

# [MS-OCEXUM]: Call Control for Exchange Unified Messaging Protocol Extensions

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## Revision Summary

Date	Revision History	Revision Class	Comments
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06/10/2011	3.0	No change	No changes to the meaning, language, or formatting of the technical content.

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# 1 Introduction

This document specifies a proprietary extension to the Session Initiation Protocol (SIP), which is used to play voice messages and to manage the unified messaging mailbox using voice commands. SIP is used to establish, modify, and terminate multimedia sessions or calls. The SIP extension is used to integrate with other telephony networks or systems, such as a private branch exchange (PBX).

## 1.1 Glossary

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

**Augmented Backus-Naur Form (ABNF)**  
**authentication**  
**server**  
**Transmission Control Protocol (TCP)**

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

**automaton**  
**endpoint**  
**INVITE**  
**Session Initiation Protocol (SIP)**  
**SIP message**  
**Transport Layer Security (TLS)**

The following terms are specific to this document:

**Exchange Web Service (EWS):** A service that is provided by Microsoft® Exchange Server and that enables clients to access mailbox content.

**personal identification number (PIN):** A number that is used by Exchange Unified Messaging to authenticate a user.

**subscriber access:** The ability of a user to gain access to features of a Unified Messaging server, such as using a phone to listen to telephony voice messages or e-mail messages.

**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](mailto: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-SIPRE] Microsoft Corporation, "[Session Initiation Protocol \(SIP\) Routing 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>

[RFC3261] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M., and Schooler, E., "SIP: Session Initiation Protocol", RFC 3261, June 2002, <http://www.ietf.org/rfc/rfc3261.txt>

[RFC3840] Rosenberg, J., Schulzrinne, H., and Kyzivat, P., "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)", RFC 3840, August 2004, <http://www.rfc-editor.org/rfc/rfc3840.txt>

### 1.2.2 Informative References

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

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

[MS-OXWUMS] Microsoft Corporation, "[Voice Mail Settings Web Service Protocol Specification](#)"

### 1.3 Protocol Overview (Synopsis)

The unified messaging server provides a **Session Initiation Protocol (SIP)** interface toward a server or gateways. By default, the unified messaging server requires a **personal identification number (PIN)** to be entered to access the voice mail in a user's inbox. This protocol allows previously authenticated protocol clients to bypass the PIN requirement, thus streamlining the connection with the unified messaging server.

This protocol is used to support calls between a protocol client and the unified messaging server supported by this protocol.

There are two types of calls between a protocol client and the unified messaging server:

- **Call-in:** Using the protocol client user interface (UI), a user calls into the unified messaging server to access the voice mail system. This is also known as **subscriber access**.
- **Dial Out (Play-On-Phone):** Upon receiving an event sent through the **Exchange Web Service (EWS)**, as described in [\[MS-OXWUMS\]](#), the unified messaging server sends a SIP **INVITE** to the client for the purpose of playing back the recorded voice message on a protocol server **endpoint(5)** identified by a phone number. The trigger point for this is an event sent by the Exchange Web Service. [<1>](#)

This protocol adds the following headers and parameters to SIP:

- **Ms-Exchange-Command:** This header is used to indicate an action to be performed by the unified messaging server. This header can have the following values for the supported actions:
  - **skip-pin:** Requests the unified messaging server to skip a voice prompt for a PIN.
- **Ms-Sensitivity:** This header is used by the unified messaging server in Play-On-Phone scenarios when the user requests a voice mail to be played on the phone from an application. When the value of this header is set to "private-no-diversion", a protocol server does not re-route the message back to voice mail when the Play-On-Phone call is not answered by the user. **Ms-Sensitivity** is fully described in [\[MS-SIPRE\]](#).

This protocol uses the following SIP headers and parameter. The semantics for these are as specified in the designated RFCs:

- **Subject:** A header described in [\[RFC3261\]](#). It is used to carry the subject of a call. The unified messaging server uses this header to specify the subject of a voice message.

- **Priority:** A header described in [\[RFC3261\]](#). A protocol client uses this header to indicate the importance of a call, with one of the following header values:
  - Urgent
  - Normal
- **Automata:** A parameter in the **Contact** header that is described in [\[RFC3840\]](#). It is used by unified messaging to indicate that the endpoint (5) is not a user, but an **automaton** functioning on behalf of the user.

## 1.4 Relationship to Other Protocols

This protocol depends on SIP.

This protocol depends on all the protocols on which SIP depends.

## 1.5 Prerequisites/Preconditions

None.

## 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

Messages MUST be transported over **Transmission Control Protocol (TCP)** or **Transport Layer Security (TLS)**.

### 2.2 Message Syntax

Messages are formatted as **SIP messages**, as specified in [\[RFC3261\]](#) section 7, with the custom headers and parameters described in this document.

