

[MS-EUMSDP]: Exchange Unified Messaging Session Description Protocol Extension

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1 Introduction

This document specifies a proprietary extension to the Session Description Protocol (SDP) characteristics that are used to negotiate and establish audio calls between protocol servers and unified messaging servers to play or record voice messages and to manage the unified messaging mailbox using touch tone commands.

Unless explicitly specified, this extension follows [\[MS-SDPEXT\]](#), which describes a proprietary SDP extension that is used to establish audio sessions between unified communication clients and servers.

1.1 Glossary

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

Data Encryption Standard (DES)
network address translation (NAT)

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

codec
dual-tone multi-frequency (DTMF)
endpoint
Master Key Identifier (MKI)
public switched telephone network (PSTN)
Quality of Experience (QoE)
remote endpoint
SDP answer
Secure Real-Time Transport Protocol (SRTP)
Session Description Protocol (SDP)

The following terms are specific to this document:

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-SDPEXT] Microsoft Corporation, "[Session Description Protocol \(SDP\) Version 2.0 Extensions](#)"

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997, <http://www.rfc-editor.org/rfc/rfc2119.txt>

[RFC4566] Handley, M., Jacobson, V., and Perkins, C., "SDP: Session Description Protocol", RFC 4566, July 2006, <http://www.ietf.org/rfc/rfc4566.txt>

1.2.2 Informative References

[MS-DTMF] Microsoft Corporation, "[RTP Payload for DTMF Digits, Telephony Tones, and Telephony Signals Extensions](#)"

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

[MS-ICE] Microsoft Corporation, "[Interactive Connectivity Establishment \(ICE\) Extensions](#)"

[MS-ICE2] Microsoft Corporation, "[Interactive Connectivity Establishment \(ICE\) Extensions 2.0](#)"

[MS-OFCGLOS] Microsoft Corporation, "[Microsoft Office Master Glossary](#)".

[MS-QoE] Microsoft Corporation, "[Quality of Experience Monitoring Server Protocol Specification](#)"

[MS-RTP] Microsoft Corporation, "[Real-time Transport Protocol \(RTP\) Extensions](#)"

[MS-SIPRE] Microsoft Corporation, "[Session Initiation Protocol \(SIP\) Routing Extensions](#)"

[MS-SRTP] Microsoft Corporation, "[Secure Real-time Transport Protocol \(SRTP\) Extensions](#)"

[MS-TURN] Microsoft Corporation, "[Traversal Using Relay NAT \(TURN\) Extensions](#)"

1.3 Protocol Overview (Synopsis)

This protocol describes the **Session Description Protocol (SDP)** extensions that are used by a protocol server to establish and exchange audio with a unified messaging server. The types of calls between the protocol server and the unified messaging server are as follows:

- **Call-in:** An incoming **public switched telephone network (PSTN)** call to a unified communications user leaves a voice message with the unified messaging server.
- **Play-On-Phone:** Upon receiving a notification on the protocol client, deflects the call to the PSTN phone number to listen to the voice message.

This protocol follows [\[MS-SDPEXT\]](#), with the following exceptions:

- The **key-info** field that is used to specify the keying information when the **Secure Real-Time Transport Protocol (SRTP)** is used. The **Master Key Identifier (MKI)** can be used optionally.
- The media formats representing audio **codecs** are listed in preference order on the **m=audio** line. [<1>](#) When an SDP offer is being sent by the remote **endpoint (5)** with a list of audio codecs, the SDP answer contains in the **m=audio** line the audio codecs listed in the order of preference.
- The **a=mid attribute** line is not used and is ignored. This attribute is described in [\[MS-SDPEXT\]](#).
- The **a=encryption** attribute is not used because **Data Encryption Standard (DES)** encryption is not supported. This attribute is described in [\[MS-SDPEXT\]](#).

Only the audio media type is supported.

- The session version on the o line can be incremented in subsequent offer/answer negotiations.

