

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

Intellectual Property Rights Notice for Open Specifications Documentation

- **Technical Documentation.** Microsoft publishes Open Specifications documentation for protocols, file formats, languages, standards as well as overviews of the interaction among each of these technologies.
- **Copyrights.** This documentation is covered by Microsoft copyrights. Regardless of any other terms that are contained in the terms of use for the Microsoft website that hosts this documentation, you may make copies of it in order to develop implementations of the technologies described in the Open Specifications and may distribute portions of it in your implementations using these technologies or your documentation as necessary to properly document the implementation. You may also distribute in your implementation, with or without modification, any schema, IDL's, or code samples that are included in the documentation. This permission also applies to any documents that are referenced in the Open Specifications.
- **No Trade Secrets.** Microsoft does not claim any trade secret rights in this documentation.
- **Patents.** Microsoft has patents that may cover your implementations of the technologies described in the Open Specifications. Neither this notice nor Microsoft's delivery of the documentation grants any licenses under those or any other Microsoft patents. However, a given Open Specification may be covered by Microsoft [Open Specification Promise](#) or the [Community Promise](#). If you would prefer a written license, or if the technologies described in the Open Specifications are not covered by the Open Specifications Promise or Community Promise, as applicable, patent licenses are available by contacting iplg@microsoft.com.
- **Trademarks.** The names of companies and products contained in this documentation may be covered by trademarks or similar intellectual property rights. This notice does not grant any licenses under those rights. For a list of Microsoft trademarks, visit www.microsoft.com/trademarks.
- **Fictitious Names.** The example companies, organizations, products, domain names, email addresses, logos, people, places, and events depicted in this documentation are fictitious. No association with any real company, organization, product, domain name, email address, logo, person, place, or event is intended or should be inferred.

Reservation of Rights. All other rights are reserved, and this notice does not grant any rights other than specifically described above, whether by implication, estoppel, or otherwise.

Tools. The Open Specifications do not require the use of Microsoft programming tools or programming environments in order for you to develop an implementation. If you have access to Microsoft programming tools and environments you are free to take advantage of them. Certain Open Specifications are intended for use in conjunction with publicly available standard specifications and network programming art, and assumes that the reader either is familiar with the aforementioned material or has immediate access to it.

Revision Summary

Date	Revision History	Revision Class	Comments
04/04/2008	0.1		Initial version
04/25/2008	0.2		Revised and edited technical content
06/27/2008	1.0		Revised and edited technical content
08/15/2008	1.01		Revised and edited technical content
12/12/2008	2.0		Revised and edited technical content
02/13/2009	2.01		Revised and edited technical content
03/13/2009	2.02		Revised and edited technical content
07/13/2009	2.03	Major	Revised and edited the technical content
08/28/2009	2.04	Editorial	Revised and edited the technical content
11/06/2009	2.05	Editorial	Revised and edited the technical content
02/19/2010	2.06	Editorial	Revised and edited the technical content
03/31/2010	2.07	Major	Updated and revised the technical content
04/30/2010	2.08	Editorial	Revised and edited the technical content
06/07/2010	2.09	Editorial	Revised and edited the technical content
06/29/2010	2.10	Editorial	Changed language and formatting in the technical content.
07/23/2010	2.10	No change	No changes to the meaning, language, or formatting of the technical content.
09/27/2010	3.0	Major	Significantly changed the technical content.
11/15/2010	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
12/17/2010	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
03/18/2011	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
06/10/2011	3.0	No change	No changes to the meaning, language, or formatting of the technical content.
01/20/2012	4.0	Major	Significantly changed the technical content.
04/11/2012	4.0	No change	No changes to the meaning, language, or formatting of the technical content.

Date	Revision History	Revision Class	Comments
07/16/2012	4.0	No change	No changes to the meaning, language, or formatting of the technical content.
10/08/2012	4.0.1	Editorial	Changed language and formatting in the technical content.
02/11/2013	4.0.1	No change	No changes to the meaning, language, or formatting of the technical content.
07/30/2013	4.0.1	No change	No changes to the meaning, language, or formatting of the technical content.
11/18/2013	4.0.1	No change	No changes to the meaning, language, or formatting of the technical content.
02/10/2014	4.0.1	No change	No changes to the meaning, language, or formatting of the technical content.

