the Worksheet part ABNF, Macro Sheet part ABNF and Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
isst																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

isst (4 bytes): An unsigned integer that specifies a zero-based index of a BrtSSTItem record in the collection of all records directly following BrtBeginSst in the Shared Strings part. The referenced BrtSSTItem specifies the string that this cell contains. This value MUST be less than the total number of BrtSSTItem records between BrtBeginSst and BrtEndSst.

2.4.220 BrtCellMeta

This record specifies a reference to a cell metadata metadata block in the metadata part.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
icmb																															

icmb (4 bytes): A signed integer that specifies a one-based index of a BrtMdb record in the collection of all records directly following the BrtBeginEsmdb record whose **fCellMeta** field equals 0x00000001. The referenced BrtMdb specifies a cell metadata metadata block that is associated with the BrtCellBlank, BrtCellRk, BrtCellError, BrtCellBool, BrtCellReal, BrtCellIsst, BrtCellSt, BrtCellStBrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError record that follows BrtCellMeta.

2.4.221 BrtCellReal

This record specifies a cell containing a real number as specified in the Worksheet part ABNF, Macro Sheet part ABNF, and Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
xnum																															
...																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

xnum (8 bytes): An Xnum that specifies the value of the cell.

2.4.222 BrtCellRk

This record specifies a cell containing a number as specified in the Worksheet part ABNF, Macro Sheet part ABNF, and Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
value																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

value (4 bytes): An RkNumber that contains the value of this cell.

2.4.223 BrtCellRString

This record specifies a cell that contains a string, as specified in the Revision Log part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
value (variable)																															
...																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

value (variable): A RichStr that specifies the string value of the cell.

2.4.224 BrtCellSmartTagProperty

This record specifies a property of a smart tag in a cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
key (variable)																															
...																															
val (variable)																															
...																															

key (variable): An XLWideString that specifies the key of the property. The length of the string MUST be greater than or equal to 1 character, and less than or equal to 255 characters.

val (variable): An XLWideString that specifies the value of the property. The length of the string MUST be greater than or equal to 1 character, and less than or equal to 255 characters.

2.4.225 BrtCellSt

This record specifies a cell that contains a string or the most recent evaluation of a **data table (1)** formula that resulted in a string, as specified in the Worksheet part ABNF.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
value (variable)																															
...																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

value (variable): An XLWideString that contains the string content of the cell. MUST be less than or equal to 32767 characters.

2.4.226 BrtCellWatch

This record specifies a reference to a watched cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rw																															
col																															

rw (4 bytes): An UncheckedRw that specifies the row of the cell.

col (4 bytes): An UncheckedCol that specifies the column of the cell.

2.4.227 BrtCFVO

This record specifies a Conditional Formatting Value Object (CFVO) that specifies how to calculate a value from the range of cells that a conditional formatting rule applies to.

The value this structure specifies how to calculate is referred to as a CFVO value in other records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iType																															
numParam																															
...																															
fSaveGTE																															

fGTE
cbFmla
formula (variable)
...

iType (4 bytes): A CFVOtype that specifies how the CFVO value is determined.

- If this record is preceded by a BrtBeginColorScale record and specifies the beginning of the color scale, then this value MUST NOT be CFVOMAX.
- If this record is preceded by a BrtBeginColorScale record and specifies the end of the color scale, then this value MUST NOT be CFVOMIN.
- If this record is preceded by a BrtBeginColorScale record and specifies the midpoint of the color scale, then this value MUST NOT be CFVOMAX and MUST NOT be CFVOMIN.
- If this record is preceded by a BrtBeginDatabar record and specifies the cell value for the shortest data bar, then this value MUST NOT be CFVOMAX.
- If this record is preceded by a a BrtBeginDatabar record and specifies the cell value for the longest data bar, then this value MUST NOT be CFVOMIN.
- If this record is preceded by a BrtBeginIconSet record, then this value MUST NOT be CFVOMAX or CFVOMIN.
- If **iType** is CFVOMIN or CFVOMAX, **numParam**, **cbFmla** and **formula** are all undefined and MUST be ignored.
- If **iType** is CFVOFMLA, **numParam** is undefined and MUST be ignored.
- If **iType** is CFVONUM, CFVOPERCENT or CFVOPERCENTILE and **cbFmla** is greater than zero, then **numParam** is undefined and MUST be ignored.
- If **iType** is CFVONUM, CFVOPERCENT or CFVOPERCENTILE and **cbFmla** is zero, then **numParam** is used.

numParam (8 bytes): An Xnum that specifies the numerical value of this BrtCFVO as specified by **iType**. If **iType** is CFVOPERCENT or CFVOPERCENTILE, **numParam** MUST be greater than or equal to 0 and less than or equal to 100.

fSaveGTE (4 bytes): A Boolean that specifies whether the value of **fGTE** is used to specify the conditional formatting behavior of this BrtCFVO. If the current group of BrtCFVO records are not preceded by a BrtBeginIconSet record and therefore not describing an icon set, then this value MUST be ignored. Otherwise, it MUST have a value of 0x00000001.

fGTE (4 bytes): A Boolean that specifies whether the first BrtCFVO will use greater-than, or greater-than-or-equal-to when applying conditional formatting rules. MUST have a value from the following table:

Value	*Meaning*
0x00000000	Greater-than is used when applying conditional formatting rules.
0x00000001	Greater-than-or-equal-to is used when applying conditional formatting rules.

MUST be ignored if the current group of BrtCFVO records is not preceded by a BrtBeginIconSet record and therefore does not describe an icon set.

cbFmla (4 bytes): An unsigned integer that specifies the length in bytes of **formula.rgce**.

formula (variable): A CFVOParsedFormula that specifies the formula that is evaluated and compared to the cell value using the comparison method specified by this BrtCFVO.

2.4.228 BrtColInfo

Specifies the column width and formatting for one or more columns of a sheet.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">colFirst</td></tr>
<tr><td colspan="32">colLast</td></tr>
<tr><td colspan="32">coldx</td></tr>
<tr><td colspan="32">ixfe</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td colspan="4">E</td><td colspan="4">F</td><td>G</td><td>H</td><td colspan="4">I</td><td colspan="16"></td></tr>
</table>

colFirst (4 bytes): An UncheckedCol that specifies the first column to which this width and formatting is applied.

colLast (4 bytes): An UncheckedCol that specifies the last column to which this width and formatting is applied.

coldx (4 bytes): An unsigned integer that specifies the column width in standard digits for all columns between **colFirst** and **colLast**, inclusive. For the purposes of this field specification, a standard digit is defined as the widest digit in the normal style font. The default column width is measured in the number of standard digits that fit in the column multiplied by 256 and rounded down. MUST be less than or equal to 65535.

ixfe (4 bytes): An unsigned integer that specifies the zero-based index of a BrtXF record in the collection of all records directly following BrtBeginCellXFs in the styles part. The referenced BrtXF specifies the format to apply as the default format for the columns specified by **colFirst** and **colLast**. This value MUST be less than the **cxfs** field of the BrtBeginCellXFs record in the styles part.

A - fHidden (1 bit): A bit that specifies whether the columns are hidden.

B - fUserSet (1 bit): A bit that specifies whether the columns width is different than the default.

C - fBestFit (1 bit): A bit that specifies whether the width of the columns has been adjusted to display all of the contents of all cells in those columns.

D - fPhonetic (1 bit): A bit that specifies whether phonetic information is displayed in the cells of the specified columns by default.

E - reserved1 (4 bits): MUST be zero and MUST be ignored.

F - iOutLevel (3 bits): An unsigned integer that specifies the **outline level (1)** of the columns. The value MUST be greater than or equal to zero and less than or equal to 7.

G - unused (1 bit): Undefined and MUST be ignored.

H - fCollapsed (1 bit): A bit that specifies whether the outline level (1) of the columns is collapsed.

I - reserved2 (3 bits): MUST be zero and MUST be ignored.

2.4.229 BrtColor

This record specifies a color.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	xColorType							index								nTintAndShade															
bRed								bGreen								bBlue								bAlpha							

A - fValidRGB (1 bit): A bit that specifies whether the color specified by **index** matches the color specified by **bRed**, **bGreen**, **bBlue**, and **bAlpha**. MUST be 1 if **xColorType** is 2.

Value	Meaning
0	The color specified by **index** does not match the color specified by **bRed**, **bGreen**, **bBlue**, and **bAlpha**. **bRed**, **bGreen**, **bBlue**, and **bAlpha** MUST be ignored.
1	The color specified by **index** matches the color specified by **bRed**, **bGreen**, **bBlue**, and **bAlpha**.

xColorType (7 bits): An unsigned integer that specifies the type of color information contained in this record. MUST be a value from the following table:

Value	Meaning
0x00	Color information is automatically determined by the application.
0x01	This color is a color from a color palette and is specified by **index**.
0x02	This color is a standard ARGB color and is specified by the values in **bRed**, **bGreen**, **bBlue**, and **bAlpha**.
0x03	This color is a **theme** color and is specified by **index**.

index (1 byte): A value that specifies the index of a color from a collection of colors. The type and meaning of this field depends on the value of **xcolorType** and is specified by the following table:

Value of **xcolorType**	Meaning of **index** field
0x00	Undefined and MUST be ignored.
0x01	An Icv that specifies a color from a color palette.
0x02	Undefined and MUST be ignored.
0x03	An unsigned integer that specifies a sub-element of the clrScheme element in the Theme part ABNF (as defined in [ECMA-376] Part 3, Section 5.1.8.2) that specifies a color. The following table specifies which sub-element of clrScheme to use for each legal value of **index**: Value of **index** | Sub-element

0x00	dk1	
0x01	lt1	
0x02	dk2	
0x03	lt2	
0x04	accent1	
0x05	accent2	
0x06	accent3	
0x07	accent4	
0x08	accent5	
0x09	accent6	
0x0A	hlink	
0x0B	folHlink	

nTintAndShade (2 bytes): A signed integer that specifies the amount of tint or **shade** applied to the color specified by **index** or **bRed**, **bGreen**, **bBlue**, and **bAlpha**. The maximum possible positive value means 100% lightening, the maximum possible negative value means 100% darkening, and 0 means no change.

bRed (1 byte): An unsigned integer that specifies the intensity of red in this color, where 0 is no red and 255 is maximum red.

bGreen (1 byte): An unsigned integer that specifies the intensity of green in this color, where 0 is no green and 255 is maximum green.

bBlue (1 byte): An unsigned integer that specifies the intensity of blue in this color, where 0 is no blue and 255 is maximum blue.

bAlpha (1 byte): An unsigned integer that specifies the transparency of this color, where 0 is completely transparent and 255 is completely opaque.

2.4.230 BrtColorFilter

This record specifies the color to filter by and whether to use the cell's fill color or font face color in the filter criteria. If the cell's fill color or font face color does not match the color specified in the criteria, the rows corresponding to those cells are hidden from view.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dxfid																															
fCellColor																															

dxfid (4 bytes): A DXFId that specifies the color to filter by. MUST NOT equal 0xFFFFFFFF.

fCellColor (4 bytes): A Boolean that specifies whether to filter by the cell 's fill color or font face color. MUST be a value from the following table:

Value	Meaning
0x00000000	The application filters by font face color of the cell
0x00000001	The application filters by the fill color of the cell

2.4.231 BrtCommentAuthor

This record specifies the author of a comment.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
author (variable)																															
...																															

author (variable): An XLWideString that specifies the author. String length MUST be greater than or equal to 1 and less than or equal to 54.

2.4.232 BrtCommentText

This record specifies the text of a comment.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
text (variable)																															
...																															

text (variable): A RichStr that specifies the text. **text**.**fRichStr** MUST be 1**.** **text**.**fExtStr** MUST be 0.

2.4.233 BrtCrashRecErr

Specifies an error found during an application fault.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stName (variable)																															
...																															

stName (variable): An XLWideString that specifies the description of the error that occurred during an application fault. The length of the string MUST be less than or equal to 65535.

2.4.234 BrtCsPageSetup

Specifies page layout and printing settings for a chart sheet.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">iPaperSize</td></tr>
<tr><td colspan="32">iRes</td></tr>
<tr><td colspan="32">iVRes</td></tr>
<tr><td colspan="32">iCopies</td></tr>
<tr><td colspan="24">iPageStart</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td colspan="2">reserved2</td></tr>
<tr><td colspan="32">szRelID (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

iPaperSize (4 bytes): An unsigned integer that specifies the size of the printer paper . MUST be greater than or equal to 0 and less than 2147483647. The value 0 or values greater than or equal to 256 specify printer paper sizes defined by the user. Values greater than or equal to 118 and less than or equal to 256 are reserved for future use.

The meaning of values between 1 and 118 is given by the following table:

Value	Meaning
1	US Letter 8 1/2 x 11 in
2	US Letter Small 8 1/2 x 11 in
3	US Tabloid 11 x 17 in
4	US Ledger 17 x 11 in
5	US Legal 8 1/2 x 14 in
6	US Statement 5 1/2 x 8 1/2 in
7	US Executive 7 1/4 x 10 1/2 in
8	A3 297 x 420 mm
9	A4 210 x 297 mm
10	A4 Small 210 x 297 mm
11	A5 148 x 210 mm
12	B4 (JIS) 250 x 354
13	B5 (JIS) 182 x 257 mm
14	Folio 8 1/2 x 13 in
15	Quarto 215 x 275 mm
16	10 x 14 in
17	11 x 17 in
18	US Note 8 1/2 x 11 in
19	US Envelope #9 3 7/8 x 8 7/8

20	US Envelope #10 4 1/8 x 9 1/2
21	US Envelope #11 4 1/2 x 10 3/8
22	US Envelope #12 4 \276 x 11
23	US Envelope #14 5 x 11 1/2
24	C size sheet
25	D size sheet
26	E size sheet
27	Envelope DL 110 x 220mm
28	Envelope C5 162 x 229 mm
29	Envelope C3 324 x 458 mm
30	Envelope C4 229 x 324 mm
31	Envelope C6 114 x 162 mm
32	Envelope C65 114 x 229 mm
33	Envelope B4 250 x 353 mm
34	Envelope B5 176 x 250 mm
35	Envelope B6 176 x 125 mm
36	Envelope 110 x 230 mm
37	US Envelope Monarch 3.875 x 7.5 in
38	6 3/4 US Envelope 3 5/8 x 6 1/2 in
39	US Std Fanfold 14 7/8 x 11 in
40	German Std Fanfold 8 1/2 x 12 in
41	German Legal Fanfold 8 1/2 x 13 in
42	B4 (ISO) 250 x 353 mm
43	Japanese Postcard 100 x 148 mm
44	9 x 11 in
45	10 x 11 in
46	15 x 11 in
47	Envelope Invite 220 x 220 mm
48	RESERVED--DO NOT USE
49	RESERVED--DO NOT USE
50	US Letter Extra 9 \275 x 12 in
51	US Legal Extra 9 \275 x 15 in
52	US Tabloid Extra 11.69 x 18 in
53	A4 Extra 9.27 x 12.69 in
54	Letter Transverse 8 \275 x 11 in
55	A4 Transverse 210 x 297 mm
56	Letter Extra Transverse 9\275 x 12 in
57	SuperA/SuperA/A4 227 x 356 mm
58	SuperB/SuperB/A3 305 x 487 mm
59	US Letter Plus 8.5 x 12.69 in
60	A4 Plus 210 x 330 mm
61	A5 Transverse 148 x 210 mm
62	B5 (JIS) Transverse 182 x 257 mm

63	A3 Extra 322 x 445 mm
64	A5 Extra 174 x 235 mm
65	B5 (ISO) Extra 201 x 276 mm
66	A2 420 x 594 mm
67	A3 Transverse 297 x 420 mm
68	A3 Extra Transverse 322 x 445 mm
69	Japanese Double Postcard 200 x 148 mm
70	A6 105 x 148 mm
71	Japanese Envelope Kaku #2
72	Japanese Envelope Kaku #3
73	Japanese Envelope Chou #3
74	Japanese Envelope Chou #4
75	Letter Rotated 11 x 8 1/2 11 in
76	A3 Rotated 420 x 297 mm
77	A4 Rotated 297 x 210 mm
78	A5 Rotated 210 x 148 mm
79	B4 (JIS) Rotated 364 x 257 mm
80	B5 (JIS) Rotated 257 x 182 mm
81	Japanese Postcard Rotated 148 x 100 mm
82	Double Japanese Postcard Rotated 148 x 200 mm
83	A6 Rotated 148 x 105 mm
84	Japanese Envelope Kaku #2 Rotated
85	Japanese Envelope Kaku #3 Rotated
86	Japanese Envelope Chou #3 Rotated
87	Japanese Envelope Chou #4 Rotated
88	B6 (JIS) 128 x 182 mm
89	B6 (JIS) Rotated 182 x 128 mm
90	12 x 11 in
91	Japanese Envelope You #4
92	Japanese Envelope You #4 Rotated
93	PRC 16K 146 x 215 mm
94	PRC 32K 97 x 151 mm
95	PRC 32K(Big) 97 x 151 mm
96	PRC Envelope #1 102 x 165 mm
97	PRC Envelope #2 102 x 176 mm
98	PRC Envelope #3 125 x 176 mm
99	PRC Envelope #4 110 x 208 mm
100	PRC Envelope #5 110 x 220 mm
101	PRC Envelope #6 120 x 230 mm
102	PRC Envelope #7 160 x 230 mm
103	PRC Envelope #8 120 x 309 mm

104	PRC Envelope #9 229 x 324 mm
105	PRC Envelope #10 324 x 458 mm
106	PRC 16K Rotated
107	PRC 32K Rotated
108	PRC 32K(Big) Rotated
109	PRC Envelope #1 Rotated 165 x 102 mm
110	PRC Envelope #2 Rotated 176 x 102 mm
111	PRC Envelope #3 Rotated 176 x 125 mm
112	PRC Envelope #4 Rotated 208 x 110 mm
113	PRC Envelope #5 Rotated 220 x 110 mm
114	PRC Envelope #6 Rotated 230 x 120 mm
115	PRC Envelope #7 Rotated 230 x 160 mm
116	PRC Envelope #8 Rotated 309 x 120 mm
117	PRC Envelope #9 Rotated 324 x 229 mm
118	PRC Envelope #10 Rotated 458 x 324 mm

iRes (4 bytes): An unsigned integer that specifies the horizontal resolution of the printer in dots per inch.

iVRes (4 bytes): An unsigned integer that specifies the vertical resolution of the printer in dots per inch.

iCopies (4 bytes): An unsigned integer that specifies the number of copies to print. This value MUST be greater than or equal to 1 and less than or equal to 32767.

iPageStart (2 bytes): A signed integer that specifies the page number of the starting page for a count or numbering of pages in a chart sheet. MUST be ignored if **fUsePage** is 0.

A - fLandscape (1 bit): A bit that specifies the orientation of the printed page. This bit MUST be ignored if **fNoOrient** has a value of 1. Otherwise, the orientation is given by the following table:

Value	Meaning
0	Portrait orientation, in which the longest edge of the page is vertical.
1	Landscape orientation, in which the longest edge of the page is horizontal.

B - reserved1 (1 bit): MUST be zero, and MUST be ignored.

C - fNoColor (1 bit): A bit that specifies the color setting of the printed page.

Value	Meaning
0	The printer will be instructed to print the page in color.
1	The printer will be instructed to print the page in black and white.

D - fNoOrient (1 bit): A bit that specifies orientation of the printed page.

Value	Meaning
0	The value of **fLandscape** is used to specify the orientation settings of the printed page.
1	Application and printer specific behavior is used to determine the orientation settings of the printed page.

E - fUsePage (1 bit): A bit that specifies whether **iPageStart** is used to specify the first page number in the chart sheet.

Value	Meaning
0	The page numbering will start with a value of 1.
1	The value of **iPageStart** is used to specify the first page number in the chart sheet.

F - fDraft (1 bit): A bit that specifies whether graphics are included on the printed page. A value of 1 specifies that graphics are omitted in the printed page.

Value	Meaning
0	Graphics are included on the printed page.
1	Graphics are omitted from the printed page.

reserved2 (10 bits): MUST be zero, and MUST be ignored.

szRelID (variable): A RelID that specifies the link to the Printer Settings part. MUST be a reference to a valid Printer Settings part. MUST be less than or equal to 260 characters long.

2.4.235 BrtCsProp

This record specifies properties for a chart sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	unused															brtcolorTab															
...																															
...																strName (variable)															
...																															

A - fPublish (1 bit): A bit that specifies whether the chart sheet is published.

unused (15 bits): Undefined and MUST be ignored.

brtcolorTab (8 bytes): A BrtColor that specifies a background color of the sheet tab.

strName (variable): A CodeName for this chart sheet.

2.4.236 BrtCsProtection

This record specifies protection options for a chart sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
protpwd																fLocked															
...																fObjects															
...																															

protpwd (2 bytes): An unsigned integer that specifies the verifier value for the password required for editing the chart sheet. If the value is 0x0000 then no password is required. The algorithm to generate the verifier value from the password is specified in Password Verifier Algorithm.

fLocked (4 bytes): A Boolean that specifies whether changes can be made to elements of the chart in the chart sheet. The chart will continue to reflect changes in source data. MUST be a value from the following table:

Value	Multiplier Type
0x00000000	Changes to the chart elements are not prevented.
0x00000001	Changes to the chart elements are prevented.

fObjects (4 bytes): A Boolean that specifies whether changes can be made to graphic objects; including shapes, text boxes, and controls; in the chart sheet. MUST be a value from the following table:

Value	Multiplier Type
0x00000000	Changes to the graphic objects are not prevented.
0x00000001	Changes to the graphic objects are prevented.

2.4.237 BrtCUsr

This record specifies the count of users that are currently editing this shared workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cUsrSav																															

cUsrSav (2 bytes): An unsigned integer that specifies the count of BrtUsr records that appear after the BrtBeginUsers record. MUST be a value between 0 and 256.

2.4.238 BrtCustomFilter

This record specifies custom AutoFilter criteria.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
vts								grbitSgn								union															

...	
...	vtsStringXls (variable)
...	

vts (1 byte): An unsigned integer that specifies the type of data used in this record. This value MUST be one of the following:

Value	Meaning
0x04	Filter by a real number
0x06	Filter by a string
0x08	Filter by a Boolean
0x0C	Filter by blanks values
0x0E	Filter by values that are not blank

grbitSgn (1 byte): An unsigned integer that specifies the comparison operation to be performed. This value MUST be one of the following:

Value	Meaning
0x01	Less than
0x02	Equal to
0x03	Less than or equal to
0x04	Greater than
0x05	Not equal to
0x06	Greater than or equal to

union (8 bytes): A union that specifies the Boolean or numeric value of the comparison criteria to be used for this AutoFilter. The data type of the union's content is dependent on **vts**, and is defined in the following table:

Value of **vts**	Type and meaning of **union**
0x04	An Xnum that specifies a numeric value.
0x08	A 1-byte Boolean that specifies a Boolean value, followed by a 7 byte field that is undefined and MUST be ignored.
0x06 0x0C 0X0E	Unused. Undefined and MUST be ignored.

vtsStringXls (variable): An XLWideString that specifies the string-based value of the comparison criteria to be used for this AutoFilter. For the purposes of comparisons, the characters "?" and "*" are used as wildcards. A "?" refers to any single character, and a "*" refers to any number of characters. This field MUST be present if and only if **vts** is equal to 0x06.

2.4.239 BrtDrawing

This record specifies a link to a Drawings Part as specified in [ECMA-376] Part 1: Fundamentals, section 12.3.8 that specifies a drawing for a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stRelId (variable)																															
...																															

stRelId (variable): A RelID that specifies the link to the Drawings Part.

2.4.240 BrtDRef

This record specifies a data reference used by data consolidation. A data reference is either an UncheckedRfX or a defined name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fName								fBuiltin								rfx (16 bytes, optional)															
...																															
...																reserved1 (optional)															
...																reserved2 (optional)															
...																reserved3 (optional)															
...																reserved4 (optional)															
...																xstrName (variable)															
...																															
xstrSheet (variable)																															
...																															
relId (variable)																															
...																															

fName (1 byte): A Boolean that specifies whether this data reference is a cell range or a defined name. MUST be a value in the following table:

Value	Meaning
0x00	This data reference refers to a cell range.
0x01	This data reference refers to a defined name.

fBuiltin (1 byte): A Boolean that specifies whether the value of **xstrName** refers to a built-in defined name or a user-created defined name. When **fName** is 0x00, **fBuiltin** MUST be 0x00. When **fName** is 0x01, **fBuiltin** MUST be a value in the following table:

Value	Meaning
0x00	The value in **xstrSheet** refers to a user-created defined name.
0x01	The value in **xstrSheet** refers to a built-in defined name. The value in **xstrSheet** MUST be one of values in the following list: • "Consolidate_Area" • "Auto_Open" • "Auto_Close" • "Extract" • "Database" • "Criteria" • "Print_Area" • "Print_Titles" • "Recorder" • "Data_Form" • "Auto_Activate" • "Auto_Deactivate" • "Sheet_Title" • "_FilterDatabase"

rfx (16 bytes): An UncheckedRfX that specifies the cell range referenced by this data reference. Exists if and only if **fName** is 0x00.

reserved1 (4 bytes): MUST be equal to 1048576 and MUST be ignored. Exists if and only if **fName** is 0x01.

reserved2 (4 bytes): MUST be equal to 1048576 and MUST be ignored. Exists if and only if **fName** is 0x01.

reserved3 (4 bytes): MUST be equal to 16384 and MUST be ignored. Exists if and only if **fName** is 0x01.

reserved4 (4 bytes): MUST be equal to 16384 and MUST be ignored. Exists if and only if **fName** is 0x01.

xstrName (variable): An XLWideString that specifies the name of this data reference. When **fName** is 0x00, this field MUST be an empty XLWideString. When **fName** is 0x01, **xstrName** MUST specify a non-empty string which represents the name of this data reference.

xstrSheet (variable): An XLWideString that specifies the name of the sheet containing the source of this data reference. If **fName** is 0x01 and the defined name has workbook scope, **xstrSheet** MUST be an empty XLWideString. Otherwise, **xstrSheet** MUST be the name of the sheet which contains this data reference.

relId (variable): A RelID that specifies the source of this data reference. When this data reference refers to an external workbook, **relId** MUST specify the relationship identifier describing this external reference. Otherwise, **relId** MUST be a zero-length RelID.

2.4.241 BrtDVal

This record specifies data validation for a range on this sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
valType				A			B	C	D	mdImeMode								E	F	G				reserved							
sqrfx (variable)																															
...																															
strErrorTitle (variable)																															
...																															
strError (variable)																															
...																															
strPromptTitle (variable)																															
...																															
strPrompt (variable)																															
...																															
formula1 (variable)																															
...																															
formula2 (variable)																															
...																															

valType (4 bits): An unsigned integer that specifies the type of data validation. MUST be a value from the following table:

Value	Meaning
0x00	Specifies that the data validation allows any type of value and does not check for a type or range of values.
0x01	Specifies that the data validation checks for and allows whole number values satisfying the given condition.
0x02	Specifies that the data validation checks for and allows decimal values satisfying the given condition.
0x03	Specifies that the data validation checks for and allows a value that matches one in a list of values.
0x04	Specifies that the data validation checks for and allows date values satisfying the

	given condition.
0x05	Specifies that the data validation checks for and allows time values satisfying the given condition.
0x06	Specifies that the data validation checks for and allows text values whose length satisfies the given condition.
0x07	Specifies that the data validation uses a custom formula to check the cell value.

A - errStyle (3 bits): An unsigned integer that specifies the style of error alert used for this data validation. MUST be a value from the following table:

Value	Meaning
0x00	Specifies that the data validation error style uses a stop icon in the error alert.
0x01	Specifies that the data validation error style uses a warning icon in the error alert.
0x02	Specifies that the data validation error style uses an information icon in the error alert.

B - unused (1 bit): Undefined and MUST be ignored.

C - fAllowBlank (1 bit): A bit that specifies whether the data validation treats empty or blank entries as valid.

D - fSuppressCombo (1 bit): A bit that specifies the behavior of the dropdown combo box as follows:

Value of **fSuppressCombo**	Value of **valType**	**Meaning**
0	3	Suppresses the dropdown combo box
1	3	Displays the dropdown combo box

mdImeMode (8 bits): An unsigned integer that specifies the **Input Method Editor (IME)** mode enforced by this data validation. MUST be a value from the following table:

Value	IME Mode
0x00	No control
0x01	On
0x02	Off (English)
0x03	Disabled
0x04	Hiragana
0x05	Full-width katakana
0x06	Half-width katakana
0x07	Full-width alphanumeric
0x08	Half-width alphanumeric
0x09	Full-width hangul
0x0A	Half-width hangul

E - fShowInputMsg (1 bit): A bit that specifies whether to display the input prompt message.

F - fShowErrorMsg (1 bit): A bit that specifies whether to display the error alert message.

G - typOperator (4 bits): An unsigned integer that specifies the relational operator used with this data validation. If **valType** is equal to 0, 3 or 7, the value of the **typOperator** field is undefined and MUST be ignored. MUST be a value from the following table:

Value	Type of Relational Operator
0x00	**Between**
0x01	**Not Between**
0x02	**Equal**
0x03	**Not Equal**
0x04	**Greater Than**
0x05	**Less Than**
0x06	**Greater Than or Equal**
0x07	**Less Than or Equal**

reserved (8 bits): MUST be zero, and MUST be ignored.

sqrfx (variable): A UncheckedSqRfX that specifies the ranges over which data validation is applied. The value **sqrfx.crfx** MUST be greater than or equal to 1 and MUST be less than or equal to 32767.

strErrorTitle (variable): An XLNullableWideString that specifies the text of the title bar of the error alert. If this is not the NULL string, the length of this string MUST be less than or equal to 32 characters.

strError (variable): An XLNullableWideString that specifies the message text of the error alert. If this is not the NULL string, the length of this string MUST be less than or equal to 224 characters.

strPromptTitle (variable): An XLNullableWideString that specifies the text of the title bar of the input prompt. If this is not the NULL string, the length of this string MUST be less than or equal to 32 characters.

strPrompt (variable): An XLNullableWideString that specifies the message text of input prompt. If this is not the NULL string, the length of this string MUST be less than or equal to 255 characters.

formula1 (variable): A DVParsedFormula specifying the first formula in the data validation dropdown combo box.

If **typOperator** is equal to 0 or 1 and **valType** is not one of 0, 3, or 7, this formula is used as the lesser of two bounding values and **formula1.cce** MUST be greater than or equal to 1.

If **typOperator** is greater than or equal to 2 or **valType** is equal to 3 or 7, this formula is the only formula for those cases, and **formula1.cce** MUST be greater than or equal to 1.

If the **valType** is equal to 0, this formula MUST be ignored and **formula1.cce** MUST be zero.

formula2 (variable): A DVParsedFormula that specifies the second formula in the data validation dropdown combo box.

If **typOperator** is equal to 0 or 1 and **valType** is not one of 0, 3, or 7, this formula is used as the greater of two bounding values and **formula2.cce** MUST be greater than or equal to 1.

If **typOperator** is greater than or equal to 2 or **valType** is equal to 0, 3 or 7, this formula MUST be ignored and **formula2.cce** MUST be zero.

2.4.242 BrtDXF

This record specifies differential formatting.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
unused															A	xfprops (variable)															
...																															

unused (15 bits): Undefined and MUST be ignored.

A - fNewBorder (1 bit): A bit that specifies whether it is possible to specify internal **border formatting** in XFProps. Internal border formatting is formatting that applies to borders that lie between a range of cells.

Value	Meaning
0x0	Specifies that the internal border formatting cannot be used in XFProps.
0x1	Specifies that the internal border formatting can be used in XFProps.

xfprops (variable): A XFProps that specifies the formatting properties.

2.4.243 BrtDynamicFilter

This record specifies dynamic filter criteria. These criteria are considered dynamic because they can change, either with the data itself (for example, "above average") or with the current system date (for example, show values for "today"). For any cells whose values do not meet the specified criteria, the corresponding rows will be hidden from view when the filter is applied.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cft																															
A	unused							xNumValue																							
...																															
...								xNumValueMax																							
...																															
...																															

cft (4 bytes): An unsigned integer that specifies the type of filter to be applied. This MUST be one of the following values:

Value	Enumeration Name	Meaning
0x00000000	CFTNIL	No filter
0x00000001	CFTABOVEAVERAGE	Shows values that are above average.
0x00000002	CFTBELOWAVERAGE	Shows values that are below average.
0x00000008	CFTTOMORROW	Shows tomorrow's dates.
0x00000009	CFTTODAY	Shows today's dates.
0x0000000A	CFTYESTERDAY	Shows yesterday's dates.
0x0000000B	CFTNEXTWEEK	Shows next week's dates.
0x0000000C	CFTTHISWEEK	Shows this week's dates.
0x0000000D	CFTLASTWEEK	Shows last week's dates.
0x0000000E	CFTNEXTMONTH	Shows next month's dates.
0x0000000F	CFTTHISMONTH	Shows this month's dates.
0x00000010	CFTLASTMONTH	Shows last month's dates.
0x00000011	CFTNEXTQUARTER	Shows next quarter's dates.
0x00000012	CFTTHISQUARTER	Shows this quarter's dates.
0x00000013	CFTLASTQUARTER	Shows last quarter's dates.
0x00000014	CFTNEXTYEAR	Shows next year's dates.
0x00000015	CFTTHISYEAR	Shows this year's dates.
0x00000016	CFTLASTYEAR	Shows last year's dates.
0x00000017	CFTYEARTODATE	Shows the dates between the beginning of the year and today, inclusive.
0x00000018	CFTQ1	Shows the dates that are in the 1st quarter, regardless of year.
0x00000019	CFTQ2	Shows the dates that are in the 2nd quarter, regardless of year.
0x0000001A	CFTQ3	Shows the dates that are in the 3rd quarter, regardless of year.
0x0000001B	CFTQ4	Shows the dates that are in the 4th quarter, regardless of year.
0x0000001C	CFTM1	Shows the dates that are in January, regardless of year.
0x0000001D	CFTM2	Shows the dates that are in February, regardless of year.
0x0000001E	CFTM3	Shows the dates that are in March, regardless of year.
0x0000001F	CFTM4	Shows the dates that are in April, regardless of year.
0x00000020	CFTM5	Shows the dates that are in May, regardless of year.
0x00000021	CFTM6	Shows the dates that are in

		June, regardless of year.
0x00000022	CFTM7	Shows the dates that are in July, regardless of year.
0x00000023	CFTM8	Shows the dates that are in August, regardless of year.
0x00000024	CFTM9	Shows the dates that are in September, regardless of year.
0x00000025	CFTM10	Shows the dates that are in October, regardless of year.
0x00000026	CFTM11	Shows the dates that are in November, regardless of year.
0x00000027	CFTM12	Shows the dates that are in December, regardless of year.

A - fApplied (1 bit): A bit that specifies whether the filter's range, as specified by the **rfx** field in the BrtBeginAFilter record that begins the collection this record is a part of, has been calculated. A value of 1 specifies that the filter's range has been calculated. A value of 1 also specifies that **xNumValue** and **xNumValueMax** are correctly calculated, if these values are not ignored. **fApplied** MUST be 0 if **cft** is greater than or equal to 0x00000018 or equal to 0x00000000.

unused (7 bits): Undefined, MUST be ignored.

xNumValue (8 bytes): An Xnum that specifies a value for the filter. For **cft** values greater than or equal to 0x00000008 and less than or equal to 0x00000017, this value specifies the minimum value in the range as specified by the **rfx** field in the BrtBeginAFilter record that begins the collection this record is a part of. For **cft** values of 0x00000001 or 0x00000002, this specifies the computed average. **xNumValue** MUST be 0x00000000 and MUST be ignored unless **cft** is greater than or equal to 0x00000001 and less than or equal to 0x00000017.

xNumValueMax (8 bytes): An Xnum that specifies the maximum value for this filter. This value MUST be 0x00000000 and MUST be ignored if **cft** is less than 0x00000008 or greater than 0x00000017.

2.4.244 BrtEndActiveXControls

This record specifies the end of a collection of BrtActiveX records as defined by the Worksheet part ABNF. The collection of BrtActiveX records specifies ActiveX controls embedded in the sheet.

2.4.245 BrtEndAFilter

This record specifies the end of a collection of records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of records specifies an AutoFilter.

2.4.246 BrtEndAutoSortScope

This record specifies the end of a collection of records as specified by the PivotTable part ABNF. The collection of records specifies sort information for the pivot items of a pivot field.

2.4.247 BrtEndBook

This record specifies the end of a collection of records as defined by the Workbook part ABNF. The collection of records specifies properties of a workbook.

2.4.248 BrtEndBookViews

This record specifies the end of a collection of BrtBookView records as defined by the Workbook part ABNF. The collection of BrtBookView records specifies workbook views.

2.4.249 BrtEndBorders

This record specifies the end of a collection of BrtBorder records as defined by the Styles part ABNF. The collection of BrtBorder records specifies cell border style.

2.4.250 BrtEndBundleShs

This record specifies the end of a collection of BrtBundleSh records as defined by the Workbook part ABNF. The collection of BrtBundleSh records specifies the sheets in the workbook.

2.4.251 BrtEndCellIgnoreECs

This record specifies the end of a collection of BrtCellIgnoreEC records as defined by Worksheet part ABNF. The collection of BrtCellIgnoreEC records specifies the types of cell errors that are to be ignored for specific cell ranges.

2.4.252 BrtEndCellSmartTag

This record specifies the end of a collection of BrtCellSmartTagProperty records as defined by the Worksheet part ABNF. The collection BrtCellSmartTagProperty records specifies the smart tag properties of a cell.

2.4.253 BrtEndCellSmartTags

This record specifies the end of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies smart tag properties of a cell.

2.4.254 BrtEndCellStyleXFs

This record specifies the end of a collection of BrtXF records as defined by the Styles part ABNF. The collection of BrtXF records specifies all cell style XFs in the workbook. The collection MUST contain at least 1 and no more than 0xFF96 BrtXF records.

2.4.255 BrtEndCellWatches

This record specifies the end of a collection of BrtCellWatch records as defined by Worksheet part ABNF. The collection of BrtCellWatch records specifies a reference to a watched cell.

2.4.256 BrtEndCellXFs

This record specifies the end of a collection of BrtXF records as defined by the Styles part ABNF. The collection of BrtXF records specifies all cell XFs in the workbook. The collection MUST contain at least 1 and no more than 0xFF96 BrtXF records.

2.4.257 BrtEndCFRule

This record specifies the end of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a conditional formatting rule used in conditional formatting.

2.4.258 BrtEndColBrk

This record specifies the end of a collection of BrtBrk records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of BrtBrk records specifies vertical page breaks (2).

2.4.259 BrtEndColInfos

This record specifies the end of a collection of BrtColInfo records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of BrtColInfo records specifies the column width and formatting for one or more columns of a sheet.

2.4.260 BrtEndColorPalette

This record specifies the end of a collection of records as defined by the Styles part ABNF. The collection of records specifies the color information associated with this workbook.

2.4.261 BrtEndColorScale

This record specifies the end of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a color scale used in conditional formatting.

2.4.262 BrtEndComment

This record specifies the end of a collection of BrtCommentText records as defined by the Comments part ABNF. The collection of BrtCommentText records specifies the text a comment.

2.4.263 BrtEndCommentAuthors

The record specifies the end of a collection of BrtCommentAuthor records as defined by the Comments part ABNF. The collection specifies a list of authors of comments.

2.4.264 BrtEndCommentList

This record specifies the end of a collection of records as defined by the Comments part ABNF. The collection specifies a list of comments.

2.4.265 BrtEndComments

This record specifies the end of a collection of records as defined by the Comments part ABNF. The collection of records specifies lists of authors and their comments.

2.4.266 BrtEndConditionalFormatting

This record specifies the end of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies conditional formatting information for a range.

2.4.267 BrtEndCRErrs

This record specifies the end of a collection of BrtCrashRecErr records as defined by the Workbook part ABNF. The collection of BrtCrashRecErr records specify the errors that occurred during an application fault.

2.4.268 BrtEndCsView

This record specifies the end of an empty collection of records as defined by the Chart Sheet part ABNF. The collection of records specifies a chart sheet view.

2.4.269 BrtEndCsViews

This record specifies the end of a collection of records as defined by the Chart Sheet part ABNF. The collection of records specifies the chart sheet views of this chart sheet.

2.4.270 BrtEndCustomFilters

This record specifies the end of a collection of BrtCustomFilter records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of BrtCustomFilter records specifies custom filter criteria to be applied to a filter.

2.4.271 BrtEndDatabar

This record specifies the end of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a data bar used in conditional formatting.

2.4.272 BrtEndDCon

This record specifies the end of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies data consolidation information.

2.4.273 BrtEndDeletedName

This record specifies the end of an empty collection of records as defined by the Query Table part ABNF. The collection of records specifies a query field that has been deleted from the query table.

2.4.274 BrtEndDeletedNames

This record specifies the end of a collection of records as defined by the Query Table part ABNF. The collection of records specifies query fields that have been deleted from the query table.

2.4.275 BrtEndDim

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF.The collection of records specifies a PivotCache OLAP dimension (1).

2.4.276 BrtEndDims

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies PivotTable OLAP dimensions.

2.4.277 BrtEndDRefs

This record specifies the end of a collection of BrtDRef records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of BrtDRef records specifies the references used by data consolidation.

2.4.278 BrtEndDVals

This record specifies the end of a collection of BrtDVal records as defined in the Worksheet part ABNF. The collection of BrtDVal records specifies data validation properties of a worksheet.

2.4.279 BrtEndDXFs

This record specifies the end of a collection of BrtDXF records as defined by the Revision Log part ABNF and the Styles part ABNF. The collection of BrtDXF records specifies a set of differential formats.

2.4.280 BrtEndECDbProps

This record specifies the end of an empty collection of records as defined by the External Data Connections part ABNF. The collection of records specifies the properties associated with an ODBC or OLE DB external connection.

2.4.281 BrtEndECOlapProps

This record specifies the end of an empty collection of records as defined by the external data connections part ABNF. The collection of records specifies properties of OLAP connection.

2.4.282 BrtEndECParam

This record specifies the end of an empty collection of records as defined by the External Data Connections part ABNF. The collection of records specifies parameters of an external connection.

2.4.283 BrtEndECParams

This record specifies the end of a collection of records as defined by the External Data Connections part ABNF. The collection specifies connection parameters.

2.4.284 BrtEndECTWFldInfoLst

This record specifies the end of a collection of BrtBeginECTwFldInfo records as defined by the External Data Connections part ABNF. The collection specifies a collection of columns of data in a text file.

2.4.285 BrtEndECTxtWiz

This record specifies the end of a collection of records as defined by the External Data Connections part ABNF. The collection specifies text import properties.

2.4.286 BrtEndECWebProps

This record specifies the end of a collection of records as defined by the External Data Connections part ABNF. The collection of records specifies the properties of a Web connection.

2.4.287 BrtEndECWPTables

This record specifies the end of a collection of records as defined by the External Data Connections part ABNF. The collection specifies a collection of tables to be returned via a Web query data connection.

2.4.288 BrtEndEsfmd

This record specifies the end of a collection of records as defined by the Metadata part ABNF. The collection of records specifies a future metadata store.

2.4.289 BrtEndEsmdb

This record specifies the end of a collection of BrtMdb records as defined by the Metadata part ABNF. The collection of records MUST contain metadata block records of the same kind: either only cell metadata records or only value metadata records.

2.4.290 BrtEndEsmdtinfo

This record specifies the end of the collection of BrtMdtinfo records as defined by the Metadata part ABNF. The collection of records specifies the list of metadata types.

2.4.291 BrtEndEsmdx

This record specifies the end of a collection of records as defined by the Metadata part ABNF. The collection of records specifies the MDX metadata store.

2.4.292 BrtEndEsstr

This record specifies the end of the collection of BrtStr records.

2.4.293 BrtEndExtConnection

This record specifies the end of a collection of records as defined by the External Data Connections part ABNF.

2.4.294 BrtEndExtConnections

This record specifies the end of a collection of records as defined by the External Data Connections part ABNF. The collection of records specifies external connections.

2.4.295 BrtEndExternals

This record specifies the end of a collection of records as defined by Workbook part ABNF. The collection of records specifies a collection of Supporting Links and specifies a collection of Xti structures.

2.4.296 BrtEndFills

This record specifies the end of a collection of BrtFill records as defined by the Styles part ABNF. The collection of BrtFill records specifies cell fill styles.

2.4.297 BrtEndFilterColumn

This record specifies the end of a collection of records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of records specifies an AutoFilter column.

2.4.298 BrtEndFilters

This record specifies the end of a collection of records as defined by the Macro Sheet part ABNF, the PivotTable part ABNF, the Table part ABNF, and the Worksheet part ABNF. The collection of records specifies information about the filter.

2.4.299 BrtEndFmd

This record specifies the end of a collection of records as defined by the Metadata part ABNF. The collection of records specifies Future Records.

2.4.300 BrtEndFmts

This record the end of a collection of BrtFmt records as defined by the Styles part ABNF. The collection of BrtFmt records specifies the properties of the number formats which indicate how to format and render the numeric value of the cells.

2.4.301 BrtEndFnGroup

This record specifies the end of a collection of BrtFnGroup records as defined by the Workbook part ABNF. The collection of BrtFnGroup records specifics function category names.

2.4.302 BrtEndFonts

This record specifies the end of a collection of BrtFont records as defined by the Styles part ABNF. The collection of BrtFont records specifies the fonts for the workbook.

2.4.303 BrtEndHeaderFooter

This record specifies the end of an empty collection of records as defined by the Worksheet part ABNF, Chart Sheet part ABNF, Dialog Sheet part ABNF, and Macro Sheet part ABNF.

2.4.304 BrtEndIconSet

This record specifies the end of a collection of BrtCFVO records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of BrtCFVO records specifies a conditional formatting rule defined using an icon set.

2.4.305 BrtEndIndexedColors

This record specifies the end of a collection of BrtIndexedColor records as defined by the Styles part ABNF. The collection of BrtIndexedColor records specifies indexed color.

2.4.306 BrtEndISXTHCols

This record specifies the end of an empty collection of records as defined by the PivotTable part ABNF. The collection of records specifies references to pivot hierarchies and any data field that appear on the column axis of a PivotTable view.

2.4.307 BrtEndISXTHRws

This record specifies the end of an empty collection of records as defined by the PivotTable part ABNF. The collection of records specifies references to pivot hierarchies and any data field that appear on the row axis of a PivotTable view.

2.4.308 BrtEndISXVDCols

This record specifies the end of an empty collection of records as defined in the PivotTable part ABNF. The collection of record specifies which pivot fields appear on the column axis of this PivotTable view.

2.4.309 BrtEndISXVDRws

This record specifies the end of an empty collection of records as specified by the PivotTable part ABNF. The collection of records specifies which pivot fields appear on the row axis of this PivotTable view.

2.4.310 BrtEndISXVIs

This record specifies the end of an empty collection of records as defined in the PivotTable part ABNF. The collection of records specifies the pivot line entries that occur on a pivot line.

2.4.311 BrtEndList

This record specifies the end of a collection of records as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection of records specifies a table.

2.4.312 BrtEndListCol

This record specifies the end of a collection of records, as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection of records specifies a table column.

2.4.313 BrtEndListCols

This record specifies the end of a collection of records, as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection of records specifies the set of table columns for a single table.

2.4.314 BrtEndListParts

This record specifies the end of a collection of BrtListPart records as defined by the Worksheet part ABNF. The collection of BrtListPart records specifies tables defined in the workbook.

2.4.315 BrtEndListXmlCPr

This record specifies the end of an empty collection of records, as defined by the Table part ABNF and the Single Cell Tables part ABNF. The collection specifies information about a table column's XML map properties.

2.4.316 BrtEndMap

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the mapping between BrtBeginDim and BrtBeginMG.

2.4.317 BrtEndMdx

This record specifies the end of a collection of records as defined by the Metadata part ABNF. The collection of records specifies additional properties for MDX metadata.

2.4.318 BrtEndMdxKPI

This record specifies the end of an empty collection of records as defined by the Metadata part ABNF. The collection of records specifies the properties of MDX KPI metadata.

2.4.319 BrtEndMdxMbrProp

This record specifies the end of an empty collection of records as defined by the Metadata part ABNF. The collection of records specifies the properties of an OLAP member.

2.4.320 BrtEndMdxSet

This record specifies the end of a collection of BrtMdxMbrIstr records as defined by the Metadata part ABNF. The collection of BrtMdxMbrIstr records specifies MDX unique names and their properties.

2.4.321 BrtEndMdxTuple

This record specifies the end of a collection of BrtMdxMbrIstr records as defined by the Metadata part ABNF. The collection of BrtMdxMbrIstr records specifies MDX unique names and their properties.

2.4.322 BrtEndMergeCells

This record specifies the end of a collection of BrtMergeCell records as defined in the Worksheet part ABNF. The collection of BrtMergeCell records specifies the merged cells for the sheet.

2.4.323 BrtEndMetadata

This record specifies the end of a collection of records as defined by the Metadata part ABNF. The collection of records specifies the metadata associated with the book.

2.4.324 BrtEndMG

This record specifies the end of a empty collection as defined by the PivotCache Definition part ABNF. The collection of records specifies a measure group for a Pivot Cache.

2.4.325 BrtEndMGMaps

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the mappings between OLAP dimensions (1) and the OLAP measure groups that each OLAP dimension (1) is related to.

2.4.326 BrtEndMGs

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies PivotTable OLAP measure groups.

2.4.327 BrtEndMRUColors

This record specifies the end of a collection of BrtMRUColor records as defined by the Styles part ABNF. The collection of BrtMRUColor records specifies the collection of most recently used colors selected by the user for this workbook.

2.4.328 BrtEndOleObjects

This record specifies the end of a collection of BrtOleObject records as defined by the Worksheet part ABNF, Dialog Sheet part ABNF, and Macro Sheet part ABNF. The collection of BrtOleObject records specifies information about OLE objects that are embedded in the workbook.

2.4.329 BrtEndPCDCalcItem

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the locations in the PivotTable view to which the calculated item applies, and a reference to the cache fields and cache items that the formula of the calculated item uses.

2.4.330 BrtEndPCDCalcItems

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of calculated items in the PivotCache.

2.4.331 BrtEndPCDCalcMem

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies an OLAP calculated member or a named set in a PivotCache.

2.4.332 BrtEndPCDCalcMems

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the OLAP calculated members in a PivotCache.

2.4.333 BrtEndPCDFAtbl

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of Cache Items.

2.4.334 BrtEndPCDFGDiscrete

This record specifies the end of a collection of BrtPCDIIndex records as defined by the PivotCache Definition part ABNF. The collection of BrtPCDIIndex records specifies a mapping from a cache item in the BrtBeginPCDFAtbl collection of the base field of this grouping field to a cache item in the BrtBeginPCDFGItems collection of the grouping field. The base field and grouping field are specified in grouping.

2.4.335 BrtEndPCDFGItems

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of cache items for a grouping field.

2.4.336 BrtEndPCDFGRange

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the grouping properties of a cache field.

2.4.337 BrtEndPCDFGroup

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the relation of this cache field and other cache fields with respect to grouping.

2.4.338 BrtEndPCDField

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a single cache field in the PivotCache.

2.4.339 BrtEndPCDFields

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of recrods specifies a collection of cache fields in the PivotCache.

2.4.340 BrtEndPCDHFieldsUsage

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. This collection of records specifies the cache fields in the PivotCache that are associated with the cache hierarchy this record is within.

2.4.341 BrtEndPCDHGLevel

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies an OLAP grouping level in a PivotCache, as specified in OLAP Grouping.

2.4.342 BrtEndPCDHGLevels

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of OLAP grouping levels, as specified in OLAP grouping.

2.4.343 BrtEndPCDHGLGMember

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies an OLAP member or name of a group in the subsequent OLAP level that is part of an OLAP grouping.

2.4.344 BrtEndPCDHGLGMembers

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the OLAP members that are part of an OLAP grouping.

2.4.345 BrtEndPCDHGLGroup

This record specifies the end a collection as defined by the PivotCache Definition part ABNF. The collection of records specifies a group as specified by OLAP Grouping.

2.4.346 BrtEndPCDHGLGroups

This record specifies the end of a collection as defined by the PivotCache Definition part ABNF. The collection of records specifies the groups as specified by OLAP grouping within the preceding cache hierarchy.

2.4.347 BrtEndPCDHierarchies

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of cache hierarchies in the PivotCache.

2.4.348 BrtEndPCDHierarchy

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a cache hierarchy in the PivotCache.

2.4.349 BrtEndPCDIRun

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a sequence of cache items all of the same data type.

2.4.350 BrtEndPCDKPI

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies an OLAP key performance indicator (KPI).

2.4.351 BrtEndPCDKPIs

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the KPIs in a PivotCache.

2.4.352 BrtEndPCDSConsol

This record specifies end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies the source data ranges for a multiple consolidation ranges PivotCache in the workbook.

2.4.353 BrtEndPCDSCPage

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of values that correspond to cache items of a cache field for a multiple consolidation ranges PivotCache.

2.4.354 BrtEndPCDSCPages

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies information for optional cache fields in the PivotCache, as specified by Multiple Consolidation Ranges.

2.4.355 BrtEndPCDSCPItem

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a value that corresponds to a cache item, as specified by Multiple Consolidation Ranges.

2.4.356 BrtEndPCDSCSet

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies properties of a range of the source data for a multiple consolidation ranges PivotCache. The workbook containing the source data is either in this workbook, or in another workbook.

2.4.357 BrtEndPCDSCSets

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies ranges used as source data for a multiple consolidation ranges PivotCache.

2.4.358 BrtEndPCDSDTCEMember

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a tuple cache entry, specified by tuple cache, in the tuple cache.

2.4.359 BrtEndPCDSDTCEMembers

This record specifies the end of a collection of BrtBeginPCDSDTCEMember records as defined by the PivotCache Definition part ABNF. The collection of records specifies tuple cache entries, as specified by Tuple Cache.

2.4.360 BrtEndPCDSDTCEntries

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a cache of cube values; each of the values is optionally followed by a collection of tuple cache entries, specified by tuple cache, used in the value calculation.

2.4.361 BrtEndPCDSDTCQueries

This record specifies the end of a collection of BrtBeginPCDSDTCQuery records.

2.4.362 BrtEndPCDSDTCQuery

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF.

2.4.363 BrtEndPCDSDTCSet

This record specifies the end of a BrtBeginPCDSDTCSet record as defined by the PivotCache Definition part ABNF.

2.4.364 BrtEndPCDSDTCSets

This record specifies the end of a collection as defined by the PivotCache Definition part ABNF. The collection of records specifies the tuple cache set, as specified by tuple cache, in the PivotCache.

2.4.365 BrtEndPCDSDTupleCache

This record specifies the end of a collection of record as defined by the PivotCache Definition part ABNF. The collection of records specifies a tuple cache within the PivotCache.

2.4.366 BrtEndPCDSFCIEntries

This record specifies the end of a collection of BrtPCDSFCIEntry records as defined by the PivotCache Definition part ABNF. The collection of BrtPCDSFCIEntry records specifies the number formats provided by an OLAP server for cube values.

2.4.367 BrtEndPCDSource

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies properties of the source data of a PivotCache.

2.4.368 BrtEndPCDSRange

This record specifies the properties of a Source Data for a PivotCache contained in the workbook and specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies Source Data for a PivotCache contained in the workbook.

2.4.369 BrtEndPivotCacheDef

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a PivotCache.

2.4.370 BrtEndPivotCacheID

This record specifies the end of an collection of PivotCache identifier records as defined by the Workbook part ABNF. The collection of a PivotCache identifier records specifies the relationship between a specific PivotCache identifier and its associated PivotCache Definition. For more information, see Relationship to PivotCache.

2.4.371 BrtEndPivotCacheIDs

This record specifies the end of a collection of PivotCache identifier records as defined by the Workbook part ABNF. The collection of records specifies the PivotCache identifiers for the workbook.

2.4.372 BrtEndPivotCacheRecords

This record specifies the end of a collection of records as defined by the PivotCache Records part ABNF. The collection of records specifies the cache records for a PivotCache.

2.4.373 BrtEndPName

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. This record specifies information used for calculated fields and calculated items. When used for a calculated field, this record specifies a reference to a cache field used in a calculated field formula. When used for a calculated item, this record specifies a reference to a pivot item used in a calculated item formula.

2.4.374 BrtEndPNames

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a collection of references to cache fields used in a calculated field formula or pivot items used in a calculated item formula.

2.4.375 BrtEndPNPair

This record specifies the end of an empty collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a reference to a pivot item used in a calculated item formula.

2.4.376 BrtEndPNPairs

This record specifies the end of a collection of records as defined by the PivotCache Definition part ABNF. The collection of records specifies a reference to a pivot item, which is used in a calculated item formula.

2.4.377 BrtEndPRFilter

This record specifies the end of a collection of records as defined by the PivotTable part ABNF, PivotCache definition part ABNF, and Worksheet part ABNF. The collection of records specifies the selected pivot field and the selected pivot items within that pivot field referred within BrtBeginPRFilters.

2.4.378 BrtEndPRFilters

This record specifies the end of a collection of records as defined by the PivotTable part ABNF, PivotCache definition part ABNF, and Worksheet part ABNF. The collection of records specifies the selected pivot fields and the selected pivot items within those pivot fields.

2.4.379 BrtEndPRFItem

This record specifies the end of a collection of records as defined by the PivotTable part ABNF, PivotCache definition part ABNF, and Worksheet part ABNF. The collection of records specifies a pivot item.

2.4.380 BrtEndPRule

This record specifies the end of a collection of records as defined by the PivotTable part ABNF, PivotCache definition part ABNF, and Worksheet part ABNF. The collection of records specifies a PivotTable rule.

2.4.381 BrtEndQSI

This record specifies the end of a collection of records as defined by the Query Table part ABNF. The collection of records specifies a query table.

2.4.382 BrtEndQSIF

This record specifies the end of an empty collection of records as defined by the Query Table part ABNF. The collection of records specifies properties of a single field of a query table.

2.4.383 BrtEndQSIFs

This record specifies the end of a collection of records as defined by the Query Table part ABNF. The collection of records specifies the query fields in this query table.

2.4.384 BrtEndQSIR

This record specifies the end of a collection of records as defined by the Query Table part ABNF. The collection of records specifies information related to the refreshing of query tables.

2.4.385 BrtEndRRSort

This record specifies the end of a collection of BrtRRSortItem records as defined by the Sort Map part ABNF. The collection of BrtRRSortItem records specifies the sort map properties of the specified cell range.

2.4.386 BrtEndRwBrk

This record specifies the end of a collection of BrtBrk records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of BrtBrk records specifies horizontal page breaks (2).

2.4.387 BrtEndScenMan

This record specifies the end of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies the Scenario Manager for the sheet.

2.4.388 BrtEndSct

This record specifies the end of a collection of BrtSlc records as defined by the Worksheet part ABNF. The collection of BrtSlc records specifies the cells that are included in the scenario.

2.4.389 BrtEndSheet

This record specifies the end of a collection of records as defined by the Chart Sheet part ABNF, Dialog Sheet part ABNF, Macro Sheet part ABNF, and Worksheet part ABNF. The collection of records specifies properties of the sheet.

2.4.390 BrtEndSheetData

This record specifies the end of a collection of records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of records specifies the cell table data for a sheet.

2.4.391 BrtEndSingleCells

This record specifies the end of a collection of records as defined by the Single Cell Tables part ABNF. The collection of records specifies a table.

2.4.392 BrtEndSmartTags

This record specifies the end of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies the smart tag properties of this sheet.

2.4.393 BrtEndSmartTagTypes

This record specifies the end of a collection of BrtSmartTagType records as defined as the Workbook part ABNF. The collection of BrtSmartTagType records specifies the properties for a smart tag type that contain the identification information for the smart tag.

2.4.394 BrtEndSortCond

This record specifies the end of an empty collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, the Macro Sheet part ABNF, the Table part ABNF, and the Query Table part ABNF. The collection specifies a sort condition to apply to a range.

2.4.395 BrtEndSortState

This record specifies the end of a collection of records as specified by the Worksheet part ABNF, the Dialog Sheet part ABNF, the Macro Sheet part ABNF, the Table part ABNF, and the Query Table part ABNF. The collection of records specifies the different sort conditions that apply to a range.

2.4.396 BrtEndSst

This record specifies the end of a collection of BrtSSTItem records as defined by the Shared Strings part ABNF. The collection of BrtSSTItem records specifies a shared string table.

2.4.397 BrtEndStyles

This record specifies the end of a collection of BrtStyle records as defined by the Styles part ABNF. The collection of BrtStyle records specifies all cell styles in the workbook. The collection MUST contain at least 1 and no more than 0xFF96 BrtStyle records.

2.4.398 BrtEndStyleSheet

This record specifies the end of a collection of records as defined by the Styles part ABNF. The collection of records specifies style information for a workbook.

2.4.399 BrtEndSupBook

This record specifies the end of a collection of records as defined by the External Link part ABNF. The collection of records specifies information about the external link.

2.4.400 BrtEndSXCondFmt

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies details about where this conditional formatting applies in the PivotTable view.

2.4.401 BrtEndSXCondFmts

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies conditional formats that apply to this PivotTable.

2.4.402 BrtEndSXCrtFormat

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a reference to a PivotChart format.

2.4.403 BrtEndSXCrtFormats

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies references to PivotChart formats.

2.4.404 BrtEndSXDI

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a data item that summarizes data in a PivotTable view.

2.4.405 BrtEndSXDIs

This record specifies the end of a collection of records as defined by the PivotTable part ABNF, that specifies the data items that appear on the data axis of this PivotTable view.

2.4.406 BrtEndSXFilter

This record specifies the end of a collection of records and collections as defined by the PivotTable part ABNF. The collection of records specifies a PivotTable advanced filter

2.4.407 BrtEndSXFilters

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a collection of advanced filters that apply to this PivotTable view.

2.4.408 BrtEndSXFormat

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the differential formatting to be applied to the PivotTable view area identified by a PivotTable rule.

2.4.409 BrtEndSxFormats

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a collection of formats that apply to this PivotTable view.

2.4.410 BrtEndSXLI

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a pivot line in a PivotTable view.

2.4.411 BrtEndSXLICols

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the pivot lines that appear on the column area of the PivotTable view.

2.4.412 BrtEndSXLIRws

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the pivot lines that appear on the row area of the PivotTable view.

2.4.413 BrtEndSXLocation

This record specifies the end of an empty collection of records as defined by the PivotTable part ABNF. The collection of records specifies the location of a PivotTable view in a sheet.

2.4.414 BrtEndSXPI

This record specifies the end of a collection of records and collections as defined in the PivotTable part ABNF. The collection of records specifies a pivot field or a pivot hierarchy on the page axis of the PivotTable.

2.4.415 BrtEndSXPIs

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the pivot fields on the page axis of the PivotTable view.

2.4.416 BrtEndSxRules

This record specifies the end of a collection of records as defined in the PivotTable part ABNF. The collection of records specifies a collection of PivotTable Rules.

2.4.417 BrtEndSxSelect

This record specifies end of a collection of records as defined by the Worksheet part ABNF. The collection of records specifies a PivotTable rule used to identify cells of the selection. This record MUST be ignored if **irstRelID** is NULL or points to an invalid PivotTable part.

2.4.418 BrtEndSXTDMP

This record specifies the end of an empty collection of records as defined in the PivotTable part ABNF. The collection of records specifies a member property.

2.4.419 BrtEndSXTDMPs

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies member properties in this pivot hierarchy.

2.4.420 BrtEndSXTH

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a pivot hierarchy.

2.4.421 BrtEndSXTHItem

This record specifies the end of an empty collection of records as defined by the PivotTable part ABNF. The collection of records specifies the MDX unique name of an OLAP member to be included or excluded in PivotTable view manual filtering.

2.4.422 BrtEndSXTHItems

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the members to be included or excluded in PivotTable manual filtering.

2.4.423 BrtEndSXTHs

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies pivot hierarchies of the PivotTable view.

2.4.424 BrtEndSXVD

This record specifies the end of a collection of records and collections as defined in the PivotTable part ABNF. The collection of records specifies a pivot field on the PivotTable view

that specifies a pivot field.

2.4.425 BrtEndSXVDs

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies the pivot fields of the PivotTable view.

2.4.426 BrtEndSXVI

This record specifies the end of an empty collection of records as defined by the PivotTable part ABNF. The collection of records specifies a pivot item.

2.4.427 BrtEndSXView

This record specifies the end of a collection of records and collections as defined in the PivotTable part ABNF. The collection of records specifies a PivotTable view.

2.4.428 BrtEndSXVIs

This record specifies the end of a collection of records as defined by the PivotTable part ABNF. The collection of records specifies a collection of pivot items.

2.4.429 BrtEndTableStyle

This record specifies the end of a collection of BrtTableStyleElement records as defined by the Styles part ABNF. The collection of BrtTableStyleElement records specifies a table style.

2.4.430 BrtEndTableStyles

This record specifies the end of a collection of records as defined by the Styles part ABNF. The collection of records specifies the user-defined table styles for the workbook.

2.4.431 BrtEndUserCsView

This record specifies the end of a collection of records as defined by the Chart Sheet part ABNF. The collection of records specifies settings of a custom view for a chart sheet.

2.4.432 BrtEndUserCsViews

This record specifies the end of a collection of records as defined by the Chart Sheet part ABNF. The collection of records specifies custom view settings for chart sheets.

2.4.433 BrtEndUserShView

This record specifies the end of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. The collection of records specifies settings of a custom view for a sheet.

2.4.434 BrtEndUserShViews

This record specifies the end of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. The collection of records specifies custom view settings for sheets.

2.4.435 BrtEndVolDeps

This record specifies the end of a collection of records as defined by the Volatile Dependencies part ABNF. The collection of records specifies dependency information for all cells that depend on either RTD server or cube functions.

2.4.436 BrtEndVolMain

This record specifies the end of a collection of records as defined by the Volatile Dependencies part ABNF. The collection of records specifies dependency information for all RTD topics within a type that share the same first string or function argument.

2.4.437 BrtEndVolTopic

This record specifies the end of a collection of records and collections as defined by the volatile dependencies par ABNF. The collection of records specifies a cached returned value and subtopics.

2.4.438 BrtEndVolType

This record specifies the end of a collection of records as defined by the Volatile Dependencies part ABNF. The collection of records specifies dependency information for a set of cells that either all depend upon an RTD server, or all depend upon cube functions.

2.4.439 BrtEndWebPubItem

This record specifies the end of an empty collection of records as defined by the Workbook part ABNF, Worksheet part ABNF, and Chart Sheet part ABNF. The collection of records specifies content in the workbook that is published.

2.4.440 BrtEndWebPubItems

This record specifies the end of a collection of records as defined by the Workbook part ABNF, Worksheet part ABNF, and Chart Sheet part ABNF. The collection of records specifies the content in this workbook that has been published.

2.4.441 BrtEndWsSortMap

This record specifies the end of a collection of records as defined by the Sort Map part ABNF. The collection of records specifies the sort map properties of a sheet.

2.4.442 BrtEndWsView

This record specifies the end of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. The collection of records specifies a sheet view.

2.4.443 BrtEndWsViews

This record specifies the end of a collection of records as defined by the Worksheet part ABNF, the Dialog Sheet part ABNF, and the Macro Sheet part ABNF. The collection of records specifies the sheet views for the current sheet.

2.4.444 BrtEOF

This record specifies the end of a collection of records as defined by Revision Headers part ABNF, Revision Log part ABNF, and User Names part ABNF. The collection of records specifies properties for a shared workbook.

2.4.445 BrtExternCellBlank

This record specifies an External Cell in the External Cell Cache that does not contain a value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															

col (4 bytes): An UncheckedCol that specifies the column containing this External Cell. This value MUST be less than 16384.

2.4.446 BrtExternCellBool

This record specifies an External Cell in the External Cell Cache that contains a Boolean value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															
value																															

col (4 bytes): An UncheckedCol that specifies the column containing this External Cell. This value MUST be less than 16384.

value (1 byte): A Boolean that specifies the value.

2.4.447 BrtExternCellError

This record specifies an External Cell in the External Cell Cache that contains an error value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															
bError																															

col (4 bytes): An UncheckedCol that specifies the column containing this External Cell. This value MUST be less than 16384.

bError (1 byte): A BErr that specifies an error value.

2.4.448 BrtExternCellReal

This record specifies an External Cell in the External Cell Cache that contains a numeric value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															
value																															
...																															

col (4 bytes): An UncheckedCol that specifies the column containing this External Cell. This value MUST be less than 16384.

value (8 bytes): An Xnum that specifies a numeric value.

2.4.449 BrtExternCellString

This record specifies an External Cell in the External Cell Cache that contains a string value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															
value (variable)																															
...																															

col (4 bytes): An UncheckedCol that specifies column containing this External Cell. This value MUST be less than 16384.

value (variable): An XLWideString that specifies a string value. The length of this string MUST be less than 32768 characters.

2.4.450 BrtExternRowHdr

This record specifies properties of row in an External Cell Cache and specifies the beginning of a collection of records as defined by the External Link part ABNF. The collection of records specifies a row in an External Cell Cache. Subsequent External Cell records prior to the subsequent BrtExternRowHdr record are in this row.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rw																															

rw (4 bytes): An UncheckedRw that specifies a row. This value MUST be less than 1048576 and MUST be less than the **rw** field of any subsequent BrtExternRowHdr record in this External Cell Cache.

2.4.451 BrtExternSheet

This record specifies a collection of Xti structures.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cXti																															
rgXti (variable)																															
...																															

cXti (4 bytes): An unsigned integer that specifies the count of items in the **rgXti** array. This value MUST be less than 65536.

rgXti (variable): An array of Xti. The number of items in the array MUST equal the value of **cXti**.

2.4.452 BrtExternTableEnd

This record specifies the end of a collection of records as defined by the External Link part ABNF. The collection of records specifies an External Cell Cache.

2.4.453 BrtExternTableStart

This record specifies properties of an External Cell Cache and specifies the beginning of a collection of records as defined by the External Link part ABNF. The collection of records specifies an External Cell Cache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iTab																															
A	reserved																														

iTab (4 bytes): An unsigned integer that specifies the zero-based index of an item in the **sheetNames** field in the BrtSupTabs record in this external link part. The referenced item MUST specify the name of a worksheet or macro sheet in the external workbook.

A - fRefreshError (1 bit): A bit that specifies that an error occurred during the last refresh of this External Cell Cache.

reserved (7 bits): MUST be 0 and MUST be ignored.

2.4.454 BrtExternValueMeta

This record specifies a reference to a value metadata metadata block in the metadata part.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ivmb																															

ivmb (4 bytes): A signed integer that specifies a one-based index of a BrtMdb record in the collection of all records directly following the BrtBeginEsmdb record whose **fCellMeta** field equals 0x00000000. The referenced BrtMdb specifies a value metadata metadata block that is associated with the BrtExternCellBlank, BrtExternCellReal, BrtExternCellBool, BrtExternCellError or BrtExternCellString record that follows BrtExternValueMeta.

2.4.455 BrtFileRecover

This record specifies state of workbook file.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F																										

A - fDontAutoRecover (1 bit): A bit that specifies whether **auto-recovery** is disabled for the workbook.

B - fSavedDuringRecovery (1 bit): A bit that specifies whether the workbook was saved during auto-recovery.

C - fCreatedViaMinimalSave (1 bit): A bit that specifies whether the workbook was created by a **minimal save** during **data-recovery**.

D - fOpenedViaDataRecovery (1 bit): A bit that specifies whether the workbook was opened by means of data-recovery.

E - fOpenedViaSafeLoad (1 bit): A bit that specifies whether the workbook was opened in **safe load** mode.

F - reserved (3 bits): MUST be zero, and MUST be ignored.

2.4.456 BrtFileSharing

This record specifies file sharing options.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
fReadOnlyRec																wResPass															

stUserName (variable)
...

fReadOnlyRec (2 bytes): A Boolean that specifies whether the **read-only recommended** option is selected for this file. If the value is 1, the read-only recommended option is selected for this file.

wResPass (2 bytes): An unsigned integer that specifies the password verifier value, which has been calculated as specified in the Password Verifier Algorithm overview, for **write reservation**. If the value is 0, there is no write reservation password.

stUserName (variable): A XLNullableWideString that specifies the name of the user that added the write reservation password. If the value of **wResPass** is 0, this value MUST be NULL. The length of **stUserName** MUST NOT exceed 54 characters.

2.4.457 BrtFileVersion

This record specifies which application and which versions of that application accessed the data contained in the file. When saving, an application can write its name in the **stAppName** field and the application can use **stLastEdited**, **stLowestEdited** and **stRupBuild** values to track the versions of the application that performed those actions. When opening, application can examine the value of **stAppName** and decide how to interpret the **stLastEdited**, **stLowestEdited** and **stRupBuild** values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
guidCodeName (16 bytes)																															
...																															
stAppName (variable)																															
...																															
stLastEdited (variable)																															
...																															
stLowestEdited (variable)																															
...																															
stRupBuild (variable)																															
...																															

guidCodeName (16 bytes): A GUID as specified by [MS-DTYP] that specifies the **type library** of the application that wrote the **Visual Basic for Applications (VBA)** project in the file. The value SHOULD <20> be 0x0.

stAppName (variable): An XLWideString that specifies the application name. Other applications SHOULD NOT <21> use value "xl". The string length MUST be less than or equal to 65535 characters.

stLastEdited (variable): An XLWideString that specifies the version of the application that last saved the file. The string length MUST be less than or equal to 65535 characters.

stLowestEdited (variable): An XLWideString that specifies the earliest version of the application that saved the file. The string length MUST be less than or equal to 65535 characters.

stRupBuild (variable): An XLWideString that specifies the **build number** of the application. The string length MUST be less than or equal to 65535 characters.

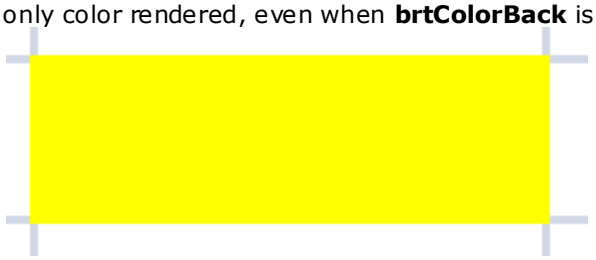
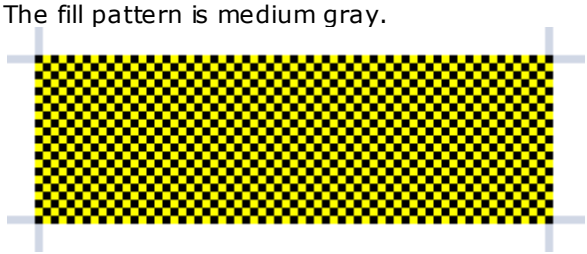
2.4.458 BrtFill

This record specifies an individual cell fill pattern.

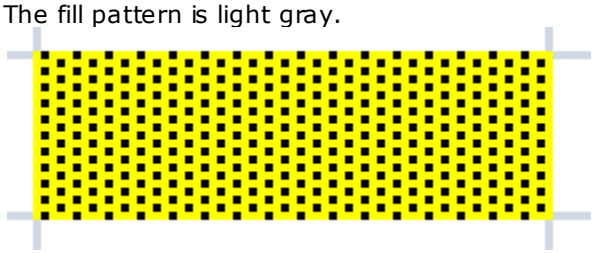
0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fls																															
brtColorFore																															
...																															
brtColorBack																															
...																															
iGradientType																															
xnumDegree																															
...																															
xnumFillToLeft																															
...																															
xnumFillToRight																															
...																															
xnumFillToTop																															
...																															

xnumFillToBottom
...
cNumStop
xfillGradientStop (variable)
...

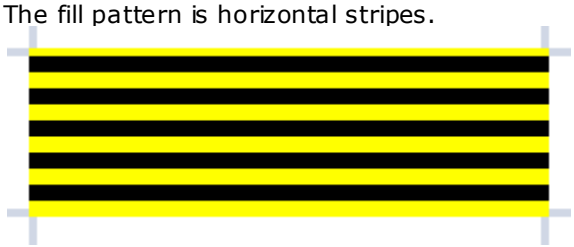
fls (4 bytes): An unsigned integer that specifies the type of fill pattern. If **fls** is NOT 0x0028 the **iGradientType**, **xnumDegree**, **xnumFillToLeft**, **xnumFillToRight**, **xnumFillToTop**, **xnumFillToBottom**, and **cNumStop** fields MUST be 0 and MUST be ignored. If **fls** is 0x0028 the **brtColorFore** and **brtColorBack** fields are undefined and MUST be ignored. MUST be a value from the following table:

Value	Meaning
0x0000	The fill pattern is none (no fill). When **brtColorFore** and/or **brtColorBack** are specified, a pattern of 'none' overrides and means there is no fill. 
0x0001	The fill pattern is solid. When solid is specified, **brtColorFore** is the only color rendered, even when **brtColorBack** is also specified. 
0x0002	The fill pattern is medium gray. 
0x0003	The fill pattern is dark gray.

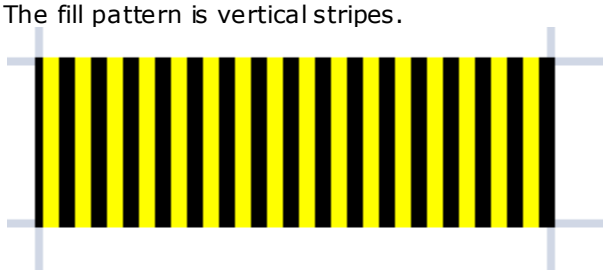
0x0004 The fill pattern is light gray.



0x0005 The fill pattern is horizontal stripes.



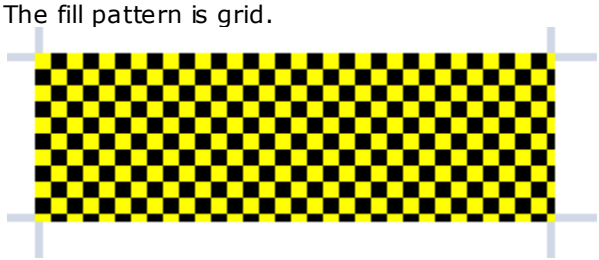
0x0006 The fill pattern is vertical stripes.



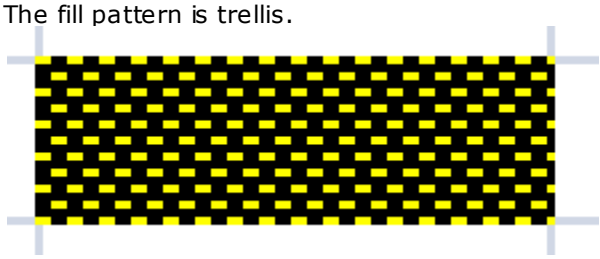
0x0007 The fill pattern is downward diagonal stripes.

0x0008 The fill pattern is upward diagonal stripes.

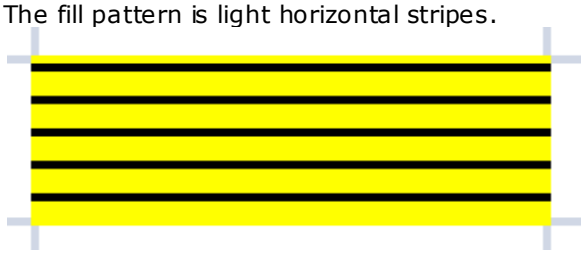
0x0009 The fill pattern is grid.



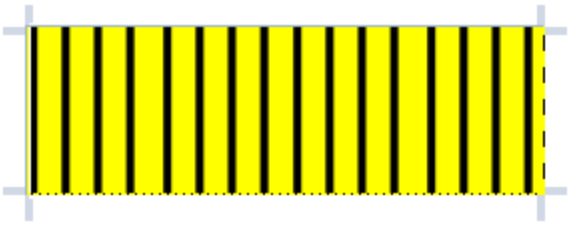
0x000A The fill pattern is trellis.



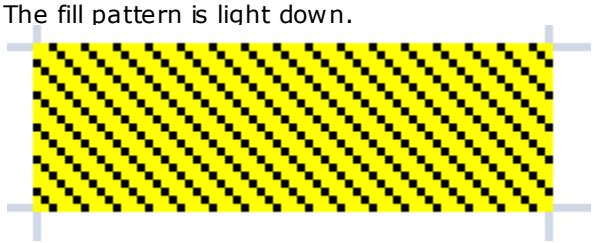
0x000B The fill pattern is light horizontal stripes.



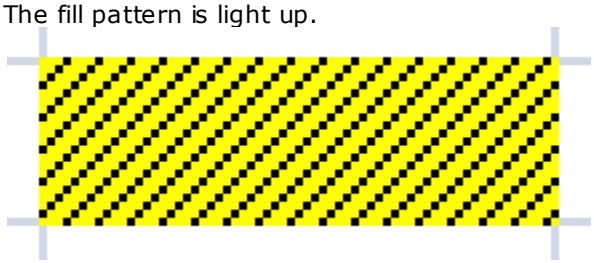
0x000C The fill pattern is light vertical stripes.



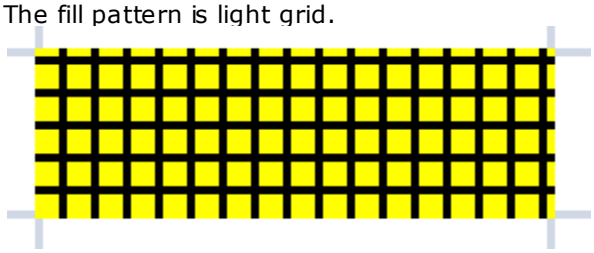
0x000D The fill pattern is light down.



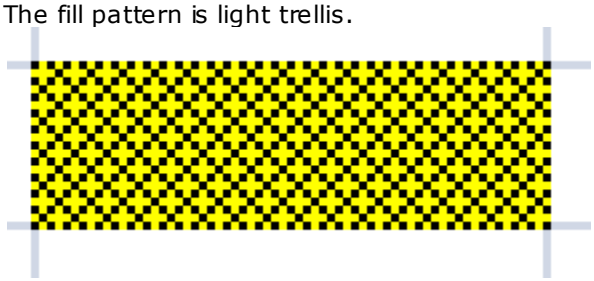
0x000E The fill pattern is light up.



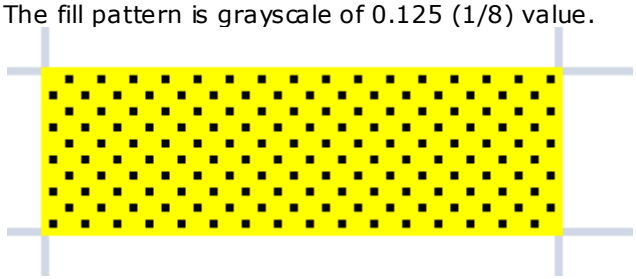
0x000F The fill pattern is light grid.



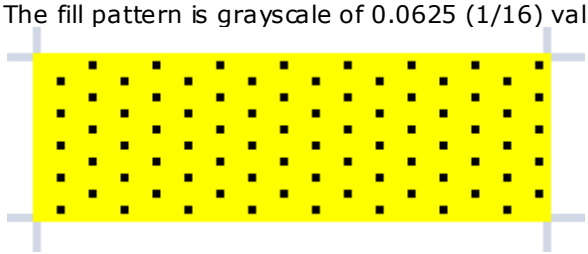
0x0010 The fill pattern is light trellis.



0x0011 The fill pattern is grayscale of 0.125 (1/8) value.



0x0012 The fill pattern is grayscale of 0.0625 (1/16) value.



0x0028 The fill pattern is a gradient fill.

brtColorFore (8 bytes): A BrtColor that specifies the foreground color for this cell.

brtColorBack (8 bytes): A BrtColor that specifies the background color for this cell.

iGradientType (4 bytes): An unsigned integer that specifies the type of **gradient fill** used. MUST be a value from the following table:

Value	Meaning
0x00000000	**Linear gradient**
0x00000001	**Rectangular gradient**

xnumDegree (8 bytes): An Xnum that specifies the gradient angle in degrees for linear gradient. The gradient angle specifies the angle at which the gradient strokes are drawn.

For example, a value of 90 for **xnumDegree** the gradient color start from the bottom of the cell.

Figure 19: Gradient angle example

MUST be used when **iGradientType** is Linear gradient.

xnumFillToLeft (8 bytes): An Xnum that specifies as a fraction of the length of the cell, the left edge of the **inner rectangle** of a rectangular gradient. For example, a value of 0 for **xnumFillToLeft**, means the left edge of the inner rectangle is the left edge of the cell, and 1 means its right edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. MUST be greater than or equal to 0 and less than or equal to 1.

xnumFillToRight (8 bytes): An Xnum that specifies as a fraction of the length of the cell, the right edge of the inner rectangle of a rectangular gradient. For example, a value of 0 for **xnumFillToRight**, means the right edge of the inner rectangle is on the left edge of the cell, and 1 means it is on the right edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. MUST be greater than or equal to 0 and less than or equal to 1.

xnumFillToTop (8 bytes): An Xnum that specifies as a fraction of the height of the cell, the top edge of the inner rectangle of a rectangular gradient. For example, a value of 0 for **xnumFillToTop**, means the top edge of the inner rectangle is on the top edge of the cell, and 1 means it is on the bottom edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. MUST be greater than or equal to 0 and less than or equal to 1.

xnumFillToBottom (8 bytes): An Xnum that specifies as a fraction of the height of the cell, the bottom edge of the inner rectangle of a rectangular gradient. For example, a value of 0 for **xnumFillToBottom**, means the bottom edge of the inner rectangle is on the bottom edge of the cell, and 1 means it is on the top edge of the cell. MUST exist when **iGradientType** is Rectangular gradient. MUST be greater than or equal to 0 and less than or equal to 1.

cNumStop (4 bytes): An unsigned integer that specifies the number of elements in **xfillGradientStop**. MUST be greater than or equal to 0 and less than or equal to 256.

xfillGradientStop (variable): An array of GradientStop. The number of elements MUST be equal to **cNumStop**.

2.4.459 BrtFilter

This record specifies a filter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgch (variable)																															
...																															

rgch (variable): An XLWideString that specifies the criteria string used in the filter. Cells that contain a string that matches this string criteria case insensitively, and cells that contain a calculation such that the resulting value expressed as a string matches this string criteria case insensitively, will have their corresponding rows shown. This field MUST be greater than or equal to 1 character in length and less than or equal to 255 characters in length.

2.4.460 BrtFmlaBool

This record specifies a cell that contains a formula of which the most recent evaluation resulted in a Boolean value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
bBool								grbitFlags																formula (variable)							
...																															

cell (8 bytes): A Cell that specifies the cell that contains this formula.

bBool (1 byte): A Boolean value to which the formula is evaluated.

Value	Meaning
0x00	False
0x01	True

grbitFlags (2 bytes): A GrbitFmla that specifies additional formula data.

formula (variable): A CellParsedFormula that specifies the formula stored in this cell.

2.4.461 BrtFmlaError

This record specifies a cell that contains a formula of which the most recent evaluation resulted in an error.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
fErr								grbitFlags															formula (variable)								
...																															

cell (8 bytes): A Cell that specifies the cell that contains this formula.

fErr (1 byte): A BErr that specifies the error in this formula.

grbitFlags (2 bytes): A GrbitFmla that specifies additional formula data.

formula (variable): A CellParsedFormula that specifies the formula stored in this cell

2.4.462 BrtFmlaNum

This record specifies a cell that contains a formula of which the most recent evaluation resulted in a numeric value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
xnum																															
...																															
grbitFlags																formula (variable)															
...																															

cell (8 bytes): A Cell that specifies the cell that contains this formula.

xnum (8 bytes): An Xnum that specifies the value to which this formula evaluated.

grbitFlags (2 bytes): A GrbitFmla that specifies additional formula data.

formula (variable): A CellParsedFormula that specifies the formula stored in this cell

2.4.463 BrtFmlaString

This record specifies a cell that contains a formula of which the most recent evaluation resulted in a string value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cell																															
...																															
value (variable)																															
...																															
grbitFlags																formula (variable)															
...																															

cell (8 bytes): A Cell that specifies cell information such as the column, style and phonetic information.

value (variable): An XLWideString that specifies the value to which this formula evaluated. MUST be less than 32768 characters.

grbitFlags (2 bytes): A GrbitFmla that specifies additional formula data.

formula (variable): A CellParsedFormula that specifies the formula stored in this cell

2.4.464 BrtFmt

This record specifies a number format.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ifmt																stFmtCode (variable)															
...																															

ifmt (2 bytes): An Ifmt that specifies the identifier of the **format string** specified by **stFmtCode**. The value of **ifmt.ifmt** MUST be a value within one of the following ranges:

- 5 to 8
- 23 to 26
- 41 to 44
- 63 to 66
- 164 to 382

stFmtCode (variable): An XLWideString that specifies the format string for this number format. The format string indicates how to format the numeric value of the cell. The length of this field MUST be greater than or equal to 1 character and less than or equal to 255 characters. For more information about how format strings are interpreted, see [ECMA-376] Part 4: Markup Language

Reference, section 3.8.31. The ABNF grammar for the format string is specified in [MS-XLS] section 2.4.126.

2.4.465 BrtFnGroup

This record specifies an individual function category.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
stGroup (variable)																															
...																															

stGroup (variable): An XLWideString that specifies the name of the function category. Its length MUST be less than or equal to 32 characters.

2.4.466 BrtFont

This record defines the properties of one of the fonts used in the workbook.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
dyHeight																grbit															
bls																sss															
uls								bFamily								bCharSet				unused											
brtColor																															
...																															
bFontScheme								name (variable)																							
...																															

dyHeight (2 bytes): An unsigned integer that specifies height of the font in twips. The value specified MUST be greater than or equal to 0x0014 and less than or equal to 0x1FFF.

grbit (2 bytes): A FontFlags that specifies the font attributes.

bls (2 bytes): An unsigned integer that specifies the weight of the font. The value specified MUST be greater than or equal to 0x0190 and less than or equal to 0x03E8. The values are 0x0190 for normal text and 0x02BC for bold text.

sss (2 bytes): An unsigned integer that specifies if the font is a subscript or a superscript font. MUST be a value from the following table:

Value	Meaning
0x0000	None
0x0001	Superscript
0x0002	Subscript

uls (1 byte): An unsigned integer that specifies the type of underline to be used. MUST be a value from the following table:

Value	Meaning
0x00	None
0x01	Single
0x02	Double
0x21	**Single accounting**
0x22	**Double accounting**

bFamily (1 byte): An unsigned integer that specifies the font family this font belongs to. MUST be a value from the following table:

Value	Meaning
0x00	Not applicable
0x01	Roman
0x02	Swiss
0x03	Modern
0x04	Script
0x05	Decorative

For more information about font family, see the Windows API LOGFONT structure in [MSDN-FONTS].

bCharSet (1 byte): An unsigned integer that specifies the character set. MUST be a value from the following table:

Value	Name	Meaning
0x00	ANSI_CHARSET	English
0x01	DEFAULT_CHARSET	System locale based
0x02	SYMBOL_CHARSET	Symbol
0x4D	MAC_CHARSET	Macintosh
0x80	SHIFTJIS_CHARSET	Japanese
0x81	HANGUL_CHARSET / HANGEUL_CHARSET	Hangul (Hangeul) Korean
0x82	JOHAB_CHARSET	Johab Korean
0x86	GB2312_CHARSET	Simplified Chinese
0x88	CHINESEBIG5_CHARSET	Traditional Chinese
0xA1	GREEK_CHARSET	Greek
0xA2	TURKISH_CHARSET	Turkish
0xA3	VIETNAMESE_CHARSET	Vietnamese
0xB1	HEBREW_CHARSET	Hebrew
0xB2	ARABIC_CHARSET	Arabic
0xBA	BALTIC_CHARSET	Baltic
0xCC	RUSSIAN_CHARSET	Russian
0xDE	THAI_CHARSET	Thai
0xEE	EASTEUROPE_CHARSET	Eastern European

0xFF	OEM_CHARSET	OEM code page (based on System Locale)

For more information about character set, see the Windows API LOGFONT structure in [MSDN-FONTS].

unused (1 byte): Undefined and MUST be ignored.

brtColor (8 bytes): A BrtColor that specifies the color of this font.

bFontScheme (1 byte): An unsigned integer that specifies the **font scheme** to which this font belongs. When a font is part of a theme as specified in [ECMA-376] part 1, section 14.2.7, the font is categorized as a **major scheme** or a **minor scheme**. When a new theme is chosen, every font that is part of the theme is updated to use the major scheme or the minor scheme. MUST be a value from the following table:

Value	Meaning
0x00	None
0x01	Major font scheme
0x02	Minor font scheme

name (variable): An XLWideString that specifies the name of the font. The length of this field MUST be greater than or equal to 1 and less than or equal to 31.

2.4.467 BrtFRTBegin

This record specifies the beginning of a collection of Future Records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
productVersion																															

productVersion (4 bytes): FRTProductVersion that specifies the application which created the Future Records.

2.4.468 BrtFRTEnd

This record specifies the end of a collection of Future Records.

2.4.469 BrtHLink

This record specifies a **hyperlink** that applies to a range of cells.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfx (16 bytes)																															
...																															
relId (variable)																															
...																															
location (variable)																															
...																															
tooltip (variable)																															
...																															
display (variable)																															
...																															

rfx (16 bytes): An UncheckedRfX that specifies the range in the sheet that contains this hyperlink.

relId (variable): A RelID that specifies the destination URL of this hyperlink. MUST be an empty string if and only if the destination is this workbook. MUST NOT be a NULL string.

location (variable): An XLWideString that specifies the **fragment identifier** of the destination URL specified by **relId**. If **relId** is an empty string, this fragment identifier specifies a location within this workbook. MUST be less than 2084 characters.

tooltip (variable): An XLWideString that specifies the ToolTip for the hyperlink. MUST be less than 256 characters.

display (variable): An XLWideString that specifies the name of the run-time object that implements this hyperlink.

2.4.470 BrtIconFilter

This record specifies the icon set and particular icon within that set to filter by. Rows with a cell icon that do not match this criteria will be hidden when the filter is applied.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iIconSet																															

iIcon

iIconSet (4 bytes): A KPISets that specifies the icon set used as the filter criteria.

iIcon (4 bytes): An Icon that specifies the icon to be used as filter criteria. If the icon set specified by **iIconSet** has 3 icons, this value MUST be less than or equal to 2. If the icon set specified by **iIconSet** has 4 icons, this value MUST be less than or equal to 3. If the icon set specified by **iIconSet** has 5 icons, this value MUST be less than or equal to 4.

2.4.471 BrtIndexBlock

The record specifies the minimum and maximum rows in a range within a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwMic																															
rwMac																															
unused1																															
unused2																															
unused3 (variable)																															
...																															

rwMic (4 bytes): An UncheckedRw that specifies a zero-base starting row for the range.

rwMac (4 bytes): An unsigned integer that specifies a one-base ending row for the range. MUST be less than or equal to **rwMic** + 32. MUST be less than or equal to 1048576.

unused1 (4 bytes): Undefined and MUST be ignored.

unused2 (4 bytes): Undefined and MUST be ignored.

unused3 (variable): Undefined and MUST be ignored. The size of this field in bytes MUST be equal to the value as specified in the following formula:

((**rwMac** – **rwMic** + 32) / 32) * 4

2.4.472 BrtIndexedColor

This record specifies an indexed color definition in **RGB (red-green-blue)**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
bRed								bGreen								bBlue								reserved							

bRed (1 byte): An unsigned integer that specifies the intensity of the color red.

bGreen (1 byte): An unsigned integer that specifies the intensity of the color green.

bBlue (1 byte): An unsigned integer that specifies the intensity of the color blue.

reserved (1 byte): Undefined and MUST be ignored.

2.4.473 BrtIndexPartEnd

This record specifies the end of a collection of BrtIndexBlock and BrtIndexRowBlock records.

2.4.474 BrtIndexRowBlock

The record specifies the cells that contain data within the range specified by a preceding BrtIndexBlock record. This BrtIndexRowBlock record provides byte indexes into the Worksheet part or Macro Sheet part for certain cell records that contain data and are within the range corresponding to the preceding BrtIndexBlock.

The range specified by the BrtIndexBlock is referred to as the block range.

Cell records are records of type : BrtCellBlank, BrtCellRk, BrtCellError, BrtCellBool, BrtCellReal, BrtCellSt, BrtCellIsst, BrtFmlaString, BrtFmlaNum, BrtFmlaBool, BrtFmlaError, or BrtCellRString.

This record MUST follow a BrtIndexBlock record which specifies the rows which the block range spans.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
grbitRowMask																															
ibBaseOffset																															
...																															
arrayColbitMask (variable)																															
...																															
arraySubBaseOffset (variable)																															
...																															

grbitRowMask (4 bytes): An unsigned integer that specifies which rows in the block range contain data. If a row contains data, the bit in **grbitRowMask** corresponding to the one-based row index is set to 1. For example **grbitRowMask** with value 0x00000003 corresponds to a block range where the first and second rows contain data.

ibBaseOffset (8 bytes): An unsigned integer that specifies a 64-bit zero-based index to the cell record within the Worksheet part or Macro Sheet part for the first cell in the block range which contains data.

arrayColbitMask (variable): An array of 2-byte unsigned integers that specify for every row which ranges of columns contain data in the sheet. Each item in this array corresponds to a row that contains data. The number of items in this array MUST equal the number of bits that are set in **grbitRowMask**. The sheet is divided into 16 equal ranges of columns. Each column range is one

row by 1024 columns in size. For every row which has a bit set in **grbitRowMask**, the bit corresponding to the one-based index to the column range that contains data in at least one of the cells is set in the corresponding item of **arrayColbitMask**. For example, if **arrayColbitMask**[0] has the value 0x0002, then at least one cell in the first row and the second column range has data.

arraySubBaseOffset (variable): An array of 4-byte unsigned integers each of which specifies the zero-based byte index to the beginning of a cell record within the Worksheet part or Macro Sheet part, for all cells that contain data within the block range when used in the following formula:

ibBaseOffset + **arraySubBaseOffset**[x]

where x is the index of an item in the **arraySubBaseOffset** array.

The number of elements in **arraySubBaseOffset** MUST be equal to the total number of bits set in **arrayColbitMask.**

For example, if **arrayColbitMask**[0] has the value 0x0002, then **ibBaseOffset + arraySubBaseOffset**[0] specifies the byte index to the first cell which contains data in the first row of the block range, and is in the second column range.

2.4.475 BrtInfo

This record specifies properties of workbook revisions and specifies the beginning of a collection of BrtRRHeader records as defined by the Revision Headers part ABNF. The collection of BrtRRHeader records specifies the list of revision headers in a shared workbook

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	reserved												guid (16 bytes)															
...																															
...																guidRoot (16 bytes)															
...																															
...																revid															
...																version															
...																E	F	unused4													
wRevHistInterval																															

A - unused1 (1 bit): MUST be 1 and MUST be ignored.

B - fDiskHasRev (1 bit): A bit that specifies whether this workbook contains revisions.

C - unused2 (1 bit): MUST be 1 and MUST be ignored.

D - unused3 (1 bit): MUST be 1 and MUST be ignored.

reserved (12 bits): MUST be 0 and MUST be ignored.

