**[MS-CVWREST]:**

**Unified Communications Call Via Work Protocol**

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**Revision Summary**

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| 9/4/2015 | 1.1 | Minor | Clarified the meaning of the technical content. |
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Table of Contents

[1 Introduction 6](#_Toc79582409)

[1.1 Glossary 6](#_Toc79582410)

[1.2 References 6](#_Toc79582411)

[1.2.1 Normative References 7](#_Toc79582412)

[1.2.2 Informative References 7](#_Toc79582413)

[1.3 Overview 7](#_Toc79582414)

[1.4 Relationship to Other Protocols 7](#_Toc79582415)

[1.5 Prerequisites/Preconditions 8](#_Toc79582416)

[1.6 Applicability Statement 8](#_Toc79582417)

[1.7 Versioning and Capability Negotiation 8](#_Toc79582418)

[1.8 Vendor-Extensible Fields 8](#_Toc79582419)

[1.9 Standards Assignments 8](#_Toc79582420)

[2 Messages 9](#_Toc79582421)

[2.1 Transport 9](#_Toc79582422)

[2.2 Common Data Types 9](#_Toc79582423)

[2.2.1 Namespaces 9](#_Toc79582424)

[2.2.2 Custom HTTP Headers 9](#_Toc79582425)

[2.2.3 Complex Types 9](#_Toc79582426)

[2.2.4 Simple Types 10](#_Toc79582427)

[2.2.4.1 AudienceMessaging 10](#_Toc79582428)

[2.2.4.2 AudienceMuteLock 11](#_Toc79582429)

[2.2.4.3 CallState 11](#_Toc79582430)

[2.2.4.4 ConversationModality 11](#_Toc79582431)

[2.2.4.5 ConversationState 12](#_Toc79582432)

[2.2.4.6 Direction 12](#_Toc79582433)

[2.2.4.7 Importance 12](#_Toc79582434)

[2.2.4.8 InvitationState 12](#_Toc79582435)

[2.2.4.9 MessageFormat 13](#_Toc79582436)

[2.2.4.10 ModalityType 13](#_Toc79582437)

[2.2.4.11 Role 13](#_Toc79582438)

[2.2.4.12 SourceNetwork 14](#_Toc79582439)

[2.2.4.13 GenericPolicy 14](#_Toc79582440)

[2.2.5 Attributes 14](#_Toc79582441)

[2.2.6 Common Data Structures 15](#_Toc79582442)

[2.2.6.1 Communication Resource 15](#_Toc79582443)

[2.2.6.2 Conversations Resource 15](#_Toc79582444)

[2.2.6.3 Conversation Resource 16](#_Toc79582445)

[2.2.6.4 Invitation Resource 17](#_Toc79582446)

[2.2.6.5 Phone Audio Invitation Resource 17](#_Toc79582447)

[2.2.6.6 Call Resource 18](#_Toc79582448)

[2.2.6.7 Phone Audio Resource 18](#_Toc79582449)

[2.2.6.8 Participant Resource 18](#_Toc79582450)

[2.2.6.9 Start Phone Audio Input Type 19](#_Toc79582451)

[2.2.6.10 Stop Phone Audio Input Type 19](#_Toc79582452)

[3 Protocol Details 20](#_Toc79582453)

[3.1 Server Details 20](#_Toc79582454)

[3.1.1 Abstract Data Model 20](#_Toc79582455)

[3.1.1.1 Navigating the Protocol 20](#_Toc79582456)

[3.1.1.2 API Versioning 20](#_Toc79582457)

[3.1.2 Timers 20](#_Toc79582458)

[3.1.3 Initialization 21](#_Toc79582459)

[3.1.4 Higher-Layer Triggered Events 21](#_Toc79582460)

[3.1.5 Message Processing Events and Sequencing Rules 21](#_Toc79582461)

[3.1.5.1 applications 21](#_Toc79582462)

[3.1.5.2 application 21](#_Toc79582463)

[3.1.5.3 batch 21](#_Toc79582464)

[3.1.5.4 conversations 21](#_Toc79582465)

[3.1.5.4.1 Get conversations 22](#_Toc79582466)

[3.1.5.4.1.1 Request Body 22](#_Toc79582467)

[3.1.5.4.1.2 Response Body 22](#_Toc79582468)

[3.1.5.5 conversation 22](#_Toc79582469)

[3.1.5.5.1 Get conversation 22](#_Toc79582470)

[3.1.5.5.1.1 Request Body 23](#_Toc79582471)

[3.1.5.5.1.2 Response Body 23](#_Toc79582472)

[3.1.5.6 phoneAudioInvitation 23](#_Toc79582473)

[3.1.5.6.1 Get phone audio invitation 23](#_Toc79582474)

[3.1.5.6.1.1 Request Body 24](#_Toc79582475)

[3.1.5.6.1.2 Response Body 24](#_Toc79582476)

[3.1.5.7 phoneAudio 24](#_Toc79582477)

[3.1.5.7.1 Get phone audio 24](#_Toc79582478)

[3.1.5.7.1.1 Request Body 25](#_Toc79582479)

[3.1.5.7.1.2 Response Body 25](#_Toc79582480)

[3.1.5.8 startPhoneAudio 25](#_Toc79582481)

[3.1.5.8.1 Post start phone audio 25](#_Toc79582482)

[3.1.5.8.1.1 Request Body 26](#_Toc79582483)

[3.1.5.8.1.2 Response Body 26](#_Toc79582484)

[3.1.5.9 stopPhoneAudio 26](#_Toc79582485)

[3.1.5.9.1 Post stop phone audio 26](#_Toc79582486)

[3.1.5.9.1.1 Request Body 27](#_Toc79582487)

[3.1.5.9.1.2 Response Body 27](#_Toc79582488)

[3.1.6 Timer Events 27](#_Toc79582489)

[3.1.7 Other Local Events 27](#_Toc79582490)

[4 Protocol Examples 28](#_Toc79582491)

[4.1 Creating an Application 28](#_Toc79582492)

[4.1.1 HTTP Request 28](#_Toc79582493)

[4.1.2 HTTP Response 28](#_Toc79582494)

[4.1.3 Preparing to receive events 29](#_Toc79582495)

[4.2 Starting a Phone Audio Conversation 30](#_Toc79582496)

[4.2.1 Phone Number Normalization 30](#_Toc79582497)

[4.2.2 HTTP Request 30](#_Toc79582498)

[4.2.3 HTTP Response 30](#_Toc79582499)

[4.2.4 Processing Events 31](#_Toc79582500)

[4.2.4.1 Initial events 31](#_Toc79582501)

[4.2.4.2 Intermediate status events 33](#_Toc79582502)

[4.2.4.3 Completion Events 34](#_Toc79582503)

[4.3 Receiving a Phone Audio Invitation 37](#_Toc79582504)

[4.3.1 Processing Events 37](#_Toc79582505)

[4.4 Stopping Phone Audio 37](#_Toc79582506)

[4.4.1 HTTP Request 37](#_Toc79582507)

[4.4.2 HTTP Response 37](#_Toc79582508)

[4.5 Handling resource versions 37](#_Toc79582509)

[4.5.1 HTTP Request 38](#_Toc79582510)

[4.5.2 HTTP Response 38](#_Toc79582511)

[4.6 Working with Asynchronous Operations 38](#_Toc79582512)

[5 Security 40](#_Toc79582513)

[5.1 Security Considerations for Implementers 40](#_Toc79582514)

[5.2 Index of Security Parameters 40](#_Toc79582515)

[6 Appendix A: Full XML Schema 41](#_Toc79582516)

[7 Appendix B: Common Error Responses 42](#_Toc79582517)

[8 Appendix C: Product Behavior 43](#_Toc79582518)

[9 Change Tracking 44](#_Toc79582519)

[10 Index 45](#_Toc79582520)

# Introduction

The Unified Communications for Business Call Via Work REST Protocol defines how an application can create a PSTN phone call between a desktop or mobile phone and a remote party.

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.

## Glossary

This document uses the following terms:

**byte order mark**: A Unicode character that is used to indicate that text is encoded in UTF-8, UTF-16, or UTF-32.

**Hypertext Transfer Protocol (HTTP)**: An application-level protocol for distributed, collaborative, hypermedia information systems (text, graphic images, sound, video, and other multimedia files) on the World Wide Web.

