

[MS-WDVME]: Web Distributed Authoring and Versioning (WebDAV) Protocol: Microsoft Extensions

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1 Introduction

The Web Distributed Authoring and Versioning (**WebDAV**) Protocol, as specified in [\[RFC2518\]](#), extends the standard **Hypertext Transfer Protocol (HTTP)** mechanisms specified in [\[RFC2068\]](#) in order to provide file access and content management over the Internet. The WebDAV Protocol enables an Internet-based file system. However, some types of files—for example, files with programmatically derived content—are not easily managed by WebDAV. Also, some protocol interactions, such as the separation of properties and content, are less than optimal for file system usage.

This specification, Web Distributed Authoring and Versioning (WebDAV) Protocol: Microsoft Extensions, documents extensions to the WebDAV Protocol specified in [\[RFC2518\]](#). Extensions include a new verb and new headers, and properties that enable previously unmanageable file types and optimize protocol interactions for file system clients. These extensions introduce new functionality into WebDAV, optimize processing, and eliminate the need for special-case processing.

1.1 Glossary

The following terms are defined in [\[MS-GLOS\]](#):

GUIDString
Hypertext Transfer Protocol (HTTP)
Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)
Secure Sockets Layer (SSL)
Transport Layer Security (TLS)
Uniform Resource Identifier (URI)
Uniform Resource Locator (URL)

The following terms are specific to this document:

Dead Property: A **property** whose semantics and syntax are not enforced by the server. The server only records a **dead property's** value; the client is responsible for maintaining the consistency of its syntax and semantics. This term is used as specified in [\[RFC2518\]](#) sections 3 and 4.1.

DocumentID: A **GUIDString** for a **resource** that is unique to that **resource** without regard to its location or version.

Document Library: A collection **resource** with special properties implemented by a FrontPage Server Extensions Remote Protocol server, as specified in [\[MS-FPSE\]](#).

Entity: Any document on a server that is accessible using an **HTTP URL**.

Live Property: A **property** whose semantics and syntax are enforced by the server. For example, the live **getcontentlength** **property** has its value, the length of the **entity** returned by a GET request, automatically calculated by the server. This term is used as specified in [\[RFC2518\]](#) sections 3, 4.1, and 4.5.

Locking: A mechanism that is used for overwrite protection. **Locking** may be applied to individual **resources** or to entire collection hierarchies. This term is used as specified in [\[RFC2518\]](#) sections 3 and 4.

Property: A name/value pair that associates metadata with a **resource**. This term is used as specified in [\[RFC2518\]](#) sections 1 and 6.

Repl-uid: A **DocumentID** for a **resource**. If a **resource** is deleted and another **resource** is created in the same location, both **resources** would have the same **URL** but different values for the **repl-uid property**. The difference in the **repl-uid property** values on each **resource** would assist the client in determining that each **resource** is, in fact, different.

Resource: An **entity** that can be identified by a **URI**. This term is used as specified in [\[RFC2068\]](#) section 1.3.

ResourceTag: A **URI** token that represents a **resource's** state. It has a schema of "rt" and is composed from a **GUIDString** value and a version number.

WebDAV: The Web Distributed Authoring and Versioning Protocol, as specified in [\[RFC2518\]](#).

WebDAV Client: A computer that uses the **WebDAV** Protocol, as specified in [\[RFC2518\]](#), to retrieve data from the **WebDAV server**.

WebDAV Server: A computer that supports the **WebDAV** Protocol, as specified in [\[RFC2518\]](#). **WebDAV clients** can connect to, and retrieve data from, a **WebDAV server**.

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://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624>, as an additional source.

[MS-GLOS] Microsoft Corporation, "[Windows Protocols Master Glossary](#)", March 2007.

[MS-WDVSE] Microsoft Corporation, "[Web Distributed Authoring and Versioning \(WebDAV\) Protocol: Server Extensions](#)", September 2007.

[RFC2068] Fielding, R., Gettys, J., Mogul, J., Frystyk, H., and Berners-Lee, T., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2068, January 1997, <http://www.ietf.org/rfc/rfc2068.txt>

[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>

[RFC2246] Dierks, T. and Allen, C., "The TLS Protocol Version 1.0", RFC 2246, January 1999, <http://www.ietf.org/rfc/rfc2246.txt>

[RFC2518] Goland, Y., Whitehead, E., Faizi, A., Carter, S., and Jensen, D., "HTTP Extensions for Distributed Authoring—WebDAV", RFC 2518, February 1999, <http://www.ietf.org/rfc/rfc2518.txt>

[RFC2616] Fielding, R., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, <http://www.ietf.org/rfc/rfc2616.txt>

[RFC2818] Rescorla, E., "HTTP Over TLS", RFC 2818, May 2000, <http://www.ietf.org/rfc/rfc2818.txt>

[RFC3986] Berners-Lee, T., Fielding, R., and Masinter, L., "Uniform Resource Identifier (URI): Generic Syntax", RFC 3986, January 2005, <http://www.ietf.org/rfc/rfc3986.txt>

[RFC4122] Leach, P., Mealling, M., and Salz, R., "A Universally Unique Identifier (UUID) URN Namespace", RFC 4122, July 2005, <http://www.ietf.org/rfc/rfc4122.txt>

1.2.2 Informative References

[MC-FPSEWM] Microsoft Corporation, "[FrontPage Server Extensions: Website Management Specification](#)" October 2007

[MS-FPSE] Microsoft Corporation, "[FrontPage Server Extensions Remote Protocol Specification](#)", March 2007.

[MS-WDV] Microsoft Corporation, "[Web Distributed Authoring and Versioning \(WebDAV\) Protocol: Client Extensions](#)", August 2007.

1.3 Protocol Overview (Synopsis)

WebDAV is a set of methods, headers, and content types that extend HTTP 1.1, as specified in [\[RFC2616\]](#). The WebDAV Protocol allows data to be written to Internet servers and is an Internet standard for collaborative authoring, as specified in [\[RFC2518\]](#).

WebDAV expands the basic support in HTTP 1.1 for content authoring by introducing additional methods and headers that provide support for **resource properties** and other base functions, such as resource **locking**. These new capabilities make the WebDAV Protocol suitable for basic remotely mountable file systems.