Table of Contents

1 Introduction	5
1.1 Glossary	5
1.2 References	5
1.2.1 Normative References	6
1.2.2 Informative References	6
1.3 Overview	6
1.4 Relationship to Other Protocols	7
1.5 Prerequisites/Preconditions	7
1.6 Applicability Statement	7
1.7 Versioning and Capability Negotiation	7
1.8 Vendor-Extensible Fields	7
1.9 Standards Assignments	7
2 Messages	8
2.1 Transport	8
2.2 Message Syntax	8
2.2.1 Ms-Exchange-Command	8
2.2.2 Ms-Sensitivity	8
3 Protocol Details	10
3.1 Ms-Exchange-Command Details	10
3.1.1 Abstract Data Model	10
3.1.2 Timers	10
3.1.3 Initialization	10
3.1.4 Higher-Layer Triggered Events	10
3.1.5 Message Processing Events and Sequencing Rules	10
3.1.6 Timer Events	10
3.1.7 Other Local Events	10
3.2 Ms-Sensitivity Details	11
3.2.1 Abstract Data Model	11
3.2.2 Timers	11
3.2.3 Initialization	11
3.2.4 Higher-Layer Triggered Events	11
3.2.5 Message Processing Events and Sequencing Rules	11
3.2.6 Timer Events	11
3.2.7 Other Local Events	12
4 Protocol Examples	13
4.1 Ms-Exchange-Command	13
4.2 Ms-Sensitivity	13
5 Security	15
5.1 Security Considerations for Implementers	15
5.2 Index of Security Parameters	15
6 Appendix A: Product Behavior	16
7 Change Tracking	17
8 Index	18

1 Introduction

The Call Control for Exchange Unified Messaging Protocol Extensions, which consist of proprietary extensions to the Session Initiation Protocol (SIP), 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. These protocol extensions are used to integrate with other telephony networks or systems, such as a private branch exchange (PBX).

Sections 1.8, 2, and 3 of this specification are normative and can contain the terms MAY, SHOULD, MUST, MUST NOT, and SHOULD NOT as defined in RFC 2119. Sections 1.5 and 1.9 are also normative but cannot contain those terms. All other sections and examples in this specification are informative.

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)
Uniform Resource Identifier (URI)
user agent client (UAC)**

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 email 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

References to Microsoft Open Specifications documentation do not include a publishing year because links are to the latest version of the documents, which are updated frequently. References to other documents include a publishing year when one is available.

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.

[MS-EUMR] Microsoft Corporation, "[Routing to Exchange Unified Messaging Extensions](#)".

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

[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>

1.2.2 Informative References

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

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

[RFC5234] Crocker, D., Ed., and Overell, P., "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, January 2008, <http://www.rfc-editor.org/rfc/rfc5234.txt>

1.3 Overview

The unified messaging **server (2)** provides a Session Initiation Protocol (SIP) interface toward a server (2) or gateways. By default, the unified messaging server (2) 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 (2).

This protocol is used to support calls between a protocol client and the unified messaging server (2) supported by this protocol.

There are two types of calls between a protocol client and the unified messaging server (2):

- **Call-in:** Using the protocol client user interface (UI), a user calls into the unified messaging server (2) to access the voice mail system. This is also known as **subscriber access**.
- **Dial Out (Play-On-Phone):** Upon receiving an appropriate event, the unified messaging server (2) sends a SIP **INVITE** to the client for the purpose of playing back the recorded voice message on a protocol server (2) **endpoint (5)** identified by a phone number.

This protocol can be used in Play-On-Phone scenarios to prevent a protocol server from rerouting the message back to voice mail back and call forwarding when the Play-On-Phone call is not answered by the user.

This protocol also adds the ability to specify the subject of a voice message, the importance of a call, and an indication that the endpoint (5) is not a user but an **automaton** functioning on behalf of the user.

Please refer to [\[MS-EUMR\]](#) for details on how the Lync Server routes the call from client to the unified messaging server.

1.4 Relationship to Other Protocols

This protocol depends on Session Initiation Protocol (SIP).

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

1.5 Prerequisites/Preconditions

None.

1.6 Applicability Statement

This protocol is designed to be used to support calls between a protocol client and the unified messaging server (2) supported by this protocol.

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

The **Ms-Exchange-Command** custom Session Initiation Protocol (SIP) header is added to the INVITE method in calls originating from a protocol client. This header is used to indicate an action to be performed by the unified messaging server (2).

The syntax of this header, in the **Augmented Backus-Naur Form (ABNF)** notation, as defined in [\[RFC5234\]](#), is as follows:

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

The only supported action is specified by the valueless parameter, **skip-pin**, which indicates to the unified messaging server (2) not to prompt the user for a personal identification number (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.