**Hypertext Transfer Protocol Secure (HTTPS)**: An extension of HTTP that securely encrypts and decrypts web page requests. In some older protocols, "Hypertext Transfer Protocol over Secure Sockets Layer" is still used (Secure Sockets Layer has been deprecated). For more information, see [[SSL3]](https://go.microsoft.com/fwlink/?LinkId=90534) and [[RFC5246]](https://go.microsoft.com/fwlink/?LinkId=129803).

**Representational State Transfer (REST)**: A software architecture implementation for distributed hypermedia systems, such as the World Wide Web.

**Uniform Resource Identifier (URI)**: A string that identifies a resource. The URI is an addressing mechanism defined in Internet Engineering Task Force (IETF) Uniform Resource Identifier (URI): Generic Syntax [[RFC3986]](https://go.microsoft.com/fwlink/?LinkId=90453).

**Uniform Resource Locator (URL)**: A string of characters in a standardized format that identifies a document or resource on the World Wide Web. The format is as specified in [[RFC1738]](https://go.microsoft.com/fwlink/?LinkId=90287).

**UTC (Coordinated Universal Time)**: A high-precision atomic time standard that approximately tracks Universal Time (UT). It is the basis for legal, civil time all over the Earth. Time zones around the world are expressed as positive and negative offsets from UTC. In this role, it is also referred to as Zulu time (Z) and Greenwich Mean Time (GMT). In these specifications, all references to UTC refer to the time at UTC–0 (or GMT).

**XML namespace**: A collection of names that is used to identify elements, types, and attributes in XML documents identified in a URI reference [RFC3986]. A combination of XML namespace and local name allows XML documents to use elements, types, and attributes that have the same names but come from different sources. For more information, see [[XMLNS-2ED]](https://go.microsoft.com/fwlink/?LinkId=90602).

**XML namespace prefix**: An abbreviated form of an [**XML namespace**](#gt_485f05b3-df3b-45ac-b8bf-d05f5d185a24), as described in [[XML]](https://go.microsoft.com/fwlink/?LinkId=90598).

**XML schema**: A description of a type of XML document that is typically expressed in terms of constraints on the structure and content of documents of that type, in addition to the basic syntax constraints that are imposed by XML itself. An XML schema provides a view of a document type at a relatively high level of abstraction.

**MAY, SHOULD, MUST, SHOULD NOT, MUST NOT:** These terms (in all caps) are used as defined in [[RFC2119]](https://go.microsoft.com/fwlink/?LinkId=90317). All statements of optional behavior use either MAY, SHOULD, or SHOULD NOT.

## 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](https://go.microsoft.com/fwlink/?linkid=850906).

### 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-OCDISCWS] Microsoft Corporation, "[Lync Autodiscover Web Service Protocol](%5BMS-OCDISCWS%5D.pdf#Section_95554ed7530a4a27beeeb353ea9f7e95)".

[MS-OCSMP] Microsoft Corporation, "[Microsoft Online Conference Scheduling and Management Protocol](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9)".

[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](https://go.microsoft.com/fwlink/?LinkId=90317)

[RFC2616] Fielding, R., Gettys, J., Mogul, J., et al., "Hypertext Transfer Protocol -- HTTP/1.1", RFC 2616, June 1999, [http://www.rfc-editor.org/rfc/rfc2616.txt](https://go.microsoft.com/fwlink/?LinkId=90372)

[RFC2818] Rescorla, E., "HTTP Over TLS", RFC 2818, May 2000, [http://www.rfc-editor.org/rfc/rfc2818.txt](https://go.microsoft.com/fwlink/?LinkId=90383)

[RFC3966] Schulzrinne, H., "The tel URI for Telephone Numbers", RFC 3966, December 2004, [http://www.rfc-editor.org/rfc/rfc3966.txt](https://go.microsoft.com/fwlink/?LinkId=114246)

[XMLNS] Bray, T., Hollander, D., Layman, A., et al., Eds., "Namespaces in XML 1.0 (Third Edition)", W3C Recommendation, December 2009, [http://www.w3.org/TR/2009/REC-xml-names-20091208/](https://go.microsoft.com/fwlink/?LinkId=191840)

[XMLSCHEMA1/2] Thompson, H., Beech, D., Maloney, M., and Mendelsohn, N., Eds., "XML Schema Part 1: Structures Second Edition", W3C Recommendation, October 2004, [http://www.w3.org/TR/2004/REC-xmlschema-1-20041028/](https://go.microsoft.com/fwlink/?LinkId=90607)

[XMLSCHEMA2/2] Biron, P., and Malhotra, A., Eds., "XML Schema Part 2: Datatypes Second Edition", W3C Recommendation, October 2004, [http://www.w3.org/TR/2004/REC-xmlschema-2-20041028/](https://go.microsoft.com/fwlink/?LinkId=90609)

### Informative References

[MS-ECREST] Microsoft Corporation, "[Unified Communications Event Channel Protocol](%5BMS-ECREST%5D.pdf#Section_4454be95159a4c99a75a5c260609343a)".

[MS-OCAUTHWS] Microsoft Corporation, "[OC Authentication Web Service Protocol](%5BMS-OCAUTHWS%5D.pdf#Section_63749828ab8d4b24941cb11985d854c5)".

## Overview

This protocol is used to create and manage phone audio in conversations.

A typical scenario for this protocol is to hear the audio of a conversation on a desktop phone instead of the computer speaker or headphones.

## Relationship to Other Protocols

This protocol transmits request and response messages by using [**HTTP**](#gt_d72f1494-4917-4e9e-a9fd-b8f1b2758dcd), as described in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), or [**Hypertext Transfer Protocol over Secure Sockets Layer (HTTPS)**](#gt_9239bd88-9747-44a6-83a6-473f53f175a7), as described in [[RFC2818]](https://go.microsoft.com/fwlink/?LinkId=90383).

Access to this protocol is discovered through the Lync Autodiscover Web Service. The discovery service protocol is described in the [[MS-OCDISCWS]](%5BMS-OCDISCWS%5D.pdf#Section_95554ed7530a4a27beeeb353ea9f7e95) document.

This protocol is accessible only to authenticated users, either directly via a client application or indirectly via a trusted server application. The authentication service protocols are described in the [[MS-OCAUTHWS]](%5BMS-OCAUTHWS%5D.pdf#Section_63749828ab8d4b24941cb11985d854c5) document.

The following diagram shows the underlying messaging and transport stack used by the protocol:



Figure 1: This protocol in relation to other protocols

## Prerequisites/Preconditions

This protocol operates against a protocol server that is configured to listen for [**HTTP**](#gt_d72f1494-4917-4e9e-a9fd-b8f1b2758dcd) or [**HTTPS**](#gt_9239bd88-9747-44a6-83a6-473f53f175a7) requests and a protocol client that knows the Request-URI of the protocol server.

In addition, the server needs to be configured with a mediation server deployed, and users with enterprise voice enabled.

## Applicability Statement

This protocol is applicable for the following scenarios:

* Starting a new conversation with phone audio
* Stopping phone audio in a conversation.

## Versioning and Capability Negotiation

This document covers versioning issues in the area of supported transports. This protocol can use [**HTTP**](#gt_d72f1494-4917-4e9e-a9fd-b8f1b2758dcd) or [**HTTPS**](#gt_9239bd88-9747-44a6-83a6-473f53f175a7) as a transport. For more information, see section [2.1](#Section_3ec0c9dae59f4c76be2d0ad1ba8bbee3).

## Vendor-Extensible Fields

None.

## Standards Assignments

None.

# Messages

## Transport

This protocol is based on [**Representational State Transfer (REST)**](#gt_72236660-af53-4390-877a-afece46ad517) architecture principals. As such, messages are transported using [**HTTP**](#gt_d72f1494-4917-4e9e-a9fd-b8f1b2758dcd), as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372), or [**HTTPS**](#gt_9239bd88-9747-44a6-83a6-473f53f175a7), as specified in [[RFC2818]](https://go.microsoft.com/fwlink/?LinkId=90383). The service SHOULD be served on ports 80 and 443 respectively, but MAY be served on other ports. For specific port information, please contact your service provider.