The WebDAV Protocol: Microsoft Extensions specify the following extensions to the base WebDAV Protocol specified in [\[MS-WDVSE\]](#):

- A mechanism, based on WebDAV and HTTP, to indicate support for the extensions covered in this document. The extensions to the OPTIONS verb is specified in section [3.1.5.1](#).
- A header to indicate whether the server supports various capabilities for document management through other protocols. The [Document Management Server header](#) is specified in section [2.2.1](#).
- An extension method, [GETLIB](#), that provides a way to determine the relative location of resource collections with specific properties implemented through other protocols. The GETLIB method is specified in section [2.2.5](#).
- A header that extends the PROPFIND client request method to obtain the same information as the GETLIB extension method, and which is also used in a server response to either method to return the requested information. The [MS-Doclib header](#) is specified in section [2.2.2](#).
- A header and property that return a value uniquely identifying a resource at a particular version, used to extend the handling of the If header. The ResourceTag: header and Repl:resourcetag property are specified in sections [2.2.4](#) and [2.2.9.2](#).
- A header and property that return a uniquely identifying value associated with a resource. The Repl-uid: header and Repl:repl-uid property are specified in sections [2.2.3](#) and [2.2.9.3](#).
- A series of extension properties for Distributed Authoring and Versioning (DAV), specified in section [2.2.8](#), and properties used for Windows client property storage and interaction with Microsoft Office clients, specified in section [2.2.9](#).

The WebDAV Protocol: Microsoft Extensions adopt the following extensions to the base WebDAV Protocol specified in [\[MS-WDVSE\]](#):

A header ([Translate](#)) indicating if an **entity** is to be returned as-is, or if any associated programmatic processing should be performed and the result returned. The Translate header is specified in [MS-WDVSE] section 2.2.1.

A header ([MS-Author-Via](#)) indicating which authoring tools should be used. The MS-Author-Via Header is specified in [MS-WDVSE] section 2.2.2.

1.4 Relationship to Other Protocols

The WebDAV Protocol: Microsoft Extensions is dependent on the WebDAV Protocol as specified in [\[RFC2518\]](#). WebDAV, in turn, relies on HTTP 1.1, as specified in [\[RFC2616\]](#). These extensions also rely on the **HTTPS**, as specified in [\[RFC2818\]](#), for data protection services. The WebDAV Protocol: Microsoft Extensions also implement some of the WebDAV Protocol server extensions, as specified in [\[MS-WDVSE\]](#).

1.5 Prerequisites/Preconditions

WebDAV Protocol: Microsoft Extensions require **WebDAV clients** that make use of these extensions to query for them through the OPTIONS command. Clients should fall back to basic WebDAV client behavior, as specified in [\[RFC2518\]](#), if the server does not advertise availability of the extensions in its OPTIONS command response.

1.6 Applicability Statement

The WebDAV Protocol: Microsoft Extensions apply in scenarios requiring efficient file operations. This document specifies only those extensions needed to enable efficient file system clients. These extensions do not add any functionality. Instead, they help reduce network traffic and increase performance of clients using the WebDAV Protocol, as specified in [\[RFC2518\]](#).<1><2>

1.7 Versioning and Capability Negotiation

Supported Transports: WebDAV Protocol: Microsoft Extensions use HTTP as their only transport.

Versioning: This document introduces no new versioning mechanisms except those that already exist in WebDAV and HTTP as specified in [\[RFC2518\]](#) and [\[RFC2068\]](#).

Capability Negotiation: Negotiation of WebDAV and HTTP capabilities is specified in [\[RFC2518\]](#) sections 9.1 and 15, and in [\[RFC2068\]](#) section 9.2, via the OPTIONS method. This document specifies extensions to the OPTIONS method, using HTTP response headers to indicate which server capabilities are present, which method verbs are available, and which authoring tools should be used, as specified in section [3.2.5.1](#).

1.8 Vendor-Extensible Fields

The extensions defined in this protocol may be extended in constrained ways, as specified in section [2.2.3](#).

1.9 Standards Assignments

No standards body has approved or governs this document or its header names and values. This specification conforms to the form and behavior of other custom HTTP headers, as specified in [\[RFC2068\]](#) section 4.2.

2 Messages

This section describes transport requirements and syntax of WebDAV Protocol: Microsoft Extensions.

2.1 Transport

Messages are transported using HTTP, as specified in [\[RFC2518\]](#) and [\[RFC2068\]](#).

This protocol MAY be used with **SSL/TLS**, as specified in [\[RFC2246\]](#).<3>

Port 80 is the standard port assignment for HTTP, and port 443 is the standard port assignment for HTTP over SSL/TLS. Implementations MAY support other ports.<4>

2.2 Message Syntax

The extension headers in this protocol conform to the form and behavior of other custom HTTP headers, as specified in [\[RFC2068\]](#) section 4.2. They are consistent with the WebDAV verbs and headers, as specified in [\[RFC2518\]](#) sections 8 and 9. Definitions are specified using the Augmented Backus-Naur Form (ABNF) syntax specified in [\[RFC2616\]](#) section 2.1.

2.2.1 Document Management Server Header

The Document Management Server header is used to advertise certain extended capabilities of the **WebDAV server**. This new header is specified as follows:

```
Document-Management-Server-Header document-Manager-Server-Header =  
    "DocumentManagementServer" ":" DMS-Options  
DMS-Options = *(DMS-Option XE "DMS-Option" ";")  
DMS-Option XE "DMS-Option" = DMS-Properties-Schema |  
    DMS-Source-Control | DMS-Version-History | token  
DMS-Properties-Schema = "Properties Schema"  
DMS-Source-Control = "Source Control"  
DMS-Version-History = "Version History"
```

WebDAV servers implementing WebDAV Protocol: Microsoft Extensions use the options listed under DMS-Option to indicate to WebDAV clients support for various capabilities, which may be extended by WebDAV Protocol: Microsoft Extensions servers to advertise additional capabilities through the use of new tokens. These capabilities are not part of the WebDAV Protocol: Microsoft Extensions, but are only advertised using this protocol extension.