The syntax of the **Ms-Exchange-Command** header with the **skip-pin** parameter is illustrated as follows:

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

2.2.2 Ms-Sensitivity

The **Ms-Sensitivity** custom Session Initiation Protocol (SIP) header, as specified in [\[MS-SIPRE\]](#), is used to instruct a protocol server (2) not to reroute the call back to the voice mail server (2) and to prevent call forwarding. When the value of this header is set to "private-no-diversion", a protocol server (2) does not reroute the message back to voice mail when a Play-On-Phone call is not answered by the user.

The syntax of this header, in the Augmented Backus-Naur Form (ABNF) notation, as defined in [\[RFC5234\]](#), is as follows:

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


The syntax of the **Ms-Sensitivity** header is illustrated as follows:

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

3 Protocol Details

3.1 Ms-Exchange-Command Details

The **Ms-Exchange-Command** header with the **skip-pin** parameter 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 (2) to skip the personal identification number (PIN) prompt. When the voice mail server (2) receives this command, it MUST skip the PIN prompt, provided that the INVITE is received over a trusted transport, such as a Transport Layer Security (TLS) transport, to the voice mail server (2). 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.

Protocol Client Behavior

A **user agent client (UAC)** accessing the subscriber access feature of the voice mail system over a trusted transport SHOULD provide a **Ms-Exchange-Command** header with the **skip-pin** parameter to provide a better user experience.

Unified Messaging Server Behavior

If a voice mail server receives a SIP INVITE over a trusted transport with a **Ms-Exchange-Command** header containing the **skip-pin** parameter, it MUST skip personal identification number (PIN) prompt.

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 Details

The **Ms-Sensitivity** header, as specified in [\[MS-SIPRE\]](#), SHOULD be used in Dial Out (Play-On-Phone), scenarios when the user requests a voice mail message to be played on the phone from an application. In such a scenario, the unified messaging server (2) sends an INVITE to the user and uses this header to indicate to the protocol server (2) that the call MUST NOT be rerouted back to voice mail and call forwarding when the Play-On-Phone call is not answered by the user. In this case, unanswered call forwarding or immediate call forwarding MUST NOT be applied. The unified messaging server (2) sends such an INVITE through the **Exchange Web Service (EWS)**, as specified in [\[MS-OXWUMS\]](#). The trigger point for this is an event sent by EWS.<1>

The unified messaging server (2) supported by this protocol uses the **Ms-Sensitivity** header with the **private-no-diversion** parameter, as specified in section [2.2.2](#).

Use of other parameters, as specified in [\[MS-SIPRE\]](#), is out of the scope of this extension.

Note that in Play-On-Phone INVITEs that originate from the unified messaging server (2), 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 or herself to the "Appear Offline" presence state.

Unified Messaging Server Behavior

A unified messaging server SHOULD send a **Ms-Sensitivity** header with the **private-no-diversion** parameter in Dial Out or Play-On-Phone scenarios.

Protocol Server Behavior

If a SIP INVITE contains a **Ms-Sensitivity** header with the **private-no-diversion** parameter, unanswered call forwarding or immediate call forwarding MUST NOT be applied.

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 **Ms-Exchange-Command** header can be used to skip pin verification for previously authenticated protocol clients.

The following figure shows the flow of the Session Initiation Protocol (SIP) INVITE transaction for subscriber access to voice mail.

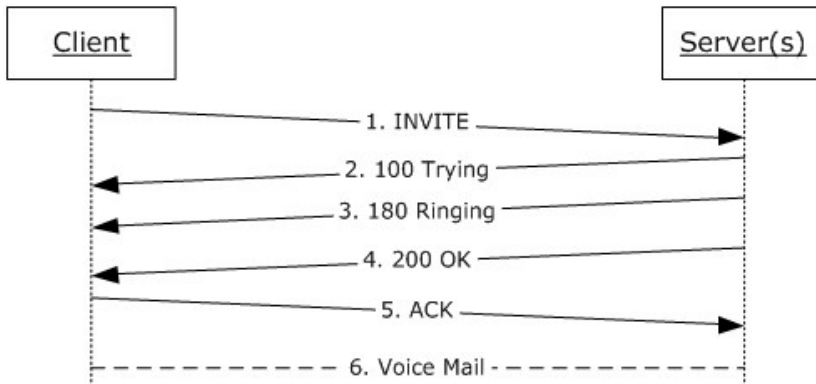


Figure 1: Subscriber access flow

The INVITE message carries the **Ms-Exchange-Command** header with the **skip-pin** 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 (2) when dialing out to the protocol client.