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies the last set of revisions. This MUST match the GUID for the most recent header.

guidRoot (16 bytes): A GUID as specified by [MS-DTYP] that specifies the last set of revisions that was saved to the file. This MUST match the GUID for one of the revision headers.

revid (4 bytes): An unsigned integer that specifies the current revision number of this shared workbook.

version (4 bytes): A signed integer that specifies the current version of this shared workbook. The value MUST be greater than or equal to 1.

E - fNoRevHist (1 bit): A bit that specifies whether the **revision history** is kept for this shared workbook. If **fNoRevHist** equals 1, the history is not kept.

F - fProtRev (1 bit): A bit that specifies whether the change tracking in this shared workbook can be removed. If **fProtRev** is 1, the tracking cannot be removed.

unused4 (14 bits): Undefined and MUST be ignored.

wRevHistInterval (2 bytes): An unsigned integer that specifies the number of days the the change history is kept for this shared workbook. The value MUST be greater than or equal to 0 and less than or equal to 32767. A value of 0 is means the default value of 30 days is used, and it is only valid when **fNoRevHist** is 1.

2.4.476 BrtLegacyDrawing

This record specifies a link to a VML Drawing Part as specified in [ECMA-376] Part 1: Fundamentals, section 15.2.17 that specifies a drawing for a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stRelId (variable)																															
...																															

stRelId (variable): A RelID that specifies the link to the VML Drawing Part.

2.4.477 BrtLegacyDrawingHF

This record specifies a link to a VML Drawing Part as specified in [ECMA-376] Part 1: Fundamentals, section 15.2.17 that specifies a drawing for the header or footer of a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stRelID (variable)																															
...																															

stRelID (variable): A RelID that specifies the link to the VML Drawing Part.

2.4.478 BrtListCCFmla

This record specifies information about a table column's calculated column formula.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	reserved2						formula (variable)																							
...																															

A - reserved1 (1 bit): MUST be zero and MUST be ignored.

B - fArray (1 bit): A bit that specifies whether this is an array formula.

reserved2 (6 bits): MUST be zero and MUST be ignored.

formula (variable): A ListParsedFormula that specifies the formula associated with the table column.

2.4.479 BrtListPart

This record specifies a reference to a Table part.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stRelID (variable)																															
...																															

stRelID (variable): A RelID that specifies a Table part in this file.

2.4.480 BrtListTrFmla

This record specifies information about a table's total row formula.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	reserved2						formula (variable)																							

...

A - reserved1 (1 bit): MUST be zero and MUST be ignored.

B - fArray (1 bit): A bit that specifies whether this is an array formula.

reserved2 (6 bits): MUST be zero and MUST be ignored.

formula (variable): A ListParsedFormula that specifies the formula associated with the table column. The **ilta** field of the preceding BrtBeginListCol record MUST be ILTA_CUSTOM. If the **crwTotals** field of the preceding BrtBeginList record is 1, then the formula specified by this value MUST equal the formula of the cell intersected by the table total row and table column.

2.4.481 BrtMargins

Specifies all of the page margins for a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xnumLeft																															
...																															
xnumRight																															
...																															
xnumTop																															
...																															
xnumBottom																															
...																															
xnumHeader																															
...																															
xnumFooter																															
...																															

xnumLeft (8 bytes): A Margin that specifies the left page margin.

xnumRight (8 bytes): A Margin that specifies the right page margin.

xnumTop (8 bytes): A Margin that specifies the top page margin.

xnumBottom (8 bytes): A Margin that specifies the bottom page margin.

xnumHeader (8 bytes): A Margin that specifies the header page margin.

xnumFooter (8 bytes): A Margin that specifies the footer page margin.

2.4.482 BrtMdb

This record specifies an array of Mdir structures.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cMdir																															
rgMdir (variable)																															
...																															

cMdir (4 bytes): A signed integer that specifies the number of items in the **rgMdir** array. This number MUST be greater than or equal to 1, and MUST be equal to the number of items in the **rgMdir** array.

rgMdir (variable): An array of Mdir structures. The number of items in the array MUST be equal to the value of **cMdir**. Mdir structures in the array MUST be stored in the strictly increasing order of their **iMdt** field.

2.4.483 BrtMdtinfo

This record specifies the name and properties of a cell metadata or value metadata type.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
grbit																															
metadataID																															
stName (variable)																															
...																															

grbit (4 bytes): An MdtFlags that specifies the properties of the metadata type.

metadataID (4 bytes): An unsigned integer that specifies the version of the application that introduced the metadata type.

stName (variable): An XLWideString that specifies the name of the metadata type. The name of the metadata type MUST be unique within the collection of metadata types. The length of the name MUST be greater than or equal to 1 character and less than or equal to 65535 characters.

2.4.484 BrtMdxMbrIstr

This record specifies an MDX unique name and its properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
istr																															
grbit																															

istr (4 bytes): An Istr that specifies the MDX unique name.

grbit (1 byte): An MdxMbrIstrFlags that specifies the properties of the MDX unique name.

2.4.485 BrtMergeCell

This record specifies a single merged cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwFirst																															
rwLast																															
colFirst																															
colLast																															

rwFirst (4 bytes): An UncheckedRw that specifies the first row of the merged cell. MUST NOT be greater than **rwLast**. MUST be zero and **rwLast** MUST be 1048575, or MUST be within the bounds of Rw.

rwLast (4 bytes): An UncheckedRw that specifies the last row of the merged cell. MUST NOT be less than **rwFirst**. MUST be 1048575 and **rwFirst** MUST be zero, or MUST be within the bounds of Rw.

colFirst (4 bytes): An UncheckedCol that specifies the first column of the merged cell. MUST NOT be greater than **colLast**. MUST be zero and **colLast** MUST be 16383, or MUST be within the bounds of Col.

colLast (4 bytes): An UncheckedCol that specifies the last column of the merged cell. MUST NOT be less than **colFirst**. MUST be 16383 and **colFirst** MUST be zero, or MUST be within the bounds of Col.

2.4.486 BrtMRUColor

This record specifies the color that the user has most recently used in the workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
colorMRU																															
...																															

colorMRU (8 bytes): A BrtColor that specifies the most recently used color. Sub-fields are further specified in the following table:

Field	Meaning
colorMRU.fValidRGB	MUST be 0x1.
colorMRU.xcolorType	MUST be 0x02.
colorMRU.Index	MUST be 0xFF.
colorMRU.nTintAndShade	MUST be 0x00.
colorMRU.bAlpha	MUST be 0xFF.

2.4.487 BrtName

This record specifies a defined name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	fgrp									G	H	I	reserved													
chKey								itab																							
...								name (variable)																							
...																															
formula (variable)																															
...																															
comment (variable)																															
...																															
unusedstring1 (variable)																															
...																															
description (variable)																															
...																															
helpTopic (variable)																															
...																															
unusedstring2 (variable)																															
...																															

A - fHidden (1 bit): A bit that specifies whether the defined name is not visible in the list of defined names.

B - fFunc (1 bit): A bit that specifies whether the defined name represents an **XLM macro**. If this bit is 1, then **fProc** MUST also be 1.

C - fOB (1 bit): A bit that specifies whether the defined name represents a Visual Basic for Applications (VBA) macro. If this bit is 1, then **fProc** MUST also be 1.

D - fProc (1 bit): A bit that specifies whether the defined name represents a macro.

E - fCalcExp (1 bit): A bit that specifies whether **formula.rgce** contains a call to a function that can return an array.

F - fBuiltin (1 bit): A bit that specifies whether the defined name represents a built-in name.

fgrp (9 bits): An FnGroupID that specifies the function category for the defined name. MUST be less than **iMac** field of BrtBeginFnGroup plus the count of BrtFnGroup records. If **fProc** is 0, then the value MUST be zero and MUST be ignored.

G - fPublished (1 bit): A bit that specifies whether the defined name was published.

H - fWorkbookParam (1 bit): A bit that specifies whether the defined name is a workbook parameter.

I - unused (1 bit): Undefined and MUST be ignored.

reserved (14 bits): MUST be zero, and MUST be ignored.

chKey (1 byte): The unsigned integer value of the **ASCII** character that specifies the shortcut key for the macro represented by the defined name. MUST be 0 if **fFunc** is 1 or if **fProc** is 0. Otherwise MUST <22> be greater than or equal to 0x41 and less than or equal to 0x5A, or greater than or equal to 0x61 and less than or equal to 0x7A.

itab (4 bytes): An unsigned integer that specifies the scope of the defined name. MUST be a value from the following table:

Value	Meaning
0xFFFFFFFF	The scope is entire workbook.
Greater than or equal to zero and less than 0xFFFFFFFF	Specifies a zero-based index of a BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs. The referenced BrtBundleSh specifies the scope of the defined name.

name (variable): XLNameWideString that specifies the name of the defined name.

formula (variable): A NameParsedFormula that specifies the formula for the defined name.

comment (variable): An XLNullableWideString that specifies the comment for the defined name. The maximum length of the string MUST be less than 256 characters.

unusedstring1 (variable): An XLNullableWideString that exists if and only if **fProc** is 1 and **fFunc** is 0. MUST specify a NULL string.

description (variable): An XLNullableWideString that specifies the custom menu for the macro represented by the defined name. Exists if and only if **fProc** is 1 and **fFunc** is 0. The maximum length of the string MUST be less than 32768 characters.

helpTopic (variable): An XLNullableWideString that specifies the description for the macro represented by the defined name. Exists if and only if **fProc** is 1 and **fFunc** is 0. The maximum length of the string MUST be less than 32768 characters.

unusedstring2 (variable): An XLNullableWideString that exists if and only if **fProc** is 1 and **fFunc** is 0. MUST specify a NULL string.

2.4.488 BrtOleObject

This record specifies an **embedded object**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dwAspect																															
dwOleUpdate																															
shapeId																															
A	B	reserved														strProgID (variable)															
...																															
link (variable)																															
...																															
strRelID (variable)																															
...																															

dwAspect (4 bytes): An unsigned integer that specifies how the object is represented when drawing or getting data. MUST be a value from the following table:

Name	Value	Meaning
DVASPECT_CONTENT	0x00000001	Provides a representation of an embedded object's content.
DVASPECT_ICON	0x00000004	Provides an iconic representation of an embedded object.

dwOleUpdate (4 bytes): An unsigned integer that specifies when to update the embedded object's cached data. MUST be 0 if **fLinked** is 0; otherwise, MUST be a value from the following table:

Name	Value	Meaning
OLEUPDATE_ALWAYS	0x00000001	Update the embedded object whenever possible.
OLEUPDATE_ONCALL	0x00000003	Update the embedded object only upon user request.

shapeId (4 bytes): An unsigned integer that corresponds to the spid attribute, as specified in [ECMA-376] Part 4, section 6.1.2.19, of a shape element in the VML Drawings part. MUST be greater than or equal to 0x00000001 and less than or equal to 0x03FFD7FF. The value of the ObjectType attribute of the ClientData child element, as specified in [ECMA-376] Part 4, section 6.4.2.12, of the shape element MUST be "Pict" as specified in [ECMA-376] Part 4, section 6.4.3.2. The total number of unique identifiers specified by **shapeId** and **BrtActiveX.shapeId** in a worksheet, macro sheet or dialog sheet MUST NOT exceed 65535.

A - fLinked (1 bit): A bit that specifies whether this embedded object is linked.

B - fAutoLoad (1 bit): A bit that specifies whether the host application for the embedded object is called to load the object data automatically when the workbook is opened.

reserved (14 bits): MUST be 0, and MUST be ignored.

strProgID (variable): An XLWideString that specifies a programmatic identifier associated with this object. This string MUST comply with the following requirements:

- Have no more than 39 characters.
- Contain no punctuation (including underscores) except one or more periods.
- Not start with a digit.
- Be different from the class name of any **OLE1** application, including the OLE1 version of the same application, if there is one.

link (variable): An ObjectParsedFormula that specifies the formula that specifies where the data for this **linked object** can be found. MUST exist if and only if **fLinked** is nonzero.

strRelID (variable): A RelID that specifies a relationship targeting an Embedded Object or an Embedded Package containing data for this object. MUST exist if and only if **fLinked** is zero.

2.4.489 BrtOleSize

This record specifies the range of cells to be displayed when this workbook is displayed as an embedded object in another document.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfx (16 bytes)																															
...																															

rfx (16 bytes): An UncheckedRfX that specifies the range of cells to be displayed by the embedded object.

2.4.490 BrtPageSetup

This record specifies page layout and printing settings for a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iPaperSize																															
iScale																															
iRes																															
iVRes																															
iCopies																															
iPageStart																															
iFitWidth																															
iFitHeight																															
A	B	C	D	E	F	G	H	I	J	reserved2				szRelID (variable)																	
...																															

iPaperSize (4 bytes): An unsigned integer that specifies the paper size according to the following table. This value MUST be greater than or equal to 0 and less than 2147483647. The value 0 or values greater than or equal to 256 specify custom printer paper sizes that can be stored in a [DEVMODE] structure. The DEVMODE structure allows printer drivers to save height and width information. This is optional.

Values between 118 and 256 are reserved for future use.

Value	Meaning
1	US Letter 8 1/2 x 11 in
2	US Letter Small 8 1/2 x 11 in
3	US Tabloid 11 x 17 in
4	US Ledger 17 x 11 in
5	US Legal 8 1/2 x 14 in
6	US Statement 5 1/2 x 8 1/2 in
7	US Executive 7 1/4 x 10 1/2 in
8	A3 297 x 420 mm
9	A4 210 x 297 mm
10	A4 Small 210 x 297 mm
11	A5 148 x 210 mm
12	B4 (JIS) 250 x 354
13	B5 (JIS) 182 x 257 mm
14	Folio 8 1/2 x 13 in
15	Quarto 215 x 275 mm
16	10 x 14 in

17	11 x 17 in
18	US Note 8 1/2 x 11 in
19	US Envelope #9 3 7/8 x 8 7/8
20	US Envelope #10 4 1/8 x 9 1/2
21	US Envelope #11 4 1/2 x 10 3/8
22	US Envelope #12 4 \276 x 11
23	US Envelope #14 5 x 11 1/2
24	C size sheet
25	D size sheet
26	E size sheet
27	Envelope DL 110 x 220mm
28	Envelope C5 162 x 229 mm
29	Envelope C3 324 x 458 mm
30	Envelope C4 229 x 324 mm
31	Envelope C6 114 x 162 mm
32	Envelope C65 114 x 229 mm
33	Envelope B4 250 x 353 mm
34	Envelope B5 176 x 250 mm
35	Envelope B6 176 x 125 mm
36	Envelope 110 x 230 mm
37	US Envelope Monarch 3.875 x 7.5 in
38	6 3/4 US Envelope 3 5/8 x 6 1/2 in
39	US Std Fanfold 14 7/8 x 11 in
40	German Std Fanfold 8 1/2 x 12 in
41	German Legal Fanfold 8 1/2 x 13 in
42	B4 (ISO) 250 x 353 mm
43	Japanese Postcard 100 x 148 mm
44	9 x 11 in
45	10 x 11 in
46	15 x 11 in
47	Envelope Invite 220 x 220 mm
48	RESERVED--DO NOT USE
49	RESERVED--DO NOT USE
50	US Letter Extra 9 \275 x 12 in
51	US Legal Extra 9 \275 x 15 in
52	US Tabloid Extra 11.69 x 18 in
53	A4 Extra 9.27 x 12.69 in
54	Letter Transverse 8 \275 x 11 in
55	A4 Transverse 210 x 297 mm
56	Letter Extra Transverse 9\275 x 12 in
57	SuperA/SuperA/A4 227 x 356 mm
58	SuperB/SuperB/A3 305 x 487 mm
59	US Letter Plus 8.5 x 12.69 in

60	A4 Plus 210 x 330 mm
61	A5 Transverse 148 x 210 mm
62	B5 (JIS) Transverse 182 x 257 mm
63	A3 Extra 322 x 445 mm
64	A5 Extra 174 x 235 mm
65	B5 (ISO) Extra 201 x 276 mm
66	A2 420 x 594 mm
67	A3 Transverse 297 x 420 mm
68	A3 Extra Transverse 322 x 445 mm
69	Japanese Double Postcard 200 x 148 mm
70	A6 105 x 148 mm
71	Japanese Envelope Kaku #2
72	Japanese Envelope Kaku #3
73	Japanese Envelope Chou #3
74	Japanese Envelope Chou #4
75	Letter Rotated 11 x 8 1/2 11 in
76	A3 Rotated 420 x 297 mm
77	A4 Rotated 297 x 210 mm
78	A5 Rotated 210 x 148 mm
79	B4 (JIS) Rotated 364 x 257 mm
80	B5 (JIS) Rotated 257 x 182 mm
81	Japanese Postcard Rotated 148 x 100 mm
82	Double Japanese Postcard Rotated 148 x 200 mm
83	A6 Rotated 148 x 105 mm
84	Japanese Envelope Kaku #2 Rotated
85	Japanese Envelope Kaku #3 Rotated
86	Japanese Envelope Chou #3 Rotated
87	Japanese Envelope Chou #4 Rotated
88	B6 (JIS) 128 x 182 mm
89	B6 (JIS) Rotated 182 x 128 mm
90	12 x 11 in
91	Japanese Envelope You #4
92	Japanese Envelope You #4 Rotated
93	PRC 16K 146 x 215 mm
94	PRC 32K 97 x 151 mm
95	PRC 32K(Big) 97 x 151 mm
96	PRC Envelope #1 102 x 165 mm
97	PRC Envelope #2 102 x 176 mm
98	PRC Envelope #3 125 x 176 mm
99	PRC Envelope #4 110 x 208 mm
100	PRC Envelope #5 110 x 220 mm

101	PRC Envelope #6 120 x 230 mm
102	PRC Envelope #7 160 x 230 mm
103	PRC Envelope #8 120 x 309 mm
104	PRC Envelope #9 229 x 324 mm
105	PRC Envelope #10 324 x 458 mm
106	PRC 16K Rotated
107	PRC 32K Rotated
108	PRC 32K(Big) Rotated
109	PRC Envelope #1 Rotated 165 x 102 mm
110	PRC Envelope #2 Rotated 176 x 102 mm
111	PRC Envelope #3 Rotated 176 x 125 mm
112	PRC Envelope #4 Rotated 208 x 110 mm
113	PRC Envelope #5 Rotated 220 x 110 mm
114	PRC Envelope #6 Rotated 230 x 120 mm
115	PRC Envelope #7 Rotated 230 x 160 mm
116	PRC Envelope #8 Rotated 309 x 120 mm
117	PRC Envelope #9 Rotated 324 x 229 mm
118	PRC Envelope #10 Rotated 458 x 324 mm

iScale (4 bytes): An unsigned integer that specifies the print scale. The value MUST be greater than or equal to 10 and less than or equal to 400, or be equal to 0.

iRes (4 bytes): An unsigned integer that specifies the horizontal resolution to use when printing, in DPI.

iVRes (4 bytes): An unsigned integer that specifies the vertical resolution to use when printing, in DPI.

iCopies (4 bytes): An unsigned integer that specifies the number of copies to print. This value MUST be greater than or equal to 0 or less than or equal to 32767.

iPageStart (4 bytes): A signed integer that specifies the page number for the first page being printed. For example, if the value is 6, the first page number will be 6. This value MUST be greater than or equal to -32765 and less than or equal to 32767. MUST be ignored if the value of **fUsePage** is 0.

iFitWidth (4 bytes): An unsigned integer that specifies the number of horizontal pages to fit the printed output into. For example, if the value is 6, the printed output is fit to a width of 6 pages. If the value is 0, then the printed output is not fit to a specific number or horizontal pages. This value MUST be greater than or equal to 0 or less than or equal to 32767.

iFitHeight (4 bytes): An unsigned integer that specifies the number of vertical pages to fit the printed output into. For example, if the value is 6, the printed output is fit to a height of 6 pages.

If the value is 0, then the printed output is not fit to a specific number or vertical pages This value MUST be greater than or equal to 0 or less than or equal to 32767.

A - fLeftToRight (1 bit): A bit that specifies the order that multiple pages are sent to the printer for a single sheet.

Value	Meaning
0	Pages are printed top-to-bottom first and then left-to-right.
1	Pages are printed left-to-right first and then top-to-bottom.

B - fLandscape (1 bit): A bit that specifies the orientation of the printed page. This bit MUST be ignored if **fNoOrient** has a value of 1. Otherwise, MUST be one of the following:

Value	Meaning
0	Portrait orientation, in which the longest edge of the page is vertical.
1	Landscape orientation, in which the longest edge of the page is horizontal.

C - reserved1 (1 bit): MUST be zero, and MUST be ignored.

D - fNoColor (1 bit): A bit that specifies the color setting of the printed page.

Value	Meaning
0	The printer is instructed to print the page in color.
1	The printer is instructed to print the page in black and white.

E - fDraft (1 bit): A bit that specifies whether graphics are included on the printed page. MUST be one of the following:

Value	Meaning
0	Graphics are included in the printed page.
1	Graphics are omitted in the printed page.

F - fNotes (1 bit): A bit that specifies **print settings** for comments. MUST be one of the following:

Value	Meaning
0	The comments are not printed.
1	The comments are printed. The location of the comments is specified by **fEndNotes**.

G - fNoOrient (1 bit): A bit that specifies whether orientation of the printed page is determined by **fLandscape** or by the printer. MUST be one of the following:

Value	Meaning
0	The value of **fLandscape** is used to specify the orientation of the printed page.
1	Application and printer specific behavior is used to determine the orientation of the printed page.

H - fUsePage (1 bit): A bit that specifies whether **iPageStart** is used to specify the page number of the first page being printed. MUST be one of the following:

Value	Meaning
0	The page numbering will start with a value of 1.
1	The value of **iPageStart** is used to specify the page number of the first page being printed.

I - fEndNotes (1 bit): A bit that specifies the location of printed comments. This bit MUST be ignored if **fNotes** has a value of 0. MUST be one of the following:

Value	Meaning
0	Comments print as displayed.
1	Comments print after the workbook is printed.

J - iErrors (2 bits): A PrintErrorsAs that specifies how represent cells that contain errors when printing.

reserved2 (5 bits): MUST be zero, and MUST be ignored.

szRelID (variable): An XLNullableWideString that specifies the link to the PrinterSettings part. The length of the XLNullableWideString MUST be less than or equal to 260 characters.

2.4.491 BrtPane

This record specifies the sheet panes.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xnumXSplit																															
...																															
xnumYSplit																															
...																															
rwTop																															
colLeft																															
pnnAct																															
A	B	reserved																													

xnumXSplit (8 bytes): An Xnum that specifies the position of the horizontal split, in twips. If **fFrozen** is equal to one or **fFrozenNoSplit** is equal to one, then this value specifies the number of rows in the **frozen panes**, and MUST be less than the maximum value of Rw.

xnumYSplit (8 bytes): An Xnum that specifies the position of the vertical split, in twips. If **fFrozen** is equal to one or **fFrozenNoSplit** is equal to one, then this value specifies the number of columns in the frozen panes, and MUST be less than the maximum value of Col.

rwTop (4 bytes): An UncheckedRw that specifies the row of the upper left visible cell in the lower right pane.

colLeft (4 bytes): An UncheckedCol that specifies the column of the upper left visible cell in the lower right pane.

pnnAct (4 bytes): A Pnn that specifies the active pane.

A - fFrozen (1 bit): A bit that specifies whether the panes are frozen panes and split panes. MUST NOT be true if **fFrozenNoSplit** is true.

Value	Meaning
0	Whether the panes are frozen panes or split panes is not specified.
1	The panes are frozen panes and split panes.

B - fFrozenNoSplit (1 bit): A bit that specifies whether the panes are frozen panes but not split panes. MUST NOT be true if **fFrozen** is true.

Value	Meaning
0	Whether the panes are frozen panes or split panes is not specified.
1	The panes are frozen panes but not split panes.

reserved (6 bits): MUST be zero, and MUST be ignored.

2.4.492 BrtPCDIABoolean

This record specifies a cache item that contains a boolean and additional data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
f								info (variable)																							
...																															

f (1 byte): A Boolean that specifies the value of this cache item.

info (variable): A PCDIAddlInfo that specifies additional data associated with this cache item.

2.4.493 BrtPCDIADatetime

This record specifies a cache item that contains date and/or time and additional data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
datetime																															
...																															
info (variable)																															
...																															

datetime (8 bytes): A PCDIDateTime that specifies the value of this cache item.

info (variable): A PCDIAddlInfo that specifies additional data associated with this cache item.

2.4.494 BrtPCDIAError

This record specifies a cache item that contains an error and additional data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
err								info (variable)																							
...																															

err (1 byte): A BErr that specifies the value of this cache item.

info (variable): A PCDIAddlInfo that specifies additional data associated with this cache item.

2.4.495 BrtPCDIAMissing

This record specifies a cache item with no value and additional data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
info (variable)																															
...																															

info (variable): A PCDIAddlInfo that specifies additional data associated with this cache item.

2.4.496 BrtPCDIANumber

This record specifies a cache item that contains a number and additional data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xnum																															
...																															
info (variable)																															
...																															

xnum (8 bytes): An Xnum that specifies the value of this cache item.

info (variable): A PCDIAddlInfo that specifies additional data associated with this cache item.

2.4.497 BrtPCDIAString

This record specifies a cache item that contains a string and additional data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
st (variable)																															
...																															
info (variable)																															
...																															

st (variable): An XLWideString that specifies the value of this cache item. If the **bVerCacheCreated** field of the BrtBeginPivotCacheDef record preceding this record is less than 0x03, then the length of the string specified by this field MUST be less than or equal to 255 characters, otherwise the length of the string specified by this field MUST be less than or equal to 32767 characters.

info (variable): A PCDIAddlInfo that specifies additional data associated with this cache item.

2.4.498 BrtPCDIBoolean

This record specifies a cache item or value that contains a Boolean.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
f																															

f (1 byte): A Boolean that specifies the value of this record.

2.4.499 BrtPCDIDatetime

This record specifies a cache item or value that contains a date-time.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
datetime																															
...																															

datetime (8 bytes): A PCDIDateTime that specifies the value of this record.

2.4.500 BrtPCDIError

This record specifies a cache item or value that contains an error and any server formatting information.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
err								sxvcellextra (variable)																							
...																															

err (1 byte): A BErr that specifies the value of this record.

sxvcellextra (variable): A PCDISrvFmt that specifies server formatting information associated with this record. MUST exist if and only if this record is part of a collection of records specified by BrtBeginPCDSDTCEntries and BrtEndPCDSDTCEntries.

2.4.501 BrtPCDIIndex

This record specifies a reference to a cache item or an HTML table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iitem																															

iitem (4 bytes): If this record is part of a collection specified by BrtBeginEcWpTables, then this is an unsigned integer that specifies an HTML table by its zero-based index (in order of the <table> tags in the HTML page); otherwise, this is an unsigned integer that specifies a zero-based index of the cache item, in the collection of cache items specified by the BrtBeginPCDFAtbl record in the cache field associated with this BrtPCDIIndex, as specified by the PivotCache overview.

2.4.502 BrtPCDIMissing

This record specifies a cache item or value that has no value and any server formatting information.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sxvcellextra (variable)																															
...																															

sxvcellextra (variable): A PCDISrvFmt that specifies server formatting information associated with this record. MUST exist if and only if this record is part of a collection of records specified by BrtBeginPCDSDTCEntries and BrtEndPCDSDTCEntries.

2.4.503 BrtPCDINumber

This record specifies a cache item or value that contains a number and any server formatting information.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xnum																															
...																															
sxvcellextra (variable)																															
...																															

xnum (8 bytes): An Xnum that specifies the value of this record.

sxvcellextra (variable): A PCDISrvFmt that specifies server formatting information associated with this record. MUST exist if and only if this record is part of a collection of records specified by BrtBeginPCDSDTCEntries and BrtEndPCDSDTCEntries.

2.4.504 BrtPCDIString

This record specifies an HTML table name, or a cache item or value that contains a string and any server formatting information.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
st (variable)																															
...																															
sxvcellextra (variable)																															
...																															

st (variable): If this record is part of a collection specified by BrtBeginEcWpTables, then this is an XLWideString that specifies the name of an HTML table to be retrieved when a Web query is refreshed. The length of this string MUST be less than or equal to 255 characters. If this record is not part of a collection specified by BrtBeginEcWpTables, then this is an XLWideString that specifies the value of this record. If the **bVerCacheCreated** of the preceding BrtBeginPivotCacheDef is less than 3, the length of this string MUST be less than or equal to 255 characters, otherwise the length of this string MUST be less than or equal to 32767 characters.

sxvcellextra (variable): A PCDISrvFmt that specifies server formatting information associated with this record. MUST exist if and only if this record is part of a collection of records specified by BrtBeginPCDSDTCEntries and BrtEndPCDSDTCEntries.

2.4.505 BrtPCDSFCIEntry

This record specifies the number format provided by the OLAP server for a cube value. The number format is either provided in the **formatString** field, or by a currency format defined by the application based on the language information specified by the **languageTag** field.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
fCurrency								languageTag (variable)																							
...																															
formatString (variable)																															
...																															

fCurrency (1 byte): A Boolean that specifies whether this is specified by a currency format or a number format.

Value	Meaning
0	Specifies the number format is provided in the **formatString** field.
1	Specifies the currency format is provided in the **languageTag** field.

languageTag (variable): An XLWideString that specifies the language of the currency format to use. This field MUST exist if and only if the value of **fCurrency** is 1. The length of this string MUST be less than 32 characters. The contents of this string MUST <23> be a language tag as specified by [RFC3066].

formatString (variable): An XLWideString that specifies the number format to use. This field MUST exist if and only if the value of **fCurrency** is 0. The length of this string MUST be less than 65536 characters.

For information on the syntax of this number format of this field, see [MSDN-MDXFS].

2.4.506 BrtPCRRecord

This record specifies a single cache record, as specified by the Cache Records.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgb (variable)																															
...																															

rgb (variable): A sequence of items that can be values and/or indexes to cache items. This sequence specifies a single row in the source data, as specified by the Cache Records.

An item in this sequence is a 4-byte unsigned integer that specifies a zero-based index of a cache item in the collection of cache items specified by the BrtBeginPCDFAtbl record in the cache field corresponding to this item, if the cache field corresponding to this item contains cache items. Otherwise, the source data value is stored in this item.

If an item in this sequence is not an index to a cache item, and if the **fNumField** field of the BrtBeginPCDFAtbl record for the cache field that corresponds to the source data value of the cache record is equal to 1, then the source data value is stored as an Xnum.

If an item in this sequence is not an index to a cache item, and if the **fDateInField** field of the BrtBeginPCDFAtbl record for the cache field that corresponds to the source data value of the cache record is equal to 1, and the **fHasTextItem** field of the same BrtBeginPCDFAtbl record is equal to 0, then the source data value is stored as a PCDIDateTime.

Otherwise, the source data value of the cache record is stored as an XLWideString. If the **bVerCacheCreated** of the BrtBeginPivotCacheDef of a PivotCache that this cache record is associated with is less than 3, the length of this string MUST be less than or equal to 255 characters, otherwise the length of this string MUST be less than or equal to 32767 characters.

2.4.507 BrtPCRRecordDt

This record specifies the beginning of a collection of records as defined by the PivotCache Records part ABNF. This collection of records specifies a single cache record, as specified by the Cache Records.

2.4.508 BrtPhoneticInfo

This record specifies the default formatting for phonetic information in a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iFnt																phType															
...																phAli															
...																															

iFnt (2 bytes): An unsigned integer that specifies a zero-based index of a BrtFont record in the collection of all records directly following BrtBeginFonts. The referenced BrtFont specifies the default font for **phonetic text runs** in a sheet.

phType (4 bytes): An unsigned integer that specifies the default **character set** used to display phonetic text runs in a sheet. MUST be a value from the following table:

Value	Meaning
0x00000000	The phonetic text run is displayed using the narrow katakana character set. Ignored if the text is not Japanese.
0x00000001	The phonetic text run is displayed using the wide katakana character set. Ignored if the text is not Japanese.
0x00000002	The phonetic text run is displayed using the hiragana character set. Ignored if the text is not Japanese.
0x00000003	No character set conversion is performed to the phonetic text run. Text is displayed as entered.

phAli (4 bytes): An unsigned integer that specifies the default alignment of phonetic text runs in the sheet. MUST be a value from the following table:

Value	Meaning
0x00000000	Left justify all characters of all phonetic text runs above the entire base text.
0x00000001	Left justify the characters of each phonetic text run above its **text run**.
0x00000002	Center the characters of each phonetic text run above its text run.
0x00000003	Distribute the characters of each phonetic text run above its text run.

2.4.509 BrtPlaceholderName

This record specifies the name of a defined name or an XLL or COM automation **add-in function**. For COM automation add-in functions only, it also specifies the ProgID of the COM object that implements the add-in function (XLL add-in functions do not have their implementing libraries uniquely specified).

If this record is in a sequence that follows a BrtSupSame record, it specifies the name of a defined name. This name is to be matched to the name of a defined name, as specified by a BrtName record, that is in the scope of the active sheet in the context of the evaluation of the formula.

If this record is in a sequence that follows a BrtSupAddin record, it specifies the name of a function defined by a XLL or COM automation add-in.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
name (variable)																															
...																															

name (variable): An XLNameWideString that contains the name of a defined name or an add-in function. If this is the name of an add-in function that is implemented by a COM automation add-in, the name MUST be prefixed by the concatenation of the ProgID of that add-in and the Unicode character 0x002E (FULL STOP).

2.4.510 BrtPrintOptions

This record specifies options for printing the sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	reserved																										

A - fHCenter (1 bit): A bit that specifies whether to center the printed content horizontally on the page.

B - fVCenter (1 bit): A bit that specifies whether to center the printed content vertically on the page.

C - fPrintHeaders (1 bit): A bit that specifies whether to print row and column **headers**. If this record is within the Dialog Sheet part, this value MUST be 0.

D - fPrintGrid (1 bit): A bit that specifies whether to print gridlines.

E - unused (1 bit): Undefined and MUST be ignored.

reserved (11 bits): MUST be zero, and MUST be ignored.

2.4.511 BrtRangeProtection

This record specifies a cell range to be protected. The cell range is protected only when sheet protection is on and the cell is locked.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
protPwd																sqRfX (variable)															
...																															
rgchTitle (variable)																															
...																															
dwsdRel																															
pSDRel (variable)																															
...																															

protPwd (2 bytes): An unsigned integer that specifies the verifier value of the password required for editing the cell range. If the value is 0x0000 then there is no password. For details on the algorithm to generate the value, see Password Verifier Algorithm.

sqRfX (variable): An UncheckedSqRfX that specifies the cell range to be protected. **sqRfX.crfx** MUST be greater than 0.

rgchTitle (variable): An XLWideString that specifies the title of the cell range. The value MUST be unique for the sheet. The number of characters in the string MUST be greater than or equal to 1, and less than or equal to 255. The string MUST conform to the following ABNF grammar:

```
string =  name-start-character *name-character

name-start-character = "_" / "\" / Unicode-character

name-character = name-start-character / Unicode-space / Unicode-digit / “?” / “.”
```

where:

Unicode-character is any code point which is a character as defined by the Unicode character properties, Chapter Four of [UNICODE4.0]

Unicode-digit is any code point which is a digit as defined by the Unicode character properties, Chapter Four of [UNICODE4.0]

Unicode-space is any code point which is a space as defined by the Unicode character properties, Chapter Four of [UNICODE4.0]

dwsdRel (4 bytes): An unsigned integer that specifies the size in bytes of the **security descriptor** in **pSDRel**. If the value is 0x00000000 then there is no security descriptor.

pSDRel (variable): An optional SECURITY_DESCRIPTOR structure, as defined in [MS-DTYP] section 2.4.6, that specifies a **relative security descriptor** that lists users who edit the cell range without providing the password. This field MUST exist if an only if **dwsdRel** is greater than 0.

2.4.512 BrtRowHdr

This record specifies row information and specifies the beginning of a collection of records as defined by the Worksheet part ABNF and Macro Sheet part ABNF. The collection of records specifies the beginning of a new row.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">rw</td></tr>
<tr><td colspan="32">ixfe</td></tr>
<tr><td colspan="16">miyRw</td><td>A</td><td>B</td><td colspan="4">reserved1</td><td colspan="4">C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td></tr>
<tr><td>I</td><td colspan="7">reserved2</td><td colspan="24">ccolspan</td></tr>
<tr><td colspan="8">...</td><td colspan="24">rgBrtColspan (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

rw (4 bytes): A Rw that specifies the index of the row this record represents. This value MUST be less than 0x00100000 (1048576) and MUST be greater than the value of any other BrtRowHdr records on the same sheet that are specified before this record.

ixfe (4 bytes): An unsigned integer that specifies a zero-based index of a BrtXF record in the collection of all records directly following the BrtBeginCellXFs record in the styles part. The referenced BrtXF specifies the format to apply as the default format for the row. This value MUST be less than the value of the **cxfs** field of the BrtBeginCellXFs record in the styles part. MUST be ignored if **fGhostDirty** is 0.

miyRw (2 bytes): An unsigned integer that specifies the height of the row in twips. This value MUST be less than or equal to 0x2000 (8192) and MUST be ignored if **fUnsynced** is 0.

A - fExtraAsc (1 bit): A bit that specifies whether to allocate padding for the top of this row for a thick upper cell border.

B - fExtraDsc (1 bit): A bit that specifies whether to allocate padding for the bottom of this row for a medium or thick bottom cell border.

reserved1 (6 bits): MUST be 0, and MUST be ignored.

C - iOutLevel (3 bits): An unsigned integer that specifies the outline level (1) for this row.

D - fCollapsed (1 bit): A bit that specifies whether the preceding rows which have an **iOutLevel** greater than the **iOutLevel** of this row are in the **collapsed outline state**.

E - fDyZero (1 bit): A bit that specifies whether this row is hidden.

F - fUnsynced (1 bit): A bit that specifies whether the row height has been manually specified.

G - fGhostDirty (1 bit): A bit that specifies whether the row style as specified by **ixfe** is applied.

H - fReserved (1 bit): MUST be 0, and MUST be ignored.

I - fPhShow (1 bit): A bit that specifies whether the cells in this row default to having the **phonetic guide** enabled. <24>

reserved2 (7 bits): MUST be 0, and MUST be ignored.

ccolspan (4 bytes): An unsigned integer that specifies the number of BrtColSpan elements in **rgBrtColspan**. MUST be less than or equal to 16.

rgBrtColspan (variable): An array of BrtColSpan structures that specify the permissible locations for cells within this row. Cells within this row MUST have a **column** value within the range specified by the union of all of the elements of this array.

2.4.513 BrtRRAutoFmt

This record specifies a revision record of a change in AutoFormat information for a table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															

...	itbl						
...	A	B	C	D	E	F	reserved
...	rfx (16 bytes)						
...							
...							

rrd (14 bytes): An RRd record with the following stipulation:

Value	Meaning
rrd.revt	MUST be 0x000C (REVTAUTOFMT).

itbl (4 bytes): A signed integer that specifies which table AutoFormat to apply. The value corresponds to the values specified by AutoFormatID. This value MUST be greater than or equal to 0 and it MUST be less than or equal to 20.

A - fAtrNum (1 bit): A bit that specifies whether to apply legacy table AutoFormat number properties.

B - fAtrFnt (1 bit): A bit that specifies whether to apply legacy table AutoFormat font properties.

C - fAtrAlc (1 bit): A bit that specifies whether to apply legacy table AutoFormat alignment properties.

D - fAtrBdr (1 bit): A bit that specifies whether to apply legacy table AutoFormat border properties.

E - fAtrPat (1 bit): A bit that specifies whether to apply legacy table AutoFormat pattern properties.

F - fAtrWidth (1 bit): A bit that specifies whether to apply legacy table AutoFormat width and height properties.

reserved (26 bits): MUST be zero and MUST be ignored.

rfx (16 bytes): An UncheckedRfX that specifies the range of cells this record applies to.

2.4.514 BrtRRChgCell

This record specifies properties of changes to a cell that have moved and specifies the beginning of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies changes to a cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															

<table>
<tr><td colspan="13">...</td></tr>
<tr><td colspan="6">...</td><td colspan="7">rw</td></tr>
<tr><td colspan="6">...</td><td colspan="7">col</td></tr>
<tr><td colspan="6">...</td><td>vt</td><td>vtOld</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td></tr>
<tr><td>ifmtDisp</td><td>J</td><td>K</td><td>L</td><td>M</td><td>unused2</td><td colspan="7">cbOldVal</td></tr>
<tr><td colspan="6">...</td><td colspan="7">rgb (variable)</td></tr>
<tr><td colspan="13">...</td></tr>
</table>

rrd (14 bytes): An RRd record with the following stipulations:

Value	Meaning
rrd.revt	MUST be 0x0008 (REVTCHANGECELL).
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.

rw (4 bytes): An UncheckedRw that specifies the row of the cell.

col (4 bytes): An UncheckedCol that specifies the column of the cell.

vt (3 bits): An unsigned integer that specifies the type of value in the new cell contents. This MUST be one of the following values:

Value	Description
0x0	Specifies a blank cell
0x1	Specifies a RkNumber value
0x2	Specifies a constant real number value
0x3	Specifies a string value
0x4	Specifies a Boolean or error value
0x5	Specifies an expression

vtOld (3 bits): An unsigned integer that specifies the type of value in the old cell contents. This MUST be one of the values as specified in **vt**.

A - f123Prefix (1 bit): A bit that specifies whether a single quote prefix is used. Single quote prefixes are used to cause the cell contents to be treated as a string. This value applies only if **vt** is 0x3.

B - reserved (1 bit): MUST be zero and MUST be ignored.

C - fOldFmt (1 bit): A bit that specifies whether there is old formatting information available for this cell. If this value is 1 and **fOldFmtNull** is 0, then the next BrtBeginDXFs record specifies the old formatting.

D - fOldFmtNull (1 bit): A bit that specifies if the old formatting information is empty. This value MUST be ignored if **fOldFmt** is 0. If **fOldFmt** is 1 and this value is 0, then the next BrtBeginDXFs record specifies the old formatting.

E - fXfDxf (1 bit): A bit that specifies that the affected cells have their format reset to the format defined by the current style before applying any format from the BrtDXF record, if present.

F - fStyXfDxf (1 bit): A bit that specifies that the format of the cell need to be cleared before applying any format from the BrtDXF record, if present.

G - fDxf (1 bit): A bit that specifies whether there was a formatting change for this cell. If this value is 1 and **fDxfNull** is 0, then there MUST be a BrtBeginDXFs record sequence that specifies the new formatting. If **fOldFmt** is 1 and **fOldFmtNull** is 0, then the formatting change will be the second BrtBeginDXFs record sequence. Otherwise, it will be the next BrtBeginDXFs record sequence.

H - fDxfNull (1 bit): A bit that specifies whether the new formatting information is empty. This value MUST be ignored if **fDxf** is 0. If **fDxf** is 1, and this value is 0, then there MUST be a BrtBeginDXFs record sequence that specifies the new formatting. If **fOldFmt** is 1 and **fOldFmtNull** is 0, then the formatting change will be the second BrtBeginDXFs record sequence. Otherwise, it will be the next BrtBeginDXFs record sequence.

I - unused1 (2 bits): Undefined and MUST be ignored.

ifmtDisp (8 bits): An Ifmt that specifies the number format for this cell. MUST be one of the built-in number formats whose identifier is less than or equal to 59.

J - fPhShow (1 bit): A bit that specifies whether the new contents of the cell contain phonetic information.

K - fPhShowOld (1 bit): A bit that specifies whether the old contents of the cell contain phonetic information.

L - fEOLFmlaUpdate (1 bit): A bit that specifies whether this cell was changed because of an automatic update to the formula.

M - fHaveOldCell (1 bit): A bit that specifies whether the old cell contents is specified by the next set of records. If this value is 0, then the next record represents the new cell contents. Otherwise, there will be two sets of cell records, of which the first is the old cell contents and the second is the new cell contents.

unused2 (4 bits): Undefined and MUST be ignored.

cbOldVal (4 bytes): A signed integer that MUST be ignored. If this value is greater than 0, **fHaveOldCell** MUST be 1.

rgb (variable): An SqEtxp that specifies font information for this record.

2.4.515 BrtRRConflict

This record specifies that the revision log entry which has the same **rrd.revid** as this BrtRRConflict record was undone as the result of a conflict resolution.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															

...	
...	

rrd (14 bytes): An RRd that specifies common revision information for this record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0025 (REVTCONFLICT).
rrd.revid	MUST be greater than 0.
rrd.fAccepted	MUST be the same as **fUndoAction** <25>.
rrd.fUndoAction	When true, specifies this revision occurred because another revision was rejected, and therefore undone.
rrd.fRedoAction	MUST be 0 and MUST be ignored.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.
rrd.tabid	MUST NOT be 0xFFFF.

2.4.516 BrtRRDefName

This record represents a revision record associated with a change to a defined name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															
...																tabidLocal															
A	B	reserved						grbit																							
...																										grbitOld					
...																															
...								fgrp																							
...								fgrpOld																							

...	stName (variable)
...	
rgce (variable)	
...	
stCustommenu (variable)	
...	
stDescription (variable)	
...	
stHelptopic (variable)	
...	
stStatustext (variable)	
...	
stComment (variable)	
...	
rgceOld (variable)	
...	
stOldCustommenu (variable)	
...	
stOldDescription (variable)	
...	
stOldHelptopic (variable)	
...	
stOldStatustext (variable)	
...	
stOldComment (variable)	

...

rrd (14 bytes): A RRd that specifies shared revision data for this revision record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x000A (REVTDEFNAME) or 0x0022 (REVTOLDNAME).
rrd.revid	MUST be greater than or equal to 0.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.

tabidLocal (2 bytes): A signed integer that specifies the id of the sheet to which this defined name belongs. If the value of this field is not equal to 0xFFFF, then this value is defined in a sheet scope and MUST be equal to an **iTabID** value from the BrtBeginBundleShs collection. The value 0xFFFF means that the defined name does not belongs to any sheet.

A - fViewName (1 bit): A bit that specifies if this named range belongs to a custom view.

B - fBuiltin (1 bit): A bit that specifies if the name is a built-in name.

reserved (6 bits): MUST be zero and MUST be ignored.

grbit (6 bytes): A RRdDnGrbit that specifies data for the new state of the defined name for this record.

grbitOld (6 bytes): A RRdDnGrbit that specifies data for the old state of the defined name for this record.

fgrp (4 bytes): A FnGroupID that specifies the **frgp** field of RRdDnGrbit. The value of this field MUST be the same as **fgrp** from **grbit**.

fgrpOld (4 bytes): A FnGroupID that specifies the function group id of the old name, this corresponds to the **frgp** field of RRdDnGrbit. The value of this field MUST be the same as **fgrp** from **grbitOld**.

stName (variable): An XLWideString that specifies the name for the new defined name. The length of this string MUST be less than or equal to 255. This field has the same meaning as the **name** field of BrtName.

rgce (variable): A NameParsedFormula that specifies the new name's formula.

stCustommenu (variable): A XLNullableWideString that specifies the new custom menu text. The length of this string MUST be less than or equal to 32767. MUST be NULL if **fCustommenu** from **grbit** is 0.

stDescription (variable): An XLNullableWideString that specifies the new description text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fDescription** from **grbit** is 0.

stHelptopic (variable): An XLNullableWideString that specifies the new help text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fHelptopic** from **grbit** is 0.

stStatustext (variable): An XLNullableWideString that specifies the new status bar text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fStatustext** from **grbit** is 0.

stComment (variable): An XLNullableWideString that specifies the new comment text. The length of this field MUST be less than or equal to 255.

rgceOld (variable): A NameParsedFormula that specifies the old name's formula.

stOldCustommenu (variable): An XLNullableWideString that specifies the old custom menu text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fCustommenu** from **grbitOld** is 0.

stOldDescription (variable): An XLNullableWideString that specifies the old description text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fDescription** from **grbitOld** is 0.

stOldHelptopic (variable): An XLNullableWideString that specifies the old help text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fHelptopic** from **grbitOld** is 0.

stOldStatustext (variable): An XLNullableWideString that specifies the old status bar text. The length of this field MUST be less than or equal to 32767. MUST be NULL if **fStatustext** from **grbitOld** is 0.

stOldComment (variable): An XLNullableWideString that specifies the old comment text. The length of this field MUST be less than or equal to 255.

2.4.517 BrtRREndChgCell

This record specifies the end of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies changes to a cell.

2.4.518 BrtRREndFormat

This record specifies the end of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies a formatting change that has been applied to a shared workbook.

2.4.519 BrtRREndInsDel

This record specifies the end of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies a row insert, row delete, column insert or row delete operation.

2.4.520 BrtRREndMove

This record specifies the end of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies revision record information about cell(s) that have moved.

2.4.521 BrtRRFormat

This record specifies a formatting change that has been applied to a shared workbook and specifies the beginning of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies a formatting change that has been applied to a shared workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															

...					
...	A	B	C	reserved	ich
...					cch
...					cbrfx
...					rgrfx (variable)
...					

rrd (14 bytes): An RRd record with the following stipulations:

Value	Meaning
rrd.revt	MUST be 0x000B (REVTFORMAT).
rrd.revid	MUST be 0.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.

A - fXfDxf (1 bit): A bit that specifies that the affected cells need to have their format reset to the format defined by the current style before applying any format from the BrtDXF record, if present.

B - fXfDxfNull (1 bit): A bit that specifies if a format is associated with this record. MUST be 0 if **fXfDxf** is 0.

Value	Meaning
0	There is a format associated with this record. The next record in the sequence MUST be BrtBeginDXFs.
1	The format associated with this record is null. If the next record in the sequence is BrtBeginDXFs the associated BrtDXF record MUST be exactly 6 bytes and all fields MUST be 0.

C - fStyXfDxf (1 bit): A bit that specifies that the format of the cells needs to be cleared before applying any format from the BrtDXF record, if it is present.

reserved (5 bits): MUST be 0 and MUST be ignored.

ich (4 bytes):

Value	Meaning
0xFFFFFFFF	The formatting change does not affect the contents of the affected cells.
0x00000000	The formatting change affects the contents of the affected cells. <26>

cch (4 bytes):

Value	Meaning
0xFFFFFFFF	The formatting change does not affect the contents of the affected cells.
0x00000000	The effect of the formatting change on cell contents was not evaluated. If the BrtDXF record describes content changes treat this value as 0x7FFFFFFF, otherwise treat this value as 0xFFFFFFFF.
0x7FFFFFFF	The formatting change affects the contents of the affected cells.

cbrfx (4 bytes): An unsigned integer that specifies the number of bytes in **rgrfx**. This value MUST NOT be 0xFFFFFFFF, and MUST be the number of UncheckedRfX elements in **rgrfx** multiplied by 16.

rgrfx (variable): An array of UncheckedRfX that specifies the cells to which this format change applies.

2.4.522 BrtRRHeader

This record specifies metadata about a list of revisions that have been made in a shared workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															
...																guid (16 bytes)															
...																															
...																sdtr															
...																															
...																tabidMac															
revidMin																															
revidMax																															
stUser (variable)																															

...
szRelId (variable)
...
ctabid
rgtabid (variable)
...
crevid
rgrevid (variable)
...

rrd (14 bytes): An RRd that specifies shared revision data. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.unused1	MUST be 0xFFFFFFFF. <27>
rrd.revt	MUST be 0x0020 (REVTHEADER).
rrd.tabid	MUST be 0xFFFF.

Additionally, all fields of **rrd** other than those specified in the preceding table MUST be 0 and all fields of **rrd** other than **revt** MUST be ignored.

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies this set of revisions.

sdtr (8 bytes): A ShortDtr that specifies the date and time when this set of revisions was saved.

tabidMac (2 bytes): An unsigned integer that specifies the next unused sheet id when this set of revisions was saved. A sheet id corresponds to the **iTabID** field of a BrtBundleSh record as specified by the Workbook part ABNF . A value of 0xFFFF indicates that either 0xFFFF is available as the next id or that all sheet ids have been used.

revidMin (4 bytes): An unsigned integer that specifies the lowest revision identifier which is associated with this header. A revision id is the **rrd.revid** field of records which begin with an RRd. MUST be 0 if no reviewable revisions are associated with this header, otherwise MUST be greater than 0. A reviewable revision is any record on the revision log that has the field **revid** of RRd greater than zero. MUST be less than 0xFFFFFFFF.

revidMax (4 bytes): An unsigned integer that specifies the highest revision identifier which is associated with this header. A revision id is the **rrd.revid** field of records which begin with an RRd. MUST be 0 if no reviewable revisions are associated with this header, otherwise MUST be greater than 0. A reviewable revision is any record on the revision log that has the field **revid** of RRd greater than zero. MUST be greater than or equal to the value of **revidMin**.

stUser (variable): An XLWideString that specifies the name of the user responsible for this set of revisions. The length of this string MUST be greater than or equal to 1 and less than or equal to 54.

szRelId (variable): An XLWideString that specifies the relationship identifier of this set of revisions. A relationship id corresponds to RevisionHeaders.bin.rels. This string MUST NOT be null or empty.

ctabid (4 bytes): An unsigned integer that specifies the number of sheets present in the workbook when this set of revisions was saved. MUST be greater than 0 and MUST be less than 65536.

rgtabid (variable): An array of 2-byte unsigned integers that specifies sheet ids, which specify the display order of the sheets when this set of revisions was saved. A sheet id corresponds to the **iTabID** field of a BrtBundleSh record as specified by the Workbook part ABNF . MUST have length equal to **ctabid**. Elements of this array MUST NOT appear more than once and MUST have a value equal to the **iTabID** field of one of the BrtBundleSh records for the workbook.

crevid (4 bytes): An unsigned integer that specifies the number of revisions associated with this header that have been reviewed. If either **revidMin** or **revidMax** are 0, this value MUST be 0, otherwise it MUST be no greater than the value **revidMax** - **revidMin** + 1.

rgrevid (variable): An array of 32-bit unsigned integers that specifies the revision ids associated with this header that have been reviewed. A revision id is the **rrd.revid** field of records which begin with an RRd. The length of this array MUST be **crevid**. The elements of this array MUST NOT appear more than once, each element MUST have a value greater than or equal to **revidMin**, and each element MUST have a value less than or equal to **revidMax**.

2.4.523 BrtRRInsDel

This record specifies properties of a revision record and specifies the beginning of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies a row insert, row delete, column insert or column delete operation.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">rrd (14 bytes)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="16">...</td><td>A</td><td colspan="7">reserved</td><td colspan="8">rfx (16 bytes)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="24">...</td><td colspan="8"></td></tr>
</table>

rrd (14 bytes): An RRd for this revision record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0000 (REVTINSRW) or 0x0001 (REVTINSCOL) or 0x0002

	(REVTDELRW) or 0x0003 (REVTDELCOL).
rrd.revid	MUST be greater than or equal to 0.
rrd.tabid	Specifies the sheet id for the current sheet.

A - fEndOfList (1 bit): A bit that specifies that a row was inserted at the bottom of the filled cells range. This field has meaning only if **revt** field of this record is REVTINSRW. MUST be 1 if data was inserted at the bottom of the filled cells range. MUST be 0 if data was inserted or deleted in any other place.

reserved (7 bits): MUST be zero, and MUST be ignored.

rfx (16 bytes): An UncheckedRfX that specifies a location of rows or columns that were inserted or deleted. If the delete or insert operation affects a full row, then **colFirst** MUST be 0 and **colLast** MUST be 16383. If the delete or insert operation affects a full column, then **rwFirst** MUST be 0 and **rwLast** MUST be 1048575.

2.4.524 BrtRRInsertSh

This record specifies that a sheet has been inserted in a shared workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															
...																itabPos															
stName (variable)																															
...																															

rrd (14 bytes): An RRd that specifies common revision information for this record. **Rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0005 (REVTINSERTSH).
rrd.revid	MUST be greater than 0.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.
rrd.tabid	Specifies the sheet id for the newly inserted sheet, MUST NOT be 0xFFFF.

itabPos (2 bytes): An unsigned integer that specifies which sheet tab position the sheet had when it was initially created.

stName (variable): A RevisionLogSheetName that specifies the name of the sheet when the workbook was first saved. Any subsequent renaming operations on this sheet before the first save will alter the **stName** field of this record as well as generate BrtRRRenSheet records.

2.4.525 BrtRRMove

This record specifies properties of a range of cells that have moved and specifies the beginning of a collection of records as defined by the Revision Log part ABNF. The collection of records specifies revision record information about cell(s) that have moved.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															
...																rfxSrc (16 bytes)															
...																															
...																rfxDst (16 bytes)															
...																															
...																tabidSrc															

rrd (14 bytes): An RRd that specifies shared revision data for this revision record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0004 (REVTMOVE).
rrd.revid	MUST be greater than or equal to 0.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.

rfxSrc (16 bytes): An UncheckedRfX that specifies the original location of the range of cells that have moved. The size of **rfxSrc** MUST be the same as size of **rfxDst**.

rfxDst (16 bytes): An UncheckedRfX that specifies the location of the range of cells that have moved. Size of **rfxDst** MUST be the same as size of **rfxSrc**.

tabidSrc (2 bytes): A signed integer that specifies the id of the source sheet. The source sheet is the sheet where the range of cells originally resided. The value of this field MUST be equal to an **itabid** value from the BrtBeginBundleShs collection.

2.4.526 BrtRRNote

This record specifies a revision record for a comment.

<table>
<tr><td colspan="31">0 1 2 3 4 5 6 7 8 9 10 1 2 3 4 5 6 7 8 9 20 1 2 3 4 5 6 7 8 9 30 1</td></tr>
<tr><td colspan="31">rrd (14 bytes)</td></tr>
<tr><td colspan="31">...</td></tr>
<tr><td colspan="16">...</td><td colspan="15">rwu</td></tr>
<tr><td colspan="16">...</td><td colspan="15">colu</td></tr>
<tr><td colspan="16">...</td><td>A</td><td>B</td><td colspan="13">reserved1</td></tr>
<tr><td colspan="2">...</td><td>C</td><td colspan="4">reserved2</td><td>D</td><td>E</td><td colspan="6">reserved3</td><td colspan="15">guid (16 bytes)</td></tr>
<tr><td colspan="31">...</td></tr>
<tr><td colspan="16">...</td><td colspan="15">ichEnd</td></tr>
<tr><td colspan="16">...</td><td colspan="15">cchNote</td></tr>
<tr><td colspan="16">...</td><td colspan="15">author (variable)</td></tr>
<tr><td colspan="31">...</td></tr>
</table>

rrd (14 bytes): An RRd that specifies information about the revision record. The **revt** field of RRd MUST be 0x000D

rwu (4 bytes): An UncheckedRw that specifies the row that contains the comment.

colu (4 bytes): An UncheckedCol that specifies the column that contains the comment.

A - bitfDelNote (1 bit): A bit that specifies whether the comment is being deleted.

B - bitfAddNote (1 bit): A bit that specifies whether the comment is being added.

reserved1 (15 bits): MUST be 0 and MUST be ignored.

C - fShow (1 bit): A bit that specifies whether the comment is shown.

reserved2 (5 bits): MUST be 0 and MUST be ignored.

D - fRwHidden (1 bit): A bit that specifies whether the row that contains the comment is hidden.

E - fColHidden (1 bit): A bit that specifies whether the column that contains the comment is hidden.

reserved3 (7 bits): MUST be 0 and MUST be ignored.

guid (16 bytes): A GUID as specified by [MS-DTYP] that identifies the comment. If the **guid** field of BrtBeginComment matches this then this is referring to the same comment.

ichEnd (4 bytes): A signed integer that specifies the length of the comment before the revision.

cchNote (4 bytes): A signed integer that specifies the length of the string that was added to the comment.

author (variable): An XLWideString that specifies the author of the comment.

2.4.527 BrtRRRenSheet

This record specifies that a sheet has been renamed in a shared workbook.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
rrd (14 bytes)																															
...																															
...																stOldName (variable)															
...																															
stNewName (variable)																															
...																															

rrd (14 bytes): An RRd that specifies common revision information for this record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x0009 (REVTRENSHEET).
rrd.revid	MUST be greater than 0.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.

rrd.tabid	MUST NOT be 0xFFFF.

stOldName (variable): A RevisionLogSheetName that specifies the old name of the sheet.

stNewName (variable): A RevisionLogSheetName that specifies the new name of the sheet.

2.4.528 BrtRRSortItem

This record specifies a single row or column mapping in a sort map.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iNewVal																															
iOldVal																															

iNewVal (4 bytes): An unsigned integer that specifies the new row or column. If the **fCol** field of the preceding BrtBeginRRSort is 0, then this value specifies a row and MUST be less than 1048576. Otherwise, this value specifies a column and MUST be less than 16384.

iOldVal (4 bytes): An unsigned integer that specifies the old row or column. If the **fCol** field of the preceding BrtBeginRRSort is 0, then this value specifies a row index and MUST be less than 1048576. Otherwise, this value specifies a column and MUST be less than 16384.

2.4.529 BrtRRTQSIF

This record specifies a revision record of a changed field in a query table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rrd (14 bytes)																															
...																															
...																rfx (16 bytes)															
...																															
...																dwFieldId															

...	

rrd (14 bytes): A RRd that specifies common revision information for this record. **rrd** has the following additional stipulations:

Field	Restrictions
rrd.revt	MUST be 0x002E (REVTTRASHQTFIELD).
rrd.revid	MUST be greater than or equal to 0.
rrd.fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.
rrd.tabid	MUST NOT be 0xFFFF.

rfx (16 bytes): An UncheckedRfX that specifies the location of the affected query table.

dwFieldId (4 bytes): An unsigned integer that specifies the identifier of the specific field of the query table that was removed. The value of **dwFieldId** MUST be greater than 0x00000000. The value of this field MUST be equal to one of the **idField** values from the collection of BrtBeginQSIF records defined for this query table.

2.4.530 BrtRRUserView

This record specifies a revision record of adding or removing a custom view to the workbook.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
rrd (14 bytes)																															
...																															
...																guid (16 bytes)															
...																															
...																															

rrd (14 bytes): A RRd value for this revision record.

Value	Meaning
revt	MUST be 0x002B (REVTADDVIEW) or 0x002C (REVTDELVIEW).
revid	MUST be greater than or equal to 0.

fDelAtEdgeOfSort	MUST be 0 and MUST be ignored.

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies the custom view defined by the user. MUST be globally unique. The value of this field MUST be equal to one of the **guid** fields of BrtBeginUserShView items in the BrtBeginUserShViews collection in the sheet.

2.4.531 BrtSel

This record specifies cell selection for a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
pnn																															
rwAct																															
colAct																															
dwRfxAct																															
sqrfx (variable)																															
...																															

pnn (4 bytes): A Pnn that specifies the pane this selection belongs to.

rwAct (4 bytes): An UncheckedRw that specifies the row of the active cell. The value MUST be the index of a row in the range in **sqrfx** that is specified by **dwRfxAct**.

colAct (4 bytes): An UncheckedCol that specifies the column of the active cell. The value MUST be the index of a column in the range in **sqrfx** that is specified by **dwRfxAct**.

dwRfxAct (4 bytes): An unsigned integer that specifies a zero-based index of a RfX structure in the array of RfX specified by **sqrfx**. The referenced RfX specifies the range that contains the active cell within the collection of all non-contiguous ranges within **sqrfx**. MUST be less than **sqrfx.crfx**.

sqrfx (variable): An UncheckedSqRfX that specifies a collection of all non-contiguous ranges within the selection. **sqrfx.crfx** MUST be less than or equal to 32767.

2.4.532 BrtSheetCalcProp

This record specifies sheet calculation properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	reserved																														

A - fFullCalcOnLoad (1 bit): A bit that specifies whether the application recalculates the results of all formulas on this sheet immediately after loading the file.

reserved (7 bits): MUST be zero, and MUST be ignored.

2.4.533 BrtSheetProtection

This record specifies protection options for a Worksheet, Dialog Sheet, or Macro Sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
protpwd																fLocked															
...																fObjects															
...																fScenarios															
...																fFormatCells															
...																fFormatColumns															
...																fFormatRows															
...																fInsertColumns															
...																fInsertRows															
...																fInsertHyperlinks															
...																fDeleteColumns															
...																fDeleteRows															
...																fSelLockedCells															
...																fSort															
...																fAutoFilter															
...																fPivotTables															
...																fSelUnlockedCells															
...																															

protpwd (2 bytes): An unsigned integer that specifies the verifier value of the password required for editing the sheet. If the value is 0x0000 then there is no password. The algorithm to generate the verifier value is documented in Password Verifier Algorithm.

fLocked (4 bytes): A Boolean with a meaning that depends on the type of sheet. For a worksheet the value specifies whether the worksheet and the contents of locked cells are protected. For a macro sheet the value specifies whether the macro sheet is protected. For a dialog sheet it is undefined and MUST be ignored.

For worksheets and macro sheets it MUST be a value from the following table:

Value	Meaning
0x00000000	The worksheet and contents of locked cells are not protected. The macro sheet is not protected.
0x00000001	The worksheet and contents of locked cells are protected. The macro sheet is protected.

fObjects (4 bytes): A Boolean with a meaning that depends on the type of sheet. When the sheet is a worksheet or macro sheet and the value of **fLocked** is 1, this field specifies whether editing of **objects** is allowed. Undefined and MUST be ignored if the sheet is a worksheet or macro sheet and **fLocked** is 0.

When the sheet is a dialog sheet, this field specifies whether the dialog sheet is protected. The value of **fScenarios** MUST be the same as this field's value.

MUST be a value from the following table:

Value	Meaning
0x00000000	Editing of objects is not allowed in the worksheet or macro sheet when the value of **fLocked** is 1. The dialog sheet is protected.
0x00000001	Editing of objects is allowed in the worksheet or macro sheet when the value of **fLocked** is 1. The dialog sheet is not protected.

fScenarios (4 bytes): A Boolean with a meaning that depends on the type of sheet. When the sheet is a worksheet or macro sheet and the value of **fLocked** is 1, this field specifies whether editing of scenarios is allowed. Undefined and MUST be ignored if the sheet is a worksheet or macro sheet and **fLocked** is 0.

When the sheet is a dialog sheet, this field specifies whether the dialog sheet is protected. The value of **fObjects** MUST be the same as this field's value.

MUST be a value from the following table:

Value	Meaning
0x00000000	Editing of scenarios is not allowed in the worksheet or macro sheet when the value of **fLocked** is 1. The dialog sheet is protected.
0x00000001	Editing of scenarios is allowed in the worksheet or macro sheetwhen the value of **fLocked** is 1. The dialog sheet is not protected.

fFormatCells (4 bytes): A Boolean that specifies whether formatting of cells is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of

fLocked is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Formatting of cells is not allowed when the value of **fLocked** is 1.
0x00000001	Formatting of cells is allowed when the value of **fLocked** is 1.

fFormatColumns (4 bytes): A Boolean that specifies whether formatting of columns is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Formatting of columns is not allowed when the value of **fLocked** is 1.
0x00000001	Formatting of columns is allowed when the value of **fLocked** is 1.

fFormatRows (4 bytes): A Boolean that specifies whether formatting of rows is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Formatting of rows is not allowed when the value of **fLocked** is 1.
0x00000001	Formatting of rows is allowed when the value of **fLocked** is 1.

fInsertColumns (4 bytes): A Boolean that specifies whether insertion of columns is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Insertion of columns is not allowed when the value of **fLocked** is 1.
0x00000001	Insertion of columns is allowed when the value of **fLocked** is 1.

fInsertRows (4 bytes): A Boolean that specifies whether insertion of rows is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Insertion of rows is not allowed when the value of **fLocked** is 1.
0x00000001	Insertion of rows is allowed when the value of **fLocked** is 1.

fInsertHyperlinks (4 bytes): A Boolean that specifies whether insertion of hyperlinks is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Insertion of hyperlinks is not allowed when the value of **fLocked** is 1.
0x00000001	Insertion of hyperlinks is allowed when the value of **fLocked** is 1.

fDeleteColumns (4 bytes): A Boolean that specifies whether deletion of columns is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Deletion of columns is not allowed when the value of **fLocked** is 1.
0x00000001	Deletion of columns is allowed when the value of **fLocked** is 1.

fDeleteRows (4 bytes): A Boolean that specifies whether deletion of rows is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Deletion of rows is not allowed when the value of **fLocked** is 1.
0x00000001	Deletion of rows is allowed when the value of **fLocked** is 1.

fSelLockedCells (4 bytes): A Boolean that specifies whether selection of locked cells is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000001, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Selection of locked cells is not allowed when the value of **fLocked** is 1.
0x00000001	Selection of locked cells is allowed when the value of **fLocked** is 1.

fSort (4 bytes): A Boolean that specifies whether sorting is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Sorting is not allowed when the value of **fLocked** is 1.
0x00000001	Sorting is allowed when the value of **fLocked** is 1.

fAutoFilter (4 bytes): A Boolean that specifies whether use of AutoFilters is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Use of AutoFilters is not allowed when the value of **fLocked** is 1.

0x00000001	Use of AutoFilters is allowed when the value of **fLocked** is 1.

fPivotTables (4 bytes): A Boolean that specifies whether use of PivotTable reports is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000000, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Use of PivotTable reports is not allowed when the value of **fLocked** is 1.
0x00000001	Use of PivotTable reports is allowed when the value of **fLocked** is 1.

fSelUnlockedCells (4 bytes): A Boolean that specifies whether selection of **unlocked** cells is allowed in the worksheet when the value of **fLocked** is 1, and undefined and MUST be ignored when the value of **fLocked** is 0. For a macro sheet or dialog sheet it MUST be a value of 0x00000001, and MUST be ignored. For a worksheet it MUST be a value from the following table:

Value	Meaning
0x00000000	Selection of unlocked cells is not allowed when the value of **fLocked** is 1.
0x00000001	Selection of unlocked cells is allowed when the value of **fLocked** is 1.

2.4.534 BrtShrFmla

This record specifies a shared formula as specified in Worksheet part ABNF and Macro Sheet part ABNF . A shared formula specifies a formula that is shared across multiple cells. Cells that share this formula have a formula record that contains a PtgExp that specifies the row of this cell and a corresponding PtgExtraCol with a **col** field equal to the column of this cell. It is preceded by a single BrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError record that specifies the first cell in the range that uses this shared formula. This record is used with the preceding BrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError record to optimize storage and memory required for the shared formula.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfx (16 bytes)																															
...																															
formula (variable)																															
...																															

rfx (16 bytes): An UncheckedRfX that specifies the row and column bounds for this shared formula.

formula (variable): A SharedParsedFormula that contains this shared formula.

2.4.535 BrtSlc

This record specifies a cell in a scenario.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rw																															
col																															
fReserved																															
fUnused																															
ifmt																	strVal (variable)														
...																															

rw (4 bytes): An UncheckedRw that specifies the row of the cell.

col (4 bytes): An UncheckedCol that specifies the column of the cell.

fReserved (4 bytes): Reserved and MUST be 0.

fUnused (4 bytes): Unused and MUST be ignored.

ifmt (2 bytes): An Ifmt that specifies the number format used when displaying the value of the cell.

strVal (variable): An XLWideString used to specify the value of the cell. MUST contain less than 256 characters.

2.4.536 BrtSmartTagType

This record specifies the properties for a smart tag type that contain the identification information for the smart tag.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
NameSpaceUri (variable)																															
...																															
Name (variable)																															
...																															
Url (variable)																															

...

NameSpaceUri (variable): An XLWideString that specifies the Uniform Resource Identifier (**URI**) for this smart tag type used by this application. The length of this string MUST be less than or equal to 2084 characters.

Name (variable): An XLWideString that specifies the name of this smart tag type. The length of string MUST be less than 256 characters.

Url (variable): An XLNullableWideString that specifies the URL for a smart tag provided by the smart tag creator, which can be shown in the application to get more information about the smart tag. The length of this string MUST be less than or equal to 2084 characters.

2.4.537 BrtSSTItem

This record specifies an individual string in the shared string table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
richStr (variable)																															
...																															

richStr (variable): A RichStr that specifies an individual string in the shared string table.

2.4.538 BrtStr

This record specifies a shared text string referenced by other records in the cell metadata and value metadata part.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
stText (variable)																															
...																															

stText (variable): An XLWideString that specifies the content of the BrtStr record. BrtStr records within the collection specified by BrtBeginEsstr and BrtEndEsstr records MUST be unique subject to the content's bitwise comparison.

2.4.539 BrtStyle

This record specifies a cell style. A record of this type exists for each cell style used in the workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ixf																															

grbitObj1	iStyBuiltIn	iLevel
stName (variable)		
...		

ixf (4 bytes): An unsigned integer that specifies a zero-based index of a BrtXF record in the collection of all records directly following BrtBeginCellStyleXFs. The referenced BrtXF specifies the cell formatting for this cell style.

This value MUST be unique with respect to the value of **ixf** in all other BrtStyle records in the workbook.

grbitObj1 (2 bytes): A StyleFlags structure which specifies properties for this cell style.

iStyBuiltIn (1 byte): An unsigned integer that specifies a built-in cell style. If this value is nonzero, this cell style is a built-in cell style and **grbitObj1.fBuiltIn** MUST equal 1. If this value is equal to 1 or 2, the value of **iLevel** is needed to specify the built-in cell style. For all other values, **iStyBuiltIn** is sufficient to identify the built-in cell style. To see a list of all built-in cell styles refer to [ECMA-376] Part 4: Markup Language Reference, section 3.8.7.

iLevel (1 byte): An unsigned integer that specifies, in conjunction with **iStyBuiltIn**, a built-in cell style. If **iStyBuiltIn** is equal to 1, the specified built-in cell style is **RowLevel_n** [ECMA-376] Part 4: Markup Language Reference, section 3.8.7, where n is an integer equal to the value of **iLevel** + 1. Similarly, if **iStyBuiltIn** is equal to 2, the specified built-in cell style is **ColLevel_n** [ECMA-376] Part 4: Markup Language Reference, section 3.8.7. If **iStyBuiltIn** is equal to 1 or 2, the value of **iLevel** MUST be between 0 and 6 inclusive. If **iStyBuiltIn** is equal to any other value, **iLevel** MUST be ignored.

stName (variable): A CellStyleName which specifies the name of this cell style. If this cell style is built-in, the name of the cell style is defined by the built-in cell style identified by **iStyBuiltIn** and **iLevel** instead of this value.

2.4.540 BrtSupAddin

This record specifies an Add-in Referencing type of Supporting Link. The names of all add-in functions implemented by XLL or COM automation add-ins that are referenced by formulas in this workbook MUST be specified in the BrtPlaceholderName records that follow this record.

2.4.541 BrtSupBookSrc

This record specifies an External Link Referencing type of Supporting Link.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
strRelID (variable)																															
...																															

strRelID (variable): A RelID that specifies an External Link part.

2.4.542 BrtSupNameBits

This record specifies properties of an External Defined Name, a DDE Data Item, or an OLE Data Item.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
contents																															
...																															

contents (7 bytes): A structure that specifies properties of an External Defined Name, a DDE Data Item, or an OLE Data Item. The structure used is dependent on the type of External Link specified by the **sbt** field in the preceding BrtBeginSupBook record.

Type of External Link	Format of **contents**
External Defined Name	ExternalNameProperties
DDE Data Item	DDEItemProperties
OLE Data Item	OLEItemProperties

2.4.543 BrtSupNameBool

This record specifies a DDE data item or OLE data item value that contains a Boolean.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
f																															

f (1 byte): A Boolean that specifies the value.

2.4.544 BrtSupNameEnd

This record specifies the end of a collection of records as defined by the External Link part ABNF. The collection of records specifies external defined name, a DDE data item, or an OLE data item.

2.4.545 BrtSupNameErr

This record specifies a DDE data item or OLE data item value that contains an error.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
err																															

err (1 byte): A BErr enumeration that specifies an error value.

2.4.546 BrtSupNameFmla

This record specifies the formula of an external defined name. The formula of an external defined name, if defined, is restricted to the formula types specified by the **val** field.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cb																															
val (variable)																															
...																															

cb (4 bytes): An unsigned integer that specifies the size of **val** in bytes. If the external defined name, as specified by the previous BrtSupNameStart record, is not defined in the external workbook, this value MUST be 0 and **val** MUST NOT exist.

val (variable): An optional variant of a Ptg that specifies the formula of an external defined name. This field exists if and only if **cb** is greater than 0. If this field exists, the contents of this field MUST be one and only one of the following:

- ExtPtgRef3D
- ExtPtgArea3D
- ExtPtgRefErr3D
- ExtPtgAreaErr3D
- ExtPtgErr

If the formula cannot be represented correctly with one of these variants of a Ptg, then **val** MUST contain an ExtPtgErr.

2.4.547 BrtSupNameNil

This record specifies a DDE data item or OLE data item value that represents a NULL value.

2.4.548 BrtSupNameNum

This record specifies a DDE data item or OLE data item value that contains a number.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xNum																															
...																															

xNum (8 bytes): An Xnum that specifies the value of this DDE data value.

2.4.549 BrtSupNameSt

This record specifies a DDE data item or OLE data item value that contains a string.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
str (variable)																															
...																															

str (variable): An XLWideString that specifies a string value. The length of this string MUST be less than 32768 characters.

2.4.550 BrtSupNameStart

This record specifies the name of an External Defined Name and specifies the beginning of a collection of records as defined by the External Link part ABNF. The collection of records specifies External Defined Name, a DDE Data Item, or an OLE Data Item. Which of those types that is specified by these records is dependent on the type of External Link specified by the **sbt** field of the preceding BrtBeginSupBook record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
name (variable)																															
...																															

name (variable): An XLNameWideString that specifies the name of a External Defined Name, the name of a DDE Data Item, or the name of an OLE Data Item.

2.4.551 BrtSupNameValueEnd

This record specifies the end of a collection of records as defined by the External Link part ABNF. The collection of records specifies a two-dimensional array of cached DDE data item or OLE data item values.

2.4.552 BrtSupNameValueStart

This record specifies properties a two-dimensional array of cached values for a DDE data item or OLE data item <28>, and specifies the beginning of a collection of records as defined by the External Link part ABNF. The collection of records specifies the values of the two-dimensional array of cached values. The dimensions of the array are specified by the **cRw** and **cCol** fields. The values MUST be stored in row-major order.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cRw																															
cCol																															

cRw (4 bytes): A DRw that specifies the number of rows in a DDE data item or OLE data item value array. This value MUST be greater than or equal to 1 and MUST be less than 1048577. <29>

cCol (4 bytes): A DCol that specifies the number of columns in a DDE data item or OLE data item value array. This value MUST be greater than or equal to 1 and MUST be less than 16385. <30>

2.4.553 BrtSupSame

This record specifies a Same-Sheet Referencing type of Supporting Link.

2.4.554 BrtSupSelf

This record specifies a Self-Referencing type of Supporting Link.

2.4.555 BrtSupTabs

This record specifies the names of the sheets in an external workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cTab																															
sheetNames (variable)																															
...																															

cTab (4 bytes): An unsigned integer that specifies the count of XLWideString items in **sheetNames**.

sheetNames (variable): An array of XLWideString. Each item specifies the name of a sheet in the external workbook. Each value MUST comply with the restrictions set on the **strName** field of BrtBundleSh. The count of items in this array MUST be less than 65535.

2.4.556 BrtSXTDMPOrder

This record specifies a reference to a member property pivot field for a pivot hierarchy, see Member Properties for more details. The order of these records is used for the order of the member properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
isxvd																															

isxvd (4 bytes): An ISXVD that specifies the member property pivot field. MUST NOT be equal to -1 or -2.

2.4.557 BrtTable

This record specifies properties of a data table (1) and specifies the beginning of a collection of records as defined by the Worksheet part ABNF and the Macro Sheet part ABNF. The collection of records specifies a **one-variable data table** or a **two-variable data table**.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rfx (16 bytes)																															
...																															
rwInput1																															
colInput1																															
rwInput2																															
colInput2																															
A	B	C	D	E	F																										

rfx (16 bytes): An RfX that specifies the row and column bounds of the cells in the data table (1). Every cell in the range specified by **rfx** MUST be a data table (1) member. **rfx.rwFirst** MUST be greater than 0 and **rfx.ColFirst** MUST be greater than 0.

rwInput1 (4 bytes): An UncheckedRw that specifies the row of the first **input cell** for the data table (1).

MUST be ignored if **fDeleted1** is 1.

If **fTable2** is 1, then **rwInput1** and **colInput1** MUST specify a cell outside the bounds specified by **rfx.rwFirst** – 1, **rfx.rwLast**, **rfx.colFirst** – 1 and **rfx.colLast**.

If **fTable2** is 0, exactly one of these statements holds:

- **rwInput1** and **colInput1** MUST specify a cell outside the bounds specified by **rfx.rwFirst** – 1, **rfx.rwLast**, **rfx.colFirst** – 1 and **rfx.colLast**.
- **rwInput1** and **colInput1** MUST be equal to **rfx.rwFirst** -1 and **rfx.colFirst** – 1 respectively.

colInput1 (4 bytes): An UncheckedCol that specifies the column of the first input cell for the data table (1). MUST be ignored if **fDeleted1** is 1.

rwInput2 (4 bytes): An UncheckedRw that specifies the row of the second input cell for a two-variable data table. **rwInput2** and **colInput2** MUST specify a cell outside the bounds specified by **rfx.rwFirst** – 1, **rfx.rwLast**, **rfx.colFirst** – 1 and **rfx.colLast**. MUST be ignored if **fDeleted2** is 1 or if **fTable2** is 0.

colInput2 (4 bytes): An UncheckedCol that specifies the column of the second input cell for a two-variable data table. MUST be ignored if **fDeleted2** is 1 or if **fTable2** is 0.

A - fRow (1 bit): A bit that specifies whether the first input cell is a row input cell or a column input cell. Value MUST be one of the following:

Value	Meaning
0	The input cell is a column input cell.
1	The input cell is a row input cell.

MUST be 1 if **fTable2** is 1.

B - fTable2 (1 bit): A bit that specifies if the data table (1) is a two-variable data table or a one-variable data table. MUST be a value from the following table:

Value	Meaning
0	This is a one-variable data table.
1	This is a two-variable data table.

C - fDeleted1 (1 bit): A bit that specifies if the first input cell for the data table (1) has been deleted.

D - fDeleted2 (1 bit): A bit that specifies if the second input cell for a two-variable data table has been deleted. MUST be 0 if **fTable2** is 0.

E - fAlwaysCalc (1 bit): A bit that specifies if the data table (1) formula needs to be calculated as part of the next recalculation. MUST be a value from the following table:

Value	Meaning
0	The data table (1) formula does not need to be calculated as part of the next recalculation.
1	The data table (1) formula needs to be calculated as part of the next recalculation.

F - reserved (3 bits): MUST be 0 and MUST be ignored.

2.4.558 BrtTableStyleClient

This record specifies information about the table style applied to a table or PivotTable.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	reserved										stStyleName (variable)															
...																															

A - fFirstColumn (1 bit): A bit that specifies whether any table style elements (as specified by BrtTableStyleElement) with a **tseType** field equal to 0x00000003 will be applied. MUST be ignored for PivotTables.

B - fLastColumn (1 bit): A bit that specifies whether any table style elements (as specified by BrtTableStyleElement) with a **tseType** field equal to 0x00000004 will be applied.

C - fRowStripes (1 bit): A bit that specifies whether any table style elements (as specified by BrtTableStyleElement) with a **tseType** field equal to 0x00000005 or 0x00000006 will be applied.

D - fColumnStripes (1 bit): A bit that specifies whether any table style elements (as specified by BrtTableStyleElement) with a **tseType** field equal to 0x00000007 or 0x00000008 will be applied.

E - fRowHeaders (1 bit): A bit that specifies whether any table style elements (as specified by BrtTableStyleElement) with a **tseType** field equal to 0x00000003, 0x00000017, 0x00000018, or 0x00000019 will be applied. MUST be ignored for tables.

F - fColumnHeaders (1 bit): A bit that specifies whether any table style elements (as specified by BrtTableStyleElement) with a **tseType** field equal to 0x00000001, 0x00000014, 0x00000015, or 0x00000016 will be applied. MUST be ignored for tables.

reserved (10 bits): MUST be zero, and MUST be ignored.

stStyleName (variable): An XLNullableWideString that specifies the name of the table style applied to this table or PivotTable. MUST be less than 256 characters long. MUST be either NULL, equal to the **strName** field of one of the BrtBeginTableStyle records in the styles part, or equal to a built-in table style name as specified in [ECMA-376] part 4, 3.8.40.

2.4.559 BrtTableStyleElement

This record specifies formatting for one element of a table style. Each table style element specifies the formatting to apply to a particular area of a table or PivotTable when the table style is applied.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
tseType																															
size																															
dxfId																															

tseType (4 bytes): An unsigned integer that specifies the area of the table or PivotTable to which the formatting is applied. MUST be a value from the following table:

Value	Meaning
0x00000000	Whole table. If this table style is applied to a PivotTable, this formatting type also applies to page field captions and page item captions.
0x00000001	**Header row**. If this table style is applied to a PivotTable, this formatting type applies to the collection of rows above the data region. See *S* in the PivotTable Style Diagram.
0x00000002	Total row. If this table style is applied to a PivotTable, this formatting type applies to the grand total row. See *N* in the PivotTable Style Diagram.
0x00000003	First column. If this table style is applied to a PivotTable, this formatting type applies to the row label area, which can span multiple columns. See *R* in the PivotTable Style Diagram.
0x00000004	Last column. If this table style is applied to a PivotTable, this formatting type applies to the grand total column. See *A* in the PivotTable Style Diagram.
0x00000005	Row **stripe band** 1
0x00000006	Row stripe band 2
0x00000007	Column stripe band 1
0x00000008	Column stripe band 2
0x00000009	First cell of header row. If this table style is applied to a PivotTable, this formatting type applies to cells contained in the area intersected by the header row and first column.
0x0000000A	Last cell of header row. MUST be ignored if this table style is applied to a PivotTable.
0x0000000B	First cell of total row. MUST be ignored if this table style is applied to a PivotTable.
0x0000000C	Last cell of total row. MUST be ignored if this table style is applied to a PivotTable.
0x0000000D	Outermost subtotal columns in a PivotTable, specified by the columns displaying subtotals for the first SXVD record in the ISXVDCOLS collection. See *B* in the PivotTable Style Diagram. Used for PivotTables only.
0x0000000E	Alternating even subtotal columns in a PivotTable, specified by the columns displaying subtotals for SXVD records for which the zero-based index in the record in the ISXVDCOLS collection is an odd number. See *C* in the PivotTable Style Diagram. Used for PivotTables only.
0x0000000F	Alternating odd subtotal columns in a PivotTable, specified by the columns displaying subtotals for SXVD records for which the zero-based index in the record in the ISXVDCOLS collection is an even number greater than zero. See *D* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000010	Outermost subtotal rows in a PivotTable, specified by the rows displaying subtotals for the first SXVD record in the ISXTHRWS collection. See *M* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000011	Alternating even subtotal rows in a PivotTable, specified by the rows displaying subtotals for SXVD records for which the zero-based index in the SXVD record in the ISXTHRWS collection is an odd number. See *K* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000012	Alternating odd subtotal rows in a PivotTable, specified by the rows displaying subtotals for SXVD records for which the zero-based index in the SXVD record in the ISXTHRWS collection is an even number greater than zero. See *J* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000013	Empty rows after each subtotal row. See *L* in the PivotTable Style Diagram. Used for PivotTables only.

0x00000014	Outermost column subheadings in a PivotTable, specified by the columns displaying pivot field captions for the first SXVD record in the ISXVDCOLS collection. See *O* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000015	Alternating even column subheadings in a PivotTable, specified by the columns displaying pivot field captions for SXVD records for which the zero-based index in the ISXVDCOLS collection is an odd number. See *P* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000016	Alternating odd column subheadings in a PivotTable, specified by the columns displaying pivot field captions for SXVD records for which the zero-based index in the ISXVDCOLS collection is an even number greater than zero. See *Q* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000017	Outermost row subheadings in a PivotTable, specified by the rows displaying pivot field captions for the first SXVD record in the ISXTHRWS collection. See *G* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000018	Alternating even row subheadings in a PivotTable, specified by the rows displaying pivot field captions for SXVD records for which the zero-based index in the ISXTHRWS collection is an odd number. See *H* in the PivotTable Style Diagram. Used for PivotTables only.
0x00000019	Alternating odd row subheadings in a PivotTable, specified by the rows displaying pivot field captions for SXVD records for which the zero-based index in the ISXTHRWS collection is an even number greater than zero. See *I* in the PivotTable Style Diagram. Used for PivotTables only.
0x0000001A	Page field captions in a PivotTable, specified by the cells displaying pivot field captions for the SXVD records in the SXPIS. See *F* in the PivotTable Style Diagram. Used for PivotTables only.
0x0000001B	Page item captions in a PivotTable, specified by the cells displaying pivot item captions for the SXVD records in the SXPIS. See *E* in the PivotTable Style Diagram. Used for PivotTables only.

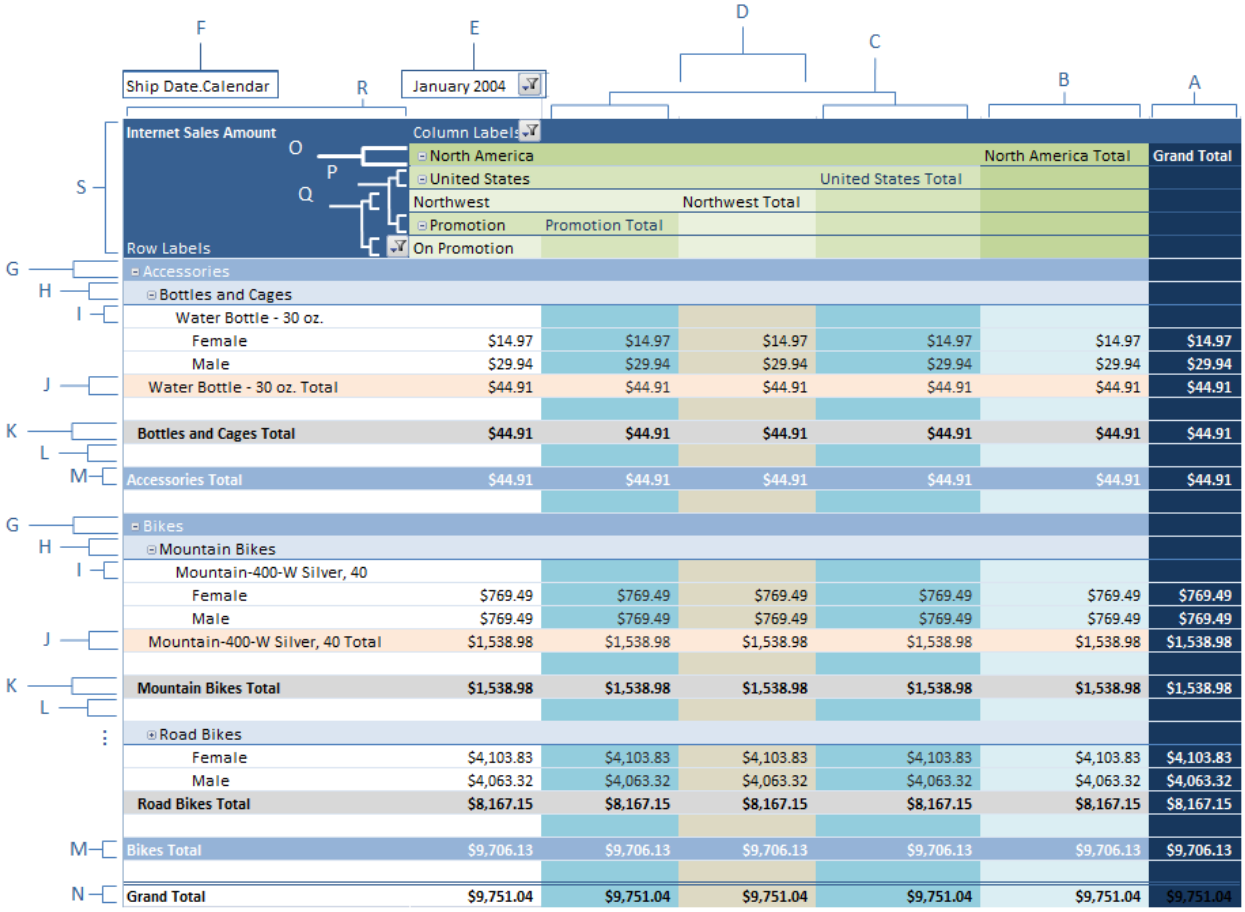


Figure 20: PivotTable Style Diagram

size (4 bytes): An unsigned integer that specifies the number of rows or columns to include in a single stripe band of **stripe formatting** if **tseType** is 0x00000005, 0x00000006, 0x00000007, or 0x00000008. For other values of **tseType**, this value is undefined and MUST be ignored. MUST be greater than or equal to 1, and MUST be less than or equal to 9.

dxfId (4 bytes): A DXFId that specifies the differential formatting applied to this table style element.

2.4.560 BrtTop10Filter

This record specifies the criteria for a top N filter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	reserved					xNumValue																							
...																															
...								xNumFilter																							

...	
...	

A - fTop (1 bit): A bit that specifies whether the top or bottom items are displayed. MUST be one of the following values:

Value	Meaning
0x0	Bottom items are displayed
0x1	Top items are displayed

B - fPercent (1 bit): A bit that specifies whether a percentage of top or bottom items are displayed, or a set number of top or bottom items are displayed. MUST be one of the following values:

Value	Meaning
0x0	Top or bottom n items are displayed
0x1	Top or bottom n percent of items are displayed

C - fApplied (1 bit): A bit that specifies whether the filter has been applied. MUST be one of the following values:

Value	Meaning
0x0	**xNumFilter** needs to be recalculated and the filter is not applied.
0x1	**xNumFilter** exists among the range of cells and is correctly calculated value, and the filter is applied

reserved (5 bits): MUST be zero, and MUST be ignored.

xNumValue (8 bytes): An Xnum that specifies the value applied in the filter. This value specifies the top or bottom **xNumValue** number or percent of items that will be displayed when the filter is applied. For example, if this filter is a "top 13 items" filter, then the value of this field would be 13. If this filter is applied to a PivotTable then this value MUST be greater than or equal to 0. Otherwise this value MUST be greater than or equal to 1 and less than or equal to 500.

xNumFilter (8 bytes): An Xnum that specifies the cell value in the range of cells that is used to perform the comparison for this filter. This value is calculated at the time the filter is applied. For example, if the filter is a top filter, then all items greater than or equal to the value stored in this field are displayed. If it is a bottom filter, all items less than or equal to this value are displayed. If **fApplied** is 1, this value MUST be a valid value in the range of cells which the filter is applied to.

2.4.561 BrtUCR

This record specifies undo information for row or column deletion and move operations when there are affected formulas or named ranges that reference the deleted rows, columns or moved range. This record is not applicable for insert revisions.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iptg																ptg								A	B	reserved1					

reserved2	
rfxChanged (16 bytes)	
...	
rw	
col	
tabid	rgb (variable)
...	

iptg (16 bits): An unsigned integer that specifies a zero-based index of a Ptg record in the affected formula's RgcePtg The referenced Ptg specifies the affected element of the formula. If **fLbl** is 1, this value MUST be 0 and MUST be ignored.

ptg (8 bits): An unsigned integer that specifies the type of expression that was adjusted in the affected formula or named range. The value MUST be one of the following values:

Value	Meaning
0x24	Specifies a reference to a single cell
0x25	Specifies a reference to a rectangular area of cells
0x26	Specifies a reference to a fixed set of cells
0x2A	Specifies an invalid reference to a cell
0x2B	Specifies an invalid reference to a cell range
0x3A	Specifies a reference to a single cell on the referenced sheet
0x3B	Specifies a reference to a rectangular area of cells on the referenced sheet
0x3C	Specifies an invalid reference to a single cell on the referenced sheet
0x3D	Specifies an invalid reference to a rectangular area of cells on the referenced sheet
0x44	Specifies a value-typed reference to a single cell
0x45	Specifies a value-typed reference to a rectangular area of cells
0x46	Specifies a value-typed reference to a fixed set of cells
0x4A	Specifies a value-typed invalid reference to a cell
0x4B	Specifies a value-typed invalid reference to a cell range
0x5A	Specifies a value-typed reference to a single cell on the referenced sheet
0x5B	Specifies a value-typed reference to a rectangular area of cells on the referenced sheet
0x5C	Specifies a value-typed invalid reference to a single cell on the

	referenced sheet
0x5D	Specifies a value-typed invalid reference to a rectangular area of cells on the given sheet
0x64	Specifies an array-typed reference to a single cell
0x65	Specifies an array-typed reference to a rectangular area of cells
0x66	Specifies an array-typed reference to a fixed set of cells
0x6A	Specifies an array-typed invalid reference to a cell
0x6B	Specifies an array-typed invalid reference to a cell range
0x7A	Specifies an array-typed reference to a single cell on the given sheet
0x7B	Specifies an array-typed reference to a rectangular area of cells on the given sheet
0x7C	Specifies an array-typed invalid reference to a single cell on the given sheet
0x7D	Specifies an array-typed invalid reference to a rectangular area of cells on the given sheet

A - fLbl (1 bit): A bit that specifies whether this record applies to a formula or a named range. If this value is 0, then this record applies to a formula. Otherwise, this record applies to a named range.

B - fUseSh2 (1 bit): A bit that specifies whether the expression was on a different sheet.

reserved1 (6 bits): MUST be zero and MUST be ignored.

reserved2 (4 bytes): MUST be zero and MUST be ignored.

rfxChanged (16 bytes): An RfXRel that specifies the range that is referenced by the affected formula or named range.

rw (4 bytes): A RwNullable that specifies the row of the cell of the formula that referenced the deleted cell range. If **fLbl** equals 1, then this value MUST be 0xFFFFFFFF and MUST be ignored.

col (4 bytes): A ColNullable that specifies the column of the cell of the formula that referenced the deleted cell range. If **fLbl** equals 1, then this value MUST be 0xFFFFFFFF and MUST be ignored.

tabid (2 bytes): A signed integer that specifies the id of the sheet that contained the formula that referenced the deleted cell range. If **tabid** equals -1, then **tabid** is ignored. This value MUST be greater than or equal to -1.

rgb (variable): An XLNameWideString that specifies the named range that references the deleted cells. This value MUST NOT be present if **fLbl** equals 0. This value MUST be present if **fLbl** equals 1.

2.4.562 BrtUserBookView

This record specifies the general custom view settings that apply to a whole workbook. There are companying BrtBeginUserShView and BrtBeginUserCsView records that specify individual custom view settings of each sheet. The set of this record and the companying BrtBeginUserShView and BrtBeginUserCsView records share the same GUID.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">xLeft</td></tr>
<tr><td colspan="32">xRight</td></tr>
<tr><td colspan="32">yTop</td></tr>
<tr><td colspan="32">yBot</td></tr>
<tr><td colspan="32">iTabid</td></tr>
<tr><td colspan="32">iTabRatio</td></tr>
<tr><td colspan="32">guid (16 bytes)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="16">wMergeInterval</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td>J</td><td>K</td><td>L</td><td>M</td><td>N</td></tr>
<tr><td>O</td><td colspan="15">unused</td><td colspan="16">stName (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

xLeft (4 bytes): A signed integer that specifies the X coordinate for the left of the window that contains the workbook, relative to the left of the workbook window. The unit of measurement for this value is twips.

xRight (4 bytes): A signed integer that specifies the X coordinate for the right of the window that contains the workbook, relative to the left of the workbook window. The unit of measurement for this value is twips.

yTop (4 bytes): A signed integer that specifies the Y coordinate for the top of the window that contains the workbook, relative to the top of the workbook window. The unit of measurement for this value is twips.

yBot (4 bytes): A signed integer that specifies the Y coordinate for the bottom of the window that contains the workbook, relative to the top of the workbook window. The unit of measurement for this value is twips.

iTabid (4 bytes): An unsigned integer that specifies the active sheet in this custom view. **iTabid** MUST be equal to the value of the **iTabID** in a BrtBundleSh in this workbook. MUST be greater than or equal to one and less than or equal to 65535.

iTabRatio (4 bytes): An unsigned integer that specifies the ratio of the window area used to display sheet tabs and the window area used to display the horizontal scroll bar. **iTabRatio** MUST be greater than or equal to zero and less than or equal to 1000. A value of 0 specifies that only the horizontal scroll bar is displayed. A value of 1000 specifies that only sheet tabs are displayed.