Protocol messages are text-based and MUST be UTF-8 encoded. Messages MUST NOT contain a [**byte order mark**](#gt_18dc5611-8b75-4bc3-97d0-a34fb6af5d59). The byte order mark is a Unicode character used to signal the byte order of a text file or stream.

## Common Data Types

### Namespaces

This specification defines and references various [**XML namespaces**](#gt_485f05b3-df3b-45ac-b8bf-d05f5d185a24) using the mechanisms specified in [[XMLNS]](https://go.microsoft.com/fwlink/?LinkId=191840). Although this specification associates a specific [**XML namespace prefix**](#gt_b9a20be7-31d9-4dcd-9cb9-ba72302857a2) for each XML namespace that is used, the choice of any particular XML namespace prefix is implementation-specific and not significant for interoperability.

| Prefix | Namespace URI | Reference |
| --- | --- | --- |
| xs | http://www.w3.org/2001/XMLSchema | [[XMLSCHEMA1/2]](https://go.microsoft.com/fwlink/?LinkId=90607)[[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609) |

### Custom HTTP Headers

The following headers are defined in this specification:

| Header | Description |
| --- | --- |
| X-MS-RequiresMinResourceVersion | Specifies the minimum required version of a resource. |

### Complex Types

The following table summarizes the set of common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) complex type definitions defined or referenced by this specification. XML schema complex type definitions that are specific to a particular operation are described with the operation.

| Complex Type | Description |
| --- | --- |
| CollectionType | Represents a collection type. Described in [[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section [2.2.4.1](%5BMS-OCSMP%5D.docx#Section_5f995f1ab1b040028c7b5d7fbadbc141). |
| InputType | Represents the type that captures the format of input data supplied in HTTP POST requests, as specified in [[RFC2616]](https://go.microsoft.com/fwlink/?LinkId=90372). Described in [MS-OCSMP] section [2.2.4.2](%5BMS-OCSMP%5D.docx#Section_e0f2df6ce3d04421bb524430c4757ec0). |
| ErrorType | Represents the type that captures the format of body in HTTP error responses, as specified in [RFC2616]. Described [MS-OCSMP] section [2.2.4.4](%5BMS-OCSMP%5D.docx#Section_fedb3afabc4144739d6e86fb8e111bbb). |
| LinkType | Represents the type that captures a reference to another resource. Described in [MS-OCSMP] section [2.2.4.5](%5BMS-OCSMP%5D.docx#Section_622dc64c214f4f69a943b12f33315cfd). |
| PropertyType | Represents the type that captures a property name and value. Described in [MS-OCSMP] section [2.2.4.6](%5BMS-OCSMP%5D.docx#Section_e9de8804d5cf4ad093db6f08322d1c38). |
| ResourceType | Represents the type that captures the format of a resource. Described in [MS-OCSMP] section [2.2.4.7](%5BMS-OCSMP%5D.docx#Section_2ebb2117822f4a368bd0f0a782f36374). |

### Simple Types

The following table summarizes the set of common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) simple type definitions defined by this specification. XML schema simple type definitions that are specific to a particular operation are described with the operation.

| Simple Type | Description |
| --- | --- |
| AudienceMessaging | An enumeration indicating the enabled state of the audience messaging feature. |
| AudienceMuteLock | An enumeration indicating the enabled state of the audience mute lock. |
| CallState | An enumeration representing the call states. |
| ConversationModality | An enumeration representing the conversation modalities. |
| ConversationState | An enumeration representing conversation states. |
| Direction | An enumeration representing invitation directions. |
| Importance | An enumeration representing conversation importance. |
| InvitationState | An enumeration representing invitation states. |
| MessageFormat | An enumeration representing the supported message formats. |
| ModalityType | An enumeration representing the modality types. |
| Role | An enumeration representing the participants’ role in a conversation. |
| SourceNetwork | An enumeration representing where a participant is joined to the conversation from. |
| GenericPolicy | An enumeration representing whether an option is enabled. |

#### AudienceMessaging

The following table summarizes the values of the **AudienceMessaging** enumeration.

| Value | Description |
| --- | --- |
| Unknown | The property is not set or is unknown. |
| Enabled | Messaging is enabled for all members of the conversation. |
| Disabled | Messaging is disabled for all members of the conversation. |

#### AudienceMuteLock

The following table summarizes the values of the **AudienceMuteLock** enumeration.

| Value | Description |
| --- | --- |
| Unknown | The property is not set or is unknown. |
| Enabled | Mute lock is enabled. |
| Disabled | Mute lock is disabled. |

#### CallState

The following table summarizes the values of the **CallState** enumeration.

| Value | Description |
| --- | --- |
| Disconnected | The call is disconnected. |
| Connecting | The call is connecting. |
| Connected | The call is connected. |
| Transferring | The call is transferring. |
| Disconnecting | The call is disconnecting |

#### ConversationModality

The following table summarizes the values of the **ConversationModality** enumeration.

| Value | Description |
| --- | --- |
| Audio | The conversation modality is audio. |
| Video | The conversation modality is video. |
| ApplicationSharing | The conversation modality is application sharing. |
| Messaging | The conversation modality is messaging. |
| DataCollaboration | The conversation modality is data collaboration. |

#### ConversationState

The following table summarizes the values of the **ConversationState** enumeration.

| Value | Description |
| --- | --- |
| Disconnected | The conversation is disconnected. |
| Incoming | The conversation is incoming. |
| Connecting | The conversation is connecting. |
| Connected | The conversation is connected. |
| InLobby | The conversation is in the conference lobby. |
| Conferencing | The conversation is connecting to a conference. |
| Conferenced | The conversation is in a conference. |
| Disconnecting | The conversation is disconnecting. |

#### Direction

The following table summarizes the values of the **Direction** enumeration.

| Value | Description |
| --- | --- |
| Incoming | The direction is incoming. |
| Outgoing | The direction is outgoing. |

#### Importance

The following table summarizes the values of the **Importance** enumeration.

| Value | Description |
| --- | --- |
| Normal | The importance is normal. |
| Urgent | The importance is urgent. |

#### InvitationState

The following table summarizes the values of the **InvitationState** enumeration.

| Value | Description |
| --- | --- |
| Connecting | The outgoing call is in the connecting state. |
| Alerting | The outgoing call is in the alerting state. |
| Forwarded | The outgoing call was forwarded. |
| TeamRing | The outgoing call is in the team-ringing state. |
| Connected | The outgoing call connected. |
| Cancelled | The outgoing call was cancelled. |
| Declined | The outgoing call was declined. |
| Failed | The outgoing call establishment failed. |

#### MessageFormat

The following table summarizes the values of the **MessageFormat** enumeration.

| Value | Description |
| --- | --- |
| Plain | Plain text. |
| Html | Html text. |

#### ModalityType

The following table summarizes the values of the **ModalityType** enumeration.

| Value | Description |
| --- | --- |
| Audio | Audio. |
| Video | Video. |
| PhoneAudio | Phone audio. |
| ApplicationSharing | Application sharing. |
| Messaging | Instant messaging. |
| Data Collaboration | Data collaboration. |

#### Role

The following table summarizes the values of the **Role** enumeration.

| Value | Description |
| --- | --- |
| Unknown | The participant’s role is unknown. |
| Attendee | The participant is an attendee. |
| Leader | The participant is a leader. |

#### SourceNetwork

The following table summarizes the values of the **SourceNetwork** enumeration.

| Value | Description |
| --- | --- |
| SameEnterprise | The participant is from the same enterprise the conference is hosted in. |
| Unknown | Not initialized or unknown. |
| Federated | The participant is from federated or external company. |
| PublicCloud | The participant is from a public hosted provider (such as MSN or Yahoo). |
| Everyone | Combination of SameEnterprise, Federated and PublicCloud values. |

#### GenericPolicy

The following table summarizes the values of the **GenericPolicy** enumeration.

| Value | Description |
| --- | --- |
| None | The default, uninitialized value. |
| Disabled | The policy is disabled. |
| Enabled | The policy is enabled. |

### Attributes

The following table summarizes the set of common [**XML schema**](#gt_bd0ce6f9-c350-4900-827e-951265294067) attribute definitions defined by this specification. XML schema attributes that are specific to a particular operation are described with the operation.