For information on the use of this header with the OPTIONS verb, see section [3.1.5.1](#).

2.2.2 MS-Doclib Header

The MS-Doclib header is used to request and respond with information about the **URL** of a **Document Library** collection. This new header is specified as follows:

```
MS-Doclib-Header = "MS-Doclib" ":" MS-Doclib-Result  
MS-Doclib-Result = [absolute-URL]
```

The absolute-URI ABNF production rule is defined in [\[RFC3986\]](#). The MS-Doclib-Header usage is specified in section [3.1.5.3](#).

2.2.3 Repl-uid Header

The Repl-uid header contains a **repl-uid**. This identifier is available in a read-only property that can be requested, and is returned in the body of the result for a PROPFIND method, but it is also returned in a Repl-uid header in the response to a successful PUT operation. This new header is specified as follows:

```
Repl-Uid-Header = "Repl-uid" ":" Repl-Uid
Repl-Uid = DocumentID
DocumentID = UUID
```

The **DocumentID** is a **GUIDString** which is unique for a given resource, without regard to the resource's location or version. A GUIDString is defined as the UUID ABNF production rule as found in [\[RFC4122\]](#) section 3. The Repl-uid header usage is specified in section [3.2.5.1](#).

2.2.4 ResourceTag Header

The ResourceTag header contains a **ResourceTag**. This identifier is available in a read-only property that can be requested, and is returned in the body of the result for a PROPFIND method, but it is also returned in a ResourceTag header in the response to a successful PUT operation.

```
ResourceTag-Header = "ResourceTag" ":" ResourceTag
ResourceTag = "rt:" DocumentID "@" 11DIGIT
```

The ResourceTag is an absolute-URI, as defined in [\[RFC3986\]](#), using the unregistered "rt" scheme. The value consists of a DocumentID followed by the at sign (@) followed by 11 decimal digits containing a version number for the resource. The ResourceTag header usage is specified in sections [3.1.5.5](#) and [3.2.5.5](#).

2.2.5 GETLIB Method

A server implementing the WebDAV Protocol: Microsoft Extensions MUST include the extension-method GETLIB in the list of methods returned in an Allow header, as specified in [\[RFC2616\]](#) section 5.1.1.

```
Method |= "GETLIB"
```

The [GETLIB method](#) is specified in section [3.1.5.2](#).

2.2.6 Translate Header

A WebDAV server implementing WebDAV Protocol: Microsoft Extensions MUST implement the Translate header as specified in [\[MS-WDVSE\]](#) section 2.2.1.

2.2.7 MS-Author-Via Header

A WebDAV server implementing WebDAV Protocol: Microsoft Extensions MUST implement the MS-Author-Via header as specified in [\[MS-WDVSE\]](#) section 2.2.2.

2.2.8 Extended DAV Properties

A WebDAV server implementing WebDAV Protocol: Microsoft Extensions MUST implement certain extended properties as elements in the DAV namespace. [<5>](#)

2.2.8.1 DAV:iscollection Property

The DAV:iscollection property is a way of indicating that the requested resource is a collection. The value of this property is either "1" or "0" depending on whether the resource is a collection. This property appears within the DAV:prop element collection. [<6>](#)

2.2.8.2 DAV:isFolder Property

The DAV:isFolder property is a way of indicating that the requested resource is a folder. This property's value is either "t" or "f" depending on whether the resource is a folder. This property appears within the DAV:prop element collection. [<7>](#)

2.2.8.3 DAV:ishidden Property

The DAV:ishidden property reflects the state of the resource, indicating whether it would appear hidden if viewed as a file system item by a client. This property's value is either "1" or "0" depending on whether the resource is considered hidden. This property appears within the DAV:prop element collection. [<8>](#)

2.2.9 Microsoft Extension Properties

A WebDAV server implementing WebDAV Protocol: Microsoft Extensions SHOULD implement the following extended properties. The XML elements use the following schema namespace aliases for their definitions:

```
xmlns:Office="urn:schemas-microsoft-com:office:office"  
xmlns:Repl="http://schemas.microsoft.com/repl/"  
xmlns:Z="urn:schemas-microsoft-com:"
```

When these elements appear in a response to a WebDAV client request, their schema aliases must be included. [<9>](#)

2.2.9.1 Repl:authoritative-directory Property

The Repl:authoritative-directory property, which indicates whether the directory listing is complete. This property's value is set to "t" for collection type resources when every resource in the collection is listed. If the property is set to "f", the directory listing could be incomplete and not contain every resource in the collection. This property appears within the DAV:prop element collection. [<10>](#)

2.2.9.2 Repl:resourcetag Property

The Repl:resourcetag property is a read-only property that contains a string with the document's ResourceTag. This property appears within the DAV:prop element collection.

2.2.9.3 Repl:repl-uid Property

The Repl:repl-uid property is a read-only property that contains a string with the document's Repl-uid. This property appears within the DAV:prop element collection.

2.2.9.4 Office:modifiedby Property

The Office:modifiedby property is a read-only property that contains a string with the user name of the last person to modify the document, as determined by the authentication mechanism used for the modification. This property appears within the DAV:prop element collection.

2.2.9.5 Office:specialFolderType Property

The Office:specialFolderType property is a **dead property** that may be set by a WebDAV client. The value of this property is restricted to a value that may be stored in a 32-bit integer. This property appears within the DAV:prop element collection.

2.2.9.6 Z:Win32CreationTime Property

The Z:Win32CreationTime property is a dead property that may be set by a WebDAV client. The value of this property can be any string. This property appears within the DAV:prop element collection.

2.2.9.7 Z:Win32FileAttributes Property

The Z:Win32FileAttributes property is a **live property** that the server stores as a string on behalf of the client. This property appears within the DAV:prop element collection.

2.2.9.8 Z:Win32LastAccessTime Property

The Z:Win32LastAccessTime property is a dead property that the server stores as a string on behalf of the client. This property appears within the DAV:prop element collection.

2.2.9.9 Z:Win32LastModifiedTime

The Z:Win32LastModifiedTime property is a dead property that the server stores as a string on behalf of the client. This property appears within the DAV:prop element collection.