1.4 Relationship to Other Protocols

This protocol depends on the following protocols:

- [\[MS-SDPEXT\]](#) for media negotiation.
- [\[MS-ICE\]](#) for media to transverse **network address translation (NAT)** and firewalls.
- [\[MS-ICE2\]](#) and [\[MS-TURN\]](#) for media to traverse NAT and firewalls.
- [\[MS-RTP\]](#) for media transmission.
- [\[MS-DTMF\]](#) for **dual-tone multi-frequency (DTMF)** digits or tones to be exchanged.
- [\[MS-SIPRE\]](#) Session 3.1.4 for ICE SDP interworking and Multipart MIME (Multipurpose Internet Mail Extensions) support.
- [\[MS-SRTP\]](#) for media encryption.
- [\[MS-QoE\]](#) for publishing audio **Quality of Experience (QoE)** metrics.

1.5 Prerequisites/Preconditions

The prerequisites for this protocol are the same as the prerequisites described in [\[MS-SDPEXT\]](#) section 1.5.

1.6 Applicability Statement

None.

1.7 Versioning and Capability Negotiation

None.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

This protocol does not introduce a new transport to support audio calls, and uses the transport specified in [\[MS-SDPEXT\]](#) section 2.1.

2.2 Message Syntax

The messages specified in [\[MS-SDPEXT\]](#) are SDP messages. An SDP message contains the description of a media session. The session and media characteristics are described by a set of <type>=<value> lines, as specified in [\[RFC4566\]](#). The extensions are defined as custom SDP attributes.

3 Protocol Details

3.1 Details

3.1.1 Abstract Data Model

The abstract data model for this protocol is the same as that specified in [\[MS-SDPEXT\]](#) section 3.1.1.

3.1.2 Timers

The timers for this protocol are the same as those specified in [\[MS-SDPEXT\]](#) section 3.1.2.

3.1.3 Initialization

The initialization for this protocol is the same as that specified in [\[MS-SDPEXT\]](#) section 3.1.3.

3.1.4 Higher-Layer Triggered Events

The higher-layer triggered events for this protocol are the same as those specified in [\[MS-SDPEXT\]](#) section 3.1.4.

3.1.5 Message Processing Events and Sequencing Rules

This protocol follows the message processing rules specified in [\[MS-SDPEXT\]](#) section 3.1.5, with the following exceptions:

- [\[MS-SDPEXT\]](#) section 3.1.5.1.1: Details of **key-info** field: MKI use is optional. If used, the MKI length **MUST** be 1 byte.
 - [\[MS-SDPEXT\]](#) section 3.1.5.4: The media formats representing audio codecs are listed in order of preference [<2>](#). The order of the media formats representing DTMF, CN, and redundancy is not significant. The remote endpoint **SHOULD** implement audio codecs preference.
 - [\[MS-SDPEXT\]](#) section 3.1.5.16: **a=encryption** **MUST NOT** be used as Data Encryption Standard (DES) encryption is not supported.
 - [\[MS-SDPEXT\]](#) section 3.1.5.19: Only **m=audio** is supported in the SDP. Other m line types, such as **m=applicationsharing**, are rejected.
 - Only **m=audio** is supported.
 - Any other m line type with audio m line in the SDP - Audio m line is accepted, but the other m line is rejected.
- Any other m line type without audio m line in the SDP – This is an invalid SDP offer.
- [\[MS-SDPEXT\]](#) section 3.1.5.20: The o line of an SDP message. The parameter <sess-version> **MUST** be a numeric value but the value **SHOULD** ignored on receive. The protocol server **SHOULD** increment the session version value (<sess-version>) in the o line in any subsequent SDP offers.

3.1.6 Timer Events

The timer events for this protocol are the same as those specified in [\[MS-SDPEXT\]](#) section 3.1.6.

3.1.7 Other Local Events

The local events for this protocol are the same as those specified in [\[MS-SDPEXT\]](#) section 3.1.7.