| Attribute | Type | Description |
| --- | --- | --- |
| rel | xs:string ([[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609)section 3.2.1) | Identifies the semantics of the link.  |
| name | xs:string | The name of a CollectionType ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 2.2.4.1) or PropertyType ([MS-OCSMP] section 2.2.4.6) |
| href | xs:anyURI ([XMLSCHEMA2/2]section 3.2.17) | A [**URL**](#gt_433a4fb7-ef84-46b0-ab65-905f5e3a80b1) that is relative to the host name of the service. |

### Common Data Structures

 The following table summarizes the set of common data structures defined by this specification.

| Data structure | Description |
| --- | --- |
| CommunicationResource | The dashboard for communications capabilities. |
| ConversationsResource | The factory and list of active conversations. |
| ConversationResource | The applications perspective of a multi-party multi-modal conversation. |
| InvitationResource | Represents information common to all invitation types. |
| PhoneAudioInvitationsResource | Information specific to phone audio invitation. |
| CallResource | Represents information common to all call resources. |
| PhoneAudioResource | Represents phone audio modality in a conversation. |
| ParticipantResource | Represents a participant in a conversation. |
| StartPhoneAudioInputType | Represents properties that can be configured when starting a new conversation with phone audio. |
| StopPhoneAudioInputType | Represents properties for the stop phone audio resource. |

#### Communication Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 2.2.4.7) containing the properties of the communication dashboard resource.

| Property name | Type | Description |
| --- | --- | --- |
| phoneNumber | xs:string ([[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609) section 3.2.1) | The phone number of the device the user wants to be reached on. |
| supportedModalities | CollectionType of ModalityType (section [2.2.4.10](#Section_4f0b955511b4438fbf17c449b6261daa)) | The modalities that are supported. |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |
| conversations | A reference to the conversations factory resource. |
| startPhoneAudio | A reference to the start phone audio resource. |
| startMessaging | A reference to the start messaging resource. |

#### Conversations Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section [2.2.4.7](%5BMS-OCSMP%5D.docx#Section_2ebb2117822f4a368bd0f0a782f36374)) containing a collection of **Conversation** structures.

| Property name | Type | Description |
| --- | --- | --- |
| None. |  | There are no properties in a ResourceType structure. |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |

#### Conversation Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 2.2.4.7) containing the properties of an existing conversation.

| Property name | Type | Description |
| --- | --- | --- |
| threadId | xs:string ([[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609) section 3.2.1) | An id identifying the discussion thread in a conversation. |
| subject | xs:string | The subject of the conversation. |
| activeModalities | CollectionType of ConversationModality (section [2.2.4.4](#Section_6b4c77a5ed434bda8411ef288c5709d7)) | List of modalities active in the conversation. |
| state | ConversationState (section [2.2.4.5](#Section_1c753cde37dc4862b761c4a1dd096bce)) | The conversation state. |
| importance | Importance (section [2.2.4.7](#Section_bda8ef3cb9ec4ab2845c2a7f25eee29e)) | The conversation importance. |
| participantCount | xs:int ([XMLSCHEMA2/2] section 3.3.17) | The number of participants in the conference. |
| audienceMute | AudienceMuteLock (section [2.2.4.2](#Section_ba0c7ec980fa42b9bddb715f3e9e88de)) | The current mute lock setting. |
| recording | xs:boolean ([XMLSCHEMA2/2] section 3.2.2) | Boolean indicating if recording is taking place on the conversation (True) or not (False). |
| expirationTime | xs:string | The expiration time of the conversation expressed in [**UTC (Coordinated Universal Time)**](#gt_6189b117-ca53-47a1-9eb3-7ea5ddc215dd) time format. |
| readLocally | xs:boolean | Boolean indicating if the conference of the conversation were read locally (True) or not (False). |
| created | xs:string | The creation time of the conversation, expressed in UTC (Coordinated Universal Time) format. |
| audienceMessaging | AudienceMessaging (section [2.2.4.1](#Section_c5594ace01ab4e809fa33f1e2047abdc)) | The current audience messaging setting. |
| videoScreenSharing | GenericPolicy (section [2.2.4.13](#section_8faf708c99434dd59888b8f21df31bf2)) | Whether video screen sharing is enabled for the conversation. |
| rdpSupport | GenericPolicy (section 2.2.4.13) | Whether Remote Desktop Protocol (RDP) is enabled for the conversation. |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |
| phoneAudio | A reference to the phone audio resource. |

#### Invitation Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 2.2.4.7) containing the properties of a conversation invitation.

| Property name | Type | Description |
| --- | --- | --- |
| direction | Direction (section [2.2.4.6](#Section_a7d4616c3bad4f77ba6ccbb34b0dca15)) | Direction of the invitation. |
| operationId | xs:string ([[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609) section 3.2.1) | Application supplied id corresponding to the operation that started the invitation. |
| sessionContext | xs:string | The session context. |
| anonymousDisplayName | xs:string | The display name to use for anonymous participants. |
| from | ParticipantResource (section [2.2.6.8](#Section_97e80445cf5b4632910713ed5e0a9e18)) | The participant that sent the invitation. |
| to | xs:string | The destination for an outgoing invitation. |
| acceptedByParticipant | ParticipantResource | The participant that accepted the invitation. |
| subject | xs:string | The subject for the conversation. |
| importance | Importance (section [2.2.4.7](#Section_bda8ef3cb9ec4ab2845c2a7f25eee29e)) | The importance of the conversation. |
| threadId | xs:string | The thread id of the conversation. |
| state | InvitationState (section [2.2.4.8](#Section_10078d29a94046b78a1cc3750c6667f8)) | The state of the invitation. |
| phoneNumber | xs:string | The phone number. |
| availableModalities | CollectionType of ConversationModality (section [2.2.4.4](#Section_6b4c77a5ed434bda8411ef288c5709d7)) | A collection of the available modalities. |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |

#### Phone Audio Invitation Resource

An **InvitationResource** structure (section [2.2.6.4](#Section_644615dc6a964e9da80eca9e348687b5)) containing the properties of a phone audio invitation.

This resource currently doesn't have any additional properties other than those of the **InvitationResource**.

#### Call Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section [2.2.4.7](%5BMS-OCSMP%5D.docx#Section_2ebb2117822f4a368bd0f0a782f36374)) containing the properties of an existing call.

| Property name | Type | Description |
| --- | --- | --- |
| state | CallState (section [2.2.4.3](#Section_93ec43e12a2a416cbeacb08984cd2e29)) | The state of the call. |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |

#### Phone Audio Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section [2.2.4.7](%5BMS-OCSMP%5D.docx#Section_2ebb2117822f4a368bd0f0a782f36374)) containing the properties of an existing phone audio call.

| Property name | Type | Description |
| --- | --- | --- |
| None. |  | The PhoneAudioResource does not have any additional properties other than from CallResource |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |
| stopPhoneAudio | A reference to the stopPhoneAudioResource |

#### Participant Resource

A **ResourceType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 2.2.4.7) containing the properties of an existing participant.

| Property name | Type | Description |
| --- | --- | --- |
| workPhoneNumber | xs:string ([[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609) section 3.2.1) | The work phone number. |
| otherPhoneNumber | xs:string | An alternate phone number. |
| Uri | xs:string | [**URI**](#gt_e18af8e8-01d7-4f91-8a1e-0fb21b191f95) of the participant. |
| name | xs:string | Name of the participant. |
| sourceNetwork | SourceNetwork (section [2.2.4.12](#Section_2a2aaae7e60247a1b886cd205b826451)) | Network location the participant has joined from. |
| role | Role (section [2.2.4.11](#Section_8bedbaab090242339f4e347ab92bc7cf)) | The role of the participant. |
| organizer | xs:boolean ([XMLSCHEMA2/2] section 3.2.2) | Is the participant the organizer (True) or not (False). |
| anonymous | xs:boolean | Is the participant anonymous (True) or not (False). |

| Link relationship | Description |
| --- | --- |
| self | A reference to the parent resource containing this link. |

#### Start Phone Audio Input Type

An **InputType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 2.2.4.2) containing the properties to start a conversation with phone audio media.

| Property name | Type | Description |
| --- | --- | --- |
| phoneNumber | xs:string ([[XMLSCHEMA2/2]](https://go.microsoft.com/fwlink/?LinkId=90609) section 3.2.1) | The user's desktop or mobile phone number to call. |
| to | xs:string | The destination phone number to call. |
| operationId | xs:string | Application supplied value to identify the operation. |
| subject | xs:string | The subject of the conversation. |
| importance | Importance (section [2.2.4.7](#Section_bda8ef3cb9ec4ab2845c2a7f25eee29e)) | The importance of the conversation. |
| threadId | xs:string | The conversation thread Id. |

#### Stop Phone Audio Input Type

An **InputType** structure ([[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section [2.2.4.2](%5BMS-OCSMP%5D.docx#Section_e0f2df6ce3d04421bb524430c4757ec0)) containing the properties required when removing phone audio from a conversation, possibly ending the conversation.

| Property name | Type | Description |
| --- | --- | --- |
| None |  | Stop phone audio currently has no input properties. |

# Protocol Details

## Server Details

The basic unit for operations in this protocol is a Resource. Applications will be able to discover available Resources as well as the Properties of a Resource thus allowing applications to create a UI that is dynamically adjustable. The entirety of this protocol will be accessible via the **HTTP** protocol. This protocol is exposed via Unified Communications Web API (UCWA) web component of the protocol server.