3 Protocol Details

As specified in [\[RFC2518\]](#), WebDAV operates between an initiator (a WebDAV client) and a responder (a WebDAV server). This section specifies client and server behaviors with respect to the WebDAV Protocol: Microsoft Extensions.

3.1 WebDAV Microsoft Extensions Client Details

3.1.1 Abstract Data Model

No additional data is required beyond that in the base protocol. A WebDAV client MAY maintain state information about server support for WebDAV Protocol: Microsoft Extensions and about the contents of the [MS-Author-Via header](#) and the [Document Management Server header](#) for the duration of a connection session.

3.1.2 Timers

No new timers are required except those in the base protocol.

3.1.3 Initialization

No additional initialization is required beyond that in the base protocol.

3.1.4 Higher-Layer Triggered Events

No new events are triggered except those in the base protocol.

3.1.5 Message Processing Events and Sequencing Rules

A WebDAV Protocol: Microsoft Extensions client SHOULD send an OPTIONS request to the server and query the headers in the server response for the presence of an Allow header containing a [GETLIB](#) method, which signals the presence of a WebDAV Protocol: Microsoft Extensions-compliant server. The client SHOULD use this information when it sends requests to this server. The client MUST NOT add the WebDAV extensions specified in WebDAV Protocol: Microsoft Extensions to the commands when it communicates with a server that responds to the OPTIONS command without the GETLIB method in the Allow header.

If the client does not support the extensions, the client MAY ignore the [GETLIB](#) value in the Allow header or any other headers sent as part of the protocol and SHOULD NOT use the WebDAV extensions specified in WebDAV Protocol: Microsoft Extensions. If the server adds the optional headers, the headers SHOULD be ignored by the client as unrecognized. [<11>](#)

3.1.5.1 Extensions to OPTIONS

A WebDAV Protocol: Microsoft Extensions-compliant server advertises its capabilities via headers returned in response to a client's OPTIONS request. A client MUST use an OPTIONS request to determine server support for the WebDAV Protocol: Microsoft Extensions. [<12>](#)

3.1.5.2 GETLIB Method

The GETLIB method is part of the WebDAV Protocol: Microsoft Extensions provided to support interaction with a Document Library. The Document Library MAY be implemented in servers that support the FrontPage Server Extensions: Website Management Protocol, as documented in [\[MC-](#)

[FPSEWM](#). A WebDAV server that implements only the WebDAV Protocol: Microsoft Extensions does not support Document Library interaction.

The GETLIB method is used to identify the absolute URL of a Document Library collection containing the resource URL given in the request, if any. A WebDAV Protocol: Microsoft Extensions client that also implements the FrontPage Server Extensions Website Management Protocol and includes support for interaction with a Document Library MAY use the GETLIB method to request the absolute URL of the first collection at or above the requested resource in the hierarchy that is a Document Library.

3.1.5.3 PROPFIND Extensions

3.1.5.3.1 PROPFIND as an Alternative to GETLIB

In addition to the [GETLIB verb](#) for finding the root of a Document Library collection, a WebDAV Protocol: Microsoft Extensions client that also implements the FrontPage Server Extensions: Website Management Protocol, as documented in [\[MC-FPSEWM\]](#), and includes support for interaction with a Document Library MAY use the PROPFIND method to request the absolute URL of the first collection at or above the requested resource in the hierarchy that is a Document Library. To use this extension, the client uses the PROPFIND method with the resource the client wants to find the containing Document Library for, and includes an [MS-Doclib header](#) with the request. The MS-Doclib header in the request SHOULD be empty, and there SHOULD be no request body.

3.1.5.4 Write Lock Limitations

A WebDAV Protocol: Microsoft Extensions-compliant server MAY be noncompliant with [\[RFC2518\]](#) section 7, which specifies the behavior of the Write Lock. A client of a server implementing this protocol SHOULD NOT expect nonexclusive locks or locks on null resources to be issued. [<13>](#)

3.1.5.5 If Header Modification

An WebDAV Protocol: Microsoft Extensions-compliant server MAY be noncompliant with [\[RFC2518\]](#) section 9.4, but MUST implement at least an alternative If header syntax that uses a ResourceTag as a State token. A WebDAV Protocol: Microsoft Extensions-compliant client communicating with a WebDAV Protocol: Microsoft Extensions-compliant server using a method such as PUT that makes use of an If header MUST limit the content of that If header in the following way:

Using the definitions specified in [\[RFC2518\]](#) section 9.4, the If header MUST contain a single no-tag-list consisting of a single list (that contains a single instance of the content), an optional "Not" followed by a State token, (that MUST be a Coded-URL containing an absolute-URI, which MUST be a ResourceTag). The modified ABNF definition specified in [\[RFC2518\]](#) for the If header is as follows:

```
If = "If" ":" No-tag-list
No-Tag-List = List
List = "(" ["Not"] State-token ")"
State-token = Coded-URL
Coded-URL = "<" ResourceTag ">"
```

The ResourceTag value may be obtained from the [ResourceTag header](#) returned in the result of a GET, HEAD, or POST request, or the Repl:resourcetag entity in the result body of a PROPFIND method for the specified resource.

3.1.5.6 Client Properties

A WebDAV client SHOULD NOT attempt to store arbitrary dead properties on a WebDAV server implementing WebDAV Protocol: Microsoft Extensions. A WebDAV Protocol: Microsoft Extensions-aware WebDAV client MAY set the following dead properties in the xmlns:Z="urn:schemas-microsoft-com:" XML namespace. [<14>](#14)

```
Z:Win32FileAttributes
Z:Win32CreationTime
Z:Win32LastAccessTime
Z:Win32LastModifiedTime
```

A WebDAV client MAY set the following dead property in the xmlns:Office="urn:schemas-microsoft-com:office:office" XML namespace. [<15>](#15)

```
Office:specialFolderType
```

3.1.6 Timer Events

No new timers are required except those in the base WebDAV Protocol.

3.1.7 Other Local Events

There are no new local events other than those specified in the base protocol.

3.2 WebDAV Microsoft Extensions Server Details

3.2.1 Abstract Data Model

No additional data is required beyond that in the base protocol.

3.2.2 Timers

No new timers are required except those in the base protocol.