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies the identity of this custom view.

wMergeInterval (2 bytes): A signed integer that specifies the automatic update interval in minutes. Undefined and MUST be ignored if **fTimedUpdate** equals 0. MUST be greater than or equal to 5 and less than or equal to 1440 when **fTimedUpdate** equals 1.

A - fIconic (1 bit): A bit that specifies that the window that contains the workbook is minimized. **fIconic** and **fZoom** MUST NOT both be 0x1. MUST be one of the following:

Value	Meaning
0x0	The window that contains the workbook is not minimized.
0x1	The window that contains the workbook is minimized.

B - fDspHScroll (1 bit): A bit that specifies that the horizontal scrollbar is displayed in the window that contains the workbook. MUST be one of the following:

Value	Meaning
0x0	Horizontal scrollbar is not displayed.
0x1	Horizontal scrollbar is displayed.

C - fDspVScroll (1 bit): A bit that specifies that the vertical scrollbar is displayed in the window that contains the workbook. MUST be one of the following:

Value	Meaning
0x0	Vertical scrollbar is not displayed.
0x1	Vertical scrollbar is displayed.

D - fBotAdornment (1 bit): A bit that specifies that sheet tabs are displayed in the window that contains the workbook. MUST be one of the following:

Value	Meaning
0x0	Sheet tabs are not displayed.
0x1	Sheet tabs are displayed.

E - fZoom (1 bit): A bit that specifies that the window that contains the workbook is maximized. **fIconic** and **fZoom** MUST NOT both be 0x1. MUST be one of the following:

Value	Meaning
0x0	The window that contains the workbook is not maximized.
0x1	The window that contains the workbook is maximized.

F - fDspFmlaBar (1 bit): A bit that specifies that the **formula bar** is displayed. MUST be one of the following:

Value	Meaning
0x0	Formula bar is not displayed.
0x1	Formula bar is displayed.

G - fDspStatus (1 bit): A bit that specifies that the status bar is displayed. MUST be one of the following:

Value	Meaning
0x0	Status bar is not displayed.
0x1	Status bar is displayed.

H - mdDspNote (2 bits): An unsigned integer that specifies how comments are displayed in the window that contains the workbook.

Value	Meaning
0x0	Comments are not displayed in this custom view.
0x1	Comments are displayed in this custom view.
0x2	Comment indicators are displayed in the window that contains the workbook.

I - mdHideObj (2 bits): An unsigned integer that specifies whether **ActiveX objects**, OLE objects, and **drawing objects** are displayed in the window that contains the workbook.

Value	Meaning
0x0	ActiveX objects, OLE objects, and drawing objects are displayed in the window that contains the workbook.
0x1	Placeholders are displayed in place of ActiveX objects, OLE objects, and drawing objects in the window that contains the workbook.
0x2	ActiveX objects, OLE objects, and drawing objects are not displayed in the window that contains the workbook.

J - fPrintIncl (1 bit): A bit that specifies that custom print settings are included in this custom view. MUST be one of the following:

Value	Meaning
0x0	No custom print settings exist for this custom view.
0x1	Custom print settings exist in a BrtBeginUserShView record that has a **guid** field value equal to the **guid** of this BrtUserBookView. Additionally, **print titles** and print areas are specified by BrtName records that have **name** containing the **guid** of this BrtUserBookView, using the following form, where <guid> matches the value of **guid** with the characters left brace "{", right brace "}", and dash "-" in **guid** replaced by an underscore "_" character: • Print titles: Z<guid>.wvu.PrintTitles • Print area: Z<guid>.wvu.PrintArea

K - fRowColIncl (1 bit): A bit that specifies that there are hidden rows, hidden columns, or filter settings included in this custom view. MUST be one of the following:

Value	Meaning
0x0	No hidden rows, hidden columns, or filter settings exist for this custom view.
0x1	Hidden rows, hidden columns, or filter settings exist in a BrtBeginUserShView record that has a **guid** field value equal to the **guid** of this BrtUserBookView. Additionally, hidden rows and/or hidden columns are specified by BrtName records that have **name** containing the **guid** of this BrtUserBookView, using the following form, where <guid> matches the value of **guid** with the characters left brace "{", right brace "}", and dash "-" in **guid** replaced by an underscore "_" character: • Hidden rows: Z<guid>.wvu.Rows • Hidden columns: Z<guid>.wvu.Cols Filter settings are also specified by BrtName records that have **name** containing the value of **guid** for this BrtUserBookView and by BrtBeginAFilter in a BrtBeginUserShView with a **guid** field value equal to the **guid** of this BrtUserBookView, using the following form, where <guid> matches the value of **guid** with the characters left brace "{", right brace "}", and dash "-" in **guid** replaced by an underscore "_" character: • Range being filtered: Z<guid>.wvu.FilterData • Range containing filter criteria: Z<guid>.wvu.FilterCriteria

L - fTimedUpdate (1 bit): A bit that specifies whether changes to the workbook will be automatically saved and changes made to this workbook by other users will be automatically loaded at the interval specified by the **wMergeInterval**. MUST be zero and MUST be ignored if **fPersonalView** equals zero. MUST be one of the following:

Value	Meaning
0x0	Changes to the shared workbook will not be automatically saved/updated.
0x1	Changes to the shared workbook will be automatically saved/updated.

M - fAllMemChanges (1 bit): A bit that specifies that changes made to the workbook in the current **session (2)** take precedence over conflicting changes that exist in the persisted version of the workbook when the current session (2) is persisted to disk. MUST be zero and MUST be ignored if **fPersonalView** equals zero. MUST be one of the following:

Value	Meaning
0x0	Changes to the current session (2) do not take precedence.
0x1	Changes to the current session (2) do take precedence.

N - fOnlySync (1 bit): A bit that specifies whether the workbook will only be synchronized at the interval specified by **wMergeInterval**. MUST be zero and MUST be ignored if **fPersonalView** equals zero. MUST be one of the following:

Value	Meaning
0x0	Save changes from the current session (2) and synchronize the shared workbook.
0x1	Only synchronize the shared workbook.

O - fPersonalView (1 bit): A bit that specifies that this custom view is a personal custom view for a shared workbook user. A personal custom view specifies print and filter settings for a single user of a shared workbook. Undefined and MUST be ignored if this is not a shared workbook. MUST be one of the following:

Value	Meaning
0x0	This custom view is not a personal custom view.
0x1	This custom view is a personal custom view.

unused (15 bits): Undefined and MUST be ignored.

stName (variable): An XLWideString that specifies the name of the custom view. Length MUST be greater than or equal to 1 and less than or equal to 255 characters.

2.4.563 BrtUsr

This record specifies information about a user that is currently editing this shared workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iUsrId																															
guid (16 bytes)																															
...																															
sdtr																															
...																															
strName (variable)																															
...																															

iUsrId (4 bytes): An unsigned integer that specifies a unique identifier for this user. The **iUsrId** value MUST be distinct from the **iUsrId** value in every other BrtUsr in this document.

guid (16 bytes): A GUID as specified by [MS-DTYP] that specifies the revision of the shared workbook to which the user is currently synchronized.

sdtr (8 bytes): A ShortDtr that specifies the date and time the user opened this shared workbook. The date and time are stored in the user's local time.

strName (variable): An XLWideString that specifies the display name of the user. MUST be greater than 0 characters and less than or equal to 54 characters.

2.4.564 BrtValueMeta

This record specifies a reference to a value metadata metadata block in the metadata part.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ivmb																															

ivmb (4 bytes): A signed integer that specifies a one-based index of a BrtMdb record in the collection of all records directly following the BrtBeginEsmdb record whose **fCellMeta** field equals 0x00000000. The referenced BrtMdb specifies a value metadata metadata block that is associated with the BrtCellBlank, BrtCellRk, BrtCellError, BrtCellBool, BrtCellReal, BrtCellIsst, BrtCellSt, BrtCellStBrtFmlaString, BrtFmlaNum, BrtFmlaBool or BrtFmlaError record that follows BrtValueMeta.

2.4.565 BrtVolBool

This record specifies a cached returned value that is a Boolean.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
f																															

f (1 byte): A Boolean that specifies the value.

2.4.566 BrtVolErr

This record specifies a cached returned value that is an error.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
err																															

err (1 byte): A BErr that specifies the error.

2.4.567 BrtVolNum

This record specifies a cached returned value that is a number.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xnum																															
...																															

xnum (8 bytes): An Xnum that specifies the number.

2.4.568 BrtVolRef

This record specifies a cell that is specified by the volatile dependency containing this record as defined by the Volatile Dependencies part ABNF .

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rw																															
col																															
ish																															

rw (4 bytes): An UncheckedRw that specifies the row of the dependent cell.

col (4 bytes): An UncheckedCol that specifies the column of the dependent cell.

ish (4 bytes): An unsigned integer that specifies a zero-based index of a BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs. The referenced BrtBundleSh specifies the sheet that contains the dependent cell.

2.4.569 BrtVolStr

This record specifies a cached returned value that is a text string.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
st (variable)																															
...																															

st (variable): An XLWideString that specifies the string.

2.4.570 BrtVolSubtopic

This record specifies a subtopic.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
subtopic (variable)																															
...																															

subtopic (variable): An XLWideString that specifies the subtopic string.

2.4.571 BrtWbFactoid

This record specifies a collection of properties for smart tags that control the run-time visibility and save-time persistence of smart tags in the workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B		unused																												

A - fEmbedFactoids (1 bit): A bit that specifies whether smart tags are saved with the workbook. BrtBeginSmartTags is present if and only if this bit is set to 0.

B - mdFactoidDisplay (2 bits): An unsigned integer that specifies whether a **smart tag actions button** and/or **smart tag indicator**. is visible at run-time. MUST be a value from the following table:

Value	Meaning
0x0	The application will display the smart tag actions button and the smart tag indicator.
0x1	The application will display the smart tag actions button only. The smart tag indicators will not be displayed.
0x2	The application will not display the smart tag actions button or the smart tag indicator.

unused (5 bits): Undefined and MUST be ignored.

2.4.572 BrtWbProp

This record specifies properties of a workbook.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	I		J	K	L	M		N	O	P	Q	unused												
dwThemeVersion																															
strName (variable)																															

...

A - f1904 (1 bit): A bit that specifies the **date system** used in this workbook. MUST be a value from the following table:

Value	Meaning
0x0	Workbook uses 1900 date system.
0x1	Workbook uses 1904 date system

B - reserved1 (1 bit): MUST be zero, and MUST be ignored.

C - fHideBorderUnselLists (1 bit): A bit that specifies whether table borders are visible when a table is not active.

D - fFilterPrivacy (1 bit): A bit that specifies whether personally identifying information is removed from this workbook on save.

E - fBuggedUserAboutSolution (1 bit): A bit that specifies whether a warning is requested before loading a **smart document** manifest file.

F - fShowInkAnnotation (1 bit): A bit that specifies whether **ink comments** are visible in this workbook.

G - fBackup (1 bit): A bit that specifies whether the backup feature is enabled for this workbook.

H - fNoSaveSup (1 bit): A bit that specifies whether **external link** values are cached with this workbook on save.

I - grbitUpdateLinks (2 bits): An unsigned integer that specifies how embedded OLE (object linking and embedding) links in this workbook are to be updated. MUST be a value from the following table:

Value	Meaning
0x0	The link update behavior is application specific.
0x1	The links are not automatically updated.
0x2	The links are automatically updated <31> .

J - fHidePivotTableFList (1 bit): A bit that specifies whether the **PivotTable field list** is hidden.

K - fPublishedBookItems (1 bit): A bit that specifies whether this workbook is published. MUST be a value from the following table:

Value	Meaning
0x0	Each sheet is published according to its own publishing state as specified by the field **fPublish** of the BrtWsProp structure.
0x1	Individual items in a sheet specify their own publishing state..

L - fCheckCompat (1 bit): A bit that specifies whether the **file format compatibility checker** is enabled for this workbook.

M - mdDspObj (2 bits): An unsigned integer that specifies how shapes in this workbook are displayed.

Value	Meaning
0x0	The shapes are visible.
0x1	**Placeholders** are shown in place of the shapes.
0x2	The shapes are not visible.

N - fShowPivotChartFilter (1 bit): A bit that specifies whether the **PivotChart filter pane** is visible.

O - fAutoCompressPictures (1 bit): A bit that specifies whether pictures in this workbook are compressed on save.

P - reserved2 (1 bit): MUST be zero, and MUST be ignored.

Q - fRefreshAll (1 bit): A bit that specifies whether all external data in this workbook are refreshed when the workbook is opened.

unused (13 bits): Undefined and MUST be ignored.

dwThemeVersion (4 bytes): An unsigned integer that specifies the version number of the theme applied to the workbook. When the value is 0 the theme is specified by the Theme part ABNF.

strName (variable): A CodeName for this workbook <32>.

2.4.573 BrtWebOpt

This record specifies the options for saving this file as a Web page.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F	reserved2										screenSize								dwPixelsPerInch							
...																								uiCodePage							
...																															

A - fRelyOnCSS (1 bit): A bit that specifies whether **cascading style sheets (CSS)** are used for font formatting when viewing the saved file in a Web browser.

B - fOrganizeInFolder (1 bit): A bit that specifies whether all supporting files, such as background textures and graphics, are organized in a separate **folder** when saving this file as a Web page. The value MUST be one of the following values:

Value	**Meaning**
0	All supporting files are saved in the same folder as the Web page.
1	All supporting files are organized in a separate folder.

C - fUseLongFileNames (1 bit): A bit that specifies whether **long file names** are used when saving this file as a Web page.

D - reserved1 (1 bit): MUST be zero, and MUST be ignored.

E - fRelyOnVML (1 bit): A bit that specifies whether **VML** is to be used to display graphics in a Web browser.

F - fAllowPNG (1 bit): A bit that specifies whether Portable Network Graphics (PNG) format is allowed as an image format when saving this file as a Web page.

reserved2 (10 bits): MUST be zero, and MUST be ignored.

screenSize (1 byte): A **WebScreenSizeEnum** as specified in [MS-OSHARED] section 2.2.1.4 that specifies the ideal minimum screen size of the target monitor used to view the saved file in a Web browser.

dwPixelsPerInch (4 bytes): An unsigned integer that specifies the resolution, in pixels per inch, of graphics images and table cells when saving this file as a Web page. The value MUST be greater than or equal to 19 and less than or equal to 480.

uiCodePage (4 bytes): An unsigned integer that specifies the **code page**. The value specifies the code page value to be used by the Web browser when viewing the saved file. For more information about code pages, see [CODEPG].

2.4.574 BrtWsDim

This record specifies the used range of the sheet. It specifies the row and column bounds of used cells in the sheet. Used cells include All cells with formulas or data. Used cells also include All cells with formatting applied directly to the cell. Cells can also be formatted by default row or column formatting If a row has default formatting then the used range includes that row in its row bounds, but does not affect the used range column bounds, unless the used range would otherwise be empty, in which case the column bounds are set to include the first column. If a column has default formatting then the used range includes that column in its column bounds, but does not affect the used range row bounds, unless the used range would otherwise be empty, in which case the row bounds are set to include the first row.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
rfx (16 bytes)																															
...																															

rfx (16 bytes): An UncheckedRfX that specifies the row and column bounds of all the used cells in this sheet. If no cells are used in the sheet then this field MUST be zero.

2.4.575 BrtWsFmtInfo

This record specifies sheet formatting properties.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dxGCol																															
cchDefColWidth																miyDefRwHeight															
A	B	C	D	reserved												iOutLevelRw								iOutLevelCol							

dxGCol (4 bytes): An unsigned integer that specifies the default column width. For the purposes of this field specification, a standard digit is defined to be the widest digit in the normal style font. The default column width is measured in the number of standard digits that fit in the column multiplied by 256 and rounded down. The value MUST be less than or equal to 65535 or be equal to 0xFFFFFFFF. If the value is 0xFFFFFFFF, this value MUST be ignored.

cchDefColWidth (2 bytes): An unsigned integer that specifies the default column width when **dxGCol** is 0xFFFFFFFF. For the purposes of this field specification, a standard digit is defined to be the widest digit in the normal style font. This value is measured in number of standard digits. This value MUST be ignored if **dxGCol** is not 0xFFFFFFFF. This value MUST be less than or equal to 255. When this record is contained in a dialog sheet, this value MUST be less than 255 and MUST be ignored.

miyDefRwHeight (2 bytes): An unsigned integer that specifies the default row height, measured in twips. This value MUST be ignored if **fUnsynced** is zero.

A - fUnsynced (1 bit): A bit that specifies whether **miyDefRwHeight** has been manually set or is different from the default.

B - fDyZero (1 bit): A bit that specifies whether rows are hidden by default.

C - fExAsc (1 bit): A bit that specifies whether rows have a thick top border by default.

D - fExDesc (1 bit): A bit that specifies whether rows have a thick bottom border by default.

reserved (12 bits): MUST be zero, and MUST be ignored.

iOutLevelRw (8 bits): An unsigned integer that specifies the highest number of outline levels for rows in this sheet. This value MUST be greater than or equal to zero and MUST be less than or equal to 7.

iOutLevelCol (8 bits): An unsigned integer that specifies the highest number of outline levels for columns in this sheet. This value MUST be greater than or equal to zero and MUST be less than or equal to 7.

2.4.576 BrtWsProp

This record specifies properties for a dialog sheet, a macro sheet, or a worksheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B		C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	reserved4						brtcolorTab							
...																															

...	rwSync
...	colSync
...	strName (variable)
...	

A - fShowAutoBreaks (1 bit): A bit that specifies whether automatic page breaks are visible on this sheet.

B - reserved1 (2 bits): MUST be zero, and MUST be ignored.

C - fPublish (1 bit): A bit that specifies whether the published feature is enabled for this sheet. If this record appears within a collection of records as defined by the Dialog Sheet part ABNF or Macro Sheet part ABNF, this field MUST be 1 and MUST be ignored.

D - fDialog (1 bit): A bit that specifies whether this sheet is a dialog sheet. MUST be 1, if this record appears within a collection of records as defined by the Dialog Sheet part ABNF; otherwise, MUST be zero.

E - fApplyStyles (1 bit): A bit that specifies whether to apply the built-in cell style when an outline is applied. The **iOutLevel** field of each BrtColInfo record specifies column outline level (1). The built-in cell style for the column outline level (1) is specified by the BrtStyle record with **iLevel** field equal to **iOutLevel** minus 1. The **iOutLevel** field of each BrtRowHdr record specifies the row outline level (1). The built-in cell style for the outline level (1) is specified by the BrtStyle record with **iLevel** field equal to **iOutLevel** minus 1.

F - fRowSumsBelow (1 bit): A bit that specifies the location of **summary** rows relative to detailed data rows when an outline is applied. If the value is 1, then a summary row appears below the detailed data rows. If the value is 0, then a summary row appears above the detailed data rows. If this record appears within a collection of records as defined by the Dialog Sheet part ABNF, this field MUST be 1 and MUST be ignored.

G - fColSumsRight (1 bit): A bit that specifies the location of summary columns relative to detailed data columns when an outline is applied. If the value is 1 then the summary columns appear to the right, if the sheet is displayed **left-to-right**, or appear to the left, if the sheet is displayed right-to-left. If the value is 0 then the summary columns appear to the left, if the sheet is displayed left-to-right, or appear to the right, if the sheet is displayed right-to-left. If this record appears within a collection of records as defined by the Dialog Sheet part ABNF, this field MUST be 1 and MUST be ignored.

H - fFitToPage (1 bit): A bit that specifies whether to fit the printable contents to a single page when printing this sheet.

I - reserved2 (1 bit): MUST be zero, and MUST be ignored.

J - fShowOutlineSymbols (1 bit): A bit that specifies whether the sheet's outline symbols are visible. If this record appears within a collection of records as defined by the Dialog Sheet part ABNF, this field MUST be 1 and MUST be ignored.

K - reserved3 (1 bit): MUST be zero, and MUST be ignored.

L - fSyncHoriz (1 bit): A bit that specifies whether horizontal scrolling is synchronized across multiple windows displaying this sheet.

M - fSyncVert (1 bit): A bit that specifies whether vertical scrolling is synchronized across multiple windows displaying this sheet.

N - fAltExprEval (1 bit): A bit that specifies whether the sheet uses **transition formula evaluation**.

O - fAltFormulaEntry (1 bit): A bit that specifies whether the sheet uses **transition formula entry**.

P - fFilterMode (1 bit): A bit that specifies whether the sheet has one or more AutoFilters. If this record appears within a collection of records as defined by the Dialog Sheet part ABNF or Macro Sheet part ABNF, this field MUST be zero and MUST be ignored.

Q - fCondFmtCalc (1 bit): A bit that specifies whether the conditional formatting calculations are to be evaluated. MUST be a value from the following table:

Value	Meaning
0	Conditional formatting is not evaluated normally and all the existing conditional formatting will not be updated as cells associated with the conditional formatting change.
1	Conditional formatting is evaluated normally and all the existing conditional formatting will be updated as the cells associated with the conditional formatting change.

reserved4 (6 bits): MUST be zero, and MUST be ignored.

brtcolorTab (8 bytes): A BrtColor that specifies a background color of the sheet tab.

rwSync (4 bytes): A RwNullable that specifies an anchor row for synchronous vertical scrolling if **fSyncHoriz** or **fSyncVert** are 1; otherwise, MUST be 0xFFFFFFFF, and MUST be ignored.

colSync (4 bytes): A ColNullable that specifies an anchor column for synchronous horizontal scrolling if **fSyncHoriz** or **fSyncVert** are 1; otherwise, MUST be 0xFFFFFFFF, and MUST be ignored.

strName (variable): A CodeName for this sheet. If this record appears within a collection of records as defined by the Dialog Sheet part ABNF or Macro Sheet part ABNF, this field MUST be a 32-bit zero (0x00000000) and MUST be ignored.

2.4.577 BrtXF

This record specifies the formatting for cells. This record can specify a cell XF or a cell style XF. The total number of BrtXF records in the workbook which are not built-in MUST NOT exceed 0xFF96. A BrtXF record is considered to be built-in if it is referenced by a built-in BrtStyle record. A BrtStyle record is considered to be built-in if the **fBuiltIn** member of **grbitObj1** equals 1.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="16">ixfeParent</td><td colspan="16">iFmt</td></tr>
<tr><td colspan="16">iFont</td><td colspan="16">iFill</td></tr>
<tr><td colspan="16">ixBorder</td><td colspan="8">trot</td><td colspan="8">indent</td></tr>
<tr><td colspan="4">alc</td><td colspan="4">alcv</td><td>A</td><td>B</td><td>C</td><td>D</td><td colspan="2">E</td><td>F</td><td>G</td><td>H</td><td>I</td><td colspan="8">xfGrbitAtr</td><td colspan="8">unused</td></tr>
</table>

ixfeParent (2 bytes): An unsigned integer that specifies whether this record is a cell style XF or a cell XF. If this record specifies a cell style XF, the value MUST be 0xFFFF. If the record specifies a cell XF, the value is a zero-based index to another BrtXF record in the collection of all records directly following BrtBeginCellStyleXFs which is a cell style XF.

iFmt (2 bytes): An Ifmt that specifies the number format used when displaying the value of the cell.

iFont (2 bytes): An unsigned integer that specifies a zero-based index of a BrtFont record in the collection of records directly following a BrtBeginFonts record. The referenced BrtFont specifies the font properties for this cell.

iFill (2 bytes): An unsigned integer that specifies a zero-based index of a BrtFill record in the collection of records directly following a BrtBeginFills record. The referenced BrtFill specifies the fill properties for this cell.

ixBorder (2 bytes): An unsigned integer that specifies a zero-based index of a BrtBorder record in the collection of records directly following a BrtBeginBorders record. The referenced BrtBorder specifies the border properties for this cell.

trot (1 byte): An unsigned integer that specifies the text rotation in cells. This is an angle that is specified in degrees. The first letter of the text is considered the center-point of the arc. MUST be a value from the following table:

Value	Meaning
0-90	Text rotated counterclockwise 0 to 90 degrees
91-180	Text rotated clockwise 1 to 90 degrees
254	Text rotation is context dependent
255	Vertical text

indent (1 byte): An unsigned integer that specifies the **indentation level** for text in a cell. The **indent** value with respect to the number of space characters is calculated according to the following formula:

```
indent = number of space characters / 3
```

indent MUST be greater than or equal to 0 and less than or equal to 250.

alc (3 bits): An unsigned integer that specifies the type of horizontal alignment for text in the cell. The possible values for this attribute are defined in the following table:

Value	Meaning
0	**General alignment**
1	Left alignment
2	Center alignment
3	Right alignment
4	**Fill alignment**
5	Justify alignment
6	**Center-across-selection alignment**
7	Distributed alignment

alcv (3 bits): An unsigned integer that specifies the type of vertical alignment for text in the cell. The possible values for this attribute are defined in the following table:

Value	Meaning
0	Top alignment
1	Center alignment
2	Bottom alignment
3	Justify alignment
4	Distributed alignment

A - fWrap (1 bit): A bit that specifies whether the text in a cell is line-wrapped within the cell.

B - fJustLast (1 bit): A bit that specifies whether the justified or **distributed alignment** of the cell is used on the last line of text. (Setting this to 1 is typical for East Asian text but not typical in other contexts.)

C - fShrinkToFit (1 bit): A bit that specifies whether the displayed text in the cell is **shrink-to-fit**.

D - fMergeCell (1 bit): A bit that specifies whether this cell is part of a merged cell.

E - iReadingOrder (2 bits): An unsigned integer that specifies the **reading order** of the cell. The possible values for this attribute are defined in the following table:

Value	Meaning
0	Context dependent
1	left-to-right
2	right-to-left

F - fLocked (1 bit): A bit that specifies whether the **locked protection** property is set to true.

G - fHidden (1 bit): A bit that specifies whether the **hidden protection** property is set to true.

H - fSxButton (1 bit): A bit that specifies whether the cell has a PivotTable dropdown button.

I - f123Prefix (1 bit): A bit that specifies whether the text string in a cell is prefixed by a single quote mark.

xfGrbitAtr (6 bits): An unsigned integer that specifies how to interpret the formatting properties defined in other fields. Each bit represents one set of related formatting properties. The meaning

of the values of the bits varies based on whether this record specifies a cell XF or a cell style XF according to the following table:

Bit	Context	Value	Meaning
0	Cell Style XF	0	Number formatting, as specified in the **iFmt** field, is included in this cell style.
		1	Number formatting, as specified in the **iFmt** field, MUST be ignored.
0	Cell XF	0	If the number format of the cell style XF record referenced by **ixfParent** changes, that number format is set in this XF as well.
		1	If the number format of the cell style XF record referenced by **ixfParent** changes, the number format in this XF MUST not be changed.
1	Cell Style XF	0	Font formatting, as specified in the **iFont** field, is included in this cell style.
		1	Font formatting, as specified in the **iFont** field, MUST be ignored.
1	Cell XF	0	If the font formatting of the cell style XF record referenced by **ixfParent** changes, that font formatting is set in this XF as well.
		1	If the font formatting of the cell style XF record referenced by **ixfParent** changes, the font formatting in this XF MUST not be changed.
2	Cell Style XF	0	Alignment properties, as specified in the **trot**, **indent**, **alc**, **alcv**, **fWrap**, **fJustLast**, **fShrinkToFit**, **fMergeCell** and **iReadingOrder** fields, are included in this cell style.
		1	Alignment properties, as specified in the **trot**, **indent**, **alc**, **alcv**, **fWrap**, **fJustLast**, **fShrinkToFit**, **fMergeCell** and **iReadingOrder** fields, MUST be ignored.
2	Cell XF	0	If the alignment properties of the cell style XF record referenced by **ixfParent** change, those alignment properties are set in this XF as well.
		1	If the alignment properties of the cell style XF record referenced by **ixfParent** change, the alignment properties in this XF MUST not be changed.
3	Cell Style XF	0	Border formatting, as specified in the **ixBorder** field, is included in this cell style.
		1	Border formatting, as specified in the **ixBorder** field, MUST be ignored.
3	Cell XF	0	If the border formatting of the cell style XF record referenced by **ixfParent** changes, that border formatting is set is this XF as well.
		1	If the border formatting of the cell style XF record referenced by **ixfParent** changes, the border formatting in this XF MUST not be changed.
4	Cell Style XF	0	Fill formatting, as specified in the **iFill** field, is included in this cell style.
		1	Fill formatting, as specified in the **iFill** field, MUST be ignored.
4	Cell XF	0	If the fill formatting of the cell style XF record referenced by **ixfParent** changes, that fill formatting is set in this XF as well.
		1	If the fill formatting of the cell style XF record referenced by **ixfParent** changes, the fill formatting in this XF MUST not be changed.
5	Cell Style XF	0	Protection properties, as specified in the **fLocked** and **fHidden** fields, are included in this cell style.
		1	Protection properties, as specified in the **fLocked** and **fHidden** fields, MUST be ignored.
5	Cell XF	0	If the protection properties of the cell style XF record referenced by

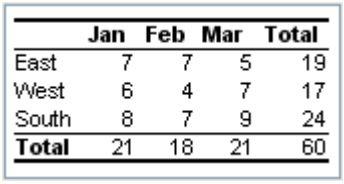
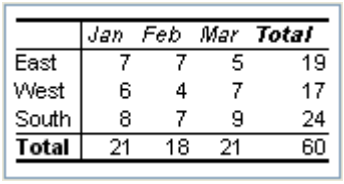
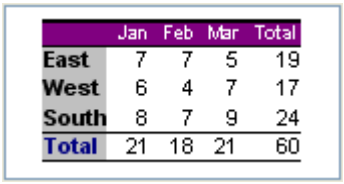
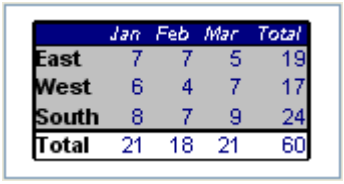
			ixfParent change, those protection properties are set in this XF as well.
		1	If the protection properties of the cell style XF record referenced by **ixfParent** change, the protection properties in this XF MUST not be changed.

unused (10 bits): Undefined and MUST be ignored.

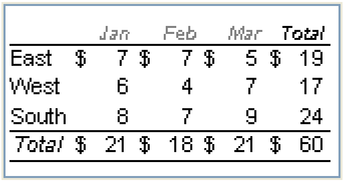
2.5 Structures

2.5.1 AutoFormatID

A 2-byte unsigned integer specifying the AutoFormat to be applied. MUST be one of the following values:

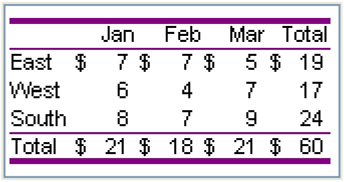
Value	Meaning
0x0000	
0x0001	
0x0002	
0x0003	

0x0004



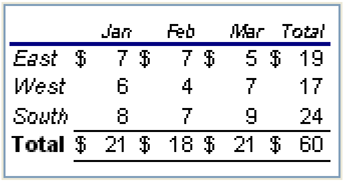
	Jan	Feb	Mar	Total
East	$ 7	$ 7	$ 5	$ 19
West	6	4	7	17
South	8	7	9	24
Total	$ 21	$ 18	$ 21	$ 60

0x0005



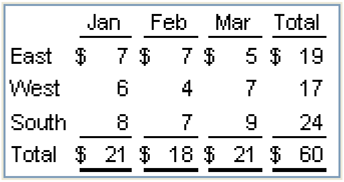
	Jan	Feb	Mar	Total
East	$ 7	$ 7	$ 5	$ 19
West	6	4	7	17
South	8	7	9	24
Total	$ 21	$ 18	$ 21	$ 60

0x0006



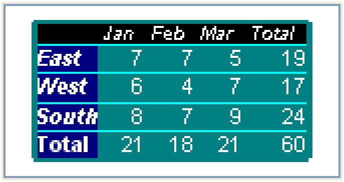
	Jan	Feb	Mar	Total
East	$ 7	$ 7	$ 5	$ 19
West	6	4	7	17
South	8	7	9	24
Total	$ 21	$ 18	$ 21	$ 60

0x0007



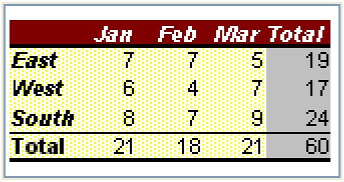
	Jan	Feb	Mar	Total
East	$ 7	$ 7	$ 5	$ 19
West	6	4	7	17
South	8	7	9	24
Total	$ 21	$ 18	$ 21	$ 60

0x0008



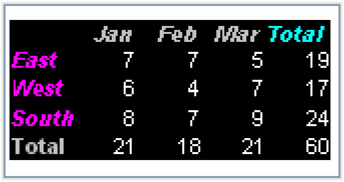
	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

0x0009



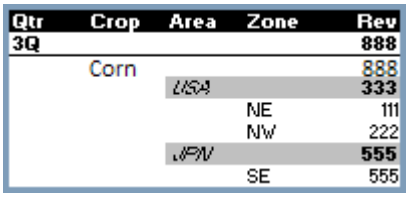
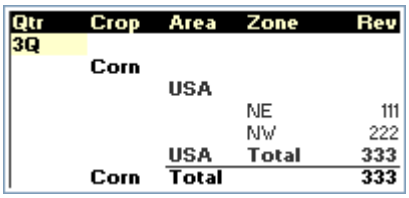
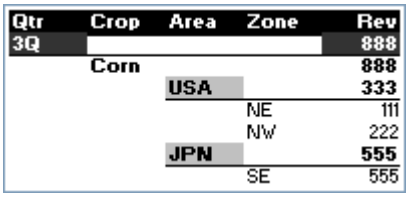
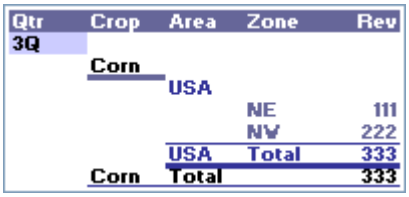
	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

0x000A



	Jan	Feb	Mar	Total
East	7	7	5	19
West	6	4	7	17
South	8	7	9	24
Total	21	18	21	60

0x000B	
0x000C	
0x000D	
0x000E	
0x000F	
0x0010	
0x0011	Japan style 2

0x0012	Japan style 3
0x0013	Japan style 4
0x0014	Japan style none
0x1000	
0x1001	
0x1002	
0x1003	

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0x1005	Qtr Crop Area Zone Rev 3Q 888 Corn 888 USA 333 NE 111 NW 222 JPN 555 SE 555
0x1006	Qtr Crop Area Zone Rev 3Q Corn USA NE 111 NW 222 USA Total 333 Corn Total 333
0x1007	Qtr Crop Area Zone Rev 3Q Corn USA NE 111 NW 222 USA Total 333 Corn Total 333
0x1008	Qtr Crop Area Zone Rev 3Q 888 Corn 888 USA 333 NE 111 NW 222 JPN 555 SE 555
0x1009	Qtr Crop Area Zone Rev 3Q 888 Corn 888 USA 333 NE 111 NW 222 JPN 555
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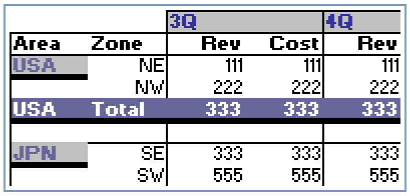
<tr><td>0x100B</td><td> 
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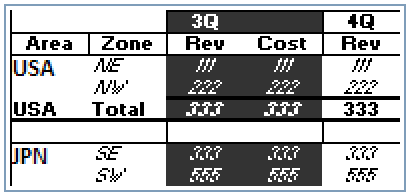
<tr><td>0x100C</td><td> 
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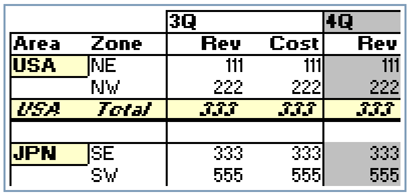
<tr><td>0x100D</td><td> 
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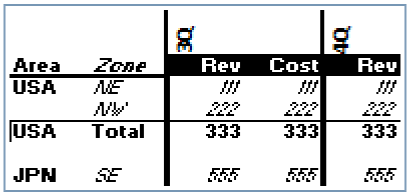
<tr><td>0x100E</td><td> 
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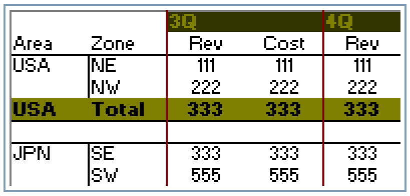
<tr><td>0x100F</td><td> 
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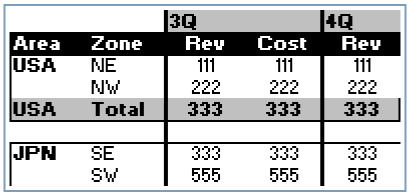
<tr><td>0x1010</td><td> 
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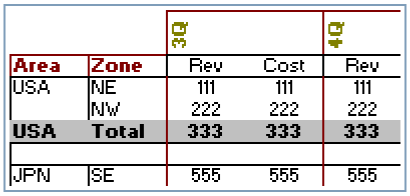
<tr><td>0x1011</td><td> 
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0x1012	
0x1013	
0x1014	
0x1015	

		3Q		4Q
Area	Zone	Rev	Cost	Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	555	555	555

		3Q		4Q
Area	Zone	Rev	Cost	Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555

		3Q		4Q
Area	Zone	Rev	Cost	Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555
JPN	Total	888	888	888

		3Q		4Q
Area	Zone	Rev	Cost	Rev
USA	NE	111	111	111
	NW	222	222	222
USA	Total	333	333	333
JPN	SE	333	333	333
	SW	555	555	555
JPN	Total	888	888	888

2.5.2 Blxf

This structure specifies a reference to border definition.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dg								reserved								brtColor															
...																															
...																															

dg (1 byte): An unsigned integer that specifies the type of border. MUST be a value from the following table:

Value	Meaning
0x00	None
0x01	Thin
0x02	Medium
0x03	Dashed
0x04	Dotted
0x05	Thick
0x06	Double
0x07	Hairline
0x08	Medium Dashed
0x09	Dash Dot
0x0A	Medium Dash Dot
0x0B	Dash Dot Dot
0x0C	Medium Dash Dot Dot
0x0D	Slant Dash Dot

reserved (1 byte): MUST be zero, and MUST be ignored.

brtColor (8 bytes): A BrtColor that specifies border color.

2.5.3 Bold

This enumeration specifies the **font face weight**. <33>

Name	Value	Meaning
BLSNORMAL	0x0190	Normal font weight
BLSBOLD	0x02BC	Bold font weight

2.5.4 BorderStyle

This enumeration specifies the border line style.

Name	Value	Meaning
NONE	0x0000	No border
THIN	0x0001	Thin line
MEDIUM	0x0002	Medium line
DASHED	0x0003	Dashed line
DOTTED	0x0004	Dotted line
THICK	0x0005	Thick line
DOUBLE	0x0006	Double line
HAIR	0x0007	Hairline
MEDIUMDASHED	0x0008	Medium dashed line
DASHDOT	0x0009	Dash-dot line
MEDIUMDASHDOT	0x000A	Medium dash-dot line
DASHDOTDOT	0x000B	Dash-dot-dot line

MEDIUMDASHDOTDOT	0x000C	Medium dash-dot-dot line
SLANTDASHDOT	0x000D	Slanted dash-dot-dot line

2.5.5 BrtColSpan

This structure specifies the index of the first and last columns that contain data for a single segment of the containing BrtRowHdr. Each BrtRowHdr is divided into 16 segments, each containing 1024 contiguous columns where the **column** field of each Cell record in the segment will result in the same value for the following formula using integer division:

column / 1024

A BrtColSpan structure exists if and only if a Cell record exists for one or more columns within the segment.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">colMic</td></tr>
<tr><td colspan="32">colLast</td></tr>
</table>

colMic (4 bytes): A Col that specifies the column index of the first cell logically contained within this segment. MUST be less than 0x00004000 (16384), MUST be equal to the smallest value of the **column** field of the Cell records logically contained in this segment and MUST be a value that satisfies the following condition under integer division:

colMic / 1024 = **colLast** / 1024

colLast (4 bytes): A Col that specifies the column index of the last cell logically contained within this segment. MUST be greater than or equal to **colMic**, MUST be less than 0x00004000 (16384) , MUST be equal to the largest value of the **column** field of the Cell records logically contained in this segment and MUST be a value that satisfies the following condition under integer division:

colLast / 1024 **= colMic** / 1024

2.5.6 Cell

This structure specifies some information for a cell such as its column number, style and phonetic information. This is a structure that is shared by many cell record types.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">column</td></tr>
<tr><td colspan="28">iStyleRef</td><td>A</td><td colspan="3">reserved</td></tr>
</table>

column (4 bytes): An UncheckedCol that specifies the column that contains this cell.

iStyleRef (24 bits): An unsigned integer that specifies a zero-based index of a BrtXF record in the collection of All records directly following BrtBeginCellXFs in the styles part. The referenced BrtXF specifies the cell formatting for this cell. This value MUST be less than the total number of BrtXF records between BrtBeginCellXFs and BrtEndCellXFs.

A - fPhShow (1 bit): A bit that specifies whether the application shows phonetic information for this cell. Value MUST be one of the following:

Value	Meaning
0	Cell does not show phonetic information
1	Cell shows phonetic information

This value MUST be 0 if the cell exists in the Revision Log part ABNF .

reserved (7 bits): MUST be 0 and MUST be ignored.

2.5.7 CellStyleName

An XLNullableWideString that specifies the name of a cell style. The length of the string MUST be less than or equal to 255. MUST be a null string or match the name of a cell style defined by a BrtStyle record.

2.5.8 CFDateOper

This enumeration specifies the valid types of date comparisons used in conditional formatting rules. All of these comparisons evaluate to False (0) if the cell does not contain a date.

Name	Value	Meaning
CF_TIMEPERIOD_TODAY	0x00000000	This rule evaluates to True (1) when the date specified by the cell is today's date.
CF_TIMEPERIOD_YESTERDAY	0x00000001	This rule evaluates to True (1) when the date specified by the cell is yesterday's date.
CF_TIMEPERIOD_LAST7DAYS	0x00000002	This rule evaluates to True (1) when the date specified by the cell is today's date or a day up to six days prior to today's date.
CF_TIMEPERIOD_THISWEEK	0x00000003	This rule evaluates to True (1) when the date specified by the cell is a day in the one-week period beginning with the previous Sunday.
CF_TIMEPERIOD_LASTWEEK	0x00000004	This rule evaluates to True (1) when the date specified by the cell is a day in the one-week period ending with the previous Saturday.
CF_TIMEPERIOD_LASTMONTH	0x00000005	This rule evaluates to True (1) when the date specified by the cell is a day in the previous month.
CF_TIMEPERIOD_TOMORROW	0x00000006	This rule evaluates to True (1) when the date specified by the cell is tomorrow's date.
CF_TIMEPERIOD_NEXTWEEK	0x00000007	This rule evaluates to True (1) when the date specified by the cell is a day in the one-week period beginning with the next Sunday.
CF_TIMEPERIOD_NEXTMONTH	0x00000008	This rule evaluates to True (1) when the date specified by the cell is a day in the next month.
CF_TIMEPERIOD_THISMONTH	0x00000009	This rule evaluates to True (1) when the date

		specified by the cell is a day in the current month.

2.5.9 CFFlag

This structure specifies an icon within an icon set.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iIconSet																															
iIcon																															

iIconSet (4 bytes): A KPISets that specifies the icon set.

iIcon (4 bytes): An Icon specifying the icon. If **iIconSet** is -1, this value MUST be -1. If the icon set specified by **iIconSet** has 3 icons, this value MUST be less than or equal to 2. If the icon set specified by **iIconSet** has 4 icons, this value MUST be less than or equal to 3. If the icon set specified by **iIconSet** has 5 icons, this value MUST be less than or equal to 4.

2.5.10 CFOper

This enumeration specifies the valid types of value comparisons used in conditional formatting rules. The value of the cell is compared against the value calculated using the formulas stored in the **rgce1** and **rgce2** fields of BrtBeginCFRule.

Name	Value	Meaning
CF_OPER_BN	0x00000001	This rule evaluates to True (1) when the cell's value is greater than or equal to the value specified by **rgce1** and less than or equal to the value specified by **rgce2**.
CF_OPER_NB	0x00000002	This rule evaluates to True (1) when the cell's value is less than the value specified by **rgce1** or greater than the value specified by **rgce2**.
CF_OPER_EQ	0x00000003	This rule evaluates to True (1) when the cell's value is equal to the value specified by **rgce1**.
CF_OPER_NE	0x00000004	This rule evaluates to True (1) when the cell's value is not equal to the value specified by **rgce1**.
CF_OPER_GT	0x00000005	This rule evaluates to True (1) when the cell's value is greater than the value specified by **rgce1**.
CF_OPER_LT	0x00000006	This rule evaluates to True (1) when the cell's value is less than the value specified by **rgce1**.
CF_OPER_GE	0x00000007	This rule evaluates to True (1) when the cell's value is greater than or equal to the value specified by **rgce1**.
CF_OPER_LE	0x00000008	This rule evaluates to True (1) when the cell's value is less than or equal to the value specified by **rgce1**.

2.5.11 CFTemp

This enumeration specifies the type of condition that causes conditional formatting to be displayed in cells as part of a conditional formatting rule.

Name	Value	Meaning
CF_TEMPLATE_EXPR	0x00000000	Cells are formatted based on their values.
CF_TEMPLATE_FMLA	0x00000001	Cells are formatted based on the result of a formula.
CF_TEMPLATE_GRADIENT	0x00000002	A color scale is used to shade the cells based on their values.
CF_TEMPLATE_DATABAR	0x00000003	A data bar is drawn in each cell.
CF_TEMPLATE_MULTISTATE	0x00000004	An icon is displayed in the cell based on its value.
CF_TEMPLATE_FILTER	0x00000005	Cells are formatted when their values are in the top or bottom of the range of all values in the conditional formatting range.
CF_TEMPLATE_BANDEDTABLE	0x00000006	This value is not used.
CF_TEMPLATE_UNIQUEVALUES	0x00000007	Formatting is applied when a cell's value is unique among All other cells in the conditional formatting range.
CF_TEMPLATE_CONTAINSTEXT	0x00000008	Formatting is applied when the cell's value contains specific text.
CF_TEMPLATE_CONTAINSBLANKS	0x00000009	Formatting is applied when the cell's value is blank.
CF_TEMPLATE_CONTAINSNOBLANKS	0x0000000A	Formatting is applied when the cell's value is not blank.
CF_TEMPLATE_CONTAINSERRORS	0x0000000B	Formatting is applied when the cell contains an error.
CF_TEMPLATE_CONTAINSNOERRORS	0x0000000C	Formatting is applied when the cell does not contain an error.
CF_TEMPLATE_CONTAINSFORMULAS	0x0000000D	This value is not used.
CF_TEMPLATE_CONTAINSNOFORMULAS	0x0000000E	This value is not used.
CF_TEMPLATE_TIMEPERIODTODAY	0x0000000F	Formatting is applied when the cell contains a date and that date is today.
CF_TEMPLATE_TIMEPERIODTOMORROW	0x00000010	Formatting is applied when the cell contains a date and that date is tomorrow.
CF_TEMPLATE_TIMEPERIODYESTERDAY	0x00000011	Formatting is applied when the cell contains a date and that date is yesterday.
CF_TEMPLATE_TIMEPERIODLAST7DAYS	0x00000012	Formatting is applied when the cell contains a date and that date occurred within the last 7 days.
CF_TEMPLATE_TIMEPERIODLASTMONTH	0x00000013	Formatting is applied when the cell contains a date and that date occurred last month.
CF_TEMPLATE_TIMEPERIODNEXTMONTH	0x00000014	Formatting is applied when the cell contains a date and that date occurs next month.
CF_TEMPLATE_TIMEPERIODTHISWEEK	0x00000015	Formatting is applied when the cell contains a date and that date occurs this week.
CF_TEMPLATE_TIMEPERIODNEXTWEEK	0x00000016	Formatting is applied when the cell contains a date and that date occurs next week.

CF_TEMPLATE_TIMEPERIODLASTWEEK	0x00000017	Formatting is applied when the cell contains a date and that date occurred last week.
CF_TEMPLATE_TIMEPERIODTHISMONTH	0x00000018	Formatting is applied when the cell contains a date and that date occurs this month.
CF_TEMPLATE_ABOVEAVERAGE	0x00000019	Formatting is applied when the cell's value is above the average value of other cells in the conditional formatting range.
CF_TEMPLATE_BELOWAVERAGE	0x0000001A	Formatting is applied when the cell's value is below the average value of other cells in the conditional formatting range.
CF_TEMPLATE_DUPLICATEVALUES	0x0000001B	Formatting is applied when the cell's value matches the value of other cells in the conditional formatting range.
CF_TEMPLATE_COMPARECOLUMNS	0x0000001C	This value is not used.
CF_TEMPLATE_EQUALABOVEAVERAGE	0x0000001D	Formatting is applied when the cell's value is equal to or greater than the average value of other cells in the conditional formatting range.
CF_TEMPLATE_EQUALBELOWAVERAGE	0x0000001E	Formatting is applied when the cell's value is equal to or less than the average value of other cells in the conditional formatting range.

2.5.12 CFTextOper

This enumeration specifies the valid types of text comparisons used in conditional formatting rules. The value of the cell is compared against the string stored in the **strParam** field of BrtBeginCFRule.

Name	Value	Meaning
CF_TEXTOPER_CONTAINS	0x00000000	This rule evaluates to True (1) when the cell contains the specified text.
CF_TEXTOPER_NOTCONTAINS	0x00000001	This rule evaluates to True (1) when the cell does not contain the specified text.
CF_TEXTOPER_BEGINSWITH	0x00000002	This rule evaluates to True (1) when the cell's text begins with the specified text.
CF_TEXTOPER_ENDSWITH	0x00000003	This rule evaluates to True (1) when the cell's text does not begin with the specified text.

2.5.13 CFType

This enumeration specifies the type of conditional formatting rule applied to a range.

Name	Value	Meaning
CF_TYPE_CELLIS	0x00000001	Cells are formatted based on their values.
CF_TYPE_EXPRIS	0x00000002	Cells are formatted based on the result of a formula or a CFTemp expression.
CF_TYPE_GRADIENT	0x00000003	A color scale is used to shade the cells based on their values.

CF_TYPE_DATABAR	0x00000004	A data bar is drawn in each cell.
CF_TYPE_FILTER	0x00000005	Cells are formatted when their values are in the top or bottom of the range of All values in the conditional formatting range.
CF_TYPE_MULTISTATE	0x00000006	An icon is displayed in the cell based on its value.

2.5.14 CFVOtype

Specifies how the CFVO value is determined. In the following table, X represents a parameter value. If the **formula.cce** field of the containing BrtCFVO record is greater than zero, then X is the result of evaluating **formula**. Otherwise, X is equal to the value of the **numvalue** field of the containing BrtCFVO record. MUST be one of the following values:

Name	Value	Meaning
CFVONUM	0x00000001	X
CFVOMIN	0x00000002	The minimum value from the range of cells that the conditional formatting rule applies to.
CFVOMAX	0x00000003	The maximum value from the range of cells that the conditional formatting rule applies to.
CFVOPERCENT	0x00000004	The minimum value in the range of cells that the conditional formatting rule applies to plus X percent of the difference between the maximum and minimum values in the range of cells that the conditional formatting rule applies to. For example, if the min and max values in the range are 1 and 10 respectively, and X is 10, then the CFVO value is 1.9.
CFVOPERCENTILE	0x00000005	The minimum value of the cell that is in X percentile of the range of cells that the conditional formatting rule applies to.
CFVOFMLA	0x00000007	The result of evaluating **formula** of the containing BrtCFVO record.

2.5.15 CmdType

This enumeration specifies the meaning of the **stCmd** field of the BrtBeginECDbProps record.

Name	Value	Meaning
CMDNULL	0x00000000	The **stCmd** field of the BrtBeginECDbProps record is not specified.
CMDCUBE	0x00000001	The **stCmd** field of the BrtBeginECDbProps record specifies the name of a cube within an OLAP database.
CMDSQL	0x00000002	The **stCmd** field of the BrtBeginECDbProps record specifies a SQL (Structured Query Language) statement.
CMDTABLE	0x00000003	The **stCmd** field of the BrtBeginECDbProps record specifies a database table name.
CMDDEFAULT	0x00000004	The **stCmd** field of the BrtBeginECDbProps record specifies a statement in the default language of the database.
CMDSPLIST	0x00000005	The **stCmd** field of the BrtBeginECDbProps record specifies a list from a Web-based data provider.

2.5.16 CodeName

An XLWideString that specifies a name as to be used in a scripting application. The length of this string MUST NOT exceed 31 characters. If this string is not empty, it MUST contain only the characters that can be mapped from Unicode to a multibyte **ANSI character set** specified by the system locale. If the system locale is Chinese, Japanese, or Korean, then the fullwidth characters in the resulting ANSI string are further mapped to corresponding halfwidth characters where applicable.

In the resulting ANSI string, the first character MUST be either a letter, a single-byte character with a code greater than 0x7F, or a multibyte character. The subsequent characters in the resulting ANSI string MUST be either a letter, a digit, an underscore, a single-byte character with a code greater that 0x7F, or a multibyte character.

If the system locale is Japanese, the original Unicode string MUST NOT contain a character with a code equal to 0xFFE3.

2.5.17 Col

A signed 32-bit integer that specifies a single column in a sheet using a zero-based index. MUST be between 0 and 16383 inclusive and MUST be between **colFirst** and **colLast** inclusive on the UncheckedRfX specified by the **rfx** field on the sheet's BrtWsDim record.

2.5.18 ColNullable

A signed 32-bit integer that specifies a single column in a sheet.

Value	Meaning
0xFFFFFFFFL	Null value
	All other values are interpreted as an UncheckedCol.

2.5.19 ColRel

Specifies a single column in a sheet. There is a row associated with this column which is determined in the context of the containing RfXRel. This structure specifies whether the associated row/column pair is a relative reference with respect to rows or columns.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col														A	B	reserved															

col (14 bits): An unsigned integer that specifies the zero-based index of which specifies the column.

A - fColRel (1 bit): A bit that specifies if the associated row/column pair is a relative reference with respect to columns.

B - fRwRel (1 bit): A bit that specifies if the associated row/column pair is a relative reference with respect to rows.

reserved (16 bits): MUST be zero, and MUST be ignored.

2.5.20 ColRelShort

Specifies a single column in a sheet. There is a row associated with this column which is determined in the context of the containing structure. This structure specifies whether the associated row/column pair is a relative reference with respect to rows or columns.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col														A	B																

col (14 bits): An unsigned integer that specifies the zero-based index of which specifies the column.

A - fColRel (1 bit): A flag that specifies if the associated row/column pair is a relative reference with respect to columns.

B - fRwRel (1 bit): A flag that specifies if the associated row/column pair is a relative reference with respect to rows.

2.5.21 ColShort

Specifies a single column in a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															

col (2 bytes): An unsigned integer that specifies a single column in a sheet using a zero-based index. MUST be between less than or equal to 16383.

2.5.22 DataConsolidationFunction

An enumeration that specifies the valid values of the data consolidation function in the BrtBeginSXDI record.

Name	Value	Meaning
SUM	0x00000000	The sum of the values.
COUNT	0x00000001	The count of data values.
AVERAGE	0x00000002	The average of the values.
MAX	0x00000003	The largest value.
MIN	0x00000004	The smallest value.
PRODUCT	0x00000005	The product of the values.
COUNTNUM	0x00000006	The count of data values that are numbers.
STDDEV	0x00000007	An estimate of the standard deviation of a population, where the data to be summarized is a subset of the entire population.
STDDEVP	0x00000008	The standard deviation of a population, where the population is all of

		the data to be summarized.
STDVAR	0x00000009	An estimate of the variance of a population, where the data to be summarized is a subset of the entire population.
STDVARP	0x0000000A	The variance of a population, where the population is all of the data to be summarized.

2.5.23 DataFunctionalityLevel

A 1 byte unsigned integer that specifies a data functionality level <34>. MUST be greater than or equal to 0 and less than or equal to 3.

2.5.24 DateAsXnum

This structure specifies a date and time.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
dateNum																															
...																															

dateNum (8 bytes): An Xnum that specifies a date and time. MUST be greater than or equal to 0.

If the **f1904** field in the BrtWbProp record is equal to 1, the Xnum MUST be less than 2958466, and the integer part of the Xnum specifies the date as a sequential number of days following January 1, 1904.

If the **f1904** field in the BrtWbProp record is equal to 0 and the value of the Xnum is less than 60, the integer part of the Xnum specifies the date as sequential number of days following December 31, 1899.

If the **f1904** field in the BrtWbProp record is equal to 0 and the integer part of the Xnum is greater than 60, the Xnum MUST be less than 2957004, and the integer part of the Xnum specifies the date as sequential number of days following December 30, 1899.

If the **f1904** field in the BrtWbProp record is equal to 0 and the integer part of the Xnum is equal to 60 no date is specified <35>.

The fractional part of the Xnum specifies the time of the day as a fraction of the 24 hour day.

2.5.25 DBType

This enumeration specifies the data source (1) type of an external connection. It is used by the BrtBeginExtConnection record.

Name	Value	Meaning
DBTODBC	0x00000001	ODBC data source (1)
DBTDAO	0x00000002	DAO data source (1)
DBTWEB	0x00000004	HTML data source (1)
DBTOLEDB	0x00000005	OLE DB data source (1)
DBTTEXT	0x00000006	Text data source (1)

DBTADO	0x00000007	**ActiveX Data Objects (ADO)** record set

2.5.26 DCol

A signed 32-bit integer that specifies a column count or offset. MUST be between 0 and 16384 inclusive.

2.5.27 DColShort

A signed integer that specifies a column count or offset. MUST be between 0 and 16384 inclusive.

2.5.28 DDEItemProperties

This structure specifies properties of a DDE Data Item.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td colspan="10">unused1</td><td colspan="16">reserved4</td></tr>
<tr><td colspan="16">...</td><td>G</td><td colspan="7">unused2</td><td colspan="8"></td></tr>
</table>

A - reserved1 (1 bit): MUST be 0 and MUST be ignored.

B - fWantAdvise (1 bit): A bit that specifies if the application requests that the data source (1) provide a notification when the data changes.

C - fWantPict (1 bit): A bit that specifies whether this DDE Data Item uses a picture-based data format.

D - fOLE (1 bit): A bit that specifies whether this DDE Data Item is used to support object linking. If the value is 1, the name of the DDE Data Item, as specified by **name** in the preceding BrtSupNameStart record, MUST be "StdDocumentName" (case-sensitive).

E - reserved2 (1 bit): MUST be 0 and MUST be ignored.

F - reserved3 (1 bit): MUST be 0 and MUST be ignored.

unused1 (10 bits): Undefined and MUST be ignored.

reserved4 (4 bytes): MUST be 0x00000000 and MUST be ignored.

G - reserved5 (1 bit): MUST be 1 and MUST be ignored.

unused2 (7 bits): Undefined and MUST be ignored.

2.5.29 DRw

A signed 32-bit integer that specifies a row count or offset. MUST be between 0 and 1048576 inclusive.

2.5.30 DXFId

A 4-byte unsigned integer that specifies a zero-based index of a BrtDXF record in the collection of All records directly following BrtBeginDXFs in the styles part. A value of 0xFFFFFFFF means no BrtDXF record is used.

2.5.31 Etxp

This structure specifies font information for a BrtRRChgCell record.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="16">cchFontName</td><td colspan="16">stFontName (62 bytes)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">twpHeight</td></tr>
<tr><td>A</td><td>B</td><td colspan="6">unused2</td><td>C</td><td colspan="24">unused3</td></tr>
<tr><td colspan="16">bls</td><td colspan="16">sss</td></tr>
<tr><td colspan="8">uls</td><td colspan="8">bFamily</td><td colspan="8">bCharSet</td><td colspan="8">unused4</td></tr>
<tr><td colspan="32">unused5</td></tr>
<tr><td colspan="32">reserved</td></tr>
<tr><td colspan="32">ifontScheme</td></tr>
<tr><td colspan="32">xclrText</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

cchFontName (2 bytes): An unsigned integer that specifies the length of **stFontName**. MUST be less than or equal to 31.

stFontName (62 bytes): A Unicode string in that specifies the name of the font. Only the number of characters specified by **cchFontName** are used and the rest, if they exist, MUST be 0x0000 and MUST be ignored.

twpHeight (4 bytes): An unsigned integer that specifies the height of the font in twips. The value MUST be greater than or equal to 0x0014 and MUST be less than or equal to 0x1FFF.

A - unused1 (1 bit): Undefined and MUST be ignored.

B - ftsItalic (1 bit): A bit that specifies whether the font is italicized.

unused2 (5 bits): Undefined and MUST be ignored.

C - ftsStrikeout (1 bit): A bit that specifies whether a strikeout line is drawn through the horizontal middle of the text.

unused3 (24 bits): Undefined and MUST be ignored.

bls (2 bytes): An unsigned integer that specifies the weight of the font. The value MUST be greater than or equal to 0x0190 and less than or equal to 0x03E8. The value for normal text is 0x0190 and the value for bold text is 0x02BC.

sss (2 bytes): An unsigned integer that specifies whether subscript or superscript are used. MUST be a value from the following table:

Value	Meaning
0x0000	None
0x0001	Superscript
0x0002	Subscript

uls (1 byte): An unsigned integer that specifies the type of underline to use. MUST be a value from the following table:

Value	Meaning
0x00	None
0x01	Single
0x02	Double
0x21	Single accounting
0x22	Double accounting

bFamily (1 byte): An unsigned integer that specifies the font family this font belongs to. MUST be a value from the following table:

Value	Meaning
0x00	Not applicable
0x01	Roman

0x02	Swiss
0x03	Modern
0x04	Script
0x05	Decorative

bCharSet (1 byte): An unsigned integer that specifies the character set of this font. MUST be a value from the following table:

Value	Meaning
0x00	ANSI_CHARSET
0x01	DEFAULT_CHARSET
0x02	SYMBOL_CHARSET
0x4D	MAC_CHARSET
0x80	SHIFTJIS_CHARSET
0x81	HANGEUL_CHARSET
0x81	HANGUL_CHARSET
0x82	JOHAB_CHARSET
0x86	GB2312_CHARSET
0x88	CHINESEBIG5_CHARSET
0xA1	GREEK_CHARSET
0xA2	TURKISH_CHARSET
0xA3	VIETNAMESE_CHARSET
0xB1	HEBREW_CHARSET

0xB2	ARABIC_CHARSET
0xBA	BALTIC_CHARSET
0xCC	RUSSIAN_CHARSET
0xDE	THAI_CHARSET
0xEE	EASTEUROPE_CHARSET
0xFF	OEM_CHARSET

unused4 (1 byte): Undefined and MUST be ignored.

unused5 (4 bytes): Undefined and MUST be ignored.

reserved (4 bytes): MUST be zero and MUST be ignored.

ifontScheme (4 bytes): An unsigned integer that specifies the font scheme to which this font belongs. When a font is part of a theme as specified in [ECMA-376] part 1, section 14.2.7, the font is categorized as a major scheme or a minor scheme. When a new theme is chosen, every font that is part of the theme is updated to use the major scheme or the minor scheme. MUST be a value from the following table:

Value	Meaning
0x00	None
0x01	Major scheme
0x02	Minor scheme

xclrText (8 bytes): A BrtColor that specifies the color of this font.

2.5.32 ExternalNameProperties

This structure specifies properties of an External Defined Name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	unused1										iSheet															

...	G	unused2	

A - fBuiltIn (1 bit): A bit that specifies if this External Defined Name is defined by the application. Otherwise, the External Defined Name is defined by the user.

B - reserved1 (1 bit): MUST be 0 and MUST be ignored.

C - reserved2 (1 bit): MUST be 0 and MUST be ignored.

D - reserved3 (1 bit): MUST be 0 and MUST be ignored.

E - reserved4 (1 bit): MUST be 0 and MUST be ignored.

F - reserved5 (1 bit): MUST be 0 and MUST be ignored.

unused1 (10 bits): Undefined and MUST be ignored.

iSheet (4 bytes): An unsigned integer that specifies the scope of this External Defined Name.

The allowable values are defined in the following table:

Value	Meaning
0	The External Defined Name has a workbook-level scope.
>0	The External Defined Name has a sheet-level scope and this value MUST specify a one-based index of an element in the array of XLWideString structures specified by the **sheetNames** field of the BrtSupTabs record in this External Link part. The referenced string specifies the name of the sheet which is in scope.

G - reserved6 (1 bit): MUST be 0 and MUST be ignored.

unused2 (7 bits): Undefined and MUST be ignored.

2.5.33 ExternalReferenceType

An enumeration that specifies a type of External Link. The allowed values of this enumeration and their meanings are specified in the following table.

Name	Value	Meaning
WORKBOOK	0x0000	The associated External Link type is External Workbook Link.
DDE	0x0001	The associated External Link type is DDE Data Source.
OLE	0x0002	The associated External Link type is OLE Data Source.

2.5.34 ExtPtgArea3D

This structure is a variation of PtgArea3d that is used by formulas in External Defined Names. It specifies a rectangular range on one or more sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
extPtg								iTabs																							
...								area																							
...																															
...																															

extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3B.

iTabs (4 bytes): An ExtSheetPair that specifies the sheet or sheets containing the range.

area (8 bytes): An RgceAreaSmall that specifies the location of the range of cells within a sheet.

2.5.35 ExtPtgAreaErr3D

This structure is a variation of PtgAreaErr3d that is used by formulas in External Defined Names. It specifies an invalid reference to a rectangular range of cells on one or more sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
extPtg								iTabs																							
...								unused1																unused2							
...								unused3																unused4							
...																															

extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3D.

iTabs (4 bytes): An ExtSheetPair that specifies the sheet or sheets containing the target of this reference.

unused1 (2 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

unused3 (2 bytes): Undefined and MUST be ignored.

unused4 (2 bytes): Undefined and MUST be ignored.

2.5.36 ExtPtgErr

This is a variation of PtgErr that is used by formulas in External Defined Names. It specifies an invalid cell reference.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
extPtg								err																							

extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x1C.

err (1 byte): A BErr that specifies the value of this error. This value MUST be 0x17.

2.5.37 ExtPtgRef3D

This structure is a variation of PtgRef3d that is used by formulas in External Defined Names. It specifies the location of a single cell on one or more sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
extPtg								iTabs																							
...								loc																							
...																															

extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3A.

iTabs (4 bytes): An ExtSheetPair that specifies the sheet or sheets containing the cell.

loc (4 bytes): A RgceLocSmall that specifies the location of a cell within a sheet.

2.5.38 ExtPtgRefErr3D

This structure is a variation of PtgRefErr3d that is used by formulas in External Defined Names. It specifies an invalid single cell reference on one or more sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
extPtg								iTabs																							
...								unused1																unused2							
...																															

extPtg (1 byte): An unsigned integer that specifies the identity of this structure. This value MUST be 0x3C.

iTabs (4 bytes): An ExtSheetPair that specifies the sheet or sheets containing the target of this reference.

unused1 (2 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

2.5.39 ExtSheetPair

This structure specifies the sheet portion of a reference to a worksheet or macro sheet or a range of worksheets or macro sheets in an external workbook. It is used by formulas in external defined names. The worksheets and macro sheets are in the collection of sheets in an external workbook as specified by the BrtSupTabs record.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
iTabFirst																iTabLast															

iTabFirst (2 bytes): A signed integer that specifies the first sheet of a single or multi-sheet reference. The allowable values are defined in the following table:

Value	Meaning
-1	Specifies that the first sheet of this reference could not be found.
>= 0	Specifies the zero-based index of an XLWideString in the array specified by the **sheetNames** field in the BrtSupTabs record in this External Link part. The referenced XLWideString MUST specify the name of a worksheet or macro sheet in the external workbook.

iTabLast (2 bytes): A signed integer that specifies the last sheet of a single or multi-sheet reference. The allowable values are defined in the following table:

Value	Meaning
-1	Specifies that the last sheet of this reference could not be found.
>= 0	Specifies the zero-based index of an XLWideString in the array specified by the **sheetNames** field in the BrtSupTabs record in this External Link part. The referenced XLWideString MUST specify the name of a worksheet or macro sheet in the external workbook. The value of this field MUST be greater than **iTabFirst**.

2.5.40 FillPattern

This enumeration specifies the fill pattern. <36>

Name	Value	Meaning
FLSNULL	0x00	No fill pattern
FLSSOLID	0x01	Solid

FLSMEDGRAY	0x02	50% gray
FLSDKGRAY	0x03	75% gray
FLSLTGRAY	0x04	25% gray
FLSDKHOR	0x05	Horizontal stripe
FLSDKVER	0x06	Vertical stripe
FLSDKDOWN	0x07	Reverse diagonal stripe
FLSDKUP	0x08	Diagonal stripe
FLSDKGRID	0x09	Diagonal crosshatch
FLSDKTRELLIS	0x0A	Thick Diagonal crosshatch
FLSLTHOR	0x0B	Thin horizontal stripe
FLSLTVER	0x0C	Thin vertical stripe
FLSLTDOWN	0x0D	Thin reverse diagonal stripe
FLSLTUP	0x0E	Thin diagonal stripe
FLSLTGRID	0x0F	Thin horizontal crosshatch
FLSLTTRELLIS	0x10	Thin diagonal crosshatch
FLSGRAY125	0x11	12.5% gray
FLSGRAY0625	0x12	6.25% gray

2.5.41 FnGroupID

An unsigned integer used to classify functions into conceptual groups. Used for example, functions in the same group can be searched or selected easily from the applications user interface. Used for example, filtering the list of All functions to allow the user to choose from functions used for financial data. The following values MUST be used:

Value of FnGroupID	Function Group Classification
0	(reserved)
1	Financial
2	Date and Time
3	Math and Trig
4	Statistical
5	Lookup & Reference
6	Database
7	Text
8	Logical

9	Information
10	Commands
11	Customizing
12	Macro Control
13	DDE/External
14	User Defined
15	Engineering
16	Cube
Any value that is greater than 16 and also less than the **iMac** field of BrtBeginFnGroup.	(reserved)
Any value which is greater than the **iMac** field of BrtBeginFnGroup and less than or equal to the **iMac** field of BrtBeginFnGroup plus the count of theBrtFnGroup records.	User-definable function groups, of which names are defined in BrtFnGroup records.

2.5.42 FontFlags

Specifies the attributes of the font.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
A	B	C	D	E	F	G	H	unused3																							

A - unused1 (1 bit): Undefined and MUST be ignored.

B - fItalic (1 bit): A bit that specifies whether the text is italicized.

C - unused2 (1 bit): Undefined and MUST be ignored.

D - fStrikeout (1 bit): A bit that specifies whether a strikethrough line is drawn through the horizontal middle of the text.

E - fOutline (1 bit): A bit that specifies whether only the inner and outer borders of the characters are displayed.

F - fShadow (1 bit): A bit that specifies a Macintosh compatibility setting. If this bit is set, the effect is to render a shadow behind, beneath and to the right of the text on Macintosh.

G - fCondense (1 bit): A bit that specifies a Macintosh compatibility setting. If this bit is set, the effect is to condense the text (squeeze it together).

H - fExtend (1 bit): A bit that specifies a Macintosh compatibility setting. If this bit is set, the effect is to extend or stretch out the text.

unused3 (8 bits): Undefined and MUST be ignored.

2.5.43 FontScheme

This enumeration specifies specifies the font scheme to which this font belongs. When a font is part of a theme as specified in [ECMA-376] part 1, section 14.2.7, the font is categorized as a major scheme or a minor scheme.

Name	Value	Meaning
XFSNONE	0x00	No font scheme
XFSMAJOR	0x01	Major scheme
XFSMINOR	0x02	Minor scheme
XFSNIL	0xFF	**Ninched** state

2.5.44 FRTFormula

This structure specifies a formula used by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved																															
formula (variable)																															
...																															

reserved (4 bytes): MUST be zero, and MUST be ignored.

formula (variable): An FRTParsedFormula that specifies this formula.

2.5.45 FRTFormulas

This structure specifies an array of formulas used by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cformula																															

array (variable)
...

cformula (4 bytes): An unsigned integer that specifies number of elements in **array**.

array (variable): An array of FRTFormula. Specifies the array of formulas.

2.5.46 FRTHeader

This structure specifies attributes of a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	reserved																									
rgRefs (variable)																															
...																															
rgSqrefs (variable)																															
...																															
rgFormulas (variable)																															
...																															
relID (variable)																															
...																															
minVersion (optional)																															
relPart (variable)																															
...																															
blob (variable)																															
...																															

A - fRef (1 bit): A bit that specifies whether the **rgRefs** field exists.

B - fSqref (1 bit): A bit that specifies whether the **rgSqrefs** field exists.

C - fFormula (1 bit): A bit that specifies whether the **rgFormulas** field exists.

D - fRelID (1 bit): A bit that specifies whether the **relID** field exists.

E - fMinVer (1 bit): A bit that specifies whether the **minVersion** field exists.

F - fPart (1 bit): A bit that specifies whether the **relPart** field exists.

reserved (26 bits): MUST be zero, and MUST be ignored.

rgRefs (variable): An FRTRefs that specifies the array of rectangular range references used by the future record. MUST exist if and only if **fRef** equals 1. An application that does not support the containing record's content can load these references, adjust them during runtime operations, and write the updated references back into the containing record during save.

rgSqrefs (variable): An FRTSqrefs that specifies the array of range references used by the future record. MUST exist if and only if **fSqref** equals 1. An application that does not support the containing record's content can load these references, adjust them during runtime operations, and write the updated references back into the containing record during save.

rgFormulas (variable): An FRTFormulas that specifies the array of formulas used by the future record. MUST exist if and only if **fFormula** equals 1. An application that does not support the containing record's content can load these formulas, adjust them during runtime operations, and write the updated formulas back into the containing record during save.

relID (variable): An FRTRelID that specifies a relationship that specifies a part used by the future record. MUST exist if and only if **fRelID** equals 1. An application that does not support the containing record's content can load this relationship and preserve it and the entire part during save.

minVersion (4 bytes): An FRTProductVersion that specifies the minimum version of the application that is capable of creating this future record. MUST exist if and only if **fMinVer** equals 1.

relPart (variable): An FRTRelID that specifies a relationship that specifies a part that contains one or more records containing FRTHeaders. MUST exist if and only if **fPart** equals 1. An application that does not support the containing record's content can load the records in that part and treat the FRTHeader fields as described in this structure.

blob (variable): An array of bytes that specifies the application-specific data used by the future record. The size of the array MUST be equal to the difference between the size of this entire record and the sum of the sizes of all other fields of this record. An application that does not support this content can load this content and preserve it during save.

2.5.47 FRTProductVersion

This structure specifies the application version which created the future record or the sequence of future records.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
version																product															A

version (16 bits): An unsigned integer that specifies the version of the application. MUST be equal to 0x0000 <37>.

product (15 bits): An unsigned integer that specifies the application. MUST be equal to 0x0000 <38>.

A - reserved (1 bit): MUST be zero, and MUST be ignored.

2.5.48 FRTRef

This structure specifies a rectangular range referenced by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved																															
rfx (16 bytes)																															
...																															

reserved (4 bytes): MUST be zero, and MUST be ignored.

rfx (16 bytes): An UncheckedRfX that specifes the rectangular range.

2.5.49 FRTRefs

This structure specifies an array of rectangular ranges referred to by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cref																															
array (variable)																															
...																															

cref (4 bytes): An unsigned integer that specifies number of elements in **array**.

array (variable): An array of FRTRef. Specifies the array of rectangular ranges.

2.5.50 FRTRelID

The record specifies a string that specifies a relationship identifier as specified in [ECMA-376] Part 2: Open Packaging Conventions, section 8.3. The length of the string MUST be greater than 0 and MUST NOT exceed 255 characters. The string MUST NOT contain a zero character 0x0000.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
relId (variable)																															
...																															

relId (variable): A LPWideString value that specifies the string.

2.5.51 FRTSqref

This structure specifies a range referred to by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved																															
sqrfx (variable)																															
...																															

reserved (4 bytes): MUST be zero, and MUST be ignored.

sqrfx (variable): An UncheckedSqRfX that specifies the range.

2.5.52 FRTSqrefs

This structure specifies an array of ranges referred to by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
csqref																															
array (variable)																															
...																															

csqref (4 bytes): An unsigned integer that specifies number of elements in **array**.

array (variable): An array of FRTSqref. Specifies the array of ranges.

2.5.53 GradientStop

The structure specifies **gradient stop** for BrtFill.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
brtColor																															
...																															

xnumPosition
...

brtColor (8 bytes): A BrtColor that specifies the color used for gradient stop.

xnumPosition (8 bytes): An Xnum that specifies as a percentage in decimal notation. The position is specified in [ECMA-376] 3.8.38 stop (Gradient stop). MUST be greater than or equal to 0 and less than or equal to 1.

2.5.54 GrbitFmla

This structure specifies additional formula data.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	unused																													

A - reserved (1 bit): MUST be zero and MUST be ignored.

B - fAlwaysCalc (1 bit): A bit that specifies if the formula needs to be reevaluated when the document is loaded.

unused (14 bits): Undefined and MUST be ignored.

2.5.55 HeaderFooterString

An XLNullableWideString that specifies a header or footer string. The length of the string MUST be less than or equal to 255. Characters within the string MUST be interpreted using the following ABNF grammar:

ABNF Grammar for Header and Footer Strings

```
headerfooter = *(left / pagenum / pagetotal / fontsize / strikethrough / superscript /
       subscript / center / date / time / filepath / picture / underline /
       doubleunderline / right / bookpath / sheetname / fontname / fonttype / font /
       bold / italic / ampersand / emptytoken / UNICHAR)

UNICHAR = %x0020-FFFF
```

This code specifies Unicode characters, starting with the space character (%x0020).

```
DIGIT = %x0030-0039
```

This code specifies a digit between 0 and 9.

```
HEXALPHA = %x0041-0046 / %x0061-0066
```

This code specifies a character between A and F or between a and f.

```
DQUOTE = %x0022
```

This code specifies a double quotation mark.

```
left = "&L"
```

This code specifies the beginning of the left section. There are three header and footer sections: left, center, and right. When two or more of this section marker exist, the contents from All markers are concatenated, in the order of appearance, and placed into the left section.

```
pagenum = "&P"
```

This code specifies the current page number.

```
pagetotal = "&N" 0*1(("-" / "+") *DIGIT)
```

This code specifies the total number of pages.

```
fontsize = "&" 1*3DIGIT
```

This code specifies the text font size, where font size is measured in points.

```
strikethrough = "&S"
```

This code specifies whether the strikethrough text style is on or off. The first occurrence of this code MUST turn the strikethrough text style on, and the second occurrence MUST turn it off.

```
superscript = "&X"
```

This code specifies whether the superscript text style is on or off. The first occurrence of this code MUST turn the superscript text style on, and the second occurrence MUST turn it off. The superscript and subscript codes MUST NOT both be on at same time. If both codes occur in the string, the code that occurs first is applied and the other is ignored.

```
subscript = "&Y"
```

This code specifies whether the subscript text style is on or off. The first occurrence of this code MUST turn the subscript text style on, and the second occurrence MUST turn it off. The superscript and subscript codes MUST NOT both be on at same time. If both codes occur in the string, the code that occurs first is applied and the other is ignored.

`center = "&C"`

This code specifies the beginning of the center section. When two or more of this section marker exist, the contents from All markers are concatenated, in the order of appearance, and placed into the center section.

`date = "&D"`

This code specifies a date.

`time = "&T"`

This code specifies a time.

`picture = "&G"`

This code specifies a picture.

`underline = "&U"`

This code specifies whether the single underline text style is on or off. The first occurrence of this code MUST turn the underline text style on, and the second occurrence MUST turn it off.

`doubleunderline = "&E"`

This code specifies whther the double underline text style is on or off. The first occurrence of this code MUST turn the double underline text style on, and the second occurrence MUST turn it off.

`right = "&R"`

This code specifies the beginning of the right section. When two or more of this section marker exist, the contents from All markers are concatenated, in the order of appearance, and placed into the right section.

`bookpath = "&Z"`

This code specifies a workbook file path.

`bookname = "&F"`

This code specifies a workbook file name.

`sheetname = "&A"`

This code specifies a sheet name.

```
fontname = (1*UNICHAR / "-")
```

This code specifies the text font name. When the font name is a hyphen, no font is specified. This can be a localized string.

```
fonttype = ("italic" / "bold" / "regular" / "italic bold" / "bold italic")
```

This code specifies the text font type. This can be a localized string.

```
font = "&" DQUOTE fontname , fonttype DQUOTE
```

This code specifies the text font.

```
bold = "&B"
```

This code specifies whether the bold text style is on or off. The first occurrence of this code MUST turn the bold text style on, and the second occurrence MUST turn it off.

```
italic = "&I"
```

This code specifies whether the italic text style is on or off. The first occurrence of this code MUST turn the italic text style on, and the second occurrence MUST turn it off.

```
ampersand = "&&"
```

This code specifies an ampersand character.

```
emptytoken = "&" *1UNICHAR
```

This code specifies an unidentified token. If just "&" appears, or if there is a UNICHAR specified after "&" and it is not one of the UNICHAR characters listed in the preceding rules, then the token is interpreted as empty and nothing is rendered in the header or footer text.

2.5.56 HorizAlign

This enumeration specifies the horizontal alignment.

Name	Value	Meaning
ALCNIL	0xFF	Alignment not specified
ALCGEN	0x00	General alignment
ALCLEFT	0x01	Left alignment
ALCCTR	0x02	Center alignment

ALCRIGHT	0x03	Right alignment
ALCFILL	0x04	Fill alignment
ALCJUST	0x05	Justify alignment
ALCCONTCTR	0x06	Center-across-selection alignment
ALCDIST	0x07	Distributed alignment

2.5.57 Icon

A 32-bit signed integer specifying the icon in an icon set. MUST be a value from the following table:

Value	Meaning
-1	No icon
0	First icon in the icon set
1	Second icon in the icon set
2	Third icon in the icon set
3	Fourth icon in the icon set
4	Fifth icon in the icon set

2.5.58 Icv

This structure specifies a color. For values less than 64 and if a BrtBeginIndexedColors record exists as defined by the Styles part ABNF , then this structure specifies a color from a custom color palette as a zero-based index of a BrtIndexedColor record in the collection of All records directly following BrtBeginIndexedColors. The referenced BrtIndexedColor specifies the color.

If a BrtBeginIndexedColors record does not exist or for values greater than or equal to 64, then this structure specifies a color from the default color palette and MUST be a value from the following table:

Value	Name	Default value in **RGBA (red-green-blue-alpha)**	Example
0x00	icvBlack	0x000000FF	
0x01	icvWhite	0xFFFFFFFF	
0x02	icvRed	0xFF0000FF	
0x03	icvGreen	0x00FF00FF	
0x04	icvBlue	0x0000FFFF	
0x05	icvYellow	0xFFFF00FF	

0x06	icvMagenta	0xFF00FFFF	
0x07	icvCyan	0x00FFFFFF	
0x08	icvPlt1	0x000000FF	
0x09	icvPlt2	0xFFFFFFFF	
0x0A	icvPlt3	0xFF0000FF	
0x0B	icvPlt4	0x00FF00FF	
0x0C	icvPlt5	0x0000FFFF	
0x0D	icvPlt6	0xFFFF00FF	
0x0E	icvPlt7	0xFF00FFFF	
0x0F	icvPlt8	0x00FFFFFF	
0x10	icvPlt9	0x800000FF	
0x11	icvPlt10	0x008000FF	
0x12	icvPlt11	0x000080FF	
0x13	icvPlt12	0x808000FF	
0x14	icvPlt13	0x800080FF	
0x15	icvPlt14	0x008080FF	
0x16	icvPlt15	0xC0C0C0FF	
0x17	icvPlt16	0x808080FF	
0x18	icvPlt17	0x9999FFFF	
0x19	icvPlt18	0x993366FF	
0x1A	icvPlt19	0xFFFFCCFF	

0x1B	icvPlt20	0xCCFFFFFF	
0x1C	icvPlt21	0x660066FF	
0x1D	icvPlt22	0xFF8080FF	
0x1E	icvPlt23	0x0066CCFF	
0x1F	icvPlt24	0xCCCCFFFF	
0x20	icvPlt25	0x000080FF	
0x21	icvPlt26	0xFF00FFFF	
0x22	icvPlt27	0xFFFF00FF	
0x23	icvPlt28	0x00FFFFFF	
0x24	icvPlt29	0x800080FF	
0x25	icvPlt30	0x800000FF	
0x26	icvPlt31	0x008080FF	
0x27	icvPlt32	0x0000FFFF	
0x28	icvPlt33	0x00CCFFFF	
0x29	icvPlt34	0xCCFFFFFF	
0x2A	icvPlt35	0xCCFFCCFF	
0x2B	icvPlt36	0xFFFF99FF	
0x2C	icvPlt37	0x99CCFFFF	
0x2D	icvPlt38	0xFF99CCFF	
0x2E	icvPlt39	0xCC99FFFF	
0x2F	icvPlt40	0xFFCC99FF	

0x30	icvPlt41	0x3366FFFF	
0x31	icvPlt42	0x33CCCCFF	
0x32	icvPlt43	0x99CC00FF	
0x33	icvPlt44	0xFFCC00FF	
0x34	icvPlt45	0xFF9900FF	
0x35	icvPlt46	0xFF6600FF	
0x36	icvPlt47	0x666699FF	
0x37	icvPlt48	0x969696FF	
0x38	icvPlt49	0x003366FF	
0x39	icvPlt50	0x339966FF	
0x3A	icvPlt51	0x003300FF	
0x3B	icvPlt52	0x333300FF	
0x3C	icvPlt53	0x993300FF	
0x3D	icvPlt54	0x993366FF	
0x3E	icvPlt55	0x333399FF	
0x3F	icvPlt56	0x333333FF	
0x40	icvForeground	System color for text in windows	N/A
0x41	icvBackground	System color for window background	N/A
0x42	icvFrame	System color for window frame	N/A

0x43	icv3D	System defined face color for three-dimensional display elements and for dialog box backgrounds	N/A
0x44	icv3DText	System color for text on push buttons	N/A
0x45	icv3DHilite	System highlight color for three-dimensional display elements (for edges facing the light source)	N/A
0x46	icv3DShadow	System shadow color for three-dimensional display elements (for edges facing away from the light source)	N/A
0x47	icvHilite	System color for items selected in a control	N/A
0x48	icvCtlText	System color for text in windows	N/A
0x49	icvCtlScrl	System color for scroll bar gray area	N/A
0x4A	icvCtlInv	Bitwise inverse of icvCtlScrl's RGB value	N/A
0x4B	icvCtlBody	System color for window background	N/A
0x4C	icvCtlFrame	System color for window frame	N/A
0x4D	icvCrtFore	System color for text in windows	N/A
0x4E	icvCrtBack	System color for window background	N/A
0x4F	icvCrtNeutral	0x000000FF	

0x50	icvInfoBk	System background color for tooltip controls	N/A
0x51	icvInfoText	System text color for tooltip controls	N/A

2.5.59 Ifmt

This structure specifies the identifier of a number format.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ifmt																															

ifmt (2 bytes): An unsigned integer that specifies the identifier of a number format. The identifier specified using this field MUST be a valid built-in number format identifier or the identifier of a custom number format defined using a BrtFmt record in the styles part. The built-in number formats are listed in [ECMA-376] Part 4: Markup Language Reference, section 3.8.30.

2.5.60 IIFtab

An enumeration that specifies the valid mathematical aggregator functions which are used by data consolidation.

Name	Value	Meaning
IIFTABAVERAGE	0x00	Consolidate using the AVERAGE function.
IIFTABCOUNT	0x01	Consolidate using the COUNT function.
IIFTABCOUNTA	0x02	Consolidate using the COUNTA function.
IIFTABMAX	0x03	Consolidate using the MAX function.
IIFTABMIN	0x04	Consolidate using the MIN function.
IIFTABPRODUCT	0x05	Consolidate using the PRODUCT function.
IIFTABSTDEV	0x06	Consolidate using the STDEV function.
IIFTABSTDEVP	0x07	Consolidate using the STDEVP function.
IIFTABSUM	0x08	Consolidate using the SUM function.
IIFTABVAR	0x09	Consolidate using the VAR function.
IIFTABVARP	0x0A	Consolidate using the VARP function.

2.5.61 Istr

A 4-byte signed integer that specifies a zero-based index of a BrtStr record in the collection of All records directly following BrtBeginEsstr.

2.5.62 ISXDI

A 4-byte signed integer that specifies a reference to a data item. MUST be a value from the following table:

Value	Meaning
-1	This specifies no data item will be used.
greater than or equal to 0	Specifies a data item index, as specified in Data Items. The referenced BrtBeginSXDI specifies the data item that will be used.

2.5.63 ISXTH

A 4-byte signed integer that specifies a reference to a pivot hierarchy. MUST be a value from the following table:

Value	Meaning
-2	This specifies that the data field will be used.
-1	This specifies no pivot hierarchy will be used.
greater than or equal to 0	Specifies a pivot hierarchy index, as specified in Pivot Hierarchies. The referenced BrtBeginSXTH specifies the pivot hierarchy that will be used.

2.5.64 ISXVD

A 4-byte signed integer that specifies a reference to a pivot field or the data field. MUST be a value from the following table:

Value	Meaning
-2	ISXVD specifies a reference to the data field in a PivotTable view.
-1	ISXVD does not specify a reference to any pivot field or the data field.
greater than or equal to 0	ISXVD specifies a pivot field index, as specified by Pivot Fields.

2.5.65 KPIProp

An enumeration that specifies the valid KPI properties of an MDX KPI metadata.

Name	Value	Meaning
KPIPROPVALUE	0x00000001	The actual value.
KPIPROPGOAL	0x00000002	A target value.
KPIPROPSTATUS	0x00000003	The state of the KPI at a specific moment in time.

KPIPROPTREND	0x00000004	A measure of the value over time.
KPIPROPWEIGHT	0x00000005	A relative importance assigned to the KPI.
KPIPROPCURRENTTIMEMEMBER	0x00000006	A temporal context for the KPI.

2.5.66 KPISets

An enumeration that specifies an icon set. This value MUST be one of the following:

Name	Value	Meaning
KPINIL	0xFFFFFFFF	No icon set
KPI3ARROWS	0x00000000	
KPI3ARROWSGRAY	0x00000001	
KPI3FLAGS	0x00000002	
KPI3TRAFFICLIGHTS1	0x00000003	
KPI3SIGNS	0x00000004	
KPI3TRAFFICLIGHTS2	0x00000005	
KPI3SYMBOLS	0x00000006	
KPI3SYMBOLS2	0x00000007	
KPI4ARROWS	0x00000008	
KPI4ARROWSGRAY	0x00000009	
KPI4REDTOBLACK	0x0000000A	
KPI4RATING	0x0000000B	
KPI4TRAFFICLIGHTS	0x0000000C	
KPI5ARROWS	0x0000000D	
KPI5ARROWSGRAY	0x0000000E	
KPI5RATING	0x0000000F	
KPI5QUARTERS	0x00000010	

2.5.67 ListTotalRowFunction

This enumeration specifies the index of a list total aggregate (ILTA) operation to perform on the data region of a column in a table.

The values ILTA_AVERAGE, ILTA_COUNT, ILTA_COUNTNUM, ILTA_MAX, ILTA_MIN, ILTA_STDDEV, ILTA_SUM, and ILTA_VAR specify the function-number and reference parameters of the subtotal-formula. The function-number is a two-byte unsigned integer that specifies the aggregation operation to perform. The reference is a PtgList or PtgArea that designates the data region of the column in a table.

The subtotal-formula Parsed Expression ABNF is as follows:

```
subtotal-formula = PtgInt function-number reference PtgFuncVar
```

```
reference = PtgList / PtgArea
```

The following non-reserved fields of PtgList MUST be equal to zero with the following exceptions:

- The **ixti** field MUST specify the Xti that identifies the sheet containing the table.
- The **columns** field MUST equal 0x01.
- The **listIndex** field MUST equal the associated **idList** field of BrtBeginList record.
- The **colFirst** field MUST equal the zero-based index of the table column within the BrtBeginList record.
- The **colLast** field MUST be equal to the **colFirst** field.

The following non-reserved fields of PtgArea MUST have the following values:

- The **rowFirst** field MUST equal the first sheet row of the data region of the table column.
- The **rowLast** field MUST equal the last sheet row of the data region of the table column.
- The **columnFirst** field MUST equal the sheet column of the data region of the table column.
- The **columnLast** field MUST equal **columnFirst**.
- The **type**, **columnFirstRelative**, **rowFirstRelative**, **columnLastRelatve**, and **rowLastRelative** fields MUST equal 0x01.

The following non-reserved fields of PtgFuncVar MUST equal zero with the following exceptions:

- The **type** field MUST equal 0x02.
- The **cparams** field MUST equal 0x02.
- The **tab** field MUST equal 0x0158.
- The **fCeFunc** field MUST equal 0x00.

The following table specifies the values of this enumeration and the value and meaning of the function-number:

Name	Value	Meaning
ILTA_NONE	0x00000000	Specifies that no operation is performed.
ILTA_AVERAGE	0x00000001	Specifies to calculate the arithmetic mean. The subtotal-formula function-number is 101.
ILTA_COUNT	0x00000002	Specifies to count the non-empty cells. The subtotal-formula function-number is 103.
ILTA_COUNTNUMS	0x00000003	Specifies to count the cells that contain numbers. The subtotal-formula function-number is 102.
ILTA_MAX	0x00000004	Specifies to calculate the largest value. The subtotal-formula function-number is 104.
ILTA_MIN	0x00000005	Specifies to calculate the smallest value. The subtotal-formula function-number is 105.
ILTA_SUM	0x00000006	Specifies to calculate the arithmetic sum. The subtotal-formula function-number is 109.
ILTA_STDDEV	0x00000007	Specifies to calculate the estimated standard deviation. The subtotal-formula function-number is 107.
ILTA_VAR	0x00000008	Specifies to calculate the estimated variance. The subtotal-formula function-number is 110.
ILTA_CUSTOM	0x00000009	Specifies to use the formula specified by the BrtListTrFmla child record of the BrtBeginListCol record.

2.5.68 ListType

An enumeration that specifies the type of a table.

Name	Value	Meaning
LTRANGE	0x00000000	Specifies a standard table.
LTXML	0x00000002	Specifies an XML table.
LTEXTDATA	0x00000003	Specifies a query table.

2.5.69 LongRGBA

This structure specifies a color as a combination of red, green, blue and alpha values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
red								green								blue								alpha							

red (1 byte): An unsigned integer that specifies the relative intensity of red.

green (1 byte): An unsigned integer that specifies the relative intensity of green.

blue (1 byte): An unsigned integer that specifies the relative intensity of blue.

alpha (1 byte): An unsigned integer that specifies the alpha value.

2.5.70 LPWideString

This type specifies a Unicode string which is prefixed by a length.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cchCharacters																rgchData (variable)															
...																															

cchCharacters (2 bytes): An unsigned integer that specifies the number of characters.

rgchData (variable): An array of Unicode characters that specifies the characters of the string. The size of this array in bytes MUST equal the following formula:

cchCharacters * 2

2.5.71 Margin

Specifies a single page margin.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
margin																															
...																															

margin (8 bytes): An Xnum that specifies a page margin size in inches. MUST be greater than or equal to 0 and less than 49.

2.5.72 Mdir

This structure specifies a reference to a metadata type and a corresponding metadata record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iMdt																															
mdd																															

iMdt (4 bytes): A signed integer that specifies a one-based index to a BrtMdtinfo record in the collection of All records directly following BrtBeginEsmdtinfo.

mdd (4 bytes): If **stName** of the BrtMdtinfo record indexed by **iMdt** is "XLMDX", then **mdd** specifies a zero-based index to a BrtBeginMdx record in the collection of BrtBeginMdx records directly following BrtBeginEsmdx. The referenced BrtBeginMdx specifies the beginning of an MDX metadata record. Otherwise **mdd** specifies a zero-based index to a BrtBeginFmd record in the collection of BrtBeginFmd records directly following the BrtBeginEsfmd record whose **stName** field matches the **stName** field of the BrtMdtinfo record indexed by **iMdt**. The referenced BrtBeginFmd specifies the beginning of a future metadata record.

2.5.73 MdtFlags

This structure specifies properties and behaviors of a cell metadata or value metadata type. In general, the behaviors specify that when operations are performed on a cell, the metadata remains associated with the cell or the value stored in this cell <39>.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X				Y	Z	a	b	c

A - fGhostRw (1 bit): A bit that specifies whether the metadata is applied to all cells in newly inserted rows.

B - fGhostCol (1 bit): A bit that specifies whether the metadata is applied to all cells in newly inserted columns.

C - fEdit (1 bit): A bit that specifies whether the metadata is preserved when the cell is edited.

D - fDelete (1 bit): A bit that specifies whether the metadata is preserved when the cell value is deleted. MUST be equal to **fClearContents**.

E - fCopy (1 bit): A bit that specifies whether the metadata is copied when the cell is copied. MUST be 1 if one of the following is 1: **fPasteAll**, **fPasteFmlas**, **fPasteValues**, **fPasteFmts**, **fPasteComments**, **fPasteDv**, **fPasteBorders**, **fPasteColWidths** or **fPasteNumFmts**.

F - fPasteAll (1 bit): A bit that specifies whether the metadata is pasted when formulas, values, formatting, comments, and data validation rules are pasted all at once from the previously copied cell.

G - fPasteFmlas (1 bit): A bit that specifies whether the metadata is pasted when only formulas are pasted from the previously copied cell.

H - fPasteValues (1 bit): A bit that specifies whether the metadata is pasted when only values are pasted from the previously copied cell.

I - fPasteFmts (1 bit): A bit that specifies whether the metadata is pasted when only formatting is pasted from the previously copied cell.

J - fPasteComments (1 bit): A bit that specifies whether the metadata is pasted when only comments are pasted from the previously copied cell.

K - fPasteDv (1 bit): A bit that specifies whether the metadata is pasted when only data validation rules are pasted from the previously copied cell.

L - fPasteBorders (1 bit): A bit that specifies whether the metadata is pasted when only borders are pasted from the previously copied cell.

M - fPasteColWidths (1 bit): A bit that specifies whether the metadata is pasted when only column widths are pasted from the previously copied cell.