### Abstract Data Model

 This protocol is structured in the same way as that described in [[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) except for how navigating the protocol is performed.

#### Navigating the Protocol

Navigating the hierarchy of this protocol is made possible by the information that is contained in the response to an HTTP request on the href of a resource. The response contains a set of properties, and a set of hypermedia links to related resources.

An application resource provides hypermedia links that contain hrefs to a number of related resources, including the **communication** and **events** resources. The events resource is described in [[MS-ECREST]](%5BMS-ECREST%5D.pdf#Section_4454be95159a4c99a75a5c260609343a).

The **communication** resource provides hypermedia links to its related resources, including **startPhoneAudio** (section [3.1.5.8](#Section_59e03d88c9964cd69ccbaf4e1e5facb0)), and **conversations** (section [3.1.5.4](#Section_5c9d6c10512d4b6a81e5e0855762e487)) among others. Similarly, a **conversation** (section [3.1.5.5](#Section_9e9d5daf3405401a8afcb8d1f9a239d6)) resource provides access to the **phoneAudio** resource. The **phoneAudio** resource provides hrefs to the **stopPhoneAudio** (section [3.1.5.9](#Section_c60209f56e10420bbc47db8ae49df10b)) resource when **phoneAudio** is active.

Using the hypermedia links that are served with a given resource, you can traverse from one resource to whatever resource you need.

This protocol can use link navigation to find the conversation for conversations initiated by the application. Conversations can also be discovered initially through notifications from the event channel for conversations initiated remotely.

#### API Versioning

When a link that the application wishes to use contains a revision attribute that is not one (the default), then the application SHOULD include the X-MS-RequiresMinResourceVersion header in requests when using that resource.

Note: Applications SHOULD extract links for resources with revisions that have been tested. If the link with the expected revision is not available, the app SHOULD NOT automatically copy the revision into the header and attempt the request anyway. Instead, it would be better to disable the functionality and alert the customer that an upgraded version of the application will be required.

The protocol examples section demonstrates how the request can be used.

### Timers

 None.

### Initialization

 None.

### Higher-Layer Triggered Events

 None.

### Message Processing Events and Sequencing Rules

| Resource | Description |
| --- | --- |
| application | Represents one instance of an application that is run by a user on a specific device. |
| applications | Represents a factory in which individual application resources are created. |
| batch | Represents a batched request handler to which multiple, independent HTTP requests packaged into a single multipart request can be sent. |
| conversations | Represents a collection of conversation (section [2.2.6.2](#Section_8787b95cb6854b5aa5e9020e26bfeee5)) resources. |
| conversation | Represents a conversation between two or more participants. |
| phoneAudioInvitation | Represents an invitation to join phone audio media in a conversation. |
| phoneAudio | Represents the phone audio media in a conversation. |
| startPhoneAudio | Represents an operation to start phone audio in a new conversation. |
| stopPhoneAudio | Represents an operation to stop phone audio media in a conversation. |

#### applications

The applications resource is specified in [[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 3.1.5.2.

#### application

The application resource is specified in [[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 3.1.5.1.

#### batch

The batch resource is specified in [[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9) section 3.1.5.3.

#### conversations

The following operations are allowed to be performed on this resource.

| Operation | Description |
| --- | --- |
| GET | Gets the conversations currently active for the conversation. |

##### Get conversations

| Token | Media types | HTTP method |
| --- | --- | --- |
| conversations | application/xmlapplication/json | GET |

###### Request Body

| Request header | Usage | Value |
| --- | --- | --- |
| Accept | Response content-type negotiation. | application/xmlapplication/json |

###### Response Body

| Response header | Usage | Value |
| --- | --- | --- |
| Content-type | Response content-type. | application/xmlapplication/json |

The response body will be the conversations resource.

The response to this operation can result in the following status codes.

| Status code | Description |
| --- | --- |
| 200 | Request was successful. |
| 410 | The requested resource is no longer available at the server and no forwarding address is known |
| 404 | The requested resource is no longer available. |

#### conversation

The following operations are allowed to be performed on this resource.

| Operation | Description |
| --- | --- |
| GET | Gets the conversation identified by the supplied URL in the request. |

##### Get conversation

| Token | Media types | HTTP method |
| --- | --- | --- |
| conversation | application/xmlapplication/json | GET |

###### Request Body

| Request header | Usage | Value |
| --- | --- | --- |
| Accept | Response content-type negotiation. | application/xmlapplication/json |

###### Response Body

| Response header | Usage | Value |
| --- | --- | --- |
| Content-type | Response content-type. | application/xmlapplication/json |

The response body will be the conversation resource.

The response to this operation can result in the following status codes.

| Status code | Description |
| --- | --- |
| 200 | Request was successful. |
| 410 | The requested resource is no longer available at the server and no forwarding address is known |
| 404 | The requested resource is no longer available. |

#### phoneAudioInvitation

The following operations are allowed to be performed on this resource.

| Operation | Description |
| --- | --- |
| GET | Get the phone audio invitation. |

##### Get phone audio invitation

| Token | Media types | HTTP method |
| --- | --- | --- |
| phoneAudioInvitation | application/xmlapplication/json | GET |

###### Request Body

| Request header | Usage | Value |
| --- | --- | --- |
| Accept | Response content-type negotiation. | application/xmlapplication/json |

###### Response Body

| Response header | Usage | Value |
| --- | --- | --- |
| Content-type | Response content-type. | application/xmlapplication/json |

The response body will be the phone audio invitation resource.

The response to this operation can result in the following status codes.

| Status code | Description |
| --- | --- |
| 200 | Request was successful. |
| 410 | The requested resource is no longer available at the server and no forwarding address is known |
| 404 | The requested resource is no longer available. |

#### phoneAudio

The following operations are allowed to be performed on this resource.

| Operation | Description |
| --- | --- |
| GET | Get the phone audio resource. |

##### Get phone audio

| Token | Media types | HTTP method |
| --- | --- | --- |
| phoneAudio | application/xmlapplication/json | GET |

###### Request Body

| Request header | Usage | Value |
| --- | --- | --- |
| Accept | Response content-type negotiation. | application/xmlapplication/json |

###### Response Body

| Response header | Usage | Value |
| --- | --- | --- |
| Content-type | Response content-type. | application/xmlapplication/json |

The response body will be the phone audio resource.

The response to this operation can result in the following status codes.

| Status code | Description |
| --- | --- |
| 200 | Request was successful. |
| 410 | The requested resource is no longer available at the server and no forwarding address is known |
| 404 | The requested resource is no longer available. |

#### startPhoneAudio

The following operations are allowed to be performed on this resource.

| Operation | Description |
| --- | --- |
| POST | Start a conversation with phone audio. |

##### Post start phone audio

| Token | Media types | HTTP method |
| --- | --- | --- |
| startPhoneAudio | application/xmlapplication/json | POST |

###### Request Body

| Request header | Usage | Value |
| --- | --- | --- |
| Accept | Response content-type negotiation. | application/xmlapplication/json |

The request body SHOULD contain a **StartPhoneAudioInput** (section [2.2.6.9](#Section_4a986eff2623435995916a886e0900b1)) data structure.