3.2.3 Initialization

No additional initialization is required beyond that in the base protocol.

3.2.4 Higher-Layer Triggered Events

No new events are triggered except those in the base protocol.

3.2.5 Message Processing Events and Sequencing Rules

3.2.5.1 Extensions to OPTIONS

A WebDAV Protocol: Microsoft Extensions-compliant server advertises its capabilities via headers returned in response to a client's OPTIONS request. [<16>](#16)

The Allow entity header field, as specified in [\[RFC2616\]](#) section 14.7, of the OPTIONS response SHOULD include the methods supported by compliant WebDAV servers as well as the [GETLIB](#) extension method.

In addition to the headers normally returned by a WebDAV-compliant server to the OPTIONS request, as specified in [\[RFC2518\]](#), a server compliant with the WebDAV Protocol: Microsoft Extensions MUST respond with the [MS-Author-Via header](#). The server MAY send the [Document Management Server header](#) as specified below. [<17>](#)

A Public-Extension header with the schema <http://schemas.microsoft.com/repl-2> MUST be sent to provide the definitions for the XML tags Repl-uid and ResourceTag. [<18>](#)

The MS-Author-Via header is specified in [\[MS-WDVSE\]](#). A server implementing the WebDAV Protocol: Microsoft Extensions MUST include the DAV option in this header, and MAY include other options if the server supports additional protocols specified in [\[MS-WDVSE\]](#).

The Document Management Server header (section 2.2.1) SHOULD NOT be sent unless the server implements one or more of the capabilities listed (or other extended capabilities) in its implementation of the FrontPage Server Extensions: Website Management Protocol, as specified in [\[MC-FPSEWM\]](#). A server implementing the WebDAV Protocol: Microsoft Extensions MAY implement none, some, or all of the FrontPage Server Extensions Website Management Protocol. The capabilities listed are not part of the WebDAV Protocol: Microsoft Extensions. They are listed in this header to inform clients capable of using the FrontPage Server Extensions: Website Management Protocol, as documented in [\[MC-FPSEWM\]](#).

3.2.5.2 GETLIB Method

The GETLIB method is part of the WebDAV Protocol: Microsoft Extensions provided to support interaction with a Document Library. The Document Library MAY be implemented by servers that support the FrontPage Server Extensions: Website Management Protocol, as specified in [\[MC-FPSEWM\]](#). A WebDAV server that implements only the WebDAV Protocol: Microsoft Extensions does not support Document Library interaction.

The GETLIB method is used to identify the absolute URL of a Document Library collection containing the resource URL given in the request, if any. A WebDAV Protocol: Microsoft Extensions server MUST implement the [GETLIB verb](#) with the following semantics:

If the server does not implement Document Library collection capabilities, the server MUST respond with an HTTP 404 Not Found.

Otherwise, the server MUST do the following:

If the request is from a client that has not been authenticated, or a client that does not have appropriate permissions to open the requested resource, the server MUST respond with an HTTP 401 error.

If the requested resource is not part of a Document Library, the server MUST respond with an HTTP 404 Not Found.

If the requested resource is part of a Document Library, and the client has appropriate permissions to open the resource, the server MUST respond with an HTTP 200 OK, and include an [MS-Doclib header](#) with the absolute URL of the containing Document Library collection that is nearest in the resource hierarchy to the requested resource. The server SHOULD leave the response body empty.

3.2.5.3 PROPFIND Extensions

3.2.5.3.1 PROPFIND and Depth:0

When a WebDAV client requests a PROPFIND with depth 0 for a resource that does not exist, a WebDAV Protocol: Microsoft Extensions server SHOULD respond with a message body indicating that the resource exists and is a collection. [.<19>](#)

3.2.5.3.2 PROPFIND as an Alternative to GETLIB

In addition to the [GETLIB verb](#) for finding the root of a Document Library collection, if the client request includes an [MS-Doclib header](#), a WebDAV Protocol: Microsoft Extensions server SHOULD extend the PROPFIND verb to behave identically to the GETLIB verb, as specified in section [3.2.5.2](#).

The server MUST ignore the contents of the MS-Doclib header and MUST ignore the contents of the request body. The server response to this request MUST return only the headers and response body specified in section [3.1.5.2](#) for the GETLIB method.

3.2.5.3.3 PROPFIND Lock Properties

A WebDAV Protocol: Microsoft Extensions server SHOULD NOT include DAV:activelock property elements in the DAV:lockdiscovery property for any resource if the user agent header contains the string "Microsoft-WebDAV-MiniRedir" and the version is prior to 5.2.3718.0. [.<20>](#)

3.2.5.4 Write Lock Limitations

[\[RFC2518\]](#) section 7 specifies the behavior of the write lock. A server implementing the WebDAV Protocol: Microsoft Extensions MAY be compliant with the requirements of [\[RFC2518\]](#) section 7. [.<21>](#)

3.2.5.5 If Header Modification

A server compliant with the WebDAV Protocol: Microsoft Extensions MAY be compliant with the If header specification in [\[RFC2518\]](#) section 9.4. [.<22>](#)

Whether or not a WebDAV Protocol: Microsoft Extensions server is in compliance with If header semantics as specified in [\[RFC2518\]](#) section 9.4, a WebDAV Protocol: Microsoft Extensions server MUST allow for an If header of the form specified in section [3.1.5.5](#) and perform the checks specified in [\[RFC2518\]](#) required to honor the If header. [.<23>](#)

3.2.5.6 Server Properties

A WebDAV Protocol: Microsoft Extensions-compliant WebDAV server MAY allow a client to set arbitrary dead values, as specified in [\[RFC2518\]](#) section 8.1. [.<24>](#)

A WebDAV Protocol: Microsoft Extensions-compliant server MUST support client setting of the following properties in the xmlns:Z="urn:schemas-microsoft-com:" XML namespace.

```
Z:Win32FileAttributes
Z:Win32CreationTime
Z:Win32LastAccessTime
Z:Win32LastModifiedTime
```

A WebDAV Protocol: Microsoft Extensions-compliant WebDAV server **MUST** support the following read-only property in the xmlns:Office="urn:schemas-microsoft-com:office:office" XML namespace.