#### 2.2.1 Ms-Exchange-Command

**Ms-Exchange-Command** is a custom SIP header added to the INVITE method in calls originating from a protocol client.

The syntax of this header, in the **Augmented Backus-Naur Form (ABNF)** notation, is as follows:

```
Ms-Exchange-Command header = "Ms-Exchange-Command" HCOLON param
param = "skip-pin"
```

The valueless parameter, **skip-pin**, is used to indicate to the unified messaging server not to prompt the user for a PIN. Before this parameter can be set, the protocol client MUST be authenticated by the SIP **server (2)**, and the additional level of **authentication (2)** in the form of a PIN is not needed for the INVITE transaction. For an example of how this parameter is used, see section [4.1](#).

An example is as follows:

```
INVITE ... SIP/2.0
From: ...
To: ...
Ms-Exchange-Command: skip-pin
```

#### 2.2.2 Ms-Sensitivity

**Ms-Sensitivity** is a custom SIP header that is used to instruct a protocol server not to reroute the call back to the voice mail server and prevent call forwarding.

The syntax of this header, in the ABNF notation, is as follows:

```
Ms-Sensitivity header = "Ms-Sensitivity" HCOLON privacy
privacy="private-no-diversion"
```

An example is as follows:

```
INVITE ... SIP/2.0
From: ...
To: ...
Ms-Sensitivity: private-no-diversion
```



### 2.2.3 Subject

The **Subject** header is a standard SIP header, as specified in [\[RFC3261\]](#) section 20.36. It is used in this protocol to specify the subject of a voice message. Any INVITE that is routed to the unified messaging server can have **Subject** and **Priority** headers. These headers are recorded into the voice message by the unified messaging server. Similarly, any Play-On-Phone calls originating from a unified messaging server can have **Subject** and **Priority** headers.

### 2.2.4 Priority

The **Priority** header is based on [\[RFC3261\]](#) section 20.26. Any INVITE that is routed to the unified messaging server can have **Subject** and **Priority** headers. These headers are recorded into the voice message by the unified messaging server. The following table lists the supported values of the **Priority** header.

Value	Meaning
"Urgent"	Indicates the call is of the higher importance.
"Normal"	Indicates the call is of normal importance.

### 2.2.5 Automata

The automata **URI** parameter is based on [\[RFC3840\]](#) section 10.7. The unified messaging server adds this **URI** parameter to the **Contact** header to indicate whether the caller is connected to an automaton, such as voice mail, that is serving on behalf of the user.

The following example is an automata.

```
INVITE SIP URI SIP/2.0
From: SIP URI
To: SIP URI

Contact: <sip:exchangeum@contoso.com >;automata
```

## 3 Protocol Details

### 3.1 Ms-Exchange- Command

The **Ms-Exchange-Command skip-pin** is used when the protocol client uses subscriber access to the voice mail system and, to provide a better user experience, requires the voice mail server to skip the PIN prompt. When the voice mail server receives this command, it **MUST** skip the PIN prompt, provided that the INVITE is received over a trusted transport, such as a TLS transport, to the voice mail server. The assumption here is that the voice mail system trusts the authentication (2) mechanism for requests that are received by it over the trusted transport.

#### 3.1.1 Abstract Data Model

None.

#### 3.1.2 Timers

None.

#### 3.1.3 Initialization

None.

#### 3.1.4 Higher-Layer Triggered Events

None.

#### 3.1.5 Message Processing Events and Sequencing Rules

None.

#### 3.1.6 Timer Events

None.

#### 3.1.7 Other Local Events

None.

### 3.2 Ms-Sensitivity

**Ms-Sensitivity** SHOULD be used in Dial Out, or Play-On-Phone, scenarios where the unified messaging server sends an INVITE to the user and uses this header to indicate to the protocol server that the call **MUST NOT** be re-routed back to voice mail and call forwarding. In this case, unanswered call forwarding or immediate call forwarding **MUST NOT** be applied.

The unified messaging server supported by this protocol always uses the **Ms-Sensitivity** header with the **private-no-diversion** parameter, as follows:

```
Ms-Sensitivity: private-no-diversion
```

Use of other parameters is out of the scope of this extension. The other parameters are covered in [\[MS-SIPRE\]](#).

Note that in Play-On-Phone INVITEs that originate from the unified messaging server, the **URIs** in the **From** header and the **To** header MUST match. This is because the protocol clients have special logic that checks for this condition and allows the protocol client to ring for Play-On-Phone calls, even if the user has manually set himself to the "Appear Offline" presence state.

### **3.2.1 Abstract Data Model**

None.

### **3.2.2 Timers**

None.

### **3.2.3 Initialization**

None.

### **3.2.4 Higher-Layer Triggered Events**

None.

### **3.2.5 Message Processing Events and Sequencing Rules**

None.

### **3.2.6 Timer Events**

None.