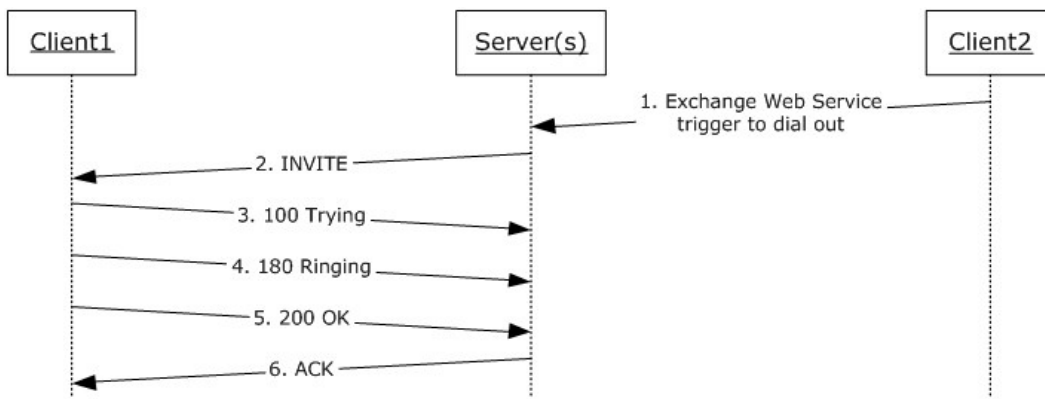


Figure 2: Play-On-Phone dial out

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...
  
```

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 Exchange Server 2007 Service Pack 1 (SP1)
- Microsoft Exchange Server 2010
- Microsoft Lync 2013
- Microsoft Lync Server 2013
- Microsoft Lync 2010
- Microsoft Lync Server 2010
- Microsoft Office Communications Server 2007
- Microsoft Office Communications Server 2007 R2
- Microsoft Office Communicator 2007
- Microsoft Office Communicator 2007 R2
- Microsoft Exchange Server 2013

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 3.2:](#) Office Outlook 2007, Office Outlook 2007 SP1, Outlook 2010 supports Play-On-Phone as an option. Any of these clients 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.

8 Index

A

Abstract data model
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11
[Applicability](#) 7

C

[Capability negotiation](#) 7
[Change tracking](#) 17

D

Data model - abstract
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11

E

Examples
[Ms-Exchange-Command](#) 13
[Ms-Sensitivity](#) 13

F

[Fields - vendor-extensible](#) 7

G

[Glossary](#) 5

H

Higher-layer triggered events
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11

I

[Implementer - security considerations](#) 15
[Index of security parameters](#) 15
[Informative references](#) 6
Initialization
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11
[Introduction](#) 5

L

Local events
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 12

M

Message processing
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11

[Message syntax](#) 8

Messages

[message syntax](#) 8
[Ms-Exchange-Command](#) 8
[Ms-Sensitivity](#) 8
[transport](#) 8

Ms-Exchange-Command

[abstract data model](#) 10
[example](#) 13
[higher-layer triggered events](#) 10
[initialization](#) 10
[local events](#) 10
[message processing](#) 10
[overview](#) 10
[sequencing rules](#) 10
[timer events](#) 10
[timers](#) 10

[Ms-Exchange-Command message](#) 8

Ms-Sensitivity

[abstract data model](#) 11
[example](#) 13
[higher-layer triggered events](#) 11
[initialization](#) 11
[local events](#) 12
[message processing](#) 11
[overview](#) 11
[sequencing rules](#) 11
[timer events](#) 11
[timers](#) 11
[Ms-Sensitivity message](#) 8

N

[Normative references](#) 6

O

[Overview \(synopsis\)](#) 6

P

[Parameters - security index](#) 15
[Preconditions](#) 7
[Prerequisites](#) 7
[Product behavior](#) 16

R

[References](#) 5
[informative](#) 6
[normative](#) 6
[Relationship to other protocols](#) 7

S

Security
[implementer considerations](#) 15
[parameter index](#) 15
Sequencing rules

[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11
[Standards assignments](#) 7

T

Timer events
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11

Timers
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11

[Tracking changes](#) 17
[Transport](#) 8

Triggered events
[Ms-Exchange-Command](#) 10
[Ms-Sensitivity](#) 11

V

[Vendor-extensible fields](#) 7
[Versioning](#) 7