N - fPasteNumFmts (1 bit): A bit that specifies whether the metadata is pasted when only number formatting is pasted from the previously copied cell.

O - fMerge (1 bit): A bit that specifies whether the metadata is preserved when cells are merged. If the value of this bit is 1, the metadata is preserved for the cell with the smallest row number and the smallest column number among the cells being merged.

P - fSplitFirst (1 bit): A bit that specifies whether, when a cell is split, the metadata is copied to the cell with the smallest row number and the smallest column number. If **fSplitAll** is set to 1, this field MUST be ignored.

Q - fSplitAll (1 bit): A bit that specifies whether, when a cell is split, the metadata is copied to all the resulting cells.

R - fRwColShift (1 bit): A bit that specifies whether the metadata is preserved when the cell is shifted due to row or column deletion or insertion.

S - fClearAll (1 bit): A bit that specifies whether the metadata is preserved when the contents, formatting and comments of the cell are cleared.

T - fClearFmts (1 bit): A bit that specifies whether the metadata is preserved when the formatting of the cell is cleared.

U - fClearContents (1 bit): A bit that specifies whether the metadata is preserved when the contents of the cell is cleared. MUST be equal to **fDelete**.

V - fClearComments (1 bit): A bit that specifies whether the metadata is preserved when the comments of the cell are cleared.

W - fAssign (1 bit): A bit that specifies whether the metadata is preserved when the cell value is propagated through an assignment operation or by a function that returns one of the referenced values <40>.

X - reserved1 (4 bits): MUST be 0, and MUST be ignored.

Y - reserved2 (1 bit): MUST be 0, and MUST be ignored <41>.

Z - fCanCoerce (1 bit): A bit that specifies whether the metadata is preserved when the cell value is cast to a different type. If this bit is 0, the metadata is not preserved, and the destination cell value is set to the BErr #VALUE! (0x0F) error.

a - fAdjust (1 bit): A bit that specifies whether the metadata is updated when the cell location is changed.

b - fCellMeta (1 bit): A bit that specifies whether this metadata type is cell metadata or value metadata.

Value	Meaning
0	Metadata is value metadata
1	Metadata is cell metadata

c - reserved3 (1 bit): MUST be 1, and MUST be ignored.

2.5.74 MdxMbrIstrFlags

This structure specifies properties of a BrtMdxMbrIstr record.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td>A</td><td colspan="7">unused</td><td colspan="24"></td></tr>
</table>

A - fCubeSet (1 bit): A bit that specifies whether **istr** of the associated BrtMdxMbrIstr record represents a set of OLAP members(3).

unused (7 bits): Undefined and MUST be ignored.

2.5.75 OLEItemProperties

This structure specifies properties of an OLE Data Item.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td colspan="10">unused1</td><td colspan="16">reserved4</td></tr>
<tr><td colspan="16">...</td><td>G</td><td colspan="8">unused2</td><td colspan="8"></td></tr>
</table>

A - reserved1 (1 bit): MUST be 0 and MUST be ignored.

B - fWantAdvise (1 bit): A bit that specifies if the application requests that the data source (1) provides a notification when the data changes.

C - fWantPict (1 bit): A bit that specifies whether this OLE Data Item uses a picture-based data format.

D - reserved2 (1 bit): MUST be 0 and MUST be ignored.

E - reserved3 (1 bit): MUST be 1 and MUST be ignored.

F - fIcon (1 bit): A bit that specifies that this OLE Data Item is displayed as an icon.

unused1 (10 bits): Undefined and MUST be ignored.

reserved4 (4 bytes): MUST be 0x00000000 and MUST be ignored.

G - reserved5 (1 bit): MUST be 1 and MUST be ignored.

unused2 (7 bits): Undefined and MUST be ignored.

2.5.76 Parsed Expressions

2.5.76.1 ArrayParsedFormula

This structure specifies an array formula.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgExp, PtgRefN, PtgAreaN, or PtgSxName.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.2 BErr

A 1 byte unsigned integer that specifies an error. MUST be a value from the following table:

Value	Meaning
0x00	#NULL!
0x07	#DIV/0!
0x0F	#VALUE!
0x17	#REF!
0x1D	#NAME?
0x24	#NUM!
0x2A	#N/A
0x2B	#GETTING_DATA

2.5.76.3 Boolean

An unsigned integer of size greater than 1 bit that specifies a Boolean value. MUST be a value from the following table. All other bits in the field MUST be 0.

Value	Meaning
0x0	Boolean value FALSE
0x1	Boolean value TRUE

2.5.76.4 CellParsedFormula

This structure specifies a formula stored in a cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgRefN, PtgAreaN, or PtgSxName.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.5 Cetab

This structure specifies a function which can be called from a formula. The definition of each function specifies the function name and the valid sequence of arguments.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cetab																															

cetab (2 bytes): An unsigned integer that specifies the function to be called. MUST be a value from the following table:

The elements ref and val are specified in Rgce.

Value	Meaning
0x0000	BEEP
	beep-params = [val]
0x0001	OPEN
	open-params = *17(val)
0x0002	OPEN.LINKS
	open-links-params = *15(val)
0x0003	CLOSE.ALL
	This function takes no parameters
0x0004	SAVE
	This function takes no parameters
0x0005	SAVE.AS
	save-as-params = *7(val)
0x0006	FILE.DELETE
	file-delete-params = [val]
0x0007	PAGE.SETUP
	page-setup-params = *30(val)
0x0008	PRINT
	print-params = *17(val)
0x0009	PRINTER.SETUP
	printer-setup-params = [val]
0x000A	QUIT
	This function takes no parameters
0x000B	NEW.WINDOW

	This function takes no parameters
0x000C	ARRANGE.ALL
	arrange-All-params = *4(val)
0x000D	WINDOW.SIZE
	window-size-params = *3(val)
0x000E	WINDOW.MOVE
	window-move-params = *3(val)
0x000F	FULL
	full-params = [val]
0x0010	CLOSE
	close-params = *2(val)
0x0011	RUN
	run-params = [(ref / val), [val]]
0x0016	SET.PRINT.AREA
	set-print-area-params = [ref / val]
0x0017	SET.PRINT.TITLES
	set-print-titles-params = *2(ref / val)
0x0018	SET.PAGE.BREAK
	This function takes no parameters
0x0019	REMOVE.PAGE.BREAK
	remove-page-break-params = *2(val)
0x001A	FONT
	font-params = *2(val)
0x001B	DISPLAY
	display-params = *9(val)
0x001C	PROTECT.DOCUMENT
	protect-document-params = *7(val)
0x001D	PRECISION
	precision-params = [val]
0x001E	A1.R1C1
	a1-r1c1-params = [val]
0x001F	CALCULATE.NOW
	This function takes no parameters
0x0020	CALCULATION
	calculation-params = *11(val)
0x0022	DATA.FIND
	data-find-params = [val]
0x0023	EXTRACT
	extract-params = [val]
0x0024	DATA.DELETE
	This function takes no parameters
0x0025	SET.DATABASE
	This function takes no parameters

0x0026	SET.CRITERIA
	This function takes no parameters
0x0027	SORT
	sort-params = [val, [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), *10(val)]]]]]]]
0x0028	DATA.SERIES
	data-series-params = *6(val)
0x0029	TABLE
	table-params = *2(ref / val)
0x002A	FORMAT.NUMBER
	format-number-params = [val]
0x002B	ALIGNMENT
	alignment-params = *10(val)
0x002C	STYLE
	style-params = *2(val)
0x002D	BORDER
	border-params = *27(val)
0x002E	CELL.PROTECTION
	cell-protection-params = *2(val)
0x002F	COLUMN.WIDTH
	column-width-params = [val, *4(ref / val)]
0x0030	UNDO
	This function takes no parameters
0x0031	CUT
	cut-params = *2(ref / val)
0x0032	COPY
	copy-params = *2(ref / val)
0x0033	PASTE
	paste-params = [ref / val]
0x0034	CLEAR
	clear-params = [val]
0x0035	PASTE.SPECIAL
	paste-special-params = *7(val)
0x0036	EDIT.DELETE
	edit-delete-params = [val]
0x0037	INSERT
	insert-params = *2(val)
0x0038	FILL.RIGHT
	This function takes no parameters
0x0039	FILL.DOWN
	This function takes no parameters
0x003D	DEFINE.NAME
	define-name-params = [val, [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [val]]]]]]]

0x003E	CREATE.NAMES
	create-names-params = *4(val)
0x003F	FORMULA.GOTO
	formula-goto-params = [(ref / val), [val]]
0x0040	FORMULA.FIND
	formula-find-params = *12(val)
0x0041	SELECT.LAST.CELL
	This function takes no parameters
0x0042	SHOW.ACTIVE.CELL
	This function takes no parameters
0x0043	GALLERY.AREA
	gAllery-area-params = *2(val)
0x0044	GALLERY.BAR
	gAllery-bar-params = *2(val)
0x0045	GALLERY.COLUMN
	gAllery-column-params = *2(val)
0x0046	GALLERY.LINE
	gAllery-line-params = *2(val)
0x0047	GALLERY.PIE
	gAllery-pie-params = *2(val)
0x0048	GALLERY.SCATTER
	gAllery-scatter-params = *2(val)
0x0049	COMBINATION
	combination-params = [val]
0x004A	PREFERRED
	This function takes no parameters
0x004B	ADD.OVERLAY
	This function takes no parameters
0x004C	GRIDLINES
	gridlines-params = *7(val)
0x004D	SET.PREFERRED
	set-preferred-params = [val]
0x004E	AXES
	axes-params = *6(val)
0x004F	LEGEND
	legend-params = [val]
0x0050	ATTACH.TEXT
	attach-text-params = *3(val)
0x0051	ADD.ARROW
	This function takes no parameters
0x0052	SELECT.CHART
	This function takes no parameters
0x0053	SELECT.PLOT.AREA

	This function takes no parameters
0x0054	PATTERNS
	patterns-params = *13(val)
0x0055	MAIN.CHART
	main-chart-params = *10(val)
0x0056	OVERLAY
	overlay-params = *12(val)
0x0057	SCALE
	scale-params = *10(val)
0x0058	FORMAT.LEGEND
	format-legend-params = [val]
0x0059	FORMAT.TEXT
	format-text-params = *11(val)
0x005A	EDIT.REPEAT
	This function takes no parameters
0x005B	PARSE
	parse-params = [val, [ref / val]]
0x005C	JUSTIFY
	This function takes no parameters
0x005D	HIDE
	This function takes no parameters
0x005E	UNHIDE
	unhide-params = [val]
0x005F	WORKSPACE
	workspace-params = *16(val)
0x0060	FORMULA
	formula-params = [val, [ref / val]]
0x0061	FORMULA.FILL
	formula-fill-params = [val, [ref / val]]
0x0062	FORMULA.ARRAY
	formula-array-params = [val, [ref / val]]
0x0063	DATA.FIND.NEXT
	This function takes no parameters
0x0064	DATA.FIND.PREV
	This function takes no parameters
0x0065	FORMULA.FIND.NEXT
	This function takes no parameters
0x0066	FORMULA.FIND.PREV
	This function takes no parameters
0x0067	ACTIVATE
	activate-params = *2(val)
0x0068	ACTIVATE.NEXT
	activate-next-params = [val]

0x0069	ACTIVATE.PREV
	activate-prev-params = [val]
0x006A	UNLOCKED.NEXT
	This function takes no parameters
0x006B	UNLOCKED.PREV
	This function takes no parameters
0x006C	COPY.PICTURE
	copy-picture-params = *3(val)
0x006D	SELECT
	select-params = *2(ref / val)
0x006E	DELETE.NAME
	delete-name-params = [val]
0x006F	DELETE.FORMAT
	delete-format-params = [val]
0x0070	VLINE
	vline-params = [val]
0x0071	HLINE
	hline-params = [val]
0x0072	VPAGE
	vpage-params = [val]
0x0073	HPAGE
	hpage-params = [val]
0x0074	VSCROLL
	vscroll-params = *2(val)
0x0075	HSCROLL
	hscroll-params = *2(val)
0x0076	ALERT
	alert-params = *3(val)
0x0077	NEW
	new-params = *3(val)
0x0078	CANCEL.COPY
	cancel-copy-params = [val]
0x0079	SHOW.CLIPBOARD
	This function takes no parameters
0x007A	MESSAGE
	message-params = *2(val)
0x007C	PASTE.LINK
	This function takes no parameters
0x007D	APP.ACTIVATE
	app-activate-params = *2(val)
0x007E	DELETE.ARROW
	This function takes no parameters
0x007F	ROW.HEIGHT

	row-height-params = [val, *3(ref / val)]
0x0080	FORMAT.MOVE
	format-move-params = [val, *2(ref / val)]
0x0081	FORMAT.SIZE
	format-size-params = [val, *2(ref / val)]
0x0082	FORMULA.REPLACE
	formula-replace-params = *11(val)
0x0083	SEND.KEYS
	send-keys-params = *2(val)
0x0084	SELECT.SPECIAL
	select-special-params = *3(val)
0x0085	APPLY.NAMES
	apply-names-params = *7(val)
0x0086	REPLACE.FONT
	replace-font-params = *10(val)
0x0087	FREEZE.PANES
	freeze-panes-params = *3(val)
0x0088	SHOW.INFO
	show-info-params = [val]
0x0089	SPLIT
	split-params = *2(val)
0x008A	ON.WINDOW
	on-window-params = *2(val)
0x008B	ON.DATA
	on-data-params = *2(val)
0x008C	DISABLE.INPUT
	disable-input-params = [val]
0x008E	OUTLINE
	outline-params = *4(val)
0x008F	LIST.NAMES
	This function takes no parameters
0x0090	FILE.CLOSE
	file-close-params = *2(val)
0x0091	SAVE.WORKBOOK
	save-workbook-params = *6(val)
0x0092	DATA.FORM
	This function takes no parameters
0x0093	COPY.CHART
	copy-chart-params = [val]
0x0094	ON.TIME
	on-time-params = *4(val)
0x0095	WAIT
	wait-params = [val]

0x0096	FORMAT.FONT
	format-font-params = *15(val)
0x0097	FILL.UP
	This function takes no parameters
0x0098	FILL.LEFT
	This function takes no parameters
0x0099	DELETE.OVERLAY
	This function takes no parameters
0x009B	SHORT.MENUS
	short-menus-params = [val]
0x009F	SET.UPDATE.STATUS
	set-update-status-params = *3(val)
0x00A1	COLOR.PALETTE
	color-palette-params = [val]
0x00A2	DELETE.STYLE
	delete-style-params = [val]
0x00A3	WINDOW.RESTORE
	window-restore-params = [val]
0x00A4	WINDOW.MAXIMIZE
	window-maximize-params = [val]
0x00A6	CHANGE.LINK
	change-link-params = *3(val)
0x00A7	CALCULATE.DOCUMENT
	This function takes no parameters
0x00A8	ON.KEY
	on-key-params = *2(val)
0x00A9	APP.RESTORE
	This function takes no parameters
0x00AA	APP.MOVE
	app-move-params = *2(val)
0x00AB	APP.SIZE
	app-size-params = *2(val)
0x00AC	APP.MINIMIZE
	This function takes no parameters
0x00AD	APP.MAXIMIZE
	This function takes no parameters
0x00AE	BRING.TO.FRONT
	This function takes no parameters
0x00AF	SEND.TO.BACK
	This function takes no parameters
0x00B9	MAIN.CHART.TYPE
	main-chart-type-params = [val]
0x00BA	OVERLAY.CHART.TYPE

	overlay-chart-type-params = [val]
0x00BB	SELECT.END
	select-end-params = [val]
0x00BC	OPEN.MAIL
	open-mail-params = *2(val)
0x00BD	SEND.MAIL
	send-mail-params = [(ref / val), *2(val)]
0x00BE	STANDARD.FONT
	standard-font-params = *9(val)
0x00BF	CONSOLIDATE
	consolidate-params = *5(val)
0x00C0	SORT.SPECIAL
	sort-special-params = [val, [val, [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), *6(val)]]]]]]]
0x00C1	GALLERY.3D.AREA
	gAllery-3d-area-params = [val]
0x00C2	GALLERY.3D.COLUMN
	gAllery-3d-column-params = [val]
0x00C3	GALLERY.3D.LINE
	gAllery-3d-line-params = [val]
0x00C4	GALLERY.3D.PIE
	gAllery-3d-pie-params = [val]
0x00C5	VIEW.3D
	view-3d-params = *6(val)
0x00C6	GOAL.SEEK
	goal-seek-params = *3(ref / val)
0x00C7	WORKGROUP
	workgroup-params = [val]
0x00C8	FILL.GROUP
	fill-group-params = [val]
0x00C9	UPDATE.LINK
	update-link-params = *2(val)
0x00CA	PROMOTE
	promote-params = [val]
0x00CB	DEMOTE
	demote-params = [val]
0x00CC	SHOW.DETAIL
	show-detail-params = *4(val)
0x00CE	UNGROUP
	This function takes no parameters
0x00CF	OBJECT.PROPERTIES
	object-properties-params = *2(val)
0x00D0	SAVE.NEW.OBJECT
	save-new-object-params = [val]

0x00D1	SHARE
	This function takes no parameters
0x00D2	SHARE.NAME
	share-name-params = [val]
0x00D3	DUPLICATE
	This function takes no parameters
0x00D4	APPLY.STYLE
	apply-style-params = [val]
0x00D5	ASSIGN.TO.OBJECT
	assign-to-object-params = [ref / val]
0x00D6	OBJECT.PROTECTION
	object-protection-params = *2(val)
0x00D7	HIDE.OBJECT
	hide-object-params = *2(val)
0x00D8	SET.EXTRACT
	This function takes no parameters
0x00D9	CREATE.PUBLISHER
	create-publisher-params = *4(val)
0x00DA	SUBSCRIBE.TO
	subscribe-to-params = *2(val)
0x00DB	ATTRIBUTES
	attributes-params = *2(val)
0x00DC	SHOW.TOOLBAR
	show-toolbar-params = *10(val)
0x00DE	PRINT.PREVIEW
	print-preview-params = [val]
0x00DF	EDIT.COLOR
	edit-color-params = *4(val)
0x00E0	SHOW.LEVELS
	show-levels-params = *2(val)
0x00E1	FORMAT.MAIN
	format-main-params = *14(val)
0x00E2	FORMAT.OVERLAY
	format-overlay-params = *14(val)
0x00E3	ON.RECALC
	on-recalc-params = *2(val)
0x00E4	EDIT.SERIES
	edit-series-params = [val, *6(ref / val)]
0x00E5	DEFINE.STYLE
	define-style-params = *14(val)
0x00F0	LINE.PRINT
	line-print-params = *11(val)
0x00F3	ENTER.DATA

	enter-data-params = [ref / val]
0x00F9	GALLERY.RADAR
	gAllery-radar-params = *2(val)
0x00FA	MERGE.STYLES
	merge-styles-params = [val]
0x00FB	EDITION.OPTIONS
	edition-options-params = [val, *6(ref / val)]
0x00FC	PASTE.PICTURE
	This function takes no parameters
0x00FD	PASTE.PICTURE.LINK
	This function takes no parameters
0x00FE	SPELLING
	spelling-params = *6(val)
0x0100	ZOOM
	zoom-params = [val]
0x0103	INSERT.OBJECT
	insert-object-params = [val, [val, [val, [val, [val, [val, [val, [(ref / val), [val, [val, [(ref / val), *2(val)]]]]]]]]]
0x0104	WINDOW.MINIMIZE
	window-minimize-params = [val]
0x0109	SOUND.NOTE
	sound-note-params = [(ref / val), *2(val)]
0x010A	SOUND.PLAY
	sound-play-params = [(ref / val), *2(val)]
0x010B	FORMAT.SHAPE
	format-shape-params = [val, [val, [(ref / val), *2(val)]]]
0x010C	EXTEND.POLYGON
	extend-polygon-params = [val]
0x010D	FORMAT.AUTO
	format-auto-params = *7(val)
0x0110	GALLERY.3D.BAR
	gAllery-3d-bar-params = [val]
0x0111	GALLERY.3D.SURFACE
	gAllery-3d-surface-params = [val]
0x0112	FILL.AUTO
	fill-auto-params = [(ref / val), [val]]
0x0114	CUSTOMIZE.TOOLBAR
	customize-toolbar-params = [val]
0x0115	ADD.TOOL
	add-tool-params = *3(val)
0x0116	EDIT.OBJECT
	edit-object-params = [val]
0x0117	ON.DOUBLECLICK
	on-doubleclick-params = *2(val)

0x0118	ON.ENTRY
	on-entry-params = *2(val)
0x0119	WORKBOOK.ADD
	workbook-add-params = *3(val)
0x011A	WORKBOOK.MOVE
	workbook-move-params = *3(val)
0x011B	WORKBOOK.COPY
	workbook-copy-params = *3(val)
0x011C	WORKBOOK.OPTIONS
	workbook-options-params = *3(val)
0x011D	SAVE.WORKSPACE
	save-workspace-params = [val]
0x0120	CHART.WIZARD
	chart-wizard-params = [val, [(ref / val), *12(val)]]
0x0121	DELETE.TOOL
	delete-tool-params = *2(val)
0x0122	MOVE.TOOL
	move-tool-params = *6(val)
0x0123	WORKBOOK.SELECT
	workbook-select-params = *3(val)
0x0124	WORKBOOK.ACTIVATE
	workbook-activate-params = *2(val)
0x0125	ASSIGN.TO.TOOL
	assign-to-tool-params = [val, [val, [ref / val]]]
0x0127	COPY.TOOL
	copy-tool-params = *2(val)
0x0128	RESET.TOOL
	reset-tool-params = *2(val)
0x0129	CONSTRAIN.NUMERIC
	constrain-numeric-params = [val]
0x012A	PASTE.TOOL
	paste-tool-params = *2(val)
0x012E	WORKBOOK.NEW
	workbook-new-params = *3(val)
0x0131	SCENARIO.CELLS
	scenario-cells-params = [ref / val]
0x0132	SCENARIO.DELETE
	scenario-delete-params = [val]
0x0133	SCENARIO.ADD
	scenario-add-params = [val, [val, [(ref / val), *3(val)]]]
0x0134	SCENARIO.EDIT
	scenario-edit-params = [val, [val, [val, [(ref / val), *3(val)]]]]
0x0135	SCENARIO.SHOW

	scenario-show-params = [val]
0x0136	SCENARIO.SHOW.NEXT
	This function takes no parameters
0x0137	SCENARIO.SUMMARY
	scenario-summary-params = [(ref / val), [val]]
0x0138	PIVOT.TABLE.WIZARD
	pivot-table-wizard-params = [val, [(ref / val), [(ref / val), *13(val)]]]
0x0139	PIVOT.FIELD.PROPERTIES
	pivot-field-properties-params = *7(val)
0x013A	PIVOT.FIELD
	pivot-field-params = *4(val)
0x013B	PIVOT.ITEM
	pivot-item-params = *4(val)
0x013C	PIVOT.ADD.FIELDS
	pivot-add-fields-params = *5(val)
0x013E	OPTIONS.CALCULATION
	options-calculation-params = *10(val)
0x013F	OPTIONS.EDIT
	options-edit-params = *11(val)
0x0140	OPTIONS.VIEW
	options-view-params = *18(val)
0x0141	ADDIN.MANAGER
	addin-manager-params = *3(val)
0x0142	MENU.EDITOR
	This function takes no parameters
0x0143	ATTACH.TOOLBARS
	This function takes no parameters
0x0144	VBAActivate
	vbaactivate-params = *2(val)
0x0145	OPTIONS.CHART
	options-chart-params = *3(val)
0x0148	VBA.INSERT.FILE
	vba-insert-file-params = [val]
0x014A	VBA.PROCEDURE.DEFINITION
	This function takes no parameters
0x0150	ROUTING.SLIP
	routing-slip-params = [(ref / val), *5(val)]
0x0152	ROUTE.DOCUMENT
	This function takes no parameters
0x0153	MAIL.LOGON
	mail-logon-params = [(ref / val), [(ref / val), [val]]]
0x0156	INSERT.PICTURE
	insert-picture-params = *2(val)

0x0157	EDIT.TOOL
	edit-tool-params = *2(val)
0x0158	GALLERY.DOUGHNUT
	gAllery-doughnut-params = *2(val)
0x015E	CHART.TREND
	chart-trend-params = *8(val)
0x0160	PIVOT.ITEM.PROPERTIES
	pivot-item-properties-params = *7(val)
0x0162	WORKBOOK.INSERT
	workbook-insert-params = [val]
0x0163	OPTIONS.TRANSITION
	options-transition-params = *5(val)
0x0164	OPTIONS.GENERAL
	options-general-params = *14(val)
0x0172	FILTER.ADVANCED
	filter-advanced-params = [val, [(ref / val), [(ref / val), [(ref / val), [val]]]]]
0x0175	MAIL.ADD.MAILER
	This function takes no parameters
0x0176	MAIL.DELETE.MAILER
	This function takes no parameters
0x0177	MAIL.REPLY
	This function takes no parameters
0x0178	MAIL.REPLY.ALL
	This function takes no parameters
0x0179	MAIL.FORWARD
	This function takes no parameters
0x017A	MAIL.NEXT.LETTER
	This function takes no parameters
0x017B	DATA.LABEL
	data-label-params = *10(val)
0x017C	INSERT.TITLE
	insert-title-params = *5(val)
0x017D	FONT.PROPERTIES
	font-properties-params = *14(val)
0x017E	MACRO.OPTIONS
	macro-options-params = *10(val)
0x017F	WORKBOOK.HIDE
	workbook-hide-params = *2(val)
0x0180	WORKBOOK.UNHIDE
	workbook-unhide-params = [val]
0x0181	WORKBOOK.DELETE
	workbook-delete-params = [val]
0x0182	WORKBOOK.NAME

	workbook-name-params = *2(val)
0x0184	GALLERY.CUSTOM
	gAllery-custom-params = [val]
0x0186	ADD.CHART.AUTOFORMAT
	add-chart-autoformat-params = *2(val)
0x0187	DELETE.CHART.AUTOFORMAT
	delete-chart-autoformat-params = [val]
0x0188	CHART.ADD.DATA
	chart-add-data-params = [val, [(ref / val), *4(val)]]
0x0189	AUTO.OUTLINE
	This function takes no parameters
0x018A	TAB.ORDER
	This function takes no parameters
0x018B	SHOW.DIALOG
	show-dialog-params = [val]
0x018C	SELECT.ALL
	This function takes no parameters
0x018D	UNGROUP.SHEETS
	This function takes no parameters
0x018E	SUBTOTAL.CREATE
	subtotal-create-params = *6(val)
0x018F	SUBTOTAL.REMOVE
	This function takes no parameters
0x0190	RENAME.OBJECT
	rename-object-params = [val]
0x019C	WORKBOOK.SCROLL
	workbook-scroll-params = *2(val)
0x019D	WORKBOOK.NEXT
	This function takes no parameters
0x019E	WORKBOOK.PREV
	This function takes no parameters
0x019F	WORKBOOK.TAB.SPLIT
	workbook-tab-split-params = [val]
0x01A0	FULL.SCREEN
	full-screen-params = [val]
0x01A1	WORKBOOK.PROTECT
	workbook-protect-params = *3(val)
0x01A4	SCROLLBAR.PROPERTIES
	scrollbar-properties-params = *7(val)
0x01A5	PIVOT.SHOW.PAGES
	pivot-show-pages-params = *2(val)
0x01A6	TEXT.TO.COLUMNS
	text-to-columns-params = [val, [(ref / val), *12(val)]]

0x01A7	FORMAT.CHARTTYPE
	format-charttype-params = *4(val)
0x01A8	LINK.FORMAT
	This function takes no parameters
0x01A9	TRACER.DISPLAY
	tracer-display-params = *2(val)
0x01AE	TRACER.NAVIGATE
	tracer-navigate-params = *3(val)
0x01AF	TRACER.CLEAR
	This function takes no parameters
0x01B0	TRACER.ERROR
	This function takes no parameters
0x01B1	PIVOT.FIELD.GROUP
	pivot-field-group-params = *4(val)
0x01B2	PIVOT.FIELD.UNGROUP
	This function takes no parameters
0x01B3	CHECKBOX.PROPERTIES
	checkbox-properties-params = *5(val)
0x01B4	LABEL.PROPERTIES
	label-properties-params = *3(val)
0x01B5	LISTBOX.PROPERTIES
	listbox-properties-params = *5(val)
0x01B6	EDITBOX.PROPERTIES
	editbox-properties-params = *4(val)
0x01B7	PIVOT.REFRESH
	pivot-refresh-params = [val]
0x01B8	LINK.COMBO
	link-combo-params = [val]
0x01B9	OPEN.TEXT
	open-text-params = *17(val)
0x01BA	HIDE.DIALOG
	hide-dialog-params = [val]
0x01BB	SET.DIALOG.FOCUS
	set-dialog-focus-params = [val]
0x01BC	ENABLE.OBJECT
	enable-object-params = *2(val)
0x01BD	PUSHBUTTON.PROPERTIES
	pushbutton-properties-params = *6(val)
0x01BE	SET.DIALOG.DEFAULT
	set-dialog-default-params = [val]
0x01BF	FILTER
	filter-params = *6(val)
0x01C0	FILTER.SHOW.ALL

	This function takes no parameters
0x01C1	CLEAR.OUTLINE
	This function takes no parameters
0x01C2	FUNCTION.WIZARD
	function-wizard-params = [val]
0x01C3	ADD.LIST.ITEM
	add-list-item-params = *2(val)
0x01C4	SET.LIST.ITEM
	set-list-item-params = *2(val)
0x01C5	REMOVE.LIST.ITEM
	remove-list-item-params = *2(val)
0x01C6	SELECT.LIST.ITEM
	select-list-item-params = *2(val)
0x01C7	SET.CONTROL.VALUE
	set-control-value-params = [val]
0x01C8	SAVE.COPY.AS
	save-copy-as-params = [val]
0x01CA	OPTIONS.LISTS.ADD
	options-lists-add-params = [val, [ref / val]]
0x01CB	OPTIONS.LISTS.DELETE
	options-lists-delete-params = [val]
0x01CC	SERIES.AXES
	series-axes-params = [val]
0x01CD	SERIES.X
	series-x-params = [ref / val]
0x01CE	SERIES.Y
	series-y-params = *2(ref / val)
0x01CF	ERRORBAR.X
	errorbar-x-params = [val, [val, [val, [ref / val]]]]
0x01D0	ERRORBAR.Y
	errorbar-y-params = [val, [val, [val, [ref / val]]]]
0x01D1	FORMAT.CHART
	format-chart-params = [(ref / val), *17(val)]
0x01D2	SERIES.ORDER
	series-order-params = *3(val)
0x01D3	MAIL.LOGOFF
	This function takes no parameters
0x01D4	CLEAR.ROUTING.SLIP
	clear-routing-slip-params = [val]
0x01D5	APP.ACTIVATE.MICROSOFT
	app-activate-microsoft-params = [val]
0x01D6	MAIL.EDIT.MAILER
	mail-edit-mailer-params = [val, [(ref / val), [(ref / val), [(ref / val), [val, [ref / val]]]]]]

0x01D7	ON.SHEET
	on-sheet-params = *3(val)
0x01D8	STANDARD.WIDTH
	standard-width-params = [val]
0x01D9	SCENARIO.MERGE
	scenario-merge-params = [val]
0x01DA	SUMMARY.INFO
	summary-info-params = *5(val)
0x01DB	FIND.FILE
	This function takes no parameters
0x01DC	ACTIVE.CELL.FONT
	active-cell-font-params = *14(val)
0x01DD	ENABLE.TIPWIZARD
	enable-tipwizard-params = [val]
0x01DE	VBA.MAKE.ADDIN
	vba-make-addin-params = [val]
0x01E0	INSERTDATATABLE
	insertdatatable-params = [val]
0x01E1	WORKGROUP.OPTIONS
	This function takes no parameters
0x01E2	MAIL.SEND.MAILER
	mail-send-mailer-params = *2(val)
0x01E5	AUTOCORRECT
	autocorrect-params = *2(val)
0x01E9	POST.DOCUMENT
	post-document-params = [val]
0x01EB	PICKLIST
	This function takes no parameters
0x01ED	VIEW.SHOW
	view-show-params = [val]
0x01EE	VIEW.DEFINE
	view-define-params = *3(val)
0x01EF	VIEW.DELETE
	view-delete-params = [val]
0x01FD	SHEET.BACKGROUND
	sheet-background-params = *2(val)
0x01FE	INSERT.MAP.OBJECT
	This function takes no parameters
0x01FF	OPTIONS.MENONO
	options-menono-params = *5(val)
0x0205	MSOCHECKS
	This function takes no parameters
0x0206	NORMAL

	This function takes no parameters
0x0207	LAYOUT
	This function takes no parameters
0x0208	RM.PRINT.AREA
	rm-print-area-params = [ref / val]
0x0209	CLEAR.PRINT.AREA
	This function takes no parameters
0x020A	ADD.PRINT.AREA
	This function takes no parameters
0x020B	MOVE.BRK
	move-brk-params = *4(val)
0x0221	HIDECURR.NOTE
	hidecurr-note-params = [(ref / val), [val]]
0x0222	HIDEALL.NOTES
	hideall-notes-params = [val]
0x0223	DELETE.NOTE
	delete-note-params = [ref / val]
0x0224	TRAVERSE.NOTES
	traverse-notes-params = [(ref / val), [val]]
0x0225	ACTIVATE.NOTES
	activate-notes-params = [(ref / val), [val]]
0x026C	PROTECT.REVISIONS
	This function takes no parameters
0x026D	UNPROTECT.REVISIONS
	This function takes no parameters
0x0287	OPTIONS.ME
	options-me-params = [(ref / val), *8(val)]
0x028D	WEB.PUBLISH
	web-publish-params = *9(val)
0x029B	NEWWEBQUERY
	newwebquery-params = [val]
0x02A1	PIVOT.TABLE.CHART
	pivot-table-chart-params = [val, [(ref / val), [(ref / val), *13(val)]]]
0x02F1	OPTIONS.SAVE
	options-save-params = *4(val)
0x02F3	OPTIONS.SPELL
	options-spell-params = *12(val)
0x0328	HIDEALL.INKANNOTS
	hideall-inkannots-params = [val]

The following grammar is used in the Rgce structure definition:

params-cetab = beep-params / open-params / open-links-params / save-as-params /

file-delete-params / page-setup-params / print-params /

printer-setup-params /

arrange-all-params / window-size-params / window-move-params /

full-params / close-params / run-params /

set-print-area-params / set-print-titles-params /

remove-page-break-params / font-params / display-params /

protect-document-params / precision-params / a1-r1c1-params / calculation-params / data-find-params /

extract-params / sort-params / data-series-params /

table-params / format-number-params / alignment-params /

style-params / border-params / cell-protection-params /

column-width-params / cut-params /

copy-params / paste-params / clear-params /

paste-special-params / edit-delete-params / insert-params / define-name-params /

create-names-params / formula-goto-params / formula-find-params / gallery-area-params /

gallery-bar-params / gallery-column-params / gallery-line-params /

gallery-pie-params / gallery-scatter-params / combination-params / gridlines-params /

set-preferred-params / axes-params / legend-params /

attach-text-params / patterns-params / main-chart-params /

overlay-params / scale-params / format-legend-params /

format-text-params / parse-params / unhide-params /

workspace-params / formula-params / formula-fill-params /

formula-array-params / activate-params /

activate-next-params / activate-prev-params / copy-picture-params / select-params /

delete-name-params / delete-format-params / vline-params /

hline-params / vpage-params / hpage-params /

vscroll-params / hscroll-params / alert-params /

new-params / cancel-copy-params /

message-params / app-activate-params / row-height-params / format-move-params /

format-size-params / formula-replace-params / send-keys-params /

select-special-params / apply-names-params / replace-font-params /

freeze-panes-params / show-info-params / split-params /

on-window-params / on-data-params / disable-input-params /

outline-params / file-close-params /

save-workbook-params / copy-chart-params /

on-time-params / wait-params / format-font-params /

short-menus-params / set-update-status-params / color-palette-params /

delete-style-params / window-restore-params / window-maximize-params /

change-link-params / on-key-params / app-move-params / app-size-params / main-chart-type-params / overlay-chart-type-params /

select-end-params / open-mail-params / send-mail-params /

standard-font-params / consolidate-params / sort-special-params /

gallery-3d-area-params / gallery-3d-column-params / gallery-3d-line-params /

gallery-3d-pie-params / view-3d-params / goal-seek-params /

workgroup-params / fill-group-params / update-link-params /

promote-params / demote-params / show-detail-params / object-properties-params / save-new-object-params / share-name-params /

apply-style-params / assign-to-object-params / object-protection-params /

hide-object-params / create-publisher-params /

subscribe-to-params / attributes-params / show-toolbar-params /

print-preview-params / edit-color-params / show-levels-params /

format-main-params / format-overlay-params / on-recalc-params /

edit-series-params / define-style-params / line-print-params /

enter-data-params / gallery-radar-params / merge-styles-params /

edition-options-params /

spelling-params / zoom-params / insert-object-params /

window-minimize-params / sound-note-params / sound-play-params /

format-shape-params / extend-polygon-params / format-auto-params /

gallery-3d-bar-params / gallery-3d-surface-params / fill-auto-params /

customize-toolbar-params / add-tool-params / edit-object-params /

on-doubleclick-params / on-entry-params / workbook-add-params /

workbook-move-params / workbook-copy-params / workbook-options-params /

save-workspace-params / chart-wizard-params / delete-tool-params /

move-tool-params / workbook-select-params / workbook-activate-params /

assign-to-tool-params / copy-tool-params / reset-tool-params /

constrain-numeric-params / paste-tool-params / workbook-new-params /

scenario-cells-params / scenario-delete-params / scenario-add-params /

scenario-edit-params / scenario-show-params /

scenario-summary-params / pivot-table-wizard-params / pivot-field-properties-params /

pivot-field-params / pivot-item-params / pivot-add-fields-params /

options-calculation-params / options-edit-params / options-view-params /

addin-manager-params /

vbaactivate-params / options-chart-params / vba-insert-file-params / routing-slip-params /

mail-logon-params / insert-picture-params / edit-tool-params /

gallery-doughnut-params / chart-trend-params / pivot-item-properties-params /

workbook-insert-params / options-transition-params / options-general-params /

filter-advanced-params / data-label-params / insert-title-params /

font-properties-params / macro-options-params / workbook-hide-params /

workbook-unhide-params / workbook-delete-params / workbook-name-params /

gallery-custom-params / add-chart-autoformat-params / delete-chart-autoformat-params /

chart-add-data-params /

show-dialog-params /

subtotal-create-params / rename-object-params /

workbook-scroll-params /

workbook-tab-split-params / full-screen-params / workbook-protect-params /

scrollbar-properties-params / pivot-show-pages-params / text-to-columns-params /

format-charttype-params / tracer-display-params /

tracer-navigate-params /

pivot-field-group-params / checkbox-properties-params /

label-properties-params / listbox-properties-params / editbox-properties-params /

pivot-refresh-params / link-combo-params / open-text-params /

hide-dialog-params / set-dialog-focus-params / enable-object-params /

pushbutton-properties-params / set-dialog-default-params / filter-params / function-wizard-params /

add-list-item-params / set-list-item-params / remove-list-item-params /

select-list-item-params / set-control-value-params / save-copy-as-params /

options-lists-add-params / options-lists-delete-params / series-axes-params /

series-x-params / series-y-params / errorbar-x-params /

errorbar-y-params / format-chart-params / series-order-params / clear-routing-slip-params / app-activate-microsoft-params /

mail-edit-mailer-params / on-sheet-params / standard-width-params /

scenario-merge-params / summary-info-params /

active-cell-font-params / enable-tipwizard-params / vba-make-addin-params /

insertdatatable-params / mail-send-mailer-params /

autocorrect-params / post-document-params /

view-show-params / view-define-params / view-delete-params /

sheet-background-params / options-menono-params /

rm-print-area-params /

move-brk-params / hidecurr-note-params / hideall-notes-params /

delete-note-params / traverse-notes-params / activate-notes-params / options-me-params /

web-publish-params / newwebquery-params / pivot-table-chart-params /

options-save-params / options-spell-params / hideall-inkannots-params

2.5.76.6 CFParsedFormula

This structure specifies a formula used in a conditional formatting rule.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptg structures for the formula. MUST NOT contain PtgExp, PtgList, PtgSxName, PtgIsect, PtgUnion, PtgArray, PtgRef3d, PtgArea3d, PtgRefErr3d, PtgAreaErr3d, PtgNameX, PtgMemArea or PtgMemNoMem. A PtgArea or a PtgAreaN MUST NOT be the only Ptg structure in the sequence.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.7 CFVOParsedFormula

This structure specifies a formula without relative references that is used in a conditional formatting rule.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgExp, PtgList, PtgSxName, PtgIsect, PtgUnion, PtgArray, PtgRef3d, PtgArea3d, PtgRefErr3d, PtgAreaErr3d, PtgNameX, PtgMemArea, or PtgMemNoMem. A PtgArea or a PtgAreaN MUST NOT be the only Ptg in the sequence.

If this field contains a PtgRef, then the **loc.column.fColRel** and **loc.column.fRwRel** fields in the PtgRef MUST be 0.

If this field contains a PtgRefN, then the **loc.column.fColRel** and **loc.column.fRwRel** fields in the PtgRefN MUST be 0.

If this field contains a PtgArea, then the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the PtgArea MUST be 0**.**

If this field contains a PtgAreaN, then the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the PtgAreaN MUST be 0.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.8 DVParsedFormula

This structure specifies a formula used in a data validation rule.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgExp, PtgList, PtgSxName, PtgIsect, PtgUnion, PtgArray, PtgRef3d, PtgRefErr3d, PtgNameX, PtgMemArea, or PtgMemNoMem.

If the BrtDVal record that contains this **DVParsedFormula** in its BrtDVal**.formula1** field has a BrtDVal.**valType** not equal to 3, then the following MUST be true:

- **rgce** MUST NOT contain a PtgArea3d or a PtgAreaErr3d.
- A PtgArea, a PtgAreaErr, or a PtgAreaN, MUST NOT be the only Ptg in **rgce**.
- The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

If the BrtDVal record that contains this **DVParsedFormula** in its BrtDVal**.formula1** field has a BrtDVal.**valType** equal to 3, then the following MUST be true:

- If **rgce** contains a PtgArea3d or a PtgAreaErr3d then the PtgArea3d or PtgAreaErr3d MUST be the only Ptg in **rgce**.
- The root node of the parse tree of this field MUST NOT be a VALUE_TYPE, as described in Rgce.

If this **DVParsedFormula** is a BrtDVal**.formula2** field then the following MUST be true:

- **rgce** MUST NOT contain a PtgArea3d or a PtgAreaErr3d.
- A PtgArea, a PtgAreaErr, or a PtgAreaN, MUST NOT be the only Ptg in **rgce**.
- The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.9 FRTParsedFormula

This structure specifies a formula used by a future record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
cb																															
rgce (variable)																															
...																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be less than 16385.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgce (variable): An Rgce that specifies the sequence of Ptg structures for the formula.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.10 Ftab

This structure specifies a function which can be called from a formula. The definition of each function specifies the function name and the valid sequence of parameters.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iftab																															

iftab (2 bytes): An unsigned integer that specifies the function to be called. MUST be a value from the following table:

The elements ref and val are specified in Rgce.

Value	Meaning
0x0000	COUNT
	count-params = (ref / val), *254(ref / val)
0x0001	IF
	if-params = val, *2(ref / val)

0x0002	ISNA
	isna-params = val
0x0003	ISERROR
	iserror-params = val
0x0004	SUM
	sum-params = (ref / val), *254(ref / val)
0x0005	AVERAGE
	average-params = (ref / val), *254(ref / val)
0x0006	MIN
	min-params = (ref / val), *254(ref / val)
0x0007	MAX
	max-params = (ref / val), *254(ref / val)
0x0008	ROW
	row-params = [ref]
0x0009	COLUMN
	column-params = [ref]
0x000A	NA
	This function takes no parameters
0x000B	NPV
	npv-params = val, (ref / val), *253(ref / val)
0x000C	STDEV
	stdev-params = (ref / val), *254(ref / val)
0x000D	DOLLAR
	dollar-params = val, [val]
0x000E	FIXED
	fixed-params = val, [val, [val]]
0x000F	SIN
	sin-params = val
0x0010	COS
	cos-params = val
0x0011	TAN
	tan-params = val
0x0012	ATAN
	atan-params = val
0x0013	PI
	This function takes no parameters
0x0014	SQRT
	sqrt-params = val
0x0015	EXP
	exp-params = val
0x0016	LN
	ln-params = val
0x0017	LOG10

	log10-params = val
0x0018	ABS
	abs-params = val
0x0019	INT
	int-params = val
0x001A	SIGN
	sign-params = val
0x001B	ROUND
	round-params = val, val
0x001C	LOOKUP
	lookup-params = val, (ref / val), [ref / val]
0x001D	INDEX
	index-params = (ref / val), val, *2(val)
0x001E	REPT
	rept-params = val, val
0x001F	MID
	mid-params = val, val, val
0x0020	LEN
	len-params = val
0x0021	VALUE
	value-params = val
0x0022	TRUE
	This function takes no parameters
0x0023	FALSE
	This function takes no parameters
0x0024	AND
	and-params = (ref / val), *254(ref / val)
0x0025	OR
	or-params = (ref / val), *254(ref / val)
0x0026	NOT
	not-params = val
0x0027	MOD
	mod-params = val, val
0x0028	DCOUNT
	dcount-params = ref, (ref / val), (ref / val)
0x0029	DSUM
	dsum-params = ref, (ref / val), (ref / val)
0x002A	DAVERAGE
	daverage-params = ref, (ref / val), (ref / val)
0x002B	DMIN
	dmin-params = ref, (ref / val), (ref / val)
0x002C	DMAX
	dmax-params = ref, (ref / val), (ref / val)

0x002D	DSTDEV
	dstdev-params = ref, (ref / val), (ref / val)
0x002E	VAR
	var-params = (ref / val), *254(ref / val)
0x002F	DVAR
	dvar-params = ref, (ref / val), (ref / val)
0x0030	TEXT
	text-params = val, val
0x0031	LINEST
	linest-params = (ref / val), [(ref / val), *2(ref / val)]
0x0032	TREND
	trend-params = (ref / val), [(ref / val), [(ref / val), [ref / val]]]
0x0033	LOGEST
	logest-params = (ref / val), [(ref / val), *2(ref / val)]
0x0034	GROWTH
	growth-params = (ref / val), [(ref / val), [(ref / val), [ref / val]]]
0x0035	GOTO
	goto-params = ref
0x0036	HALT
	halt-params = [val]
0x0037	RETURN
	return-params = [ref / val]
0x0038	PV
	pv-params = val, val, val, *2(val)
0x0039	FV
	fv-params = val, val, val, *2(val)
0x003A	NPER
	nper-params = val, val, val, *2(val)
0x003B	PMT
	pmt-params = val, val, val, *2(val)
0x003C	RATE
	rate-params = val, val, val, *3(val)
0x003D	MIRR
	mirr-params = (ref / val), val, val
0x003E	IRR
	irr-params = (ref / val), [val]
0x003F	RAND
	This function takes no parameters
0x0040	MATCH
	match-params = val, (ref / val), [ref / val]
0x0041	DATE
	date-params = val, val, val
0x0042	TIME

	time-params = val, val, val
0x0043	DAY
	day-params = val
0x0044	MONTH
	month-params = val
0x0045	YEAR
	year-params = val
0x0046	WEEKDAY
	weekday-params = val, [val]
0x0047	HOUR
	hour-params = val
0x0048	MINUTE
	minute-params = val
0x0049	SECOND
	second-params = val
0x004A	NOW
	This function takes no parameters
0x004B	AREAS
	areas-params = ref
0x004C	ROWS
	rows-params = (ref / val)
0x004D	COLUMNS
	columns-params = (ref / val)
0x004E	OFFSET
	offset-params = ref, val, val, *2(val)
0x004F	ABSREF
	absref-params = val, ref
0x0050	RELREF
	relref-params = ref, ref
0x0051	ARGUMENT
	argument-params = [val, [(ref / val), [ref]]]
0x0052	SEARCH
	search-params = val, val, [val]
0x0053	TRANSPOSE
	transpose-params = val
0x0054	ERROR
	error-params = [val, [ref / val]]
0x0055	STEP
	This function takes no parameters
0x0056	TYPE
	type-params = val
0x0057	ECHO
	echo-params = [val]

0x0058	SET.NAME
	set-name-params = val, [ref / val]
0x0059	CALLER
	This function takes no parameters
0x005A	DEREF
	deref-params = ref
0x005B	WINDOWS
	windows-params = [val, [val]]
0x005D	DOCUMENTS
	documents-params = [val, [val]]
0x005E	ACTIVE.CELL
	This function takes no parameters
0x005F	SELECTION
	This function takes no parameters
0x0060	RESULT
	result-params = [val]
0x0061	ATAN2
	atan2-params = val, val
0x0062	ASIN
	asin-params = val
0x0063	ACOS
	acos-params = val
0x0064	CHOOSE
	choose-params = val, (ref / val), *253(ref / val)
0x0065	HLOOKUP
	hlookup-params = val, (ref / val), (ref / val), [val]
0x0066	VLOOKUP
	vlookup-params = val, (ref / val), (ref / val), [val]
0x0067	LINKS
	links-params = [val, [val]]
0x0068	INPUT
	input-params = val, [val, [val, [val, [val, [val, [val]]]]]]
0x0069	ISREF
	isref-params = (ref / val)
0x006A	GET.FORMULA
	get-formula-params = (ref / val)
0x006B	GET.NAME
	get-name-params = val, [val]
0x006C	SET.VALUE
	set-value-params = ref, val
0x006D	LOG
	log-params = val, [val]
0x006E	EXEC

	exec-params = val, [val, *2(val)]
0x006F	CHAR
	char-params = val
0x0070	LOWER
	lower-params = val
0x0071	UPPER
	upper-params = val
0x0072	PROPER
	proper-params = val
0x0073	LEFT
	left-params = val, [val]
0x0074	RIGHT
	right-params = val, [val]
0x0075	EXACT
	exact-params = val, val
0x0076	TRIM
	trim-params = val
0x0077	REPLACE
	replace-params = val, val, val, val
0x0078	SUBSTITUTE
	substitute-params = val, val, val, [val]
0x0079	CODE
	code-params = val
0x007A	NAMES
	names-params = [val, [val, [val]]]
0x007B	DIRECTORY
	directory-params = [val]
0x007C	FIND
	find-params = val, val, [val]
0x007D	CELL
	cell-params = val, [ref]
0x007E	ISERR
	iserr-params = val
0x007F	ISTEXT
	istext-params = val
0x0080	ISNUMBER
	isnumber-params = val
0x0081	ISBLANK
	isblank-params = val
0x0082	T
	t-params = (ref / val)
0x0083	N
	n-params = (ref / val)

0x0084	FOPEN
	fopen-params = val, [val]
0x0085	FCLOSE
	fclose-params = val
0x0086	FSIZE
	fsize-params = val
0x0087	FREADLN
	freadln-params = val
0x0088	FREAD
	fread-params = val, val
0x0089	FWRITELN
	fwriteln-params = val, val
0x008A	FWRITE
	fwrite-params = val, val
0x008B	FPOS
	fpos-params = val, [val]
0x008C	DATEVALUE
	datevalue-params = val
0x008D	TIMEVALUE
	timevalue-params = val
0x008E	SLN
	sln-params = val, val, val
0x008F	SYD
	syd-params = val, val, val, val
0x0090	DDB
	ddb-params = val, val, val, val, [val]
0x0091	GET.DEF
	get-def-params = val, [val, [val]]
0x0092	REFTEXT
	reftext-params = ref, [val]
0x0093	TEXTREF
	textref-params = val, [val]
0x0094	INDIRECT
	indirect-params = val, [val]
0x0095	REGISTER
	register-params = val, [val, [val, [val, [val, [val, [val, [val, [val, [val, [val, *245(val)]]]]]]]]]
0x0096	CALL
	call-params = val, [(ref / val), *253(ref / val)]
0x0097	ADD.BAR
	add-bar-params = [val]
0x0098	ADD.MENU
	add-menu-params = val, (ref / val), [(ref / val), [val]]
0x0099	ADD.COMMAND

	add-command-params = val, (ref / val), (ref / val), [(ref / val), [val]]
0x009A	ENABLE.COMMAND
	enable-command-params = val, val, val, val, [val]
0x009B	CHECK.COMMAND
	check-command-params = val, val, val, val, [val]
0x009C	RENAME.COMMAND
	rename-command-params = val, val, val, val, [val]
0x009D	SHOW.BAR
	show-bar-params = [val]
0x009E	DELETE.MENU
	delete-menu-params = val, val, [val]
0x009F	DELETE.COMMAND
	delete-command-params = val, val, val, [val]
0x00A0	GET.CHART.ITEM
	get-chart-item-params = val, [val, [val]]
0x00A1	DIALOG.BOX
	dialog-box-params = (ref / val)
0x00A2	CLEAN
	clean-params = val
0x00A3	MDETERM
	mdeterm-params = val
0x00A4	MINVERSE
	minverse-params = val
0x00A5	MMULT
	mmult-params = val, val
0x00A6	FILES
	files-params = *2(val)
0x00A7	IPMT
	ipmt-params = val, val, val, val, *2(val)
0x00A8	PPMT
	ppmt-params = val, val, val, val, *2(val)
0x00A9	COUNTA
	counta-params = (ref / val), *254(ref / val)
0x00AA	CANCEL.KEY
	cancel-key-params = [val, [ref]]
0x00AB	FOR
	for-params = val, val, val, [val]
0x00AC	WHILE
	while-params = val
0x00AD	BREAK
	This function takes no parameters
0x00AE	NEXT
	This function takes no parameters

0x00AF	INITIATE
	initiate-params = val, val
0x00B0	REQUEST
	request-params = val, val
0x00B1	POKE
	poke-params = val, (ref / val), (ref / val)
0x00B2	EXECUTE
	execute-params = val, val
0x00B3	TERMINATE
	terminate-params = val
0x00B4	RESTART
	restart-params = [val]
0x00B5	HELP
	help-params = [val]
0x00B6	GET.BAR
	get-bar-params = *4(val)
0x00B7	PRODUCT
	product-params = (ref / val), *254(ref / val)
0x00B8	FACT
	fact-params = val
0x00B9	GET.CELL
	get-cell-params = val, [ref]
0x00BA	GET.WORKSPACE
	get-workspace-params = val
0x00BB	GET.WINDOW
	get-window-params = val, [val]
0x00BC	GET.DOCUMENT
	get-document-params = val, [val]
0x00BD	DPRODUCT
	dproduct-params = ref, (ref / val), (ref / val)
0x00BE	ISNONTEXT
	isnontext-params = val
0x00BF	GET.NOTE
	get-note-params = [(ref / val), *2(val)]
0x00C0	NOTE
	note-params = [val, [(ref / val), *2(ref / val)]]
0x00C1	STDEVP
	stdevp-params = (ref / val), *254(ref / val)
0x00C2	VARP
	varp-params = (ref / val), *254(ref / val)
0x00C3	DSTDEVP
	dstdevp-params = ref, (ref / val), (ref / val)
0x00C4	DVARP

	dvarp-params = ref, (ref / val), (ref / val)
0x00C5	TRUNC
	trunc-params = val, [val]
0x00C6	ISLOGICAL
	islogical-params = val
0x00C7	DCOUNTA
	dcounta-params = ref, (ref / val), (ref / val)
0x00C8	DELETE.BAR
	delete-bar-params = val
0x00C9	UNREGISTER
	unregister-params = val
0x00CC	USDOLLAR
	usdollar-params = val, [val]
0x00CD	FINDB
	findb-params = val, val, [val]
0x00CE	SEARCHB
	searchb-params = val, val, [val]
0x00CF	REPLACEB
	replaceb-params = val, val, val, val
0x00D0	LEFTB
	leftb-params = val, [val]
0x00D1	RIGHTB
	rightb-params = val, [val]
0x00D2	MIDB
	midb-params = val, val, val
0x00D3	LENB
	lenb-params = val
0x00D4	ROUNDUP
	roundup-params = val, val
0x00D5	ROUNDDOWN
	rounddown-params = val, val
0x00D6	ASC
	asc-params = val
0x00D7	DBCS
	dbcs-params = val
0x00D8	RANK
	rank-params = val, ref, [val]
0x00DB	ADDRESS
	address-params = val, val, [val, [val, [val]]]
0x00DC	DAYS360
	days360-params = val, val, [val]
0x00DD	TODAY
	This function takes no parameters

0x00DE	VDB
	vdb-params = val, val, val, val, val, [val, [val]]
0x00DF	ELSE
	This function takes no parameters
0x00E0	ELSE.IF
	else-if-params = val
0x00E1	END.IF
	This function takes no parameters
0x00E2	FOR.CELL
	for-cell-params = val, [(ref / val), [ref / val]]
0x00E3	MEDIAN
	median-params = (ref / val), *254(ref / val)
0x00E4	SUMPRODUCT
	sumproduct-params = val, *254(val)
0x00E5	SINH
	sinh-params = val
0x00E6	COSH
	cosh-params = val
0x00E7	TANH
	tanh-params = val
0x00E8	ASINH
	asinh-params = val
0x00E9	ACOSH
	acosh-params = val
0x00EA	ATANH
	atanh-params = val
0x00EB	DGET
	dget-params = ref, (ref / val), (ref / val)
0x00EC	CREATE.OBJECT
	create-object-params = val, (ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [(ref / val), [ref / val]]]]]]]]
0x00ED	VOLATILE
	volatile-params = [val]
0x00EE	LAST.ERROR
	This function takes no parameters
0x00EF	CUSTOM.UNDO
	custom-undo-params = *2(val)
0x00F0	CUSTOM.REPEAT
	custom-repeat-params = *3(val)
0x00F1	FORMULA.CONVERT
	formula-convert-params = val, (ref / val), *3(ref / val)
0x00F2	GET.LINK.INFO
	get-link-info-params = val, val, [val, [val]]

0x00F3	TEXT.BOX
	text-box-params = val, [val, *2(val)]
0x00F4	INFO
	info-params = val
0x00F5	GROUP
	This function takes no parameters
0x00F6	GET.OBJECT
	get-object-params = val, [val, *3(val)]
0x00F7	DB
	db-params = val, val, val, val, [val]
0x00F8	PAUSE
	pause-params = [val]
0x00FB	RESUME
	resume-params = [val]
0x00FC	FREQUENCY
	frequency-params = (ref / val), (ref / val)
0x00FD	ADD.TOOLBAR
	add-toolbar-params = [val, [val]]
0x00FE	DELETE.TOOLBAR
	delete-toolbar-params = val
0x00FF	User Defined Function
	user-defined-function-params = (ref / val), [(ref / val), *253(ref / val)]
0x0100	RESET.TOOLBAR
	reset-toolbar-params = val
0x0101	EVALUATE
	evaluate-params = val
0x0102	GET.TOOLBAR
	get-toolbar-params = val, [val]
0x0103	GET.TOOL
	get-tool-params = val, [val, [val]]
0x0104	SPELLING.CHECK
	spelling-check-params = val, [val, [val]]
0x0105	ERROR.TYPE
	error-type-params = val
0x0106	APP.TITLE
	app-title-params = [val]
0x0107	WINDOW.TITLE
	window-title-params = [val]
0x0108	SAVE.TOOLBAR
	save-toolbar-params = [val, [val]]
0x0109	ENABLE.TOOL
	enable-tool-params = val, val, val
0x010A	PRESS.TOOL

	press-tool-params = val, val, val
0x010B	REGISTER.ID
	register-id-params = val, val, [val]
0x010C	GET.WORKBOOK
	get-workbook-params = val, [val]
0x010D	AVEDEV
	avedev-params = (ref / val), *254(ref / val)
0x010E	BETADIST
	betadist-params = val, val, val, *2(val)
0x010F	GAMMALN
	gammaln-params = val
0x0110	BETAINV
	betainv-params = val, val, val, *2(val)
0x0111	BINOMDIST
	binomdist-params = val, val, val, val
0x0112	CHIDIST
	chidist-params = val, val
0x0113	CHIINV
	chiinv-params = val, val
0x0114	COMBIN
	combin-params = val, val
0x0115	CONFIDENCE
	confidence-params = val, val, val
0x0116	CRITBINOM
	critbinom-params = val, val, val
0x0117	EVEN
	even-params = val
0x0118	EXPONDIST
	expondist-params = val, val, val
0x0119	FDIST
	fdist-params = val, val, val
0x011A	FINV
	finv-params = val, val, val
0x011B	FISHER
	fisher-params = val
0x011C	FISHERINV
	fisherinv-params = val
0x011D	FLOOR
	floor-params = val, val
0x011E	GAMMADIST
	gammadist-params = val, val, val, val
0x011F	GAMMAINV
	gammainv-params = val, val, val

0x0120	CEILING
	ceiling-params = val, val
0x0121	HYPGEOMDIST
	hypgeomdist-params = val, val, val, val
0x0122	LOGNORMDIST
	lognormdist-params = val, val, val
0x0123	LOGINV
	loginv-params = val, val, val
0x0124	NEGBINOMDIST
	negbinomdist-params = val, val, val
0x0125	NORMDIST
	normdist-params = val, val, val, val
0x0126	NORMSDIST
	normsdist-params = val
0x0127	NORMINV
	norminv-params = val, val, val
0x0128	NORMSINV
	normsinv-params = val
0x0129	STANDARDIZE
	standardize-params = val, val, val
0x012A	ODD
	odd-params = val
0x012B	PERMUT
	permut-params = val, val
0x012C	POISSON
	poisson-params = val, val, val
0x012D	TDIST
	tdist-params = val, val, val
0x012E	WEIBULL
	weibull-params = val, val, val, val
0x012F	SUMXMY2
	sumxmy2-params = val, val
0x0130	SUMX2MY2
	sumx2my2-params = val, val
0x0131	SUMX2PY2
	sumx2py2-params = val, val
0x0132	CHITEST
	chitest-params = val, val
0x0133	CORREL
	correl-params = val, val
0x0134	COVAR
	covar-params = val, val
0x0135	FORECAST

	forecast-params = val, val, val
0x0136	FTEST
	ftest-params = val, val
0x0137	INTERCEPT
	intercept-params = val, val
0x0138	PEARSON
	pearson-params = val, val
0x0139	RSQ
	rsq-params = val, val
0x013A	STEYX
	steyx-params = val, val
0x013B	SLOPE
	slope-params = val, val
0x013C	TTEST
	ttest-params = val, val, val, val
0x013D	PROB
	prob-params = val, val, val, [val]
0x013E	DEVSQ
	devsq-params = (ref / val), *254(ref / val)
0x013F	GEOMEAN
	geomean-params = (ref / val), *254(ref / val)
0x0140	HARMEAN
	harmean-params = (ref / val), *254(ref / val)
0x0141	SUMSQ
	sumsq-params = (ref / val), *254(ref / val)
0x0142	KURT
	kurt-params = (ref / val), *254(ref / val)
0x0143	SKEW
	skew-params = (ref / val), *254(ref / val)
0x0144	ZTEST
	ztest-params = (ref / val), val, [val]
0x0145	LARGE
	large-params = (ref / val), val
0x0146	SMALL
	small-params = (ref / val), val
0x0147	QUARTILE
	quartile-params = (ref / val), val
0x0148	PERCENTILE
	percentile-params = (ref / val), val
0x0149	PERCENTRANK
	percentrank-params = (ref / val), val, [val]
0x014A	MODE
	mode-params = val, *254(val)

0x014B	TRIMMEAN
	trimmean-params = (ref / val), val
0x014C	TINV
	tinv-params = val, val
0x014E	MOVIE.COMMAND
	movie-command-params = val, val, val, [val]
0x014F	GET.MOVIE
	get-movie-params = val, val, [val]
0x0150	CONCATENATE
	concatenate-params = val, *254(val)
0x0151	POWER
	power-params = val, val
0x0152	PIVOT.ADD.DATA
	pivot-add-data-params = val, val, [val, [val, [val, [val, *3(val)]]]]
0x0153	GET.PIVOT.TABLE
	get-pivot-table-params = val, [val]
0x0154	GET.PIVOT.FIELD
	get-pivot-field-params = val, [val, [val]]
0x0155	GET.PIVOT.ITEM
	get-pivot-item-params = val, [val, [val, [val]]]
0x0156	RADIANS
	radians-params = val
0x0157	DEGREES
	degrees-params = val
0x0158	SUBTOTAL
	subtotal-params = val, ref, *253(ref)
0x0159	SUMIF
	sumif-params = ref, val, [ref]
0x015A	COUNTIF
	countif-params = ref, val
0x015B	COUNTBLANK
	countblank-params = ref
0x015C	SCENARIO.GET
	scenario-get-params = val, [val]
0x015D	OPTIONS.LISTS.GET
	options-lists-get-params = val
0x015E	ISPMT
	ispmt-params = val, val, val, val
0x015F	DATEDIF
	datedif-params = val, val, val
0x0160	DATESTRING
	datestring-params = val
0x0161	NUMBERSTRING

	numberstring-params = val, val
0x0162	ROMAN
	roman-params = val, [val]
0x0163	OPEN.DIALOG
	open-dialog-params = [val, [val, [val, [val]]]]
0x0164	SAVE.DIALOG
	save-dialog-params = [val, [val, [val, [val, [val]]]]]
0x0165	VIEW.GET
	view-get-params = val, [val]
0x0166	GETPIVOTDATA
	getpivotdata-params = (ref / val), (ref / val), [val, [val, *125(val, val)]]
0x0167	HYPERLINK
	hyperlink-params = val, [val]
0x0168	PHONETIC
	phonetic-params = ref
0x0169	AVERAGEA
	averagea-params = (ref / val), *254(ref / val)
0x016A	MAXA
	maxa-params = (ref / val), *254(ref / val)
0x016B	MINA
	mina-params = (ref / val), *254(ref / val)
0x016C	STDEVPA
	stdevpa-params = (ref / val), *254(ref / val)
0x016D	VARPA
	varpa-params = (ref / val), *254(ref / val)
0x016E	STDEVA
	stdeva-params = (ref / val), *254(ref / val)
0x016F	VARA
	vara-params = (ref / val), *254(ref / val)
0x0170	BAHTTEXT
	bahttext-params = val
0x0171	THAIDAYOFWEEK
	thaidayofweek-params = val
0x0172	THAIDIGIT
	thaidigit-params = val
0x0173	THAIMONTHOFYEAR
	thaimonthofyear-params = val
0x0174	THAINUMSOUND
	thainumsound-params = val
0x0175	THAINUMSTRING
	thainumstring-params = val
0x0176	THAISTRINGLENGTH
	thaistringlength-params = val

0x0177	ISTHAIDIGIT
	isthaidigit-params = val
0x0178	ROUNDBAHTDOWN
	roundbahtdown-params = val
0x0179	ROUNDBAHTUP
	roundbahtup-params = val
0x017A	THAIYEAR
	thaiyear-params = val
0x017B	RTD
	rtd-params = val, val, val, *252(val)
0x017C	CUBEVALUE
	cubevalue-params = val, [(ref / val), *253(ref / val)]
0x017D	CUBEMEMBER
	cubemember-params = val, (ref / val), [val]
0x017E	CUBEMEMBERPROPERTY
	cubememberproperty-params = val, val, val
0x017F	CUBERANKEDMEMBER
	cuberankedmember-params = val, val, val, [val]
0x0180	HEX2BIN
	hex2bin-params = (ref / val), [ref / val]
0x0181	HEX2DEC
	hex2dec-params = (ref / val)
0x0182	HEX2OCT
	hex2oct-params = (ref / val), [ref / val]
0x0183	DEC2BIN
	dec2bin-params = (ref / val), [ref / val]
0x0184	DEC2HEX
	dec2hex-params = (ref / val), [ref / val]
0x0185	DEC2OCT
	dec2oct-params = (ref / val), [ref / val]
0x0186	OCT2BIN
	oct2bin-params = (ref / val), [ref / val]
0x0187	OCT2HEX
	oct2hex-params = (ref / val), [ref / val]
0x0188	OCT2DEC
	oct2dec-params = (ref / val)
0x0189	BIN2DEC
	bin2dec-params = (ref / val)
0x018A	BIN2OCT
	bin2oct-params = (ref / val), [ref / val]
0x018B	BIN2HEX
	bin2hex-params = (ref / val), [ref / val]
0x018C	IMSUB

	imsub-params = (ref / val), (ref / val)
0x018D	IMDIV
	imdiv-params = (ref / val), (ref / val)
0x018E	IMPOWER
	impower-params = (ref / val), (ref / val)
0x018F	IMABS
	imabs-params = (ref / val)
0x0190	IMSQRT
	imsqrt-params = (ref / val)
0x0191	IMLN
	imln-params = (ref / val)
0x0192	IMLOG2
	imlog2-params = (ref / val)
0x0193	IMLOG10
	imlog10-params = (ref / val)
0x0194	IMSIN
	imsin-params = (ref / val)
0x0195	IMCOS
	imcos-params = (ref / val)
0x0196	IMEXP
	imexp-params = (ref / val)
0x0197	IMARGUMENT
	imargument-params = (ref / val)
0x0198	IMCONJUGATE
	imconjugate-params = (ref / val)
0x0199	IMAGINARY
	imaginary-params = (ref / val)
0x019A	IMREAL
	imreal-params = (ref / val)
0x019B	COMPLEX
	complex-params = (ref / val), (ref / val), [ref / val]
0x019C	IMSUM
	imsum-params = (ref / val), *254(ref / val)
0x019D	IMPRODUCT
	improduct-params = (ref / val), *254(ref / val)
0x019E	SERIESSUM
	seriessum-params = (ref / val), (ref / val), (ref / val), (ref / val)
0x019F	FACTDOUBLE
	factdouble-params = (ref / val)
0x01A0	SQRTPI
	sqrtpi-params = (ref / val)
0x01A1	QUOTIENT
	quotient-params = (ref / val), (ref / val)

0x01A2	DELTA
	delta-params = (ref / val), [ref / val]
0x01A3	GESTEP
	gestep-params = (ref / val), [ref / val]
0x01A4	ISEVEN
	iseven-params = (ref / val)
0x01A5	ISODD
	isodd-params = (ref / val)
0x01A6	MROUND
	mround-params = (ref / val), (ref / val)
0x01A7	ERF
	erf-params = (ref / val), [ref / val]
0x01A8	ERFC
	erfc-params = (ref / val)
0x01A9	BESSELJ
	besselj-params = (ref / val), (ref / val)
0x01AA	BESSELK
	besselk-params = (ref / val), (ref / val)
0x01AB	BESSELY
	bessely-params = (ref / val), (ref / val)
0x01AC	BESSELI
	besseli-params = (ref / val), (ref / val)
0x01AD	XIRR
	xirr-params = (ref / val), (ref / val), [ref / val]
0x01AE	XNPV
	xnpv-params = (ref / val), (ref / val), (ref / val)
0x01AF	PRICEMAT
	pricemat-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B0	YIELDMAT
	yieldmat-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B1	INTRATE
	intrate-params = (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B2	RECEIVED
	received-params = (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B3	DISC
	disc-params = (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B4	PRICEDISC
	pricedisc-params = (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B5	YIELDDISC
	yielddisc-params = (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01B6	TBILLEQ
	tbilleq-params = (ref / val), (ref / val), (ref / val)

0x01B7	TBILLPRICE
	tbillprice-params = (ref / val), (ref / val), (ref / val)
0x01B8	TBILLYIELD
	tbillyield-params = (ref / val), (ref / val), (ref / val)
0x01B9	PRICE
	price-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01BA	YIELD
	yield-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01BB	DOLLARDE
	dollarde-params = (ref / val), (ref / val)
0x01BC	DOLLARFR
	dollarfr-params = (ref / val), (ref / val)
0x01BD	NOMINAL
	nominal-params = (ref / val), (ref / val)
0x01BE	EFFECT
	effect-params = (ref / val), (ref / val)
0x01BF	CUMPRINC
	cumprinc-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val)
0x01C0	CUMIPMT
	cumipmt-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val)
0x01C1	EDATE
	edate-params = (ref / val), (ref / val)
0x01C2	EOMONTH
	eomonth-params = (ref / val), (ref / val)
0x01C3	YEARFRAC
	yearfrac-params = (ref / val), (ref / val), [ref / val]
0x01C4	COUPDAYBS
	coupdaybs-params = (ref / val), (ref / val), (ref / val), [ref / val]
0x01C5	COUPDAYS
	coupdays-params = (ref / val), (ref / val), (ref / val), [ref / val]
0x01C6	COUPDAYSNC
	coupdaysnc-params = (ref / val), (ref / val), (ref / val), [ref / val]
0x01C7	COUPNCD
	coupncd-params = (ref / val), (ref / val), (ref / val), [ref / val]
0x01C8	COUPNUM
	coupnum-params = (ref / val), (ref / val), (ref / val), [ref / val]
0x01C9	COUPPCD
	couppcd-params = (ref / val), (ref / val), (ref / val), [ref / val]
0x01CA	DURATION
	duration-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]

0x01CB	MDURATION
	mduration-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01CC	ODDLPRICE
	oddlprice-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01CD	ODDLYIELD
	oddlyield-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01CE	ODDFPRICE
	oddfprice-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01CF	ODDFYIELD
	oddfyield-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01D0	RANDBETWEEN
	randbetween-params = (ref / val), (ref / val)
0x01D1	WEEKNUM
	weeknum-params = (ref / val), [ref / val]
0x01D2	AMORDEGRC
	amordegrc-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01D3	AMORLINC
	amorlinc-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01D4	CONVERT
	convert-params = (ref / val), (ref / val), (ref / val)
0x01D5	ACCRINT
	accrint-params = (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), (ref / val), *2(ref / val)
0x01D6	ACCRINTM
	accrintm-params = (ref / val), (ref / val), (ref / val), (ref / val), [ref / val]
0x01D7	WORKDAY
	workday-params = (ref / val), (ref / val), [ref / val]
0x01D8	NETWORKDAYS
	networkdays-params = (ref / val), (ref / val), [ref / val]
0x01D9	GCD
	gcd-params = (ref / val), *254(ref / val)
0x01DA	MULTINOMIAL
	multinomial-params = (ref / val), *254(ref / val)
0x01DB	LCM
	lcm-params = (ref / val), *254(ref / val)
0x01DC	FVSCHEDULE
	fvschedule-params = (ref / val), (ref / val)
0x01DD	CUBEKPIMEMBER

	cubekpimember-params = val, val, val, [val]
0x01DE	CUBESET
	cubeset-params = val, (ref / val), [val, [val, [val]]]
0x01DF	CUBESETCOUNT
	cubesetcount-params = val
0x01E0	IFERROR
	iferror-params = val, (ref / val)
0x01E1	COUNTIFS
	countifs-params = ref, val, *126(ref, val)
0x01E2	SUMIFS
	sumifs-params = ref, ref, val, *126(ref, val)
0x01E3	AVERAGEIF
	averageif-params = ref, val, [ref]
0x01E4	AVERAGEIFS
	averageifs-params = ref, ref, val, *126(ref, val)
0x0000	COUNT
	count-params = (ref / val), *254(ref / val)

The following grammar is used in the Rgce structure definition:

params-fixed = isna-params / iserror-params /

sin-params / cos-params / tan-params /

atan-params / sqrt-params /

exp-params / ln-params / log10-params /

abs-params / int-params / sign-params /

round-params / rept-params / mid-params /

len-params / value-params / not-params / mod-params /

dcount-params / dsum-params / daverage-params /

dmin-params / dmax-params / dstdev-params /

dvar-params / text-params / goto-params /

mirr-params / date-params /

time-params / day-params / month-params /

year-params / hour-params / minute-params /

second-params / areas-params /

rows-params / columns-params / absref-params /

relref-params / transpose-params /

type-params / deref-params / atan2-params /

asin-params / acos-params / isref-params /

get-formula-params / set-value-params / char-params /

lower-params / upper-params / proper-params /

exact-params / trim-params / replace-params /

code-params / iserr-params / istext-params /

isnumber-params / isblank-params / t-params /

n-params / fclose-params / fsize-params /

freadln-params / fread-params / fwriteln-params /

fwrite-params / datevalue-params / timevalue-params /

sln-params / syd-params / dialog-box-params /

clean-params / mdeterm-params / minverse-params /

mmult-params / while-params / initiate-params / request-params /

poke-params / execute-params / terminate-params /

fact-params / get-workspace-params / dproduct-params /

isnontext-params / dstdevp-params / dvarp-params /

islogical-params / dcounta-params / delete-bar-params /

unregister-params / replaceb-params / midb-params /

lenb-params / roundup-params / rounddown-params /

asc-params / dbcs-params / else-if-params /

sinh-params / cosh-params / tanh-params /

asinh-params / acosh-params / atanh-params /

dget-params / info-params / frequency-params / delete-toolbar-params /

reset-toolbar-params / evaluate-params / error-type-params /

enable-tool-params / press-tool-params / gammaln-params /

binomdist-params / chidist-params / chiinv-params /

combin-params / confidence-params / critbinom-params /

even-params / expondist-params / fdist-params /

finv-params / fisher-params / fisherinv-params /

floor-params / gammadist-params / gammainv-params /

ceiling-params / hypgeomdist-params / lognormdist-params /

loginv-params / negbinomdist-params / normdist-params /

normsdist-params / norminv-params / normsinv-params /

standardize-params / odd-params / permut-params /

poisson-params / tdist-params / weibull-params /

sumxmy2-params / sumx2my2-params / sumx2py2-params /

chitest-params / correl-params / covar-params /

forecast-params / ftest-params / intercept-params /

pearson-params / rsq-params / steyx-params /

slope-params / ttest-params / large-params /

small-params / quartile-params / percentile-params /

trimmean-params / tinv-params / power-params /

radians-params / degrees-params / countif-params /

countblank-params / options-lists-get-params / ispmt-params /

datedif-params / datestring-params / numberstring-params /

phonetic-params / bahttext-params / thaidayofweek-params /

thaidigit-params / thaimonthofyear-params / thainumsound-params /

thainumstring-params / thaistringlength-params / isthaidigit-params /

roundbahtdown-params / roundbahtup-params / thaiyear-params /

cubememberproperty-params / hex2dec-params / oct2dec-params /

bin2dec-params / imsub-params / imdiv-params /

impower-params / imabs-params / imsqrt-params /

imln-params / imlog2-params / imlog10-params /

imsin-params / imcos-params / imexp-params /

imargument-params / imconjugate-params / imaginary-params /

imreal-params / seriessum-params / factdouble-params /

sqrtpi-params / quotient-params / iseven-params /

isodd-params / mround-params / erfc-params /

besselj-params / besselk-params / bessely-params /

besseli-params / xnpv-params / tbilleq-params /

tbillprice-params / tbillyield-params / dollarde-params /

dollarfr-params / nominal-params / effect-params /

cumprinc-params / cumipmt-params / edate-params /

eomonth-params / randbetween-params / convert-params /

fvschedule-params / cubesetcount-params / iferror-params

params-variable = count-params / if-params / sum-params /

average-params / min-params / max-params /

row-params / column-params / npv-params /

stdev-params / dollar-params / fixed-params /

lookup-params / index-params / and-params /

or-params / var-params / linest-params /

trend-params / logest-params / growth-params /

halt-params / return-params / pv-params /

fv-params / nper-params / pmt-params /

rate-params / irr-params / match-params /

weekday-params / offset-params / argument-params /

search-params / error-params / echo-params /

set-name-params / windows-params / c

documents-params / result-params / choose-params /

hlookup-params / vlookup-params / links-params /

input-params / get-name-params / log-params /

exec-params / left-params / right-params /

substitute-params / names-params / directory-params /

find-params / cell-params / fopen-params /

fpos-params / ddb-params / get-def-params /

reftext-params / textref-params / indirect-params /

register-params / call-params / add-bar-params /

add-menu-params / add-command-params / enable-command-params /

check-command-params / rename-command-params / show-bar-params /

delete-menu-params / delete-command-params / get-chart-item-params /

files-params / ipmt-params / ppmt-params /

counta-params / cancel-key-params / for-params /

restart-params / help-params / get-bar-params /

product-params / get-cell-params / get-window-params /

get-document-params / get-note-params / note-params /

stdevp-params / varp-params / trunc-params /

usdollar-params / findb-params / searchb-params /

leftb-params / rightb-params / rank-params /

address-params / days360-params / vdb-params /

for-cell-params / median-params / sumproduct-params /

create-object-params / volatile-params / custom-undo-params /

custom-repeat-params / formula-convert-params / get-link-info-params /

text-box-params / get-object-params / db-params /

pause-params / resume-params / add-toolbar-params /

user-defined-function-params / get-toolbar-params / get-tool-params /

spelling-check-params / app-title-params / window-title-params /

save-toolbar-params / register-id-params / get-workbook-params /

avedev-params / betadist-params / betainv-params /

prob-params / devsq-params / geomean-params /

harmean-params / sumsq-params / kurt-params /

skew-params / ztest-params / percentrank-params /

mode-params / movie-command-params / get-movie-params /

concatenate-params / pivot-add-data-params / get-pivot-table-params /

get-pivot-field-params / get-pivot-item-params / subtotal-params /

sumif-params / scenario-get-params / roman-params /

open-dialog-params / save-dialog-params / view-get-params /

getpivotdata-params / hyperlink-params / averagea-params /

maxa-params / mina-params / stdevpa-params /

varpa-params / stdeva-params / vara-params /

rtd-params / cubevalue-params / cubemember-params /

cuberankedmember-params / hex2bin-params / hex2oct-params /

dec2bin-params / dec2hex-params / dec2oct-params /

oct2bin-params / oct2hex-params / bin2oct-params /

bin2hex-params / complex-params / imsum-params /

improduct-params / delta-params / gestep-params /

erf-params / xirr-params / pricemat-params /

yieldmat-params / intrate-params / received-params /

disc-params / pricedisc-params / yielddisc-params /

price-params / yield-params / yearfrac-params /

coupdaybs-params / coupdays-params / coupdaysnc-params /

coupncd-params / coupnum-params / couppcd-params /

duration-params / mduration-params / oddlprice-params /

oddlyield-params / oddfprice-params / oddfyield-params /

weeknum-params / amordegrc-params / amorlinc-params /

accrint-params / accrintm-params / workday-params /

networkdays-params / gcd-params / multinomial-params /

lcm-params / cubekpimember-params / cubeset-params /

countifs-params / sumifs-params / averageif-params /

averageifs-params

2.5.76.11 ListParsedFormula

This structure specifies a formula used in a table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgExp, or PtgSxName.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.12 NameParsedFormula

This structure specifies a formula used in a defined name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgExp, PtgSxName, PtgRef, PtgRefN, PtgRefErr, PtgArea, PtgAreaN, or PtgAreaErr.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.13 ObjectParsedFormula

This structure specifies a formula used by an embedded object.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be equal to 7.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST contain one Ptg only, and this Ptg MUST be PtgNameX.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.14 ParameterParsedFormula

This structure specifies the formula for a query parameter.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptg structures for the formula. MUST NOT contain PtgExp, PtgArray <42>, PtgMemArea, or PtgSxName.

The root node of the parse tree of this field MUST NOT be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.15 PivotParsedFormula

This structure specifies a formula used in a PivotTable.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															

rgcb (variable)
...

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptg structures for the formula. MUST NOT contain PtgExp, PtgUnion, PtgIsect, PtgRange, PtgList, PtgArray, PtgAttrSpaceSemi, PtgAttrSemi, PtgRef, PtgRefErr, PtgRefN, PtgArea, PtgAreaErr, PtgAreaN, PtgRef3d, PtgArea3d, PtgRefErr3d, PtgAreaErr3d, PtgName, PtgNameX, PtgMemArea, PtgMemErr, PtgMemNoMem, or PtgMemFunc.

If this field contains a PtgFunc, then the **iftab** field of PtgFunc MUST be less than 0x0028 or greater than 0x002D and MUST NOT be equal to 0x002F, 0x00BD, 0x00C3, 0x00C4, or 0x00C7.

If this field contains a PtgFuncVar, then the **fCeFunc** field of PtgFuncVar MUST be 0 and the **tab** field of PtgFuncVar MUST NOT be equal to 0x00FF or 0x0166.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.16 Ptg

This structure specifies a single element of a formula. The value of the first byte determines which structure it represents and MUST be one of the values in the first column of the following table. If the value of the first byte is 0x18 or 0x19, then the second byte determines which structure it represents and MUST be one of the values in the second column of the following table.

First byte	Second byte	Ptg
0x01		PtgExp
0x03		PtgAdd
0x04		PtgSub
0x05		PtgMul
0x06		PtgDiv
0x07		PtgPower
0x08		PtgConcat
0x09		PtgLt
0x0A		PtgLe
0x0B		PtgEq
0x0C		PtgGe
0x0D		PtgGt
0x0E		PtgNe
0x0F		PtgIsect
0x10		PtgUnion
0x11		PtgRange

0x12		PtgUPlus
0x13		PtgUMinus
0x14		PtgPercent
0x15		PtgParen
0x16		PtgMissArg
0x17		PtgStr
0x18	0x19	PtgList
0x18	0x1D	PtgSxName
0x19	0x01	PtgAttrSemi
0x19	0x02	PtgAttrIf
0x19	0x04	PtgAttrChoose
0x19	0x08	PtgAttrGoTo
0x19	0x10	PtgAttrSum
0x19	0x20	PtgAttrBaxcel
0x19	0x21	PtgAttrBaxcel
0x19	0x40	PtgAttrSpace
0x19	0x41	PtgAttrSpaceSemi
0x19	0x80	PtgAttrIfError
0x1C		PtgErr
0x1D		PtgBool
0x1E		PtgInt
0x1F		PtgNum
0x20		PtgArray
0x21		PtgFunc
0x22		PtgFuncVar
0x23		PtgName
0x24		PtgRef
0x25		PtgArea
0x26		PtgMemArea
0x27		PtgMemErr
0x28		PtgMemNoMem
0x29		PtgMemFunc
0x2A		PtgRefErr
0x2B		PtgAreaErr
0x2C		PtgRefN
0x2D		PtgAreaN
0x39		PtgNameX
0x3A		PtgRef3d
0x3B		PtgArea3d

0x3C		PtgRefErr3d
0x3D		PtgAreaErr3d
0x40		PtgArray
0x41		PtgFunc
0x42		PtgFuncVar
0x43		PtgName
0x44		PtgRef
0x45		PtgArea
0x46		PtgMemArea
0x47		PtgMemErr
0x48		PtgMemNoMem
0x49		PtgMemFunc
0x4A		PtgRefErr
0x4B		PtgAreaErr
0x4C		PtgRefN
0x4D		PtgAreaN
0x59		PtgNameX
0x5A		PtgRef3d
0x5B		PtgArea3d
0x5C		PtgRefErr3d
0x5D		PtgAreaErr3d
0x60		PtgArray
0x61		PtgFunc
0x62		PtgFuncVar
0x63		PtgName
0x64		PtgRef
0x65		PtgArea
0x66		PtgMemArea
0x67		PtgMemErr
0x68		PtgMemNoMem
0x69		PtgMemFunc
0x6A		PtgRefErr
0x6B		PtgAreaErr
0x6C		PtgRefN
0x6D		PtgAreaN
0x79		PtgNameX
0x7A		PtgRef3d
0x7B		PtgArea3d
0x7C		PtgRefErr3d

0x7D		PtgAreaErr3d

2.5.76.17 PtgAdd

This structure specifies a binary-value operator that adds the second expression in a binary-value-expression to the first.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x03.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.18 PtgArea

This operand specifies a reference to a rectangular range of cells.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	area																							
...																															
...																															
...																															

ptg (5 bits): Reserved. MUST be 0x05.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero and MUST be ignored.

area (12 bytes): A RgceArea that specifies the referenced range of cells.

2.5.76.19 PtgArea3d

This operand specifies a reference to the same rectangular range of cells on one or more sheets.

If the formula containing this structure is part of a revision as specified in the Formulas overview, then there MUST be a RevExtern in the RgbExtra corresponding to this PtgArea3d, which specifies those sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	ixti																area							

...	
...	
...	

ptg (5 bits): Reserved. MUST be 0x1B.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview, then this value is an XtiIndex that specifies the Xti which specifies those sheets. Otherwise it is undefined and MUST be ignored.

area (12 bytes): A value that specifies coordinates of the referenced range of cell. If this PtgArea3d is part of a NameParsedFormula then this is a RgceAreaRel value. Otherwise it is a RgceArea value.

2.5.76.20 PtgAreaErr

This operand specifies an invalid reference to a cell range.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	unused1																							
...								unused2																							
...								unused3																							
...																															

ptg (5 bits): Reserved. MUST be 0x0B.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

unused1 (4 bytes): Undefined and MUST be ignored.

unused2 (4 bytes): Undefined and MUST be ignored.

unused3 (4 bytes): Undefined and MUST be ignored.

2.5.76.21 PtgAreaErr3d

This operand specifies an invalid reference to the same rectangular range of cells on multiple sheets.

If the formula containing this structure is part of a revision as specified in the Formulas overview, then there MUST be a RevExtern in the RgbExtra corresponding to this PtgAreaErr3d, which specifies those sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	ixti																unused1							
...																								unused2							
...																								unused3							
...																															

ptg (5 bits): Reserved. MUST be 0x1D.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview, then this value is an XtiIndex that specifies the Xti which specifies those sheets. Otherwise it is undefined and MUST be ignored.

unused1 (4 bytes): Undefined and MUST be ignored.

unused2 (4 bytes): Undefined and MUST be ignored.

unused3 (4 bytes): Undefined and MUST be ignored.

2.5.76.22 PtgAreaN

This operand specifies a reference to a rectangular range of cells as an RgceAreaRel.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	area																							
...																															
...																															
...																															

ptg (5 bits): Reserved. MUST be 0x0D.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

area (12 bytes): An RgceAreaRel that specifies the referenced range.

2.5.76.23 PtgArray

This operand specifies an array of values. There MUST be a PtgExtraArray in the RgbExtra corresponding to this PtgArray. The correspondence between PtgArray and PtgExtraArray structures is specified in RgbExtra.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="5">ptg</td><td colspan="2">A</td><td>B</td><td colspan="24">unused1</td></tr>
<tr><td colspan="8">...</td><td colspan="16">unused2</td><td colspan="8">unused3</td></tr>
<tr><td colspan="24">...</td><td colspan="8">unused4</td></tr>
<tr><td colspan="24">...</td><td colspan="8"></td></tr>
</table>

ptg (5 bits): Reserved. MUST be 0x00.

A - type (2 bits): A PtgDataType that specifies the data type for the array. MUST be 2 or 3.

B - reserved (1 bit): MUST be zero and MUST be ignored.

unused1 (4 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

unused3 (4 bytes): Undefined and MUST be ignored.

unused4 (4 bytes): Undefined and MUST be ignored.

2.5.76.24 PtgAttrBaxcel

This structure specifies that the result of the Rgce is to be assigned to a local variable used in a macro sheet.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="7">ptg</td><td>A</td><td>B</td><td colspan="4">C</td><td>D</td><td colspan="2">E</td><td colspan="16">unused</td></tr>
</table>

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - bitSemi (1 bit): A bit that specifies whether this Rgce is **volatile**.

C - reserved2 (4 bits): MUST be zero, and MUST be ignored.

D - bitBaxcel (1 bit): Reserved. MUST be 1.

E - reserved3 (2 bits): MUST be zero, and MUST be ignored.

unused (2 bytes): Undefined and MUST be ignored.

2.5.76.25 PtgAttrChoose

This structure specifies a control token.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	B			C	reserved3				cOffset															
rgOffset (variable)																															
...																															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - reserved2 (2 bits): MUST be zero, and MUST be ignored.

C - bitChoose (1 bit): Reserved. MUST be 1.

reserved3 (5 bits): MUST be zero, and MUST be ignored.

cOffset (2 bytes): An unsigned integer that specifies a value which is 1 less than the number of elements in **rgOffset**.

rgOffset (variable): An array of unsigned integers that specifies the byte offsets.

2.5.76.26 PtgAttrGoTo

This structure specifies a control token.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	B			C	D				offset															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - reserved2 (3 bits): MUST be zero, and MUST be ignored.

C - bitGoto (1 bit): Reserved. MUST be 1.

D - reserved3 (4 bits): MUST be zero, and MUST be ignored.

offset (2 bytes): An unsigned integer that specifies a value 1 less than the byte offset.

2.5.76.27 PtgAttrIf

This structure specifies a control token.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	B	C	reserved3						offset															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - reserved2 (1 bit): MUST be zero, and MUST be ignored.

C - bitIf (1 bit): Reserved. MUST be 1.

reserved3 (6 bits): MUST be zero, and MUST be ignored.

offset (2 bytes): An unsigned integer that specifies the byte offset.

2.5.76.28 PtgAttrIfError

This structure specifies a control token.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	reserved2							B	offset															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

reserved2 (7 bits): MUST be zero, and MUST be ignored.

B - bitIfError (1 bit): Reserved. MUST be 1.

offset (2 bytes): An unsigned integer that specifies the byte offset.

2.5.76.29 PtgAttrSemi

This structure specifies that this Rgce is volatile.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	B	reserved2							unused															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - bitSemi (1 bit): Reserved. MUST be 1.

reserved2 (7 bits): MUST be zero, and MUST be ignored.

unused (2 bytes): Undefined and MUST be ignored.

2.5.76.30 PtgAttrSpace

This display token specifies a number of space or carriage return characters that are displayed around the expression in a display-precedence-expression.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	reserved2						B	C	type															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

reserved2 (6 bits): MUST be zero, and MUST be ignored.

B - bitSpace (1 bit): Reserved. MUST be 1.

C - reserved3 (1 bit): MUST be zero, and MUST be ignored.

type (2 bytes): A PtgAttrSpaceType that specifies a number of space or carriage return characters and the position of those characters.

2.5.76.31 PtgAttrSpaceSemi

This structure specifies a number of space or carriage return characters that are displayed around the expression in a display-precedence-expression and that the Rgce is volatile.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	reserved2								type															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

reserved2 (1 byte): Reserved. MUST be 0x41.

type (2 bytes): A PtgAttrSpaceType that specifies a number of space or carriage return characters and position of those characters.

2.5.76.32 PtgAttrSpaceType

This structure specifies the number of space or carriage return characters and position of those characters.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
type								cch																							

type (1 byte): An unsigned integer that specifies the character and position of the character. MUST be a value from the following table:

Value	Meaning
0x00	Specifies space characters before a base-expression.
0x01	Specifies carriage return characters before a base-expression.
0x02	Specifies space characters before the open parenthesis specified by PtgParen in a display-precedence-specifier.
0x03	Specifies carriage return characters before the open parenthesis specified by PtgParen in a display-precedence-specifier.
0x04	Specifies space characters before the close parenthesis specified by PtgParen in a display-precedence-specifier.
0x05	Specifies carriage return characters before the close parenthesis specified by PtgParen in a display-precedence-specifier.
0x06	Specifies space characters before an expression.

cch (1 byte): An unsigned integer that specifies the number of characters.

2.5.76.33 PtgAttrSum

This structure specifies the sum of an expression as defined in function-call.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	B				C	D			unused															

ptg (7 bits): Reserved. MUST be 0x19.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

B - reserved2 (4 bits): MUST be zero, and MUST be ignored.

C - bitSum (1 bit): Reserved. MUST be 1.

D - reserved3 (3 bits): MUST be zero, and MUST be ignored.

unused (2 bytes): Undefined and MUST be ignored.

2.5.76.34 PtgBool

This operand specifies a Boolean value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	boolean																							

ptg (7 bits): Reserved. MUST be 0x1D.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

boolean (1 byte): A Boolean that specifies the value.

2.5.76.35 PtgConcat

This structure specifies a binary-value-operator that appends the second expression in binary-value-expression to the first.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x08.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.36 PtgDataType

This enumeration specifies the data type of a Ptg. MUST be a value from the following table:

Name	Value	Meaning
REFERENCE	0x1	Specifies a reference to a range.
VALUE	0x2	Specifies a single value of a simple type. The type can be a Boolean, a number, a string, or an error code.
ARRAY	0x3	Specifies an array of values.

2.5.76.37 PtgDiv

This structure specifies a binary-value-operator that divides the first expression in a binary-value-expression by the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x06.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.38 PtgEq

This structure specifies a binary-value-operator that compares whether the second expression in a binary-value-expression is equal to the first.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x0B.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.39 PtgErr

This operand specifies an error code.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	err																							

ptg (7 bits): Reserved. MUST be 0x1C.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

err (1 byte): A BErr that specifies the error code.

2.5.76.40 PtgExp

This structure specifies that the containing Rgce is part of an array formula or shared formula and specifies the row of the cell in which that formula exists. The column of the cell in which that formula exists is specified by the **col** field of the corresponding PtgExtraCol in the RgbExtra of the containing Rgce.

There MUST be a PtgExtraCol in the RgbExtra corresponding to this PtgExp.

There MUST be a BrtFmlaString, BrtFmlaNum, BrtFmlaBool, or BrtFmlaError record specifying the array formula or shared formula. That record MUST have a **cell**.**col** field equal to the **col** field of the PtgExtraCol, and MUST be between a BrtRowHdr record with a **rw** field equal to the **row** field and the next BrtRowHdr or BrtEndSheetData record, as defined in the Worksheet part ABNF and Macro Sheet part ABNF.

The array formula or shared formula that the containing Rgce is a part of MUST be followed by either a BrtShrFmla record or a BrtArrFmla record.

If the record specifying the array formula or shared formula is followed by a BrtShrFmla, the **row** of this PtgExp MUST be greater than or equal to the **rfx.rwFirst** field and less than or equal to the **rfx.rwLast** field of the BrtShrFmla, and the **col** field of the PtgExtraCol MUST be greater than or equal to the **rfx.colFirst** field and less than or equal to the **rfx.colLast** field of the BrtShrFmla.

If the record specifying the array formula or shared formula is followed by a BrtArrFmla, the **row** of this PtgExp MUST be equal to the **rfx.rwFirst** field of the BrtArrFmla, and the **col** field of the PtgExtraCol MUST be equal to the **rfx.colFirst** field of the BrtArrFmla.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	row																							
...																															

ptg (7 bits): Reserved. MUST be 0x01.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

row (4 bytes): An Rw that specifies a zero-based index of the row of the cell on the current sheet that contains the array formula or shared formula that the containing Rgce is a part of. MUST be less than or equal to 1048575.

2.5.76.41 PtgExtraArray

This structure specifies the values for the corresponding PtgArray as specified in RgbExtra.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rows																															
cols																															
array (variable)																															
...																															

rows (4 bytes): A DRw that specifies the number of rows in the array. MUST be greater than zero.

cols (4 bytes): A DCol that specifies the number of columns in the array. MUST be greater than zero.

array (variable): An array of SerAr that specifies the values in row major order. The number of elements MUST be equal to the product of rows and **cols**.

2.5.76.42 PtgExtraCol

This structure specifies the column for the corresponding PtgExp as specified in RgbExtra.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
col																															

col (4 bytes): A Col that specifies the column.