###### Response Body

| Response header | Usage | Value |
| --- | --- | --- |
| Content-type | Response content-type. | application/xmlapplication/json |

The response body will be the phone audio invitation resource.

The response to this operation can result in the following status codes.

| Status code | Description |
| --- | --- |
| 201 | Request was successful. |
| 410 | The requested resource is no longer available at the server and no forwarding address is known |
| 404 | The requested resource is no longer available. |

#### stopPhoneAudio

| Token | Media types | HTTP method |
| --- | --- | --- |
| stopPhoneAudio | application/xmlapplication/json | POST |

##### Post stop phone audio

| Token | Media types | HTTP method |
| --- | --- | --- |
| stopPhoneAudio | application/xmlapplication/json | POST |

###### Request Body

| Request header | Usage | Value |
| --- | --- | --- |
| Accept | Response content-type negotiation. | application/xmlapplication/json |

The request body can be empty.

###### Response Body

| Response header | Usage | Value |
| --- | --- | --- |
| Content-type | Response content-type. | application/xmlapplication/json |

The response body will be empty.

The response to this operation can result in the following status codes.

| Status code | Description |
| --- | --- |
| 204 | Request was successful. |
| 410 | The requested resource is no longer available at the server and no forwarding address is known |
| 404 | The requested resource is no longer available. |

### Timer Events

 None.

### Other Local Events

 None.

# Protocol Examples

This section will show a few examples of how the protocol works.

## Creating an Application

The following example illustrates the exchange of messages required for a client to create an application resource in order to successfully use the a server implementing this protocol.

The client application POSTs a request to create an application instance on the server implementing this protocol. The URI to which the request is addressed is obtained from the auto-discovery response ([[MS-OCDISCWS]](%5BMS-OCDISCWS%5D.pdf#Section_95554ed7530a4a27beeeb353ea9f7e95) section 4.1.)

### HTTP Request

The body of the request includes the culture of the application, an endpointId that is unique to the client application, and the userAgent string for the client.

1. POST https://ext.vdomain.com:4443/ucwa/oauth/v1/applications HTTP/1.1
2. User-Agent: UcwaClient/1.0
3. Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...
4. Accept: application/xml
5. Content-Type: application/xml
6. Host: ext.vdomain.com:4443
7. Content-Length: 316
8. Expect: 100-continue
9.
10. <?xml version="1.0" encoding="utf-8"?>
11. <input xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
12. <property name="culture">en-US</property>
13. <property name="endpointId">e80dc357-19bb-418d-93bf-1ecb5135d43f</property>
14. <property name="userAgent">UcwaClient/1.0</property>
15. <property name="type">Phone</property>
16. </input>

### HTTP Response

The client application parses the response to find the embedded resource with the "rel" equal to events to retrieve events related to application activity.

In addition, the application will find the embedded resource with the "rel" equal to communication to retrieve the resources to available to start conversations. This embedded resource contains links to all other resources associated with starting and maintaining conversations. These links will be needed in order to perform future requests. It is advisable that links be cached but not persisted because they are only valid for the lifetime of the application instance.

When looking for resources identified by a "rel" attribute, it is advisable to determine the resource version the application was written to support. If no "revision" attribute is available, the revision is assumed to be 1.

1. HTTP/1.1 201 Created
2. Cache-Control: private
3. Via: 1.1 accessproxy.vdomain.com RtcExt
4. Content-Length: 5063
5. Content-Type: application/xml; charset=utf-8
6. Expires: Thu, 22 Jan 2015 06:43:24 GMT
7. ETag: "766942815"
8. X-MS-Server-Fqdn: SERVER.vdomain.com
9. X-MS-Correlation-Id: 2147483652
10. client-request-id: 13efd9fe-d041-4729-af67-9f97abb81a18
11. X-MS-Correlation-Id: 2147483679
12. client-request-id: bfcaa11b-6cb2-44f2-9f56-6569e15c643b
13. Strict-Transport-Security: max-age=31536000; includeSubDomains
14. Date: Wed, 21 Jan 2015 22:43:23 GMT
15.
16. <?xml version="1.0" encoding="utf-8"?>
17. <resource rel="application" href="/ucwa/oauth/v1/applications/211177894191" xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
18.
19. <link rel="events" href="/ucwa/oauth/v1/applications/211177894191/events?ack=1" />
20.
21. <property name="culture">en-US</property>
22. <property name="userAgent">UcwaClient/1.0</property>
23. <property name="type">Phone</property><property name="etag">766942815</property>
24. <resource rel="communication" href="/ucwa/oauth/v1/applications/211177894191/communication">
25. <link rel="startPhoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations" />
26. <link rel="conversations" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations?filter=active" />
27. <link rel="startMessaging" href="/ucwa/oauth/v1/applications/211177894191/communication/messagingInvitations" />
28. <link rel="startAudioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/audioVideoInvitations" />
29. <link rel="startScreenSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/applicationSharingInvitations" />
30. </resource>
31.
32. (output abbreviated for readability)
33.
34. </resource>

### Preparing to receive events

Using the [**URI**](#gt_e18af8e8-01d7-4f91-8a1e-0fb21b191f95) for the **events** resource in the response, issue a request to get event information for the application:

GET https://ext.vdomain.com:4443/ucwa/oauth/v1/applications/211177894191/events?ack=1&timeout=900 HTTP/1.1

User-Agent: UcwaClient/1.0

Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...

Accept: multipart/related; type="application/xml", multipart/related, multipart/alternative, multipart/batching

Host: ext.vdomain.com:4443

You can append the timeout parameter (see [[MS-ECREST]](%5BMS-ECREST%5D.pdf#Section_4454be95159a4c99a75a5c260609343a) section 2.2.2) to the URI before issuing the request, but it is not advisable to make any assumptions about the format of the URI.

This request will be blocked until there are events to return or until the timeout parameter value is reached. For this reason, it is not advisable to issue this request in any queue where other requests are posted.

## Starting a Phone Audio Conversation

A client application can initiate a phone audio conversation by using the startPhoneAudio API.

### Phone Number Normalization

When supplying a phone number in an input field, the phone number is validated at the server against the configured normalization rules to see if the phone number is valid. If the phone number does not match any rules, the request will be rejected with 400 Bad request, with a subcode of NormalizationFailed.

The best practice for specifying phone numbers is to specify them in tel uri format according to [[RFC3966]](https://go.microsoft.com/fwlink/?LinkId=114246).

Working with phone audio often requires specifying a phone number, which has to pass normalization checks.

### HTTP Request

For a client application to initiate a new conversation using phone audio, it issues a post request on the resource [**URI**](#gt_e18af8e8-01d7-4f91-8a1e-0fb21b191f95) identified by the "rel" value of startPhoneAudio and the current revision 1:

1. POST https://ext.vdomain.com:4443/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations HTTP/1.1
2. User-Agent: UcwaClient/1.0
3. Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...
4. Accept: application/xml
5. Content-Type: application/xml
6. Host: ext.vdomain.com:4443
7. Content-Length: 390
8. Expect: 100-continue
9.
10. <?xml version="1.0" encoding="utf-8"?>
11. <input xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
12. <property name="to">sip:UcwaOVBvtUser2@ucwatenant.com</property>
13. <property name="operationId">8eb90e4aa1874134b89dac298d458d20</property>
14. <property name="subject">OV Call</property>
15. <property name="importance">Normal</property>
16. <property name="phoneNumber">tel:+14257078488</property>
17. </input>

The request initiates an asynchronous processing a job identified by the application specified operationId. The operationId can be used to identify status of the processing in the event information returned.

### HTTP Response

1. HTTP/1.1 201 Created
2. Cache-Control: no-cache
3. Via: 1.1 accessproxy.vdomain.com RtcExt
4. Content-Length: 0
5. Location: /ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations/aa91df7425864b94b25aaf1206f1e795
6. X-MS-Server-Fqdn: SERVER.vdomain.com
7. X-MS-Correlation-Id: 2147483808
8. client-request-id: e17c53ce-064b-4b2e-8bdc-115ea79d09ca
9. X-MS-Correlation-Id: 2147483673
10. client-request-id: fcc2528c-8175-46d4-b504-c449b834ca69
11. Strict-Transport-Security: max-age=31536000; includeSubDomains
12. Date: Wed, 21 Jan 2015 22:43:23 GMT

### Processing Events

The event channel will start returning a stream of events about the status of the conversation and call that is connecting.