Office:modifiedby

A WebDAV Protocol: Microsoft Extensions-compliant WebDAV server **SHOULD** support the following dead property in the xmlns:Office="urn:schemas-microsoft-com:office:office" XML namespace.

Office:specialFolderType

A WebDAV Protocol: Microsoft Extensions-compliant WebDAV server **MUST** support the following read-only properties in the xmlns:Repl="http://schemas.microsoft.com/repl/" XML namespace.

Repl:authoritative-directory
Repl:repl-uid
Repl:resourcetag

A WebDAV Protocol: Microsoft Extensions-compliant WebDAV server **SHOULD** support the following read-only properties in the xmlns:D="DAV:" XML namespace.

D:iscollection
D:isFolder
D:ishidden

3.2.6 Timer Events

No new timers are required except those in the base WebDAV Protocol.

3.2.7 Other Local Events

There are no new local events other than those specified in the base WebDAV Protocol.

4 Protocol Examples

This section provides examples of the WebDAV Protocol: Microsoft Extensions. In these examples, several common general and implementation-specific headers in the client requests and server responses have been omitted for clarity.

4.1 OPTIONS Verb

The following is an example of a WebDAV client request and the response generated by a WebDAV server that implements WebDAV Protocol: Microsoft Extensions.

4.1.1 Client OPTIONS Request

In this example request, the client sends the OPTIONS verb to the root of the server at www.contoso.com. Other client-specific headers have been left out for readability.

```
OPTIONS / HTTP/1.1
Host: www.contoso.com
Accept: */*
Connection: Keep-Alive
```

4.1.2 FrontPage Server Extension-Compliant Server Response

Response from a server that fully supports the FrontPage Server Extensions: Website Management Protocol, as specified in [\[MC-FPSEWM\]](#), and the Document Management Server capabilities.

```
HTTP/1.1 200 OK
Date: Tue, 05 Jun 2007 02:00:02 GMT
MS-Author-Via: MS-FP/4.0,DAV
DocumentManagementServer: Properties Schema;Source Control;Version History;
DAV: 1,2
Allow: GET, POST, OPTIONS, HEAD, MKCOL, PUT, PROPFIND, PROPPATCH, DELETE, MOVE, COPY,
GETLIB, LOCK, UNLOCK
Content-Length: 0
Public-Extension: http://schemas.microsoft.com/repl-2
```

Because this server fully implements the FrontPage Server Extensions: Website Management Protocol, as specified in [\[MC-FPSEWM\]](#), it includes the [Document Management Server header](#) with all three options, and includes the "MS-FP/4.0" option in its [MS-Author-Via header](#), as specified in [\[MS-WDVSE\]](#).

4.1.3 Non-FrontPage Server Extension-Compliant Server Response

The following example shows a possible response from a server implementing WebDAV Protocol: Microsoft Extensions but not the FrontPage Server Extensions: Website Management Protocol, as specified in [\[MC-FPSEWM\]](#):

```
HTTP/1.1 200 OK
Date: Tue, 05 Jun 2007 02:00:02 GMT
MS-Author-Via: DAV
DAV: 1,2
Allow: GET, POST, OPTIONS, HEAD, MKCOL, PUT, PROPFIND, PROPPATCH, DELETE, MOVE, COPY,
GETLIB, LOCK, UNLOCK
```

```
Content-Length: 0
Public-Extension: http://schemas.microsoft.com/repl-2
```

This example response includes only the headers that a WebDAV-compliant server would send, along with the headers added for WebDAV Protocol: Microsoft Extensions. Other general and server-specific headers may be included in any order.

4.2 GETLIB Verb and PROPFIND Extension for Document Library Support

A server that implements both WebDAV Protocol: Microsoft Extensions and supports Document Library functionality uses the GETLIB verb or the GETLIB support through the PROPFIND verb to communicate the root of the Document Library to a client.

4.2.1 Client Request

The following is an example of a client request to find the root of the Document Library for the resource "/Shared Documents/testing/Files" with other client-specific headers left out, and assuming an anonymous connection.

```
GETLIB /Shared%20Documents/testing/Files HTTP/1.1
Host: www.contoso.com
Accept: */*
Connection: Keep-Alive
```

4.2.2 Server Response

The [MS-Doclib header](#) in the result contains the absolute **URI** of the Document Library containing the resource "/Shared Documents/testing/Files," which in this case is <http://www.contoso.com/Shared Documents>. The response from a server that implements WebDAV Protocol: Microsoft Extensions with support for a Document Library may safely include other general, server, and implementation-specific headers in any order.

```
HTTP/1.1 200 OK
Date: Tue, 05 Jun 2007 20:05:01 GMT
MS-Doclib: http://www.contoso.com/Shared Documents
Content-Length: 0
Public-Extension: http://schemas.microsoft.com/repl-2
```

4.2.3 Client Request Using PROPFIND

When the [PROPFIND verb](#) is used with an [MS-Doclib header](#), the request may look something like the following example.

```
PROPFIND /Shared%20Documents/testing/Files HTTP/1.1
Host: www.contoso.com
Accept: */*
Connection: Keep-Alive
MS-Doclib: some random value
```

Note that, as specified, a client SHOULD NOT send a value in the MS-Doclib header, and the server MUST ignore any value that is present. The order of the headers is not significant, and the request

may include other client-specific headers. The server response should be identical to the server's [GETLIB verb](#) response for the same resource.

4.3 If Header Usage

The following example shows the interaction between a WebDAV client and a WebDAV server implementing WebDAV Protocol: Microsoft Extensions as the client first makes a GET request for a file, and a subsequent PUT of a modified file with an If header to make sure that the file has not changed in the interim. Then the client attempts to PUT the file with an If header with an incorrect ResourceTag, and the server response is shown.