2.5.76.43 PtgExtraList

This structure specifies a range in a table that corresponds to a PtgList as specified in RgbExtra.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
hasColumns								rowType					reserved											cch							
...								table (variable)																							
...																															
columns (variable)																															
...																															

hasColumns (1 byte): A Boolean that specifies the set of columns of the range. MUST be a value from the following table:

Value	Meaning
0x00	The columns of the range consist of All the columns in the table.
0x01	The columns of the range consist of one or more columns specified by **columns**.

rowType (5 bits): A PtgRowType that specifies the rows in the range.

reserved (11 bits): MUST be zero, and MUST be ignored.

cch (2 bytes): An unsigned integer that specifies the number of 16-bit Unicode characters in **table**. MUST be less than 256.

table (variable): An array of 16-bit Unicode characters that specifies the string with the table name. The string MUST adhere to the grammar specified for XLNameWideString.

columns (variable): An SxSu that specifies the columns. MUST exist if and only if **hasColumns** is nonzero.

2.5.76.44 PtgExtraMem

This structure specifies a range that corresponds to a PtgMemArea as specified in RgbExtra.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
count																															
array (variable)																															
...																															

count (4 bytes): An unsigned integer that specifies the number of areas within the range.

array (variable): An array of UncheckedRfX that specifies the range. The number of elements MUST be equal to **count**.

2.5.76.45 PtgFunc

This structure specifies a call to a function with a fixed number of parameters, as defined in function-call.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ptg					A		B	iftab																							

ptg (5 bits): Reserved. MUST be 0x01.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

iftab (2 bytes): A Ftab that specifies the function to be called. MUST specify a function with a fixed number of parameters.

2.5.76.46 PtgFuncVar

This structure specifies a call to a function with a variable number of parameters as defined in function-call.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ptg					A		B	cparams								tab															C

ptg (5 bits): Reserved. MUST be 0x02

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be 0, MUST be ignored.

cparams (1 byte): An unsigned integer that specifies the number of parameters. MUST be within the range defined for the function specified by **tab**.

tab (15 bits): A structure that specifies the function to be called. If **fCeFunc** is 1 then this field specifies a **Cetab** value. If **fCeFunc** is 0 then this field specifies a **Ftab** value.

C - fCeFunc (1 bit): A bit that specifies if **tab** specifies a **Cetab** value or a **Ftab** value.

2.5.76.47 PtgGe

This structure specifies a binary-value-operator that compares whether the first expression in a binary-value-expression is greater than or equal to the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x0C.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.48 PtgGt

This structure specifies a binary-value-operator that compares whether the first expression in a binary-value-expression is greater than the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x0D.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.49 PtgInt

This operand specifies an unsigned integer value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	integer																							

ptg (7 bits): Reserved. MUST be 0x1E.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

integer (2 bytes): An unsigned integer that specifies the value.

2.5.76.50 PtgIsect

This structure specifies a binary-reference-operator that intersects the first expression in a binary-reference-expression with the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x0F.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.51 PtgLe

This structure specifies a binary-value-operator that compares whether the first expression in a binary-value-expression is less than or equal to the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x0A.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.52 PtgList

This structure specifies a rectangular area of cells in a table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	eptg								ixti															
B	rowType						C	D	E	F			G	H	I	listIndex															
...																colFirst															
colLast																															

ptg (7 bits): Reserved. MUST be 0x18.

A - reserved1 (1 bit): MUST be zero, and MUST be ignored.

eptg (1 byte): Reserved. MUST be 0x19.

ixti (2 bytes): An XtiIndex that specifies the location of the table.

B - columns (2 bits): An unsigned integer that specifies the columns in the referenced area. If **invalid** is 1 or **nonresident** is 1, **columns** is unused and MUST be ignored. Otherwise, MUST be a value from the following table:

Value	Meaning
0x00	The columns of the rectangular area consist of all the columns of the table.
0x01	The rectangular area is one column wide; that column is specified by **colFirst**.
0x02	The columns of the rectangular area consist of the columns between the column specified by **colFirst** and the column specified by **colLast**, inclusive.

rowType (5 bits): A PtgRowType that specifies the rows of the referenced area. If **invalid** is 1 or **nonresident** is 1, **rowType** is unused and MUST be ignored.

C - squareBracketSpace (1 bit): A bit that specifies whether to display spacing around the intra-table portion of the string representation of this formula element.

D - commaSpace (1 bit): A bit that specifies whether to display spacing between column references in the string representation of this formula element.

E - unused (1 bit): Undefined and MUST be ignored.

F - type (2 bits): An unsigned integer that specifies the data type of this record. MUST be a value from the following table:

Value	Meaning
0x00	This structure contains a reference, as specified in PtgDataType.
0x01	This structure contains a value, as specified in PtgDataType.
0x02	This structure contains an array, as specified in PtgDataType.

G - invalid (1 bit): A bit that specifies whether this structure specifies an invalid area.

H - nonresident (1 bit): A bit that specifies whether the table is on a different workbook than the Rgce. MUST be 1 if **ixti** specifies a different workbook than the workbook containing the Rgce and **invalid** is 0.

If **invalid** is 1, **nonresident** is unused and MUST be ignored.

If **nonresident** is 1, there MUST be a PtgExtraList associated with this PtgList in the RgbExtra. This associated PtgExtraList specifies the rectangular area.

I - reserved2 (2 bits): MUST be zero, and MUST be ignored.

listIndex (4 bytes): An unsigned integer that specifies the numeric identifier of the referenced table. MUST equal the **idList** of one of the BrtBeginList records in this file.

If **invalid** is 1 or **nonresident** is 1, **listIndex** is unused and MUST be ignored.

colFirst (2 bytes): A ColShort that specifies the first column of the referenced area of the table, relative to the position of the referenced table. MUST be less than the number of columns in the referenced table.

If **invalid** is 1, or **nonresident** is 1, or **columns** is 0, then **colFirst** is unused and MUST be ignored.

colLast (2 bytes): A ColShort that specifies the index of the last column of the referenced area of the table, relative to the position of the referenced table. MUST be greater than or equal to **colFirst**, and less than the number of columns in the table.

If **invalid** is 1, or **nonresident** is 1, or **columns** is 0, then **colLast** is unused and MUST be ignored.

2.5.76.53 PtgLt

This structure specifies a binary-value-operator that compares whether the first expression in a binary-value-expression is less than the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x09.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.54 PtgMemArea

This mem token specifies that the result of a binary-reference-expression in a mem-area-expression is a range of cells. The RgbExtra corresponding to this structure MUST contain a PtgExtraMem that specifies the range of cells.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	unused																							
...								cce																							

ptg (5 bits): Reserved. MUST be 0x06.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

unused (4 bytes): Undefined and MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.76.55 PtgMemErr

This mem token specifies that the result of a binary-reference-expression in a mem-area-expression is an error code.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	err								unused1								unused2							
...								cce																							

ptg (5 bits): Reserved. MUST be 0x07.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

err (1 byte): A BErr that specifies the error code value.

unused1 (1 byte): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.76.56 PtgMemFunc

This mem token specifies that the result of a binary-reference-expression in a mem-area-expression is variable.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	cce																							

ptg (5 bits): Reserved. MUST be 0x09.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.76.57 PtgMemNoMem

This mem token specifies that the result of the binary-reference-expression in a mem-area-expression failed to cache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	unused																							
...								cce																							

ptg (5 bits): Reserved. MUST be 0x08.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

unused (4 bytes): Undefined and MUST be ignored.

cce (2 bytes): An unsigned integer that specifies the count of bytes in the binary-reference-expression following this structure.

2.5.76.58 PtgMissArg

This operand specifies a missing value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x16.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.59 PtgMul

This structure specifies a binary-value-operator that multiplies the first and second expressions in a binary-value-expression.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x05.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.60 PtgName

This operand specifies a reference to a defined name in the same workbook as the containing Rgce.

If the formula containing this structure is part of a revision as specified in the Formulas overview, then there MUST be a RevNameTabid in the RgbExtra corresponding to this PtgName, which specifies those defined name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	nameindex																							
...																															

ptg (5 bits): Reserved. MUST be 0x03.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be 0, and MUST be ignored.

nameindex (4 bytes): If the formula containing this structure is part of a revision as specified in the Formulas overview, then this value is undefined and MUST be ignored. Otherwise it is an unsigned integer that specifies a one-based index of a BrtName record in the collection of BrtName records in the workbook part. MUST be greater than 0 and less than or equal to the number of BrtName records in the workbook.

2.5.76.61 PtgNameX

This structure specifies a reference to a defined name in an external workbook.

If the formula containing this structure is part of a revision as specified in the Formulas overview, then there MUST be a RevName in the RgbExtra corresponding to this PtgNameX that specifies the defined name.

If the formula containing this structure is not part of a revision as specified in the Formulas overview, then the referenced defined name is specified by an XtiIndex.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="5">ptg</td><td colspan="2">A</td><td>B</td><td colspan="18">ixti</td><td colspan="8">nameindex</td></tr>
<tr><td colspan="23">...</td><td colspan="8"></td></tr>
</table>

ptg (5 bits): Reserved. MUST be 0x19.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview, this value is an XtiIndex that specifies the referenced defined name. The XtiIndex MUST specify an Xti that is a reference to a BrtSupBookSrc record.

If the formula containing this structure is part of a revision as specified in the Formulas overview, this value is undefined and MUST be ignored.

nameindex (4 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview, this value is an unsigned integer that specifies the one-based index of a BrtSupNameStart record in the collection of BrtSupNameStart records in the External Link part which is specified by the BrtSupBookSrc record referenced by **ixti**. The referenced BrtSupNameStart and its associated records specify the defined name referenced by this record.

If the formula containing this structure is part of a revision as specified in the Formulas overview, this value is undefined and MUST be ignored.

2.5.76.62 PtgNe

This structure specifies a binary-value-operator that compares whether the second expression in a binary-value-expression is not equal to the first.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="7">ptg</td><td>A</td><td colspan="23"></td></tr>
</table>

ptg (7 bits): Reserved. MUST be 0x0E.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.63 PtgNum

This operand specifies a floating point value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	value																							
...																															
...																															

ptg (7 bits): Reserved. MUST be 0x1F.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

value (8 bytes): An Xnum that specifies the value.

2.5.76.64 PtgParen

This display token specifies that parentheses are displayed around the expression in a display-precedence-expression.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x15.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.65 PtgPercent

This structure specifies a unary-operator which divides the expression in a unary-expression by 100.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x14.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.66 PtgPower

This structure specifies a binary-value-operator that raises the first expression in a binary-value-expression to the power of the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x07.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.67 PtgRange

This structure specifies a binary-reference-operator, that returns the minimum bounding range of the first and second expressions in a binary-reference-expression.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x11.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.68 PtgRef

This operand specifies a reference to a single cell as an RgceLoc.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	loc																							
...																															

ptg (5 bits): Reserved. MUST be 0x04.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be 0, and MUST be ignored.

loc (6 bytes): An RgceLoc value that specifies the coordinates of the referenced cell.

2.5.76.69 PtgRef3d

This operand specifies a reference to a single cell on one or more sheets.

If the formula containing this structure is part of a revision as specified in the Formulas overview, then there MUST be a RevExtern in the RgbExtra corresponding to this PtgRef3d, which specifies those sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	ixti																loc							
...																															
...																															

ptg (5 bits): Reserved. MUST be 0x1A.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview, then this value is an XtiIndex that specifies the Xti which specifies those sheets. Otherwise it is undefined and MUST be ignored.

loc (6 bytes): A value that specifies coordinates of the referenced cell. If this PtgRef3d is part of a NameParsedFormula then this is a RgceLocRel value. Otherwise it is a RgceLoc value.

2.5.76.70 PtgRefErr

This operand specifies an invalid reference to a cell.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	unused1																							
...								unused2																							

ptg (5 bits): Reserved. MUST be 0x0A.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

unused1 (4 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

2.5.76.71 PtgRefErr3d

This operand specifies an invalid reference to a cell on one or more sheets.

If the formula containing this structure is part of a revision as specified in the Formulas overview, then there MUST be a RevExtern in the RgbExtra corresponding to this PtgRefErr3d, which specifies those sheets.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	ixti																unused1							
...																								unused2							
...																															

ptg (5 bits): Reserved. MUST be 0x1C.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

ixti (2 bytes): If the formula containing this structure is not part of a revision as specified in the Formulas overview, then this value is an XtiIndex that specifies the Xti which specifies those sheets. Otherwise it is undefined and MUST be ignored.

unused1 (4 bytes): Undefined and MUST be ignored.

unused2 (2 bytes): Undefined and MUST be ignored.

2.5.76.72 PtgRefN

This operand specifies a reference to a single cell as an RgceLocRel.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg					A		B	loc																							
...																															

ptg (5 bits): Reserved. MUST be 0x0C.

A - type (2 bits): A PtgDataType that specifies the data type for the value of this Ptg.

B - reserved (1 bit): MUST be zero, and MUST be ignored.

loc (6 bytes): An RgceLocRel that specifies the referenced cell.

2.5.76.73 PtgRowType

This enumeration specifies the type of rows that make up a contiguous range in a table.

Name	Value	Meaning
DATA	0x00	The rows consist of the data region of the table.
ALL	0x01	The rows consist of all of the rows in the table.
HEADERS	0x02	The rows consist of the table header.
DATA2	0x04	The rows consist of the data region of the table.
DATAHEADERS	0x06	The rows consist of the table header and the data region of the table.

TOTALS	0x08	The rows consist of the total row of the table.
DATATOTALS	0x0C	The rows consist of the data region of the table and the total row of the table.
CURRENT	0x10	The rows consist of the current row.

2.5.76.74 PtgStr

This operand specifies a Unicode string value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	cch																rgch (variable)							
...																															

ptg (7 bits): Reserved. MUST be 0x17.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

cch (2 bytes): An unsigned integer that specifies the number of elements in **rgch**. MUST be less than or equal to 255.

rgch (variable): An array of 16-bit Unicode characters.

2.5.76.75 PtgSub

This structure specifies a binary-value operator that subtracts the second expression in a binary-value-expression from the first.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x04.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.76 PtgSxName

This structure specifies a reference to a calculated field or a calculated item found in a PivotParsedFormula. The Rgce that contains this Ptg MUST be part of the **fldFmla** field of a BrtBeginPCDField record or the **fmla** field of a BrtBeginPCDCalcItem record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A	eptg								sxIndex															

...	

ptg (7 bits): Reserved. MUST be 0x18.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

eptg (1 byte): Reserved. MUST be 0x1D.

sxIndex (4 bytes): An unsigned integer that specifies the zero-based index of a BrtBeginPName record in the collection of BrtBeginPName records that follows a BrtBeginPCDField record or a BrtBeginPCDCalcItem record. MUST be less than the number of BrtBeginPName records that follow BrtBeginPCDField or BrtBeginPCDCalcItem.

2.5.76.77 PtgUMinus

This structure specifies a unary-operator which generates the additive inverse of a unary-expression.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x13.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.78 PtgUnion

This structure specifies a binary-reference-operator that specifies a union of the first expression in a binary-reference expression with the second.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x10.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.79 PtgUPlus

This structure specifies a unary-operator which leaves a unary-expression unchanged.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ptg							A																								

ptg (7 bits): Reserved. MUST be 0x12.

A - reserved0 (1 bit): MUST be zero, and MUST be ignored.

2.5.76.80 RevExtern

This structure specifies a range of sheets on a workbook that is referenced by a formula in a revision as specified in the Formulas overview.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
book (variable)																															
...																															
itabFirst (variable)																															
...																															
itabLast (variable)																															
...																															

book (variable): Specifies the workbook based on the value of the first byte, according to the following table:

Value	Meaning
0x01	Specifies the current workbook. This field is two bytes in size. The second byte MUST be 0x02.
Any value except 0x01	This field is a VirtualPath that specifies the workbook.

itabFirst (variable): A RevItab that specifies the first sheet in the range.

itabLast (variable): A RevItab that specifies the last sheet in the range.

2.5.76.81 RevItab

This structure specifies a sheet of a workbook referenced by a formula in a revision as specified in the Formulas overview

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
type								tabid (optional)																sheet (variable)							
...																															

type (1 byte): An unsigned integer that specifies the sheet. MUST be a value from the following table:

Value	Meaning
0x00	Specifies a sheet on the same workbook. The **tabid** field specifies the sheet.
0x01	Specifies a sheet on a different workbook. The **sheet** field specifies the sheet.
0x02	Specifies the same sheet specified by the preceding RevItab.
0x03	Specifies a missing sheet.

tabid (2 bytes): An unsigned integer that specifies a sheet in the current workbook. This field MUST be present if and only if **type** is 0x00. This MUST equal the value of the **iTabID** field in an existing BrtBundleSh.

sheet (variable): A XLUnicodeString that specifies the sheet name. This field MUST be present if and only if **type** is 0x01.

2.5.76.82 RevLblName

This structure specifies the name of a defined name that is referenced by a formula in a revision as specified in the Formulas overview.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
iBuiltin								st (variable)																							
...																															

iBuiltin (1 byte): An unsigned integer that specifies whether the defined name is a built-in name, and if so, which built-in name it is. MUST be a value from the following table:

Value	Meaning
0x00	This is not a built-in name.
0x01	Consolidate_Area
0x02	Auto_Open
0x03	Auto_Close
0x04	Extract
0x05	Database
0x06	Criteria
0x07	Print_Area
0x08	Print_Titles
0x09	Recorder
0x0A	Data_Form
0x0B	Auto_Activate
0x0C	Auto_Deactivate
0x0D	Sheet_Title

0x0E	_FilterDatabase

st (variable): If the value of the **iBuiltin** field is 0x00 then this field is an XLNameWideString that specifies the name of the defined name. Otherwise, this field is an XLWideString and the name of the defined name is specified as the concatenation of the built-in name specified by **iBuiltin** and the value of this field. The concatenated string MUST match grammar specified for XLNameWideString.

2.5.76.83 RevName

This structure specifies a defined name referenced by a formula in a revision as specified in the Formulas overview.

<table>
<tr><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>20</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>30</td><td>1</td></tr>
<tr><td colspan="32">book (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="8">fExtern</td><td colspan="24">name (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
<tr><td colspan="32">externName (variable)</td></tr>
<tr><td colspan="32">...</td></tr>
</table>

book (variable): Specifies the workbook based on the value of the first byte, according to the following table:

Value	Meaning
0x01	Specifies the current workbook. This field is two bytes in size. The second byte MUST be 0x02.
Any value except 0x01	This field is a VirtualPath that specifies the workbook.

fExtern (1 byte): An unsigned integer that specifies whether the defined name is defined in the current workbook. MUST be 0x00 if the first byte of **book** is 0x01, and 0x01 otherwise.

name (variable): A RevNameTabid that specifies the name and the scope of the defined name. This field MUST be present if and only if **fExtern** is 0x00.

externName (variable): A RevNamePly that specifies the name and the scope of the defined name. This field MUST be present if and only if **fExtern** is 0x01.

2.5.76.84 RevNamePly

This structure specifies a defined name in an external workbook that is referenced by a formula in a revision as specified in the Formulas overview, and the sheet it is defined on.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sheet (variable)																															
...																															
name (variable)																															
...																															

sheet (variable): A RevSheetName that specifies the sheet the defined name is defined on.

name (variable): A RevLblName that specifies the defined name.

2.5.76.85 RevNameTabid

This structure specifies a non-external defined name that is referenced by a formula in a revision as specified in the Formulas overview.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
tabid																name (variable)															
...																															

tabid (2 bytes): An unsigned integer that specifies the scope of the defined name. The value MUST be from the following table:

Value	Meaning
0xFFFF	Specifies that the scope is the entire workbook.
Greater than or equal to 1 and less than 0xFFFF	Specifies that the scope is a sheet from the workbook. This MUST equal the value of the **iTabID** field in a BrtBundleSh in the Workbook part.

name (variable): A RevLblName that specifies the name of the defined name.

2.5.76.86 RevSheetName

This structure specifies the sheet or workbook a defined name is defined on, for a defined name that is referenced by a formula in a revision as specified in the Formulas overview.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sheet (variable)																															
...																															

sheet (variable): A XLUnicodeString that specifies the name of the sheet. The length of the string MUST be less than or equal to 31 characters. This field specifies the entire workbook if the length of the string is zero.

2.5.76.87 RgbExtra

This structure specifies a set of structures, laid out sequentially in the file, that correspond to and MUST exist for certain Ptgs in the Rgce. The order of the structures MUST be the same as the order of the Ptgs in the Rgce that they correspond to.

The following Ptgs MUST have a corresponding structure in an RgbExtra.

Ptg	Required structure in an RgbExtra
PtgArray	PtgExtraArray
PtgMemArea	PtgExtraMem
PtgExp	PtgExtraCol

A PtgList requires a corresponding structure in an RgbExtra if and only if the **ixti** field of the PtgList refers to a different workbook and the **invalid** field of the PtgList is 0.

Ptg	Required structure in an RgbExtra
PtgList	PtgExtraList

The following Ptgs MUST have a corresponding structure in an RgbExtra if and only if the formula containing that Ptg is part of a revision as specified in the Formulas overview.

Ptg	Required structure in an RgbExtra
PtgName	RevNameTabid
PtgNameX	RevName
PtgRef3d	RevExtern
PtgRefErr3d	RevExtern
PtgArea3d	RevExtern
PtgAreaErr3d	RevExtern

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgb (variable)																															
...																															
0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rgb (variable)																															
...																															

rgb (variable): An array that contains the sequence of these structures.

2.5.76.88 Rgce

This structure specifies a set of Ptgs, laid out sequentially in the file.

The sequence of Ptgs MUST adhere to the following grammar.

EXPRESSION_SIZE is the sum of the sizes of a contiguous set of Ptgs in bytes.

```
rgce = PtgExp / [PtgAttrBaxcel / PtgAttrSemi / PtgAttrSpaceSemi] expression

expression = *(PtgAttrSpace) base-expression
```

The value of the **type** field of each PtgAttrSpace in an expression MUST be 0, 1, or 6.

```
base-expression = operand / unary-expression / binary-reference-expression / binary-
      value-expression / display-precedence-specifier / mem-area-expression /
      function-call

operand = PtgMissArg / PtgStr / PtgErr / PtgBool / PtgInt / PtgNum / PtgArray /
      PtgName / PtgRef / PtgArea / PtgRefErr / PtgAreaErr / PtgRefN / PtgAreaN /
      PtgNameX / PtgRef3d / PtgArea3d / PtgRefErr3d / PtgAreaErr3d / PtgList /
      PtgSxName
```

Each Ptg in this definition is an operand token.

```
unary-expression = val unary-operator

unary-operator = PtgUPlus / PtgUMinus / PtgPercent
```

Each Ptg in this definition is a unary operator token.

```
binary-reference-expression = 2ref binary-reference-operator

binary-reference-operator = PtgIsect / PtgUnion / PtgRange
```

Each Ptg in this definition is a binary operator token.

```
binary-value-expression = 2val binary-value-operator
```

```
binary-value-operator = PtgAdd / PtgSub / PtgMul / PtgDiv / PtgPower / PtgConcat /
      PtgLt / PtgLe / PtgEq / PtgGe / PtgGt / PtgNe
```

Each Ptg in this definition is a binary operator token.

```
display-precedence-specifier = expression [PtgAttrSpace] PtgParen
```

The value of the **type** field of the PtgAttrSpace MUST be between 2 and 5 inclusive.

PtgAttrSpace and PtgParen are display tokens.

```
mem-area-expression = mem-ptg binary-reference-expression
```

The **cce** field in the Ptg of the mem-ptg rule MUST be equal to the EXPRESSION_SIZE of the Ptgs that comprise the binary-reference-expression.

If mem-ptg is not PtgMemFunc, then both expression elements in the binary-reference-expression MUST NOT contain any mem-ptg elements, PtgFunc, PtgFuncVar, PtgName, PtgNameX, PtgList, PtgRef3d, PtgArea3d, PtgRefErr3d, or PtgAreaErr3d.

```
mem-ptg = PtgMemArea / PtgMemErr / PtgMemNoMem / PtgMemFunc
```

Each Ptg in this definition is a mem token.

```
function-call = if-expression / iferror-expression / choose-expression / [params-
      fixed] PtgFunc / params-variable PtgFuncVar / params-cetab PtgFuncVar /
      expression PtgAttrSum
```

The params-fixed element MUST NOT be specified if PtgFunc specifies a function that takes no parameters. Otherwise, it MUST conform to the ABNF rule for the function specified by PtgFunc.

```
if-expression = expression PtgAttrIf 1*2(expression PtgAttrGoTo) PtgFuncVar
```

The value of the **offset** field in the PtgAttrIf MUST be equal to the EXPRESSION_SIZE of all Ptgs in the if-expression after the PtgAttrIf through the first PtgAttrGoTo.

The value of the **offset** field in each PtgAttrGoTo MUST be equal to one less than the EXPRESSION_SIZE of all Ptgs remaining in the if-expression after that PtgAttrGoTo.

The value of the **fCetab** field of the PtgFuncVar MUST be zero. The value of the **tab** field of the PtgFuncVar MUST be 0x0001, which represents the IF function.

```
iferror-expression = expression PtgAttrIfError expression PtgAttrGoTo PtgFunc
```

The value of the **offset** field in the PtgAttrIfError MUST be equal to the EXPRESSION_SIZE of all Ptgs in the iferror-expression after the PtgAttrIfError through the first PtgAttrGoTo.

The value of the **offset** field in the PtgAttrGoTo MUST be equal to one less than the EXPRESSION_SIZE of the PtgFunc.

The value of the **iftab** field of the PtgFunc MUST be 0x01E0, which represents the IFERROR function.

```
choose-expression = expression PtgAttrChoose 1*254(expression PtgAttrGoTo) PtgFuncVar
```

The value of the **cOffset** field in the PtgAttrChoose MUST be equal to the number of times the expression in the repeated sequence group appears.

The first offset in the array of offsets in the **rgOffset** field in the PtgAttrChoose MUST be equal to four less than the size of the PtgAttrChoose in bytes.

For the nth occurrence of the repeated sequence group, the $(n+1)^{th}$ offset in the array of offsets in the **rgOffset** field in the PtgAttrChoose MUST be equal to the EXPRESSION_SIZE of all Ptgs in the choose-expression after the PtgAttrChoose through the nth PtgAttrGoTo.

The value of the **offset** field in each PtgAttrGoTo MUST equal one less than the EXPRESSION_SIZE of all Ptgs remaining in the choose-expression after that PtgAttrGoTo.

The value of the **fCetab** field of the PtgFuncVar MUST be zero. The value of the **tab** field of the PtgFuncVar MUST be 0x0064, which represents the CHOOSE function.

`val = expression`

Additional restrictions are specified under VALUE_TYPE. The params-fixed, params-variable and params-cetab rules also use val.

`ref = expression`

Additional restrictions are specified under VALUE_TYPE. The params-fixed, params-variable and params-cetab rules also use ref.

Additional restrictions on the contents of this structure are specified in terms of a parse tree. For this purpose, a parse tree is a means of organizing the components of an Rgce. Each node in the parse tree represents a Ptg or an ABNF rule described earlier. Non-leaf nodes represent rules and have one child node for each element in the rule. Leaf nodes represent only a Ptg.

For a leaf node in the parse tree, NESTING_DEPTH is the number of function-call nodes in the path from the root node to that leaf.

For a node in the parse tree, OPERAND_COUNT is as follows:

- The OPERAND_COUNT of each Ptg appearing in the operand rule definition is one.
- The OPERAND_COUNT of all other Ptgs is zero.
- The OPERAND_COUNT of a node that has n child nodes with nonzero OPERAND_COUNT is equal to the maximum, across all the n child nodes, of (n-1) plus the OPERAND_COUNT of the nth child that has nonzero OPERAND_COUNT.

For a node in the parse tree, VALUE_TYPE is a state indicating that the node represents a single value of a simple type or an array of such values. A node that is not a VALUE_TYPE represents a reference to a range. Elements in an expression MUST represent either values or references, based on the specific Ptgs used in the expression. The following rules specify how to traverse the parse tree from the bottom up and determine whether each node is a VALUE_TYPE, which determines whether the sequence of Ptgs comprising the formula correctly satisfies the requirements of each expression in the formula. A node is determined to be a VALUE_TYPE as follows:

- Leaf nodes:
  - PtgMissArg, PtgStr, PtgSxName, PtgErr, PtgBool, PtgInt, PtgNum, PtgArray, PtgRefErr, PtgAreaErr, PtgRefErr3d, PtgAreaErr3d, PtgUPlus, PtgUMinus, PtgPercent, PtgAdd, PtgSub, PtgMul, PtgDiv, PtgPower, PtgConcat, PtgLt, PtgLe, PtgEq, PtgGe, PtgGt, and PtgNe leaf nodes are VALUE_TYPEs.

- PtgName, PtgRef, PtgArea, PtgRefN, PtgAreaN, PtgNameX, PtgRef3d, PtgArea3d, PtgFunc, PtgFuncVar, PtgMemArea, PtgMemErr, PtgMemNoMem, and PtgMemFunc leaf nodes are VALUE_TYPEs if and only if the value of the **type** field is value or array.
- PtgList leaf nodes are VALUE_TYPEs if and only if the **type** field equals 1.
- All other leaf nodes are not VALUE_TYPEs.

- Non-leaf nodes:
  - Any non-leaf node with a single child node MUST be a VALUE_TYPE if and only if the child node is a VALUE_TYPE.
  - Any non-leaf node with a mem-ptg, unary-operator, binary-value-operator, binary-reference-operator, PtgAttrSum, PtgFunc or PtgFuncVar child node is a VALUE_TYPE if and only if that child node is a VALUE_TYPE. Other child nodes are ignored for the purposes of determining whether the non-leaf node is a VALUE_TYPE.
  - Any non-leaf node corresponding to a val rule MUST be a VALUE_TYPE.
  - Any non-leaf node corresponding to a ref rule MUST NOT be a VALUE_TYPE.
  - Otherwise, a non-leaf node with an expression child node is a VALUE_TYPE if and only if that expression child node is a VALUE_TYPE.

A parse tree for an Rgce MUST meet the following conditions:

- The NESTING_DEPTH of each leaf node MUST NOT exceed 65.
- The OPERAND_COUNT of the root node MUST NOT exceed 1024.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
sequence (variable)																															
...																															

sequence (variable): An array of Ptg that specifies the sequence of Ptgs.

2.5.76.89 RgceArea

This structure specifies a reference to a rectangular range of cells where relative references are stored as coordinates.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rowFirst																															
rowLast																															
columnFirst																columnLast															

rowFirst (4 bytes): An UncheckedRw that specifies the first row of the cell range. MUST be less than 1048576.

rowLast (4 bytes): An UncheckedRw that specifies the last row of the cell range. MUST be less than 1048576.

columnFirst (2 bytes): A ColRelShort that specifies the first column of the cell range, and relative reference information about the first column and first row.

columnLast (2 bytes): A ColRelShort that specifies the last column of the cell range, and relative reference information about the last column and last row.

2.5.76.90 RgceAreaRel

This structure specifies a rectangular range of cells where the relative portions of relative references are specified as offsets from the cell in which the formula is evaluated.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rowFirst																															
rowLast																															
columnFirst																columnLast															

rowFirst (4 bytes): If **columnFirst.fRwRel** is 0, then **rowFirst** is an UncheckedRw that specifies the first row coordinate of the cell reference. If **columnFirst.fRwRel** is 1, then **rowFirst** is a RwRelNeg that specifies the first row as an offset from the cell in which the formula is evaluated.

rowLast (4 bytes): If **columnLast.fRwRel** is 0, then **rowLast** is an UncheckedRw that specifies the last row coordinate of the cell reference. If **columnLast.fRwRel** is 1, then **rowLast** is a RwRelNeg that specifies the last row as an offset from the cell in which the formula is evaluated.

columnFirst (2 bytes): A ColRelShort that specifies information about the first row and column. If **columnFirst.fColRel** is 0, then **columnFirst.col** specifies the first column coordinate of the cell reference. If **columnFirst.fColRel** is 1, then **columnFirst.col** specifies the first column as an offset from the cell in which the formula is evaluated.

columnLast (2 bytes): A ColRelShort that specifies information about the last row and column. If **columnLast.fColRel** is 0, then **columnLast.col** specifies the last column coordinate of the cell reference. If **columnLast.fColRel** is 1, then **columnLast.col** specifies the last column as an offset from the cell in which the formula is evaluated.

2.5.76.91 RgceLoc

This structure specifies a reference to a single cell where relative references are stored as coordinates.

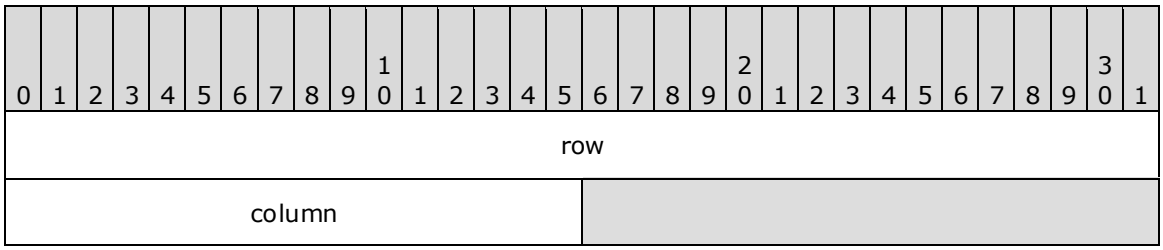
0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
row																															
column																															

row (4 bytes): An UncheckedRw that specifies the row coordinate of the cell reference. MUST be less than 1048576.

column (2 bytes): A ColRelShort that specifies the column coordinate of the cell reference, and relative reference information.

2.5.76.92 RgceLocRel

This structure specifies a single cell reference where the relative portions of relative references are specified as offsets from the cell in which the formula is evaluated.

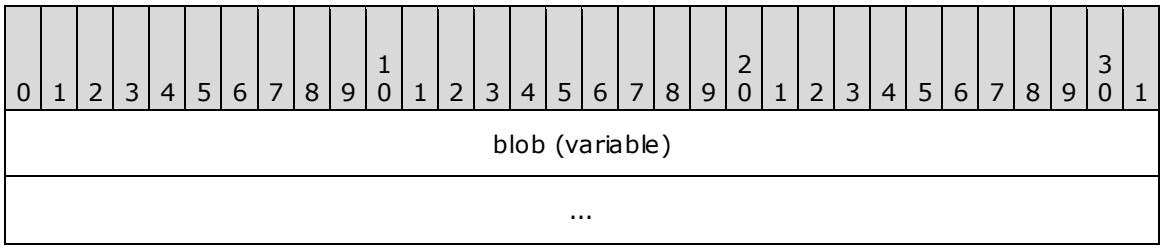


row (4 bytes): If **column.fRwRel** is 0, then **row** is an UncheckedRw that specifies the row coordinate of the cell reference. If **column.fRwRel** is 1, then **row** is a RwRelNeg that specifies the row as an offset from the cell in which the formula is evaluated. If the signed result of the offset is a row index less than 0x00000000 or greater than 0x000FFFFF, the value is adjusted by 0x00100000 so that it will result in a valid row index.

column (2 bytes): A ColRelShort that specifies information about the row and column. If **column.fColRel** is 0, then **column.col** specifies the column coordinate of the cell reference. If **column.fColRel** is 1, then **column.col** specifies the column as an offset from the cell in which the formula is evaluated. If the signed result of the offset is a column index less than 0x0000 or greater than 0x3FFF, the value is adjusted by 0x4000 so that it will result in a valid column index

2.5.76.93 SerAr

This structure specifies a value in PtgExtraArray.



blob (variable): A structure that specifies a value in PtgExtraArray. MUST be one of the following structures: SerNum, SerStr, SerBool, or SerErr. The structure is specified by the first byte, which is the reserved byte in each of those structures.

2.5.76.94 SerBool

Specifies a Boolean value in an array of values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved								f																							

reserved (1 byte): Reserved. MUST be 0x02.

f (1 byte): A Boolean that specifies the value.

2.5.76.95 SerErr

Specifies an error value in an array of values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved1								err								reserved2								reserved3							
...																															

reserved1 (1 byte): Reserved. MUST be 0x04.

err (1 byte): A BErr that specifies the error code value.

reserved2 (1 byte): MUST be zero, and MUST be ignored.

reserved3 (2 bytes): MUST be zero, and MUST be ignored.

2.5.76.96 SerNum

Specifies a numeric value in an array of values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved								xnum																							
...																															
...																															

reserved (1 byte): Reserved. MUST be 0x00.

xnum (8 bytes): An Xnum that specifies the value.

2.5.76.97 SerStr

Specifies a text string in an array of values.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved								cch																rgch (variable)							
...																															

reserved (1 byte): Reserved. MUST be 0x01.

cch (2 bytes): An unsigned integer that specifies the number of characters in **rgch**. MUST be less than 256.

rgch (variable): An array of 16-bit Unicode characters in the string.

2.5.76.98 SharedParsedFormula

This structure specifies the formula for a shared formula.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cce																															
rgce (variable)																															
...																															
cb																															
rgcb (variable)																															
...																															

cce (4 bytes): An unsigned integer that specifies the length of **rgce** in bytes. MUST be greater than 0 and less than 16385.

rgce (variable): An Rgce that specifies the sequence of Ptgs for the formula. MUST NOT contain PtgExp, PtgSxName, PtgIsect, PtgUnion, PtgRange, PtgArray, PtgRefErr, PtgAreaErr, PtgRef3d, PtgArea3d, PtgRefErr3d, PtgAreaErr3d, PtgNameX, PtgMemArea, PtgMemErr, PtgMemNoMem, or PtgMemFunc.

If this field contains a PtgRef, then the **loc.column.fColRel** and **loc.column.fRwRel** fields in the PtgRef MUST be 0.

If this field contains a PtgArea, then the **area.columnFirst.fColRel**, **area.columnFirst.fRwRel**, **area.columnLast.fColRel**, and **area.columnLast.fRwRel** fields in the PtgArea MUST be 0**.**

If this field contains a PtgFuncVar and the **fCeFunc** field of the PtgFuncVar is 0, then the **tab** field of the PtgFuncVar MUST NOT be 0x017B.

The root node of the parse tree of this field MUST be a VALUE_TYPE, as described in Rgce.

cb (4 bytes): An unsigned integer that specifies the length of **rgcb** in bytes.

rgcb (variable): An RgbExtra that specifies ancillary data for the formula.

2.5.76.99 SxOs

This structure specifies a column in a table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
notLast								reserved																column (variable)							
...																															

notLast (1 byte): A Boolean that specifies which field of SxSu is specified by this structure. MUST be a value from the following table:

Value	Meaning
0x1	This structure specifies an SxSu.**sxosFirst** field**.**
0x0	This structure specifies an SxSu.**sxosLast** field**.**

reserved (2 bytes): Reserved. MUST be 0x0002.

column (variable): A LPWideString that specifies the column name. **column.cchCharacters** MUST be greater than zero.

2.5.76.100 SxSu

Specifies a range of columns in a table.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
reserved																csxos								sxosFirst (variable)							
...																															
sxosLast (variable)																															
...																															

reserved (2 bytes): MUST be zero, and MUST be ignored.

csxos (1 byte): An unsigned integer that specifies the columns in the range. MUST be a value from the following table.

Value	Meaning
0x01	The columns of the range consist of a single column specified by **sxosFirst**.
0x02	The columns of the range consist of the range of columns between the column specified by **sxosFirst**, and the column specified by **sxosLast**, inclusive.

sxosFirst (variable): A SxOs that specifies the first column. **sxosFirst.notLast** MUST be 1 if **csxos** is 2. **sxosFirst.notLast** MUST be 0 if **csxos** is 1.

sxosLast (variable): A SxOs that specifies the last column. **sxosLast.notLast** MUST be 0.

2.5.76.101 VirtualPath

A XLUnicodeString that specifies a path, workbook and optionally a sheet. MUST be a XLUnicodeString in the following grammar:

virt-path = volume / unc-volume / rel-volume / transfer-protocol / startup / alt-startup / library

startup = %x0001 %x0006 file-path

This code specifies that the relative-path is relative to the startup directory.

alt-startup = %x0001 %x0007 file-path

This code specifies that the relative-path is relative to the alternate startup directory.

library = %x0001 %x0008 file-path

This code specifies that the relative-path is relative to the library directory.

transfer-protocol = %x0001 %x0005 count transfer-path

This code specifies that the path is a **transfer protocol** path. The value of count MUST be equal to the number of characters following count in transfer-path.

transfer-path = transfer-base-path / "[" transfer-base-path "]" sheet-name

transfer-base-path = transfer-type "://" file-path

transfer-type = "ftp" / "http" / "https"

volume = %x0001 %x0001 volume-character file-path

This code specifies that the path is relative to a specific drive volume. The drive volume is specified in volume-character.

rel-volume = %x0001 %x0002 file-path

This code specifies that the path is relative to the drive volume of the workbook that contains the path.

unc-volume = %x0001 %x0001 %x0040 unc-path

This code specifies that the path is relative to a **UNC volume**. The computer name is specified in computer-name and the shared folder is specified in shared-folder.

unc-path = unc-base-path / "[" unc-base-path "]" sheet-name

unc-base-path = computer-name %x0003 shared-folder %x0003 relative-path

volume-character = %x0041-%x005A / %0061-%x007A

This code specifies the volume title. The volume specified is a drive volume and volume-character is the character of that drive.

file-path = relative-path / "[" relative-path "]" sheet-name

sheet-name = sheet-start-end-character *sheet-character sheet-start-end-character / sheet-start-end-character

sheet-start-end-character = %x0001-%xFFFF

This code specifies the sheet-start-end-character MUST also not include any character that matches invalid-sheet-start-end-character

invalid-sheet-start-end-character = %x0003 / "*" / "?" / "'" / "[" / "]" / "\" / ":" / "/"

sheet-character = %x0001-%xFFFF

This code specifies a sheet character. A sheet character MUST also not include any character that matches invalid-sheet-character

invalid-sheet-character = %x0003 / "*" / "?" / "[" / "]" / "\" / ":" / "/"

relative-path = directory *(%x0003 directory)

directory = path-string

computer-name = path-string

shared-folder = path-string

path-string = 1*path-character

path-character = %x0020-%x0021 / %x0023-%x0029 / %x002B-%x002E / %x0030-%x0039 / %x003B / %x003D / %x0040-%x005B / %x005D-%x007B / %x007D-%xFFFF

This code specifies a path character.

count = %x00-%xFF

Certain grammar rules have specific meanings, as specified in the following table:

Rule	Meaning
volume	Specifies that the path is relative to a specific drive volume. volume-character specifies the drive volume.
unc-volume	Specifies that the path is relative to a UNC volume. computer-name specifies the computer. shared-folder specifies the shared folder.
transfer-protocol	Specifies that the path is a transfer protocol path. The count MUST equal the number of characters following count in the XLUnicodeString.

startup	Specifies that the relative-path is relative to the startup directory.
alt-startup	Specifies that the relative-path is relative to the alternate startup directory.
library	Specifies that the relative-path is relative to the library directory.
relative-path	Specifies a sequence of subdirectories that comprise the path from the volume or directory.
sheet-name	The name of the sheet in the workbook.

2.5.76.102 XLUnicodeString

This structure specifies a Unicode string.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cch																A	reserved							rgb (variable)							
...																															

cch (2 bytes): An unsigned integer that specifies the count of characters in the string.

A - fHighByte (1 bit): A bit that specifies whether the characters in **rgb** are double-byte characters. MUST be a value from the following table:

Value	Meaning
0x0	All the characters in the string have a high byte of 0x00 and only the low bytes are in **rgb**.
0x1	All the characters in the string are saved as double-byte characters in **rgb**.

reserved (7 bits): MUST be zero, and MUST be ignored.

rgb (variable): An array of bytes that specifies the characters. If **fHighByte** is 0x0, the size of the array MUST be equal to **cch**. If **fHighByte** is 0x1, the size of the array MUST be equal to **cch***2.

2.5.76.103 XtiIndex

A 2-byte unsigned integer that identifies an Xti structure. MUST be a value from the following table:

Value	Meaning
0xFFFF	Specifies an invalid Xti.
Greater than or equal to zero and less than 0xFFFF	Specifies a zero-based index of an element in the array of Xti structures specified by the **rgXti** field of the BrtExternSheet record in the workbook part. The value MUST be less than the value of the **cXti** field of the BrtExternSheet record.

2.5.77 PCDIAddlInfo

This structure specifies additional data associated with a cache item.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	unused													stCaption (variable)															
...																															
cIMemProps																															
rgIMemProps (variable)																															
...																															

A - fGhost (1 bit): A bit that specifies whether the cache item previously existed, but is no longer present in the source data.

B - fFmla (1 bit): A bit that specifies whether the cache item is a calculated item. MUST be equal to 0 if the cache item is in an OLAP PivotCache.

C - fCaption (1 bit): A bit that specifies whether **stCaption** exists. MUST be 0 if the cache item is not in an OLAP PivotCache, or the **bVerCacheCreated** of the preceding BrtBeginPivotCacheDef is less than 3.

unused (13 bits): Undefined and MUST be ignored.

stCaption (variable): An XLNullableWideString that specifies the caption for this cache item. MUST exist if and only if **fCaption** equals to 1. The length of this string MUST be less than or equal to 32767 characters.

cIMemProps (4 bytes): An unsigned integer that specifies the count of items in **rgIMemProps**. MUST be less than 0x1FFFFFFE. MUST be equal to 0 if the cache item is not in an OLAP PivotCache, otherwise MUST be less than or equal to **cIsxtmps** of the preceding BrtBeginPCDField.

rgIMemProps (variable): An array of 4-byte signed integers. Each element of the array is a signed integer that specifies the cache item index, as specified by Cache Items, in the associated cache field. The associated cache field for the Nth element of this array is specified by the Nth element of the **rgisxtmp** array of the preceding BrtBeginPCDField. Each cache item specifies a member property value. Each element of this array MUST be greater than or equal to -1, where -1 specifies no cache item.

2.5.78 PCDIDateTime

Specifies a date-time value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
yr																mon															
dom								hr								min								sec							

yr (2 bytes): An unsigned integer that specifies the year of the date. MUST be greater than or equal to 1900, and MUST be less than or equal to 9999. If **dom** is 0, **yr** MUST be 1900.

mon (2 bytes): An unsigned integer that specifies the month of the date. MUST be greater than or equal to 1, and MUST be less than or equal to 12. If **dom** is 0, **mon** MUST be 1.

dom (1 byte): An unsigned integer that specifies the day of month of the date. MUST be less than or equal to 31.

hr (1 byte): An unsigned integer that specifies the hour of the time. MUST be less than or equal to 23.

min (1 byte): An unsigned integer that specifies the minute of the time. MUST be less than or equal to 59.

sec (1 byte): An unsigned integer that specifies the second of the time. MUST be less than or equal to 59.

2.5.79 PCDISrvFmt

This structure specifies server formatting information associated with a cached cube value, as specified by Tuple Cache.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	isfci (optional)																							
...								cvBack (optional)																							
...								cvFore (optional)																							
...																															

A - fSrvFmtNum (1 bit): A bit that specifies whether the cube value has number formatting applied that was provided by an OLAP server. The number formatting is specified by **isfci**.

B - fSrvFmtBack (1 bit): A bit that specifies whether the cube value has a background color applied that was provided by an OLAP server.

C - fSrvFmtFore (1 bit): A bit that specifies whether the cube value has a foreground color applied that was provided by an OLAP server.

D - fSrvFmtItalic (1 bit): A bit that specifies whether the cube value has italic formatting applied that was provided by an OLAP server.

E - fSrvFmtUnderline (1 bit): A bit that specifies whether the cube value has underline formatting applied that was provided by an OLAP server.

F - fSrvFmtBold (1 bit): A bit that specifies whether the cube value has bold formatting applied that was provided by an OLAP server.

G - fSrvFmtStrikethrough (1 bit): A bit that specifies whether the cube value has strikethrough formatting applied that was provided by an OLAP server.

H - unused (1 bit): Undefined and MUST be ignored.

isfci (4 bytes): An unsigned integer that specifies a zero-based index to a BrtPCDSFCIEntry record in the BrtBeginPcdSFCIEntries collection in this tuple cache. The BrtPCDSFCIEntry record specifies the number formatting for the cube value. MUST exist if and only if **fSrvFmtNum** equals 1. MUST be less than the **centry** field of the BrtBeginPcdSFCIEntries record .

cvBack (4 bytes): A SrvFmtCV that specifies the background color for the cube value. MUST exist if and only if **fSrvFmtBack** equals 1.

cvFore (4 bytes): A SrvFmtCV that specifies the foreground color for the cube value. MUST exist if and only if **fSrvFmtFore** equals 1.

2.5.80 PhRun

This structure specifies a phonetic text run that is displayed above a text run.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ichFirst (2 bytes)																ichMom (2 bytes)															
cchMom (2 bytes)																ifnt (2 bytes)															
A		B		unused1																											

ichFirst (2 bytes): An unsigned integer that specifies the zero-based index of a character in the **phoneticStr** field of the associated RichStr, where the associated RichStr is the RichStr that contains the **rgsPhRun** that contains this PhRun. **ichFirst** specifies the first character of the phonetic text run. **ichFirst** MUST be less than the number of characters in the **phoneticStr** field of the associated RichStr.

ichMom (2 bytes): An unsigned integer that specifies the zero-based index of a character in the **str** field of the associated RichStr **ichMom** specifies the location where the phonetic text run begins. **ichMom** MUST be less than the number of characters in the **str** field of the associated RichStr.

cchMom (2 bytes): An unsigned integer that specifies the number of characters in the **str** field of the associated RichStr that this phonetic text run applies to. **cchMom** MUST be less than or equal to the number of characters in the **str** field of the associated RichStr.

A - ifnt (2 bytes): An unsigned integer that specifies the zero-based index of a BrtFont record in the collection of all records directly following BrtBeginFonts. The referenced BrtFont specifies the font of the phonetic text run.

B - phType (2 bits): An unsigned integer that specifies a character set used to display the phonetic text run.

Value	Meaning
0x00	The phonetic text run is displayed using the narrow katakana character set. Ignored if the text is not Japanese.
0x01	The phonetic text run is displayed using the wide katakana character set. Ignored if the text is not Japanese.
0x02	The phonetic text run is displayed using the hiragana character set. Ignored if the text is not Japanese.
0x03	No character set conversion is performed to the phonetic text run. Text is displayed as entered.

alcH (2 bits): An unsigned integer that specifies the alignment of the phonetic text run.

Value	Meaning
0x00	Left justify All characters of All phonetic text runs above the entire base text.
0x01	Left justify the characters of each phonetic text run above its text run.
0x02	Center the characters of each phonetic text run above its text run.
0x03	Distribute the characters of each phonetic text run above its text run.

unused1 (12 bits): Undefined and MUST be ignored.

2.5.81 PivotFilterType

A 4 byte unsigned integer that specifies the type of advanced PivotTable filter. It is used by BrtBeginSXFILTER record. MUST be a value from the Value column in the following table:

Category	Value	Meaning
Value Filter	0x00000001	"count" filter
	0x00000002	"percent" filter for numeric values
	0x00000003	"sum" filter for numeric values
Label Filter	0x00000004	"equals" filter for field captions
	0x00000005	"not equal" filter for field captions
	0x00000006	"begins with" filter for field captions
	0x00000007	"does not begin with" filter for field captions
	0x00000008	"ends with" filter for field captions
	0x00000009	"does not end with" filter for field captions
	0x0000000A	"contains" filter for field captions
	0x0000000B	"does not contain" filter for field captions
	0x0000000C	"is greater than" filter for field captions
	0x0000000D	"is greater than or equal to" filter for field captions

	0x0000000E	"is less than" filter for field captions
	0x0000000F	"is less than or equal to" filter for field captions
	0x00000010	"is between" filter for field captions
	0x00000011	"is not between" filter for field captions
Value Filter	0x00000012	"value equal" filter for text and numeric values
	0x00000013	"value not equal" filter for text and numeric values
	0x00000014	"value greater than" filter for text and numeric values
	0x00000015	"value greater than or equal to" filter for text and numeric values
	0x00000016	"value less than" filter for text and numeric values
	0x00000017	"value less than or equal to" filter for text and numeric values
	0x00000018	"value between" filter for text and numeric values
	0x00000019	"value not between" filter for text and numeric values
Date Filter	0x0000001A	"equals" filter for date values
	0x0000001B	"older than" filter for date values
	0x0000001C	"newer than" filter for date values
	0x0000001D	"between" filter for date values
	0x0000001E	"tomorrow" filter for date values
	0x0000001F	"today" filter for date values
	0x00000020	"yesterday" filter for date values
	0x00000021	"next week" filter for date values
	0x00000022	"this week" filter for date values
	0x00000023	"last week" filter for date values
	0x00000024	"next month" filter for date values
	0x00000025	"this month" filter for date values
	0x00000026	"last month" filter for date values
	0x00000027	"next quarter" filter for date values
	0x00000028	"this quarter" filter for date values
	0x00000029	"last quarter" filter for date values
	0x0000002A	"next year" filter for date values
	0x0000002B	"this year" filter for date values
	0x0000002C	"last year" filter for date values
	0x0000002D	"year-to-date" filter for date values
	0x0000002E	"first quarter" filter for date values
	0x0000002F	"second quarter" filter for date values
	0x00000030	"third quarter" filter for date values
	0x00000031	"fourth quarter" filter for date values
	0x00000032	"January" filter for date values
	0x00000033	"February" filter for date values
	0x00000034	"March" filter for date values
	0x00000035	"April" filter for date values
	0x00000036	"May" filter for date values
	0x00000037	"June" filter for date values

	0x00000038	"July" filter for date values
	0x00000039	"August" filter for date values
	0x0000003A	"September" filter for date values
	0x0000003B	"October" filter for date values
	0x0000003C	"November" filter for date values
	0x0000003D	"December" filter for date values
	0x0000003E	"not equal" filter for date values
	0x0000003F	"older than or equal to" filter for date values
	0x00000040	"newer than or equal to" filter for date values
	0x00000041	"not between" filter for date values

2.5.82 PivotItemType

This enumeration specifies the type of a pivot item as specified by a BrtBeginSXVI record, or the type of a pivot line as specified by a BrtBeginSXLI record.

Name	Value	Meaning
PITDATA	0x00	Specifies no subtotal, no grand total, or no blank line behavior.
PITDEFAULT	0x01	Specifies a subtotal using the aggregation function specified by the data items included in this subtotal.
PITSUM	0x02	Specifies a subtotal using the Sum aggregation function.
PITCOUNTA	0x03	Specifies a subtotal using the Count aggregation function.
PITAVG	0x04	Specifies a subtotal using the Average aggregation function.
PITMAX	0x05	Specifies a subtotal using the Maximum aggregation function.
PITMIN	0x06	Specifies a subtotal using the Minimum aggregation function.
PITPRODUCT	0x07	Specifies a subtotal using the Product aggregation function.
PITCOUNT	0x08	Specifies a subtotal using the Count Numbers aggregation function.
PITSTDDEV	0x09	Specifies a subtotal using the Standard Deviation aggregation function.
PITSTDDEVP	0x0A	Specifies a subtotal using the Standard Deviation of a Population aggregation function.
PITVAR	0x0B	Specifies a subtotal using the Variance aggregation function.
PITVARP	0x0C	Specifies a subtotal using the Variance of a Population aggregation function.
PITGRAND	0x0D	Specifies a grand total line.
PITBLANK	0x0E	Specifies a blank line.

2.5.83 PivotNumFmt

This structure specifies the number format used in PivotTables and PivotCaches.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
ifmt																reserved															

ifmt (2 bytes): An Ifmt that specifies the number format used in PivotTables and PivotCaches.

reserved (2 bytes): MUST be zero, and MUST be ignored.

2.5.84 PivotNumFmtExt

An unsigned 32-bit integer that specifies the number format used in PivotTables and PivotCaches.

Value	Meaning
0xFFFFFFFF	Default number format. Equivalent to a PivotNumFmt with the value 0x00000000.
All other values	All other values are interpreted as a PivotNumFmt.

2.5.85 Pnn

An enumeration that specifies a pane.

Name	Value	Meaning
PNNBOTRIGHT	0x00000000	Bottom-right pane
PNNTOPRIGHT	0x00000001	Top-right pane
PNNBOTLEFT	0x00000002	Bottom-left pane
PNNTOPLEFT	0x00000003	Top-left pane

2.5.86 PrintErrorsAs

This enumeration specifies how to represent cells containing errors when printing.

Name	Value	Meaning
IERRORSDISPLAYED	0x0000	Errors are printed as they are displayed.
IERRORSBLANK	0x0001	Errors are printed as blanks.
IERRORSDASH	0x0002	Errors are printed as series of dash characters.
IERRORSNA	0x0003	Errors are printed as "#N/A".

2.5.87 QsiFieldId

A 4 byte unsigned integer that specifies a numeric identifier for a query table column.

2.5.88 ReadingOrder

This enumeration specifies the reading order.

Name	Value	Meaning
READING_ORDER_CONTEXT	0x00	Context reading order
READING_ORDER_LTR	0x01	Left-to-right reading order
READING_ORDER_RTL	0x02	Right-to-left reading order

2.5.89 RelID

An XLNullableWideString that specifies a relationship identifier as specified in [ECMA-376] Part 2: Open Packaging Conventions, section 8.3. The length of the string MUST NOT exceed 255 characters. The string MUST NOT contain a zero character (0x0000). A string that is NULL means that the relationship is not specified.

2.5.90 RevisionLogSheetName

An XLWideString that specifies the name of a sheet for records in the revision log part of a shared workbook.

The string MUST have at least 4 characters and MUST have at most 248 characters, MUST be of the form:

[*filename*]*sheetName*

Opening square bracket followed by the name of the file, excluding directory information but including extension, followed by close-square-bracket followed by the sheet name.

The *filename* portion MUST be at least 1 character and MUST be at most 215 characters. Any '[' (opening square bracket) characters in the *filename* portion MUST be replaced with '(' (opening parenthesis) characters and any ']' (closing square bracket) characters in the *filename* portion MUST be replaced with ')' (closing parenthesis) characters.

The *sheetName* portion MUST be a value which would be valid in the **strName** field of BrtBundleSh.

2.5.91 RevisionType

Specifies the type of the revision record.

Name	Value	Meaning
REVTINSRW	0x0000	Insert Row. This value is only valid in record type BrtRRInsDel.
REVTINSCOL	0x0001	Insert Column. This value is only valid in record type BrtRRInsDel.
REVTDELRW	0x0002	Delete Row. This value is only valid in record type BrtRRInsDel.
REVTDELCOL	0x0003	Delete Column. This value is only valid in record type BrtRRInsDel.
REVTMOVE	0x0004	Move cell. This value is only valid in record type BrtRRMove.
REVTINSERTSH	0x0005	Insert sheet. This value is only valid in record type BrtRRInsertSh.
REVTCHANGECELL	0x0008	Change cell content, including inline formatting. This value is only valid in record type BrtRRChgCell.
REVTRENSHEET	0x0009	Rename sheet. This value is only valid in record type BrtRRRenSheet.
REVTDEFNAME	0x000A	Define name. This value is only valid in record type BrtRRDefName.
REVTFORMAT	0x000B	Change cell format. This value is only valid in record type BrtRRFormat.
REVTAUTOFMT	0x000C	Change autoformat. This value is only valid in record type BrtRRAutoFmt.
REVTNOTE	0x000D	Change comment. This value is only valid in record type BrtRRNote.
REVTHEADER	0x0020	Revision header. This value is only valid in record type BrtRRHeader.
REVTCONFLICT	0x0025	This value is only valid in record type BrtRRConflict.
REVTADDVIEW	0x002B	This value is only valid in record type BrtRRUserView.
REVTDELVIEW	0x002C	This value is only valid in record type BrtRRUserView.
REVTOLDNAME	0x0022	This value is only valid in record type BrtRRDefName.
REVTTRASHQTFIELD	0x002E	This value is only valid in record BrtRRTQSIF.

2.5.92 RfX

Specifies a range. The range MUST NOT include any cell which lies outside the sheet's used range specified by BrtWsDim.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwFirst																															
rwLast																															
colFirst																															
colLast																															

rwFirst (4 bytes): A Rw that specifies the first row of the range.

rwLast (4 bytes): A Rw that specifies the last row of the range. MUST NOT be less than **rwFirst**.

colFirst (4 bytes): A Col that specifies the first column of the range.

colLast (4 bytes): A Col that specifies the last column of the range. MUST NOT be less than **colFirst**.

2.5.93 RfXRel

Specifies a range which can contain a relative reference.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwFirst																															
rwLast																															
colFirst																															
colLast																															

rwFirst (4 bytes): An UncheckedRw that specifies the first row of the range.

rwLast (4 bytes): An UncheckedRw that specifies the last row of the range. MUST NOT be less than **rwFirst**.

colFirst (4 bytes): A ColRel that specifies the first column of the range. The associated row is **rwFirst**.

colLast (4 bytes): A ColRel that specifies the last column of the range. The associated row is **rwLast**. The specified column index MUST NOT be less than the column index specified by **colFirst**.

2.5.94 RgceAreaSmall

This structure is a variant of RgceArea that is limited to a range reference in the first 256 columns and 65536 rows of a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rowFirst																rowLast															
columnFirst																columnLast															

rowFirst (2 bytes): A RwShort that specifies the zero-based index of the first row of the range. This value MUST be less than 65536.

rowLast (2 bytes): A RwShort that specifies the zero-based index of the last row of the range. This value MUST greater than or equal to **rowFirst**, and MUST be less than 65536.

columnFirst (2 bytes): A ColRelShort that specifies the first column of the cell range, and relative reference information about the first column and first row. The value of **columnFirst.col** MUST be less than 256.

columnLast (2 bytes): A ColRelShort that specifies the last column of the cell range, and relative reference information about the last column and last row. The value of **columnLast.col** MUST be greater than or equal to **columnFirst.col**, and MUST be less than 256.

2.5.95 RgceLocSmall

This structure is a variant of RgceLoc that is limited to a cell reference in the first 256 columns and 65536 rows of a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
row																column															

row (2 bytes): A RwShort that specifies the zero-based index of the row of the cell reference. This value MUST be less than 65536.

column (2 bytes): A ColRelShort that specifies the zero-based column index the column of the cell reference and relative reference information. The value of **column.col** MUST be less than 256.

2.5.96 RichStr

This structure specifies a rich string.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	unused1						str (variable)																							

dwSizeStrRun (4 bytes)
rgsStrRun (variable)
phoneticStr (variable)
dwPhoneticRun (4 bytes)
rgsPhRun (variable)

A - fRichStr (1 bit): A bit that specifies whether **dwSizeStrRun** and **rgsStrRun** exist.

B - fExtStr (1 bit): A bit that specifies whether **phoneticStr, dwPhoneticRun** and **rgsPhRun** exist.

unused1 (6 bits): Undefined and MUST be ignored.

str (variable): An XLWideString that specifies the string. The number of Unicode characters MUST be less than or equal to 0x7FFF.

dwSizeStrRun (4 bytes): An unsigned integer that specifies the number of StrRun in **rgsStrRun**. MUST be less than or equal to 0x7FFF.

rgsStrRun (variable): An array of StrRun. Each StrRun specifies formatting that is applied to a text run of characters within **str**. Every StrRun except the last StrRun in the array specifies formatting for a text run which begins with the character specified by the **ich** field of the StrRun and which ends with the character that precedes the character specified by the **ich** field of the subsequent StrRun in the array. The last StrRun in the array specifies formatting for a text run that begins with the character specified by its **ich** field and ends with the last character in **str**. Each **ich** field of a StrRun in the array MUST be less than the **ich** field of the subsequent StrRun in the array.

phoneticStr (variable): An XLWideString that specifies the **phonetic string**.

dwPhoneticRun (4 bytes): An unsigned integer that specifies the number of PhRun in **rgsPhRun**. MUST be less than or equal to 0x7FFF.

rgsPhRun (variable): An array of PhRun. Each PhRun specifies a phonetic text run within **phoneticStr** that is displayed above a text run within **str**. The first character in the phonetic text run is the character specified by the **ichFirst** field of PhRun. The first character in the **str** that the phonetic text run appears above is specified by the **ichMom** field of PhRun. The number of characters in the **str** that phonetic text run appears is specified by **cchMom** field of PhRun. Each **ichMom** field of a PhRun in the array MUST be less than the **ichMom** field of the subsequent PhRun in the array. Each **ichFirst** field of a PhRun in the array MUST be less than the **ichFirst** field of the subsequent PhRun in the array. The sum of the **cchMom** fields of All PhRun in the array MUST less than or equal to the number of characters in **str**.

2.5.97 RkNumber

This structure specifies a numeric value.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	num																													

A - fx100 (1 bit): A bit that specifies whether **num** is the value of the RkNumber or 100 times the value of the RkNumber. MUST be a value from the following table:

Value	Meaning
0	The value of RkNumber is the value of **num**.
1	The value of RkNumber is the value of **num** divided by 100.

B - fInt (1 bit): A bit that specifies the type of **num**.

num (30 bits): A variable type field whose type and meaning is specified by the value of **fInt**, as defined in the following table:

Value of **fInt**	Type of **num**
0	**num** is the 30 most significant bits of a 64-bit binary floating-point number as defined in [IEEE754]. The remaining 34-bits of the floating-point number MUST be 0.
1	**num** is a signed integer.

2.5.98 RRd

This structure specifies the revision record information used to track changes in a shared workbook.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
unused1																															
revid																															
revt																A	B	C	D	unused2											
tabid																															

unused1 (4 bytes): Undefined and MUST be ignored.

revid (4 bytes): An unsigned integer that specifies the reviewable revision id of this revision record. The value MUST be either 0, or greater or equal to **revidMin** and less or equal to **revidMax** defined in the BrtRRHeader record for this revision part, or same as another revision record's **revid** if this record's type is **REVTCONFLICT**. If this value is 0, this revision record cannot be reviewed.

revt (2 bytes): A RevisionType that specifies the type of this revision record.

A - fAccepted (1 bit): A bit that specifies whether this revision record has been reviewed.

B - fUndoAction (1 bit): A bit that specifies whether the revision record occurred due to rejected changes.

C - reserved1 (1 bit): A bit that specifies whether the revision record occurred due to redo of the rejected changes.

D - reserved2 (1 bit): A bit that specifies whether the row or column that is being deleted is at the edge of a sorted range. If the value is 1, then **revt** MUST be either 0x0002 or 0x0003.

unused2 (12 bits): Undefined and MUST be ignored.

tabid (2 bytes): An unsigned integer that specifies the **tabid** of the sheet associated with the revision record. If the value is 65535, this revision record doesn't apply to any sheet. Otherwise, the value MUST equal the value of the **iTabID** field in a BrtBundleSh record.

2.5.99 RRdDnGrbit

This structure specifies additional information as specified by the BrtRRDefName record.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
unused																A	B	fgrp						chKey							
C	D	E	F	G	H	reserved																									

unused (2 bytes): Undefined and MUST be ignored.

A - fPli (1 bit): fPli (1 bit): A bit that specifies that one or more of the fields **stDescription**, **stHelptopic**, **stCustommenu**, **stStatustext**, **stOldDescription**, **stOldHelptopic**, **stOldCustommenu** or **stOldStatustext** specified in the BrtRRDefName record MUST be not empty.

B - fFunc (1 bit): A bit that specifies whether the BrtRRDefName record specifies a name that refers to a function.

fgrp (6 bits): An FnGroupID that specifies the function category classification of a name that refers to a new function.

chKey (8 bits): An unsigned integer that specifies the shortcut key. MUST have same restrictions **as chKey** field from BrtName record.

C - fHidden (1 bit): A bit that specifies whether the range specified by the BrtRRDefName record is hidden.

D - fCustommenu (1 bit): A bit that specifies whether the **stCustommenu** field from the BrtRRDefName record is not empty.

E - fDescription (1 bit): A bit that specifies whether the **stDescription** field from the BrtRRDefName record is not empty.

F - fHelptopic (1 bit): A bit that specifies whether the **stHelptopic** field from the BrtRRDefName record is not empty.

G - fStatustext (1 bit): A bit that specifies whether the **stStatustext** field from the BrtRRDefName record is not empty.

H - fCorruptComment (1 bit): MUST be zero and MUST be ignored.

reserved (10 bits): MUST be zero, and MUST be ignored.

2.5.100 Rw

A signed 32-bit integer that specifies a single row in a sheet using a zero-based index. MUST be between 0 and 1048575 inclusive and MUST be between **rwFirst** and **rwLast** inclusive on the UncheckedRfX specified by the **rfx** field on the sheet's BrtWsDim record.

2.5.101 Rw_Col

A 4 byte unsigned integer that specifies either a zero-based row index or a zero-based column index. MUST be greater than or equal to 0 and less than or equal to 1048575.

2.5.102 RwNullable

A signed 32-bit integer that specifies a single row in a sheet.

Value	Meaning
0xFFFFFFFFL	Null value
	All other values are interpreted as an UncheckedRw.

2.5.103 RwRelNeg

A 32-bit signed integer that specifies the zero-based offset of a row index. MUST be greater than -1048576 and less than 1048576.

2.5.104 RwShort

Specifies a single row in a sheet.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rw																															

rw (2 bytes): An unsigned integer that specifies a single row in a sheet using a zero-based index.

2.5.105 Script

This enumeration specifies the superscript or subscript style.

Name	Value	Meaning
SSSNONE	0x0000	Normal script
SSSSUPER	0x0001	Superscript
SSSSUB	0x0002	Subscript

2.5.106 SdSetSortOrder

An enumeration that specifies the sorting order of an MDX set metadata or a tuple cache set.

Name	Value	Meaning
SSONONE	0x00000000	No sorting order.
SSOASC	0x00000001	Ascending order by tuple.
SSODESC	0x00000002	Descending order by tuple.
SSOALPHAASC	0x00000003	Ascending order by the caption.
SSOALPHADESC	0x00000004	Descending order by the caption.
SSONATURALASC	0x00000005	Ascending order by the natural order of the data, as defined by the data source (1).
SSONATURALDESC	0x00000006	Descending order by the natural order of the data, as defined by the data source (1).

2.5.107 ShortDtr

This structure specifies a date and time which is accurate down to the second. The year, month, day, and weekday values MUST be consistent with the Gregorian calendar.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
yr																mon								dom							
hr								mint								sec								wdy							

yr (2 bytes): An unsigned integer that specifies the year. MUST be greater than or equal to 1900, and MUST be less than or equal to 9999.

mon (1 byte): An unsigned integer that specifies the month. The value MUST be greater than or equal to 1 and less than or equal to 12.

dom (1 byte): An unsigned integer that specifies the day. The value MUST greater than or equal to 1 and less than or equal to 31.

hr (1 byte): An unsigned integer that specifies the hour. The value MUST be greater than or equal to 0 and less than or equal to 23.

mint (1 byte): An unsigned integer that specifies the minute. The value MUST be greater than or equal to 0 and less than or equal to 59.

sec (1 byte): An unsigned integer that specifies the second. The value MUST be greater than or equal to 0 and less than or equal to 59.

wdy (1 byte): An unsigned integer that specifies the weekday. The value MUST be one of the following <43>:

Value	Meaning
0x01	Monday
0x02	Tuesday
0x03	Wednesday

0x04	Thursday
0x05	Friday
0x06	Saturday
0x07	Sunday

2.5.108 ShowDataAs

An enumeration that specifies the valid display format values in the BrtBeginSXDI record.

Name	Value	Meaning
NORMAL	0x00000000	Normal data type.
DIFFERENCE	0x00000001	Difference from.
PERCENT	0x00000002	Percentage of.
PERCENTDIFF	0x00000003	Percentage difference of.
RUNTOTAL	0x00000004	Running total in.
PERCENTOFROW	0x00000005	Percentage of row.
PERCENTOFCOL	0x00000006	Percentage of column.
PERCENTOFTOTAL	0x00000007	Percentage of total.
INDEX	0x00000008	Index.

2.5.109 SqEtxp

This structure specifies a collection of Etxp that specifies the font information for a BrtRRChgCell record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cbrgetxp																															
rgetxp (variable)																															
...																															

cbrgetxp (4 bytes): An unsigned integer that specifies the number of elements in **rgetxp** multiplied by 100. MUST be a multiple of 100.

rgetxp (variable): An array of Etxp. The number of elements in the array MUST be equal to **cbrgetxp** divided by 100.

2.5.110 SrvFmtCV

This record specifies an indexed color definition in RGB (red-green-blue).

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ciRed								ciGreen								ciBlue								unused							

ciRed (1 byte): An unsigned integer that specifies the intensity of the color red.

ciGreen (1 byte): An unsigned integer that specifies the intensity of the color green.

ciBlue (1 byte): An unsigned integer that specifies the intensity of the color blue.

unused (1 byte): Undefined and MUST be ignored.

2.5.111 SrvFmtData

This structure specifies the number format on the server.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
cb																															
dwSrvFmtNum																															

cb (4 bytes): An unsigned integer that specifies the size in bytes of the data that follows this field. MUST be equal to 0x00000004.

dwSrvFmtNum (4 bytes): An unsigned integer that specifies the number format on the server, and whose value is dictated by the value of **sff.fSrvFmtNumStr** of the associated BrtBeginMdxTuple record as specified in the following table:

Value of **sff.fSrvFmtNumStr**	Meaning of **dwSrvFmtNum**
0	Value specifies one of the built-in number formats as described in the following table.
1	Value is an index to a string in the metadata string store. That string contains information on how to format the number. For more information about how format strings are interpreted, see [ECMA-376] Part 4: Markup Language Reference, section 3.8.31. The ABNF grammar for the format string is specified in [MS-XLS] section 2.4.126.

The value of **dwSrvFmtNum** MUST be one of the following values when the value of **sff.fSrvFmtNumStr** is 0:

Value	Format specification	Example formatted data
0x00000000	General	3.14159
0x0000000E	0.00%	20.73%
0x00000013	m/d/yyyy	1/13/1999

2.5.112 SrvFmtFlags

This structure specifies the properties of applied server-specified formatting.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E	F	G	H	I	unused																						

A - fSrvFmtNum (1 bit): A bit that specifies whether the number formatting is applied.

B - fSrvFmtNumCurrency (1 bit): A bit that specifies whether the currency formatting is applied.

C - fSrvFmtNumStr (1 bit): A bit that specifies whether the number formatting is stored in the metadata string store.

D - fSrvFmtBack (1 bit): A bit that specifies whether the background color is applied.

E - fSrvFmtFore (1 bit): A bit that specifies whether the foreground color is applied.

F - fSrvFmtItalic (1 bit): A bit that specifies whether the italic formatting is applied.

G - fSrvFmtUnderline (1 bit): A bit that specifies whether the underline formatting is applied.

H - fSrvFmtBold (1 bit): A bit that specifies whether the bold formatting is applied.

I - fSrvFmtStrikethrough (1 bit): A bit that specifies whether the **strikethrough formatting** is applied.

unused (7 bits): Undefined and MUST be ignored.

2.5.113 SrvFmtNum

This structure specifies the number or currency formatting in BrtBeginMdxTuple record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
data (variable)																															
...																															

data (variable): A field whose type and value are dictated by the value of **sff.fSrvFmtNumCurrency** of the associated BrtBeginMdxTuple record as specified in the following table:

Value of **sff.fSrvFmtNumCurrency**	Type of **data**
0	Value is a SrvFmtData.
1	Value is an XLNullableWideString that specifies a language tag used to determine the currency symbol to display for currency values. For example, if the language tag is "en-us", the application formats the values with a dollar sign. If the language tag is "fr-fr" the application formats the values with a euro sign. This value MUST <44> conform to the language tagging conventions of [RFC3066]. The pattern <language>-<REGION> is used, for example "en-us" or "fr-fr".

2.5.114 ST_SheetState

This enumeration specifies the visibility state of a sheet.

Name	Value	Meaning
VISIBLE	0x00000000	The sheet is visible.
HIDDEN	0x00000001	The sheet is hidden.
VERYHIDDEN	0x00000002	The sheet is hidden and cannot be displayed using the user interface.

2.5.115 StrRun

This structure specifies a text run.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
ich (2 bytes)																ifnt (2 bytes)															

ich (2 bytes): An unsigned integer that specifies the zero-based index of a character in the **str** field of the RichStr that contains the **rgsStrRun** array that contains this StrRun. **ich** MUST be less than the number of characters in the **str** field of the associated RichStr..

ifnt (2 bytes): An unsigned integer that specifies the zero-based index of a BrtFont record in the collection of all records directly following BrtBeginFonts. The referenced BrtFont specifies the font for the text run.

2.5.116 StyleFlags

This structure specifies properties of a BrtStyle record.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	unused																												

A - fBuiltIn (1 bit): A bit that specifies whether the associated cell style is a built-in cell style.

B - fHidden (1 bit): A bit that specifies whether the associated cell style is not displayed in the UI.

C - fCustom (1 bit): A bit that specifies whether the associated cell style is a built-in cell style which has been customized. If this bit is set, the **fBuiltIn** bit MUST be set. Customized built-in cell styles MUST be saved with the workbook even if not currently in use.

unused (13 bits): MUST be zero, and MUST be ignored.

2.5.117 SXAxis

This structure specifies which PivotTable axis is being referred to.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	B	C	D	E																											

A - sxaxisRw (1 bit): A bit that specifies whether the row axis is being referred to.

B - sxaxisCol (1 bit): A bit that specifies whether the column axis is being referred to.

C - sxaxisPage (1 bit): A bit that specifies whether the page axis is being referred to.

D - sxaxisData (1 bit): A bit that specifies whether the data axis is being referred to.

E - reserved (4 bits): MUST be zero, and MUST be ignored.

2.5.118 TagFnMdx

This enumeration specifies cube function types.

Name	Value	Meaning
TFNCUBEMEMBER	0x00000001	CUBEMEMBER
TFNCUBEVALUE	0x00000002	CUBEVALUE
TFNCUBESET	0x00000003	CUBESET
TFNCUBESETCOUNT	0x00000004	CUBESETCOUNT
TFNCUBERANKEDMEMBER	0x00000005	CUBERANKEDMEMBER
TFNCUBEMEMBERPROPERTY	0x00000006	CUBEMEMBERPROPERTY
TFNCUBEKPIPROPERTY	0x00000007	CUBEKPIMEMBER

2.5.119 Tws

This enumeration specifies type of an object published.

Name	Value	Meaning
TWSWORKBOOK	0x00	Entire workbook
TWSSHEET	0x01	Entire sheet
TWSPRINTAREA	0x02	Print area
TWSAUTOFILTER	0x03	AutoFilter
TWSREF	0x04	A rectangular range of cells
TWSCHART	0x05	Chart
TWSPIVOTTABLE	0x06	PivotTable
TWSQUERY	0x07	Query table
TWSLABEL	0x08	Named range of cells

2.5.120 TypeSql

This signed integer specifies the SQL data type. The following are example data types supported by ODBC. For more information about ODBC, see [MSDN-ODBC].

Value	SQL Type	Data Type
0x0001	SQL_CHAR	Fixed-length string of ANSI characters
0x0003	SQL_DECIMAL	Fixed-precision, Fixed-scale numbers
0x0004	SQL_INTEGER	32-bit signed integer
0x0005	SQL_SMALLINT	16-bit signed integer
0x0006	SQL_FLOAT	User-specified precision floating-point
0x0007	SQL_REAL	Single-precision floating-point
0x0008	SQL_DOUBLE	Double-precision floating-point
0x000B	SQL_TIMESTAMP	Date and Time
0x000C	SQL_VARCHAR	Variable-length string of characters
0xFFF9	SQL_BIT	Bit (1 or 0)
0xFFFE	SQL_BINARY	Fixed-length binary data

2.5.121 UncheckedCol

A signed 32-bit integer that specifies a single column in a sheet using a zero-based index. MUST be greater than or equal to 0 and less than or equal to 16383.

2.5.122 UncheckedRfX

This structure specifies an unchecked cell range. The range can reference cells which lie outside the sheet's used range specified by BrtWsDim. When All the fields in this structure are set to their maximum value, the structure specifies an invalid cell range.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
rwFirst																															

rwLast
colFirst
colLast

rwFirst (4 bytes): An UncheckedRw that specifies the first row of the range.

rwLast (4 bytes): An UncheckedRw that specifies the last row of the range. MUST NOT be less than **rwFirst**.

colFirst (4 bytes): An UncheckedCol that specifies the first column of the range.

colLast (4 bytes): An UncheckedCol that specifies the last column of the range. MUST NOT be less than **colFirst**.

2.5.123 UncheckedRw

A signed 32-bit integer that specifies a single row in a sheet using a zero-based index. MUST be greater than or equal to 0 and less than or equal to 1048575.

2.5.124 UncheckedSqRfX

Specifies a set of unchecked ranges.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
crfx																															
rgrfx (variable)																															
...																															

crfx (4 bytes): A signed integer that specifies the count of UncheckedRfX in **rgrfx**. The value MUST be greater than or equal to -1 and less than or equal to 2147483647. A value of -1 specifies that the SqRfX is null. A value of 0 specifies that the SqRfX is empty.

rgrfx (variable): An array of UncheckedRfX. Specifies the set of ranges.

2.5.125 Underline

This enumeration specifies the underline style.

Name	Value	Meaning
ULSNONE	0x0000	No underline
ULSSINGLE	0x0001	Single
ULSDOUBLE	0x0002	Double
ULSSINGLEACCOUNTANT	0x0021	Single accounting
ULSDOUBLEACCOUNTANT	0x0022	Double accounting

2.5.126 VertAlign

This enumeration specifies the vertical alignment.

Name	Value	Meaning
ALCVTOP	0x00	Top alignment
ALCVCTR	0x01	Center alignment
ALCVBOT	0x02	Bottom alignment
ALCVJUST	0x03	Justify alignment
ALCVDIST	0x04	Distributed alignment

2.5.127 XFProp

This structure specifies a formatting property. Instances of this structure appear as elements in the **xfPropArray** field of an XFProps structure.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
xfPropType																cb															
xfPropDataBlob (variable)																															
...																															

xfPropType (2 bytes): An unsigned integer that specifies the type of the formatting property. MUST be greater than or equal to 0x0000 and less than or equal to 0x002C, and MUST NOT be equal to 0x0027 or 0x0028. For more information on the meaning of this field, see the table in the description for **xfPropDataBlob**.

cb (2 bytes): An unsigned integer that specifies the size of this XFProp structure.

xfPropDataBlob (variable): A field that specifies the formatting property data. The size and data type of this field varies as follows based on the property type as specified in **xfPropType**:

xfPropType value	xfPropDataBlob field Data and Meaning
0x0000	A **FillPattern** that specifies the fill pattern.
0x0001	An XFPropColor that specifies the foreground color.
0x0002	An XFPropColor that specifies the background color.
0x0003	An XFPropGradient that specifies the gradient fill. This is often followed in the same **xfPropArray** field of the XFProps record by one or more XFProp structures with **xfPropType** equal to 0x0004, which provides additional specifications for the gradient fill.
0x0004	An XFPropGradientStop that specifies a gradient stop for a preceding XFProp with **xfPropType** equal to 0x0003 in the same **xfPropArray** field in the XFProps record.
0x0005	An XFPropColor that specifies the text color.
0x0006	An XFPropBorder that specifies the top border formatting.
0x0007	An XFPropBorder that specifies the bottom border formatting.

0x0008	An XFPropBorder that specifies the left border formatting.
0x0009	An XFPropBorder that specifies the right border formatting.
0x000A	An XFPropBorder that specifies the diagonal border formatting.
0x000B	An XFPropBorder that specifies the vertical border formatting.
0x000C	An XFPropBorder that specifies the horizontal border formatting.
0x000D	A 1-byte unsigned integer that specifies whether a **diagonal-up** border is used. MUST be 0 or 1. The value of 1 means that a diagonal-up border is used.
0x000E	A 1-byte unsigned integer that specifies whether a **diagonal-down** border is used. MUST be 0 or 1. The value of 1 means that a diagonal-down border is used.
0x000F	A **HorizAlign** that specifies the **horizontal alignment**.
0x0010	A **VertAlign** that specifies the **vertical alignment**.
0x0011	An XFPropTextRotation that specifies the text rotation.
0x0012	A 2-byte unsigned integer that specifies the absolute text indentation level. MUST be less than or equal to 15. The absolute indentation level will replace any previous indentation.
0x0013	A **ReadingOrder** that specifies the reading order.
0x0014	A 1-byte unsigned integer that specifies whether cell text is wrapped. MUST be 0 or 1. The value of 1 means that the text is wrapped.
0x0015	A 1-byte unsigned integer that specifies whether cell text is **justify distributed**. MUST be 0 or 1. The value of 1 means that the text is justify distributed. If this value is 1 then an XFProp with **xfPropType** equal to 0x000F MUST exist in this **xfPropArray** field of XFProps and MUST equal 0x07.
0x0016	A 1-byte unsigned integer that specifies whether the cell is shrink-to-fit. MUST be 0 or 1. The value of 1 means that the cell is shrink-to-fit.
0x0017	A 1-byte unsigned integer that specifies whether the cell is merged. MUST be 0 or 1. The value of 1 means that the cell is merged.
0x0018	An LPWideString that specifies the font name used by the cell data. MUST be less than or equal to 32 characters in length.
0x0019	A **Bold** that specifies the font face weight.
0x001A	An **Underline** that specifies the underline style.
0x001B	A **Script** that specifies the superscript or subscript style.
0x001C	A 1-byte unsigned integer that specifies whether text is italicized. MUST be 0 or 1. The value of 1 means that the text is italic.
0x001D	A 1-byte unsigned integer that specifies whether text has strikethrough formatting applied. MUST be 0 or 1. The value of 1 means that the text has strikethrough formatting applied.
0x001E	A 1-byte unsigned integer that specifies whether text has an outline style. MUST be 0 or 1. The value of 1 means that the text is outline style.
0x001F	A 1-byte unsigned integer that specifies whether text has a shadow style. MUST be 0 or 1. The value of 1 means that the text is shadow style.
0x0020	A 1-byte unsigned integer that specifies whether text is condensed. MUST be 0 or 1. The value of 1 means that the text is condensed.
0x0021	A 1-byte unsigned integer that specifies whether text is extended. MUST be 0 or 1. The value of 1 means that the text is extended.
0x0022	A 1-byte unsigned integer that specifies a character set. For more information about character sets, see the Windows API LOGFONT structure in [MSDN-FONTS].
0x0023	A 1-byte unsigned integer that specifies a font family. For more information about font families, see the Windows API LOGFONT structure in [MSDN-FONTS]. MUST

	be greater than or equal to 0 and less than or equal to 5.
0x0024	A 4-byte unsigned integer that specifies text size in twips. MUST be greater than or equal to 20 and less than or equal to 8191.
0x0025	A **FontScheme** that specifies the font scheme of a theme font.
0x0026	A number format as specified by [MS-XLS] section 2.5.126 that specifies the number format string.
0x0029	An Ifmt that specifies the identifier of a number format.
0x002A	A 2-byte signed integer that specifies the relative text indentation level. The relative indentation level will be added to any previous indentation. The value MUST either be greater than or equal to -15 and less than or equal to 15, or it MUST be 255. Values -15 through 15 specify a relative indentation level, and the value 255 specifies the absence of a relative indentation level.
0x002B	A 1-byte unsigned integer that specifies whether the locked protection property is set to true. MUST be 0 or 1. The value of 1 means that the property is set to true.
0x002C	A 1-byte unsigned integer that specifies whether the hidden protection property is set to true. MUST be 0 or 1. The value of 1 means that the property is set to true.

2.5.128 XFPropBorder

This structure specifies border formatting.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
color																															
...																															
dgBorder																															

color (8 bytes): An XFPropColor that specifies the border color.

dgBorder (2 bytes): A BorderStyle that specifies the border **line style**.

2.5.129 XFPropColor

This structure specifies a color.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
A	xclrType							icv								nTintShade															
dwRgba																															

A - fValidRGBA (1 bit): A bit that specifies whether the **xclrType, icv** and **nTintShade** fields have been used to set the **dwRgba** field. MUST equal 1.

xclrType (7 bits): An unsigned integer that specifies how the color information is stored. MUST be a value from the following table:

Value	Meaning
0x00	Automatic foreground and background colors
0x01	**Palette color**. The value of **icv** MUST be less than or equal to 220.
0x02	RGBA (red-green-blue-alpha) color
0x03	Theme color. The value of **icv** MUST be less than or equal to 11.
0x04	Color not set.

icv (1 byte): An unsigned integer that specifies color information. The type and meaning of this field depends on the value of the **xclrType** field and is specified by the following tables:

Value of **xclrType**	Meaning of **icv** field
0x00	Undefined and MUST be ignored.
0x01	An Icv that specifies a color from a color palette.
0x02	Undefined and MUST be ignored.
0x03	An unsigned integer that specifies a sub-element of the clrScheme element in the Theme part ABNF as defined in [ECMA-376] Part 3, Section 5.1.8.2 that specifies a color. The following table specifies which sub-element of clrScheme to use for each legal value of the index:

Value of index	Sub-element of clrScheme
0x00	dk1
0x01	lt1
0x02	dk2
0x03	lt2
0x04	accent1
0x05	accent2
0x06	accent3
0x07	accent4
0x08	accent5
0x09	accent6
0x0A	hlink
0x0B	folHlink

nTintShade (2 bytes): A signed integer that specifies the tint of the color. This value is mapped to the range -1.0 to 1.0. Positive values lighten the color, and negative values darken the color. MUST NOT equal -32768.

dwRgba (4 bytes): A LongRGBA that specifies the color.

2.5.130 XFPropGradient

This structure specifies a gradient fill.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
type																															
numDegree																															
...																															
numFillToLeft																															
...																															
numFillToRight																															
...																															
numFillToTop																															
...																															
numFillToBottom																															
...																															

type (4 bytes): A signed integer that specifies the gradient type. MUST be a value from the following table:

Value	Meaning
0x00000000	Linear gradient
0x00000001	Rectangular gradient

numDegree (8 bytes): An Xnum that specifies the gradient angle in degrees for linear gradients. The gradient angle specifies the angle at which gradient strokes are drawn. If **type** equals 0x00000001 this value MUST equal 0.0.

numFillToLeft (8 bytes): An Xnum that specifies the left coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left hand corner of the inner rectangle. MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000 this value MUST equal 0.0.

numFillToRight (8 bytes): An Xnum that specifies the right coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left hand corner of the inner rectangle. MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000 this value MUST equal 0.0.

numFillToTop (8 bytes): An Xnum that specifies the top coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left hand corner of the inner rectangle. MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000 this value MUST equal 0.0.

numFillToBottom (8 bytes): An Xnum that specifies the bottom coordinate of the inner rectangle for rectangular gradients, where (0.0,0.0) is the upper-left hand corner of the inner rectangle. MUST be greater than or equal to 0.0 and less than or equal to 1.0. If **type** equals 0x00000000 this value MUST equal 0.0.

2.5.131 XFPropGradientStop

This structure specifies a gradient stop for a gradient fill.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
unused	numPosition
...	
...	color
...	
...	

unused (2 bytes): Undefined and MUST be ignored.

numPosition (8 bytes): An Xnum that specifies the gradient stop position. The gradient stop position is the position within the gradient range where this gradient stop's color begins. MUST be greater than or equal to 0.0 and less than or equal to 1.0.

color (8 bytes): An XFPropColor that specifies the gradient stop color.

2.5.132 XFProps

This structure specifies an array of formatting properties.

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
reserved	cprops
xfPropArray (variable)	
...	

reserved (2 bytes): MUST be zero and MUST be ignored.

cprops (2 bytes): An unsigned integer that specifies the number of XFProp structures in **xfPropArray.** MUST match the number of XFProp structures.

xfPropArray (variable): An array of XFProp. Each array element specifies a formatting property. The array of properties specifies the full set of formatting properties. If the array contains an XFProp with an **xfPropType** field equaling 0, the array MUST not contain any XFProp elements with **xfPropType** fields equaling 3 or 4. If the array contains an XFProp with an **xfPropType** field equaling 3 or 4, the array MUST not contain any XFProp elements with an **xfPropType** field equaling 0.

2.5.133 XFPropTextRotation

This structure specifies the text rotation.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
trot																															

trot (1 byte): An unsigned integer that specifies the text rotation. MUST be a value from the following table:

Value	Meaning
0x00 to 0x5A (0 to 90)	Text rotated counterclockwise 0 to 90 degrees
0x5B to 0xB4 (91 to 180)	Text rotated clockwise 1 to 90 degrees
0xFE (254)	Context dependent text rotation
0xFF (255)	Vertical text

2.5.134 XLNameWideString

This structure specifies a defined name.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
string (variable)																															
...																															

string (variable): An XLWideString that specifies the name. The length of the string MUST NOT exceed 255 characters.

The string MUST adhere to the following grammar:

```
string =  name-start-character *name-character

name-start-character =  "_" /   "\" /  Unicode-character
```

```
name-character =  name-start-character  / "?" / 0x061F / "."  /  Unicode-digit
```

where:

Unicode-character is any code point which is a character as defined by the Unicode character properties, Chapter Four of [UNICODE4.0]

Unicode-digit is any code point which is a digit as defined by the Unicode character properties, Chapter Four of [UNICODE4.0]

The string MUST NOT equal "TRUE" or "FALSE" (case-insensitive).

The string MUST NOT be an A1 or R1C1 cell reference.

An R1C1 cell reference is defined to be:

```
R1C1-cell-reference= R1C1-row R1C1-column / R1C1-column R1C1-row

R1C1-row = letter-r row-number

letter-r = "R" / "r"

R1C1-column = letter-c column-number

letter-c = "C" / "c"

column-number = 1-16384

    ; A string composed of Unicode digits (see definition above) that represents an unsigned
    integer that is greater than or equal to 1 and less than or equal to 16384

row-number = 1-1048576

    ; A string composed of unicode digits (see definition above) that represents an unsigned
    integer that is greater than or equal to 1 and less than or equal to 1048576.
```

An A1 cell reference is defined to be:

```
A1-reference  = A1-column A1-Row

A1-row = row-number

   ; See definition of row-number in R1C1 cell reference grammar above.

A1-column = 1*2 az-letter / aw-letter az-letter az-letter / "X" ae-letter az-letter / "X" "F" ad-letter

ad-letter = "A" / "B" / "C" / "D" / "a" / "b" / "c" / "d"

ae-letter = ad-letter / "E" / "e"
```

aw-letter = ae-letter / "F" / "G" / "H" / "I" / "J" / "K" / "L" / "M" / "N" / "O" / "P" / "Q" / "R" / "S" / "T" / "U" / "V" / "W" / "f" / "g" / "h" / "i" / "j" / "k" / "l" / "m" / "n" / "o" / "p" / "q" / "r" / "s" / "t" / "u" / "v" / "w"

az-letter = aw-letter / "X" / "Y" / "Z" / "x" / "y" / "z"

2.5.135 XLNullableWideString

This type specifies a length-prefixed Unicode string that can additionally specify a string that is NULL. For convenience, references to characters in a string specified by this or a derived type use those Unicode characters.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cchCharacters																															
rgchData (variable)																															
...																															

cchCharacters (4 bytes): An unsigned integer that specifies the number of characters. MUST be 0xFFFFFFFF if a NULL string is specified.

rgchData (variable): An array of Unicode characters that specifies the characters of the string. If a NULL string is specified the size of this array in bytes MUST be 0. If a NULL string is not specified the size of this array in bytes MUST equal the following formula:

cchCharacters * 2

2.5.136 XLView

This enumeration specifies the way information is displayed in a sheet view.

Name	Value	Meaning
XLVNORMAL	0x00000000	Information is displayed in Normal view.
XLVSHEETLAYOUTVIEW	0x00000001	Information is displayed in Page Break Preview view.
XLVPAGELAYOUTVIEW	0x00000002	Information is displayed in Page Layout view.

2.5.137 XLWideString

This type specifies a length-prefixed Unicode string. For convenience, references to characters in a string specified by this or a derived type use those Unicode characters.

0	1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	20	1	2	3	4	5	6	7	8	9	30	1
cchCharacters																															
rgchData (variable)																															

...

cchCharacters (4 bytes): An unsigned integer that specifies the number of characters. MUST be greater than or equal to 0x00000000 and less than 0xFFFFFFFF.

rgchData (variable): An array of Unicode characters that specifies the characters of the string. The size of this array in bytes MUST equal the following formula:

cchCharacters * 2

2.5.138 XmlDataType

An enumeration that specifies a subset of XML data types, as specified by [W3C-XSD]. MUST be a value from the following table. Note, the following table uses *xs* as the prefix for the namespace "http://www.w3.org/2001/XMLSchema".

Name	Value	Meaning
MSOXIDTSTRING	0x00000001	Specifies the xs:string type.
MSOXIDTNORMALIZEDSTRING	0x00000002	Specifies the xs:normalizedString type.
MSOXIDTTOKEN	0x00000003	Specifies the xs:token type.
MSOXIDTBYTE	0x00000004	Specifies the xs:byte type.
MSOXIDTUNSIGNEDBYTE	0x00000005	Specifies the xs:unsignedByte type.
MSOXIDTBASE64BINARY	0x00000006	Specifies the xs:base64Binary type.
MSOXIDTHEXBINARY	0x00000007	Specifies the xs:hexBinary type.
MSOXIDTINTEGER	0x00000008	Specifies the xs:integer type.
MSOXIDTPOSITIVEINTEGER	0x00000009	Specifies the xs: positiveInteger type.
MSOXIDTNEGATIVEINTEGER	0x0000000A	Specifies the xs:negativeInteger type.
MSOXIDTNONPOSITIVEINTEGER	0x0000000B	Specifies the xs:nonPositiveInteger type.
MSOXIDTNONNEGATIVEINTEGER	0x0000000C	Specifies the xs:nonNegativeInteger type.
MSOXIDTINT	0x0000000D	Specifies the xs:int type.
MSOXIDTUNSIGNEDINT	0x0000000E	Specifies the xs:unsignedInt type.
MSOXIDTLONG	0x0000000F	Specifies the xs:long type.
MSOXIDTUNSIGNEDLONG	0x00000010	Specifies the xs:unsignedLong type.
MSOXIDTSHORT	0x00000011	Specifies the xs:short type.
MSOXIDTUNSIGNEDSHORT	0x00000012	Specifies the xs:unsignedShort type.
MSOXIDTDECIMAL	0x00000013	Specifies the xs:decimal type.
MSOXIDTFLOAT	0x00000014	Specifies the xs:float type.
MSOXIDTDOUBLE	0x00000015	Specifies the xs:double type.
MSOXIDTBOOLEAN	0x00000016	Specifies the xs:boolean type.
MSOXIDTTIME	0x00000017	Specifies the xs:time type.
MSOXIDTDATETIME	0x00000018	Specifies the xs:dateTime type.
MSOXIDTDURATION	0x00000019	Specifies the xs:duration type.
MSOXIDTDATE	0x0000001A	Specifies the xs:date type.
MSOXIDTMONTH	0x0000001B	Specifies the xs:gMonth type.
MSOXIDTYEAR	0x0000001C	Specifies the xs:gYear type.
MSOXIDTYEARMONTH	0x0000001D	Specifies the xs:gYearMonth type.