4 Protocol Examples

4.1 Only m=audio Type Is Supported

The following example is an offer sent by a **remote endpoint** to support applicationSharing.

```
v=0
o=- 0 0 IN IP4 10.197.16.201
s=session
c=IN IP4 10.197.16.201
b=CT:99980
t=0 0
m=applicationsharing 53632 TCP/RTP/AVP 127
a=ice-ufrag:Ub22
a=ice-pwd:6JfHnlwctWnGjHlFEOAPU7DN
a=candidate:1 1 TCP-PASS 2120613887 192.168.0.242 16435 typ host
a=candidate:1 2 TCP-PASS 2120613374 192.168.0.242 16435 typ host
a=candidate:2 1 TCP-ACT 2121006591 192.168.0.242 5958 typ host
a=candidate:2 2 TCP-ACT 2121006078 192.168.0.242 5958 typ host
a=candidate:3 1 TCP-PASS 2120612863 157.56.67.67 31142 typ host
a=candidate:3 2 TCP-PASS 2120612350 157.56.67.67 31142 typ host
a=candidate:4 1 TCP-ACT 2121005567 157.56.67.67 9641 typ host
a=candidate:4 2 TCP-ACT 2121005054 157.56.67.67 9641 typ host
a=candidate:5 1 TCP-PASS 6556159 10.197.16.201 53632 typ relay raddr 157.56.67.67 rport 33379
a=candidate:5 2 TCP-PASS 6556158 10.197.16.201 53632 typ relay raddr 157.56.67.67 rport 33379
a=candidate:6 1 TCP-ACT 7075583 10.197.16.201 53632 typ relay raddr 157.56.67.67 rport 33379
a=candidate:6 2 TCP-ACT 7075070 10.197.16.201 53632 typ relay raddr 157.56.67.67 rport 33379
a=cryptoscale:1 client AES_CM_128_HMAC_SHA1_80
inline:oRCrGic2O7p650tuSMYjGpKFz34dDhzMXeEfIWXz|2^31|1:1
a=crypto:2 AES_CM_128_HMAC_SHA1_80 inline:nPDCIPVASFXc0k1TL8S2jbN2DVzGezIRegGeqyAQ|2^31|1:1
a=crypto:3 AES_CM_128_HMAC_SHA1_80 inline:Qlmt76SQtdEksZu67dHGSm7X5O94i7gotmTbutrT|2^31
a=setup:active
a=connection:new
a=rtcp:53632
a=mid:1
a=rtpmap:127 x-data/90000
a=x-applicationsharing-session-id:1
a=x-applicationsharing-role:sharer
a=x-applicationsharing-media-type:rdp
a=x-capabilities:request-control="sendrecv"
```

The following example is the answer sent by the unified messaging server.

```
SIP/2.0 415 Unsupported Media Type
FROM: "TestUser11"<sip:testuser11@vdomain.com>;tag=c1f6d38b7f;epid=7119e89d8a
TO: "TestUser10"<sip:testuser10@vdomain.com>;epid=FA11861496;tag=3ae8438b8e
CSEQ: 1 INVITE
CALL-ID: 3bd9411e3f514e31af1e4d064ec323c3
VIA: SIP/2.0/TLS
10.197.16.201:5061;branch=z9hG4bKB6C2BBF1.D2D7E13F010E0466;branched=FALSE;ms-internal-
info="ck4Nx4b6DFb7VL6jLnLSVsCdPpkUQ_4dfSkXKlqgAA",SIP/2.0/TLS
192.168.0.240:5061;branch=z9hG4bK51EBBC99.E98F31BE3B1F8466;branched=FALSE;ms-ts="Fri, 29 Jan
2010 23:18:46 GMT 31";ms-received-port=5061;ms-received-cid=B0D202,SIP/2.0/TLS
192.168.0.242:58019;branch=z9hG4bK2F86C755.F5CC97F3010D0466;branched=FALSE;ms-received-
port=58019;ms-received-cid=36500,SIP/2.0/TLS 157.56.67.67:32532;ms-received-port=32532;ms-
received-cid=B0D400
```

```
AUTHORIZATION: NTLM realm="SIP Communications
Service",targetname="server.Vdomain.com",response="01000000000000009919053f780fd56b",crand="e
453a5e5",cnum="5",opaque="1FA0A9B1",qop="auth"
CONTENT-LENGTH: 0
P-PREFERRED-IDENTITY: "TestUser10"<sip:TestUser10@vdomain.com>
```