4.3.1 Client GET Request

First, the client makes a GET request, using the Translate: f header to get the document without server processing.

```
GET /Shared%20Documents/simple.txt HTTP/1.1
Host: www.contoso.com
Accept: */*
Translate: f
Connection: Keep-Alive
```

4.3.2 GET Request: Server Response

The WebDAV Protocol: Microsoft Extensions server responds with the following (with some headers omitted for clarity).

```
HTTP/1.1 200 OK
Date: Thu, 14 Jun 2007 21:27:17 GMT
Server: Microsoft-IIS/6.0
Last-Modified: Thu, 14 Jun 2007 21:14:42 GMT
ETag: "{93DAE904-C4AE-4B5F-A7F6-BDF4FAACEF5F},2"
ResourceTag: rt:93DAE904-C4AE-4B5F-A7F6-BDF4FAACEF5F@000000000002
Content-Type: text/plain
Cache-Control: private
Content-Length: 53
Public-Extension: http://schemas.microsoft.com/repl-2
```

This is a simple document that has some text in it.

The response includes the ResourceTag needed for an If header in a conditional action.

4.3.3 Client PUT Request with If Header

A PUT request with new content for the resource the client just performed a GET on, using an If header to make sure the document hasn't changed in the interim.

```
PUT /Shared%20Documents/simple.txt HTTP/1.1
If: (<rt:93DAE904-C4AE-4B5F-A7F6-BDF4FAACEF5F@000000000002>)
Host: www.contoso.com
Accept: */*
Content-Length: 67
Connection: Keep-Alive
```

This is a simple document that has some newly changed text in it.

4.3.4 Server Response to PUT

The client has the If header set to the correct value for the ResourceTag, so the server responds with the following. [<25>](#25)

```
HTTP/1.1 200 OK
Date: Thu, 14 Jun 2007 21:30:07 GMT
Server: Microsoft-IIS/6.0
Cache-Control: private
Content-Length: 0
Public-Extension: http://schemas.microsoft.com/repl-2
```

4.3.5 Client PUT Request with If Header with Incorrect ResourceTag

In the following example, the client performs a PUT request with new content for the document, using an If header with the old ResourceTag, which no longer matches the new value on the server.

```
PUT /Shared%20Documents/simple.txt HTTP/1.1
If: (<rt:93DAE904-C4AE-4B5F-A7F6-BDF4FAACEF5F@000000000002>)
Host: www.contoso.com
Accept: */*
Content-Length: 67
Connection: Keep-Alive
```

This is a simple document that has some other changed text in it.

4.3.6 Server PUT Response to Incorrect ResourceTag in If Header

The server responds to the PUT with an incorrect ResourceTag, as follows.

```
HTTP/1.1 412 PRECONDITION FAILED
Date: Thu, 14 Jun 2007 21:30:44 GMT
Server: Microsoft-IIS/6.0
Cache-Control: private
Content-Length: 0
Public-Extension: http://schemas.microsoft.com/repl-2
```

5 Security

The following sections specify security considerations for implementers of the WebDAV Protocol: Microsoft Extensions.

5.1 Security Considerations for Implementers

WebDAV servers that support the translate: f header SHOULD perform access checks before returning the source of the file in order to protect any source content (for example, database passwords).<26>

5.2 Index of Security Parameters

No new security parameters are required beyond those in the base protocol.

6 Appendix A: Windows Behavior

The information in this specification is applicable to the following versions of Windows:

- Windows Server 2008
- Windows Vista
- Windows Server 2003
- Windows XP
- Windows 2000

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 Windows behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that Windows does not follow the prescription.

[<1> Section 1.6:](#) The WebDAV client is available on Windows Server 2008, Windows Vista, Windows Server 2003, and Windows XP.

[<2> Section 1.6:](#) The WebDAV server is available as an Internet Server API (ISAPI) extension in Internet Information Services (IIS) and Windows SharePoint Services 3.0.

[<3> Section 2.1:](#) Client support for SSL/TLS is available only in Windows Server 2008 and Windows Vista. WebDAV servers that run on IIS, on Windows SharePoint Services 3.0, support SSL/TLS.

[<4> Section 2.1:](#) Windows Server 2003 and Windows XP WebDAV clients support only port 80. Support for other ports is available only in Windows Server 2008 and Windows Vista. The WebDAV client in Windows Vista and Windows Server 2008 uses port 80 by default for HTTP, and port 443 for HTTP over SSL/TLS. WebDAV servers that run on IIS, on Windows SharePoint Services 3.0, or on Windows NT 3.1 support any port.

[<5> Section 2.2.8:](#) XML Parser limitations in Windows SharePoint Services require that the XML namespace alias for "DAV:" sent by WebDAV clients always appear as xmlns:D="DAV:", so that element names in that namespace are always qualified with "D:" as in this example, `<D:lockdiscovery/>`. Windows SharePoint Services does not recognize any other form of the element names in the "DAV:" namespace, including fully qualified element names.

[<6> Section 2.2.8.1:](#) Windows SharePoint Services only returns this property for collections. It is always set to 1.

[<7> Section 2.2.8.2:](#) Windows SharePoint Services only returns this property for collections. It is always set to "t".

[<8> Section 2.2.8.3:](#) Windows SharePoint Services only returns this property for collections. It is always set to 0.

[<9> Section 2.2.9:](#) XML parser limitations in Windows SharePoint Services require that the XML namespace aliases that clients send always appear as listed in section [2.2.9](#). Windows SharePoint Services does not recognize any other form of these element names, including fully qualified element names.

[<10> Section 2.2.9.1:](#) Windows SharePoint Services only returns this property for collections. It is always set to "t".

<11> [Section 3.1.5:](#) The WebDAV client in all versions of Windows sends an OPTIONS command to verify server support for extensions. In Windows Server 2003 and Windows XP, the WebDAV client does not support the extensions and, therefore, the new headers are ignored on the OPTIONS response. In Windows Server 2008 and Windows Vista, the WebDAV client supports the extensions, and the new headers in the server OPTIONS response are not ignored.

<12> [Section 3.1.5.1:](#) While a WebDAV-compliant server could choose to implement WebDAV on some resources and not on others, and allow the client to distinguish this fact by sending an OPTIONS verb to any resource, limitations in the Windows client WebDAV implementation do not allow for a WebDAV server that supports WebDAV on only some resources. To support the Windows client, Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 do not implement this capability, and instead only allow a server-wide setting of the WebDAV capabilities and the WebDAV Protocol: Microsoft Extensions. Therefore, a single OPTIONS verb sent to a server tells a WebDAV client whether these extensions are available server-wide. Due to a defect in Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0, the OPTIONS request must be sent with an actual resource location in the Request-URI, and not to the asterisk (*) general location.