MSOXIDTDAY	0x0000001E	Specifies the xs:gDay type.
MSOXIDTMONTHDAY	0x0000001F	Specifies the xs:gMonthDay type.
MSOXIDTNAME	0x00000020	Specifies the xs:Name type.
MSOXIDTQNAME	0x00000021	Specifies the xs:QName type.
MSOXIDTNCNAME	0x00000022	Specifies the xs:NCName type.
MSOXIDTANYURI	0x00000023	Specifies the xs:anyURI type.
MSOXIDTLANGUAGE	0x00000024	Specifies the xs:language type.
MSOXIDTID	0x00000025	Specifies the xs:ID type.
MSOXIDTIDREF	0x00000026	Specifies the xs:IDREF type.
MSOXIDTIDREFS	0x00000027	Specifies the xs:IDREFS type.
MSOXIDTENTITY	0x00000028	Specifies the xs:ENTITY type.
MSOXIDTENTITIES	0x00000029	Specifies the xs:ENTITIES type.
MSOXIDTNOTATION	0x0000002A	Specifies the xs:NOTATION type.
MSOXIDTNMTOKEN	0x0000002B	Specifies the xs:NMTOKEN type.
MSOXIDTNMTOKENS	0x0000002C	Specifies the xs: NMTOKENS type.
MSOXIDTANYTYPE	0x0000002D	Specifies the xs:anyType type.

2.5.139 XmlMappedXpath

This structure is an XLWideString representing the XPath to the element this column is associated with. The length of this string MUST be greater than or equal to 1 and less than or equal to 31999.

An XPath specified by this structure MUST have the following properties:

- The XPath MUST be an absolute path.
- The XPath MUST return a simple content element or an attribute (as described in [XPATH])
- The XPath MUST NOT express an explicit XPath axes (as described in [XPATH]).

If an XPath specifies a XPath predicate (as described in [XPATH]), it MUST have the following properties:

- The XPath predicate MUST immediately follow a simple content element name.
- The XPath predicate MUST contain a single **XPath expression** comparing an attribute identified by name (as described in [XPATH]) of the preceding element to a specific value.

2.5.140 Xnum

A 64-bit binary **floating-point number** as defined in [IEEE754]. This value MUST NOT <45> be infinity, denormalized, not-a-number (NaN), nor negative zero.

2.5.141 Xti

This structure specifies a supporting link record and scope information for a supporting link.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
externalLink																															
firstSheet																															

lastSheet

externalLink (4 bytes): An unsigned integer that specifies a zero-based index to a supporting link record in the collection of supporting link records in the Workbook part ABNF. This value MUST be less than the count of the supporting link records in that part.

firstSheet (4 bytes): A signed integer that specifies the scope of the supporting link. If **externalLink** refers to a BrtSupAddin, a BrtSupSame or a BrtSupBookSrc that specifies a DDE Data Source or OLE Data Source, this field MUST be -2.

If **externalLink** refers to a BrtSupSelf or a BrtSupBookSrc that specifies an external workbook link, this field MUST be a value from the following table:

Value	Meaning
-2	Workbook-level reference that applies to the entire workbook.
-1	Sheet-level reference. The first sheet in the reference could not be found.
>= 0	Sheet-level reference. This value specifies the first sheet in the reference. If **externalLink** specifies a BrtSupSelf record, then this value specifies a zero-based index of a BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs in the workbook part. If **externalLink** specifies a BrtSupBookSrc record, then this value specifies a zero-based index of an XLWideString in the array specified by the **sheetNames** field in the BrtSupTabs record in the external link part that is specified by the BrtSupBookSrc record. The sheet specified by the part specified by the BrtBundleSh record, or the sheet identified by the sheet name specified by the item in the **sheetNames** field, MUST be a worksheet or macro sheet.

lastSheet (4 bytes): A signed integer that specifies the scope of the supporting link. If **externalLink** refers to a BrtSupAddin, a BrtSupSame or a BrtSupBookSrc that specifies a DDE Data Source or OLE Data Source, this field MUST be -2.

If **externalLink** refers to a BrtSupSelf or a BrtSupBookSrc that specifies an external workbook link, this field MUST be a value from the following table:

Value	Meaning
-2	Workbook-level reference. MUST be used if **firstSheet** equals -2.
-1	Sheet-level reference. The last sheet in the reference could not be found. <46> MUST NOT be used if **firstSheet** equals -2.
>= 0	Sheet-level reference. This value specifies the last sheet in the reference. MUST NOT be

	used if **firstSheet** equals -2. If **externalLink** specifies a BrtSupSelf record, then this value specifies a zero-based index of a BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs in the workbook part. If **externalLink** specifies a BrtSupBookSrc record, then this value specifies a zero-based index of an XLWideString in the array specified by the **sheetNames** field in the BrtSupTabs record in the external link part that is specified by the BrtSupBookSrc record. The sheet specified by the part specified by the BrtBundleSh record, or the sheet identified by the sheet name specified by the item in the **sheetNames** field, MUST be a worksheet or macro sheet. This value MUST be greater than or equal to **firstSheet.**

3 Structure Examples

This section contains examples of some of the most commonly used data structures in MS-XLSB files. The examples are meant to be a starting point for an implementer learning the file format. They are not meant to cover all records in the file format.

The following conventions are followed for all of the examples, unless noted otherwise:

- The order of the records, structures, and field within the example match their corresponding order in the file format.
- The examples begin with the first record relevant to the example and end with the last record relevant to the example. An example cannot be used as a complete and standalone MS-XLSB file.
- The examples are self-contained and contiguous; no records or structures are omitted in the middle of an example.
- Undefined and ignored fields are not included in the field explanations.
- Offsets for records and structures are omitted due to the fact that these values may vary depending on how the files are created and what optional records applications choose to include in files.

3.1 Example: Conditional Formatting

In this example, cell A2 has had conditional formatting applied such that the cell displays a light red background when the cell value is greater than or equal to 1.5 and less than or equal to 2.5.

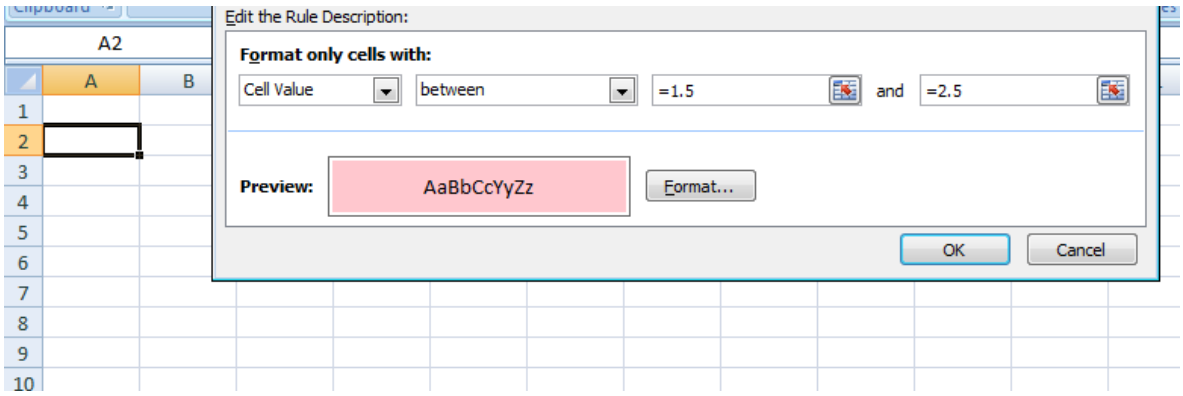


Figure 21: Conditional formatting within a sheet

This set of records in this example includes all records in the worksheet part that appear between the BrtBeginConditionalFormatting and BrtEndConditionalFormatting records.

The range of cells to which the formatting is applied is defined in the BrtBeginConditionalFormatting record. Then, a BrtBeginCFRule record specifies the properties of the conditional formatting rule; it contains a BrtBeginCFRule record that defines the conditional formatting rule.

3.1.1 Example: Conditional Formatting: BrtBeginConditionalFormatting

In this example, cell A2 has had conditional formatting applied such that the cell displays a light red background when the cell value is greater than or equal to 1.5 and less than or equal to 2.5.

This set of records in this example includes all records in the worksheet part that appear between the BrtBeginConditionalFormatting and BrtEndConditionalFormatting records.

The range to which the formatting is applied is defined in the BrtBeginConditionalFormatting record. A BrtBeginCFRule record specifies the rule properties of the conditional formatting. A BrtDXF record specifies the cell formatting properties of the conditional formatting.

The first record in this example, BrtBeginConditionalFormatting, specifies the target range of cells to which the conditional formatting is applied.

Size	Structure	Value
001C	BrtBeginConditionalFormatting - **BrtBeginConditionalFormatting**	
0004	LONG - **ccf**	0x00000001
0004	BOOL - **fPivot**	0x00000000
0014	SQRFX - **sqrfx**	
0004	LONG - **crfx**	0x00000001
0010	UncheckedRgRfX - **rgrfx**	
0010	UncheckedRfX - **rfx[0]**	
0004	LONG - **rwFirst**	0x00000001
0004	LONG - **rwLast**	0x00000001
0004	LONG - **colFirst**	0x00000000
0004	LONG - **colLast**	0x00000000

Figure 22: Structure of BrtBeginConditionalFormatting

ccf: 0x00000001 specifies that there is one related BrtBeginCFRule record in the BrtBeginConditionalFormatting collection.

fPivot: 0x00000000 specifies that this conditional formatting rule applies to cells that are not part of a PivotTable.

sqrfx: An UncheckedSqRfX that specifies a set of UncheckedRfX.

sqrfx.crfx: 0x00000001 specifies that there is one UncheckedRfX structure in **sqrfx.rgrfx**.

sqrfx.rgrfx: An array of UncheckedRfX structures.

sqrfx.rgrfx.rfx[0]: An UncheckedRfX structure that specifies the conditional formatting rule's target range.

sqrfx.rgrfx.rfx[0].rwFirst: 0x00000001 specifies that the first row in the target range is row 2.

sqrfx.rgrfx.rfx[0].rwLast: 0x00000001 specifies that the last row in the target range is row 2.

sqrfx.rgrfx.rfx[0].colFirst: 0x00000000 specifies that the first column in the target range is column A.

sqrfx.rgrfx.rfx[0].colLast: 0x00000000 specifies that the last column in the target range is column A.

3.1.2 Example: Conditional Formatting: BrtBeginCFRule

This record specifies a conditional formatting rule for the range defined in the BrtBeginConditionalFormatting record.

Size	Structure	Value
0050	BrtBeginCFRule - **BrtBeginCFRule**	
0004	CFType - **iType**	0x00000001
0004	CFTemp - **iTemplate**	0x00000000
0004	DWORD - **dxfId**	0x00000000
0004	LONG - **iPri**	0x00000001
0004	LONG - **iParam**	0x00000001
0004	LONG - **reserved1**	0x00000000
0004	LONG - **reserved2**	0x00000000
1 bit	WORD - **reserved3**	0x0
1 bit	WORD - **fStopTrue**	0x0
1 bit	WORD - **fAbove**	0x0
1 bit	WORD - **fBottom**	0x0
1 bit	WORD - **fPercent**	0x0
11 bits	WORD - **reserved4**	0x000
0004	DWORD - **cbfmla1**	0x00000009
0004	DWORD - **cbfmla2**	0x00000009
0004	DWORD - **cbfmla3**	0x00000000
0004	XLNullableWideString - **strParam**	null string
0011	CFParsedFormula - **rgce1**	
0004	DWORD - **cce**	0x00000009
0009	Rgce - **rgce**	
0009	ptg - **rgce[0]**	
0009	PtgNum - **PtgNum**	
7 bits	BYTE - **ptg**	0x1F
1 bit	BYTE - **reserved0**	0x0
0008	Double - **value**	0x3FF8000000000000
0004	DWORD - **cb**	0x00000000
0011	CFParsedFormula - **rgce2**	
0004	DWORD - **cce**	0x00000009
0009	Rgce - **rgce**	
0009	ptg - **rgce[0]**	
0009	PtgNum - **PtgNum**	
7 bits	BYTE - **ptg**	0x1F
1 bit	BYTE - **reserved0**	0x0
0008	Double - **value**	0x4004000000000000
0004	DWORD - **cb**	0x00000000

Figure 23: Structure of BrtBeginCFRule

iType: 0x00000001 corresponds to the CFType value of CF_TYPE_CELLIS and specifies that cells will be formatted based on their values.

iTemplate: 0x00000000 corresponds to the CFTemp value of CF_TEMPLATE_EXPR and is required because **itype** is equal to CR_TYPE_CELLIS. This value specifies that cells will be formatted based on their values.

dxfId: 0x00000000 specifies that the formatting style applied to the cells when the condition is true is specified in the first BrtDXF record in the collection of records directly following BrtBeginDXFs in the styles part.

iPri: 0x00000001 specifies that this rule is evaluated first when multiple BrtBeginCFRule records are present.

iParam: 0x00000001 corresponds to the CFOper value of CF_OPER_BN. This value specifies that this rule evaluates to True when the cell value is greater than or equal to the value specified by **rgce1** and less than or equal to the value specified by **rgce2**.

fStopTrue: 0x0 specifies that conditional formatting rules with larger **iPri** values than this BrtBeginCFRule will be evaluated whether the rule evaluates to True or False.

fAbove: 0x0 because **iTemplate** is not equal to CF_TEMPLATE_ABOVEAVERAGE or CF_TEMPLATE_EQUALABOVEAVERAGE.

fBottom: 0x0 because **iType** is not equal to CF_TYPE_FILTER.

fPercent: 0x0 because **iType** is not equal to CF_TYPE_FILTER.

cbfmla1: 0x00000009 specifies that there are 9 bytes in **rgce1.rgce**.

cbfmla2: 0x00000009 specifies that there are 9 bytes in **rgce2.rgce**.

cbfmla3: 0x00000000 specifies that **rgce3** does not exist.

strParam: A null string because the value of **iTemplate** is not CF_TEMPLATE_CONTAINSTEXT.

rgce1.cce: 0x00000009 specifies that there are 9 bytes in **rgce1.rgce**.

rgce1.rgce: A CFParsedFormula that specifies the first formula used in this conditional formatting rule.

rgce1.rgce.rgce[0]: An Rgce that specifies the sequence of Ptg structures for the formula.

rgce1.rgce.rgce[0].PtgNum: An operand that specifies a floating point value. This is the lower limit for the Between condition of this conditional formatting rule.

rgce1.rgce.rgce[0].PtgNum.ptg: 0x1F specifies that this parse token, as specified in Formulas, is of type PtgNum.

rgce1.rgce.rgce[0].PtgNum.value: 0x3FF8000000000000 specifies a 64-bit IEEE-754 floating-point value of 1.5.

rgce1.cb: 0x00000000 specifies that the rgcb field does not exist.

rgce2.cce: 0x00000009 specifies that there are 9 bytes in **rgce2.rgce**.

rgce2.rgce.rgce[0]: An Rgce that specifies the sequence of Ptg structures for the formula.

rgce2.rgce.rgce[0].PtgNum: An operand that specifies a floating point value. This is the upper limit for the Between condition of this conditional formatting rule.

rgce2.rgce.rgce[0].PtgNum.ptg: 0x1F specifies that this parse token is of type PtgNum.

rgce2.rgce.rgce[0].PtgNum.value: 0x4004000000000000 specifies a 64-bit IEEE-754 floating-point value of 2.5.

rgce2.cb: 0x00000000 specifies that the rgcb field does not exist.

3.1.3 Example: Conditional Formatting: BrtEndCFRule

This record indicates the end of the conditional formatting rule.

Size	Structure
0000	BrtEndCFRule - **BrtEndCFRule**

Figure 24: Structure of BrtEndCFRule

3.1.4 Example: Conditional Formatting: BrtEndConditionalFormatting

This record indicates the end of conditional formatting information for a range.

Size	Structure
0000	BrtEndConditionalFormatting - **BrtEndConditionalFormatting**

Figure 25: Structure of BrtEndConditionalFormatting

3.1.5 Example: Conditional Formatting: BrtDXF

This next record in this example is the BrtDXF referenced by the **dxfid** field of the BrtBeginCFRule record, which specifies the formatting that will be applied to the range specified by BrtBeginConditionalFormatting when the condition evaluates to True.

Size	Structure	Value
0012	BrtDXF - **BrtDxf**	
15 bits	WORD - **unused**	0x0000
1 bit	WORD - **fNewBorder**	0x1
0010	XFProps - **xfprops**	
0002	USHORT - **reserved**	0x0000
0002	USHORT - **cprops**	0x0001
000C	XfPropArray - **xfPropArray**	
000C	XFProp - **xfProp[0]**	
0002	USHORT - **xfpropType**	0x0002
0002	USHORT - **cb**	0x000C
0008	XfPropDataBlob - **xfPropDataBlob**	
0008	XFPropColor - **XfPropColor**	
1 bit	BYTE - **fValidRGBA**	0x1
7 bits	BYTE - **xclrType**	0x02
0001	XFPropColorICV - **icv**	
0002	SHORT - **nTintShade**	0x0000
0004	LongRGBA - **dwRgba**	
0001	BYTE - **red**	0xFF
0001	BYTE - **green**	0xC7
0001	BYTE - **blue**	0xCE
0001	BYTE - **alpha**	0xFF

Figure 26: Structure of BrtDxf

fNewBorder: 0x1 specifies that internal border formatting can be used in the XFProps specified in **xfprops**.

xfprops: An XFProps structure that specifies cell formatting properties.

xfprops.cprops: 0x0001 specifies that there is one XFProp structure in **xfprops.xfPropArray**.

xfprops.xfPropArray: An array of XFProp structures. Each array element specifies a cell formatting property.

xfprops.xfPropArray.xfProp[0]: A XFProp structure that specifies a cell formatting property.

xfprops.xfPropArray.xfProp[0].xfpropType: 0x0002 specifies that this cell formatting property specifies a cell background color.

xfprops.xfPropArray.xfProp[0].cb: 0x000C specifies the size of this XFProp structure is 12 bytes.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob: A variable field that specifies the cell formatting property data.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor: An XFPropColor structure that specifies the background color that will be applied to the cell if the conditional formatting rule evaluates to True.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.fValidRGBA: 0x1 specifies that the **xclrType**, **icv** and **nTintShade** fields have been used to set the **dwRgba** field.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.xclrType: 0x02 specifies that the color information is stored as RGBA (red-green-blue-alpha).

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.icv: Undefined and ignored because **xclrType** is 0x02.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.nTintShade: 0x0000 specifies that the color defined in **dwRgba** will be used without being lightened or darkened.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba: A LongRGBA that specifies a light red background color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.red: 0xFF specifies the relative intensity of the red component of this color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.green: 0xC7 specifies the relative intensity of the green component of this color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.blue: 0xCE specifies the relative intensity of the blue component of this color.

xfprops.xfPropArray.xfProp[0].xfPropDataBlob.XfPropColor.dwRgba.alpha: 0xFF specifies the alpha component of this color.

3.2 Example: Defined Name

This example shows a defined name that refers to the absolute cell reference E4 on the second sheet of the file. The defined name is specified by a BrtName record.

This example includes all of the records that define supporting links for the defined name. Together, these records specify which workbook and which sheet the defined name is referring to. These records are stored between BrtBeginExternals/BrtEndExternals records: BrtSupSelf and BrtExternSheet.

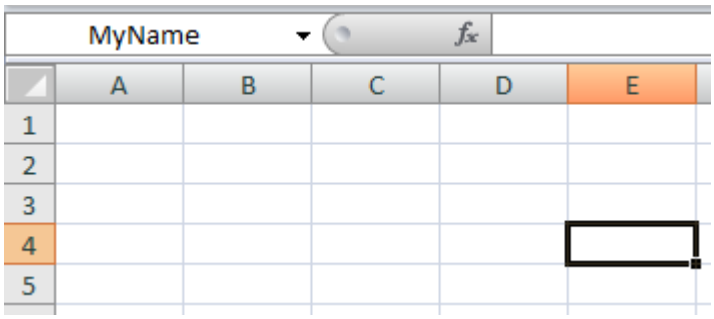


Figure 27: Defined name within a sheet

3.2.1 Example: Defined Name: BrtName

The first record in this example, BrtName, defines the properties of the defined name.

Size	Structure	Value
002E	BrtName - **BrtName**	
1 bit	DWORD - **fHidden**	0x0
1 bit	DWORD - **fFunc**	0x0
1 bit	DWORD - **fOB**	0x0
1 bit	DWORD - **fProc**	0x0
1 bit	DWORD - **fCalcExp**	0x0
1 bit	DWORD - **fBuiltin**	0x0
9 bits	DWORD - **fgrp**	0x000
1 bit	DWORD - **fPublished**	0x0
1 bit	DWORD - **fWorkbookParam**	0x0
1 bit	DWORD - **unused**	0x0
14 bits	DWORD - **reserved**	0x0000
0001	BYTE - **chKey**	0x00
0004	DWORD - **itab**	0xFFFFFFFF
0010	XLNameWideString - **name**	MyName
0011	NameParsedFormula - **formula**	
0004	DWORD - **cce**	0x00000009
0009	Rgce - **rgce**	
0009	PtgRef3d - **PtgRef3d**	
0001	BYTE - **ptg**	0x1A
0001	PtgDataType - **type**	0x01
0001	BYTE - **reserved**	0x00
0002	USHORT - **ixti**	0x0000
0006	RgceLoc - **loc**	
0004	UncheckedRw - **row**	0x00000003
0002	ColRelShort - **column**	
14 bits	USHORT - **col**	0x0004
1 bit	DWORD - **fColRel**	0x0
1 bit	DWORD - **fRwRel**	0x0
0004	DWORD - **cb**	0x00000000
0004	XLNullableWideString - **comment**	

Figure 28: Structure of BrtName

fHidden: 0x0 specifies that the defined name is not hidden.

fFunc: 0x0 specifies that the defined name does not represent an XLM macro.

fOB: 0x0 specifies that the defined name does not represent a **VBA** macro.

fProc: 0x0 specifies that the defined name does not represent a macro.

fCalcExp: 0x0 specifies that the **formula.rgce** field does not contain a call to a function that can return an array.

fBuiltin: 0x0 specifies that the defined name does not represent a built-in name.

fPublished: 0x0 specifies that the defined name was not published.

fWorkbookParam: 0x0 specifies that the defined name is not a workbook parameter.

chKey: 0x00 specifies that there is no shortcut key for the macro represented by the defined name. This is equal to 0 because **fProc** is 0.

itab: 0xFFFFFFFF specifies that the scope of the defined name is the entire workbook.

name: "MyName" specifies the name of the defined name.

formula: a NameParsedFormula that contains the formula that specifies the sheet and cell range of the workbook associated with the name.

formula.cce: 0x00000009 specifies that there are 9 bytes in **formula.rgce**.

formula.rgce: an Rgce that contains the Ptgs that make up the formula.

formula.rgce.PtgRef3d: a Ptg in the formula.

formula.rgce.PtgRef3d.ptg: 0x1A specifies that this Ptg is of type PtgRef3d.

formula.rgce.PtgRef3d.type: 0x01 specifies that this PtgRef3d specifies a reference to a range of cells.

formula.rgce.PtgRef3d.ixti: 0x0000 specifies that this PtgRef3d refers to the first Xti in the BrtExternSheet record shown in this example.

formula.rgce.PtgRef3d.loc: a RgceLoc that specifies the coordinates of the referenced cell.

formula.rgce.PtgRef3d.loc.row: 0x00000003 specifies that the defined name refers to row 4 of the worksheet.

formula.rgce.PtgRef3d.loc.column: specifies the column and that the row and column references are **absolute references**.

formula.rgce.PtgRef3d.loc.column.col: 0x0004 specifies that the defined name refers to column E of the worksheet.

formula.rgce.PtgRef3d.loc.column.fColRel: 0x0 specifies that the column is an absolute reference.

formula.rgce.PtgRef3d.loc.column.fRwRel: 0x0 specifies that the row is an absolute reference.

comment: an XLNullableWideString that specifies a NULL string, which means that there is no comment.

3.2.2 Example: Defined Name: BrtBeginExternals

The next record in this example, BrtBeginExternals, specifies the beginning of a collection of Supporting Links.

Size	Structure
0000	BrtBeginExternals **- BrtBeginExternals**

Figure 29: Structure of BrtBeginExternals

3.2.3 Example: Defined Name: BrtSupSelf

The next record in this example, a BrtSupSelf record, specifies that this supporting link points back into the same workbook.

Size	Structure
0000	BrtSupSelf - **BrtSupSelf**

Figure 30: Structure of BrtSupSelf

3.2.4 Example: Defined Name: BrtExternSheet

The next record in this example, BrtExternSheet, contains the set of supporting links and specifies the scope of those links.

Size	Structure	Value
0010	BrtExternSheet - **BrtExternSheet**	
0004	DWORD - **cXti**	0x00000001
000C	RgXti - **rgXti**	
000C	Xti - **xti[0]**	
0004	DWORD - **externalLink**	0x00000000
0004	LONG - **firstSheet**	0x00000001
0004	LONG - **lastSheet**	0x00000001

Figure 31: Structure of BrtExternSheet

cXti: 0x00000001 specifies that there is 1 Xti record in the **rgXti** field.

rgXti.xti[0].externalLink: 0x00000000 specifies that this Xti record refers to the first supporting link record in the collection of supporting link records, which is the BrtSupSelf record as specified earlier.

rgXti.xti[0].firstSheet: 0x00000001 specifies that the first sheet referenced by the defined name is the second sheet in the workbook (Sheet2). The related BrtBundleSh record has been omitted for brevity.

rgXti.xti[0].lastSheet: 0x00000001 specifies that the last sheet referenced by the defined name is the second sheet in the workbook (Sheet2).

3.2.5 Example: Defined Name: BrtEndExternals

The last record in this example, BrtEndExternals, specifies the end of a collection of supporting links.

Size	Structure
0000	BrtEndExternals - **BrtEndExternals**

Figure 32: Structure of BrtEndExternals

3.3 Example: Table

This example is a workbook where the range C4:E7 contains values and is formatted as a table. The column "Sales Tax" is a calculated column that contains the formula "=Table1[[#This Row],[Price]]*.08".

The following figure shows a possible implementation of the table in this example:

	A	B	C	D	E
1					
2					
3					
4			Item	Price	Sales Tax
5			Bicycle	50	4
6			Backpack	24	1.92
7			Shoes	60	4.8

Figure 33: Table within a sheet

The example specifies a table as a collection of records between BrtListPart and BrtEndList records in the worksheet part. The table properties are specified with the BrtBeginList, BrtBeginListCols, BrtBeginListCol, BrtEndListCol, BrtEndListCols, BtListCCFmla, BrtTableStyleClient records in the Table part. The table AutoFilter settings are specified with BrtBeginAFilter and BrtEndAFilter in the worksheet part.

3.3.1 Example: Table: BrtListPart

The first record in this example is the BrtListPart record, which appears in the Worksheet part ABNF and indicates the Table part associated with the table.

Size	Structure	Value
000C	BrtListPart - **BrtListPart**	
000C	RelID - **stRelID**	rId3

Figure 34: Structure of BrtListPart

stRelID: "rId3" specifies the RelID listed in the relationship part for this sheet. This RelID identifies the relationship element that specifies the path to the Table part within the package.

3.3.2 Example: Table: BrtBeginList

The next record in this example, BrtBeginList, specifies the table properties and specifies the beginning of the collection of records that specify this table.

Size	Structure	Value
0064	BrtBeginList - **BrtBeginList**	
0010	RfX - **rfxList**	
0004	LONG - **rwFirst**	0x00000003
0004	LONG - **rwLast**	0x00000006
0004	LONG - **colFirst**	0x00000002
0004	LONG - **colLast**	0x00000004
0004	ListType - **lt**	0x00000000
0004	DWORD - **idList**	0x00000001
0004	DWORD - **crwHeader**	0x00000001
0004	DWORD - **crwTotals**	0x00000000
1 bit	DWORD - **fShownTotalRow**	0x0
1 bit	DWORD - **fSingleCell**	0x0
1 bit	DWORD - **fForceInsertToBeVisible**	0x0
1 bit	DWORD - **fInsertRowInsCells**	0x0
1 bit	DWORD - **fPublished**	0x0
27 bits	DWORD - **reserved**	0x0000000
0004	DWORD - **nDxfHeader**	0xFFFFFFFF
0004	DWORD - **nDxfData**	0xFFFFFFFF
0004	DWORD - **nDxfAgg**	0xFFFFFFFF
0004	DWORD - **nDxfBorder**	0xFFFFFFFF
0004	DWORD - **nDxfHeaderBorder**	0xFFFFFFFF
0004	DWORD - **nDxfAggBorder**	0xFFFFFFFF
0004	DWORD - **dwConnID**	0x00000000
0004	XLNullableWideString - **stName**	null string
0010	XLNullableWideString - **stDisplayName**	Table1
0004	XLNullableWideString - **stComment**	empty string
0004	CellStyleName - **stStyleHeader**	null string
0004	CellStyleName - **stStyleData**	null string
0004	CellStyleName - **stStyleAgg**	null string

Figure 35: Structure of BrtBeginList

rfxList: This specifies the range of cells that the table occupies. This refers to the range C4:E7.

rfxList.rwFirst: 0x00000003 specifies the first row of the range is 4.

rfxList.rwLast: 0x00000006 specifies the last row of the range is 7.

rfxList.colFirst: 0x00000002 specifies the first column of the range is C.

rfxList.colLast: 0x00000004 specifies the last column of the range is E.

lt: 0x00000000 specifies the table is a standard table.

idList: 0x00000001 specifies the numeric identifier of the table is 1.

crwHeader: 0x00000001 specifies the header row is displayed.

crwTotals: 0x00000000 specifies the total row is hidden.

fShownTotalRow: 0x0 specifies the table total row has never been displayed for this table.

fSingleCell: 0x0 specifies the table is not a single cell table.

fForceInsertToBeVisible: 0x0 specifies the table insert row is not displayed.

fInsertRowInsCells: 0x0 specifies that cells in the sheet were not automatically inserted when the table insert row was displayed for this table.

fPublished: 0x0 specifies the table is not published.

nDxfHeader: 0xFFFFFFFF specifies that differential formatting is not applied to the table header row.

nDxfData: 0xFFFFFFFF specifies that differential formatting is not applied to the table data region.

nDxfAgg: 0xFFFFFFFF specifies that differential formatting is not applied to the table total row that.

nDxfBorder: 0xFFFFFFFF specifies that differential formatting is not applied to the borders of the table data region.

nDxfHeaderBorder: 0xFFFFFFFF specifies that differential formatting is not applied to the borders of the table header row.

nDxfAggBorder: 0xFFFFFFFF specifies that differential formatting is not applied to the borders of the table total row.

dwConnID: 0x00000000 specifies that there is no external connection for this table. This value is required in this field because the **lt** field is not equal to LTXML.

stName: NULL string specifies that the **stDisplayName** field is the name used for programmatic purposes.

stDisplayName: "Table1" specifies the string identifier of the table. This identifier is used for both programmatic purposes and for the displayed string in formulas because **stName** is NULL.

stComment: The empty string specifies that there is no comment.

stStyleHeader: NULL specifies that no cell style is applied to the table header row.

stStyleData: NULL specifies that no cell style is applied to the table data region.

stStyleAgg: NULL specifies that no cell style is applied table total row.

3.3.3 Example: Table: BrtBeginAFilter

The next record in this example, BrtBeginAFilter, specifies the range of cells the AutoFilter applies to and specifies the beginning of the collection of records that specifies the AutoFilter for the table.

Size	Structure	Value
0010	BrtBeginAFilter - **BrtBeginAfilter**	
0010	UncheckedRfX - **rfx**	
0004	LONG - **rwFirst**	0x00000003
0004	LONG - **rwLast**	0x00000006
0004	LONG - **colFirst**	0x00000002
0004	LONG - **colLast**	0x00000004

Figure 36: Structure of BrtBeginAfilter

rfx: Specifies the range of cells the AutoFilter applies to. This range, which is the same as the range of the table, is C4:E7.

rfx.rwFirst: 0x00000003 specifies the first row of the range is 4.

rfx.rwLast: 0x00000006 specifies the last row of the range is 7.

rfx.colFirst: 0x00000002 specifies the first column of the range is C.

rfx.colLast: 0x00000004 specifies the last column of the range is E.

3.3.4 Example: Table: BrtEndAFilter

The next record in this example, BrtEndAFilter, specifies the end of the collection of records that specify the AutoFilter for the table. No filtering is applied because there are zero records between the preceding BrtBeginAFilter record and this record.

Size	Structure
0000	BrtEndAFilter - **BrtEndAfilter**

Figure 37: Structure of BrtEndAfilter

3.3.5 Example: Table: BrtBeginListCols

The next record in this example, BrtBeginListCols, specifies the number of table columns and specifies the beginning of the collection of records that specifies the set of table columns for this table.

Size	Structure	Value
0004	BrtBeginListCols - **BrtBeginListCols**	
0004	ULONG - **nCols**	0x00000003

Figure 38: Structure of BrtBeginListCols

nCols: 0x00000003 specifies that the table has three columns.

3.3.6 Example: Table: BrtBeginListCol

The next record in the example, BrtBeginListCol, specifies the properties of the first column in the table, which begins with the header "Item" and specifies the begging of a collection of records that specify additional properties of the table column.

Size	Structure	Value
0038	BrtBeginListCol - **BrtBeginListCol**	
0004	DWORD - **idField**	0x00000001
0004	ListTotalRowFunction - **ilta**	0x00000000
0004	DWORD - **nDxfHdr**	0xFFFFFFFF
0004	DWORD - **nDxfInsertRow**	0xFFFFFFFF
0004	DWORD - **nDxfAgg**	0xFFFFFFFF
0004	DWORD - **idqsif**	0x00000000
0004	XLNullableWideString - **stName**	null string
000C	XLNullableWideString - **stCaption**	Item
0004	XLNullableWideString - **stTotal**	null string
0004	CellStyleName - **stStyleHeader**	null string
0004	CellStyleName - **stStyleInsertRow**	null string
0004	CellStyleName - **stStyleAgg**	null string

Figure 39: Structure of BrtBeginListCol

idField: 0x00000001 specifies the numeric identifier of the table column.

ilta: 0x00000000 specifies that no operation is performed in the total row aggregation function for this table column.

nDxfHdr: 0xFFFFFFFF specifies that no differential formatting is applied to the header row. This value is required because the **crwHeader** field of the preceding BrtBeginList record is equal to 1.

nDxfInsertRow: 0xFFFFFFFF specifies that no differential formatting is applied to the table insert row of this table column.

nDxfAgg: 0xFFFFFFFF specifies that no differential formatting is applied to the table total row of this table column.

idqsif: 0x00000000 specifies that there is no query table column associated with this column. This value is required because the **lt** field of the preceding BrtBeginList record is not equal to LTEXTDATA.

stName: NULL string because the **lt** field of the preceding BrtBeginList record is equal to LTRANGE.

stCaption: "Item" specifies the caption of this table column displayed in the sheet.

stTotal: NULL specifies that no text is displayed in the table total row of this table column.

stStyleHeader: NULL string because the **crwHeader** field of the preceding BrtBeginList record is equal to 1.

stStyleInsertRow: NULL specifies that no cell style is applied to the table insert row of this table column.

stStyleAgg: NULL specifies that no cell style is applied to the total row of this table column.

3.3.7 Example: Table: BrtEndListCol

The next record in this example, BrtEndListCol, specifies the end of the collection of records that specifies the first table column. The table column does not have a calculated column formula, a total row formula, or any XML map information because this collection is empty.

Size	Structure
0000	BrtEndListCol - **BrtEndListCol**

Figure 40: Structure of BrtEndListCol

3.3.8 Example: Table: BrtBeginListCol

The next record in this example, BrtBeginListCol, specifies the second column in the table. Fields in this record that are explained in previous records in this example are omitted for brevity. This is the second column of the table, and it has the header "Price".

Size	Structure	Value
003A	BrtBeginListCol - **BrtBeginListCol**	
0004	DWORD - **idField**	0x00000002
0004	ListTotalRowFunction - **ilta**	0x00000000
0004	DWORD - **nDxfHdr**	0xFFFFFFFF
0004	DWORD - **nDxfInsertRow**	0xFFFFFFFF
0004	DWORD - **nDxfAgg**	0xFFFFFFFF
0004	DWORD - **idqsif**	0x00000000
0004	XLNullableWideString - **stName**	null string
000E	XLNullableWideString - **stCaption**	Price
0004	XLNullableWideString - **stTotal**	null string
0004	CellStyleName - **stStyleHeader**	null string
0004	CellStyleName - **stStyleInsertRow**	null string
0004	CellStyleName - **stStyleAgg**	null string

Figure 41: Structure of BrtBeginListCol

Fields in this record that are explained in previous records in this example are omitted for brevity.

idField: 0x00000002 specifies the numeric identifier of the table column.

stCaption: "Price" specifies the caption of this table column displayed in the sheet.

3.3.9 Example: Table: BrtEndListCol

The next record in this example, BrtEndListCol, specifies the end of the collection of records that specifies the second table column. The second table column does not have a calculated column formula, a total row formula, or any XML map information because this collection is empty.

Size	Structure
0000	BrtEndListCol - **BrtEndListCol**

Figure 42: Structure of BrtEndListCol

3.3.10 Example: Table: BrtBeginListCol

The next record in this example, BrtBeginListCol, specifies the properties of the third table column and specifies the beginning of the collection of records that specifies additional properties of that table column. The third column of the table has the header "Sales Tax" and contains a calculated column.

Size	Structure	Value
0042	BrtBeginListCol - **BrtBeginListCol**	
0004	DWORD - **idField**	0x00000003
0004	ListTotalRowFunction - **ilta**	0x00000000
0004	DWORD - **nDxfHdr**	0xFFFFFFFF
0004	DWORD - **nDxfInsertRow**	0x00000000
0004	DWORD - **nDxfAgg**	0xFFFFFFFF
0004	DWORD - **idqsif**	0x00000000
0004	XLNullableWideString - **stName**	null string
0016	XLNullableWideString - **stCaption**	Sales Tax
0004	XLNullableWideString - **stTotal**	null string
0004	CellStyleName - **stStyleHeader**	null string
0004	CellStyleName - **stStyleInsertRow**	null string
0004	CellStyleName - **stStyleAgg**	null string

Figure 43: Structure of BrtBeginListCol

Fields in this record that are explained in previous records in this example are omitted for brevity.

idField: 0x00000003 specifies the numeric identifier of the table column.

stCaption: "Sales Tax" specifies the caption of the table column displayed in the sheet.

3.3.11 Example: Table: BrtListCCFmla

The next record in this example, the BrtListCCFmla record between the third BrtBeginListCol and the third BrtEndListCol, specifies the calculated column formula for the third table column.

Size	Structure	Value
0021	BrtListCCFmla - **BrtListCcFmla**	
1 bit	BYTE - **reserved1**	0x0
1 bit	BYTE - **fArray**	0x0
6 bits	BYTE - **reserved2**	0x00
0020	ListParsedFormula - **formula**	
0004	DWORD - **cce**	0x00000018
0018	Rgce - **rgce**	
000E	Ptg - **Ptg[0]**	
000E	PtgList - **PtgList**	
7 bits	BYTE - **ptg**	0x18
1 bit	BYTE - **reserved1**	0x0
8 bits	BYTE - **eptg**	0x19
0002	USHORT - **ixti**	0x0000
2 bits	BYTE - **columns**	0x1
5 bits	PtgRowType - **rowType**	0x10
1 bit	BYTE - **squareBracketSpace**	0x0
1 bit	BYTE - **commaSpace**	0x0
1 bit	BYTE - **unused**	0x1
2 bits	BYTE - **type**	0x1
1 bit	BYTE - **invalid**	0x0
1 bit	BYTE - **nonresident**	0x0
2 bits	BYTE - **reserved2**	0x0
0004	DWORD - **listIndex**	0x00000001
0002	WORD - **colFirst**	0x0001
0002	WORD - **colLast**	0x0001
0009	Ptg - **Ptg[1]**	
0009	PtgNum - **PtgNum**	
7 bits	BYTE - **ptg**	0x1F
1 bit	BYTE - **reserved0**	0x0
0008	Double - **value**	0x3FB47AE147AE147B
0001	Ptg - **Ptg[2]**	
0001	PtgMul - **PtgMul**	
7 bits	BYTE - **ptg**	0x05
1 bit	BYTE - **reserved0**	0x0
0004	DWORD - **cb**	0x00000000

Figure 44: Structure of BrtListCcFmla

fArray: 0x0 specifies that the calculated column formula is not an array formula.

formula: Specifies the calculated column formula associated with the table column. This formula is "=Table1[[#This Row],[Price]]*.08". The Ptgs that specify this formula conform to the ABNF grammar in ListParsedFormula.

formula.cce: 0x00000018 specifies that the **rgce** field is 18 bytes long.

formula.rgce: Specifies the sequence of Ptgs for the formula "=Table1[[#This Row],[Price]]*.08".

formula.rgce.Ptg[0].PtgList: Specifies that the first parse token in the formula is a PtgList operand token that specifies a rectangular range of cells in a table that corresponds to the reference "Table1[[#This Row],[Price]]" in the formula.

formula.rgce.Ptg[0].PtgList.ptg: 0x18 is required in this field.

formula.rgce.Ptg[0].PtgList.eptg: 0x19 is required in this field.

formula.rgce.Ptg[0].PtgList.ixti: 0x0000 specifies the first Xti structure in the **rgXti** field of the BrtExternSheet record that specifies the location of the table. This location is the first sheet of this workbook. This record is omitted from this example for brevity. For an example of the BrtExternSheet record, see the External References or Defined Name examples.

formula.rgce.Ptg[0].PtgList.columns: 0x1 specifies the rectangular area is one column wide.

formula.rgce.Ptg[0].PtgList.rowType: 0x10 specifies the rows of the referenced area consist of the current row.

formula.rgce.Ptg[0].PtgList.squareBracketSpace: 0x0 specifies not to display spacing around the intra-table portion of the string representation of this formula element.

formula.rgce.Ptg[0].PtgList.commaSpace: 0x0 specifies not to display spacing between column references in the string representation of this formula element.

formula.rgce.Ptg[0].PtgList.type: 0x1 specifies this structure contains a value.

formula.rgce.Ptg[0].PtgList.invalid: 0x0 specifies this structure specifies a valid area.

formula.rgce.Ptg[0].PtgList.nonresident: 0x0 specifies the table is in the same workbook as the Rgce structure.

formula.rgce.Ptg[0].PtgList.listIndex: 0x00000001 specifies the numeric identifier of the referenced table.

formula.rgce.Ptg[0].PtgList.colFirst: 0x0001 specifies the first column of the referenced area of the table is the second column of the table.

formula.rgce.Ptg[0].PtgList.colLast: 0x0001 specifies the last column of the referenced area of the table is the second column of the table.

formula.rgce.Ptg[1].PtgNum: Specifies the second parse token in the formula is a PtgNum operand token that specifies the floating point value (0.08) in the formula.

formula.rgce.Ptg[1].PtgNum.ptg: 0x1F is required in this field.

formula.rgce.Ptg[1].PtgNum.value: 0x3FB47AE147AE147B specifies the Xnum representation of the value 0.08.

formula.rgce.Ptg[2].PtgMul: Specifies the third parse token in the formula is the PtgMul binary-value-operator. This Ptg specifies that the first and second expressions in the binary-value-

expression, which in this formula correspond to the PtgList and PtgNum operator tokens, are multiplied together.

formula.rgce.Ptg[2].PtgMul.ptg: 0x05 is required in this field.

formula.cb: 0x00000000 specifies the length of **rgcb** in bytes.

3.3.12 Example: Table: BrtEndListCol

The next record in this example, BrtEndListCol, specifies the end of the collection of records that specifies the third table column. The second table column does not have a total row formula, or any XML map information because this collection only contained a BrtListCCFmla.

Size	Structure
0000	BrtEndListCol **- BrtEndListCol**

Figure 45: Structure of BrtEndListCol

3.3.13 Example: Table: BrtEndListCols

The next record in this example, BrtEndListCols, specifies the end of the collection of records that specifies the table columns for this table.

Size	Structure
0000	BrtEndListCols **- BrtEndListCols**

Figure 46: Structure of BrtEndListCols

3.3.14 Example: Table: BrtTableStyleClient

The next record in this example, BrtTableStyleClient, specifies information about the table style applied to the table.

Size	Structure	Value
0028	BrtTableStyleClient **- BrtTableStyleClient**	
1 bit	WORD **- fFirstColumn**	0x0
1 bit	WORD **- fLastColumn**	0x0
1 bit	WORD **- fRowStripes**	0x1
1 bit	WORD **- fColumnStripes**	0x0
1 bit	WORD **- fRowHeaders**	0x0
1 bit	WORD **- fColumnHeaders**	0x0
10 bits	WORD **- reserved**	0x000
0026	TableStyleName **- stStyleName**	TableStyleMedium9

Figure 47: Structure of BrtTableStyleClient

fFirstColumn: 0x0 specifies the first column in the table does not have the table style element applied.

fLastColumn: 0x0 specifies the last column in the table does not have the table style element applied.

fRowStripes: 0x1 specifies the table has the row stripe formatting table style element applied.

fColumnStripes: 0x0 specifies the table does not have the column stripe formatting table style element applied.

fRowHeaders: 0x0 is ignored because this is a table.

fColumnHeaders: 0x0 is ignored because this is a table.

stStyleName: "TableStyleMedium9" specifies the table style applied to the table.

Records specifying the table style itself are omitted from this example for brevity.

3.3.15 Example: Table: BrtEndList

The next record in this example, BrtEndList, specifies the end of the collection of records that specifies this table.

Size	Structure
0000	BrtEndList - **BrtEndList**

Figure 48: Structure of BrtEndList

3.4 Example: Filters

This example shows how an AutoFilter is applied to a range of cells (C4:C8) on a sheet. The AutoFilter displays numbers that are greater than 70.

The example includes all of the records between BrtBeginAFilter and BrtEndAFilter in the worksheet part. In this example, these are BrtBeginFilterColumn, BrtBeginCustomFilters, BrtCustomFilter, BrtEndCustomFilters and BrtEndFilterColumn.

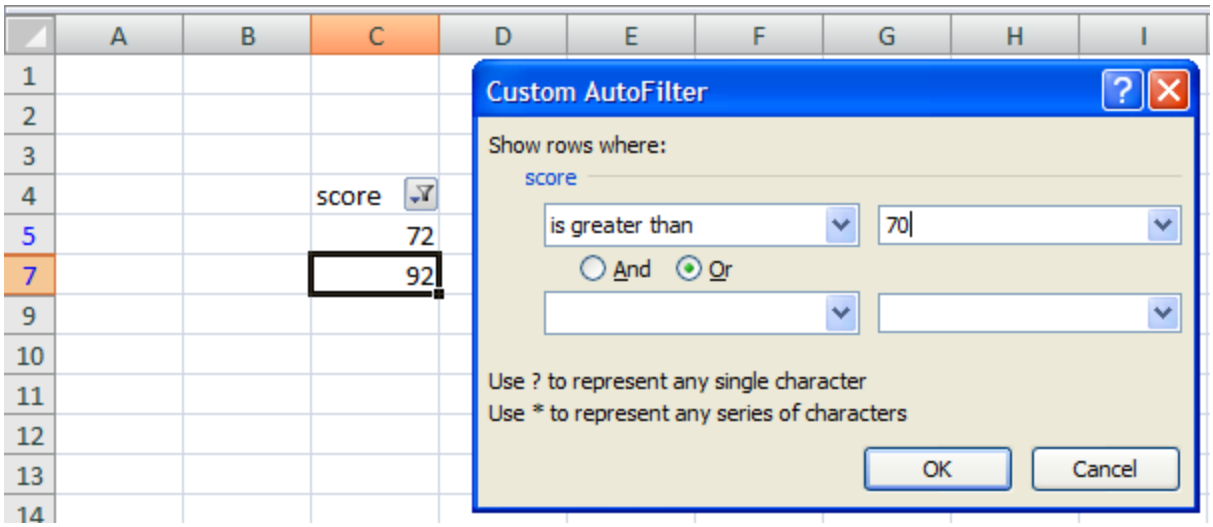


Figure 49: AutoFilter within a sheet

3.4.1 Example: Filters: BrtBeginAFilter

The BrtBeginAFilter specifies the beginning of a collection of records that define the AutoFilter and specifies the range of cells the AutoFilter applies to.

Size	Structure	Value
0010	BrtBeginAFilter - **BrtBeginAfilter**	
0010	UncheckedRfX - **rfx**	
0004	LONG - **rwFirst**	0x00000003
0004	LONG - **rwLast**	0x00000007
0004	LONG - **colFirst**	0x00000002
0004	LONG - **colLast**	0x00000002

Figure 50: Structure of BrtBeginAfilter

rfx: an UncheckedRfX that specifies that the AutoFilter is applied to the range C4:C8.

rfx.rwFirst: 0x00000003 specifies that the first row of the filtered range is row 4 of the sheet.

rfx.rwLast: 0x00000007 specifies that the last row of the filtered range is row 8 of the sheet.

rfx.colFirst: 0x00000002 specifies that the first column of the filtered range is column C of the sheet.

rfx.colLast: 0x00000002 specifies that the last column of the filtered range is column C of the sheet.

3.4.2 Example: Filters: BrtBeginFilterColumn

The next record in this example, BrtBeginFilterColumn, specifies the properties of an AutoFilter column.

Size	Structure	Value
0006	BrtBeginFilterColumn - **BrtBeginFilterColumn**	
0004	DWORD - **dwCol**	0x00000000
1 bit	WORD - **fHideArrow**	0x0
1 bit	WORD - **fNoBtn**	0x0
14 bits	WORD - **reserved**	0x0000

Figure 51: Structure of BrtBeginFilterColumn

dwCol: 0x00000000 specifies that the properties are applied to the first column in the range to which the AutoFilter is applied. This is Column C in this example.

fHideArrow: 0x0 specifies that the user interface that displays AutoFilter button is displayed.

fNoBtn: 0x0 specifies that the user interface that displays AutoFilter button does not get displayed in the next column.

3.4.3 Example: Filters: BrtBeginCustomFilters

The next record in this example, BrtBeginCustomFilters**,** specifies additional properties that are set on the AutoFilter.

Size	Structure	Value
0004	BrtBeginCustomFilters - **BrtBeginCustomFilters**	
0004	DWORD - **fAnd**	0x00000000

Figure 52: Structure of BrtBeginCustomFilters

fAnd: 0x00000000 specifies that a logical AND relationship is used when evaluating filtering criteria, stored in BrtCustomFilter records that follow.

3.4.4 Example: Filters: BrtCustomFilters

The next record in this example, BrtCustomFilter, specifies the filtering criteria used for this AutoFilter.

Size	Structure	Value
000A	BrtCustomFilter - **BrtCustomFilter**	
0001	BYTE - **vts**	0x04
0001	BYTE - **grbitSgn**	0x04
0008	Xnum - **union**	0x4051800000000000

Figure 53: Structure of BrtCustomFilter

vts: 0x04 specifies that filtering will be based on the criteria specified by a numeric value.

grbitSgn: 0x04 specifies that the comparison operation is Greater Than.

union: 0x4051800000000000 specifies the floating-point value of 70. This is the value used for the comparison criteria by this AutoFilter.

3.4.5 Example: Filters: BrtEndCustomFilters

The next record in this example, BrtEndCustomFilters**,** specifies the end of the collection that was started by the corresponding BrtBeginCustomFilters record.

Size	Structure
0000	BrtEndCustomFilters **- BrtEndCustomFilters**

Figure 54: Structure of BrtEndCustomFilters

3.4.6 Example: Filters: BrtEndFilterColumn

The next record in this example, BrtEndFilterColumn, specifies the end of the collection that was started by the BrtBeginFilterColumn record.

Size	Structure
0000	BrtEndFilterColumn **- BrtEndFilterColumn**

Figure 55: Structure of BrtEndFilterColumn

3.4.7 Example: Filters: BrtEndAFilter

The last record in this example, BrtEndAFilter**,** specifies the end of the collection that was started by the BrtBeginAFilter record.

Size	Structure
0000	BrtEndAFilter **- BrtEndAfilter**

Figure 56: Structure of BrtEndAfilter

3.5 Example: External References

This example shows how a cell (F5) contains a reference to a cell (B3) in a different workbook (Book1.xlsb). The workbook that contains this example and Book1.xlsb are in the same folder. The cell (B3) in Book1.xlsb contains the string "External Cell".

The example includes the BrtRowHdr and BrtFmlaString records that appear in the worksheet part. The example also includes all records between BrtBeginSupBook and BrtEndSupBook in the external link part. In this example these are BrtBeginSupBook, BrtSupTabs, BrtExternTableStart, BrtExternRowHdr, BrtExternCellString, BrtExternTableEnd, and BrtEndSupBook records.

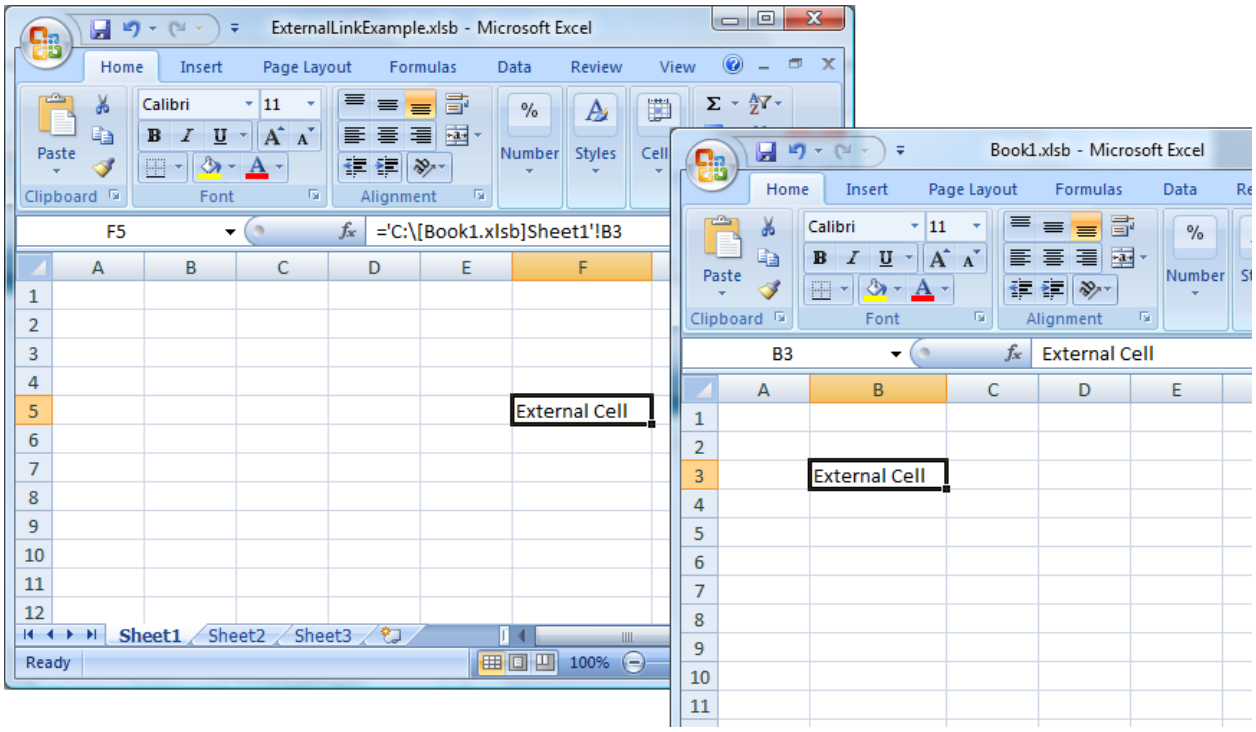


Figure 57: External reference within a sheet

3.5.1 Example: External References: BrtRowHdr

The first record in this example, BrtRowHdr, specifies information about the row that contains the external reference and specifies the beginning of a collection of records that contain information about the row.

Size	Structure	Value
0019	BrtRowHdr - **BrtRowHdr**	
0004	ULONG - **rw**	0x00000004
0004	DWORD - **ixfe**	0x00000000
0002	WORD - **miyRw**	0x012C
1 bit	BYTE - **fExtraAsc**	0x0
1 bit	BYTE - **fExtraDsc**	0x0
6 bits	BYTE - **reserved1**	0x00
3 bits	BYTE - **iOutLevel**	0x0
1 bit	BYTE - **fCollapsed**	0x0
1 bit	BYTE - **fDyZero**	0x0
1 bit	BYTE - **fUnsynced**	0x0
1 bit	BYTE - **fGhostDirty**	0x0
1 bit	BYTE - **fGhostCol**	0x0
1 bit	BYTE - **fPhShow**	0x0
7 bits	BYTE - **reserved2**	0x00
0004	DWORD - **ccolspan**	0x00000001
0008	BrtColSpan - **rgBrtColspan**	
0008	BrtColSpan - **brtBrtColspan[0]**	
0004	ULONG - **colMic**	0x00000005
0004	ULONG - **colLast**	0x00000005

Figure 58: Structure of BrtRowHdr

rw: 0x00000004 specifies that the external reference is in row 5 of the worksheet.

ixfe: 0x00000000 specifies that the formatting properties of the cell are specified by the first BrtXF record in the collection of records directly following the BrtBeginCellXFs record in the styles part. The referenced BrtXF and BrtBeginCellXFs records are not included in this example for brevity.

miyRw: 0x012C specifies that the height of this row is 300 twips.

fExtraAsc: 0x0 specifies not to allocate padding to the top of this row.

fExtraDsc: 0x0 specifies not to allocate padding to the bottom of this row.

iOutLevel: 0x0 specifies the outline level for this row.

fCollapsed: 0x0 specifies that zero rows with an **iOutLevel** greater than 0 are in the collapsed outline state.

fDyZero: 0x0 specifies that this row is not hidden.

fUnsynced: 0x0 specifies that the height of this row is not manually specified.

fGhostDirty: 0x0 specifies that the row style as specified by **ixfe** is not applied.

fPhShow: 0x0 specifies that this row defaults to having the phonetic guide disabled.

ccolspan: 0x00000001 specifies that there is one BrtColSpan element in **rgBrtColspan**. This means that the external reference is in the first 1024 columns of the row specified by this BrtRowHdr.

rgBrtColspan: An array with one BrtColSpan element.

rgBrtColspan.brtBrtColspan[0]: The BrtColSpan element that specifies the cells that contain data in the first 1024 column wide segment of this row.

rgBrtColspan.brtBrtColspan[0].colMic: 0x00000005 specifies that the first cell that contains data in the row specified by this BrtRowHdr is in column F.

rgBrtColspan.brtBrtColspan[0].colLast: 0x00000005 specifies that the last cell that contains data in the row specified by this BrtRowHdr is in column F.

3.5.2 Example: External References: BrtFmlaString

The next record in this example, BrtFmlaString, specifies that the cell that contains the external reference contains a formula that most recently evaluated to a string value. The string value is the string value contained in the cell in the external workbook named Book1.xlsb.

Size	Structure	Value
0039	BrtFmlaString - **BrtFmlaString**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000005
24 bits	DWORD - **iStyleRef**	0x000000
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **reserved**	0x00
001E	XLWideString - **value**	External Cell
0002	GrbitFmla - **grbitFlags**	
1 bit	WORD - **reserved**	0x0
1 bit	WORD - **fAlwaysCalc**	0x0
14 bits	WORD - **unused**	0x0000
0011	CellParsedFormula - **formula**	
0004	DWORD - **cce**	0x00000009
0009	Rgce - **rgce**	
0009	Ptg - **sequence**	
0009	PtgRef3d - **PtgRef3D**	
5 bits	BYTE - **ptg**	0x1A
2 bits	PtgDataType - **type**	0x2
1 bit	BYTE - **reserved**	0x0
0002	USHORT - **ixti**	0x0000
0006	RgceLoc - **loc**	
0004	UncheckedRw - **row**	0x00000002
0002	ColRelShort - **column**	0xC001
0004	DWORD - **cb**	0x00000000

Figure 59: Structure of BrtFmlaString

cell: A Cell that specifies information about the cell that contains the external reference.

cell.column: 0x00000005 specifies that the cell is in column F.

cell.iStyleRef: 0x000000 specifies that the formatting properties of the cell are specified by the first BrtXF record in the collection of records directly following the BrtBeginCellXFs record in the styles part. The referenced BrtXF and BrtBeginCellXFs records are not included in this example for brevity.

cell.fPhShow: 0x0 specifies that the cell does not show phonetic information.

value: "External Cell" specifies the string value to which the formula in this cell evaluated. This is the string value contained in the external referenced cell.

grbitFlags.fAlwaysCalc: 0x0000 specifies that this formula is not to be reevaluated when the document is loaded.

formula: A CellParsedFormula that specifies the formula stored in this cell. This formula contains the information necessary to reference the cell in the external workbook named Book1.xlsb.

formula.cce: 0x00000009 specifies that the length of the **formula.rgce** field is 9 bytes.

formula.rgce: An Rgce that specifies a sequence of Ptgs for the formula.

formula.rgce.sequence: A sequence of Ptgs that contains a single Ptg.

formula.rgce.sequence.PtgRef3D: An operand that references the cell in the external workbook, Book1.xslb.

formula.rgce.sequence.PtgRef3D.ptg: 0x1A specifies that this Ptg is a PtgRef3D.

formula.rgce.sequence.PtgRef3D.type: 0x2 specifies that this Ptg specifies a single value, which is a string simple type.

formula.rgce.sequence.PtgRef3D.ixti: 0x0000 specifies that the external link information is specified by the first XTI record in the collection of records directly following the BrtExternSheet record. The referenced XTI record is not included in this example for brevity.

formula.rgce.sequence.PtgRef3D.loc: Specifies the coordinates of the referenced cell in the external workbook.

formula.rgce.sequence.PtgRef3D.loc.row: 0x00000002 specifies that the referenced cell is in row 3.

formula.rgce.sequence.PtgRef3D.loc.column: 0x0001 specifies that the referenced cell is in column B.

formula.cb: 0x00000000 specifies that there is no ancillary data for this formula.

3.5.3 Example: External References: BrtBeginSupBook

The next record in this example, BrtBeginSupBook, specifies the properties of the external link and specifies the beginning of a collection of records that specify information about the external link.

Size	Structure	Value
0012	BrtBeginSupBook - **BrtBeginSupBook**	
0002	ExternalReferenceType - **sbt**	0x0000
000C	RelID - **string1**	rId1
0004	XLNullableWideString - **string2**	

Figure 60: Structure of BrtBeginSupBook

sbt: 0x0000 specifies that the external link type is an external workbook link.

string1: "rId1" specifies a RelID that specifies the external workbook. The entity referenced by the RelID is not included in this example for brevity.

string2: A NULL string because the external link type is an external workbook link.

3.5.4 Example: External References: BrtSupTabs

The next record in this example, BrtSupTabs, specifies the names of the sheets in the external workbook, Book1.xlsb.

Size	Structure	Value
0034	BrtSupTabs - **BrtSupTabs**	
0004	DWORD - **ctab**	0x00000003
0030	XLWideString - **sheetNames**	
0010	XLWideString - **sheetNames[0]**	Sheet1
0010	XLWideString - **sheetNames[1]**	Sheet2
0010	XLWideString - **sheetNames[2]**	Sheet3

Figure 61: Structure of BrtSupTabs

ctab: 0x00000003 specifies that there are three sheets in the external workbook.

sheetNames: Specifies the array of sheet names in the external workbook.

sheetNames.sheetNames[0]: "Sheet1" specifies the name of the first sheet in the external workbook.

sheetNames.sheetNames[1]: "Sheet2" specifies the name of the second sheet in the external workbook.

sheetNames.sheetNames[2]: "Sheet3" specifies the name of the third and last sheet in the external workbook.

3.5.5 Example: External References: BrtExternTableStart

The next record in this example, BrtExternTableStart, specifies properties of the External Cell Cache and specifies the beginning of a collection of records that specify the External Cell Cache.

Size	Structure	Value
0005	BrtExternTableStart - **BrtExternTableStart**	
0004	DWORD - **itab**	0x00000000
1 bit	BYTE - **fRefreshError**	0x0
7 bits	BYTE - **reserved**	0x00

Figure 62: Structure of BrtExternTableStart

itab: 0x00000000 specifies that the External Cell Cache references the first **sheetNames** field in the BrtSupTabs record in this external link.

fRefreshError: 0x0 specifies that no error occurred during the last refresh of this External Cell Cache.

3.5.6 Example: External References: BrtExternRowHdr

The next record in this example, BrtExternRowHdr, specifies properties of the row that contains data from the external workbook in the External Cell Cache and specifies the beginning of a collection of records that specifies information about this row.

Size	Structure	Value
0004	BrtExternRowHdr - **BrtExternRowHdr**	
0004	DWORD - **rw**	0x00000002

Figure 63: Structure of BrtExternRowHdr

rw: 0x00000002 specifies that the referenced row in the External Cell Cache is row 3.

3.5.7 Example: External References: BrtExternCellString

The next record in this example, BrtExternCellString, specifies an External Cell in the External Cell Cache that contains the string value from the external workbook.

Size	Structure	Value
0022	BrtExternCellString - **BrtExternCellString**	
0004	UncheckedCol - **col**	0x00000001
001E	XLWideString - **value**	External Cell

Figure 64: Structure of BrtExternCellString

col: 0x00000001 specifies that the column of the external cell in the External Cell Cache is column B.

value: "External Cell" is the value of the external cell in the External Cell Cache.

3.5.8 Example: External References: BrtExternTableEnd

The next record in this example, BrtExternTableEnd, specifies the end of the collection of records that specify the External Cell Cache.

Size	Structure
0000	BrtExternTableEnd - **BrtExternTableEnd**

Figure 65: Structure of BrtExternTableEnd

3.5.9 Example: External References: BrtExternTableStart

The next record in this example, BrtExternTableStart, is present because the external workbook contains a second worksheet. There is no relevant data in this worksheet.

Size	Structure	Value
0005	BrtExternTableStart - **BrtExternTableStart**	
0004	DWORD - **itab**	0x00000001
0001	ExternTableStartBit - **grbit**	
0001	BYTE - **fRefreshError**	0x00
0001	BYTE - **reserved**	0x00

Figure 66: Structure of BrtExternTableStart

Fields in this record that are explained in previous records in this example are omitted for brevity.

itab: 0x00000001 specifies that the External Cell Cache references the second **sheetNames** field in the BrtSupTabs record in this external link part.

3.5.10 Example: External References: BrtExternTableEnd

The next record in this example, BrtExternTableEnd, specifies the end of the collection of records that specify the External Cell Cache for the second worksheet.

Size	Structure
0000	BrtExternTableEnd - **BrtExternTableEnd**

Figure 67: Structure of BrtExternTableEnd

3.5.11 Example: External References: BrtExternTableStart

The next record in this example, BrtExternTableStart, is present because the external workbook contains a third worksheet. There is no relevant data in this worksheet.

Size	Structure	Value
0005	BrtExternTableStart - **BrtExternTableStart**	
0004	DWORD - **itab**	0x00000002
0001	ExternTableStartBit - **grbit**	
0001	BYTE - **fRefreshError**	0x00
0001	BYTE - **reserved**	0x00

Figure 68: Structure of BrtExternTableStart

Fields in this record that are explained in previous records in this example are omitted for brevity.

itab: 0x00000002 specifies that the External Cell Cache references the third **sheetNames** field in the BrtSupTabs record in this external link part.

3.5.12 Example: External References: BrtExternTableEnd

The next record in this example, BrtExternTableEnd, specifies the end of the collection of records that specify the External Cell Cache for the third worksheet.

Size	Structure
0000	BrtExternTableEnd - **BrtExternTableEnd**

Figure 69: Structure of BrtExternTableEnd

3.5.13 Example: External References: BrtEndSupBook

The next record in this example, BrtEndSupBook, specifies the end of the collection of records that specify information about the external link.

Size	Structure
0000	BrtEndSupBook - **BrtEndSupBook**

Figure 70: Structure of BrtEndSupBook

3.6 Example: Formatting

In this example, cell formatting and number formats are applied to the following three cells in the sheet:

Cell B3 contains the value 1.2345 and is formatted using the built-in "0.00" number format.

Cell B4 contains the value 1.2345 and is formatted using the custom "0.00000" number format.

Cell B5 contains the value 1.2345 and is formatted with a yellow background color, the font is bold, and the font color is blue.

The example begins with BrtCellReal records in the worksheet part that specify the cell value and number formats for each of the three cells. Number formats are specified with BrtBeginFmts, BrtFmt, and BrtEndFmts records in the styles part. Cell formatting is specified with BrtBeginFonts, BrtFont, BrtEndFonts, BrtBeginFills, BrtFill, BrtEndFills, BrtBeginCellStyleXFs, BrtXF, BrtEndCellStyleXFs, BrtBeginCellXFs, BrtXF, and BrtEndCellXFs records in the styles part.

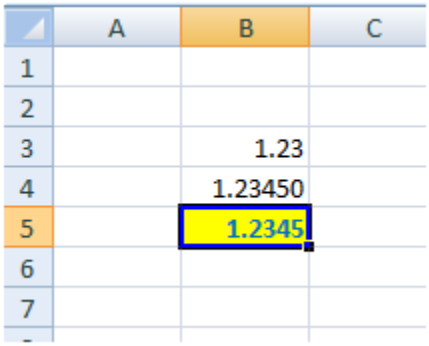


Figure 71: Formatting within a sheet

3.6.1 Example: Formatting: BrtCellReal

This is the first of three BrtCellReal records that specify a cell value and cell formatting. This record specifies cell B3.

Size	Structure	Value
0010	BrtCellReal **- BrtCellReal**	
0008	Cell **- cell**	
0004	LONG **- column**	0x00000001
24 bits	DWORD **- iStyleRef**	0x000001
1 bit	DWORD **- fPhShow**	0x0
7 bits	DWORD **- reserved**	0x00
0008	Xnum **- xnum**	0x3FF3C083126E978D

Figure 72: Structure of BrtCellReal

cell: Specifies a cell that contains the real number 1.2345 formatted using the cell formatting specified by the second BrtXF record following BrtBeginCellXFs as defined by the Styles part ABNF.

cell.column: 0x00000001 specifies that the cell is in column B.

cell.iStyleRef: 0x000001 specifies that the cell formatting applied to the cell is specified by the second BrtXF record in the collection of all records following BrtBeginCellXFs as defined by the Styles part ABNF.

cell.fPhShow: 0x0 specifies that the cell does not show phonetic information.

xnum: 0x3FF3C083126E978D specifies a floating-point number 1.2345.

3.6.2 Example: Formatting: BrtCellReal

The next BrtCellReal record in this example specifies the cell value and cell formatting for cell B4.

Size	Structure	Value
0010	BrtCellReal - **BrtCellReal**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000001
24 bits	DWORD - **iStyleRef**	0x000002
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **reserved**	0x00
0008	Xnum - **xnum**	0x3FF3C083126E978D

Figure 73: Structure of BrtCellReal

Fields in this record that are explained in previous records in this example are omitted for brevity.

cell: Specifies a cell that contains the real number 1.2345 formatted using the cell formatting specified by the third BrtXF record following BrtBeginCellXFs as defined by the Styles part ABNF.

cell.iStyleRef: 0x000002 specifies the cell formatting applied to the cell is specified by the third BrtXF record in the collection of all records following BrtBeginCellXFs as defined by the Styles part ABNF.

3.6.3 Example: Formatting: BrtCellReal

The next BrtCellReal record in this example specifies the cell value and cell formatting for cell B5.

Size	Structure	Value
0010	BrtCellReal - **BrtCellReal**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000001
24 bits	DWORD - **iStyleRef**	0x000003
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **reserved**	0x00
0008	Xnum - **xnum**	0x3FF3C083126E978D

Figure 74: Structure of BrtCellReal

Fields in this record that are explained in previous records in this example are omitted for brevity.

cell: Specifies a cell that contains the real number 1.2345 formatted using the cell formatting specified by the fourth BrtXF record following BrtBeginCellXFs as defined by the Styles part ABNF.

cell.iStyleRef: 0x000003 specifies the cell formatting applied to the cell is specified by the fourth BrtXF record in the collection of all records following BrtBeginCellXFs as defined by the Styles part ABNF.

3.6.4 Example: Formatting: BrtBeginFmts

The next record in this example, BrtBeginFmts, specifies the beginning of a collection of BrtFmt records.

Size	Structure	Value
0004	BrtBeginFmts - **BrtBeginFmts**	
0004	ULONG - **cfmts**	0x00000001

Figure 75: Structure of BrtBeginFmts

cfmts: 0x00000001 specifies that there is one BrtFmt record in the collection that specifies custom number formats. This custom number format is referenced by the **iFmt.ifmt** of the BrtXF record that is referenced by the **cell.iStyleRef** field of the BrtCellReal record that specifies cell B4.

3.6.5 Example: Formatting: BrtFmt

The next record in this example, BrtFmt, specifies the number format properties for the first number format in the collection of custom number formats. This format is applied to cell B4.

Size	Structure	Value
0014	BrtFmt - **BrtFmt**	
0002	WORD - **ifmt**	0x00A6
0012	XLWideString - **stFmtCode**	0.00000

Figure 76: Structure of BrtFmt

ifmt: 0x00A6 specifies the identifier for the custom number format "0.00000".

stFmtCode: "0.00000" specifies the format string for this number format.

3.6.6 Example: Formatting: BrtEndFmts

The next record in this example, BrtEndFmts, specifies the end of the collection of BrtFmt records.

Size	Structure
0000	BrtEndFmts - **BrtEndFmts**

Figure 77: Structure of BrtEndFmts

3.6.7 Example: Formatting: BrtBeginFonts

The next record in this example, BrtBeginFonts, specifies a count of BrtFont records and the beginning of a collection of BrtFont records that specifies the fonts used in the workbook.

Size	Structure	Value
0004	BrtBeginFonts - **BrtBeginFonts**	
0004	ULONG - **cfonts**	0x00000002

Figure 78: Structure of BrtBeginFonts

cfonts: 0x00000002 specifies that there are two BrtFont records in this collection.

3.6.8 Example: Formatting: BrtFont

The next record in this example, BrtFont, specifies the properties of the default font used by cells in this workbook. This record is referenced in **iFmt.ifmt** of the BrtXF records that is referenced by the **cell.iStyleRef** field of the BrtCellReal records that specify cells B3 and B4.

Size	Structure	Value
0027	BrtFont - **BrtFont**	
0002	SHORT - **dyHeight**	0x00DC
0002	FontFlags - **grbit**	
1 bit	WORD - **unused1**	0x0
1 bit	WORD - **fItalic**	0x0
1 bit	WORD - **unused2**	0x0
1 bit	WORD - **fStrikeout**	0x0
1 bit	WORD - **fOutline**	0x0
1 bit	WORD - **fShadow**	0x0
1 bit	WORD - **fCondense**	0x0
1 bit	WORD - **fExtend**	0x0
8 bits	WORD - **unused3**	0x00
0002	SHORT - **bls**	0x0190
0002	SHORT - **sss**	0x0000
0001	BYTE - **uls**	0x00
0001	BYTE - **bFamily**	0x02
0001	BYTE - **bCharSet**	0x00
0001	BYTE - **unused**	0x00
0008	BrtColor - **brtColor**	
1 bit	BYTE - **fValidRGB**	0x1
7 bits	XColorType - **xColorType**	0x03
0001	BYTE - **index**	0x01
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0x00
0001	BYTE - **bGreen**	0x00
0001	BYTE - **bBlue**	0x00
0001	BYTE - **bAlpha**	0xFF
0001	BYTE - **bFontScheme**	0x02
0012	XLWideString - **name**	Calibri

Figure 79: Structure of BrtFont

dyHeight: 0x00DC specifies that the height of the font is 220 twips.

grbit: Specifies the font attributes.

grbit.fItalic: 0x0000 specifies that the font is not italic.

grbit.fStrikeout: 0x0000 specifies that the font does not have strikethrough formatting.

grbit.fOutline: 0x0000 specifies that the font is not an outline.

grbit.fShadow: 0x0000 specifies that the font does not have a shadow applied.

grbit.fCondense: 0x0000 specifies that the font is not condensed.

grbit.fExtend: 0x0000 specifies that the font is not extended.

bls: 0x0190 specifies that the font is normal weight.

sss: 0x0000 specifies that the font is not a superscript font or a subscript font.

uls: 0x00 specifies that the font has no underline type.

bFamily: 0x02 specifies that the font belongs to the Swiss font family.

bCharSet: 0x00 specifies that the font belongs to the ANSI character set.

brtColor: This BrtColor record specifies the color properties of the font.

brtColor.fValidRGB: 0x1 specifies that the color specified by **brtColor.index** matches the color specified by **brtColor.bRed**, **brtColor.bGreen**, **brtColor.bBlue**, and **brtColor.bAlpha**.

brtColor.xColorType: 0x03 specifies that the color is a theme color and is specified by **brtColor.index**.

brtColor.index: 0x01 specifies an Icv that specifies a color from a color palette. The color is black.

brtColor.nTintAndShade: 0x0000 specifies that no tint or shade is applied.

brtColor.bRed: 0x00 specifies that the color has no red intensity.

brtColor.bGreen: 0x00 specifies that the color has no green intensity.

brtColor.bBlue: 0x00 specifies that the color has no blue intensity.

brtColor.bAlpha: 0xFF specifies that the color is completely opaque.

bFontScheme: 0x02 specifies that the font belongs to the minor scheme.

name: "Calibri" specifies the name of the font.

3.6.9 Example: Formatting: BrtFont

The next record in this example, BrtFont, specifies the properties of the font used in cell B5.

Size	Structure	Value
0027	BrtFont - **BrtFont**	
0002	SHORT - **dyHeight**	0x00DC
0002	FontFlags - **grbit**	
1 bit	WORD - **unused1**	0x0
1 bit	WORD - **fItalic**	0x0
1 bit	WORD - **unused2**	0x0
1 bit	WORD - **fStrikeout**	0x0
1 bit	WORD - **fOutline**	0x0
1 bit	WORD - **fShadow**	0x0
1 bit	WORD - **fCondense**	0x0
1 bit	WORD - **fExtend**	0x0
8 bits	WORD - **unused3**	0x00
0002	SHORT - **bls**	0x02BC
0002	SHORT - **sss**	0x0000
0001	BYTE - **uls**	0x00
0001	BYTE - **bFamily**	0x02
0001	BYTE - **bCharSet**	0x00
0001	BYTE - **unused**	0x00
0008	BrtColor - **brtColor**	
1 bit	BYTE - **fValidRGB**	0x1
7 bits	XColorType - **xColorType**	0x02
0001	BYTE - **index**	0xFF
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0x00
0001	BYTE - **bGreen**	0x70
0001	BYTE - **bBlue**	0xC0
0001	BYTE - **bAlpha**	0xFF
0001	BYTE - **bFontScheme**	0x02
0012	XLWideString - **name**	Calibri

Figure 80: Structure of BrtFont

Fields in this record that are explained in previous records in this example are omitted for brevity.

bls: 0x02BC specifies that the font is bold.

brtColor.fValidRGB: 0x01 because **brtColor.xColorType** is 0x02.

brtColor.xColorType: 0x02 specifies that this color is a standard RGBA (red-green-blue-alpha) color and is specified by the values in **brtColor.bRed**, **brtColor.bGreen**, **brtColor.bBlue**, and **brtColor.bAlpha**.

brtColor.index: This field is ignored because **brtColor.xColorType** is 0x02.

brtColor.bRed: 0x00 specifies that the color has no red intensity.

brtColor.bGreen: 0x70 specifies that the color has a medium green intensity.

brtColor.bBlue: 0xC0 specifies that the color has a medium-strong blue intensity.

3.6.10 Example: Formatting: BrtEndFonts

The next record in this example, BrtEndFonts, specifies the end of the collection of BrtFont records.

Size	Structure
0000	BrtEndFonts **- BrtEndFonts**

Figure 81: Structure of BrtEndFonts

3.6.11 Example: Formatting: BrtBeginFills

The next record in this example, BrtBeginFills, specifies the count of BrtFill records and the beginning of a collection of BrtFill records that specifies the cell fill pattern applied to the cells in the example.

Size	Structure	Value
0004	BrtBeginFills **- BrtBeginFills**	
0004	ULONG **- cfills**	0x00000003

Figure 82: Structure of BrtBeginFills

cfills: 0x00000003 specifies that there are three BrtFill records in this collection.

3.6.12 Example: Formatting: BrtFill

The next record in this example, BrtFill, specifies the default fill pattern (no fill) applied to cells. The cells that reference this fill pattern in this example are cells B3 and B4.

Size	Structure	Value
0044	BrtFill - **BrtFill**	
0004	DWORD - **fls**	0x00000000
0008	BrtColor - **brtColorFore**	
1 bit	BYTE - **fValidRGB**	0x1
7 bits	XColorType - **xColorType**	0x01
0001	BYTE - **index**	0x40
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0x00
0001	BYTE - **bGreen**	0x00
0001	BYTE - **bBlue**	0x00
0001	BYTE - **bAlpha**	0xFF
0008	BrtColor - **brtColorBack**	
1 bit	BYTE - **fValidRGB**	0x1
7 bits	XColorType - **xColorType**	0x01
0001	BYTE - **index**	0x41
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0xFF
0001	BYTE - **bGreen**	0xFF
0001	BYTE - **bBlue**	0xFF
0001	BYTE - **bAlpha**	0xFF
0004	LONG - **iGradientType**	0x00000000
0008	Xnum - **xnumDegree**	0x0000000000000000
0008	Xnum - **xnumFillToLeft**	0x0000000000000000
0008	Xnum - **xnumFillToRight**	0x0000000000000000
0008	Xnum - **xnumFillToTop**	0x0000000000000000
0008	Xnum - **xnumFillToBottom**	0x0000000000000000
0004	DWORD - **cNumStop**	0x00000000

Figure 83: Structure of BrtFill

Fields in this record that are explained in previous records in this example are omitted for brevity.

fls: 0x00000000 specifies that no fill pattern is applied.

brtColorFore: Specifies the foreground color of the cell fill pattern. Because **fls** is 0x00000000, which specifies that no fill pattern is applied, values for **brtColorFore.fValidRGB**, **brtColorFore.xColorType**, **brtColorFore.index**, **brtColorFore.nTintAndShade**, **brtColorFore.bRed**, **brtColorFore.bGreen**, **brtColorFore.bBlue**, and **brtColorFore.bAlpha** are ignored and are omitted for brevity.

brtColorBack: Specifies the background color of the cell fill pattern. Because **fls** is 0x00000000, which specifies that no fill pattern is applied, values for **brtColorBack.fValidRGB**, **brtColorBack.xColorType**, **brtColorBack.index**, **brtColorBack.nTintAndShade**,

brtColorBack.bRed, **brtColorBack.bGreen**, **brtColorBack.bBlue**, and **brtColorBack.bAlpha** are ignored and are omitted for brevity.

iGradientType: 0x00000000 specifies that the gradient fill applied is a linear gradient. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumDegree: 0x0000000000000000 specifies that the **gradient vector** applied is horizontal from left to right. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToLeft: 0x0000000000000000 specifies that the left edge of the inner rectangle is the left edge of the cell. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToRight: 0x0000000000000000 specifies that the right edge of the inner rectangle is the right edge of the cell. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToTop: 0x0000000000000000 specifies that the top edge of the inner rectangle is the top edge of the cell. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

xnumFillToBottom: 0x0000000000000000 specifies that the bottom edge of the inner rectangle is the bottom edge of the cell. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

cNumStop: 0x00000000 specifies that there are no GradientStop structures. This field is zero and is ignored because **fls** is not 0x0028, which specifies that no gradient fill is applied.

The next record in this example, BrtFill, specifies a legacy fill pattern that is always written but not referenced by this example and is omitted for brevity.

3.6.13 Example: Formatting: BrtFill

The next record in this example, BrtFill, specifies the fill pattern applied to cell B5.

Size	Structure	Value
0044	BrtFill - **BrtFill**	
0004	DWORD - **fls**	0x00000001
0008	BrtColor - **brtColorFore**	
1 bit	BYTE - **fValidRGB**	0x1
7 bits	XColorType - **xColorType**	0x02
0001	BYTE - **index**	0xFF
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0xFF
0001	BYTE - **bGreen**	0xFF
0001	BYTE - **bBlue**	0x00
0001	BYTE - **bAlpha**	0xFF
0008	BrtColor - **brtColorBack**	
1 bit	BYTE - **fValidRGB**	0x1
7 bits	XColorType - **xColorType**	0x01
0001	BYTE - **index**	0x40
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0x00
0001	BYTE - **bGreen**	0x00
0001	BYTE - **bBlue**	0x00
0001	BYTE - **bAlpha**	0xFF
0004	LONG - **iGradientType**	0x00000000
0008	Xnum - **xnumDegree**	0x0000000000000000
0008	Xnum - **xnumFillToLeft**	0x0000000000000000
0008	Xnum - **xnumFillToRight**	0x0000000000000000
0008	Xnum - **xnumFillToTop**	0x0000000000000000
0008	Xnum - **xnumFillToBottom**	0x0000000000000000
0004	DWORD - **cNumStop**	0x00000000

Figure 84: Structure of BrtFill

Fields in this record that are explained in previous records in this example are omitted for brevity.

fls: 0x00000001 specifies that the fill pattern is a solid fill.

brtColorFore: Specifies that the foreground color of the cell fill pattern is yellow.

brtColorFore.fValidRGB: 0x01 specifies that the color specified by **brtColor.index** matches the color specified by **brtColor.bRed**, **brtColor.bGreen**, **brtColor.bBlue**, and **brtColor.bAlpha**

brtColorFore.xColorType: 0x02 specifies that this color is a standard RGBA (red-green-blue-alpha) color and is specified by the values in **brtColorFore.bRed**, **brtColorFore.bGreen**, **brtColorFore.bBlue**, and **brtColorFore.bAlpha**.

brtColorFore.index: This field is ignored because **brtColor.xColorType** is 0x02.

brtColorFore.nTintAndShade: 0x0000 specifies that no tint or shade is applied.

brtColorFore.bRed: 0xFF specifies that the color has maximum red intensity.

brtColorFore.bGreen: 0xFF specifies that the color has maximum green intensity.

brtColorFore.bBlue: 0x00 specifies that the color has no blue intensity.

brtColorFore.bAlpha: 0xFF specifies that the color is completely is completely opaque.

brtColorBack: Specifies the background color of the cell fill pattern. Because **fls** is 0x00000000, which specifies that no fill pattern is applied, values for **brtColorBack.fValidRGB**, **brtColorBack.xColorType**, **brtColorBack.index**, **brtColorBack.nTintAndShade**, **brtColorBack.bRed**, **brtColorBack.bGreen**, **brtColorBack.bBlue**, and **brtColorBack.bAlpha** are ignored and are omitted for brevity.

3.6.14 Example: Formatting: BrtEndFills

The next record in this example, BrtEndFills, specifies the end of the collection of BrtFill records.

Size	Structure
0000	BrtEndFills - **BrtEndFills**

Figure 85: Structure of BrtEndFills

3.6.15 Example: Formatting: BrtBeginCellStyleXFs

The next record in this example, BrtBeginCellStyleXFs, specifies a count of BrtXF records and the beginning of a collection of BrtXF records that specifies the cell style XFs in the workbook.

Size	Structure	Value
0004	BrtBeginCellStyleXFs - **BrtBeginCellStyleXfs**	
0004	DWORD - **cxfs**	0x00000001

Figure 86: Structure of BrtBeginCellStyleXfs

cxfs: 0x00000001 specifies that there is one BrtXF record in this collection.

3.6.16 Example: Formatting: BrtXF

The next record in this example, BrtXF, specifies the formatting properties for the cell style XFs.

Size	Structure	Value
0010	BrtXF - **BrtXf**	
0002	WORD - **ixfeParent**	0xFFFF
0002	Ifmt - **iFmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **iFont**	0x0000
0002	WORD - **iFill**	0x0000
0002	WORD - **ixBorder**	0x0000
0001	BYTE - **trot**	0x00
0001	BYTE - **indent**	0x00
3 bits	BYTE - **alc**	0x0
3 bits	BYTE - **alcv**	0x2
1 bit	BYTE - **fWrap**	0x0
1 bit	BYTE - **fJustLast**	0x0
1 bit	BYTE - **fShrinkToFit**	0x0
1 bit	BYTE - **fMergeCell**	0x0
2 bits	BYTE - **iReadingOrder**	0x0
1 bit	BYTE - **fLocked**	0x1
1 bit	BYTE - **fHidden**	0x0
1 bit	BYTE - **fSxButton**	0x0
1 bit	BYTE - **f123Prefix**	0x0
6 bits	WORD - **xfGrbitAtr**	0x00
10 bits	WORD - **unused**	0x000

Figure 87: Structure of BrtXf

ixfeParent: 0xFFFF specifies that this record is a cell style BrtXF record.

iFmt: Specifies the index of the BrtFmt that specifies the number format of the cell.

iFmt.ifmt: 0x0000 specifies that the number format of the cell is specified by the first BrtFmt record following BrtBeginFmts.

iFont: 0x0000 specifies that the font of the cell is specified by the first BrtFont record following BrtBeginFonts.

iFill: 0x0000 specifies that the fill properties of the cell are specified by the first BrtFill record following BrtBeginFills.

ixBorder: 0x0000 specifies that the border properties of the cell are specified by the first BrtBorder record following BrtBeginBorders. BrtBorder records are omitted for brevity.

trot: 0x00 specifies that the text rotation is horizontal.

indent: 0x00 specifies that there is no indentation for the text in the cell.

alc: 0x00 specifies that the cell has a general horizontal alignment.

alcv: 0x02 specifies that the cell has a bottom vertical alignment.

fWrap: 0x00 specifies that the text in the cell is not line-wrapped within the cell.

fJustLast: 0x00 specifies that the **justify alignment** or distributed alignment is not applied to the last line of text in the cell.

fShrinkToFit: 0x00 specifies that shrink to fit is not applied to the text in the cell.

fMergeCell: 0x00 specifies that the cell is not a part of a merged cell.

iReadingOrder: 0x00 specifies that the reading order of the cell is context-dependent.

fLocked: 0x01 specifies that the cell is locked for user editing.

fHidden: 0x00 specifies that the cell is not hidden.

fSxButton: 0x00 specifies that the cell does not have a PivotTable dropdown button.

f123Prefix: 0x00 specifies that the text in the cell is not prefixed by a single quote mark.

xfGrbitAtr: 0x0000 specifies the cell formatting properties applied to the cell according to the following table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x0 specifies that the number property of the formatting for this cell is applied.
1	ibitAtrFnt	1	0x0 specifies that the font property of the formatting for this cell is applied.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is applied.
3	ibitAtrBdr	1	0x0 specifies that the border property of the formatting for this cell is applied.
4	ibitAtrPat	1	0x0 specifies that the fill property of the formatting for this cell is applied.
5	ibitAtrProt	1	0x0 specifies that the protection property of the formatting for this cell is applied.

3.6.17 Example: Formatting: BrtEndCellStyleXFs

The next record in this example, BrtEndCellStyleXFs, specifies the end of the collection of BrtXF records that specifies all cell style XFs in the workbook.

Size	Structure
0000	BrtEndCellStyleXFs - **BrtEndCellStyleXfs**

Figure 88: Structure of BrtEndCellStyleXfs

3.6.18 Example: Formatting: BrtBeginCellXFs

The next record in this example, BrtBeginCellXFs, specifies a count of BrtXF records and the beginning of a collection of BrtXF records that specifies all cell XFs in the workbook.

Size	Structure	Value
0004	BrtBeginCellXFs - **BrtBeginCellXfs**	
0004	ULONG - **cxfs**	0x00000004

Figure 89: Structure of BrtBeginCellXfs

cxfs: 0x00000004 specifies that there are four BrtXf records in this collection.

3.6.19 Example: Formatting: BrtXF

The next record in this example, BrtXF, specifies the default cell formatting for the workbook.

Size	Structure	Value
0010	BrtXF - **BrtXf**	
0002	WORD - **ixfeParent**	0x0000
0002	Ifmt - **iFmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **iFont**	0x0000
0002	WORD - **iFill**	0x0000
0002	WORD - **ixBorder**	0x0000
0001	BYTE - **trot**	0x00
0001	BYTE - **indent**	0x00
3 bits	BYTE - **alc**	0x0
3 bits	BYTE - **alcv**	0x2
1 bit	BYTE - **fWrap**	0x0
1 bit	BYTE - **fJustLast**	0x0
1 bit	BYTE - **fShrinkToFit**	0x0
1 bit	BYTE - **fMergeCell**	0x0
2 bits	BYTE - **iReadingOrder**	0x0
1 bit	BYTE - **fLocked**	0x1
1 bit	BYTE - **fHidden**	0x0
1 bit	BYTE - **fSxButton**	0x0
1 bit	BYTE - **f123Prefix**	0x0
6 bits	WORD - **xfGrbitAtr**	0x00
10 bits	WORD - **unused**	0x000

Figure 90: Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

ixfeParent: 0x0000 specifies that the parent cell style is the first BrtXf in the BrtBeginCellStyleXFs collection.

xfGrbitAtr: 0x0000 specifies the cell formatting properties that are overwritten according to the following table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x0 specifies that the number property of the formatting for this cell is not inherited.
1	ibitAtrFnt	1	0x0 specifies that the font property of the formatting for this cell is not inherited.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is not inherited.
3	ibitAtrBdr	1	0x0 specifies that the border property of the formatting for this cell is not inherited.
4	ibitAtrPat	1	0x0 specifies that the fill property of the formatting for this cell is not inherited.
5	ibitAtrProt	1	0x0 specifies that the protection property of the formatting for this cell is not inherited.

3.6.20 Example: Formatting: BrtXF

The next record in this example, BrtXF, specifies the formatting for cells in this workbook. The cell that references this formatting in this example is cell B3.

Size	Structure	Value
0010	BrtXF - **BrtXf**	
0002	WORD - **ixfeParent**	0x0000
0002	Ifmt - **iFmt**	
0002	WORD - **ifmt**	0x0002
0002	WORD - **iFont**	0x0000
0002	WORD - **iFill**	0x0000
0002	WORD - **ixBorder**	0x0000
0001	BYTE - **trot**	0x00
0001	BYTE - **indent**	0x00
3 bits	BYTE - **alc**	0x0
3 bits	BYTE - **alcv**	0x2
1 bit	BYTE - **fWrap**	0x0
1 bit	BYTE - **fJustLast**	0x0
1 bit	BYTE - **fShrinkToFit**	0x0
1 bit	BYTE - **fMergeCell**	0x0
2 bits	BYTE - **iReadingOrder**	0x0
1 bit	BYTE - **fLocked**	0x1
1 bit	BYTE - **fHidden**	0x0
1 bit	BYTE - **fSxButton**	0x0
1 bit	BYTE - **f123Prefix**	0x0
6 bits	WORD - **xfGrbitAtr**	0x01
10 bits	WORD - **unused**	0x000

Figure 91: Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

iFmt.ifmt: 0x0002 specifies that the number format of the cell is specified by the third BrtFmt record following BrtBeginFmts.

xfGrbitAtr: 0x0001 specifies the cell formatting properties that are overwritten according to this table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x1 specifies that the number property of the formatting for this cell is overwritten.
1	ibitAtrFnt	1	0x0 specifies that the font property of the formatting for this cell is not inherited.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is not inherited.
3	ibitAtrBdr	1	0x0 specifies that the border property of the formatting for this cell is not inherited.
4	ibitAtrPat	1	0x0 specifies that the fill property of the formatting for this cell is not inherited.

5	ibitAtrProt	1	0x0 specifies that the protection property of the formatting for this cell is not inherited.

3.6.21 Example: Formatting: BrtXF

The next record in this example, BrtXF, specifies the formatting for cell B4.

Size	Structure	Value
0010	BrtXF - **BrtXf**	
0002	WORD - **ixfeParent**	0x0000
0002	Ifmt - **iFmt**	
0002	WORD - **ifmt**	0x00A6
0002	WORD - **iFont**	0x0000
0002	WORD - **iFill**	0x0000
0002	WORD - **ixBorder**	0x0000
0001	BYTE - **trot**	0x00
0001	BYTE - **indent**	0x00
3 bits	BYTE - **alc**	0x0
3 bits	BYTE - **alcv**	0x2
1 bit	BYTE - **fWrap**	0x0
1 bit	BYTE - **fJustLast**	0x0
1 bit	BYTE - **fShrinkToFit**	0x0
1 bit	BYTE - **fMergeCell**	0x0
2 bits	BYTE - **iReadingOrder**	0x0
1 bit	BYTE - **fLocked**	0x1
1 bit	BYTE - **fHidden**	0x0
1 bit	BYTE - **fSxButton**	0x0
1 bit	BYTE - **f123Prefix**	0x0
6 bits	WORD - **xfGrbitAtr**	0x01
10 bits	WORD - **unused**	0x000

Figure 92: Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

iFmt.ifmt: 0x00A6 specifies the identifier of the custom number format for cell B4.

3.6.22 Example: Formatting: BrtXF

The next record in this example, BrtXF, specifies the formatting for cell B5.

Size	Structure	Value
0010	BrtXF - **BrtXf**	
0002	WORD - **ixfeParent**	0x0000
0002	Ifmt - **iFmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **iFont**	0x0001
0002	WORD - **iFill**	0x0002
0002	WORD - **ixBorder**	0x0000
0001	BYTE - **trot**	0x00
0001	BYTE - **indent**	0x00
3 bits	BYTE - **alc**	0x0
3 bits	BYTE - **alcv**	0x2
1 bit	BYTE - **fWrap**	0x0
1 bit	BYTE - **fJustLast**	0x0
1 bit	BYTE - **fShrinkToFit**	0x0
1 bit	BYTE - **fMergeCell**	0x0
2 bits	BYTE - **iReadingOrder**	0x0
1 bit	BYTE - **fLocked**	0x1
1 bit	BYTE - **fHidden**	0x0
1 bit	BYTE - **fSxButton**	0x0
1 bit	BYTE - **f123Prefix**	0x0
6 bits	WORD - **xfGrbitAtr**	0x12
10 bits	WORD - **unused**	0x000

Figure 93: Structure of BrtXf

Fields in this record that are explained in previous records in this example are omitted for brevity.

iFont: 0x0001 specifies that the font of cell B5 is specified by the second BrtFont record following BrtBeginFonts.

iFill: 0x0002 specifies that the fill properties of cell B5 are specified by the third BrtFill record following BrtBeginFills.

xfGrbitAtr: 0x0012 specifies the cell formatting properties that are overwritten according to the following table:

Offset	Field Name	Bits	Meaning
0	ibitAtrNum	1	0x0 specifies that the number property of the formatting for this cell is overwritten.
1	ibitAtrFnt	1	0x1 specifies that the font property of the formatting for this cell is not overwritten.
2	ibitAtrAlc	1	0x0 specifies that the alignment property of the formatting for this cell is overwritten.
3	ibitAtrBdr	1	0x0 specifies that the border property of the formatting for this cell is overwritten.

4	ibitAtrPat	1	0x1 specifies that the fill property of the formatting for this cell is not overwritten.
5	ibitAtrProt	1	0x0 specifies that the protection property of the formatting for this cell is overwritten.

3.6.23 Example: Formatting: BrtEndCellXFs

This BrtEndCellXFs record specifies the end of the collection of BrtXF records that specifies all cell XFs in the workbook.

Size	Structure
0000	BrtEndCellXFs - **BrtEndCellXfs**

Figure 94: Structure of BrtEndCellXfs

3.7 Example: Workbook

This example shows a workbook that contains three worksheets. The sheet names are Sheet1, Sheet2 and Sheet3. On Sheet1, there is content in the following cells:

- Cell B4 has a string "Number"
- Cell B5 has the number 1
- Cell B6 has a string "Formula"
- Cell B7 has the following formula: =SQRT(B5*2)

Sheet2 and Sheet3 are empty sheets and their record details are not documented in this example.