#### Initial events

The first set of events give you information about created resources and initial status:

1. HTTP/1.1 200 OK
2. Cache-Control: no-cache
3. Via: 1.1 accessproxy.vdomain.com RtcExt
4. Content-Length: 4145
5. Content-Type: multipart/related; type="application/xml"; charset=utf-8; boundary=3c589cb8-79df-4104-a39c-f4e03d2f2993
6. X-MS-Server-Fqdn: SERVER.vdomain.com
7. X-MS-Correlation-Id: 2147483653
8. client-request-id: 270cdbcf-da3a-4230-ad44-e880cfe2f58a
9. X-MS-Correlation-Id: 2147483680
10. client-request-id: 4a98d3e3-a561-4a07-acf9-89289788f33d
11. Strict-Transport-Security: max-age=31536000; includeSubDomains
12. Date: Wed, 21 Jan 2015 22:43:25 GMT
13.
14. --3c589cb8-79df-4104-a39c-f4e03d2f2993
15. Content-Type: application/xml; charset=utf-8
16.
17. <?xml version="1.0" encoding="utf-8"?>
18. <events href="/ucwa/oauth/v1/applications/211177894191/events?ack=1" xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
19. <link rel="next" href="/ucwa/oauth/v1/applications/211177894191/events?ack=2" />
20. <sender rel="communication" href="/ucwa/oauth/v1/applications/211177894191/communication">
21. <started rel="phoneAudioInvitation" href="/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations/aa91df7425864b94b25aaf1206f1e795">
22. <resource rel="phoneAudioInvitation" href="/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations/aa91df7425864b94b25aaf1206f1e795">
23. <link rel="from" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com" title="UcwaOVBvtUser5" />
24. <link rel="to" href="/ucwa/oauth/v1/applications/211177894191/people/ucwaovbvtuser2@ucwatenant.com" />
25. <link rel="cancel" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio/terminate" />
26. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
27. <link rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio" />
28. <property name="direction">Outgoing</property><property name="importance">Normal</property>
29. <property name="threadId">AdA1y6o9qIkpVdAlDE6j6U1YN46JpA==</property>
30. <property name="state">Connecting</property>
31. <property name="operationId">8eb90e4aa1874134b89dac298d458d20</property>
32. <property name="subject">OV Call</property>
33. </resource>
34. </started>
35. <added rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
36. <resource rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
37. <link rel="applicationSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/applicationSharing" />
38. <link rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo" />
39. <link rel="dataCollaboration" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/dataCollaboration" />
40. <link rel="messaging" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/messaging" />
41. <link rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio" />
42. <property name="state">Disconnected</property><property name="threadId">AdA1y6o9qIkpVdAlDE6j6U1YN46JpA==</property>
43. <property name="subject">OV Call</property>
44. <propertyList name="activeModalities" />
45. <property name="importance">Normal</property>
46. <property name="recording">False</property>
47. </resource>
48. </added>
49. </sender>
50. <sender rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
51. <added rel="localParticipant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com" title="UcwaOVBvtUser5">
52. <resource rel="localParticipant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com">
53. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
54. <link rel="me" href="/ucwa/oauth/v1/applications/211177894191/me" />
55. <property name="sourceNetwork">SameEnterprise</property>
56. <property name="anonymous">False</property>
57. <property name="local">True</property>
58. <property name="name">UcwaOVBvtUser5</property>
59. <property name="uri">sip:UcwaOVBvtUser5@ucwatenant.com</property>
60. </resource>
61. </added>
62. </sender>
63. </events>
64. --3c589cb8-79df-4104-a39c-f4e03d2f2993—

From this notification, you can see that your request is in state Connecting, a conversation has been added, and participants have been added to the conversation.

After processing the event information, issue a new HTTP GET request to retrieve your next set of events by using the [**URI**](#gt_e18af8e8-01d7-4f91-8a1e-0fb21b191f95) given in the **next** link specified:

1. GET https://ext.vdomain.com:4443/ucwa/oauth/v1/applications/211177894191/events?ack=2&timeout=900 HTTP/1.1
2. User-Agent: UcwaClient/1.0
3. Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...
4. Accept: multipart/related; type="application/xml", multipart/related, multipart/alternative, multipart/batching
5. Host: ext.vdomain.com:4443

Posting another HTTP GET using the next link after processing the events occurs each time event data is returned, and is assumed from now on in the protocol sample.

#### Intermediate status events

Sometime later, you will get additional events describing the progress of your phone call:

1. <?xml version="1.0" encoding="utf-8"?>
2. <events href="/ucwa/oauth/v1/applications/211177894191/events?ack=2" xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
3. <link rel="next" href="/ucwa/oauth/v1/applications/211177894191/events?ack=3" />
4. <sender rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
5. <updated rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio">
6. <resource rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio">
7. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
8. <link rel="stopPhoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio/terminate" />
9. <property name="state">Connecting</property>
10. </resource>
11. </updated>
12. </sender>
13. <sender rel="communication" href="/ucwa/oauth/v1/applications/211177894191/communication">
14. <updated rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
15. <resource rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
16. <link rel="applicationSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/applicationSharing" />
17. <link rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo" />
18. <link rel="dataCollaboration" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/dataCollaboration" />
19. <link rel="messaging" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/messaging" />
20. <link rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio" />
21. <property name="state">Connecting</property>
22. <property name="threadId">AdA1y6o9qIkpVdAlDE6j6U1YN46JpA==</property>
23. <property name="subject">OV Call</property><propertyList name="activeModalities" />
24. <property name="importance">Normal</property>
25. <property name="recording">False</property>
26. </resource>
27. </updated>
28. </sender>
29. <sender rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
30. <updated rel="messaging" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/messaging">
31. <resource rel="messaging" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/messaging">
32. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
33. <link rel="addMessaging" href="/ucwa/oauth/v1/applications/211177894191/communication/messagingInvitations?conversation=89938156-c927-4f1c-a1a2-e99178f0056f" />
34. <property name="state">Disconnected</property>
35. </resource>
36. </updated>
37. <updated rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo">
38. <resource rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo">
39. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
40. <property name="state">Disconnected</property>
41. </resource>
42. </updated>
43. <updated rel="applicationSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/applicationSharing">
44. <resource rel="applicationSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/applicationSharing">
45. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
46. <link rel="addScreenSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/applicationSharingInvitations?conversation=89938156-c927-4f1c-a1a2-e99178f0056f" />
47. <property name="state">Disconnected</property></resource>
48. </updated>
49. <updated rel="dataCollaboration" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/dataCollaboration">
50. <resource rel="dataCollaboration" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/dataCollaboration">
51. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
52. <property name="state">Disconnected</property>
53. </resource>
54. </updated>
55. </sender>
56. </events>

The HTTP protocol and MIME encoding artifacts are now removed to improve clarity. At this point, the **phoneAudio** and conversation resources have both been updated to Connecting state, and the **phoneAudio** resource has a resource link for **stopPhoneAudio**. There are no other media types in the conversation as they are all Disconnected.