<13> [Section 3.1.5.4:](#) Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 are not compliant with [\[RFC2518\]](#) section 7.4, and do not implement write locks on null resources.

<14> [Section 3.1.5.6:](#) These dead properties are used by the Windows client WebDAV Redirector to store Windows-specific file attributes in these properties, but Windows SharePoint Services accepts any value for these properties. Windows SharePoint Services 3.0 provides a default value for the [Z:Win32FileAttributes property](#) for certain collections on the server that are hidden and not normally accessible, if no value has been set by the client. The Windows SharePoint Services 3.0 server provides a default value of "00000016" (which is interpreted by the Windows client WebDAV Redirector as a combination of HIDDEN and SYSTEM attributes) for a directory that begins with an underscore (_). The Windows SharePoint Services 3.0 server provides a default value of "00000012" (which is interpreted by the Windows client WebDAV Redirector as the HIDDEN attributes) for a directory that is contained within a Document Library and is named "Forms".

<15> [Section 3.1.5.6:](#) This dead property is supported by Windows SharePoint Services but is not used by the Windows client or by any version of Microsoft Office. When this property is set with a PROPPATCH command, Windows SharePoint Services parses the input as an unsigned decimal string and stores it internally in an unsigned 32-bit integer. Windows SharePoint Services returns this property in a PROPFIND request as an unsigned decimal string.

<16> [Section 3.2.5.1:](#) The WebDAV server in Windows SharePoint Services 3.0 technology checks to see if the user agent string sent with an OPTIONS request is "Microsoft Data Access Internet Publishing Provider". In this case, the server SHOULD send an additional Microsoft Office Web Server header of the following form with content of "5.0_Collab" in the OPTIONS response: MicrosoftOfficeWebServer: 5.0_Collab. A server SHOULD NOT send this header in response to a client sending any other user agent header string. Sending this additional header overcomes a defect in the Microsoft Data Access Internet Publishing Provider (MSDAIPP) component in versions of the Windows client prior to Windows Vista, which otherwise might not recognize the presence of WebDAV Protocol client extensions in the server and thus fall back to basic WebDAV behavior. Adding this header allows this component to optimize its behavior to take advantage of WebDAV Protocol client extensions.

<17> [Section 3.2.5.1:](#) If the WebDAV server in Windows SharePoint Services 3.0 technology detects that the user agent string sent with an OPTIONS request is "Microsoft Data Access Internet Publishing Provider," then the server SHOULD NOT send the Public-Extension header with the <http://schemas.microsoft.com/repl-2> schema option, in order to overcome a defect in the Windows client MSDAIPP component in Windows XP and Windows Server 2003.

<18> [Section 3.2.5.1:](#) Windows SharePoint Services 3.0 maintains a state flag indicating whether it should advertise its capabilities in response to an OPTIONS request. If the state flag is not set, Windows SharePoint Services returns the usual headers returned by a WebDAV-compliant server, as specified in [\[RFC2518\]](#), including the Allow header with the [GETLIB method](#), but it will not send the MS-WebDAV-Extension, [MS-Author-Via](#), Document Management Server, or Microsoft Office Web Server headers. WebDAV Protocol: Microsoft Extensions servers MAY implement a similar state flag capability to enable or disable the advertising of the extended WebDAV capabilities.

<19> [Section 3.2.5.3.1:](#) Windows WebDAV clients in Windows XP and Windows Server 2003 may attempt to walk a resource hierarchy for a particular resource, even when elements of that hierarchy may be nonexistent or otherwise not available for access, such as when a user has permissions to access resources at a certain level in the hierarchy, but not above that level. Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 report that any such inaccessible resource requested exists, and is a directory (that is, a resource collection) to enable Windows WebDAV clients to succeed. This behavior has a side effect of allowing the user to explicitly browse with the Windows WebDAV client to a nonexistent directory, even though all user actions, such as listing the directory contents or putting a file in that directory, will fail.

<20> [Section 3.2.5.3.3:](#) In versions of Windows prior to Windows Server 2003, the Windows client WebDAV Redirector was not aware of WebDAV locks and the related properties for lock discovery and reporting. If a DAV:activelock property is returned by a PROPFIND to these older versions of the Windows client, the client appends the value returned in the DAV:href element within the DAV:locktoken to the name of the resource. Since this results in an incorrect name that is unusable for further navigation, Windows SharePoint Services performs this check before sending a PROPFIND response to the affected Windows clients and modifies its output accordingly.

<21> [Section 3.2.5.4:](#) Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 are not compliant with [\[RFC2518\]](#) section 7.4 and do not implement write locks on null resources.

<22> [Section 3.2.5.5:](#) Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 are not compliant with [\[RFC2518\]](#) section 9.4 and do not implement the If header except as specified in this extension.

<23> [Section 3.2.5.5:](#) Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 do not check for the existence of multiple ResourceTag state tokens, or for other allowed list combinations that include ResourceTag state tokens.

<24> [Section 3.2.5.6:](#) Windows SharePoint Services 2.0 and Windows SharePoint Services 3.0 do not allow setting arbitrary dead properties other than ones listed as supported for WebDAV clients.

<25> [Section 4.3.4:](#) Windows SharePoint Services 3.0 returns a [ResourceTag header](#) in response to any PUT request containing the ResourceTag value passed in by the WebDAV client's request in an If header. In addition, Windows SharePoint Services 3.0 returns an additional [ResourceTag header](#), which contains the updated ResourceTag value. WebDAV clients SHOULD NOT rely on the ResourceTag values returned in the response to a PUT request to make any subsequent changes to the resource. The current ResourceTag value SHOULD be obtained using a GET, HEAD, or POST request, or from the properties returned from a PROPFIND request.

<26> [Section 5.1:](#) For a [Translate header](#) value of FALSE, the WebDAV server included in IIS for Windows 2000, Windows XP, Windows Server 2003, Windows Vista, and Windows Server 2008 requires WRITE access to return the source of the file.

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