The BrtBeginBook and BrtEndBook records and all the records in between are contained in the Workbook part ABNF. The following screenshot is of Sheet1.

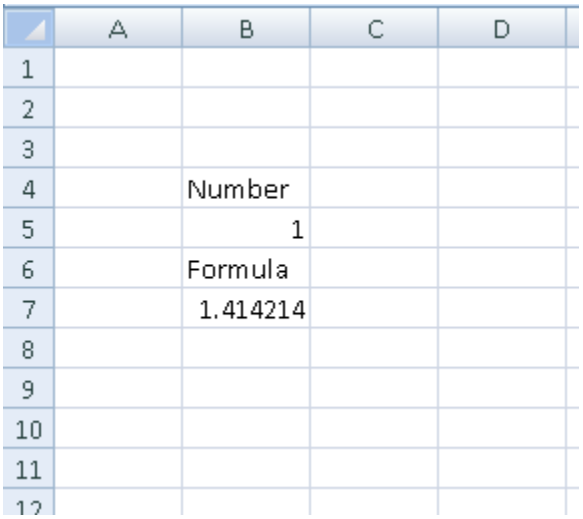


Figure 95: Sheet within a workbook

3.7.1 Example: Workbook: BrtBeginBook

The first record in this example specifies the beginning of a collection of records that specifies properties of a workbook.

Size	Structure
0000	BrtBeginBook - **BrtBeginBook**

Figure 96: Structure of BrtBeginBook

3.7.2 Example: Workbook: BrtFileVersion

This next record in this example, BrtFileVersion, specifies which application and which versions of that application accessed the data contained in the file.

Size	Structure	Value
0030	BrtFileVersion - **BrtFileVersion**	
0010	GUID - **guidCodeName**	0x00000000000000000000000000000000
0008	XLNullableWideString - **stAppName**	xl
0006	XLNullableWideString - **stLastEdited**	4
0006	XLNullableWideString - **stLowestEdited**	4
000C	XLNullableWideString - **stRupBuild**	4505

Figure 97: Structure of BrtFileVersion

guidCodeName: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 specifies that the VBA project needs to be recompiled on load.

stAppName: "xl" specifies that Excel is the application name.

stLastEdited: "4" specifies that Microsoft® Office Excel® 2007 is the version of the application that last saved the file.

stLowestEdited: "4" specifies that Office Excel 2007 is the earliest version of the application that saved the file.

stRupBuild: "4505" specifies the build number of the application.

3.7.3 Example: Workbook: BrtWbProp

The next record in this example, BrtWbProp, specifies properties of the workbook.

Size	Structure	Value
000C	BrtWbProp - **BrtWbProp**	
1 bit	BOOL - **f1904**	0x0
1 bit	BOOL - **reserved1**	0x0
1 bit	BOOL - **fHideBorderUnselLists**	0x0
1 bit	BOOL - **fFilterPrivacy**	0x0
1 bit	BOOL - **fBuggedUserAboutSolution**	0x0
1 bit	BOOL - **fShowInkAnnotation**	0x1
1 bit	BOOL - **fBackup**	0x0
1 bit	BOOL - **fNoSaveSup**	0x0
2 bits	DWORD - **grbitUpdateLinks**	0x0
1 bit	BOOL - **fHidePivotTableFList**	0x0
1 bit	BOOL - **fPublishedBookItems**	0x0
1 bit	BOOL - **fCheckCompat**	0x0
2 bits	DWORD - **mdDspObj**	0x0
1 bit	BOOL - **fShowPivotChartFilter**	0x0
1 bit	BOOL - **fAutoCompressPictures**	0x1
1 bit	BOOL - **reserved2**	0x0
1 bit	BOOL - **fRefreshAll**	0x0
13 bits	DWORD - **unused**	0x0000
0004	DWORD - **dwThemeVersion**	0x0001E542
0004	CodeName - **strName**	empty string

Figure 98: Structure of BrtWbProp

f1904: 0x0 specifies that the 1900 date system is the date system used in this workbook.

fHideBorderUnselLists: 0x0 specifies that table borders are not visible when a table is not active.

fFilterPrivacy: 0x0 specifies that personally identifiable information is not removed from this workbook on save.

fBuggedUserAboutSolution: 0x0 specifies that a warning will not appear before opening a smart document **manifest** file.

fShowInkAnnotation: 0x1 specifies that ink comments are visible in this workbook.

fBackup: 0x0 specifies that the backup feature is not enabled for the workbook.

fNoSaveSup: 0x0 specifies that the external link values are not cached with the workbook on save.

grbitUpdateLinks: 0x0 specifies that the link update behavior is application specific.

fHidePivotTableFList: 0x0 specifies that PivotTable view field lists are not hidden.

fPublishedBookItems: 0x0 specifies each sheet is published according to its own publishing state as specified by the **fPublish** field of the BrtWsProp structure.

fCheckCompat: 0x0 specifies that the file format compatibility checker for the workbook is not enabled.

mdDspObj: 0x0 specifies that the shapes in the workbook are visible.

fShowPivotChartFilter: 0x0 specifies that the pivot chart filter pane is not visible.

fAutoCompressPictures: 0x1 specifies that the pictures in the workbook are compressed when the workbook is saved.

fRefreshAll: 0x0 specifies that external connections in the workbook are not refreshed when the workbook is opened.

dwThemeVersion: 0x0001E542 specifies the version number of the theme applied to the workbook.

strName: The empty string specifies this workbook doesn't contain a VBA project.

3.7.4 Example: Workbook: BrtBeginBookViews

The next record in this example, BrtBeginBookViews, specifies the beginning of a collection of BrtBookView records.

Size	Structure
0000	BrtBeginBookViews - **BrtBeginBookViews**

Figure 99: Structure of BrtBeginBookViews

3.7.5 Example: Workbook: BrtBookView

The next record in this example, BrtBookView specifies a single workbook view.

Size	Structure	Value
001D	BrtBookView - **BrtBookView**	
0004	LONG - **xWn**	0x00000078
0004	LONG - **yWn**	0x0000001E
0004	DWORD - **dxWn**	0x00005CD0
0004	DWORD - **dyWn**	0x00003930
0004	DWORD - **iTabRatio**	0x00000258
0004	DWORD - **itabFirst**	0x00000000
0004	DWORD - **itabCur**	0x00000000
1 bit	BYTE - **fHidden**	0x0
1 bit	BYTE - **fVeryHidden**	0x0
1 bit	BYTE - **fIconic**	0x0
1 bit	BYTE - **fDspHScroll**	0x1
1 bit	BYTE - **fDspVScroll**	0x1
1 bit	BYTE - **fBotAdornment**	0x1
1 bit	BYTE - **fAFDateGroup**	0x1
1 bit	BYTE - **unused**	0x0

Figure 100: Structure of BrtBookView

xWn: 0x00000078 specifies the X coordinate for the top-left corner of the window that contains the workbook is 120 twips.

yWn: 0x0000001E specifies the Y coordinate for the top-left corner of the window that contains the workbook is 30 twips.

dxWn: 0x00005CD0 specifies the width of the window that contains the workbook is 23760 twips.

dyWn: 0x00003930 specifies the height of the window that contains the workbook is 14640 twips.

iTabRatio: 0x00000258 specifies the ratio of the width of the sheet tabs to the width of the horizontal scroll bar is 600.

itabFirst: 0x00000000 specifies the first sheet in this workbook view, which is the BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs.

itabCur: 0x00000000 specifies the active sheet in this workbook view, which is the BrtBundleSh record in the collection of all records directly following BrtBeginBundleShs.

fHidden: 0x0 specifies the window that contains the workbook is not hidden.

fVeryHidden: 0x0 specifies the window that contains the workbook is not hidden.

fIconic: 0x0 specifies that the window that contains the workbook is not minimized.

fDspHScroll: 0x1 specifies the horizontal scrollbar is displayed in the workbook view.

fDspVScroll: 0x1 specifies the vertical scrollbar is displayed in the workbook view.

fBotAdornment: 0x1 specifies the sheet tabs are displayed in the workbook view.

fAFDateGroup: 0x1 specifies to group dates with the filtering options in the user interface.

3.7.6 Example: Workbook: BrtEndBookViews

The next record in this example, BrtEndBookViews, specifies the end of a collection of BrtBookView records.

Size	Structure
0000	BrtEndBookViews - **BrtEndBookViews**

Figure 101: Structure of BrtEndBookViews

3.7.7 Example: Workbook: BrtBeginBundleShs

The next record in this example, BrtBeginBundleShs, specifies the beginning of a collection of BrtBundleSh records.

Size	Structure
0000	BrtBeginBundleShs - **BrtBeginBundleShs**

Figure 102: Structure of BrtBeginBundleShs

3.7.8 Example: Workbook: BrtBundleSh

The next record in this example, BrtBundleSh, specifies the first sheet in the workbook.

Size	Structure	Value
0024	BrtBundleSh - **BrtBundleSh**	
0004	ST_SheetState - **hsState**	0x00000000
0004	DWORD - **itabID**	0x00000001
000C	RelID - **strRelID**	rId1
0010	XLWideString - **strName**	Sheet1

Figure 103: Structure of BrtBundleSh

hsState: 0x00000000 specifies the sheet is visible.

itabID: 0x00000001 specifies the unique identifier for the sheet.

strRelID: "rId1" specifies the RelID listed in the sheet1.bin.rels part that identifies the path to the table part within the package.

strName: "Sheet1" specifies the unique case-insensitive name of the sheet.

3.7.9 Example: Workbook: BrtBundleSh

The next record in this example specifies the second sheet in the workbook.

Size	Structure	Value
0024	BrtBundleSh - **BrtBundleSh**	
0004	ST_SheetState - **hsState**	0x00000000
0004	DWORD - **itabID**	0x00000002
000C	RelID - **strRelID**	rId2
0010	XLWideString - **strName**	Sheet2

Figure 104: Structure of BrtBundleSh

Fields in this record are explained in a previous record in this example and are omitted for brevity. The record shows a typical example of a workbook with three sheets.

3.7.10 Example: Workbook: BrtBundleSh

The next record in this example specifies the third sheet in the workbook.

Size	Structure	Value
0024	BrtBundleSh - **BrtBundleSh**	
0004	ST_SheetState - **hsState**	0x00000000
0004	DWORD - **itabID**	0x00000003
000C	RelID - **strRelID**	rId3
0010	XLWideString - **strName**	Sheet3

Figure 105: Structure of BrtBundleSh

Fields in this record are explained in a previous record in this example and are omitted for brevity. The record shows a typical example of a workbook with three sheets.

3.7.11 Example: Workbook: BrtEndBundleShs

The next record in this example, BrtEndBundleShs, specifies the end of a collection of BrtBundleSh records.

Size	Structure
0000	BrtEndBundleShs - **BrtEndBundleShs**

Figure 106: Structure of BrtEndBundleShs

3.7.12 Example: Workbook: BrtCalcProp

The next record in this example, BrtCalcProp, specifies workbook calculation properties.

Size	Structure	Value
001A	BrtCalcProp - **BrtCalcProp**	
0004	DWORD - **recalcID**	0x0001EB1D
0004	LONG - **fAutoRecalc**	0x00000001
0004	DWORD - **cCalcCount**	0x00000064
0008	Xnum - **xnumDelta**	0x3F50624DD2F1A9FC
0004	LONG - **cUserThreadCount**	0x00000001
1 bit	WORD - **fFullCalcOnLoad**	0x0
1 bit	WORD - **fRefA1**	0x1
1 bit	WORD - **fIter**	0x0
1 bit	WORD - **fFullPrec**	0x1
1 bit	WORD - **fSomeUncalced**	0x0
1 bit	WORD - **fSaveRecalc**	0x1
1 bit	WORD - **fMTREnabled**	0x1
1 bit	WORD - **fUserSetThreadCount**	0x0
1 bit	WORD - **fNoDeps**	0x0
7 bits	WORD - **reserved**	0x00

Figure 107: Structure of BrtCalcProp

recalcID: 0x0001EB1D specifies the version of the calculation engine that was last used to calculate values in the workbook.

fAutoRecalc: 0x00000001 specifies that the workbook is in automatic calculation mode.

cCalcCount: 0x00000064 specifies that the number of iterations to run when calculating a workbook in iterative calculation mode is 100.

xnumDelta: 0x3F50624DD2F1A9FC specifies an Xnum value of 0.001 that specifies that the application stops calculating after **cCalcCount** iterations or after all values in the circular reference change by less than .001 between iterations, whichever comes first.

cUserThreadCount: 0x00000001 specifies one concurrent calculation process is to be used to calculate this workbook.

fFullCalcOnLoad: 0x0 specifies not to perform a full calculation on load.

fRefA1: 0x1 specifies A1 reference style is used in the workbook.

fIter: 0x0 specifies that the application does not attempt to calculate formulas that contain circular references.

fFullPrec: 0x1 specifies that the precision as displayed mode is not selected.

fSomeUncalced: 0x0 specifies that the workbook is recalculated fully before save.

fSaveRecalc: 0x1 specifies that the application will recalculate values in the workbook on save when in manual calculation mode.

fMTREnabled: 0x1 specifies that concurrent calculation processes are enabled for this workbook.

fUserSetThreadCount: 0x0 specifies that the user has not set the number of concurrent calculation processes for this workbook.

fNoDeps: 0x0 specifies dependencies are respected and only formulas that depend on cells that changed in the workbook are calculated.

3.7.13 Example: Workbook: BrtWbFactoid

The next record in this example, BrtWbFactoid, specifies a collection of properties for smart tags.

Size	Structure	Value
0001	BrtWbFactoid - **BrtWbFactoid**	
1 bit	BYTE - **fEmbedFactoids**	0x0
2 bits	BYTE - **mdFactoidDisplay**	0x0
5 bits	BYTE - **unused**	0x00

Figure 108: Structure of BrtWbFactoid

fEmbedFactoids: 0x00 specifies smart tags are not saved with the workbook.

mdFactoidDisplay: 0x00 specifies the smart tag actions button and the smart tag indicator are visible at runtime.

3.7.14 Example: Workbook: BrtFileRecover

The next record in this example, BrtFileRecover, specifies the state of the workbook file for AutoRecover information.

Size	Structure	Value
0001	BrtFileRecover - **BrtFileRecover**	
1 bit	BYTE - **fDontAutoRecover**	0x0
1 bit	BYTE - **fSavedDuringRecovery**	0x0
1 bit	BYTE - **fCreatedViaMinimalSave**	0x0
1 bit	BYTE - **fOpenedViaDataRecovery**	0x0
1 bit	BYTE - **fOpenedViaSafeLoad**	0x0
3 bits	BYTE - **reserved**	0x0

Figure 109: Structure of BrtFileRecover

fDontAutoRecover: 0x00 specifies that the AutoRecover information has not been disabled for the workbook.

fSavedDuringRecovery: 0x00 specifies that the workbook was not saved during the AutoRecover process.

fCreatedViaMinimalSave: 0x00 specifies that the workbook was not created by a minimal save during data recovery.

fOpenedViaDataRecovery: 0x00 specifies that the workbook was not opened by a data recovery operation.

fOpenedViaSafeLoad: 0x00 specifies that the workbook was not opened in safe load mode.

3.7.15 Example: Workbook: BrtEndBook

The next record in this example, BrtEndBook, specifies the end of a collection of records that specifies properties of the workbook.

Size	Structure
0000	BrtEndBook - **BrtEndBook**

Figure 110: Structure of BrtEndBook

3.7.16 Example: Workbook: BrtBeginSst

The next record in this example, BrtBeginSst, specifies properties of a shared string table and the beginning of a collection of BrtSSTItem records.

Size	Structure	Value
0008	BrtBeginSst - **BrtBeginSst**	
0004	DWORD - **cstTotal**	0x00000002
0004	DWORD - **cstUnique**	0x00000002

Figure 111: Structure of BrtBeginSst

cstTotal: 0x00000002 specifies the total number of references in the workbook to strings in the BrtSSTItem collection is 2.

cstUnique: 0x00000002 specifies the number of unique strings in the BrtSSTItem collection is 2.

3.7.17 Example: Workbook: BrtSSTItem

The next record in this example, BrtSSTItem, specifies an individual string in the shared string table.

Size	Structure	Value
0011	BrtSSTItem - **BrtSstItem**	
0011	RichStr - **richStr**	Number

Figure 112: Structure of BrtSstItem

richStr: "Number" specifies the type of the string.

3.7.18 Example: Workbook: BrtSSTItem

The next record in this example, BrtSSTItem, specifies an individual string in the shared string table.

Size	Structure	Value
0013	BrtSSTItem - **BrtSstItem**	
0013	RichStr - **richStr**	Formula

Figure 113: Structure of BrtSstItem

richStr: "Formula" specifies the type of the string.

3.7.19 Example: Workbook: BrtEndSst

The next record in this example, BrtEndSst, specifies the end of a collection of BrtSSTItem records.

Size	Structure
0000	BrtEndSst - **BrtEndSst**

Figure 114: Structure of BrtEndSst

3.7.20 Example: Workbook: BrtBeginSheet

The next record in this example, BrtBeginSheet, specifies the beginning of a collection of records that specifies sheets. Every sheet in the workbook starts with this record and ends with the BrtEndSheet record.

Size	Structure
0000	BrtBeginSheet - **BrtBeginSheet**

Figure 115: Structure of BrtBeginSheet

The records for the second and third sheets in the workbook are not included in this example.

3.7.21 Example: Workbook: BrtWsProp

The next record in this example, BrtWsProp, specifies properties for the worksheet.

Size	Structure	Value
0017	BrtWsProp - **BrtWsProp**	
1 bit	USHORT - **fShowAutoBreaks**	0x1
2 bits	USHORT - **reserved1**	0x0
1 bit	USHORT - **fPublish**	0x1
1 bit	USHORT - **fDialog**	0x0
1 bit	USHORT - **fApplyStyles**	0x0
1 bit	USHORT - **fRowSumsBelow**	0x1
1 bit	USHORT - **fColSumsRight**	0x1
1 bit	USHORT - **fFitToPage**	0x0
1 bit	USHORT - **reserved2**	0x0
1 bit	USHORT - **fShowOutlineSymbols**	0x1
1 bit	USHORT - **reserved3**	0x0
1 bit	USHORT - **fSyncHoriz**	0x0
1 bit	USHORT - **fSyncVert**	0x0
1 bit	USHORT - **fAltExprEval**	0x0
1 bit	USHORT - **fAltFormulaEntry**	0x0
1 bit	BYTE - **fFilterMode**	0x0
1 bit	BYTE - **fCondFmtCalc**	0x1
6 bits	BYTE - **reserved4**	0x00
0008	BrtColor - **brtcolorTab**	
1 bit	BYTE - **fValidRGB**	0x0
7 bits	XColorType - **xColorType**	0x00
0001	BYTE - **index**	0x40
0002	SHORT - **nTintAndShade**	0x0000
0001	BYTE - **bRed**	0x00
0001	BYTE - **bGreen**	0x00
0001	BYTE - **bBlue**	0x00
0001	BYTE - **bAlpha**	0x00
0004	Rw - **rwSync**	
0004	RwNullable - **rw**	0xFFFFFFFF
0004	Col - **colSync**	
0004	ColNullable - **col**	0xFFFFFFFF
0004	CodeName - **strName**	empty string

Figure 116: Structure of BrtWsProp

fShowAutoBreaks: 0x1 specifies that automatic page breaks (2) are visible on this sheet.

fPublish: 0x1 specifies that the publish to server feature is enabled for this sheet.

fDialog: 0x0 specifies that the sheet is not a dialog sheet.

fApplyStyles: 0x0 specifies not to apply the built-in cell style when an outline is applied.

fRowSumsBelow: 0x1 specifies that a summary row appears below the detailed data rows.

fColSumsRight: 0x1 specifies that the summary columns appear to the right in a sheet that is displayed left-to-right.

fFitToPage: 0x0 specifies not to fit the printable contents in a single page when printing this sheet.

fShowOutlineSymbols: 0x1 specifies that the sheet outline symbols are visible for the sheet.

fSyncHoriz: 0x0 specifies that horizontal scrolling is not synchronized across multiple windows that display this sheet.

fSyncVert: 0x0 specifies vertical scrolling is not synchronized across multiple windows that display this sheet.

fAltExprEval: 0x0 specifies that the sheet does not use transition formula evaluation.

fAltFormulaEntry: 0x0 specifies that the sheet does not use transition formula entry.

fFilterMode: 0x0 specifies that there are no AutoFilters on the sheet.

fCondFmtCalc: 0x1 specifies that conditional formatting is evaluated normally and all the existing conditional formatting will be updated as the cells associated with the conditional formatting change.

brtcolorTab: Specifies the background color of the sheet tab.

brtcolorTab.fValidRGB: 0x00 specifies that the color specified by the **index** field does not match the color specified by the **bRed**, **bGreen**, **bBlue**, and **bAlpha** fields.

brtcolorTab.xColorType: 0x00 specifies that color information is automatically determined by the application.

brtcolorTab.index: 0x40 specifies this value is undefined and ignored.

brtcolorTab.nTintAndShade: 0x0000 specifies the amount of tint or shade applied to the color specified by the **index** field or the **bRed**, **bGreen**, **bBlue**, and **bAlpha** fields.

brtcolorTab.bRed: 0x00 specifies the intensity of the color red in this color.

brtcolorTab.bGreen: 0x00 specifies the intensity of the color green in this color.

brtcolorTab.bBlue: 0x00 specifies the intensity of the color blue in this color.

brtcolorTab.bAlpha: 0x00 specifies the transparency of this color.

rwSync: Specifies the anchor row for synchronous vertical scrolling.

rwSync.rw: 0xFFFFFFFF specifies this value is ignored.

colSync: Specifies the anchor column for synchronous horizontal scrolling.

colSync.col: 0xFFFFFFFF specifies this value is ignored.

strName: The empty string specifies there is no **module** associated with the sheet.

3.7.22 Example: Workbook: BrtWsDim

The next record in this example, BrtWsDim, specifies the row and column bounds of used cells in the sheet. Used cells include all cells with data, formulas, or formatting applied directly to the cell.

Size	Structure	Value
0010	BrtWsDim - **BrtWsDim**	
0010	UncheckedRfX - **rfx**	
0004	LONG - **rwFirst**	0x00000003
0004	LONG - **rwLast**	0x00000006
0004	LONG - **colFirst**	0x00000001
0004	LONG - **colLast**	0x00000001

Figure 117: Structure of BrtWsDim

rfx: Specifies the row and column bounds of all the non-empty cells in this sheet, which is B4:B7.

rfx.rwFirst: 0x00000003 specifies the first row of the range, which is row 4.

rfx.rwLast: 0x00000006 specifies the last row of the range, which is row 7.

rfx.colFirst: 0x00000001 specifies the first column of the range, which is column B.

rfx.colLast: 0x00000001 specifies the last column of the range, which is column B.

3.7.23 Example: Workbook: BrtBeginWsViews

The next record in this example, BrtBeginWsViews, specifies the beginning of a collection of sheet views.

Size	Structure
0000	BrtBeginWsViews - **BrtBeginWsViews**

Figure 118: Structure of BrtBeginWsViews

3.7.24 Example: Workbook: BrtBeginWsView

The next record in this example, BrtBeginWsView, specifies sheet view properties.

Size	Structure	Value
001E	BrtBeginWsView - **BrtBeginWsView**	
1 bit	USHORT - **fWnProt**	0x0
1 bit	USHORT - **fDspFmla**	0x0
1 bit	USHORT - **fDspGrid**	0x1
1 bit	USHORT - **fDspRwCol**	0x1
1 bit	USHORT - **fDspZeros**	0x1
1 bit	USHORT - **fRightToLeft**	0x0
1 bit	USHORT - **fSelected**	0x0
1 bit	USHORT - **fDspRuler**	0x1
1 bit	USHORT - **fDspGuts**	0x1
1 bit	USHORT - **fDefaultHdr**	0x1
1 bit	USHORT - **fWhitespaceHidden**	0x0
5 bits	USHORT - **reserved1**	0x00
0004	XLView - **xlView**	0x00000000
0004	LONG - **rwTop**	0x00000000
0004	LONG - **colLeft**	0x00000000
0001	BYTE - **icvHdr**	0x40
0001	BYTE - **reserved2**	0x00
0002	WORD - **reserved3**	0x0000
0002	USHORT - **wScale**	0x0064
0002	USHORT - **wScaleNormal**	0x0000
0002	USHORT - **wScaleSLV**	0x0000
0002	USHORT - **wScalePLV**	0x0000
0004	DWORD - **iWbkView**	0x00000000

Figure 119: Structure of BrtBeginWsView

fWnProt: 0x0 specifies that the window that displays the sheet view is not locked due to window protection.

fDspFmla: 0x0 specifies that formulas are not displayed in cells in the sheet view.

fDspGrid: 0x1 specifies that gridlines are displayed in the sheet view.

fDspRwCol: 0x1 specifies that row and column headings are displayed in the sheet view.

fDspZeros: 0x1 specifies that cells with a value of zero are displayed as numbers.

fRightToLeft: 0x0 specifies that the sheet view is displayed left-to-right.

fSelected: 0x0 specifies that the sheet is not selected in the sheet view.

fDspRuler: 0x1 specifies that this value is ignored because **xlView** is not in Page Layout view.

fDspGuts: 0x1 specifies that outline symbols are displayed in sheet view.

fDefaultHdr: 0x1 specifies that the default color is used for the gridlines.

fWhitespaceHidden: 0x0 specifies that page margins, headers and footers are not hidden.

xlView: 0x00000000 specifies the type of sheet view is XLVNORMAL, which indicates that information is displayed in Normal view.

rwTop: 0x00000000 specifies the first row that is displayed in the sheet view is row 1.

colLeft: 0x00000000 specifies the first column that is displayed in the sheet view is column A.

icvHdr: 0x40 specifies the color of the gridlines displayed in the sheet view is the system color for text in the window.

wScale: 0x0064 specifies the zoom level percentage of the sheet displayed in the sheet view is 100%.

wScaleNormal: 0x0000 specifies the zoom level percentage of the sheet when displayed in Normal view is 100.

wScaleSLV: 0x0000 specifies the zoom level percentage of the sheet when displayed in Page Break Preview view is 100.

wScalePLV: 0x0000 specifies the zoom level percentage of the sheet when displayed in Page Layout view is 100.

iWbkView: 0x00000000 specifies the workbook view this sheet view is associated with.

3.7.25 Example: Workbook: BrtSel

The next record in this example, BrtSel, specifies the cell selection for a sheet.

Size	Structure	Value
0024	BrtSel - **BrtSel**	
0004	Pnn - **pnn**	0x00000003
0004	LONG - **rwAct**	0x00000000
0004	LONG - **colAct**	0x00000000
0004	DWORD - **dwRfxAct**	0x00000000
0014	UncheckedSqRfX - **sqrfx**	
0004	LONG - **crfx**	0x00000001
0010	UncheckedRfX - **rgrfx**	
0010	UncheckedRfX - **rfx[0]**	
0004	LONG - **rwFirst**	0x00000000
0004	LONG - **rwLast**	0x00000000
0004	LONG - **colFirst**	0x00000000
0004	LONG - **colLast**	0x00000000

Figure 120: Structure of BrtSel

pnn: 0x00000003 specifies selection belongs to the top-left pane.

rwAct: 0x00000000 specifies the row of the active cell.

colAct: 0x00000000 specifies the column of the active cell.

dwRfxAct: 0x00000000 specifies the zero-based index of the RfX structure in the **sqrfx** array.

sqrfx: Specifies a collection of all non-contiguous ranges within the selection.

sqrfx.crfx: 0x00000001 specifies the count of the UncheckedRfX structures in **rgrfx**.

sqrfx.rgrfx: Specifies the set of ranges that are selected.

sqrfx.rgrfx.rfx[0]: Specifies the first range.

sqrfx.rgrfx.rfx[0].rwFirst: 0x00000000 specifies first row in the range is row 1.

sqrfx.rgrfx.rfx[0].rwLast: 0x00000000 specifies last row in the range is row 1.

sqrfx.rgrfx.rfx[0].colFirst: 0x00000000 specifies first column in the range is column A.

sqrfx.rgrfx.rfx[0].colLast: 0x00000000 specifies last column in the range is column A.

3.7.26 Example: Workbook: BrtEndWsView

The next record in this example, BrtEndWsView, specifies the end of a collection of BrtBeginWsView records.

Size	Structure
0000	BrtEndWsView - **BrtEndWsView**

Figure 121: Structure of BrtEndWsView

3.7.27 Example: Workbook: BrtEndWsViews

The next record in this example, BrtEndWsView, specifies the end of a collection of BrtBeginWsViews record.

Size	Structure
0000	BrtEndWsViews - **BrtEndWsViews**

Figure 122: Structure of BrtEndWsViews

3.7.28 Example: Workbook: BrtWsFmtInfo

The next record in this example, BrtWsFmtInfo, specifies sheet formatting properties.

Size	Structure	Value
000C	BrtWsFmtInfo - **BrtWsFmtInfo**	
0004	DWORD - **dxGCol**	0xFFFFFFFF
0002	WORD - **cchDefColWidth**	0x0008
0002	WORD - **miyDefRwHeight**	0x012C
1 bit	DWORD - **fUnsynced**	0x0
1 bit	DWORD - **fDyZero**	0x0
1 bit	DWORD - **fExAsc**	0x0
1 bit	DWORD - **fExDesc**	0x0
12 bits	DWORD - **reserved**	0x000
8 bits	DWORD - **iOutLevelRw**	0x00
8 bits	DWORD - **iOutLevelCol**	0x00

Figure 123: Structure of BrtWsFmtInfo

dxGCol: 0xFFFFFFFF specifies that this value is ignored.

cchDefColWidth: 0x0008 specifies the default column width is 8.

miyDefRwHeight: 0x012C specifies this field is ignored when **fUnsynched** is 0.

fUnsynced: 0x0 specifies **miyDefRwHeight** has been determined by the application.

fDyZero: 0x0 specifies that rows are not hidden by default.

fExAsc: 0x0 specifies that rows do not have a thick top border by default.

fExDesc: 0x0 specifies that rows do not have a thick bottom border by default.

iOutLevelRw: 0x00 specifies the highest number of outline levels (1) for rows in this sheet.

iOutLevelCol: 0x00 specifies the highest number of outline levels (1) for columns in this sheet.

3.7.29 Example: Workbook: BrtBeginSheetData

The next record in this example, BrtBeginSheetData, specifies the beginning of the cell table on this sheet.

Size	Structure
0000	BrtBeginSheetData - **BrtBeginSheetData**

Figure 124: Structure of BrtBeginSheetData

3.7.30 Example: Workbook: BrtRowHdr

The next record in this example, BrtRowHdr, specifies row information.

Size	Structure	Value
0019	BrtRowHdr - **BrtRowHdr**	
0004	LONG - **rw**	0x00000003
0004	DWORD - **ixfe**	0x00000000
0002	WORD - **miyRw**	0x012C
1 bit	BYTE - **fExtraAsc**	0x0
1 bit	BYTE - **fExtraDsc**	0x0
6 bits	BYTE - **reserved1**	0x00
3 bits	BYTE - **iOutLevel**	0x0
1 bit	BYTE - **fCollapsed**	0x0
1 bit	BYTE - **fDyZero**	0x0
1 bit	BYTE - **fUnsynced**	0x0
1 bit	BYTE - **fGhostDirty**	0x0
1 bit	BYTE - **fReserved**	0x0
1 bit	BYTE - **fPhShow**	0x0
7 bits	BYTE - **reserved2**	0x00
0004	DWORD - **ccolspan**	0x00000001
0008	BrtColSpan - **rgBrtColspan**	
0008	BrtColSpan - **brtcolspan[0]**	
0004	LONG - **colMic**	0x00000001
0004	LONG - **colLast**	0x00000001

Figure 125: Structure of BrtRowHdr

rw: 0x00000003 specifies the index of the row is the fourth row.

ixfe: 0x00000000 specifies a zero-based index of a BrtXF record that specifies the format to apply as the default format for the row. The indexed BrtXF is not included in this example.

miyRw: 0x012C specifies this value is ignored because the **fUnsynced** field is 0.

fExtraAsc: 0x0 specifies that padding will not be allocated for the top of this row for a thick upper cell border.

fExtraDsc: 0x0 specifies that padding will not be allocated for the bottom of this row for a medium or thick bottom cell border.

iOutLevel: 0x0 specifies the outline level (1) for this row.

fCollapsed: 0x0 specifies that preceding rows are not in the collapsed **outline state**.

fDyZero: 0x0 specifies that the row is not hidden.

fUnsynced: 0x0 specifies the row height has not been manually specified.

fGhostDirty: 0x0 specifies the row style as specified by the **ixfe** field is not applied.

fPhShow: 0x0 specifies the cells in this row do not have the phonetic guide enabled.

ccolspan: 0x00000001 specifies the number of BrtColSpan elements in **rgBrtColspan** is 1.

rgBrtColspan: Specifies the permissible locations for cells within this row.

rgBrtColspan.brtcolspan[0]: An array of BrtColSpan structures that specify the permissible locations for cells within this row.

rgBrtColspan.brtcolspan[0].colMic: 0x00000001 specifies that the first column with data in this span is column B.

rgBrtColspan.brtcolspan[0].colLast: 0x00000001 specifies that the last column with data in this span is column B.

3.7.31 Example: Workbook: BrtCellIsst

The next record in this example, BrtCellIsst, specifies a cell that contains a string.

Size	Structure	Value
000C	BrtCellIsst - **BrtCellIsst**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000001
24 bits	DWORD - **iStyleRef**	0x000000
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **reserved**	0x00
0004	DWORD - **isst**	0x00000000

Figure 126: Structure of BrtCellIsst

cell: Specifies cell information.

cell.column: 0x00000001 specifies that column B contains the cell.

cell.iStyleRef: 0x000000 specifies a zero-based index of a BrtXF record that specifies the cell formatting for this cell. The indexed BrtXF is not included in this example.

cell.fPhShow: 0x0 specifies the sheet does not show phonetic information for this cell.

isst: 0x00000000 specifies a zero-based index of a BrtSSTItem that specifies the string "Number" that this cell contains.

3.7.32 Example: Workbook: BrtRowHdr

The next record in this example, BrtRowHdr, specifies row information.

Size	Structure	Value
0019	BrtRowHdr - **BrtRowHdr**	
0004	LONG - **rw**	0x00000004
0004	DWORD - **ixfe**	0x00000000
0002	WORD - **miyRw**	0x012C
1 bit	BYTE - **fExtraAsc**	0x0
1 bit	BYTE - **fExtraDsc**	0x0
6 bits	BYTE - **reserved1**	0x00
3 bits	BYTE - **iOutLevel**	0x0
1 bit	BYTE - **fCollapsed**	0x0
1 bit	BYTE - **fDyZero**	0x0
1 bit	BYTE - **fUnsynced**	0x0
1 bit	BYTE - **fGhostDirty**	0x0
1 bit	BYTE - **fReserved**	0x0
1 bit	BYTE - **fPhShow**	0x0
7 bits	BYTE - **reserved2**	0x00
0004	DWORD - **ccolspan**	0x00000001
0008	BrtColSpan - **rgBrtColspan**	
0008	BrtColSpan - **brtcolspan[0]**	
0004	LONG - **colMic**	0x00000001
0004	LONG - **colLast**	0x00000001

Figure 127: Structure of BrtRowHdr

Fields in this record are explained in a previous BrtRowHdr record in this example and are omitted for brevity.

3.7.33 Example: Workbook: BrtCellRk

The next record in this example, BrtCellRk, specifies a cell that contains a number.

Size	Structure	Value
000C	BrtCellRk - **BrtCellRk**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000001
24 bits	DWORD - **iStyleRef**	0x000000
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **unused**	0x00
0004	RkNumber - **value**	
1 bit	ULONG - **FX100**	0x0
1 bit	ULONG - **FInt**	0x0
30 bits	ULONG - **num**	0x0FFC0000

Figure 128: Structure of BrtCellRk

cell: Specifies cell information.

cell.column: 0x00000001 specifies that column B contains the cell.

cell.iStyleRef: 0x000000 specifies a zero-based index of a BrtXF record that specifies the cell formatting for this cell. The indexed BrtXF is not included in this example.

cell.fPhShow: 0x0 specifies the sheet does not show phonetic information for this cell.

value: The RkNumber which specifies the value in the cell.

value.FX100: 0x0 specifies the value in the **value.num** field was not multiplied by 100 when it was saved.

value.FInt: 0x0 specifies that the value in the **value.num** field is 30 most significant bits of a 64-bit binary floating point number.

value.num: 0x0FFC0000 specifies the 30 most significant bits of a 64-bit binary floating-point number whose remaining bits are 0. That number is 1.

3.7.34 Example: Workbook: BrtRowHdr

The next record in this example, BrtRowHdr, specifies row information.

Size	Structure	Value
0019	BrtRowHdr **- BrtRowHdr**	
0004	LONG **- rw**	0x00000005
0004	DWORD **- ixfe**	0x00000000
0002	WORD **- miyRw**	0x012C
1 bit	BYTE **- fExtraAsc**	0x0
1 bit	BYTE **- fExtraDsc**	0x0
6 bits	BYTE **- reserved1**	0x00
3 bits	BYTE **- iOutLevel**	0x0
1 bit	BYTE **- fCollapsed**	0x0
1 bit	BYTE **- fDyZero**	0x0
1 bit	BYTE **- fUnsynced**	0x0
1 bit	BYTE **- fGhostDirty**	0x0
1 bit	BYTE **- fReserved**	0x0
1 bit	BYTE **- fPhShow**	0x0
7 bits	BYTE **- reserved2**	0x00
0004	DWORD **- ccolspan**	0x00000001
0008	BrtColSpan **- rgBrtColspan**	
0008	BrtColSpan **- brtcolspan[0]**	
0004	LONG **- colMic**	0x00000001
0004	LONG **- colLast**	0x00000001

Figure 129: Structure of BrtRowHdr

Fields in this record are explained in a previous BrtRowHdr record in this example and are omitted for brevity.

3.7.35 Example: Workbook: BrtCellIsst

The next record in this example, BrtCellIsst, specifies a cell that contains a string.

Size	Structure	Value
000C	BrtCellIsst - **BrtCellIsst**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000001
24 bits	DWORD - **iStyleRef**	0x000000
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **reserved**	0x00
0004	DWORD - **isst**	0x00000001

Figure 130: Structure of BrtCellIsst

cell: Specifies cell information.

cell.column: 0x00000001 specifies that column B contains the cell.

cell.iStyleRef: 0x000000 specifies the formatting for a cell. The BrtXF record is not included in the example.

cell.fPhShow: 0x0 specifies the sheet does not show phonetic information for this cell.

isst: 0x00000001 specifies a zero-based index of a BrtSSTItem that specifies the string "Formula" that this cell contains.

3.7.36 Example: Workbook: BrtRowHdr

The next record in this example, BrtRowHdr, specifies row information.

Size	Structure	Value
0019	BrtRowHdr - **BrtRowHdr**	
0004	LONG - **rw**	0x00000006
0004	DWORD - **ixfe**	0x00000000
0002	WORD - **miyRw**	0x012C
1 bit	BYTE - **fExtraAsc**	0x0
1 bit	BYTE - **fExtraDsc**	0x0
6 bits	BYTE - **reserved1**	0x00
3 bits	BYTE - **iOutLevel**	0x0
1 bit	BYTE - **fCollapsed**	0x0
1 bit	BYTE - **fDyZero**	0x0
1 bit	BYTE - **fUnsynced**	0x0
1 bit	BYTE - **fGhostDirty**	0x0
1 bit	BYTE - **fReserved**	0x0
1 bit	BYTE - **fPhShow**	0x0
7 bits	BYTE - **reserved2**	0x00
0004	DWORD - **ccolspan**	0x00000001
0008	BrtColSpan - **rgBrtColspan**	
0008	BrtColSpan - **brtcolspan[0]**	
0004	LONG - **colMic**	0x00000001
0004	LONG - **colLast**	0x00000001

Figure 131: Structure of BrtRowHdr

Fields in this record are explained in a previous BrtRowHdr record in this example and are omitted for brevity.

3.7.37 Example: Workbook: BrtFmlaNum

The next record in this example, BrtFmlaNum, specifies a cell that contains a formula of which the most recent evaluation resulted in a numeric value.

Size	Structure	Value
0028	BrtFmlaNum - **BrtFmlaNum**	
0008	Cell - **cell**	
0004	LONG - **column**	0x00000001
24 bits	DWORD - **iStyleRef**	0x000000
1 bit	DWORD - **fPhShow**	0x0
7 bits	DWORD - **reserved**	0x00
0008	Xnum - **xnum**	0x3FF6A09E667F3BCD
0002	GrbitFmla - **grbitFlags**	
1 bit	WORD - **fReserved**	0x0
1 bit	WORD - **fAlwaysCalc**	0x0
14 bits	WORD - **unused**	0x0000
0016	CellParsedFormula - **formula**	
0004	DWORD - **cce**	0x0000000E
000E	Rgce - **rgce**	
0007	Ptg - **Ptg[0]**	
0007	PtgRef - **PtgRef**	
5 bits	BYTE - **ptg**	0x04
2 bits	PtgDataType - **type**	0x2
1 bit	BYTE - **reserved**	0x0
0006	RgceLoc - **loc**	
0004	UncheckedRw - **row**	0x00000004
0002	ColRelShort - **column**	
14 bits	USHORT - **col**	0x0001
1 bit	USHORT - **fColRel**	0x1
1 bit	USHORT - **fRwRel**	0x1
0003	Ptg - **Ptg[1]**	
0003	PtgInt - **PtgInt**	
7 bits	BYTE - **ptg**	0x1E
1 bit	BYTE - **reserved0**	0x0
0002	WORD - **integer**	0x0002
0001	Ptg - **Ptg[2]**	
0001	PtgMul - **PtgMul**	
7 bits	BYTE - **ptg**	0x05
1 bit	BYTE - **reserved0**	0x0
0003	Ptg - **Ptg[3]**	
0003	PtgFunc - **PtgFunc**	
5 bits	BYTE - **ptg**	0x01

2 bits	PtgDataType - **type**	0x2
1 bit	BYTE - **reserved**	0x0
0002	Ftab - **iftab**	
0002	WORD - **iftab**	0x0014
0004	DWORD - **cb**	0x00000000

Figure 132: Structure of BrtFmlaNum

cell: Specifies the cell that contains the formula.

cell.column: 0x00000001 specifies that column B contains this cell.

cell.iStyleRef: 0x000000 specifies a zero-based index to a BrtXF record that the formatting style. The BrtXF record is not included in the example.

cell.fPhShow: 0x0 specifies the cell does not show phonetic information.

xnum: 0x3FF6A09E667F3BCD specifies an Xnum value of 1.4142135623730951 that specifies the value to which this formula is evaluated.

grbitFlags.fAlwaysCalc: 0x0 specifies the formula does not need to be reevaluated when the document is loaded.

formula: Specifies a formula stored in a cell.

formula.cce: 0x0000000E specifies the length of **rgce** in bytes is 14.

formula.rgce: Specifies the sequence of Ptgs for the formula.

formula.rgce.Ptg[0]: Specifies a single element of a formula.

formula.rgce.Ptg[0].PtgRef: Specifies a reference to a single cell.

formula.rgce.Ptg[0].PtgRef.ptg: 0x04 is required in this field.

formula.rgce.Ptg[0].PtgRef.type: 0x2 specifies a single value of a simple type.

formula.rgce.Ptg[0].PtgRef.loc: Specifies that a reference to single cell relative references is stored as coordinates.

formula.rgce.Ptg[0].PtgRef.loc.row: 0x00000004 specifies the row coordinate of the cell reference is 5.

formula.rgce.Ptg[0].PtgRef.loc.column: Specifies the column coordinate of the cell reference.

formula.rgce.Ptg[0].PtgRef.loc.column.col: 0x0001 specifies column B.

formula.rgce.Ptg[0].PtgRef.loc.column.fColRel: 0x1 specifies if the associated row and column pair is a relative reference with respect to columns.

formula.rgce.Ptg[0].PtgRef.loc.column.fRwRel: 0x1 specifies if the associated row and column pair is a relative reference with respect to rows.

formula.rgce.Ptg[1]: Specifies a single element of a formula.

formula.rgce.Ptg[1].PtgInt: Specifies a value.

formula.rgce.Ptg[1].PtgInt.ptg: 0x1E is required in this field.

formula.rgce.Ptg[1].PtgInt.integer: 0x0002 specifies the value is 2.

formula.rgce.Ptg[2]: Specifies a single element of a formula.

formula.rgce.Ptg[2].PtgMul: Specifies a binary value operator that multiplies the first and second expression in a binary value expression.

formula.rgce.Ptg[2].PtgMul.ptg: 0x05 is required in this field.

formula.rgce.Ptg[3]: Specifies a single element of a formula.

formula.rgce.Ptg[3].PtgFunc: Specifies a call to a function with a fixed number of parameters.

formula.rgce.Ptg[3].PtgFunc.ptg: 0x01 is required in this field.

formula.rgce.Ptg[3].PtgFunc.type: 0x2 specifies the data type for the value of this Ptg is VALUE.

formula.rgce.Ptg[3].PtgFunc.iftab: Specifies the function to be called.

formula.rgce.Ptg[3].PtgFunc.iftab.iftab: 0x0014 specifies function being called is SQRT.

formula.cb: 0x00000000 specifies the length of the **rgcb** field is 0.

3.7.38 Example: Workbook: BrtEndSheetData

The next record in this example, BrtEndSheetData, specifies the end of the cell table on the sheet.

Size	Structure
0000	BrtEndSheetData - **BrtEndSheetData**

Figure 133: Structure of BrtEndSheetData

3.7.39 Example: Workbook: BrtSheetProtection

The next record in this example, BrtSheetProtection, specifies protection options for a sheet.

Size	Structure	Value
0042	BrtSheetProtection - **BrtSheetProtection**	
0002	WORD - **protpwd**	0x0000
0004	DWORD - **fLocked**	0x00000000
0004	DWORD - **fObjects**	0x00000001
0004	DWORD - **fScenarios**	0x00000001
0004	DWORD - **fFormatCells**	0x00000000
0004	DWORD - **fFormatColumns**	0x00000000
0004	DWORD - **fFormatRows**	0x00000000
0004	DWORD - **fInsertColumns**	0x00000000
0004	DWORD - **fInsertRows**	0x00000000
0004	DWORD - **fInsertHyperlinks**	0x00000000
0004	DWORD - **fDeleteColumns**	0x00000000
0004	DWORD - **fDeleteRows**	0x00000000
0004	DWORD - **fSelLockedCells**	0x00000001
0004	DWORD - **fSort**	0x00000000
0004	DWORD - **fAutoFilter**	0x00000000
0004	DWORD - **fPivotTables**	0x00000000
0004	DWORD - **fSelUnlockedCells**	0x00000001

Figure 134: Structure of BrtSheetProtection

protpwd: 0x0000 specifies that there is no password set.

fLocked: 0x00000000 specifies the sheet and contents of locked cells are not protected.

fObjects: 0x00000001 specifies this field is undefined and ignored because **fLocked** is 0.

fScenarios: 0x00000001 specifies this field is undefined and ignored because **fLocked** is 0

fFormatCells: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fFormatColumns: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fFormatRows: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0.

fInsertColumns: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fInsertRows: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fInsertHyperlinks: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fDeleteColumns: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fDeleteRows: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0

fSelLockedCells: 0x00000001 specifies this field is undefined and ignored because **fLocked** is 0

fSort: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0.

fAutoFilter: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0.

fPivotTables: 0x00000000 specifies this field is undefined and ignored because **fLocked** is 0..

fSelUnlockedCells: 0x00000001 specifies this field is undefined and ignored because **fLocked** is 0.

3.7.40 Example: Workbook: BrtPrintOptions

The next record in this example, BrtPrintOptions, specifies the options for printing the sheet.

Size	Structure	Value
0002	BrtPrintOptions - **BrtPrintOptions**	
1 bit	WORD - **fHCenter**	0x0
1 bit	WORD - **fVCenter**	0x0
1 bit	WORD - **fPrintHeaders**	0x0
1 bit	WORD - **fPrintGrid**	0x0
1 bit	WORD - **unused**	0x1
11 bits	WORD - **reserved**	0x000

Figure 135: Structure of BrtPrintOptions

fHCenter: 0x0 specifies not to center the printed content horizontally on the page.

fVCenter: 0x0 specifies not to center the printed content vertically on the page.

fPrintHeaders: 0x0 specifies that the header rows and column heading will not be printed.

fPrintGrid: 0x0 specifies that gridlines will not be printed.

3.7.41 Example: Workbook: BrtMargins

The next record in this example, BrtMargins, specifies the page margins for the sheet.

Size	Structure	Value
0030	BrtMargins - **BrtMargins**	
0008	Margin - **xnumLeft**	
0008	Xnum - **margin**	0x3FE6666666666666
0008	Margin - **xnumRight**	
0008	Xnum - **margin**	0x3FE6666666666666
0008	Margin - **xnumTop**	
0008	Xnum - **margin**	0x3FE8000000000000
0008	Margin - **xnumBottom**	
0008	Xnum - **margin**	0x3FE8000000000000
0008	Margin - **xnumHeader**	
0008	Xnum - **margin**	0x3FD3333333333333
0008	Margin - **xnumFooter**	
0008	Xnum - **margin**	0x3FD3333333333333

Figure 136: Structure of BrtMargins

xnumLeft: Specifies the left page margin.

xnumLeft.margin: 0x3FE6666666666666 specifies an Xnum value of 0.7 that specifies the left page margin size in inches.

xnumRight: Specifies the right page margin.

xnumRight.margin: 0x3FE6666666666666 specifies an Xnum value of 0.7 that specifies the right page margin size in inches.

xnumTop: Specifies the top page margin.

xnumTop.margin: 0x3FE8000000000000 specifies an Xnum value of 0.75 that specifies the top page margin size in inches.

xnumBottom: Specifies the bottom page margin.

xnumBottom.margin: 0x3FE8000000000000 specifies an Xnum value of 0.75 that specifies the bottom page margin size in inches.

xnumHeader: Specifies the header page margin.

xnumHeader.margin: 0x3FD3333333333333 specifies an Xnum value of 0.3 that specifies the header page margin size in inches.

xnumFooter: Specifies the footer page margin.

xnumFooter.margin: 0x3FD3333333333333 specifies an Xnum value of 0.3 that specifies the footer page margin size in inches.

3.7.42 Example: Workbook: BrtEndSheet

The last record in this example, BrtEndSheet, specifies the end of a collection of records that specifies properties of the sheet.

Size	Structure
0000	BrtEndSheet - **BrtEndSheet**

Figure 137: Structure of BrtEndSheet

3.8 Example: PivotTable

This example shows a PivotTable and its associated PivotCache. The PivotTable uses a range of cells (A1:E45) in the "Source Data" sheet as its source data. The "CustomerName" and "ProductName" fields have been added to the row area, "Quantity" to the data area, and "OrderDate" to the page area of this PivotTable view. The "OrderDate" field has two dates selected in the filter (12/23/1997 and 12/26/1997) and the rest have been filtered out.

The following figure shows a possible implementation of the PivotTable discussed in this example:

	A	B	C
1			
2			
3		OrderDate	(Multiple Items)
4			
5		**Row Labels**	**Sum of Quantity**
6		**Island Trading**	**55**
7		Ipoh Coffee	55
8		**Königlich Essen**	**71**
9		Geitost	23
10		Perth Pasties	48
11		**Richter Supermarkt**	**31**
12		**Grand Total**	**157**

Figure: PivotTable within a sheet

The example covers PivotTable records that are members of the Workbook, PivotCache Definition, PivotCache Records, and PivotTable parts. The first set of records between BrtBeginPivotCacheIDs and BrtEndPivotCacheIDs are contained in the Workbook part ABNF. The records between BrtBeginPivotCacheDef and BrtEndPivotCacheDef are contained in the PivotCache Definition part ABNF. The records between BrtBeginPivotCacheRecords and BrtEndPivotCacheRecords are contained in the PivotCache Records part ABNF. The records between BrtBeginSXView and BrtEndSXView are contained in the PivotTable part ABNF.

3.8.1 Example: PivotTable: BrtBeginPivotCacheIDs

The first record in this example, BrtBeginPivotCacheIDs**,** represents the beginning of the collection of BrtBeginPivotCacheID records in the Workbook part.

Size	Structure
0000	BrtBeginPivotCacheIDs **- BrtBeginPivotCacheIDs**

Figure 138: Structure of BrtBeginPivotCacheIDs

3.8.2 Example: PivotTable: BrtBeginPivotCacheID

The BrtBeginPivotCacheID record specifies the relationship between the PivotCache identifier and its associated PivotCache Definition.

Size	Structure	Value
0010	BrtBeginPivotCacheID **- BrtBeginPivotCacheID**	
0004	DWORD **- idSx**	0x00000041
000C	RelID **- irstcacheRelID**	rId3

Figure 139: Structure of BrtBeginPivotCacheID

idSx: 0x00000041 specifies the identifier of the PivotCache Definition. This identifier corresponds to the **idCache** field of the PivotTable view as specified in BrtBeginSXView.

irstcacheRelID: rId3 specifies the relationship identifier of the workbook part containing the PivotTable.

3.8.3 Example: PivotTable: BrtBeginPivotCacheDef

Next, BrtBeginPivotCacheDef specifies the properties of the PivotCache.

Size	Structure	Value
0039	BrtBeginPivotCacheDef - **BrtBeginPivotCacheDef**	
0001	AppVersion - **bVerCacheLastRefresh**	0x03
0001	AppVersion - **bVerCacheRefreshableMin**	0x03
0001	AppVersion - **bVerCacheCreated**	0x03
1 bit	BYTE - **fSaveData**	0x1
1 bit	BYTE - **fInvalid**	0x0
1 bit	BYTE - **fRefreshOnLoad**	0x0
1 bit	BYTE - **fOptimizeCache**	0x0
1 bit	BYTE - **fEnableRefresh**	0x1
1 bit	BYTE - **fBackgroundQuery**	0x0
1 bit	BYTE - **fUpgradeOnRefresh**	0x0
1 bit	BYTE - **fSheetData**	0x0
0004	LONG - **citmGhostMax**	0xFFFFFFFF
0008	DateAsXnum - **xnumRefreshedDate**	
0008	Xnum - **dateNum**	0x40E355758E27E5E8
1 bit	BYTE - **fLoadRefreshedWho**	0x1
1 bit	BYTE - **fLoadRelIDRecords**	0x1
1 bit	BYTE - **fSupportSubquery**	0x0
1 bit	BYTE - **fSupportAttribDrill**	0x0
4 bits	BYTE - **reserved**	0x0
0004	DWORD - **crecords**	0x0000002C
0018	XLWideString - **stRefreshedWho**	John Smith
000C	RelID - **stRelIDRecords**	rId1

Figure 140: Structure of BrtBeginPivotCacheDef

Fields in this record that are ignored because they apply only to OLAP or ODBC data sources are omitted for brevity.

bVerCacheLastRefresh: 0x03 specifies the data functionality level of the application that last refreshed the PivotCache.

bVerCacheRefreshableMin: 0x03 specifies the lowest data functionality level of the application that is required to refresh the PivotCache.

bVerCacheCreated: 0x03 specifies the data functionality level of the application that created the PivotCache.

fSaveData: 0x1 specifies that the cache records exist.

fInvalid: 0x0 specifies that the PivotCache is valid and does not need a refresh before the next recalculation.

fRefreshOnLoad: 0x0 specifies that the PivotCache is not refreshed when the workbook is opened.

fOptimizeCache: 0x0 specifies that optimizations to reduce memory are not applied to the PivotCache.

fEnableRefresh: 0x1 specifies that the user can refresh the PivotCache.

fBackgroundQuery: 0x0 specifies that the PivotCache is not refreshed asynchronously.

fUpgradeOnRefresh: 0x0 specifies that the PivotCache is not scheduled for a version upgrade at the next refresh.

citmGhostMax: 0xFFFFFFFF specifies the number of unused cache items to allow before they are discarded, which is 4294967295.

xnumRefreshedDate: 0x40E355758E27E5E8 represents 5/27/2008 4:09:59PM, which is when the PivotCache was last refreshed.

fLoadRefreshedWho: 0x1 specifies that the **stRefreshedWho** field exists.

fLoadRelIDRecords: 0x1 specifies that the **stRelIDRecords** field exists.

crecords: 0x0000002C specifies that the number of cache records in the PivotCache is 44.

stRefreshedWho: John Smith specifies the name of the user who last refreshed the PivotCache.

stRelIDRecords: rId1 specifies the unique identifier that corresponds to the related cache records.

3.8.4 Example: PivotTable: BrtBeginPCDSource

The BrtBeginPCDSource record specifies the type of the PivotCache source data.

Size	Structure	Value
0008	BrtBeginPCDSource - **BrtBeginPCDSource**	
0004	LONG - **iSrcType**	0x00000000
0004	DWORD - **dwConnID**	0x00000000

Figure 141: Structure of BrtBeginPCDSource

iSrcType: 0x00000000 specifies that the PivotCache source data is a range.

dwConnID: 0x00000000 specifies the unique identifier of the external connection. This value is ignored, because the value of **iSrcType** is 0x00000000.

3.8.5 Example: PivotTable: BrtBeginPCDSRange

The BrtBeginPCDSRange record specifies the properties of the range-based source data for this PivotCache.

Size	Structure	Value
002D	BrtBeginPCDSRange - **BrtBeginPCDSRange**	
1 bit	BYTE - **fName**	0x0
7 bits	BYTE - **reserved1**	0x00
1 bit	BYTE - **fBuiltIn**	0x0
7 bits	BYTE - **reserved2**	0x00
1 bit	BYTE - **fLoadRelId**	0x0
1 bit	BYTE - **fLoadSheet**	0x1
6 bits	BYTE - **reserved3**	0x00
001A	XLWideString - **sheetName**	Source Data
0010	RfX - **range**	
0004	LONG - **rwFirst**	0x00000000
0004	LONG - **rwLast**	0x0000002C
0004	LONG - **colFirst**	0x00000000
0004	LONG - **colLast**	0x00000004

Figure 142: Structure of BrtBeginPCDSRange

fName: 0x0 specifies that the source data is not a defined name.

fBuiltIn: 0x0 specifies that the defined name is not a built-in name**.** This field is ignored, because the source data is not a defined name.

fLoadRelId: 0x0 specifies that the source data is not in an external workbook.

fLoadSheet: 0x1 specifies that the source data is scoped to a single sheet.

sheetName: Source Data specifies the name of the sheet to which the source data is scoped.

range: Specifies the source data range in the following fields:

range.rwFirst: 0x00000000 specifies that the first row of the source data range is row 1.

range.rwLast: 0x0000002C specifies that the last row of the source data range is row 45.

range.colFirst: 0x00000000 specifies that the first column of the source data range is column A.

range.colLast: 0x00000004 specifies that the last column of the source data range is column E.

3.8.6 Example: PivotTable: BrtBeginPCDFields

Next, BrtBeginPCDFields specifies the beginning of the collection of cache fields in the PivotCache and the count of the cache fields.

Size	Structure	Value
0004	BrtBeginPCDFields - **BrtBeginPCDFields**	
0004	DWORD - **cfields**	0x00000005

Figure 143: Structure of BrtBeginPCDFields

cfields: 0x00000005 specifies that there are five cache fields in the PivotCache.

3.8.7 Example: PivotTable: BrtBeginPCDField

The first BrtBeginPCDField record specifies the properties of the "CustomerName" cache field in the PivotCache.

Size	Structure	Value
0030	BrtBeginPCDField - **BrtBeginPCDField**	
1 bit	BYTE - **fServerBased**	0x0
1 bit	BYTE - **fCantGetUniqueItems**	0x0
1 bit	BYTE - **fSrcField**	0x1
1 bit	BYTE - **fCaption**	0x0
1 bit	BYTE - **fOlapMemPropField**	0x0
3 bits	BYTE - **reserved1**	0x0
1 bit	BYTE - **fLoadFmla**	0x0
1 bit	BYTE - **fLoadPropName**	0x0
6 bits	BYTE - **reserved2**	0x00
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
0002	SHORT - **wTypeSql**	0x0000
0004	DWORD - **ihdb**	0x00000000
0004	DWORD - **isxtl**	0x00000000
0004	DWORD - **cIsxtmps**	0x00000000
001C	XLWideString - **stFldName**	CustomerName

Figure 144: Structure of BrtBeginPCDField

Fields in this record that are ignored because they apply only to OLAP or ODBC data sources are omitted for brevity.

fSrcField: 0x1 specifies that this cache field was created based on a column in the source data.

fCaption: 0x0 specifies that the **stFldCaption** field, which specifies the caption of this cache field, does not exist after the fixed size portion of the record.

fLoadFmla: 0x0 specifies that the **fldFmla** field, which specifies the formula for a calculated field, does not exist after the fixed-size portion of the record.

ifmt: Specifies the number format applied to all items in this cache field.

ifmt.ifmt.ifmt: 0x0000 specifies that all the items in the cache field are in the General number format as specified in [ECMA-376] Part 4: Markup Language Reference, section 3.8.30.

stFldName: CustomerName specifies the name of the cache field.

3.8.8 Example: PivotTable: BrtBeginPCDFAtbl

The BrtBeginPCDFAtbl record specifies properties of the "CustomerName" cache field and begins the collection of cache item records shared by the cache field in the PivotCache.

Size	Structure	Value
0006	BrtBeginPCDFAtbl - **BrtBeginPCDFAtbl**	
1 bit	WORD - **fTextEtcField**	0x1
1 bit	WORD - **fNonDates**	0x1
1 bit	WORD - **fDateInField**	0x0
1 bit	WORD - **fHasTextItem**	0x1
1 bit	WORD - **fHasBlankItem**	0x0
1 bit	WORD - **fMixedTypesIgnoringBlanks**	0x0
1 bit	WORD - **fNumField**	0x0
1 bit	WORD - **fIntField**	0x0
1 bit	WORD - **fNumMinMaxValid**	0x0
1 bit	WORD - **fHasLongTextItem**	0x0
6 bits	WORD - **reserved**	0x00
0004	DWORD - **citems**	0x00000005

Figure 145: Structure of BrtBeginPCDFAtbl

fTextEtcField: 0x1 specifies that this cache field contains at least one cache item that is a text, blank, Boolean, or error value.

fNonDates: 0x1 specifies that this cache field contains at least one cache item that is not a date.

fDateInField: 0x0 specifies that this cache field does not contain a cache item that is a date.

fHasTextItem: 0x1 specifies that this cache field contains a cache item that is a text value.

fHasBlankItem: 0x0 specifies that this cache field does not contain a cache item that is a blank value.

fMixedTypesIgnoringBlanks: 0x0 specifies that this cache field does not contain cache items that are more than one of the following types of values: text, numeric, or date.

fNumField: 0x0 specifies that this cache field does not contain a cache item that is a numeric value.

fIntField: 0x0 specifies that this cache field does not contain a cache item that is an integer.

fNumMinMaxValid: 0x0 specifies that **xnumMin** and **xnumMax** do not exist in the record.

fHasLongTextItem: 0x0 specifies that this cache field does not contain a cache item that is a string over 255 characters.

citems: 0x00000005 specifies that there are five cache items in this collection.

3.8.9 Example: PivotTable: BrtPCDIString

The next record, BrtPCDIString, specifies the value of the "Great Lakes Food Market" cache item in the PivotCache.

Size	Structure	Value
0032	BrtPCDIString - **BrtPCDIString**	
0032	XLWideString - **st**	Great Lakes Food Market

Figure 146: Structure of BrtPCDIString

st: Great Lakes Food Market specifies the string type value of this record.

3.8.10 Example: PivotTable: BrtPCDIString

This BrtPCDIString record specifies the value of the "Island Trading" cache item in the PivotCache.

Size	Structure	Value
0020	BrtPCDIString - **BrtPCDIString**	
0020	XLWideString - **st**	Island Trading

Figure 147: Structure of BrtPCDIString

st: Island Trading specifies the string type value of this record.

The remaining BrtPCDIString records are omitted for brevity.

3.8.11 Example: PivotTable: BrtBeginPCDField

The next BrtBeginPCDField record describes the "OrderDate" cache field that corresponds to the pivot field displayed on the page axis in the example.

Size	Structure	Value
002A	BrtBeginPCDField - **BrtBeginPCDField**	
1 bit	BYTE - **fServerBased**	0x0
1 bit	BYTE - **fCantGetUniqueItems**	0x0
1 bit	BYTE - **fSrcField**	0x1
1 bit	BYTE - **fCaption**	0x0
1 bit	BYTE - **fOlapMemPropField**	0x0
3 bits	BYTE - **reserved1**	0x0
1 bit	BYTE - **fLoadFmla**	0x0
1 bit	BYTE - **fLoadPropName**	0x0
6 bits	BYTE - **reserved2**	0x00
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x000E
0002	WORD - **reserved**	0x0000
0002	SHORT - **wTypeSql**	0x0000
0004	DWORD - **ihdb**	0x00000000
0004	DWORD - **isxtl**	0x00000000
0004	DWORD - **cIsxtmps**	0x00000000
0016	XLWideString - **stFldName**	OrderDate

Figure 148: Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

ifmt.ifmt.ifmt: 0x000E specifies all the items in the cache field are in **mm-dd-yy** format as specified in [ECMA-376] Part 4: Markup Language Reference, section 3.8.30.

stFldName: OrderDate specifies the name of the cache field.

3.8.12 Example: PivotTable: BrtBeginPCDFAtbl

The next BrtBeginPCDFAtbl record specifies properties of the "OrderDate" cache field and begins the collection of cache item records shared by the cache field in the PivotCache.

Size	Structure	Value
0016	BrtBeginPCDFAtbl - **BrtBeginPCDFAtbl**	
1 bit	WORD - **fTextEtcField**	0x0
1 bit	WORD - **fNonDates**	0x0
1 bit	WORD - **fDateInField**	0x1
1 bit	WORD - **fHasTextItem**	0x0
1 bit	WORD - **fHasBlankItem**	0x0
1 bit	WORD - **fMixedTypesIgnoringBlanks**	0x0
1 bit	WORD - **fNumField**	0x0
1 bit	WORD - **fIntField**	0x0
1 bit	WORD - **fNumMinMaxValid**	0x1
1 bit	WORD - **fHasLongTextItem**	0x0
6 bits	WORD - **reserved**	0x00
0004	DWORD - **citems**	0x00000014
0008	Xnum - **xnumMin**	0x40E15C8000000000
0008	Xnum - **xnumMax**	0x40E17D6000000000

Figure 149: Structure of BrtBeginPCDFAtbl

Fields in this record that are explained in previous records in this example are omitted for brevity.

fTextEtcField: 0x0 specifies that this cache field does not contain at least one cache item that is a text, blank, Boolean, or error value.

fNonDates: 0x0 specifies that this cache field does not contain a cache item that is a non-date value.

fDateInField: 0x1 specifies that this cache field contains at least one cache item that is a date.

fHasTextItem: 0x0 specifies that this cache field does not contain a cache item that is a text value.

fNumMinMaxValid: 0x1 specifies that **xnumMin** and **xnumMax** exist in the record.

citems: 0x00000014 specifies that there are 20 cache items in this collection.

xnumMin: 0x40E15C8000000000 specifies that the earliest date specified among all the BrtPCDIDatetime records in this collection is May 6, 1997.

xnumMax: 0x40E17D6000000000 specifies that the latest date specified among all the BrtPCDIDatetime records in this collection is January 24, 1998.

3.8.13 Example: PivotTable: BrtBeginPCDIRun

The BrtBeginPCDIRun record specifies the sequence of PCDIDateTime cache items.

Size	Structure	Value
00A6	BrtBeginPCDIRun - **BrtBeginPCDIRun**	
0002	SHORT - **mdSxoper**	0x0020
0004	DWORD - **cItems**	0x00000014
00A0	PCDIDateTime - **rgPCDIDatetime**	
0008	PCDIDateTime - **PCDIDatetime[0]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0005
0001	BYTE - **dom**	0x06
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[1]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0005
0001	BYTE - **dom**	0x0F
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[2]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0006
0001	BYTE - **dom**	0x13
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[3]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0006
0001	BYTE - **dom**	0x18
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[4]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0007
0001	BYTE - **dom**	0x0F
0001	BYTE - **hr**	0x00

0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[5]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0007
0001	BYTE - **dom**	0x1F
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[6]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0008
0001	BYTE - **dom**	0x05
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[7]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0008
0001	BYTE - **dom**	0x0E
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[8]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0009
0001	BYTE - **dom**	0x04
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[9]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0009
0001	BYTE - **dom**	0x0F
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[10]**	

0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x0009
0001	BYTE - **dom**	0x16
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[11]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000A
0001	BYTE - **dom**	0x10
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[12]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000A
0001	BYTE - **dom**	0x1B
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[13]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000B
0001	BYTE - **dom**	0x14
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[14]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000B
0001	BYTE - **dom**	0x18
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[15]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000B
0001	BYTE - **dom**	0x1C

0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[16]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000C
0001	BYTE - **dom**	0x17
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[17]**	
0002	USHORT - **yr**	0x07CD
0002	USHORT - **mon**	0x000C
0001	BYTE - **dom**	0x1A
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[18]**	
0002	USHORT - **yr**	0x07CE
0002	USHORT - **mon**	0x0001
0001	BYTE - **dom**	0x06
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00
0008	PCDIDateTime - **PCDIDatetime[19]**	
0002	USHORT - **yr**	0x07CE
0002	USHORT - **mon**	0x0001
0001	BYTE - **dom**	0x17
0001	BYTE - **hr**	0x00
0001	BYTE - **min**	0x00
0001	BYTE - **sec**	0x00

Figure 150: Structure of BrtBeginPCDIRun

mdSxoper: 0x0020 specifies that the DateTime type field is used to store cache items and is defined by **rgPCDIDateTime**.

cItems: 0x00000014 specifies the number of cache items in the array is 20.

rgPCDIDatetime: specifies an array of 20 unique PCDIDateTime structures that specify the date-time values of the cache items, three of which are described below (the rest are omitted for brevity):

rgPCDIDatetime.PCDIDatetime[0]: Specifies the date-time value of May 6, 1997 00:00:00.

rgPCDIDatetime.PCDIDatetime[0].yr: 0x07CD specifies the year to be 1997.

rgPCDIDatetime.PCDIDatetime[0].mon: 0x0005 specifies the month to be May.

rgPCDIDatetime.PCDIDatetime[0].dom: 0x06 specifies the date to be the 6th.

rgPCDIDatetime.PCDIDatetime[0].hr: 0x00 specifies the hour to be 0.

rgPCDIDatetime.PCDIDatetime[0].min: 0x00 specifies the minute to be 0.

rgPCDIDatetime.PCDIDatetime[0].sec: 0x00 specifies the second to be 0.

rgPCDIDatetime.PCDIDatetime[16]: Specifies the date-time value of December 23, 1997 00:00:00.

rgPCDIDatetime.PCDIDatetime[16].yr: 0x07CD specifies the year to be 1997.

rgPCDIDatetime.PCDIDatetime[16].mon: 0x000C specifies the month to be December.

rgPCDIDatetime.PCDIDatetime[16].dom: 0x17 specifies the date to be the 23rd.

rgPCDIDatetime.PCDIDatetime[16].hr: 0x00 specifies the hour to be 0.

rgPCDIDatetime.PCDIDatetime[16].min: 0x00 specifies the minute to be 0.

rgPCDIDatetime.PCDIDatetime[16].sec: 0x00 specifies the second to be 0.

rgPCDIDatetime.PCDIDatetime[17]: Specifies the date-time value of December 26, 1997 00:00:00

rgPCDIDatetime.PCDIDatetime[17].yr: 0x07CD specifies the year is 1997 in the date.

rgPCDIDatetime.PCDIDatetime[17].mon: 0x000C specifies the month to be December.

rgPCDIDatetime.PCDIDatetime[17].dom: 0x1A specifies the date to be the 26th.

rgPCDIDatetime.PCDIDatetime[17].hr: 0x00 specifies the hour to be 0.

rgPCDIDatetime.PCDIDatetime[17].min: 0x00 specifies the minute to be 0.

rgPCDIDatetime.PCDIDatetime[17].sec: 0x00 specifies the second to be 0.

3.8.14 Example: PivotTable: BrtBeginPCDField

The next BrtBeginPCDField record specifies the "ProductName" cache field.

Size	Structure	Value
002E	BrtBeginPCDField - **BrtBeginPCDField**	
1 bit	BYTE - **fServerBased**	0x0
1 bit	BYTE - **fCantGetUniqueItems**	0x0
1 bit	BYTE - **fSrcField**	0x1
1 bit	BYTE - **fCaption**	0x0
1 bit	BYTE - **fOlapMemPropField**	0x0
3 bits	BYTE - **reserved1**	0x0
1 bit	BYTE - **fLoadFmla**	0x0
1 bit	BYTE - **fLoadPropName**	0x0
6 bits	BYTE - **reserved2**	0x00
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
0002	SHORT - **wTypeSql**	0x0000
0004	DWORD - **ihdb**	0x00000000
0004	DWORD - **isxtl**	0x00000000
0004	DWORD - **cIsxtmps**	0x00000000
001A	XLWideString - **stFldName**	ProductName

Figure 151: Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

stFldName: ProductName specifies the name of this cache field.

The BrtBeginPCDFAtbl and BrtBeginPCDIRun records following this record are omitted for brevity.

3.8.15 Example: PivotTable: BrtBeginPCDField

The next BrtBeginPCDField record describes the "UnitPrice" cache field.

Size	Structure	Value
002A	BrtBeginPCDField - **BrtBeginPCDField**	
1 bit	BYTE - **fServerBased**	0x0
1 bit	BYTE - **fCantGetUniqueItems**	0x0
1 bit	BYTE - **fSrcField**	0x1
1 bit	BYTE - **fCaption**	0x0
1 bit	BYTE - **fOlapMemPropField**	0x0
3 bits	BYTE - **reserved1**	0x0
1 bit	BYTE - **fLoadFmla**	0x0
1 bit	BYTE - **fLoadPropName**	0x0
6 bits	BYTE - **reserved2**	0x00
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x002C
0002	WORD - **reserved**	0x0000
0002	SHORT - **wTypeSql**	0x0000
0004	DWORD - **ihdb**	0x00000000
0004	DWORD - **isxtl**	0x00000000
0004	DWORD - **cIsxtmps**	0x00000000
0016	XLWideString - **stFldName**	UnitPrice

Figure 152: Structure of BrtBeginPCDField

Fields in this record that are explained in previous records in this example are omitted for brevity.

ifmt.ifmt.ifmt: 0x002C specifies that the number formatting style applied is style 44 from the built-in number formats as specified in [ECMA-376] Part 4: Markup Language Reference, section 3.8.30.

stFldName: UnitPrice specifies the name of this cache field.

The BrtBeginPCDFAtbl record following this record is omitted for brevity.

3.8.16 Example: PivotTable: BrtBeginPCDField

The next BrtBeginPCDField record describes the "Quantity" cache field.

Size	Structure	Value
0028	BrtBeginPCDField - **BrtBeginPCDField**	
1 bit	BYTE - **fServerBased**	0x0
1 bit	BYTE - **fCantGetUniqueItems**	0x0
1 bit	BYTE - **fSrcField**	0x1
1 bit	BYTE - **fCaption**	0x0
1 bit	BYTE - **fOlapMemPropField**	0x0
3 bits	BYTE - **reserved1**	0x0
1 bit	BYTE - **fLoadFmla**	0x0
1 bit	BYTE - **fLoadPropName**	0x0
6 bits	BYTE - **reserved2**	0x00
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
0002	SHORT - **wTypeSql**	0x0000
0004	DWORD - **ihdb**	0x00000000
0004	DWORD - **isxtl**	0x00000000
0004	DWORD - **cIsxtmps**	0x00000000
0014	XLWideString - **stFldName**	Quantity

Figure: Structure of brtBeginPCDField Record

stFldName: Quantity specifies the name of this cache field.

3.8.17 Example: PivotTable: BrtBeginPCDFAtbl

The next BrtBeginPCDFAtbl record specifies properties of the "Quantity" cache field and begins the collection of cache item records shared by the cache field in the PivotCache.

Size	Structure	Value
0016	BrtBeginPCDFAtbl - **BrtBeginPCDFAtbl**	
1 bit	WORD - **fTextEtcField**	0x0
1 bit	WORD - **fNonDates**	0x1
1 bit	WORD - **fDateInField**	0x0
1 bit	WORD - **fHasTextItem**	0x0
1 bit	WORD - **fHasBlankItem**	0x0
1 bit	WORD - **fMixedTypesIgnoringBlanks**	0x0
1 bit	WORD - **fNumField**	0x1
1 bit	WORD - **fIntField**	0x1
1 bit	WORD - **fNumMinMaxValid**	0x1
1 bit	WORD - **fHasLongTextItem**	0x0
6 bits	WORD - **reserved**	0x00
0004	DWORD - **citems**	0x00000000
0008	Xnum - **xnumMin**	0x4008000000000000
0008	Xnum - **xnumMax**	0x404C000000000000

Figure 153: Structure of BrtBeginPCDFAtbl

Fields in this record that are explained in previous records in this example are omitted for brevity.

fNumField: 0x1 specifies that this cache field contains a cache item that is a numeric value.

fIntField: 0x1 specifies that this cache field contains a cache item that is an integer value.

citems: 0x00000000 specifies that the number of cache items in this collection is 0.

xnumMin: 0x4008000000000000 specifies that the minimum value in this cache field is 3.

xnumMax: 0x404C000000000000 specifies that the maximum value in this cache field is 56.

3.8.18 Example: PivotTable: BrtBeginPivotCacheRecords

The next record in this example, BrtBeginPivotCacheRecords, specifies the beginning of the collection of cache records in the PivotCache.

Size	Structure	Value
0004	BrtBeginPivotCacheRecords - **BrtBeginPivotCacheRecords**	
0004	DWORD - **crecords**	0x0000002C

Figure 154: Structure of BrtBeginPivotCacheRecords

crecords: 0x0000002C specifies that there are 44 cache records in the PivotCache.

3.8.19 Example: PivotTable: BrtPCRRecord

The next record in this example, BrtPCRRecord, specifies the first cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000000
0004	ULONG - **rgb[1]**	0x00000000
0004	ULONG - **rgb[2]**	0x00000000
0008	Xnum - **rgb[3]**	0x4004000000000000
0008	Xnum - **rgb[4]**	0x4020000000000000

Figure 155: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

These records can be broken down into five sequential parts as follows:

1. A 4-byte, zero-based cache item index into the "CustomerName" cache field.
2. A 4-byte, zero -based cache item index into the "OrderDate" cache field.
3. A 4-byte, zero -based cache item index into the "ProductName" cache field.
4. A 8-byte, 64-bit floating point number specifying the value of the "UnitPrice" cache field.
5. A 8-byte, 64-bit floating point number specifying the value of the "Quantity" cache field.

This particular record would evaluate as follows:

rgb.rgb[0]: 0x00000000 specifies the index of the first cache item in the "CustomerName" cache field, which is "Great Lakes Food Market".

rgb.rgb[1]: 0x00000000 specifies the index of the first cache item in the "OrderDate" cache field, which is 5/6/1997.

rgb.rgb[2]: 0x00000000 specifies the index of the first cache item in the "ProductName" cache field, which is “Geitost”.

rgb.rgb[3]: 0x4004000000000000 specifies the 64-bit floating point value 2.50 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4020000000000000 specifies the 64-bit floating point value 8 in the "Quantity" cache field.

3.8.20 Example: PivotTable: BrtPCRRecord

This BrtPCRRecord specifies the next cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000002
0004	ULONG - **rgb[1]**	0x00000010
0004	ULONG - **rgb[2]**	0x00000004
0008	Xnum - **rgb[3]**	0x4043000000000000
0008	Xnum - **rgb[4]**	0x4026000000000000

Figure 156: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

rgb.rgb[0]: 0x00000002 specifies the index of the third cache item in the "CustomerName" cache field, which is "Richter Supermarkt".

rgb.rgb[1]: 0x00000010 specifies the index of the 17th cache item in the "OrderDate" cache field, which is 12/23/1997.

rgb.rgb[2]: 0x00000004 specifies the index of the fifth cache item in the "ProductName" cache field, which is "Gnocchi di nonna Alice".

rgb.rgb[3]: 0x4043000000000000 specifies the 64-bit floating point value 38.00 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4026000000000000 specifies the 64-bit floating point value 11 in the "Quantity" cache field.

3.8.21 Example: PivotTable: BrtPCRRecord

This BrtPCRRecord specifies the next cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000002
0004	ULONG - **rgb[1]**	0x00000010
0004	ULONG - **rgb[2]**	0x00000003
0008	Xnum - **rgb[3]**	0x4047000000000000
0008	Xnum - **rgb[4]**	0x4010000000000000

Figure 157: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

rgb.rgb[0]: 0x00000002 specifies the index of the third cache item in the "CustomerName" cache field, which is "Richter Supermarkt".

rgb.rgb[1]: 0x00000010 specifies the index of the 17th cache item in the "OrderDate" cache field, which is 12/23/1997.

rgb.rgb[2]: 0x00000003 specifies the index of the fourth cache item in the "ProductName" cache field, which is "Ipoh Coffee".

rgb.rgb[3]: 0x4047000000000000 specifies the 64-bit floating point value 46.00 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4010000000000000 specifies the 64-bit floating point value 4 in the "Quantity" cache field.

3.8.22 Example: PivotTable: BrtPCRRecord

This BrtPCRRecord specifies the next cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000002
0004	ULONG - **rgb[1]**	0x00000010
0004	ULONG - **rgb[2]**	0x00000005
0008	Xnum - **rgb[3]**	0x4022666666666666
0008	Xnum - **rgb[4]**	0x4030000000000000

Figure 158: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

rgb.rgb[0]: 0x00000002 specifies the index of the third cache item in the “CustomerName” cache field, which is “Richter Supermarkt”.

rgb.rgb[1]: 0x00000010 specifies the index of the 17th cache item in the "OrderDate" cache field, which is 12/23/1997.

rgb.rgb[2]: 0x00000005 specifies the index of the sixth cache item in the "ProductName" cache field, which is "Teatime Chocolate Biscuits".

rgb.rgb[3]: 0x4022666666666666 specifies the 64-bit floating point value 9.20 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4030000000000000 specifies the 64-bit floating point value 16 in the "Quantity" cache field.

3.8.23 Example: PivotTable: BrtPCRRecord

This BrtPCRRecord specifies the next cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000004
0004	ULONG - **rgb[1]**	0x00000011
0004	ULONG - **rgb[2]**	0x00000000
0008	Xnum - **rgb[3]**	0x4004000000000000
0008	Xnum - **rgb[4]**	0x4037000000000000

Figure 159: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

rgb.rgb[0]: 0x00000004 specifies the index of the fifth cache item in the "CustomerName" cache field, which is "Königlich Essen".

rgb.rgb[1]: 0x00000011 specifies the index of the 18th cache item in the "OrderDate" cache field, which is 12/26/1997.

rgb.rgb[2]: 0x00000000 specifies the index of the first cache item in the "ProductName" cache field, which is "Geitost".

rgb.rgb[3]: 0x4004000000000000 specifies the 64-bit floating point value 2.50 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4037000000000000 specifies the 64-bit floating point value 23 in the "Quantity" cache field.

3.8.24 Example: PivotTable: BrtPCRRecord

This BrtPCRRecord specifies the next cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000003
0004	ULONG - **rgb[1]**	0x00000011
0004	ULONG - **rgb[2]**	0x00000003
0008	Xnum - **rgb[3]**	0x4047000000000000
0008	Xnum - **rgb[4]**	0x404B800000000000

Figure 160: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

rgb.rgb[0]: 0x00000003 specifies the index of the fourth cache item in the "CustomerName" cache field, which is "Island Trading".

rgb.rgb[1]: 0x00000011 specifies the index of the 18th cache item in the "OrderDate" cache field, which is 12/26/1997.

rgb.rgb[2]: 0x00000003 specifies the index of the fourth cache item in the "ProductName" cache field, which is "Ipoh Coffee".

rgb.rgb[3]: 0x4047000000000000 specifies the 64-bit floating point value 46 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x404B800000000000 specifies the 64-bit floating point value 55 in the "Quantity" cache field.

3.8.25 Example: PivotTable: BrtPCRRecord

This BrtPCRRecord specifies the next cache record in the PivotCache.

Size	Structure	Value
001C	BrtPCRRecord - **BrtPCRRecord**	
001C	rgb - **rgb**	
0004	ULONG - **rgb[0]**	0x00000004
0004	ULONG - **rgb[1]**	0x00000011
0004	ULONG - **rgb[2]**	0x00000002
0008	Xnum - **rgb[3]**	0x404B800000000000
0008	Xnum - **rgb[4]**	0x4048000000000000

Figure 161: Structure of BrtPCRRecord

rgb: Specifies a cache record that consists of cache items from the "CustomerName", "OrderDate", "ProductName", "UnitPrice", and "Quantity" cache fields.

rgb.rgb[0]: 0x00000004 specifies the index of the fifth cache item in the "CustomerName" cache field, which is "Königlich Essen".

rgb.rgb[1]: 0x00000011 specifies the index of the 18th cache item in the "OrderDate" cache field, which is 12/26/1997.

rgb.rgb[2]: 0x00000002 specifies the index of the third cache item in the "ProductName" cache field, which is "Perth Pasties".

rgb.rgb[3]: 0x404B800000000000 specifies the 64-bit floating point value 55.00 in the "UnitPrice" cache field.

rgb.rgb[4]: 0x4048000000000000 specifies the 64-bit floating point value 48 in the "Quantity" cache field.

The remaining 37 BrtPCRRecord records have been omitted for brevity.

3.8.26 Example: PivotTable: BrtBeginSXView

The BrtBeginSXView record begins a collection of records that specify the PivotTable view.

Size	Structure	Value
0054	BrtBeginSXView - **BrtBeginSXView**	
0001	AppVersion - **bVerSxMacro**	0x03
1 bit	BYTE - **fDisplayImmediateItems**	0x1
1 bit	BYTE - **fEnableDataEd**	0x0
1 bit	BYTE - **fDisableFList**	0x0
1 bit	BYTE - **fReenterOnLoadOnce**	0x0
1 bit	BYTE - **fNotViewCalculatedMembers**	0x1
1 bit	BYTE - **fNotVisualTotals**	0x0
1 bit	BYTE - **fPageMultipleItemLabel**	0x1
1 bit	BYTE - **reserved1**	0x0
1 bit	WORD - **fHideDDData**	0x0
3 bits	WORD - **reserved2**	0x0
1 bit	WORD - **fHideDrillIndicators**	0x0
1 bit	WORD - **fPrintDrillIndicators**	0x0
1 bit	WORD - **fMemPropsInTips**	0x1
1 bit	WORD - **fNoPivotTips**	0x0
7 bits	WORD - **cIndentInc**	0x00
1 bit	WORD - **fNoHeaders**	0x0
1 bit	DWORD - **fNoStencil**	0x0
1 bit	DWORD - **fHideTotAnnotation**	0x0
1 bit	DWORD - **fIncludeEmptyRw**	0x0
1 bit	DWORD - **fIncludeEmptyCol**	0x0
1 bit	DWORD - **fEnableWizard**	0x1
1 bit	DWORD - **fEnableDrilldown**	0x1
1 bit	DWORD - **fEnableFieldDialog**	0x1
1 bit	DWORD - **fPreserveFormatting**	0x1
1 bit	DWORD - **fAutoFormat**	0x1
1 bit	DWORD - **fDisplayErrorString**	0x0
1 bit	DWORD - **fDisplayNullString**	0x1
1 bit	DWORD - **fAcrossPageLay**	0x0
1 bit	DWORD - **fSubtotalHiddenPageItems**	0x0
1 bit	DWORD - **fRwGrand**	0x1
1 bit	DWORD - **fColGrand**	0x1
1 bit	DWORD - **fPrintTitles**	0x0
1 bit	DWORD - **unused**	0x1
1 bit	DWORD - **fRepeatItemsOnEachPrintedPage**	0x1
1 bit	DWORD - **fMergeLabels**	0x0

1 bit	DWORD - **fDisplayData**	0x1
1 bit	DWORD - **fDisplayGrand**	0x0
1 bit	DWORD - **fDisplayPageFieldStyle**	0x0
1 bit	DWORD - **fDisplayTableStyle**	0x0
1 bit	DWORD - **fDisplayVacateStyle**	0x0
1 bit	DWORD - **ibitAtrNum**	0x0
1 bit	DWORD - **ibitAtrFnt**	0x0
1 bit	DWORD - **ibitAtrAlc**	0x0
1 bit	DWORD - **ibitAtrBdr**	0x0
1 bit	DWORD - **ibitAtrPat**	0x0
1 bit	DWORD - **ibitAtrProt**	0x1
1 bit	DWORD - **fDisplayTag**	0x0
1 bit	DWORD - **reserved3**	0x0
1 bit	DWORD - **fDefaultCompact**	0x1
1 bit	DWORD - **fDefaultOutline**	0x1
1 bit	DWORD - **fOutlineData**	0x1
1 bit	DWORD - **fCompactData**	0x1
1 bit	DWORD - **fNewDropZones**	0x1
1 bit	DWORD - **fPublished**	0x0
1 bit	DWORD - **fEmptyDisplayErrorString**	0x1
1 bit	DWORD - **fEmptyDisplayNullString**	0x1
1 bit	DWORD - **fTurnOffImmersive**	0x0
1 bit	DWORD - **fSingleFilterPerField**	0x1
1 bit	DWORD - **fUseRwHdrName**	0x0
1 bit	DWORD - **fUseColHdrName**	0x0
1 bit	DWORD - **fNonDefaultSortInFlist**	0x0
1 bit	DWORD - **reserved4**	0x0
1 bit	DWORD - **fDontUseCustomLists**	0x0
17 bits	DWORD - **reserved5**	0x00000
0001	DWORD - **sxaxis4Data**	0x02
0001	BYTE - **cWrapPage**	0x00
0001	AppVersion - **bVerSxLastUpdated**	0x03
0001	AppVersion - **bVerSxUpdateableMin**	0x03
0004	LONG - **ipos4Data**	0xFFFFFFFF
0002	USHORT - **itblAutoFmt**	0x0001
0002	WORD - **reserved6**	0x0000
0004	DWORD - **dwCrtFmtId**	0x00000000
0004	DWORD - **idCache**	0x00000041

0024	XLWideString - **irstName**	OrdersPivotTable
0010	XLWideString - **irstData**	Values

Figure 162: Structure of BrtBeginSXView

Fields in this record that are ignored because they apply to OLAP source data or are not applicable in compact axis mode are omitted for brevity.

bVerSxMacro: 0x03 specifies that the application version that created this PivotTable is Office Excel 2007.

fDisplayImmediateItems: 0x1 specifies that pivot item labels displayed on the row axis and the column axis when there are no data items in this PivotTable view.

fEnableDataEd: 0x0 specifies that cells displaying values for data items cannot be edited.

fDisableFList: 0x0 specifies that the PivotTable field list is displayed.

fReenterOnLoadOnce: 0x0 specifies that the PivotTable view is not automatically updated on load.

fPageMultipleItemLabel: 0x1 specifies that a pivot field on the page axis with multiple pivot items selected displays "(multiple items)".

fHideDDData: 0x0 specifies that a drop-down button for the data field in the PivotTable view is not hidden.

fHideDrillIndicators: 0x0 specifies that expand/collapse buttons are displayed.

fPrintDrillIndicators: 0x0 specifies that expand/collapse buttons are not displayed when printed.

fMemPropsInTips: 0x1 specifies that member property information is shown in PivotTable view ToolTips.

fNoPivotTips: 0x0 specifies that ToolTips are displayed for PivotTable view cells.

cIndentInc: 0x00 specifies that the indentation increment that will be used for pivot fields in compact axis mode will be 1.

fNoStencil: 0x0 specifies that the PivotTable view displays large drop zones when there are no data items in the PivotTable view.

fEnableWizard: 0x1 specifies that the user is able to use a wizard UI to work with the PivotTable.

fEnableDrilldown: 0x1 specifies that the user is able to show details for a cell displaying the value for a data item.

fEnableFieldDialog: 0x1 specifies that the user is allowed to display pivot field properties.

fPreserveFormatting: 0x1 specifies that formatting applied by the user to PivotTable view cells is preserved on refresh.

fAutoFormat: 0x1 specifies that an AutoFormat has been applied to the PivotTable view.

fDisplayErrorString: 0x0 specifies that if there are errors, the error strings to display in the cells are determined by the application.

fDisplayNullString: 0x1 specifies that if a cell is empty, the string as specified by the **irstNullString** field is displayed in the cell.

fAcrossPageLay: 0x0 specifies that if the page area has another field added, Pivot fields are displayed down, then over.

fSubtotalHiddenPageItems: 0x0 specifies page-filtering behavior that is not applicable for this example because the application version that created this PivotTable is Office Excel 2007.

fRwGrand: 0x1 specifies that grand totals are displayed for the row axis.

fColGrand: 0x1 specifies that grand totals are displayed for the column axis.

fPrintTitles: 0x0 specifies that pivot field captions and pivot item captions on the row axis and the column axis from this PivotTable view do not appear on every page when printed.

fRepeatItemsOnEachPrintedPage: 0x1 specifies that pivot item captions on the row axis are repeated at the top of each printed page for pivot fields in tabular form.

fMergeLabels: 0x0 specifies that pivot item captions on the row area and column area that span multiple cells are not merged into a single cell.

fDisplayData: 0x1 specifies that there is an **irstData** field after the fixed part of this record, that specifies the caption for the data field in the PivotTable view.

fDisplayGrand: 0x0 specifies that there is not an **irstGrand** field after the fixed part of this record, that specifies a user-defined caption to display for grand totals when the PivotTable is recalculated.

fDisplayPageFieldStyle: 0x0 specifies that there is not an **irstPageFieldStyle** field after the fixed part of this record, that specifies the cell style to apply to each cell that contains data for pivot fields on the page axis of the PivotTable view.

fDisplayTableStyle: 0x0 specifies that there is not an **irstTableStyle** field after the fixed part of this record, that specifies the cell style to apply to this PivotTable view.

fDisplayVacateStyle: 0x0 specifies that there is not an **irstVacateStyle** field after the fixed part of this record, that specifies the cell style to apply to the cells left blank when a PivotTable view shrinks during a refresh operation.

ibitAtrNum: 0x0 specifies that AutoFormat number format properties are not applied.

ibitAtrFnt: 0x0 specifies that AutoFormat font format properties are not applied.

ibitAtrAlc: 0x0 specifies that AutoFormat alignment format properties are not applied.

ibitAtrBdr: 0x0 specifies that AutoFormat border format properties are not applied.

ibitAtrPat: 0x0 specifies that AutoFormat pattern format properties are not applied.

ibitAtrProt: 0x1 specifies that the AutoFormat style is protected.

fDisplayTag: 0x0 specifies that there is not an **irstTag** field after the fixed part of this record, that specifies a user-defined string that is associated with this PivotTable view.

fDefaultCompact: 0x1 specifies that new pivot fields are created in compact axis mode.

fDefaultOutline: 0x1 specifies that new pivot fields are created in outline mode.

fOutlineData: 0x1 specifies that the data field in the PivotTable view is displayed in outline mode.

fCompactData: 0x1 specifies that the data field in the PivotTable view is displayed in compact axis mode.

fNewDropZones: 0x1 specifies that in-grid drop zones is disabled. Fields cannot be dragged and dropped within the PivotTable view.

fPublished: 0x0 specifies that this PivotTable view is not included in the version of the workbook that is published to or rendered on a web or application server.

fEmptyDisplayErrorString: 0x1 specifies that the **irstErrorString** field does not exist after the fixed part of this record, that specifies the string to display in cells that contain values for data items when an error occurs.

fEmptyDisplayNullString: 0x1 specifies that the **irstNullString** field does not exist after the fixed part of this record, that specifies the string to display in cells that contain values for data items that are empty.

fTurnOffImmersive: 0x0 specifies that the PivotTable contextual tab, a user interface for manipulating PivotTable options, is displayed.

fSingleFilterPerField: 0x1 specifies that the pivot fields in the PivotTable view each can have only one filter.

fUseRwHdrName: 0x0 specifies that there is not an **irstRwHdrName** field after the fixed part of this record, that specifies the user-defined string to display in the row header when one or more pivot fields in the PivotTable view are in compact axis mode.

fUseColHdrName: 0x0 specifies that there is not an **irstColHdrName** field after the fixed part of this record, that specifies the user-defined string to display in the column header when one or more pivot fields in the PivotTable view are in compact axis mode.

fNonDefaultSortInFlist: 0x0 specifies that Pivot fields in the PivotTable field list are displayed in source data order.

fDontUseCustomLists: 0x0 specifies that custom lists are used when sorting the pivot items in the PivotTable view.

sxaxis4Data: 0x02 specifies that the data field is displayed on the column axis.

cWrapPage: 0x00 specifies that no wrapping occurs when starting another row or column.

bVerSxLastUpdated: 0x03 specifies that the last application version to update this PivotTable view is Office Excel 2007.

bVerSxUpdateableMin: 0x03 specifies that the earliest application version that can update this PivotTable view is Office Excel 2007.

ipos4Data: 0xFFFFFFFF specifies the position of the data field and specifies that the data field is displayed as the last field on the column axis.

itblAutoFmt: 0x0001 specifies an AutoFormatID that specifies which AutoFormat is applied.

dwCrtFmtId: 0x00000000 specifies the next available chart identifier to use when creating a PivotChart for this PivotTable.

idCache: 0x00000041 specifies the PivotCache identifier of the PivotCache used by this PivotTable view. This value equals the **idSx** field of the BrtBeginPivotCacheID record.

irstName: Specifies that the unique name for this PivotTable view is "OrdersPivotTable".

irstData: Specifies that the caption of the data field in the PivotTable view is "Values".

3.8.27 Example: PivotTable: BrtBeginSxLocation

The BrtBeginSXLocation record specifies the position of the PivotTable view in the sheet.

Size	Structure	Value
0024	BrtBeginSXLocation - **BrtBeginSxlocation**	
0010	UncheckedRfX - **rfxGeom**	
0004	LONG - **rwFirst**	0x00000004
0004	LONG - **rwLast**	0x0000000B
0004	LONG - **colFirst**	0x00000001
0004	LONG - **colLast**	0x00000002
0004	LONG - **rwFirstHead**	0x00000005
0004	LONG - **rwFirstData**	0x00000005
0004	LONG - **colFirstData**	0x00000002
0004	LONG - **crwPage**	0x00000001
0004	LONG - **ccolPage**	0x00000001

Figure 163: Structure of BrtBeginSxlocation

rfxGeom: Specifies the location of the PivotTable view in the sheet as follows:

rfxGeom.rwFirst: 0x00000004 specifies that the first row of the range specified by the PivotTable view is row 5.

rfxGeom.rwLast: 0x0000000B specifies that the last row of the range specified by the PivotTable view is row 12.

rfxGeom.colFirst: 0x00000001 specifies that the first column of the range specified by the PivotTable view is column B.

rfxGeom.colLast: 0x00000002 specifies that the last column of the range specified by the PivotTable view is column C.

rwFirstHead: 0x00000005 specifies that the location of the topmost row in the PivotTable view body is row 6.

rwFirstData: 0x00000005 specifies that the location of the topmost row of the PivotTable view body where cells containing values of data items are displayed is row 6.

colFirstData: 0x00000002 specifies that the location of the first column of the PivotTable view body where cells containing values of data items are displayed is column C.

crwPage: 0x00000001 specifies that there is one row with cells containing data for pivot fields on the page axis of the PivotTable view.

ccolPage: 0x00000001 specifies that there is one column with cells containing data for pivot fields on the page axis of the PivotTable view.

