

## [MS-EUMSDP]:

# Exchange Unified Messaging Session Description Protocol Extension

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## Revision Summary

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# 1 Introduction

The Exchange Unified Messaging Session Description Protocol Extension is a proprietary extension to the Session Description Protocol (SDP) that extends the characteristics that are used to negotiate and establish audio calls between protocol clients (or servers) and unified messaging servers, typically to enable a client to play or record voice messages and to manage the unified messaging mailbox by using touch-tone commands.

Sections 1.5, 1.8, 1.9, 2, and 3 of this specification are normative. All other sections and examples in this specification are informative.

## 1.1 Glossary

This document uses the following terms:

**dual-tone multi-frequency (DTMF):** In telephony systems, a signaling system in which each digit is associated with two specific frequencies. This system typically is associated with touch-tone keypads for telephones.

**Interactive Connectivity Establishment (ICE):** A methodology that was established by the Internet Engineering Task Force (IETF) to facilitate the traversal of network address translation (NAT) by media.

**Media Source ID (MSI):** A 32-bit identifier that uniquely identifies an audio or video source in a conference.

**Multipurpose Internet Mail Extensions (MIME):** A set of extensions that redefines and expands support for various types of content in email messages, as described in [\[RFC2045\]](#), [\[RFC2046\]](#), and [\[RFC2047\]](#).

**network address translation (NAT):** The process of converting between IP addresses used within an intranet, or other private network, and Internet IP addresses.

**public switched telephone network (PSTN):** Public switched telephone network is the voice-oriented public switched telephone network. It is circuit-switched, as opposed to the packet-switched networks.

**Quality of Experience (QoE):** A subjective measure of a user's experiences with a media service.

**Real-Time Transport Control Protocol (RTCP):** A network transport protocol that enables monitoring of Real-Time Transport Protocol (RTP) data delivery and provides minimal control and identification functionality, as described in [\[RFC3550\]](#).

**remote endpoint:** See peer.

**SDP answer:** A **Session Description Protocol (SDP)** message that is sent by an answerer in response to an offer that is received from an offerer.

**SDP offer:** A **Session Description Protocol (SDP)** message that is sent by an offerer.

**Session Description Protocol (SDP):** A protocol that is used for session announcement, session invitation, and other forms of multimedia session initiation. For more information see [\[MS-SDP\]](#) and [\[RFC3264\]](#).

**Synchronization Source (SSRC):** A 32-bit identifier that uniquely identifies a media stream (2) in a Real-Time Transport Protocol (RTP) session. An SSRC value is part of an RTP packet header, as described in [\[RFC3550\]](#).

**Unified Communications:** A system that integrates platforms for communications including email, voice mail, telephony, instant messaging, and voice and video conferencing.

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

## 1.2 References

Links to a document in the Microsoft Open Specifications library point to the correct section in the most recently published version of the referenced document. However, because individual documents in the library are not updated at the same time, the section numbers in the documents may not match. You can confirm the correct section numbering by checking the [Errata](#).

### 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](mailto:dochelp@microsoft.com). We will assist you in finding the relevant information.

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

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

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

[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 Overview

This protocol describes the **Session Description Protocol (SDP)** extensions that are used by a protocol client (or server) to establish and exchange audio with a unified messaging server. The types of calls between the protocol client 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 from a protocol client, the unified messaging server deflects the call to the PSTN phone number to play a voice message.

The information in this document applies to all types of calls between a protocol client and the unified messaging server.

This protocol supplements [\[MS-SDPEXT\]](#), which describes a proprietary SDP extension that is used to establish audio sessions between unified communication clients and servers, with the following exceptions:

- Only the audio media type is supported.
- The session version on the **o** line can be incremented in subsequent offer/answer negotiations.
- If an **SDP answer** is given in an 18x-level provisional response, the SDP answer in the final response (for the same fork) is required not to contain any differences.
- Optimizing the media pathway using the **a=x-bypassid** and **a=x-bypass** attributes is not supported.
- Extensions for **RTCP**-based feedback messages, **Synchronization Source (SSRC)** range allocation, **Media Source ID (MSI)** assignment and media source labeling are not supported.