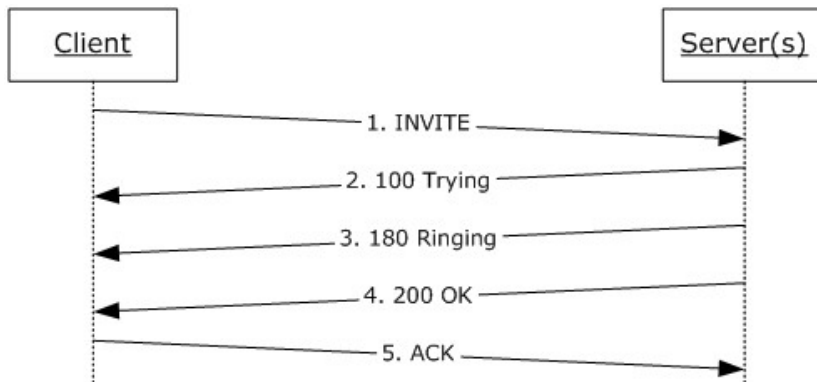
### **3.2.7 Other Local Events**

None.

## 4 Protocol Examples

### 4.1 Ms-Exchange-Command

The following figure shows the flow of the SIP INVITE transaction for subscriber access to voice mail.



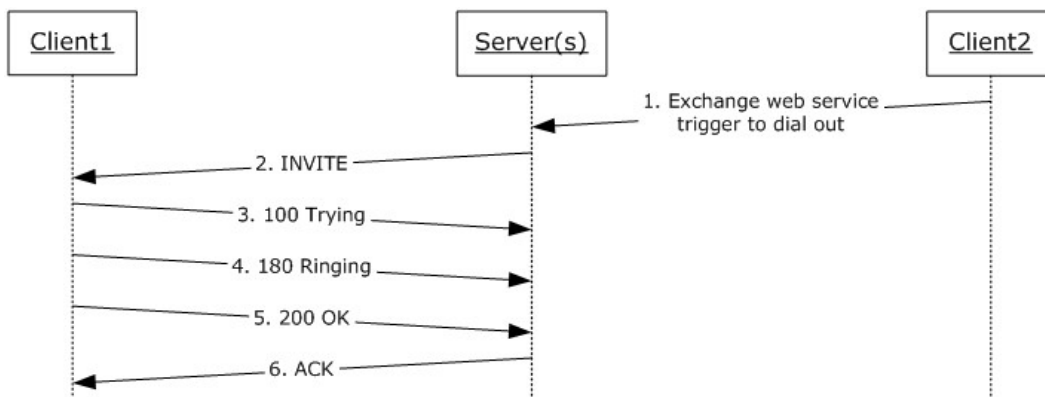
**Figure 1: Subscriber Access Flow**

The INVITE message carries the **Ms-Exchange-Command** parameter, as shown in the following example.

```
INVITE sip:alice@contoso.com;opaque=app:voicemail SIP/2.0
Via: SIP/2.0/TLS 10.56.65.37:33876
Max-Forwards: 70
From: <sip:alice@contoso.com>;tag=01742a55e6;epid=6b5d10e663
To: <sip:alice@contoso.com;opaque=app:voicemail>
Call-ID: f7c2efff9240413cb6e5125fdca4b63a
CSeq: 1 INVITE
Contact: <sip:alice@contoso.com;opaque=user:epid:ihclvAI6-FmKSGLKr_2rtAAA;gruu>
Ms-Exchange-Command: skip-pin
... SDP SNIPPED .....
```

### 4.2 Ms-Sensitivity

The following figure shows the flow for the **Ms-Sensitivity** header that is added by the unified messaging server when dialing out to the protocol client.



**Figure 2: Play-On-Phone dial out**

The INVITE message in step 2 of the preceding figure is shown in the following example.

```

INVITE sip:172.19.58.98:2280;transport=tls;ms-opaque=ce5f21cc9d;ms-received-cid=D0A300
SIP/2.0
Max-Forwards: 68
Content-Length: 317
From: <sip:alice@contoso.com>;epid=1944B98832;tag=7534fa434
To: <sip:alice@contoso.com>;epid=d793aff63a
CSeq: 5 INVITE
Call-ID: 7a7378c9-7b3c-4cec-b6da-ec27d752e904
Contact: <sip: exchange.contoso.com:5066;transport=Tls;ms-opaque=a752506cbee22182>;automata
User-Agent: RTCC/3.0.0.0
Content-Type: application/sdp
Allow: UPDATE
Ms-Sensitivity: private-no-diversion
Allow: Ack, Cancel, Bye, Invite, Message, Info, Service, Options, BeNotify
...SDP SNIPPED...
  
```

### 4.3 Subject and Priority

```

INVITE sip:bob@contoso.com;opaque=app:voicemail SIP/2.0
From: sip:bob@contoso.com
To:sip:bob@contoso.com;opaque=app:voicemail
Subject: About the new sales project
Priority: Urgent
  
```

## **5 Security**

### **5.1 Security Considerations for Implementers**

None.

### **5.2 Index of Security Parameters**

None.

## 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
- Microsoft® Office Communications Server 2007 R2
- Microsoft® Office Communicator 2007
- Microsoft® Office Communicator 2007 R2
- Microsoft® Lync™ Server 2010
- Microsoft® Lync™ 2010
- Microsoft® Exchange Server 2010
- Microsoft® Exchange Server 2007 Service Pack 1 (SP1)

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:](#) Microsoft Office Outlook, which supports Play-On-Phone as an option, can be used to raise the event.

## 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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