3.8.28 Example: PivotTable: BrtBeginSXVDs

The next record in this example, BrtBeginSXVDs, begins a collection of records that specify the pivot fields of the PivotTable view.

Size	Structure	Value
0004	BrtBeginSXVDs - **BrtBeginSXVDs**	
0004	DWORD - **csxvds**	0x00000005

Figure 164: Structure of BrtBeginSXVDs

csxvds: 0x00000005 specifies that there are five pivot fields in the PivotTable view.

3.8.29 Example: PivotTable: BrtBeginSXVD

The first BrtBeginSXVD record specifies the "CustomerName" pivot field in the PivotTable view.

Size	Structure	Value
0014	BrtBeginSXVD - **BrtBeginSXVD**	
0001	SXAxis - **sxaxis**	
1 bit	BYTE - **sxaxisRw**	0x1
1 bit	BYTE - **sxaxisCol**	0x0
1 bit	BYTE - **sxaxisPage**	0x0
1 bit	BYTE - **sxaxisData**	0x0
4 bits	BYTE - **reserved**	0x0
1 bit	WORD - **fDefault**	0x1
1 bit	WORD - **fSum**	0x0
1 bit	WORD - **fCounta**	0x0
1 bit	WORD - **fAverage**	0x0
1 bit	WORD - **fMax**	0x0
1 bit	WORD - **fMin**	0x0
1 bit	WORD - **fProduct**	0x0
1 bit	WORD - **fCount**	0x0
1 bit	WORD - **fStdev**	0x0
1 bit	WORD - **fStdevp**	0x0
1 bit	WORD - **fVar**	0x0
1 bit	WORD - **fVarp**	0x0
4 bits	WORD - **reserved1**	0x0
1 bit	BYTE - **fDrilledLevel**	0x0
1 bit	BYTE - **fHideDD**	0x0
1 bit	BYTE - **fHiddenLvl**	0x0
1 bit	BYTE - **fUseMemPropCaption**	0x0
1 bit	BYTE - **fCompact**	0x1
1 bit	BYTE - **fDisplayName**	0x0
1 bit	BYTE - **fDisplaySub**	0x0
1 bit	BYTE - **fTensorSort**	0x0
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
1 bit	DWORD - **fDragToRow**	0x1
1 bit	DWORD - **fDragToColumn**	0x1
1 bit	DWORD - **fDragToPage**	0x1
1 bit	DWORD - **fDragToHide**	0x1
1 bit	DWORD - **fDragToData**	0x1

1 bit	DWORD - **fShowAllItems**	0x0
1 bit	DWORD - **fOutline**	0x1
1 bit	DWORD - **fInsertBlankRow**	0x0
1 bit	DWORD - **fSubtotalAtTop**	0x1
1 bit	DWORD - **fServerBased**	0x0
1 bit	DWORD - **reserved2**	0x0
1 bit	DWORD - **fPageBreaksBetweenItems**	0x0
1 bit	DWORD - **fAutoSort**	0x0
1 bit	DWORD - **fAscendSort**	0x1
1 bit	DWORD - **fAutoShow**	0x0
1 bit	DWORD - **fTopAutoShow**	0x1
1 bit	DWORD - **fHideNewItems**	0x0
1 bit	DWORD - **fHasAdvFilter**	0x0
1 bit	DWORD - **fFilterInclusive**	0x1
1 bit	DWORD - **fEnableMultiplePageItems**	0x0
1 bit	DWORD - **fNotAutoSortDft**	0x0
1 bit	DWORD - **fMemPropDisplayInReport**	0x0
1 bit	DWORD - **fMemPropDisplayInTip**	0x0
1 bit	DWORD - **fMemPropDisplayInCaption**	0x0
1 bit	DWORD - **fItemsDrilledByDefault**	0x0
7 bits	DWORD - **unused2**	0x00
0004	DWORD - **citmAutoShow**	0x0000000A
0004	ISXDI - **isxdiAutoShow**	0xFFFFFFFF

Figure 165: Structure of BrtBeginSXVD

Fields in this record that are ignored because they apply only to OLAP or ODBC data sources are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field is placed on as follows:

sxaxis.sxaxisRw: 0x01 specifies that this pivot field is on the row axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the column axis.

sxaxis.sxaxisPage: 0x00 specifies that this pivot field is not on the page axis.

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis.

fDefault: 0x1 specifies that the default subtotal is displayed for this pivot field.

fSum: 0x0 specifies that subtotals using the sum aggregate function are not displayed for this pivot field.

fCounta: 0x0 specifies that subtotals using the count aggregate function are not displayed for this pivot field.

fAverage: 0x0 specifies that subtotals using the average aggregate function are not displayed for this pivot field.

fMax: 0x0 specifies that subtotals using the maximum aggregate function are not displayed for this pivot field.

fMin: 0x0 specifies that subtotals using the minimum aggregate function are not displayed for this pivot field.

fProduct: 0x0 specifies that subtotals using the product aggregate function are not displayed for this pivot field.

fCount: 0x0 specifies that subtotals using the count number aggregate function are not displayed for this pivot field.

fStdev: 0x0 specifies that subtotals using the standard deviation aggregate function are not displayed for this pivot field.

fStdevp: 0x0 specifies that subtotals using the standard deviation population aggregate function are not displayed for this pivot field.

fVar: 0x0 specifies that subtotals using the variance aggregate function are not displayed for this pivot field.

fVarp: 0x0 specifies that subtotals using the variance population aggregate function are not displayed for this pivot field.

fHideDD: 0x0 specifies that drop-down buttons are not shown in cells where pivot field labels are displayed.

fCompact: 0x1 specifies that this pivot field is in compact axis mode.

fDisplayName: 0x0 specifies that the **irstName** field, which specifies the name of the pivot field, does not exist after the fixed-size portion of the record.

fDisplaySub: 0x0 specifies that the **irstSub** field, which specifies custom text displayed for a subtotals label, does not exist after the fixed-size portion of the record.

fDragToRow: 0x1 specifies that this pivot field can be placed on the row axis.

fDragToColumn: 0x1 specifies that this pivot field can be placed on the column axis.

fDragToPage: 0x1 specifies that this pivot field can be placed on the page axis.

fDragToHide: 0x1 specifies that this pivot field can be removed from the PivotTable view.

fDragToData: 0x1 specifies that this pivot field can be placed on the data axis.

fShowAllItems: 0x0 specifies that all pivot items for this pivot field are not displayed.

fOutline: 0x1 specifies that this pivot field is in outline mode.

fInsertBlankRow: 0x0 specifies that a blank row is not inserted after each pivot item.

fSubtotalAtTop: 0x1 specifies that subtotals are displayed at the top.

fPageBreaksBetweenItems: 0x0 specifies that a page break (2) will not be inserted after each pivot item when the PivotTable is printed.

fAutoSort: 0x0 specifies that autosort (see pivot field sorting) is not applied to this pivot field.

fAscendSort: 0x1 specifies that any autosort (see pivot field sorting) applied to this pivot field will sort in **ascending order**.

fAutoShow: 0x0 specifies that an AutoShow filter is not applied to this pivot field.

fTopAutoShow: 0x1 specifies that any AutoShow filter applied to this pivot field shows the top ranked values.

fHideNewItems: 0x0 specifies that new pivot items that are added after a refresh are shown by default.

fHasAdvFilter: 0x0 specifies that this pivot field does not have a value filter applied to it.

fFilterInclusive: 0x1 specifies that new pivot items of this pivot field are excluded in manual filtering by default.

fEnableMultiplePageItems: 0x0 specifies that this pivot field cannot have multiple pivot items selected when it is on the page axis.

fNotAutoSortDft: 0x0 specifies that any sort operation applied to this pivot field is an autosort (see pivot field sorting).

citmAutoShow: 0x0000000A specifies the number of pivot items to show when AutoShow is applied.

isxdiAutoShow: 0xFFFFFFFF specifies that no data item is set for the AutoShow.

3.8.30 Example: PivotTable: BrtBeginSXVIs

The next record in this example, BrtBeginSXVIs, begins the collection of records that specify the pivot items of the "CustomerName" pivot field in this PivotTable view.

Size	Structure	Value
0004	BrtBeginSXVIs - **BrtBeginSXVIs**	
0004	DWORD - **csxvis**	0x00000006

Figure 166: Structure of BrtBeginSXVIs

csxvis: 0x00000006 specifies that the count of pivot items in this collection is 6.

3.8.31 Example: PivotTable: BrtBeginSXVI

This BrtBeginSXVI record specifies the "Antonio Moreno Taquería" pivot item in the BrtBeginSXVIs collection. This pivot item is filtered out of the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000001

Figure 167: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000001 specifies the index to the cache item in the cache field for the "CustomerName" pivot field.

The next record in this collection, the BrtBeginSXVI for "Great Lakes Food Market", is omitted for brevity.

3.8.32 Example: PivotTable: BrtBeginSXVI

The next BrtBeginSXVI record is the "Island Trading" pivot item in the BrtBeginSXVIs collection and in the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000003

Figure 168: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000003 specifies the index to the cache item in the cache field for the "CustomerName" pivot field.

3.8.33 Example: PivotTable: BrtBeginSXVI

The next BrtBeginSXVI record is the "Königlich Essen" pivot item in the BrtBeginSXVIs collection and in the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000004

Figure 169: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000004 specifies the index to the cache item in the cache field for the "CustomerName" pivot field.

3.8.34 Example: PivotTable: BrtBeginSXVI

The next BrtBeginSXVI record in this example is the "Richter Supermarkt" pivot item in the BrtBeginSXVIs collection and in the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x1
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000002

Figure 170: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x1 specifies that this pivot item is collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000002 specifies the index to the cache item in the cache field for the "CustomerName" pivot field.

3.8.35 Example: PivotTable: BrtBeginSXVI

The next BrtBeginSXVI record in this example specifies the grand total pivot item in the BrtBeginSXVIs collection and in the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x01
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0xFFFFFFFF

Figure 171: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x01 specifies that this pivot item is a subtotal that uses the aggregation function specified by the data items included in this subtotal.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0xFFFFFFFF specifies that an index to a cache item is not specified.

3.8.36 Example: PivotTable: BrtBeginSXVD

The next record in this example, BrtBeginSXVD, specifies the "OrderDate" pivot field displayed on the page axis in the example.

Size	Structure	Value
0014	BrtBeginSXVD - **BrtBeginSXVD**	
0001	SXAxis - **sxaxis**	
1 bit	BYTE - **sxaxisRw**	0x0
1 bit	BYTE - **sxaxisCol**	0x0
1 bit	BYTE - **sxaxisPage**	0x1
1 bit	BYTE - **sxaxisData**	0x0
4 bits	BYTE - **reserved**	0x0
1 bit	WORD - **fDefault**	0x1
1 bit	WORD - **fSum**	0x0
1 bit	WORD - **fCounta**	0x0
1 bit	WORD - **fAverage**	0x0
1 bit	WORD - **fMax**	0x0
1 bit	WORD - **fMin**	0x0
1 bit	WORD - **fProduct**	0x0
1 bit	WORD - **fCount**	0x0
1 bit	WORD - **fStdev**	0x0
1 bit	WORD - **fStdevp**	0x0
1 bit	WORD - **fVar**	0x0
1 bit	WORD - **fVarp**	0x0
4 bits	WORD - **reserved1**	0x0
1 bit	BYTE - **fDrilledLevel**	0x0
1 bit	BYTE - **fHideDD**	0x0
1 bit	BYTE - **fHiddenLvl**	0x0
1 bit	BYTE - **fUseMemPropCaption**	0x0
1 bit	BYTE - **fCompact**	0x1
1 bit	BYTE - **fDisplayName**	0x0
1 bit	BYTE - **fDisplaySub**	0x0
1 bit	BYTE - **fTensorSort**	0x0
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x000E
0002	WORD - **reserved**	0x0000
1 bit	DWORD - **fDragToRow**	0x1
1 bit	DWORD - **fDragToColumn**	0x1
1 bit	DWORD - **fDragToPage**	0x1
1 bit	DWORD - **fDragToHide**	0x1
1 bit	DWORD - **fDragToData**	0x1

1 bit	DWORD - **fShowAllItems**	0x0
1 bit	DWORD - **fOutline**	0x1
1 bit	DWORD - **fInsertBlankRow**	0x0
1 bit	DWORD - **fSubtotalAtTop**	0x1
1 bit	DWORD - **fServerBased**	0x0
1 bit	DWORD - **reserved2**	0x0
1 bit	DWORD - **fPageBreaksBetweenItems**	0x0
1 bit	DWORD - **fAutoSort**	0x0
1 bit	DWORD - **fAscendSort**	0x1
1 bit	DWORD - **fAutoShow**	0x0
1 bit	DWORD - **fTopAutoShow**	0x1
1 bit	DWORD - **fHideNewItems**	0x0
1 bit	DWORD - **fHasAdvFilter**	0x0
1 bit	DWORD - **fFilterInclusive**	0x1
1 bit	DWORD - **fEnableMultiplePageItems**	0x1
1 bit	DWORD - **fNotAutoSortDft**	0x0
1 bit	DWORD - **fMemPropDisplayInReport**	0x0
1 bit	DWORD - **fMemPropDisplayInTip**	0x0
1 bit	DWORD - **fMemPropDisplayInCaption**	0x0
1 bit	DWORD - **fItemsDrilledByDefault**	0x0
7 bits	DWORD - **unused**	0x00
0004	DWORD - **citmAutoShow**	0x0000000A
0004	ISXDI - **isxdiAutoShow**	0xFFFFFFFF

Figure 172: Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field is placed on as follows:

sxaxis.sxaxisRw: 0x00 specifies that this pivot field is not on the row axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the column axis.

sxaxis.sxaxisPage: 0x01 specifies that this pivot field is on the page axis.

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis.

ifmt: Specifies the number format used in PivotTables and PivotCaches as follows:

ifmt.ifmt: Specifies the identifier of a number format.

ifmt.ifmt.ifmt: 0x000E specifies that the number format used to display this value is "mm-dd-yy".

fEnableMultiplePageItems: 0x1 specifies that this pivot field can have multiple pivot items selected when it is on the page axis.

3.8.37 Example: PivotTable: BrtBeginSXVIs

The next record in this example, BrtBeginSXVIs, begins the collection of pivot item records for the "OrderDate" pivot field.

Size	Structure	Value
0004	BrtBeginSXVIs - **BrtBeginSXVIs**	
0004	DWORD - **csxvis**	0x00000015

Figure 173: Structure of BrtBeginSXVIs

csxvis: 0x00000015 specifies that the count of pivot items in this collection is 21.

3.8.38 Example: PivotTable: BrtBeginSXVI

The first BrtBeginSXVI record specifies the 5/6/1997 pivot item of the "OrderDate" pivot field, which is filtered out of the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x1
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000000

Figure 174: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x1 specifies that this pivot item is hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000000 specifies the index to the cache item in the cache field for the "OrderDate" pivot field.

The second through the 16th BrtBeginSXVI records are omitted for brevity.

3.8.39 Example: PivotTable: BrtBeginSXVI

The 17th BrtBeginSXVI record specifies the 12/23/1997 pivot item of the "OrderDate" pivot field, which is included in the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000010

Figure 175: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000010 specifies the index to the cache item in the cache field for the "OrderDate" pivot field.

3.8.40 Example: PivotTable: BrtBeginSXVI

The 18th BrtBeginSXVI record specifies the 12/26/1997 pivot item of the "OrderDate" pivot field, which is included in the PivotTable view.

Size	Structure	Value
0007	BrtBeginSXVI - **BrtBeginSXVI**	
0001	PivotItemType - **itmtype**	0x00
1 bit	WORD - **fHidden**	0x0
1 bit	WORD - **fHideDetail**	0x0
1 bit	WORD - **fFormula**	0x0
1 bit	WORD - **fMissing**	0x0
1 bit	WORD - **fDisplayName**	0x0
1 bit	WORD - **fDrilledMember**	0x0
1 bit	WORD - **fHasChildrenEst**	0x0
1 bit	WORD - **fCollapsedMember**	0x0
1 bit	WORD - **fOlapFilterSelected**	0x0
7 bits	WORD - **reserved**	0x00
0004	LONG - **iCache**	0x00000011

Figure 176: Structure of BrtBeginSXVI

Fields in this record that are ignored because they apply only to OLAP data sources are omitted for brevity.

itmtype: 0x00 specifies that this pivot item is not a subtotal, grand total, or blank line.

fHidden: 0x0 specifies that this pivot item is not hidden by a manual filter.

fHideDetail: 0x0 specifies that this pivot item is not collapsed.

fFormula: 0x0 specifies that this pivot item is not a calculated item.

fMissing: 0x0 specifies that this pivot item is not missing from the source data.

fDisplayName: 0x0 specifies that this pivot item does not have a user-defined caption.

iCache: 0x00000011 specifies the index to the cache item in the cache field for the "OrderDate" pivot field.

The remaining BrtBeginSXVI records are omitted for brevity.

3.8.41 Example: PivotTable: BrtBeginSXVD

The next BrtBeginSXVD record specifies the "ProductName" pivot field in the row area.

Size	Structure	Value
0014	BrtBeginSXVD - **BrtBeginSXVD**	
0001	SXAxis - **sxaxis**	
1 bit	BYTE - **sxaxisRw**	0x1
1 bit	BYTE - **sxaxisCol**	0x0
1 bit	BYTE - **sxaxisPage**	0x0
1 bit	BYTE - **sxaxisData**	0x0
4 bits	BYTE - **reserved**	0x0
1 bit	WORD - **fDefault**	0x1
1 bit	WORD - **fSum**	0x0
1 bit	WORD - **fCounta**	0x0
1 bit	WORD - **fAverage**	0x0
1 bit	WORD - **fMax**	0x0
1 bit	WORD - **fMin**	0x0
1 bit	WORD - **fProduct**	0x0
1 bit	WORD - **fCount**	0x0
1 bit	WORD - **fStdev**	0x0
1 bit	WORD - **fStdevp**	0x0
1 bit	WORD - **fVar**	0x0
1 bit	WORD - **fVarp**	0x0
4 bits	WORD - **reserved1**	0x0
1 bit	BYTE - **fDrilledLevel**	0x0
1 bit	BYTE - **fHideDD**	0x0
1 bit	BYTE - **fHiddenLvl**	0x0
1 bit	BYTE - **fUseMemPropCaption**	0x0
1 bit	BYTE - **fCompact**	0x1
1 bit	BYTE - **fDisplayName**	0x0
1 bit	BYTE - **fDisplaySub**	0x0
1 bit	BYTE - **fTensorSort**	0x0
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
1 bit	DWORD - **fDragToRow**	0x1
1 bit	DWORD - **fDragToColumn**	0x1
1 bit	DWORD - **fDragToPage**	0x1
1 bit	DWORD - **fDragToHide**	0x1
1 bit	DWORD - **fDragToData**	0x1

1 bit	DWORD - **fShowAllItems**	0x0
1 bit	DWORD - **fOutline**	0x1
1 bit	DWORD - **fInsertBlankRow**	0x0
1 bit	DWORD - **fSubtotalAtTop**	0x1
1 bit	DWORD - **fServerBased**	0x0
1 bit	DWORD - **reserved2**	0x0
1 bit	DWORD - **fPageBreaksBetweenItems**	0x0
1 bit	DWORD - **fAutoSort**	0x0
1 bit	DWORD - **fAscendSort**	0x1
1 bit	DWORD - **fAutoShow**	0x0
1 bit	DWORD - **fTopAutoShow**	0x1
1 bit	DWORD - **fHideNewItems**	0x0
1 bit	DWORD - **fHasAdvFilter**	0x0
1 bit	DWORD - **fFilterInclusive**	0x1
1 bit	DWORD - **fEnableMultiplePageItems**	0x0
1 bit	DWORD - **fNotAutoSortDft**	0x0
1 bit	DWORD - **fMemPropDisplayInReport**	0x0
1 bit	DWORD - **fMemPropDisplayInTip**	0x0
1 bit	DWORD - **fMemPropDisplayInCaption**	0x0
1 bit	DWORD - **fItemsDrilledByDefault**	0x0
7 bits	DWORD - **unused**	0x00
0004	DWORD - **citmAutoShow**	0x0000000A
0004	LONG - **isxdiAutoShow**	0xFFFFFFFF

Figure 177: Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field is placed on as follows:

sxaxis.sxaxisRw: 0x01 specifies that this pivot field is on the row axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the column axis.

sxaxis.sxaxisPage: 0x00 specifies that this pivot field is not on the page axis.

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis.

The seven BrtBeginSXVI records in this collection are omitted for brevity.

3.8.42 Example: PivotTable: BrtBeginSXVD

The next BrtBeginSXVD record specifies the "UnitPrice" pivot field, which is not in the PivotTable view.

Size	Structure	Value
0014	BrtBeginSXVD - **BrtBeginSXVD**	
0001	SXAxis - **sxaxis**	
1 bit	BYTE - **sxaxisRw**	0x0
1 bit	BYTE - **sxaxisCol**	0x0
1 bit	BYTE - **sxaxisPage**	0x0
1 bit	BYTE - **sxaxisData**	0x0
4 bits	BYTE - **reserved**	0x0
1 bit	WORD - **fDefault**	0x1
1 bit	WORD - **fSum**	0x0
1 bit	WORD - **fCounta**	0x0
1 bit	WORD - **fAverage**	0x0
1 bit	WORD - **fMax**	0x0
1 bit	WORD - **fMin**	0x0
1 bit	WORD - **fProduct**	0x0
1 bit	WORD - **fCount**	0x0
1 bit	WORD - **fStdev**	0x0
1 bit	WORD - **fStdevp**	0x0
1 bit	WORD - **fVar**	0x0
1 bit	WORD - **fVarp**	0x0
4 bits	WORD - **reserved1**	0x0
1 bit	BYTE - **fDrilledLevel**	0x0
1 bit	BYTE - **fHideDD**	0x0
1 bit	BYTE - **fHiddenLvl**	0x0
1 bit	BYTE - **fUseMemPropCaption**	0x0
1 bit	BYTE - **fCompact**	0x1
1 bit	BYTE - **fDisplayName**	0x0
1 bit	BYTE - **fDisplaySub**	0x0
1 bit	BYTE - **fTensorSort**	0x0
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x002C
0002	WORD - **reserved**	0x0000
1 bit	DWORD - **fDragToRow**	0x1
1 bit	DWORD - **fDragToColumn**	0x1
1 bit	DWORD - **fDragToPage**	0x1
1 bit	DWORD - **fDragToHide**	0x1
1 bit	DWORD - **fDragToData**	0x1

1 bit	DWORD - **fShowAllItems**	0x0
1 bit	DWORD - **fOutline**	0x1
1 bit	DWORD - **fInsertBlankRow**	0x0
1 bit	DWORD - **fSubtotalAtTop**	0x1
1 bit	DWORD - **fServerBased**	0x0
1 bit	DWORD - **reserved2**	0x0
1 bit	DWORD - **fPageBreaksBetweenItems**	0x0
1 bit	DWORD - **fAutoSort**	0x0
1 bit	DWORD - **fAscendSort**	0x1
1 bit	DWORD - **fAutoShow**	0x0
1 bit	DWORD - **fTopAutoShow**	0x1
1 bit	DWORD - **fHideNewItems**	0x0
1 bit	DWORD - **fHasAdvFilter**	0x0
1 bit	DWORD - **fFilterInclusive**	0x1
1 bit	DWORD - **fEnableMultiplePageItems**	0x0
1 bit	DWORD - **fNotAutoSortDft**	0x0
1 bit	DWORD - **fMemPropDisplayInReport**	0x0
1 bit	DWORD - **fMemPropDisplayInTip**	0x0
1 bit	DWORD - **fMemPropDisplayInCaption**	0x0
1 bit	DWORD - **fItemsDrilledByDefault**	0x0
7 bits	DWORD - **unused**	0x00
0004	DWORD - **citmAutoShow**	0x0000000A
0004	LONG - **isxdiAutoShow**	0xFFFFFFFF

Figure 178: Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field is placed on as follows:

sxaxis.sxaxisRw: 0x00 specifies that this pivot field is not on the row axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the column axis.

sxaxis.sxaxisPage: 0x00 specifies that this pivot field is not on the page axis.

sxaxis.sxaxisData: 0x00 specifies that this pivot field is not on the data axis.

ifmt: Specifies the number format used in PivotTables and PivotCaches as follows:

ifmt.ifmt: Specifies the identifier of a number format.

ifmt.ifmt.ifmt: 0x002C specifies that the number format used to display this value is the following currency format "_($* #,##0.00_);_($* (#,##0.00);_($* "-"??_);_(@_)".

3.8.43 Example: PivotTable: BrtBeginSXVD

The next BrtBeginSXVD record specifies the "Quantity" pivot field on the data axis in the PivotTable view.

Size	Structure	Value
0014	BrtBeginSXVD - **BrtBeginSXVD**	
0001	SXAxis - **sxaxis**	
1 bit	BYTE - **sxaxisRw**	0x0
1 bit	BYTE - **sxaxisCol**	0x0
1 bit	BYTE - **sxaxisPage**	0x0
1 bit	BYTE - **sxaxisData**	0x1
4 bits	BYTE - **reserved**	0x0
1 bit	WORD - **fDefault**	0x1
1 bit	WORD - **fSum**	0x0
1 bit	WORD - **fCounta**	0x0
1 bit	WORD - **fAverage**	0x0
1 bit	WORD - **fMax**	0x0
1 bit	WORD - **fMin**	0x0
1 bit	WORD - **fProduct**	0x0
1 bit	WORD - **fCount**	0x0
1 bit	WORD - **fStdev**	0x0
1 bit	WORD - **fStdevp**	0x0
1 bit	WORD - **fVar**	0x0
1 bit	WORD - **fVarp**	0x0
4 bits	WORD - **reserved1**	0x0
1 bit	BYTE - **fDrilledLevel**	0x0
1 bit	BYTE - **fHideDD**	0x0
1 bit	BYTE - **fHiddenLvl**	0x0
1 bit	BYTE - **fUseMemPropCaption**	0x0
1 bit	BYTE - **fCompact**	0x1
1 bit	BYTE - **fDisplayName**	0x0
1 bit	BYTE - **fDisplaySub**	0x0
1 bit	BYTE - **fTensorSort**	0x0
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
1 bit	DWORD - **fDragToRow**	0x1
1 bit	DWORD - **fDragToColumn**	0x1
1 bit	DWORD - **fDragToPage**	0x1
1 bit	DWORD - **fDragToHide**	0x1
1 bit	DWORD - **fDragToData**	0x1

1 bit	DWORD - **fShowAllItems**	0x0
1 bit	DWORD - **fOutline**	0x1
1 bit	DWORD - **fInsertBlankRow**	0x0
1 bit	DWORD - **fSubtotalAtTop**	0x1
1 bit	DWORD - **fServerBased**	0x0
1 bit	DWORD - **reserved2**	0x0
1 bit	DWORD - **fPageBreaksBetweenItems**	0x0
1 bit	DWORD - **fAutoSort**	0x0
1 bit	DWORD - **fAscendSort**	0x1
1 bit	DWORD - **fAutoShow**	0x0
1 bit	DWORD - **fTopAutoShow**	0x1
1 bit	DWORD - **fHideNewItems**	0x0
1 bit	DWORD - **fHasAdvFilter**	0x0
1 bit	DWORD - **fFilterInclusive**	0x1
1 bit	DWORD - **fEnableMultiplePageItems**	0x0
1 bit	DWORD - **fNotAutoSortDft**	0x0
1 bit	DWORD - **fMemPropDisplayInReport**	0x0
1 bit	DWORD - **fMemPropDisplayInTip**	0x0
1 bit	DWORD - **fMemPropDisplayInCaption**	0x0
1 bit	DWORD - **fItemsDrilledByDefault**	0x0
7 bits	DWORD - **unused**	0x00
0004	DWORD - **citmAutoShow**	0x0000000A
0004	LONG - **isxdiAutoShow**	0xFFFFFFFF

Figure 179: Structure of BrtBeginSXVD

Fields in this record that are explained in previous records in this example are omitted for brevity.

sxaxis: Specifies the axis or axes this pivot field is placed on as follows:

sxaxis.sxaxisRw: 0x00 specifies that this pivot field is not on the row axis.

sxaxis.sxaxisCol: 0x00 specifies that this pivot field is not on the column axis.

sxaxis.sxaxisPage: 0x00 specifies this pivot field does not refer to the page axis.

sxaxis.sxaxisData: 0x01 specifies that this pivot field is on the data axis.

ifmt: Specifies the number format used in PivotTables and PivotCaches as follows:

ifmt.ifmt: Specifies the identifier of a number format.

ifmt.ifmt.ifmt: 0x0000 specifies that the general number format is used to display this value.

3.8.44 Example: PivotTable: BrtBeginISXVDRws

The next record in this example, BrtBeginISXVDRws, specifies the pivot fields that are displayed on the row axis of this PivotTable view.

Size	Structure	Value
000C	BrtBeginISXVDRws - **BrtBeginIsxvdRws**	
0004	DWORD - **cisxvd**	0x00000002
0008	ISXVD - **rgisxvdrws**	
0004	LONG - **isxvd[0]**	0x00000000
0004	LONG - **isxvd[1]**	0x00000002

Figure 180: Structure of BrtBeginIsxvdRws

cisxvd: 0x00000002 specifies that the count of pivot fields in the row axis is 2.

rgisxvdrws: An array of ISXVD that specifies the pivot fields that are displayed on the row axis of this PivotTable view.

rgisxvdrws.isxvd[0]: 0x00000000 specifies a pivot field index within the collection of BrtBeginSXVDs records as referenced by this field. This index specifies the corresponding brtBeginPCDField "CustomerName" in the PivotCache Definition part.

rgisxvdrws.isxvd[1]: 0x00000002 specifies a pivot field index within the collection of BrtBeginSXVDs records as referenced by this field. This index specifies the corresponding brtBeginPCDField "ProductName" in the PivotCache Definition part.

3.8.45 Example: PivotTable: BrtBeginSXLIRws

The next record in this example, BrtBeginSXLIRws, begins a collection of records that specify the pivot lines that are displayed on the row area of the PivotTable view.

Size	Structure	Value
0004	BrtBeginSXLIRws - **BrtBeginSXLIRws**	
0004	DWORD - **csxlis**	0x00000007

Figure 181: Structure of BrtBeginSXLIRws

csxlis: 0x00000007 specifies that the number of pivot lines that are displayed on the row area of the PivotTable view is 7.

3.8.46 Example: PivotTable: BrtBeginSXLI

The first BrtBeginSXLI record is the "Island Trading" pivot line in the row axis of this PivotTable view.

Size	Structure	Value
000C	BrtBeginSXLI - **BrtBeginSXLI**	
0002	WORD - **cSic**	0x0000
0001	PivotItemType - **itmtype**	0x00
0001	BYTE - **reserved**	0x00
0004	DWORD - **cisxvis**	0x00000001
0004	ISXDI - **iData**	0x00000000

Figure 182: Structure of BrtBeginSXLI

cSic: 0x0000 specifies that zero pivot line entries are reused from the previous pivot line.

itmtype: 0x00 specifies that the type of this pivot line item is not a subtotal or grand total.

cisxvis: 0x00000001 specifies that the count of pivot line entries in this pivot line is 1.

3.8.47 Example: PivotTable: BrtBeginISXVIs

The next record, BrtBeginISXVIs, specifies the pivot line entries that occur on the pivot line.

Size	Structure	Value
0004	BrtBeginISXVIs - **BrtBeginIsxvis**	
0004	LONG - **rgisxvis**	
0004	LONG - **isxvi[0]**	0x00000002

Figure 183: Structure of BrtBeginIsxvis

rgisxvis: An array of pivot line entry indexes.

rgisxvis.isxvi[0]: 0x00000002 specifies the index of a pivot item within the 1st row field "CustomerName". The index 0x02 refers to the 3rd item in the pivot items collection (BrtBeginSXVIs) of BrtBeginSXVD pivot field "CustomerName". This 3rd pivot item (BrtBeginSXVI) contains an index that refers to the 4th item in the BrtBeginPCDIRun "Island Trading" of the corresponding BrtBeginPCDField in the PivotCache Definition.

3.8.48 Example: PivotTable: BrtBeginSXLI

The next BrtBeginSXLI record is the "Ipoh Coffee" pivot line in the row axis of this PivotTable view.

Size	Structure	Value
000C	BrtBeginSXLI - **BrtBeginSXLI**	
0002	WORD - **cSic**	0x0001
0001	PivotItemType - **itmtype**	0x00
0001	BYTE - **reserved**	0x00
0004	DWORD - **cisxvis**	0x00000001
0004	ISXDI - **iData**	0x00000000

Figure 184: Structure of BrtBeginSXLI

cSic: 0x0001 specifies the number of pivot line entries to reuse from the previous pivot line is 1.

itmtype: 0x00 specifies that the type of this pivot line item is not a subtotal or grand total.

cisxvis: 0x00000001 specifies that the count of pivot line entries in this pivot line is 1.

3.8.49 Example: PivotTable: BrtBeginISXVIs

The next BrtBeginISXVIs record specifies the pivot line entries that occur on the second pivot line.

Size	Structure	Value
0004	BrtBeginISXVIs - **BrtBeginIsxvis**	
0004	LONG - **rgisxvis**	
0004	LONG - **isxvi[0]**	0x00000002

Figure 185: Structure of BrtBeginIsxvis

rgisxvis: An array of pivot line entry indexes.

rgisxvis.isxvi[0]: 0x00000002 specifies the index of the pivot item within the 2nd row field "ProductName". The index 0x02 refers to the 3rd item in the pivot items collection (BrtBeginSXVIs) of BrtBeginSXVD pivot field "ProductName". This 3rd pivot item (BrtBeginSXVI) contains an index that refers to the 4th item in the BrtBeginPCDIRun "Ipoh Coffee" of the corresponding BrtBeginPCDField in the PivotCache Definition.

Records following this record, and before the next BrtBeginSXLI record, are omitted for brevity.

3.8.50 Example: PivotTable: BrtBeginSXLI

The next BrtBeginSXLI record is the grand total pivot line in the row axis of this PivotTable view.

Size	Structure	Value
000C	BrtBeginSXLI - **BrtBeginSXLI**	
0002	WORD - **cSic**	0x0000
0001	PivotItemType - **itmtype**	0x0D
0001	BYTE - **reserved**	0x00
0004	DWORD - **cisxvis**	0x00000001
0004	ISXDI - **iData**	0x00000000

Figure 186: Structure of BrtBeginSXLI

cSic: 0x0000 specifies the number of pivot line entries to reuse from the previous pivot line is 0.

itmtype: 0x0D specifies that the type of this pivot line item is grand total.

cisxvis: 0x00000001 specifies that the count of pivot line entries in this pivot line is 1.

3.8.51 Example: PivotTable: BrtBeginISXVIs

The next BrtBeginISXVIs record specifies the pivot line entries for the grand total pivot line.

Size	Structure	Value
0004	BrtBeginISXVIs - **BrtBeginIsxvis**	
0004	LONG - **rgisxvis**	
0004	LONG - **isxvi[0]**	0x00000000

Figure 187: Structure of BrtBeginIsxvis

rgisxvis: An array of pivot line entry indexes.

rgisxvis.isxvi[0]: 0x00000000 specifies the index of the pivot item within the last row field "Grand Total".

3.8.52 Example: PivotTable: BrtBeginSXLICols

The next record in this example, BrtBeginSXLICols, specifies the pivot lines that are displayed on the column axis of the PivotTable view.

Size	Structure	Value
0004	BrtBeginSXLICols - **BrtBeginSXLICols**	
0004	DWORD - **csxlis**	0x00000001

Figure 188: Structure of BrtBeginSXLICols

csxlis: 0x00000001 specifies that the number of pivot lines that are displayed on the column area of the PivotTable view is 1.

3.8.53 Example: PivotTable: BrtBeginSXLI

The next record in this example, BrtBeginSXLI, is the "Sum of Quantity" pivot line in the column axis of this PivotTable view.

Size	Structure	Value
000C	BrtBeginSXLI - **BrtBeginSXLI**	
0002	WORD - **cSic**	0x0000
0001	PivotItemType - **itmtype**	0x00
0001	BYTE - **reserved**	0x00
0004	DWORD - **cisxvis**	0x00000000
0004	ISXDI - **iData**	0x00000000

Figure 189: Structure of BrtBeginSXLI

cSic: 0x0000 specifies the number of pivot line entries to reuse from the previous pivot line.

itmtype: 0x00 specifies that the type of this pivot line item is not a subtotal or grand total.

cisxvis: 0x00000000 specifies that the count of pivot line entries in this pivot line is 0.

3.8.54 Example: PivotTable: BrtBeginSXPIs

The next record in this example, BrtBeginSXPIs, begins the collection of records that specify the pivot fields on the page axis of the PivotTable view.

Size	Structure	Value
0004	BrtBeginSXPIs - **BrtBeginSXPIs**	
0004	DWORD - **csxpis**	0x00000001

Figure 190: Structure of BrtBeginSXPIs

csxpis: 0x00000001 specifies that the count of pivot fields on the page axis is 1.

3.8.55 Example: PivotTable: BrtBeginSXPI

The next record in this example, BrtBeginSXPI, specifies the properties of a pivot field on the page axis of the PivotTable view.

Size	Structure	Value
000D	BrtBeginSXPI - **BrtBeginSXPI**	
0004	ISXVD - **isxvd**	0x00000001
0004	DWORD - **isxvi**	0x001000FE
0004	LONG - **isxth**	0xFFFFFFFF
1 bit	BYTE - **fUnique**	0x0
1 bit	BYTE - **fDisplay**	0x0
6 bits	BYTE - **reserved**	0x00

Figure 191: Structure of BrtBeginSXPI

isxvd: 0x00000001 specifies a pivot field index that refers to a pivot field in the BrtBeginSXVDs collection.

isxvi: 0x001000FE specifies that this field is ignored, as specified in Non-OLAP Page Filtering.

isxth: 0xFFFFFFFF specifies a value that is ignored because this PivotTable is not an OLAP PivotTable.

fUnique: 0x0 specifies that the **irstUnique** field, which applies only to OLAP PivotTables, is not present after the fixed-size portion of this record.

fDisplay: 0x0 specifies that the **irstDisplay** field, which applies only to OLAP PivotTables, is not present after the fixed-size portion of this record.

3.8.56 Example: PivotTable: BrtBeginSXDIs

The next record, BrtBeginSXDIs, begins the collection of records that specify the data items on the data axis of the PivotTable view.

Size	Structure	Value
0004	BrtBeginSXDIs - **BrtBeginSXDIs**	
0004	DWORD - **csxdis**	0x00000001

Figure 192: Structure of BrtBeginSXDIs

csxdis: 0x00000001 specifies that the number of data items on the data axis in this PivotTable view is 1.

3.8.57 Example: PivotTable: BrtBeginSXDI

The next record, BrtBeginSXDI, specifies the "Sum of Quantity" data item that summarizes data in this PivotTable view.

Size	Structure	Value
003B	BrtBeginSXDI - **BrtBeginSXDI**	
0004	ISXVD - **isxvdData**	0x00000004
0004	DataConsolidationFunction - **iiftab**	0x00000000
0004	ShowDataAs - **df**	0x00000000
0004	ISXVD - **isxvd**	0x00000000
0004	DWORD - **isxvi**	0x00000000
0004	PivotNumFmt - **ifmt**	
0002	Ifmt - **ifmt**	
0002	WORD - **ifmt**	0x0000
0002	WORD - **reserved**	0x0000
0001	BYTE - **fLoadDisplayName**	0x01
0022	XLWideString - **stDisplayName**	Sum of Quantity

Figure 193: Structure of BrtBeginSXDI

The **isxvd** and **isxvi** fields are not described here because they are ignored in this example.

isxvdData: 0x00000004 specifies the index of the pivot field in the BrtBeginSXVDs collection the pivot field that this data item summarizes.

iiftab: 0x00000000 specifies the SUM aggregation data consolidation function that applies to this data item.

df: 0x00000000 specifies that the data format for this data item is normal.

ifmt: Specifies the format applied to this data item.

ifmt.ifmt.ifmt: 0x0000 specifies it has General number format.

fLoadDisplayName: 0x01 specifies that the name of the data item is present.

stDisplayName: Specifies that the name of the data item is "Sum of Quantity".

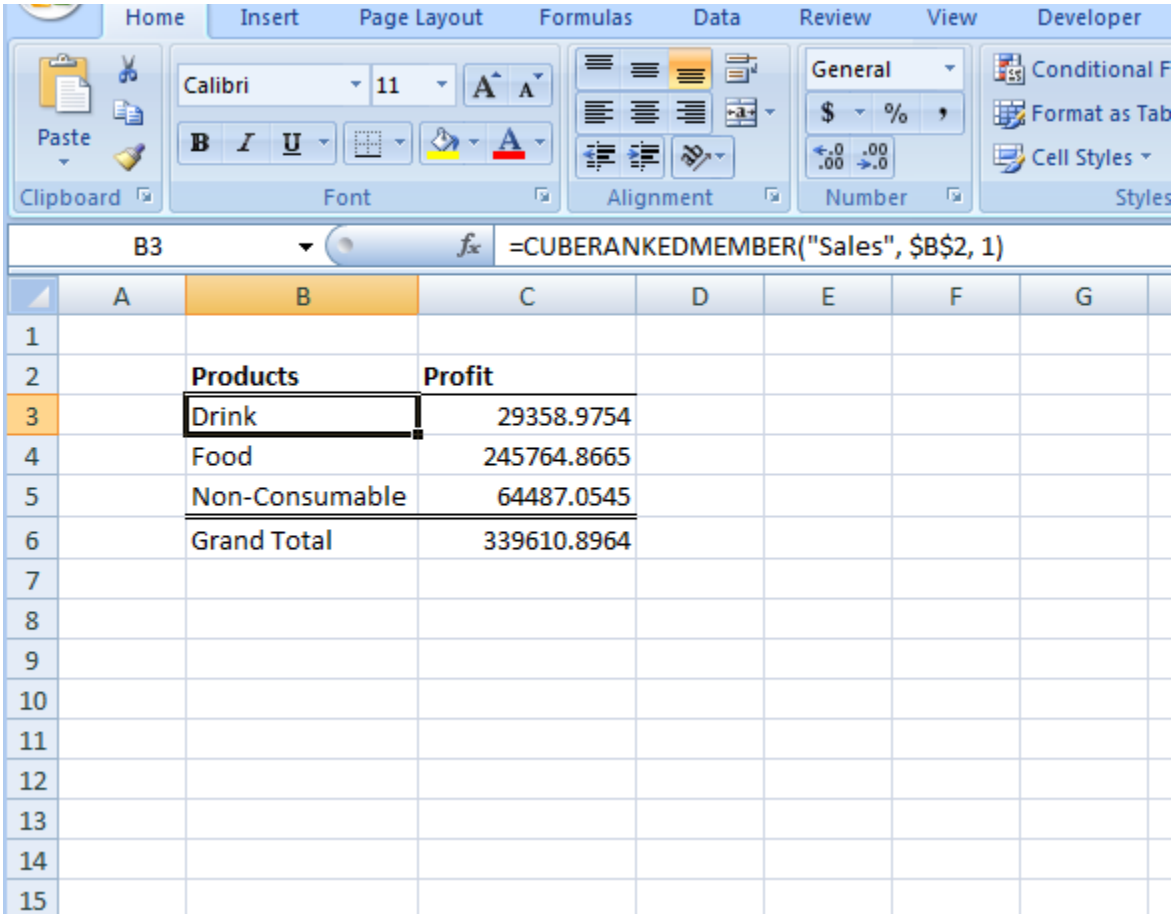
3.9 Example: Metadata

This example shows metadata for cube functions and the external connection used with them.

This example uses a sample workbook with the following cell values:

Cell	Formula	Result
B2	=CUBESET("Sales", "[Product].[All Products].Children", "Products")	Products
C2	=CUBEMEMBER("Sales", "[Measures].[Profit]")	Profit
B3	=CUBERANKEDMEMBER("Sales", B2, 1)	Drink
C3	=CUBEVALUE("Sales", $B3, C$2)	29358.9754
B4	=CUBERANKEDMEMBER("Sales", B2, 2)	Food
C4	=CUBEVALUE("Sales", $B4, C$2)	245764.8665

B5	=CUBERANKEDMEMBER("Sales", B2, 3)	Non-Consumable
C5	=CUBEVALUE("Sales", $B5, C$2)	64487.0545
B6	Grand Total	Grand Total
C6	=CUBEVALUE("Sales", B2,C$2)	339610.8964



This example includes all of the records in the external data connections part and in the metadata part except for BrtEnd* records, which have been omitted for brevity. Additionally, certain records which occur multiple times in the file are documented a fewer number of times in this example, again for brevity.

The records in the external data connections part are BrtBeginExtConnections, BrtBeginExtConnection, BrtBeginECDbProps and BrtBeginECOlapProps. Together, these records specify a connection to an OLAP data source (1).

The rest of the records in the example are in the metadata part.

BrtBeginMetadata, BrtBeginEsmdtinfo, BrtBeginEsstr, and BrtBeginEsmdx specify the beginning of collections as specified in their respective section 2 specifications.

BrtMdtinfo specifies the name and properties of the value metadata type for MDX Metadata which is the metadata type used in this example.

Four of the six BrtStr records in the file are shown in this example. These records specify shared text strings used by other records in this example.

Next, four of the nine sequences of records that conform to the MDX rule are shown in this example. In each, the BrtBeginMdx record specifies the data connection name and the type of cube function that generated the metadata.

The first example of a sequence of records that conforms to the MDX rule specifies the metadata associated with cell B2 in the example and includes one BrtBeginMdx record and one BrtBeginMdxSet record.

The second example of a sequence of records that conforms to the MDX rule specifies the metadata associated with cell B3 in the example and includes one BrtBeginMdx record, one BrtBeginMdxTuple record and one BrtMdxMbrIstr record.

The third example of a sequence of records that conforms to the MDX rule specifies the metadata associated with cell C2 in the example and includes one BrtBeginMdx record, one BrtBeginMdxTuple record and one BrtMdxMbrIstr record.

The fourth example of a sequence of records that conforms to the MDX rule specifies the metadata associated with cell C6 in the example and includes one BrtBeginMdx record, one BrtBeginMdxTuple record and two BrtMdxMbrIstr records.

Finally, the BrtBeginEsmdb and BrtMdb records specify the association between the BrtBeginMdx records and the BrtMdtinfo record which specifies the metadata type.

3.9.1 Example: MetaData: BrtBeginExtConnections

The first record in this example is BrtBeginExtConnections from the external data connections part, which specifies the beginning of the collection of external connections. In this example, there is only one external connection in this collection, specified by BrtBeginExtConnection.

Size	Structure
0000	BrtBeginExtConnections - **BrtBeginExtConnections**

Figure 194: Structure of BrtBeginExtConnections

3.9.2 Example: MetaData: BrtBeginExtConnection

The BrtBeginExtConnection record specifies the external connection used with the cube functions in this workbook.

Size	Structure	Value
00DF	BrtBeginExtConnection - **BrtBeginExtConnection**	
0001	DataFunctionalityLevel - **bVerRefreshed**	0x03
0001	DataFunctionalityLevel - **bVerRefreshableMin**	0x00
8 bits	WORD - **pc**	0x02
8 bits	WORD - **reserved1**	0x00
16 bits	DWORD - **wInterval**	0x0000
1 bit	DWORD - **fMaintain**	0x1
1 bit	DWORD - **fNewQuery**	0x0
1 bit	DWORD - **fDeleted**	0x0
1 bit	DWORD - **fAlwaysUseConnectionFile**	0x0
1 bit	DWORD - **fBackgroundQuery**	0x1
1 bit	DWORD - **fRefreshOnLoad**	0x0
1 bit	DWORD - **fSaveData**	0x1
9 bits	DWORD - **reserved2**	0x000
1 bit	WORD - **fLoadSourceDataFile**	0x0
1 bit	WORD - **fLoadSourceConnectionFile**	0x1
1 bit	WORD - **fLoadConnectionDesc**	0x1
1 bit	WORD - **reserved3**	0x1
1 bit	WORD - **fLoadSSOApplicationID**	0x0
11 bits	WORD - **reserved4**	0x000
0004	DBType - **idbtype**	0x00000005
0004	DWORD - **irecontype**	0x00000001
0004	DWORD - **dwConnID**	0x00000001
0001	BYTE - **iCredMethod**	0x00
0098	XLWideString - **stConnectionFile**	C:\Documents and Settings\joh...
0022	XLWideString - **stConnDesc**	Sales Reporting
000E	XLWideString - **stConnName**	Sales

Figure 195: Structure of BrtBeginExtConnection

bVerRefreshed: 0x03 specifies that the application that last refreshed this external connection had a data functionality level of greater than or equal to 3.

bVerRefreshableMin: 0x00 specifies that the minimum data functionality level that the application is required to support in order to correctly refresh the external connection is less than 3.

pc: 0x02 specifies that the password is not saved as part of the connection string. Note that this field is irrelevant in this example because the connection string specifies integrated security as the authentication method.

wInterval: 0x0000 specifies that this external connection is not refreshed automatically.

fMaintain: 0x1 specifies that the application keeps this external connection open after a refresh.

fNewQuery: 0x0 specifies that this external connection has been refreshed.

fDeleted: 0x0 specifies that this external connection has not been deleted.

fAlwaysUseConnectionFile: 0x0 specifies that the application follows the procedure specified by the **irecontype** field when refreshing this external connection.

fBackgroundQuery: 0x1 specifies that the preferred usage of this external connection is to refresh asynchronously in the background.

fRefreshOnLoad: 0x0 specifies that this external connection is not refreshed when the workbook is opened.

fSaveData: 0x1 specifies that the data retrieved from this external connection is saved within the workbook.

fLoadSourceDataFile: 0x0 specifies that **stDataFile** does not exist after the fixed-size portion of this record.

fLoadSourceConnectionFile: 0x1 specifies that **stConnectionFile** exists after the fixed-size portion of this record.

fLoadConnectionDesc: 0x1 specifies that **stConnDesc** exists after the fixed-size portion of this record.

fLoadSSOApplicationID: 0x0 specifies that **stSso** does not exist after the fixed-size portion of this record.

idbtype: 0x00000005 specifies that the data source type of this external connection is OLE DB.

irecontype: 0x00000001 specifies that this external connection is refreshed using the existing external connection information first. If the refresh fails, then updated connection information is retrieved, if available, from the external connection file associated with this external connection.

dwConnID: 0x00000001 specifies that the unique identifier of this external connection is 1.

iCredMethod: 0x00 specifies that integrated authentication is the authentication method used when establishing or re-establishing this external connection.

stConnectionFile: "C:\Documents and Settings\johnsmith\My Documents\My Data Sources\Sales.odc" specifies the path to the external connection file from which this external connection was created.

stConnDesc: "Sales Reporting" specifies the user description for this external connection.

stConnName: "Sales" specifies the name of this external connection.

3.9.3 Example: MetaData: BrtBeginECDbProps

The BrtBeginECDbProps record specifies properties associated with this external connection.

Size	Structure	Value
0191	BrtBeginECDbProps - **BrtBeginECDbProps**	
0004	CmdType - **icmdtype**	0x00000001
1 bit	BYTE - **fLoadCmdSvr**	0x0
1 bit	BYTE - **fLoadCmd**	0x1
6 bits	BYTE - **reserved**	0x00
017E	XLWideString - **stConn**	Provider=MSOLAP.3;Integrated Security=SSPI;...
000E	XLWideString - **stCmd**	Sales

Figure 196: Structure of BrtBeginECDbProps

icmdtype: 0x00000001 specifies that the command type for this connection is CMDCUBE. This means that **stCmd** specifies the name of a cube within an OLAP database.

fLoadCmdSvr: 0x0 specifies that **stCmdSvr** does not exist after the fixed-size portion of this record.

fLoadCmd: 0x1 specifies that **stCmd** exists after the fixed-size portion of this record.

stConn: "Provider=MSOLAP.3;Integrated Security=SSPI;Persist Security Info=True;Initial Catalog=FoodMart 2000;Data Source=olapserver;MDX Compatibility=1;Safety Options=2;MDX Missing Member Mode=Error" specifies the connection string used to connect to the data source.

stCmd: "Sales" specifies the name of the cube within the OLAP database (FoodMart 2000) specified in the connection string.

3.9.4 Example: MetaData: BrtBeginECOlapProps

The BrtBeginECOlapProps record specifies properties specific to OLAP external connections.

Size	Structure	Value
0006	BrtBeginECOlapProps - **BrtBeginECOlapProps**	
1 bit	BYTE - **fLocalConn**	0x0
1 bit	BYTE - **fNoRefreshCube**	0x0
1 bit	BYTE - **fSrvFmtBack**	0x1
1 bit	BYTE - **fSrvFmtFore**	0x1
1 bit	BYTE - **fSrvFmtFlags**	0x1
1 bit	BYTE - **fSrvFmtNum**	0x1
1 bit	BYTE - **fUseOfficeLcid**	0x1
1 bit	BYTE - **reserved1**	0x0
0004	DRw - **nDrillthroughRows**	0x000003E8
1 bit	BYTE - **bLoadConnLocal**	0x0
7 bits	BYTE - **reserved2**	0x00

Figure 197: Structure of BrtBeginECOlapProps

fLocalConn: 0x0 specifies that data is retrieved using the connection string specified by the **stConn** field of the BrtBeginECDbProps record preceding this record.

fNoRefreshCube: 0x0 specifies that the local cube file is rebuilt from the original OLAP data source (1) on refresh.

fSrvFmtBack: 0x1 specifies that the fill colors retrieved from the OLAP source are used for cell formatting.

fSrvFmtFore: 0x1 specifies that the font face color retrieved from the OLAP source is used for cell formatting.

fSrvFmtFlags: 0x1 specifies that the font family name retrieved from the OLAP source is used for cell formatting.

fSrvFmtNum: 0x1 specifies that the format string retrieved from the OLAP source is used for cell formatting.

fUseOfficeLcid: 0x1 specifies that the application sends the language code identifier (LCID) to the OLAP provider in order to retrieve localized data.

nDrillthroughRows: 0x000003E8 specifies that a maximum of 1000 rows are returned when the user drills through an aggregate value in a PivotTable.

bLoadConnLocal: 0x0 specifies that **stConnLocal** does not exist after the fixed-size portion of this record and therefore, no local cube is associated with this external connection.

3.9.5 Example: MetaData: BrtBeginMetadata

The BrtBeginMetadata record specifies the beginning of a collection of records as defined by the Metadata part ABNF. The collection of records specifies the metadata associated with the book.

Size	Structure
0000	BrtBeginMetadata - **BrtBeginMetadata**

Figure 198: Structure of BrtBeginMetadata

3.9.6 Example: MetaData: BrtBeginEsmdtinfo

The BrtBeginEsmdtinfo record specifies the beginning of the collection of BrtMdtinfo records as defined by the Metadata part ABNF. The collection of records specifies the list of metadata types.

Size	Structure	Value
0004	BrtBeginEsmdtinfo - **BrtBeginEsmdtinfo**	
0004	LONG - **cMdtinfo**	0x00000001

Figure 199: Structure of BrtBeginEsmdtinfo

cMdtinfo: 0x00000001 specifies that there is one record in this collection.

3.9.7 Example: MetaData: BrtMdtinfo

The BrtMdtinfo record specifies the name and properties of the value metadata type for MDX metadata. The values for the fields in this record are fixed for cube functions, and are specified in MDX Metadata. Refer to the BrtMdtinfo definition for the descriptions of these fields.

Size	Structure	Value
0016	BrtMdtinfo - **BrtMdtinfo**	
0004	MdtFlags - **grbit**	
1 bit	DWORD - **fGhostRw**	0x0
1 bit	DWORD - **fGhostCol**	0x0
1 bit	DWORD - **fEdit**	0x0
1 bit	DWORD - **fDelete**	0x0
1 bit	DWORD - **fCopy**	0x1
1 bit	DWORD - **fPasteAll**	0x1
1 bit	DWORD - **fPasteFmlas**	0x0
1 bit	DWORD - **fPasteValues**	0x1
1 bit	DWORD - **fPasteFmts**	0x0
1 bit	DWORD - **fPasteComments**	0x0
1 bit	DWORD - **fPasteDv**	0x0
1 bit	DWORD - **fPasteBorders**	0x0
1 bit	DWORD - **fPasteColWidths**	0x0
1 bit	DWORD - **fPasteNumFmts**	0x0
1 bit	DWORD - **fMerge**	0x1
1 bit	DWORD - **fSplitFirst**	0x1
1 bit	DWORD - **fSplitAll**	0x0
1 bit	DWORD - **fRwColShift**	0x1
1 bit	DWORD - **fClearAll**	0x0
1 bit	DWORD - **fClearFmts**	0x1
1 bit	DWORD - **fClearContents**	0x0
1 bit	DWORD - **fClearComments**	0x1
1 bit	DWORD - **fAssign**	0x1
4 bits	DWORD - **reserved1**	0x0
1 bit	DWORD - **reserved2**	0x1
1 bit	DWORD - **fCanCoerce**	0x1
1 bit	DWORD - **fAdjust**	0x0
1 bit	DWORD - **fCellMeta**	0x0
1 bit	DWORD - **reserved3**	0x1
0004	DWORD - **metadataID**	0x0001D4C0
000E	XLWideString - **stName**	XLMDX

Figure 200: Structure of BrtMdtinfo

3.9.8 Example: MetaData: BrtBeginEsstr

The BrtBeginEsstr record specifies the beginning of a collection of BrtStr records.

Size	Structure	Value
0004	BrtBeginEsstr - **BrtBeginEsstr**	
0004	LONG - **cStr**	0x00000006

Figure 201: Structure of BrtBeginEsstr

cStr: 0x00000006 specifies that there are 6 BrtStr records in this collection.

3.9.9 Example: MetaData: BrtStr

This BrtStr record specifies the first shared text string in the collection.

Size	Structure	Value
0046	BrtStr - **BrtStr**	
0046	XLWideString - **stText**	[Product].[All Products].Children

Figure 202: Structure of BrtStr

stText: "[Product].[All Products].Children" specifies the MDX expression that defines an **OLAP set**.

3.9.10 Example: MetaData: BrtStr

This BrtStr record specifies the second shared text string in the collection.

Size	Structure	Value
0044	BrtStr - **BrtStr**	
0044	XLWideString - **stText**	[Product].[All Products].[Drink]

Figure 203: Structure of BrtStr

stText: "[Product].[All Products].[Drink]" specifies the MDX expression that represents one of the members of the OLAP set used in this example.

The next two BrtStr records that have been omitted specify the MDX expression of the other two members of the OLAP set used in this example.

3.9.11 Example: MetaData: BrtStr

This BrtStr record specifies the fifth shared text string in the collection.

Size	Structure	Value
002A	BrtStr - **BrtStr**	
002A	XLWideString - **stText**	[Measures].[Profit]

Figure 204: Structure of BrtStr

stText: "[Measures].[Profit]" specifies an MDX expression that represents an OLAP measure.

3.9.12 Example: MetaData: BrtStr

This BrtStr record specifies the sixth shared text string in the collection.

Size	Structure	Value
000E	BrtStr - **BrtStr**	
000E	XLWideString - **stText**	Sales

Figure 205: Structure of BrtStr

stText: "Sales" specifies the name of the external connection used by the cube functions in this workbook. It matches the **stConnName** field of the BrtBeginExtConnections record in this example.

3.9.13 Example: MetaData: BrtBeginEsmdx

The BrtBeginEsmdx record specifies the beginning of the collection of records that specify the MDX metadata store.

Size	Structure	Value
0004	BrtBeginEsmdx - **BrtBeginEsmdx**	
0004	LONG - **cMdx**	0x00000009

Figure 206: Structure of BrtBeginEsmdx

cMdx: 0x00000009 specifies that there are 9 MDX metadata records in this collection.

Note that only the first, second, fifth, and ninth BrtBeginMdx records are described following this record because they reference the shared strings specified earlier in this example and are used by different cube functions. The others are omitted for brevity.

3.9.14 Example: MetaData: BrtBeginMdx

This is the first BrtBeginMdx record in the example. It specifies properties of MDX metadata used in cell B2 in the example.

Size	Structure	Value
0008	BrtBeginMdx - **BrtBeginMdx**	
0004	Istr - **istrConnName**	0x00000005
0004	TagFnMdx - **tfnSrc**	0x00000003

Figure 207: Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection used by the function that generated this metadata.

tfnSrc: 0x00000003 specifies this metadata was generated by a CUBESET cube function.

3.9.15 Example: MetaData: BrtBeginMdxSet

The BrtBeginMdxSet record specifies properties of MDX set metadata associated with the preceding BrtBeginMdx record.

Size	Structure	Value
000C	BrtBeginMdxSet - **BrtBeginMdxSet**	
0004	Istr - **istrSetDef**	0x00000000
0004	SdSetSortOrder - **sso**	0x00000000
0004	LONG - **cMbrsSortBy**	0x00000000

Figure 208: Structure of BrtBeginMdxSet

istrSetDef: 0x00000000 specifies the first shared text string, "[Product].[All Products].Children", which specifies the MDX expression that defines this set.

sso: 0x00000000 specifies that this set is not sorted.

cMbrsSortBy: 0x00000000 specifies that number of coordinates in the OLAP cube to sort the set on is 0.

3.9.16 Example: MetaData: BrtBeginMdx

This is the second BrtBeginMdx record in the example. It specifies properties of MDX metadata used in cell B3 in the example.

Size	Structure	Value
0008	BrtBeginMdx - **BrtBeginMdx**	
0004	Istr - **istrConnName**	0x00000005
0004	TagFnMdx - **tfnSrc**	0x00000005

Figure 209: Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection used by the function that generated this metadata.

tfnSrc: 0x00000005 specifies this metadata was generated by a CUBERANKEDMEMBER cube function.

3.9.17 Example: MetaData: BrtBeginMdxTuple

The BrtBeginMdxTuple record specifies formatting properties for MDX tuple metadata associated with the preceding MDX metadata record and specifies the beginning of a collection of BrtMdxMbrIstr records that specify MDX unique names.

The descriptions for the fields related to formatting have been omitted as they are not relevant to this example.

Size	Structure	Value
000E	BrtBeginMdxTuple - **BrtBeginMdxTuple**	
0004	LONG - **cMbrs**	0x00000001
0004	SrvFmtCV - **dwSrvFmtBack**	
0001	BYTE - **ciRed**	0x00
0001	BYTE - **ciGreen**	0x00
0001	BYTE - **ciBlue**	0x00
0001	BYTE - **unused**	0x00
0004	SrvFmtCV - **dwSrvFmtFore**	
0001	BYTE - **ciRed**	0x00
0001	BYTE - **ciGreen**	0x00
0001	BYTE - **ciBlue**	0x00
0001	BYTE - **unused**	0x00
0002	SrvFmtFlags - **sff**	
1 bit	WORD - **fSrvFmtNum**	0x0
1 bit	WORD - **fSrvFmtNumCurrency**	0x0
1 bit	WORD - **fSrvFmtNumStr**	0x0
1 bit	WORD - **fSrvFmtBack**	0x0
1 bit	WORD - **fSrvFmtFore**	0x0
1 bit	WORD - **fSrvFmtItalic**	0x0
1 bit	WORD - **fSrvFmtUnderline**	0x0
1 bit	WORD - **fSrvFmtBold**	0x0
1 bit	WORD - **fSrvFmtStrikethrough**	0x0
7 bits	WORD - **unused**	0x00

Figure 210: Structure of BrtBeginMdxTuple

cMbrs: 0x00000001 specifies there is one member expression in the tuple.

3.9.18 Example: MetaData: BrtMdxMbrIstr

The BrtMdxMbrIstr record specifies an MDX unique name and its properties.

Size	Structure	Value
0005	BrtMdxMbrIstr - **BrtMdxMbrIstr**	
0004	Istr - **istr**	0x00000001
0001	MdxMbrIstrFlags - **grbit**	
1 bit	BYTE - **fCubeSet**	0x0
7 bits	BYTE - **unused**	0x00

Figure 211: Structure of BrtMdxMbrIstr

istr: 0x00000001 specifies the second shared text string, "[Product].[All Products].[Drink]", which specifies the MDX unique name.

grbit.fCubeSet: 0x00 specifies that istr does not specify an OLAP set.

3.9.19 Example: MetaData: BrtBeginMdx

This is the fifth BrtBeginMdx record in the example. It specifies properties of MDX metadata used in cell C2 in the example.

Size	Structure	Value
0008	BrtBeginMdx - **BrtBeginMdx**	
0004	Istr - **istrConnName**	0x00000005
0004	TagFnMdx - **tfnSrc**	0x00000001

Figure 212: Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection used by the function that generated this metadata.

tfnSrc: 0x00000001 specifies this metadata was generated by a CUBEMEMBER cube function.

3.9.20 Example: MetaData: BrtBeginMdxTuple

The BrtBeginMdxTuple record specifies formatting properties for MDX tuple metadata associated with the preceding MDX metadata record and specifies the beginning of a collection of BrtMdxMbrIstr records that specify MDX unique names.

The descriptions for the fields related to formatting have been omitted as they are not relevant to this example.

Size	Structure	Value
000E	BrtBeginMdxTuple - **BrtBeginMdxTuple**	
0004	LONG - **cMbrs**	0x00000001
0004	SrvFmtCV - **dwSrvFmtBack**	
0001	BYTE - **ciRed**	0x00
0001	BYTE - **ciGreen**	0x00
0001	BYTE - **ciBlue**	0x00
0001	BYTE - **unused**	0x00
0004	SrvFmtCV - **dwSrvFmtFore**	
0001	BYTE - **ciRed**	0x00
0001	BYTE - **ciGreen**	0x00
0001	BYTE - **ciBlue**	0x00
0001	BYTE - **unused**	0x00
0002	SrvFmtFlags - **sff**	
1 bit	WORD - **fSrvFmtNum**	0x0
1 bit	WORD - **fSrvFmtNumCurrency**	0x0
1 bit	WORD - **fSrvFmtNumStr**	0x0
1 bit	WORD - **fSrvFmtBack**	0x0
1 bit	WORD - **fSrvFmtFore**	0x0
1 bit	WORD - **fSrvFmtItalic**	0x0
1 bit	WORD - **fSrvFmtUnderline**	0x0
1 bit	WORD - **fSrvFmtBold**	0x0
1 bit	WORD - **fSrvFmtStrikethrough**	0x0
7 bits	WORD - **unused**	0x00

Figure 213: Structure of BrtBeginMdxTuple

cMbrs: 0x00000001 specifies that there is one member expression in the tuple.

3.9.21 Example: MetaData: BrtMdxMbrIStr

The BrtMdxMbrIstr record specifies an MDX unique name and its properties.

Size	Structure	Value
0005	BrtMdxMbrIstr - **BrtMdxMbrIstr**	
0004	Istr - **istr**	0x00000004
0001	MdxMbrIstrFlags - **grbit**	
1 bit	BYTE - **fCubeSet**	0x0
7 bits	BYTE - **unused**	0x00

Figure 214: Structure of BrtMdxMbrIstr

istr: 0x00000004 specifies the fifth shared text string, "[Measures].[Profit]", which specifies the MDX unique name.

grbit.fCubeSet: 0x00 specifies that istr does not specify an OLAP set.

3.9.22 Example: MetaData: BrtBeginMdx

This is the ninth BrtBeginMdx record in the example. It specifies properties of MDX metadata used in cell C6 in the example.

Size	Structure	Value
0008	BrtBeginMdx - **BrtBeginMdx**	
0004	Istr - **istrConnName**	0x00000005
0004	TagFnMdx - **tfnSrc**	0x00000002

Figure 215: Structure of BrtBeginMdx

istrConnName: 0x00000005 specifies the sixth shared text string, "Sales", which represents the name of the external connection used by the function that generated this metadata.

tfnSrc: 0x00000002 specifies this metadata was generated by a CUBEVALUE cube function.

3.9.23 Example: MetaData: BrtBeginMdxTuple

The BrtBeginMdxTuple record specifies formatting properties for MDX tuple metadata associated with the preceding MDX metadata record and specifies the beginning of a collection of BrtMdxMbrIstr records that specify MDX unique names.

The descriptions for the fields related to formatting have been omitted because they are not relevant to this example.

Size	Structure	Value
0016	BrtBeginMdxTuple - **BrtBeginMdxTuple**	
0004	LONG - **cMbrs**	0x00000002
0004	SrvFmtCV - **dwSrvFmtBack**	
0001	BYTE - **ciRed**	0x00
0001	BYTE - **ciGreen**	0x00
0001	BYTE - **ciBlue**	0x00
0001	BYTE - **unused**	0x00
0004	SrvFmtCV - **dwSrvFmtFore**	
0001	BYTE - **ciRed**	0x00
0001	BYTE - **ciGreen**	0x00
0001	BYTE - **ciBlue**	0x00
0001	BYTE - **unused**	0x00
0002	SrvFmtFlags - **sff**	
1 bit	WORD - **fSrvFmtNum**	0x1
1 bit	WORD - **fSrvFmtNumCurrency**	0x0
1 bit	WORD - **fSrvFmtNumStr**	0x0
1 bit	WORD - **fSrvFmtBack**	0x0
1 bit	WORD - **fSrvFmtFore**	0x0
1 bit	WORD - **fSrvFmtItalic**	0x0
1 bit	WORD - **fSrvFmtUnderline**	0x0
1 bit	WORD - **fSrvFmtBold**	0x0
1 bit	WORD - **fSrvFmtStrikethrough**	0x0
7 bits	WORD - **unused**	0x00
0008	SrvFmtNum - **sfnum**	
0008	SrvFmtData - **data**	
0004	ULONG - **cb**	0x00000004
0004	DWORD - **dwSrvFmtNum**	0x00000000

Figure 216: Structure of BrtBeginMdxTuple

cMbrs: 0x00000002 specifies that there are two member expressions in the tuple.

3.9.24 Example: MetaData: BrtMdxMbrIStr

The BrtMdxMbrIstr record specifies an MDX unique name and its properties.

Size	Structure	Value
0005	BrtMdxMbrIstr - **BrtMdxMbrIstr**	
0004	Istr - **istr**	0x00000000
0001	MdxMbrIstrFlags - **grbit**	
1 bit	BYTE - **fCubeSet**	0x1
7 bits	BYTE - **unused**	0x00

Figure 217: Structure of BrtMdxMbrIstr

istr: 0x00000000 specifies the first shared text string, "[Product].[All Products].Children", which specifies the MDX unique name.

grbit.fCubeSet: 0x01 specifies that istr does not specify an OLAP set.

3.9.25 Example: MetaData: BrtMdxMbrIStr

The BrtMdxMbrIstr record specifies an MDX unique name and its properties.

Size	Structure	Value
0005	BrtMdxMbrIstr - **BrtMdxMbrIstr**	
0004	Istr - **istr**	0x00000004
0001	MdxMbrIstrFlags - **grbit**	
1 bit	BYTE - **fCubeSet**	0x0
7 bits	BYTE - **unused**	0x00

Figure 218: Structure of BrtMdxMbrIstr

istr: 0x00000004 specifies the fifth shared text string, "[Measures].[Profit]", which specifies the MDX unique name.

grbit.fCubeSet: 0x00 specifies that istr does not specify an OLAP set.

3.9.26 Example: MetaData: BrtBeginEsmdb

The BrtBeginEsmdb record specifies the type of metadata block records and specifies the beginning of a collection of BrtMdb records as defined by the Metadata part ABNF.

Size	Structure	Value
0008	BrtBeginEsmdb - **BrtBeginEsmdb**	
0004	LONG - **cMdb**	0x00000009
0004	DWORD - **fCellMeta**	0x00000000

Figure 219: Structure of BrtBeginEsmdb

cMdb: 0x00000009 specifies that there are nine metadata blocks in this collection.

fCellMeta: 0x00000000 specifies that this collection contains value metadata records.

3.9.27 Example: MetaData: BrtMdb

This BrtMdb record specifies an array of Mdir structures and is the first metadata block in the collection.

Size	Structure	Value
000C	BrtMdb - **BrtMdb**	
0004	LONG - **cMdir**	0x00000001
0008	RgMdir - **rgMdir**	
0008	Mdir - **Mdir[0]**	
0004	LONG - **iMdt**	0x00000001
0004	DWORD - **mdd**	0x00000000

Figure 220: Structure of BrtMdb

cMdir: 0x00000001 specifies that there is one Mdir in the following array of Mdir structures. An Mdir structure specifies a reference to a metadata type and a corresponding metadata record.

rgMdir: This is the array of Mdir structures.

rgMdir.Mdir[0]: This is the first and only Mdir structure in the array.

rgMdir.Mdir[0].iMdt: 0x00000001 specifies the first BrtMdtinfo in BrtBeginEsmdtinfo.

rgMdir.Mdir[0].mdd: 0x00000000 specifies the first BrtBeginMdx in BrtBeginEsmdx because the **BrtMdtinfo.stName** is "XLMDX".

The next eight BrtMdb records, which have been omitted, specify the mappings between the same BrtMdtinfo referenced in this record and the other eight BrtBeginMdx records.

4 Security Considerations

The password verifier features available in the file format (see Password Verifier Algorithm) are used to prevent accidental modification, rather than being used as security features. It is possible to remove the passwords by removing the records containing the verifier values.

The translation of passwords from a double-byte Unicode string to a new character string in the ANSI codepage of the current system converts any Unicode character that cannot be mapped to the ANSI codepage of the current system to the 0x3F character in that codepage ([ECMA-376] part 4, 3.2.29). Replacing these characters with 0x3F when the **hash** is verified will generate positive hash value matches. In certain locales this can be a significant portion of the everyday character set. <47>

Further security considerations regarding the file encryption algorithms (see Encryption) are detailed in [MS-OFFCRYPTO] section 4.3.

5 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products and technologies:

- Microsoft® Office Excel® 2007 Service Pack 1

Exceptions, if any, are noted below. Unless otherwise specified, any statement of optional behavior in this specification prescribed using the terms SHOULD or SHOULD NOT implies the aforementioned Microsoft products' behavior is in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies these Microsoft products do not follow the prescription.

<1> Section 1.5: This persistence format provides interoperability with applications that create or read documents conforming to this structure, including Microsoft® Office Excel® 2007.

<2> Section 2.1.7.4: Office Excel 2007 writes out this part on save.

<3> Section 2.2.7.4.3.1: Office Excel 2007 does not save cached values for OLE data items.

<4> Section 2.4.2: the 2007 Microsoft® Office system will sometimes save a value of 0 in this field when a file is converted from the XLSX format to XLSB.

<5> Section 2.4.17: When **iType** is CF_TYPE_FILTER and **iTemplate** is CF_TEMPLATE_FILTER, Office Excel 2007 allows **iParam** to be 0. If **fPercent** is 1, the topmost or bottommost cell is formatted. If **fPercent** is 0, all cells in the range are formatted.

<6> Section 2.4.46: Office Excel 2007 can allow creating files with the zero-length **stFile**.

<7> Section 2.4.47: If this Web connection was created in Microsoft® Excel® 97 this field is always 1. Otherwise, this field is always 0.

<8> Section 2.4.47: If this Web connection was refreshed using Microsoft® Excel® 2000, Microsoft® Excel® 2002, Microsoft® Office Excel® 2003, or Office Excel 2007 this field is always 1. Otherwise, this field is always 0.

<9> Section 2.4.61: In certain scenarios, Office Excel 2007 writes out more than 0x000000CE BrtFmt records.

<10> Section 2.4.73: When the file is saved, the value of the **stStyleAgg** becomes NULL and the old value is written to the **stStyleInsertRow**. When the file is re-opened, these new styles will be applied.

<11> Section 2.4.97: If this value is greater than 0x00 and the **fMixedTypesIgnoringBlanks** field of the BrtBeginPCDFAtbl record of the enclosing BrtBeginPCDField record is 1, Office Excel 2007 will report a valid file as corrupt.

<12> Section 2.4.111: Office Excel 2007 will only load a file if the MDX expression specified by **stWeight** corresponds to a measure in the OLAP cube.

<13> Section 2.4.111: Office Excel 2007 will not load a file with this string specified.

<14> Section 2.4.130: The value of **fLoadSheet** can be 0 if **fName** is 0 and the specified external workbook has one sheet and that sheet has the same name as that external workbook, not including the **file extension**.

<15> Section 2.4.150: Office Excel 2007 allows the **Comment** field of a BrtBeginSct record to be a NULL string after converting an Excel Binary File Format (.xls) document to an Excel 2007 Binary File Format (.xlsb) document.

<16> Section 2.4.178: the 2007 Office system will not save out the correct value in this field.

<17> Section 2.4.179: Office Excel 2007 saves the PNN value of Top-left pane as Bottom-right pane and Bottom-right pane as Top-left pane.

<18> Section 2.4.179: Office Excel 2007 will not load a file if the pivot selection belongs to the page area.

<19> Section 2.4.189: the 2007 Office system does not always save a value of 1 for OLAP PivotTables.

<20> Section 2.4.457: Office Excel 2007 uses this GUID as specified by [MS-DTYP] to determine if the VBA project needs to be recompiled on load by comparing the GUID in the file to the GUID built into the application. If the value is 0x0, the VBA project needs to be recompiled on load.

<21> Section 2.4.457: Value "xl" for **stAppName** is used by Office Excel 2007. When **stAppName** is equal to "xl", Office Excel 2007 expects each of **stLastEdited**, **stLowestEdited** and **stRupBuild** to be a text representation of an unsigned integer which is less than or equal to 32767. When **stAppName** is not equal to "xl", Office Excel 2007 ignores values of **stLastEdited**, **stLowestEdited** and **stRupBuild**.

<22> Section 2.4.487: Excel can save any value from 0 to 0xFF.

<23> Section 2.4.505: the 2007 Office system does not load a file in which this field contains a value that it does not recognize, or is not recognized by the underlying operating system. the 2007 Office system recognizes the following language tags:

Language	Locale	Language Tag
Africaans	South Africa	af-ZA
Albanian	Albanian	sq-AL
Alsatian	France	gsw-FR
Amharic	Ethiopia	am-ET
Arabic	Algeria	ar-DZ
Arabic	Bahrain	ar-BH
Arabic	Egypt	ar-EG
Arabic	Iraq	ar-IQ
Arabic	Jordan	ar-JO
Arabic	Kuwait	ar-KW
Arabic	Lebanon	ar-LB
Arabic	Libya	ar-LY
Arabic	Morocco	ar-MA
Arabic	Oman	ar-OM
Arabic	Qatar	ar-QA

Arabic	Saudi Arabia	ar-SA
Arabic	Syria	ar-SY
Arabic	Tunisia	ar-TN
Arabic	U.A.E.	ar-AE
Arabic	Yemen	ar-YE
Armenian	Armenia	hy-AM
Assamese	India	as-IN
Azeri (Cyrillic)	Azerbaijan	az-AZ-Cyrl
Azeri (Latin)	Azerbaijan	az-AZ-Latn
Bashkir	Russia	ba-RU
Basque	Basque	eu-ES
Belarusian	Belarus	be-BY
Bengali	Bangladesh	bn-BD
Bengali (Bengali Script)	India	bn-IN
Bosnian (Cyrillic)	Bosnia and Herzegovina	bs-BA-Cyrl
Bosnian (Latin)	Bosnia and Herzegovina	bs-BA-Latn
Breton	France	br-FR
Bulgarian	Bulgaria	bg-BG
Catalan	Catalan	ca-ES
Chinese	Hong Kong	zh-HK
Chinese	Macao	zh-MO
Chinese	PRC	zh-CN
Chinese	Singapore	zh-SG
Chinese	Taiwan	zh-TW
Corsican	France	co-FR
Croatian	Croatia	hr-HR
Croatian (Latin)	Bosnia and Herzegovina	hr-BA-Latn
Czech	Czech Republic	cs-CZ
Danish	Denmark	da-DK

Dari	Afghanistan	prs-AF
Divehi	Maldives	div-MV
Dutch	Belgium	nl-BE
Dutch	Netherlands	nl-NL
English	Australia	en-AU
English	Belize	en-BZ
English	Canada	en-CA
English	Caribbean	en-CB
English	India	en-IN
English	Ireland	en-IE
English	Jamaica	en-JM
English	Malaysia	en-MY
English	New Zealand	en-NZ
English	Philippines	en-PH
English	South Africa	en-ZA
English	Trinidad	en-TT
English	United Kingdom	en-GB
English	United States	en-US
English	Zimbabwe	en-ZW
Estonian	Estonia	et-EE
Faroese	Faroe Islands	fo-FO
Filipino	Philippines	fil-PH
Finnish	Finland	fi-FI
French	Belgium	fr-BE
French	Canada	fr-CA
French	France	fr-FR
French	Luxembourg	fr-LU
French	Monaco	fr-MC
French	Switzerland	fr-CH

Frisian	Netherlands	fy-NL
Galician	Galician	gl-ES
Georgian	Georgia	ka-GE
German	Austria	de-AT
German	Germany	de-DE
German	Liechtenstein	de-LI
German	Luxembourg	de-LU
German	Switzerland	de-CH
Greek	Greece	el-GR
Greenlandic	Greenland	kl-GL
Gujarati (Gujarati Script)	India	gu-IN
Hausa (Latin)	Nigeria	ha-NG-Latn
Hebrew	Israel	he-IL
Hindi	India	hi-IN
Hungarian	Hungary	hu-HU
Icelandic	Iceland	is-IS
Igbo	Nigeria	ig-NG
Inari Sami	Finland	smn-FI
Indonesian	Indonesia	id-ID
Inuktitut (Latin)	Canada	iu-CA-Latn
Inuktitut (Syllabics)	Canada	iu-CA-Cans
Irish	Ireland	ga-IE
isiXhosa / Xhosa	South Africa	xh-ZA
isiZulu / Zulu	South Africa	zu-ZA
Italian	Italy	it-IT
Italian	Switzerland	it-CH
Japanese	Japan	ja-JP
Kannada (Kannada Script)	India	kn-IN
Kazakh	Kazakhstan	kk-KZ

Khmer	Cambodia	kh-KH
K'iche	Guatemala	qut-GT
Kinyarwanda	Rwanda	rw-RW
Konkani	India	kok-IN
Korean	Korea	ko-KR
Kyrgyz	Kyrgyzstan	ky-KG
Lao	Lao PDR	lo-LA
Latvian	Latvia	lv-LV
Lithuanian	Lithuania	lt-LT
Lower Sorbian	Germany	wee-DE
Lule Sami	Norway	smj-NO
Lule Sami	Sweden	smj-SE
Luxembourgish	Luxembourg	lb-LU
Macedonian (FYROM)	Macedonia, Former Yugoslav Republic of	mk-MK
Malay	Brunei	ms-BN
Malay	Malaysia	ms-MY
Malayalam (Malayalam Script)	India	ml-IN
Maltese	Malta	mt-MT
Maori	New Zealand	mi-NZ
Mapudungun	Chile	arn-CL
Marathi	India	mr-IN
Mohawk	Mohawk	moh-CA
Mongolian (Cyrillic)	Mongolia	mn-MN
Mongolian (Mongolian)	PRC	mn-CN-Mong
Nepali	Nepal	ne-NP
Northern Sami	Finland	se-FI
Northern Sami	Norway	se-NO
Northern Sami	Sweden	se-SE
Norwegian (Bokmål)	Norway	nb-NO

Norwegian (Nynorsk)	Norway	nn-NO
Occitan	France	oc-FR
Oriya (Oriya Script)	India	or-IN
Pashto	Afghanistan	ps-AF
Persian	Iran	fa-IR
Polish	Poland	pl-PL
Portuguese	Brazil	pt-BR
Portuguese	Portugal	pt-PT
Punjabi (Gurmukhi Script)	India	pa-IN
Quechua	Bolivia	quz-BO
Quechua	Ecuador	quz-EC
Quechua	Peru	quz-PE
Romanian	Romania	ro-RO
Romansh	Switzerland	rm-CH
Russian	Russia	ru-RU
Sanskrit	India	sa-IN
Serbian (Cyrillic)	Bosnia and Herzegovina	sr-BA-Cyrl
Serbian (Cyrillic)	Serbia	sr-SP-Cyrl
Serbian (Latin)	Bosnia and Herzegovina	sr-BA-Latn
Serbian (Latin)	Serbia	sr-SP-Latn
Sesotho sa Leboa / Northern Sotho	South Africa	ns-ZA
Setswana / Tswana	South Africa	tn-ZA
Sinhala	Sri Lanka	si-LK
Skolt Sami	Finland	sms-FI
Slovak	Slovakia	sk-SK
Slovenian	Slovenia	sl-SI
Southern Sami	Norway	sma-NO
Southern Sami	Sweden	sma-SE
Spanish	Argentina	es-AR

Spanish	Bolivia	es-BO
Spanish	Chile	es-CL
Spanish	Columbia	es-CO
Spanish	Costa Rica	es-CR
Spanish	Dominican Republic	es-DO
Spanish	Ecuador	es-EC
Spanish	El Salvador	es-SV
Spanish	Guatemala	es-GT
Spanish	Honduras	es-HN
Spanish	Mexico	es-MX
Spanish	Nicaragua	es-NI
Spanish	Panama	es-PA
Spanish	Paraguay	es-PY
Spanish	Peru	es-PE
Spanish	Puerto Rico	es-PR
Spanish	Spain	es-ES
Spanish	United States	es-US
Spanish	Uruguay	es-UY
Spanish	Venezuela	es-VE
Swahili	Kenya	sw-KE
Swedish	Finland	sv-FI
Swedish	Sweden	sv-SE
Syriac	Syria	syr-SY
Tajik (Cyrillic)	Tajikistan	tg-TJ-Cyrl
Tamazight (Latin)	Algeria	tmz-DZ-Latn
Tamil	India	ta-IN
Tatar	Russia	tt-RU
Telugu (Telugu Script)	India	te-IN
Thai	Thailand	th-TH

Bhutanese	Bhutan	bo-BT
Tibetan	PRC	bo-CN
Turkish	Turkey	tr-TR
Turkmen	Turkmenistan	tk-TM
Uighur	PRC	ug-CN
Ukrainian	Ukraine	uk-UA
Upper Sorbian	Germany	wen-DE
Urdu	Pakistan	ur-PK
Uzbek (Cyrillic)	Uzbekistan	uz-UZ-Cyrl
Uzbek (Latin)	Uzbekistan	uz-UZ-Latn
Vietnamese	Viet Nam	vi-VN
Welsh	United Kingdom	cy-GB
Wolof	Senegal	wo-SN
Sakha	Russia	sah-RU
Yi	PRC	ii-CN
Yoruba	Nigeria	yo-NG

<24> Section 2.4.512: Office Excel 2007 ignores this value on load and always writes out 0.

<25> Section 2.4.515: Office Excel 2007 always writes the value of **fAccepted** as 0 when converting from an [ECMA-376] document to this persistence format and the other revision whose **rrd.revid** value matches the **rrd.revid** value of this revision is in a different revision log.

<26> Section 2.4.521: In Office Excel 2007 the value BrtRRFormat.**ich** can also be 0 because the effect was not calculated. The **ich** value can be correctly determined from the **cch** value.

<27> Section 2.4.522: Office Excel 2007 writes the value of the field **rrd.unknown** in BrtRRHeader as 0 after converting an [ECMA-376] document to this persistence format.

<28> Section 2.4.552: Office Excel 2007 does not save cached values for OLE data items.

<29> Section 2.4.552: Office Excel 2007 will not load a file that has a value of 1048576 for this field.

<30> Section 2.4.552: Office Excel 2007 will not load a file that has a value of 16384 for this field.

<31> Section 2.4.572: Office Excel 2007 treat this as 0x0 for security considerations.

<32> Section 2.4.572: If this workbook doesn't contain a VBA project, Office Excel 2007 will reset the **strName** to a default value when the project is created.

<33> Section 2.5.3: Office Excel 2007 can also write out 0.

<34> Section 2.5.23: The following table shows the maximum data functionality levels that different Microsoft Office Excel versions support:

Value	Maximum data functionality level for
0	Microsoft Office Excel 97 and Microsoft Office Excel 2000
1	Microsoft Office Excel 2002 and Microsoft Office Excel 2003
3	Microsoft Office Excel 2007

<35> Section 2.5.24: Office Excel 2007 treats this value as the non-existent date February, 29 1900.

<36> Section 2.5.40: Excel can sometimes write out values 0x13 through 0x24.

<37> Section 2.5.47: Office Excel 2007 writes 0x0000 for this field.

<38> Section 2.5.47: Office Excel 2007 writes 0x0000 for this field.

<39> Section 2.5.73: Office Excel 2007 uses fixed values for some of the MdtFlags flags regardless of the values specified in the structure. The specified values are preserved when the file is saved. The following table specifies the affected flags and their respective fixed values:

MdtFlags Properties	Value
fGhostRw	0
fGhostCol	0
fDelete	0
fPasteAll	1
fPasteFmlas	1
fPasteValues	1
fPasteFmts	0
fPasteComments	0
fPasteDv	0
fPasteBorders	1
fPasteColWidths	0
fPasteNumFmts	0
fMerge	1
fSplitFirst	1
fSplitAll	0
fRwColShift	1
fClearAll	0
fClearContents	0
fClearComments	1
fCanCoerce	1
fAdjust	0

<40> Section 2.5.73: In Office Excel 2007, examples of such functions are: IF, CHOOSE, VLOOKUP and HLOOKUP.

<41> Section 2.5.73: Office Excel 2007 writes the **reserved2** value as 1 for MDX metadata metadata type.

<42> Section 2.5.76.14: Office Excel 2007 and earlier can sometimes write out an **rgce** which contain PtgArray.

<43> Section 2.5.107: There is a known issue in Office Excel 2007 in which the BrtRRHeader.**sdtr.wdy** value can be 0 after converting an XLSX document to XLSB.

<44> Section 2.5.113: the 2007 Office system does not load a file in which this field contains a value that it does not recognize, or is not recognized by the underlying operating system. the 2007 Office system recognizes the following language tags:

Language	Locale	Language Tag
Africaans	South Africa	af-ZA
Albanian	Albanian	sq-AL
Alsatian	France	gsw-FR
Amharic	Ethiopia	am-ET
Arabic	Algeria	ar-DZ
Arabic	Bahrain	ar-BH
Arabic	Egypt	ar-EG
Arabic	Iraq	ar-IQ
Arabic	Jordan	ar-JO
Arabic	Kuwait	ar-KW
Arabic	Lebanon	ar-LB
Arabic	Libya	ar-LY
Arabic	Morocco	ar-MA
Arabic	Oman	ar-OM
Arabic	Qatar	ar-QA
Arabic	Saudi Arabia	ar-SA
Arabic	Syria	ar-SY
Arabic	Tunisia	ar-TN
Arabic	U.A.E.	ar-AE
Arabic	Yemen	ar-YE
Armenian	Armenia	hy-AM
Assamese	India	as-IN

Azeri (Cyrillic)	Azerbaijan	az-AZ-Cyrl
Azeri (Latin)	Azerbaijan	az-AZ-Latn
Bashkir	Russia	ba-RU
Basque	Basque	eu-ES
Belarusian	Belarus	be-BY
Bengali	Bangladesh	bn-BD
Bengali (Bengali Script)	India	bn-IN
Bosnian (Cyrillic)	Bosnia and Herzegovina	bs-BA-Cyrl
Bosnian (Latin)	Bosnia and Herzegovina	bs-BA-Latn
Breton	France	br-FR
Bulgarian	Bulgaria	bg-BG
Catalan	Catalan	ca-ES
Chinese	Hong Kong	zh-HK
Chinese	Macao	zh-MO
Chinese	PRC	zh-CN
Chinese	Singapore	zh-SG
Chinese	Taiwan	zh-TW
Corsican	France	co-FR
Croatian	Croatia	hr-HR
Croatian (Latin)	Bosnia and Herzegovina	hr-BA-Latn
Czech	Czech Republic	cs-CZ
Danish	Denmark	da-DK
Dari	Afghanistan	prs-AF
Divehi	Maldives	div-MV
Dutch	Belgium	nl-BE
Dutch	Netherlands	nl-NL
English	Australia	en-AU
English	Belize	en-BZ
English	Canada	en-CA

English	Caribbean	en-CB
English	India	en-IN
English	Ireland	en-IE
English	Jamaica	en-JM
English	Malaysia	en-MY
English	New Zealand	en-NZ
English	Philippines	en-PH
English	South Africa	en-ZA
English	Trinidad	en-TT
English	United Kingdom	en-GB
English	United States	en-US
English	Zimbabwe	en-ZW
Estonian	Estonia	et-EE
Faroese	Faroe Islands	fo-FO
Filipino	Philippines	fil-PH
Finnish	Finland	fi-FI
French	Belgium	fr-BE
French	Canada	fr-CA
French	France	fr-FR
French	Luxembourg	fr-LU
French	Monaco	fr-MC
French	Switzerland	fr-CH
Frisian	Netherlands	fy-NL
Galician	Galician	gl-ES
Georgian	Georgia	ka-GE
German	Austria	de-AT
German	Germany	de-DE
German	Liechtenstein	de-LI
German	Luxembourg	de-LU

German	Switzerland	de-CH
Greek	Greece	el-GR
Greenlandic	Greenland	kl-GL
Gujarati (Gujarati Script)	India	gu-IN
Hausa (Latin)	Nigeria	ha-NG-Latn
Hebrew	Israel	he-IL
Hindi	India	hi-IN
Hungarian	Hungary	hu-HU
Icelandic	Iceland	is-IS
Igbo	Nigeria	ig-NG
Inari Sami	Finland	smn-FI
Indonesian	Indonesia	id-ID
Inuktitut (Latin)	Canada	iu-CA-Latn
Inuktitut (Syllabics)	Canada	iu-CA-Cans
Irish	Ireland	ga-IE
isiXhosa / Xhosa	South Africa	xh-ZA
isiZulu / Zulu	South Africa	zu-ZA
Italian	Italy	it-IT
Italian	Switzerland	it-CH
Japanese	Japan	ja-JP
Kannada (Kannada Script)	India	kn-IN
Kazakh	Kazakhstan	kk-KZ
Khmer	Cambodia	kh-KH
K'iche	Guatemala	qut-GT
Kinyarwanda	Rwanda	rw-RW
Konkani	India	kok-IN
Korean	Korea	ko-KR
Kyrgyz	Kyrgyzstan	ky-KG
Lao	Lao PDR	lo-LA

Latvian	Latvia	lv-LV
Lithuanian	Lithuania	lt-LT
Lower Sorbian	Germany	wee-DE
Lule Sami	Norway	smj-NO
Lule Sami	Sweden	smj-SE
Luxembourgish	Luxembourg	lb-LU
Macedonian (FYROM)	Macedonia, Former Yugoslav Republic of	mk-MK
Malay	Brunei	ms-BN
Malay	Malaysia	ms-MY
Malayalam (Malayalam Script)	India	ml-IN
Maltese	Malta	mt-MT
Maori	New Zealand	mi-NZ
Mapudungun	Chile	arn-CL
Marathi	India	mr-IN
Mohawk	Mohawk	moh-CA
Mongolian (Cyrillic)	Mongolia	mn-MN
Mongolian (Mongolian)	PRC	mn-CN-Mong
Nepali	Nepal	ne-NP
Northern Sami	Finland	se-FI
Northern Sami	Norway	se-NO
Northern Sami	Sweden	se-SE
Norwegian (Bokmål)	Norway	nb-NO
Norwegian (Nynorsk)	Norway	nn-NO
Occitan	France	oc-FR
Oriya (Oriya Script)	India	or-IN
Pashto	Afghanistan	ps-AF
Persian	Iran	fa-IR
Polish	Poland	pl-PL
Portuguese	Brazil	pt-BR

Portuguese	Portugal	pt-PT
Punjabi (Gurmukhi Script)	India	pa-IN
Quechua	Bolivia	quz-BO
Quechua	Ecuador	quz-EC
Quechua	Peru	quz-PE
Romanian	Romania	ro-RO
Romansh	Switzerland	rm-CH
Russian	Russia	ru-RU
Sanskrit	India	sa-IN
Serbian (Cyrillic)	Bosnia and Herzegovina	sr-BA-Cyrl
Serbian (Cyrillic)	Serbia	sr-SP-Cyrl
Serbian (Latin)	Bosnia and Herzegovina	sr-BA-Latn
Serbian (Latin)	Serbia	sr-SP-Latn
Sesotho sa Leboa / Northern Sotho	South Africa	ns-ZA
Setswana / Tswana	South Africa	tn-ZA
Sinhala	Sri Lanka	si-LK
Skolt Sami	Finland	sms-FI
Slovak	Slovakia	sk-SK
Slovenian	Slovenia	sl-SI
Southern Sami	Norway	sma-NO
Southern Sami	Sweden	sma-SE
Spanish	Argentina	es-AR
Spanish	Bolivia	es-BO
Spanish	Chile	es-CL
Spanish	Columbia	es-CO
Spanish	Costa Rica	es-CR
Spanish	Dominican Republic	es-DO
Spanish	Ecuador	es-EC
Spanish	El Salvador	es-SV

Spanish	Guatemala	es-GT
Spanish	Honduras	es-HN
Spanish	Mexico	es-MX
Spanish	Nicaragua	es-NI
Spanish	Panama	es-PA
Spanish	Paraguay	es-PY
Spanish	Peru	es-PE
Spanish	Puerto Rico	es-PR
Spanish	Spain	es-ES
Spanish	United States	es-US
Spanish	Uruguay	es-UY
Spanish	Venezuela	es-VE
Swahili	Kenya	sw-KE
Swedish	Finland	sv-FI
Swedish	Sweden	sv-SE
Syriac	Syria	syr-SY
Tajik (Cyrillic)	Tajikistan	tg-TJ-Cyrl
Tamazight (Latin)	Algeria	tmz-DZ-Latn
Tamil	India	ta-IN
Tatar	Russia	tt-RU
Telugu (Telugu Script)	India	te-IN
Thai	Thailand	th-TH
Bhutanese	Bhutan	bo-BT
Tibetan	PRC	bo-CN
Turkish	Turkey	tr-TR
Turkmen	Turkmenistan	tk-TM
Uighur	PRC	ug-CN
Ukrainian	Ukraine	uk-UA
Upper Sorbian	Germany	wen-DE

Urdu	Pakistan	ur-PK
Uzbek (Cyrillic)	Uzbekistan	uz-UZ-Cyrl
Uzbek (Latin)	Uzbekistan	uz-UZ-Latn
Vietnamese	Viet Nam	vi-VN
Welsh	United Kingdom	cy-GB
Wolof	Senegal	wo-SN
Sakha	Russia	sah-RU
Yi	PRC	ii-CN
Yoruba	Nigeria	yo-NG

<45> Section 2.5.140: Under certain circumstances, Excel will persist these values.

<46> Section 2.5.141: Office Excel 2007 can sometimes save a value of -1 on the **lastSheet** field for either a top-level or a sheet-level reference to an external book if an **Information Rights Management (IRM)** authorization failure occurred during a refresh of that book's data.

<47> Section 4: Office Excel 2007 warns the user when they enter passwords that contain characters other than alphanumeric characters or punctuation symbols.

6 Index