4.2 Codecs in preference order

In this example, the offer received by the unified messaging server is **G711** and **RTAudioWB**. The unified messaging server sends the codecs in the **SDP answer** that match the offer that was sent by the remote endpoint[<3>](#3).

The following example is the offer from the remote client.

```
v=0
o=- 0 0 IN IP4 157.56.66.142
s=session
c=IN IP4 157.56.66.142
b=CT:1000
t=0 0
m=audio 1066 RTP/AVP 101 8 114
c=IN IP4 157.56.66.142
a=rtcp:1067
a=crypto:2 AES_CM_128_HMAC_SHA1_80 inline:vFct99tDKYLNnz4apkTMfecZdguAjrFUeufKh1qA|2^31|1:1
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
a=label:main-audio
a=rtpmap:8 PCMA/8000
a=rtpmap:114 x-msrta/16000
a=fmtp:114 bitrate=29000
```

The following example is the answer from the unified messaging server matching the order from the remote endpoint.

```
v=0
o=- 1 0 IN IP4 157.56.66.142
s=session
c=IN IP4 157.56.66.142
b=CT:1000
t=0 0
m=audio 1068 RTP/SAVP8 114 101
c=IN IP4 157.56.66.142
a=rtcp:1069
a=crypto:2 AES_CM_128_HMAC_SHA1_80 inline:xkTJumg4jwqB49k4m6dX8diAGD5a63RWEZfhLaZW|2^31|1:1
a=sendrecv
a=label:main-audio
a=rtpmap:8 PCMA/8000
a=rtpmap:114 x-msrta/16000
a=fmtp:114 bitrate=29000

a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16,36
a=ptime:20
```

5 Security

5.1 Security Considerations for Implementers

This protocol has the security considerations described in [\[MS-SDPEXT\]](#) section 5.1.

5.2 Index of Security Parameters

This protocol has the index of security parameters described in [\[MS-SDPEXT\]](#) section 5.2.

6 Appendix A: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include released service packs:

- Microsoft® Office Communications Server 2007 R2
- Microsoft® Office Communicator 2007 R2
- Microsoft® Exchange Server 2007
- Microsoft® Exchange Server 2010
- Microsoft® Lync™ 2010
- Microsoft® Lync™ Server 2010

Exceptions, if any, are noted below. If a service pack or Quick Fix Engineering (QFE) number appears with the product version, behavior changed in that service pack or QFE. The new behavior also applies to subsequent service packs of the product unless otherwise specified. If a product edition appears with the product version, behavior is different in that product edition.

Unless otherwise specified, any statement of optional behavior in this specification that is prescribed using the terms SHOULD or SHOULD NOT implies product behavior in accordance with the SHOULD or SHOULD NOT prescription. Unless otherwise specified, the term MAY implies that the product does not follow the prescription.

[<1> Section 1.3:](#) Office Communications Server 2007, Office Communicator 2007, Office Communications Server 2007 R2, Office Communicator 2007 R2: This behavior is not supported.

[<2> Section 3.1.5:](#) Office Communications Server 2007 R2, Office Communicator 2007 R2: The order of preference in the m line is not applied. For more information, see [MS-SDPEXT].

[<3> Section 4.2:](#) Office Communications Server 2007 R2, Office Communicator 2007 R2: This behavior is not supported.

7 Change Tracking

No table of changes is available. The document is either new or has had no changes since its last release.

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