#### 1.4 Relationship to Other Protocols

This protocol depends on the following protocols:

- [\[MS-SDPEXT\]](#) for media negotiation.
- [\[MS-ICE\]](#) for media to traverse **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.
- [\[MS-SIPRE\]](#) section 3.2.4 for **Interactive Connectivity Establishment (ICE)** Session Description Protocol (SDP) interworking and Multipart **Multipurpose Internet Mail Extensions (MIME)** 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 Session Description Protocol (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 Server 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 3.1.5.18: Only the **m=audio** line is supported in the Session Description Protocol (SDP). All other **m** line types, such as **m=video** and **m=applicationsharing**, are rejected.
- [\[MS-SDPEXT\]](#) section 3.1.5.19: Regarding the **o** line of an SDP message:
  - the parameter **<sess-version>** MUST be a numeric value, but the value SHOULD be ignored on receive.
  - the protocol server SHOULD increment the session version value (**<sess-version>**) in the **o** line in any subsequent **SDP offers**.
- [\[MS-SDPEXT\]](#) section 3.1.5.12.3: If an SDP answer is received in a provisional 18x-level response, any SDP answer given in a final response (for the same fork) is assumed to be identical. Any differences with the SDP answer in the final response will be ignored.
- [\[MS-SDPEXT\]](#) section 3.1.5.25: The **a=x-bypassid**, **a=x-bypass** and **a=x-mediasettings** attributes are ignored.
- [\[MS-SDPEXT\]](#) section 3.1.5.30: The **a=rtcp-rsize** and **a=rtcp-fb** attributes are ignored.
- [\[MS-SDPEXT\]](#) section 3.1.5.31: The **a=x-ssrc-range** attribute is ignored.
- [\[MS-SDPEXT\]](#) section 3.1.5.32: The **a=x-source-streamid** attribute is ignored.
- [\[MS-SDPEXT\]](#) section 3.1.5.33: The **a=x-source** attribute is ignored.

### **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

The following example is an SDP offer sent by a **remote endpoint** to a unified messaging server.

```
v=0
o=- 0 0 IN IP4 10.56.65.184
s=session
c=IN IP4 10.56.65.184
b=CT:53980
t=0 0
m=audio 50024 RTP/AVP 114 9 112 111 0 8 116 115 97 13 118 101
a=ice-ufrag:vxUD
a=ice-pwd:4QoBoSfCA7vYy9AwNBhsISk9
a=candidate:1 1 UDP 2130706431 10.56.65.184 50024 typ host
a=candidate:1 2 UDP 2130705918 10.56.65.184 50025 typ host
a=candidate:2 1 TCP-PASS 6556159 10.9.66.105 51450 typ relay raddr 10.56.65.184
rport 50026
a=candidate:2 2 TCP-PASS 6556158 10.9.66.105 51450 typ relay raddr 10.56.65.184
rport 50026
a=candidate:3 1 UDP 16648703 10.9.66.105 59291 typ relay raddr 10.56.65.184 rport
50020
a=candidate:3 2 UDP 16648702 10.9.66.105 3937 typ relay raddr 10.56.65.184 rport
50021
a=candidate:4 1 TCP-ACT 7076351 10.9.66.105 51450 typ relay raddr 10.56.65.184 rport
50026
a=candidate:4 2 TCP-ACT 7075838 10.9.66.105 51450 typ relay raddr 10.56.65.184 rport
50026
a=candidate:5 1 TCP-ACT 1684797439 10.56.65.184 50026 typ srflx raddr 10.56.65.184
rport 50026
a=candidate:5 2 TCP-ACT 1684796926 10.56.65.184 50026 typ srflx raddr 10.56.65.184
rport 50026
a=cryptoscale:1 client AES CM 128 HMAC SHA1 80
inline:Vg7c4/T5hsxb/UDMzHqSPk2DwKXzsJk1/IPIx2tI|2^31|1:1
a=crypto:2 AES_CM_128_HMAC_SHA1_80
inline:rX1Y0WgGnXDdutAA8eEH7ZYog+ydd//x+Cidwcvw|2^31|1:1
a=crypto:3 AES_CM_128_HMAC_SHA1_80
inline:ZRbU8mr2f5nK9adY1tjCzbb3AbDU8pfkRIpreca|2^31
a=maxptime:200
a=rtpmap:114 x-msrta/16000
a=fmtp:114 bitrate=29000
a=rtpmap:9 G722/8000
a=rtpmap:112 G7221/16000
a=fmtp:112 bitrate=24000
a=rtpmap:111 SIREN/16000
a=fmtp:111 bitrate=16000
a=rtpmap:0 PCMU/8000
a=rtpmap:8 PCMA/8000
a=rtpmap:116 AAL2-G726-32/8000
a=rtpmap:115 x-msrta/8000
a=fmtp:115 bitrate=11800
a=rtpmap:97 RED/8000
a=rtpmap:13 CN/8000
a=rtpmap:118 CN/16000
a=rtpmap:101 telephone-event/8000
a=fmtp:101 0-16
a=x-byypassid:9CD08A01-E998-456a-AC8A-D028930E5933
```

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

v=0  
o=- 2303 0 IN IP4 157.56.65.134  
s=session  
c=IN IP4 157.56.65.134  
b=CT:1000  
t=0 0  
m=audio 1469 RTP/SAVP 114 115 112 111 116 0 8 13 118 97 101  
c=IN IP4 157.56.65.134  
a=rtcp:32805  
a=ice-ufrag:Aieb  
a=ice-pwd:qw3WPnif3nyEAFbPHhtWpWs3  
a=candidate:1 1 UDP 2130706431 157.56.65.134 1469 typ host  
a=candidate:1 2 UDP 2130705918 157.56.65.13432805 typ host  
a=candidate:2 1 tcp-pass 6555135 172.29.105.158 56439 typ relay raddr 205.248.125.34 rport 56439  
a=candidate:2 2 tcp-pass 6555134 172.29.105.158 56439 typ relay raddr 205.248.125.34 rport 56439  
a=candidate:3 1 UDP 16647679 172.29.105.158 56659 typ relay raddr 172.29.105.158 rport 56659  
a=candidate:3 2 UDP 16647678 172.29.105.158 51883 typ relay raddr 172.29.105.158 rport 51883  
a=candidate:4 1 tcp-act 7076863 172.29.105.158.34 56439 typ relay raddr 172.29.105.158 rport 56439  
a=candidate:4 2 tcp-act 7076350 172.29.105.158 56439 typ relay raddr 172.29.105.158 rport 56439  
a=candidate:5 1 tcp-act 1684797951 192.168.104.102 38263 typ srflx raddr 157.56.65.134 rport 1783  
a=candidate:5 2 tcp-act 1684797438 192.168.104.102 38263 typ srflx raddr 157.56.65.134 rport 1783  
a=crypto:2 AES\_CM\_128\_HMAC\_SHA1\_80 inline:apG+pahPrJUCGUw3FMogAth9HWpCVzv6BxakuzNL|2^31|1:1  
a=label:main-audio  
a=rtpmap:114 x-msrta/16000  
a=fmtp:114 bitrate=29000  
a=rtpmap:115 x-msrta/8000  
a=fmtp:115 bitrate=11800  
a=rtpmap:112 G7221/16000  
a=fmtp:112 bitrate=24000  
a=rtpmap:111 SIREN/16000  
a=fmtp:111 bitrate=16000  
a=rtpmap:116 AAL2-G726-32/8000  
a=rtpmap:0 PCMU/8000  
a=rtpmap:8 PCMA/8000  
a=rtpmap:13 CN/8000  
a=rtpmap:118 CN/16000  
a=rtpmap:97 RED/8000  
a=rtpmap:101 telephone-event/8000  
a=fmtp:101 0-16,36

## **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 Exchange Server 2013
- Microsoft Lync 2010
- Microsoft Lync Server 2010
- Microsoft Lync Client 2013/Skype for Business
- Microsoft Lync Server 2013
- Microsoft Skype for Business 2016
- Microsoft Skype for Business Server 2015

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.

## 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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