#### Completion Events

The next batch of event information, shows the completion of the call with success:

1. <?xml version="1.0" encoding="utf-8"?>
2. <events href="/ucwa/oauth/v1/applications/211177894191/events?ack=3" xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
3. <link rel="next" href="/ucwa/oauth/v1/applications/211177894191/events?ack=4" />
4. <sender rel="communication" href="/ucwa/oauth/v1/applications/211177894191/communication">
5. <updated rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
6. <resource rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
7. <link rel="applicationSharing" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/applicationSharing" />
8. <link rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo" />
9. <link rel="dataCollaboration" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/dataCollaboration" />
10. <link rel="messaging" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/messaging" />
11. <link rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio" />
12. <link rel="localParticipant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com" title="UcwaOVBvtUser5" />
13. <link rel="participants" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants" />
14. <link rel="addParticipant" href="/ucwa/oauth/v1/applications/211177894191/communication/participantInvitations?conversation=89938156-c927-4f1c-a1a2-e99178f0056f" />
15. <property name="state">Connected</property>
16. <property name="threadId">AdA1y6o9qIkpVdAlDE6j6U1YN46JpA==</property>
17. <property name="subject">OV Call</property>
18. <propertyList name="activeModalities">
19. <item>Audio</item>
20. </propertyList>
21. <property name="importance">Normal</property>
22. <property name="recording">False</property>
23. </resource>
24. </updated>
25. </sender>
26. <sender rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f">
27. <added rel="participant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser2@ucwatenant.com" title="UcwaOVBvtUser2" />
28. <added rel="participantAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser2@ucwatenant.com/audio">
29. <in rel="participant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser2@ucwatenant.com" title="UcwaOVBvtUser2" />
30. </added>
31. <added rel="participantAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com/audio">
32. <in rel="localParticipant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com" title="UcwaOVBvtUser5" />
33. <resource rel="participantAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com/audio">
34. <link rel="participant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com" title="UcwaOVBvtUser5" />
35. </resource>
36. </added>
37. <updated rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo">
38. <resource rel="audioVideo" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/audioVideo">
39. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
40. <property name="state">Disconnected</property>
41. </resource>
42. </updated>
43. <updated rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio">
44. <resource rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio">
45. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
46. <link rel="transfer" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio/transfer" revision="2" />
47. <link rel="stopPhoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio/terminate" />
48. <property name="state">Connected</property>
49. </resource>
50. </updated>
51. <updated rel="participant" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser2@ucwatenant.com" title="UcwaOVBvtUser2" />
52. </sender>
53. <sender rel="communication" href="/ucwa/oauth/v1/applications/211177894191/communication">
54. <completed rel="phoneAudioInvitation" href="/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations/aa91df7425864b94b25aaf1206f1e795">
55. <status>Success</status>
56. <resource rel="phoneAudioInvitation" href="/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations/aa91df7425864b94b25aaf1206f1e795">
57. <link rel="from" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/participants/ucwaovbvtuser5@ucwatenant.com" title="UcwaOVBvtUser5" />
58. <link rel="to" href="/ucwa/oauth/v1/applications/211177894191/people/ucwaovbvtuser2@ucwatenant.com" />
59. <link rel="conversation" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f" />
60. <link rel="phoneAudio" href="/ucwa/oauth/v1/applications/211177894191/communication/conversations/89938156-c927-4f1c-a1a2-e99178f0056f/phoneAudio" />
61. <property name="direction">Outgoing</property>
62. <property name="importance">Normal</property>
63. <property name="threadId">AdA1y6o9qIkpVdAlDE6j6U1YN46JpA==</property>
64. <property name="state">Connected</property>
65. <property name="operationId">8eb90e4aa1874134b89dac298d458d20</property>
66. <property name="subject">OV Call</property>
67. </resource>
68. </completed>
69. </sender>
70. </events>

The **phoneAudio** resource has been updated and its state is now Connected. The **phoneAudioInvitation** has now completed its work and has a final state of Connected. The **conversation** is also in Connected state.

## Receiving a Phone Audio Invitation

Receiving a phone audio call doesn’t require any action by the application. The acceptance of the call is at the phone that was called. Events are delivered in the same manner as when an outgoing conversation was made, except that the direction properties will be Incoming.

### Processing Events

Events for an incoming phone audio conversation is the same for the outgoing case.

## Stopping Phone Audio

A client application can stop a phone audio in a conversation by using the stopPhoneAudio API. If the conversation only has phone audio in it, it will terminate the conversation as well as the phone audio.

### HTTP Request

POST https://ext.vdomain.com:4443/ucwa/oauth/v1/applications/211525898501/communication/conversations/756e9863-7232-4f92-b64e-7abcefb0a3e8/phoneAudio/terminate HTTP/1.1

User-Agent: UcwaClient/1.0

Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...

Accept: application/xml

Content-Type: text/plain

Host: ext.vdomain.com:4443

Content-Length: 0

### HTTP Response

HTTP/1.1 204 No Content

Cache-Control: no-cache

Via: 1.1 accessproxy.vdomain.com RtcExt

Content-Length: 0

X-MS-Server-Fqdn: SERVER.vdomain.com

X-MS-Correlation-Id: 2147484557

client-request-id: 2c81b86a-8ec3-4799-a169-acd39c35c2fb

X-MS-Correlation-Id: 2147485111

client-request-id: 582d58c6-585c-4804-82a8-4641623f2bb7

Strict-Transport-Security: max-age=31536000; includeSubDomains

Date: Thu, 29 Jan 2015 21:56:03 GMT

## Handling resource versions

When working with resources that have been versioned, it is necessary to add the X-MS-RequiresMinResourceVersion header to the request. This section shows how this is added into the request. In this case, the link used by the application in the example was marked with a revision of 2:

<link rel="myGroupMemberships" href="/ucwa/oauth/v1/applications/211177894191/people/groupMemberships" revision="2" />

### HTTP Request

POST https://ext.vdomain.com:4443/ucwa/oauth/v1/applications/11543867552/people/groupMemberships?... HTTP/1.1

X-MS-RequiresMinResourceVersion: 2

User-Agent: UcwaClient/1.0

Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...

Accept: application/json

Host: ext.vdomain.com:4443

Content-Length: 0

### HTTP Response

HTTP/1.1 204 No Content

Cache-Control: no-cache

Via: 1.1 accessproxy.vdomain.com RtcExt

Content-Length: 0

X-MS-Server-Fqdn: SERVER.vdomain.com

X-MS-Correlation-Id: 2147483691

client-request-id: 48ed8c59-418e-4c12-9211-8faca8856eda

X-MS-Correlation-Id: 2147483676

client-request-id: 85d705bc-f016-4a20-ab25-e17740418895

Strict-Transport-Security: max-age=31536000; includeSubDomains

Date: Thu, 29 Jan 2015 16:20:17 GMT

## Working with Asynchronous Operations

Some operations in UCWA, such as starting phone audio or another type of conversation, can take a considerable amount of time, and needs periodic status updates. These long-running operations are represented as a special type of resource, an **operation resource**.

An operation resource is created in the event channel as the result of a POST request to the URL of another kind of resource that can be thought of as an **operation factory**. One example of an operation factory resource is the **startPhoneAudio** resource. The response to the POST request will have the HTTP status code 201 Created, and the Location header will give the URL to the operation that was created.

All subsequent updates to the operation status will arrive in the event channel, until the final "completed" event.

The operation that the **startPhoneAudio** resource creates is a **phoneAudioInvitation** resource. A "started", "updated", or "completed" event includes both the embedded operation resource and a link to the same resource. This way the client can associate the outcome of the operation with the operation itself.

Because updates to operation resources arrive as a response to a separate HTTP request (the pending GET, or P-GET), in some cases the event can reach the client before the arrival of the 201 Created response (which contains the link to the operation resource). This makes it impossible to associate an event with the URL of the operation. To link events to their corresponding operations, all operation-starting resources in UCWA accept an "operationId" key-value pair in either the POST body or as a query parameter. This ID is a unique identifier that is generated by the client, that is also be included in every event about the operation, which makes it possible to match the event to the operation at all times.

Example:

Below is an example of a client application starting an operation, providing an operation ID, and tracking it on the event channel:

1. POST https://ext.vdomain.com:4443/ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations HTTP/1.1
2. User-Agent: UcwaClient/1.0
3. Authorization: Bearer cwt=AAEBHAEFAAAAAAAFFQAAAPmQRuRgha2wB2cEg...
4. Accept: application/xml
5. Content-Type: application/xml
6. Host: ext.vdomain.com:4443
7. Content-Length: 390
8. Expect: 100-continue
9.
10. <?xml version="1.0" encoding="utf-8"?>
11. <input xmlns="http://schemas.microsoft.com/rtc/2012/03/ucwa">
12. <property name="to">sip:UcwaOVBvtUser2@ucwatenant.com</property>
13. <property name="operationId">8eb90e4aa1874134b89dac298d458d20</property>
14. <property name="subject">OV Call</property>
15. <property name="importance">Normal</property>
16. <property name="phoneNumber">tel:+14257078488</property>
17. </input>

The POST response includes the operation URL.

1. HTTP/1.1 201 Created
2. Cache-Control: no-cache
3. Via: 1.1 accessproxy.vdomain.com RtcExt
4. Content-Length: 0
5. Location: /ucwa/oauth/v1/applications/211177894191/communication/phoneAudioInvitations/aa91df7425864b94b25aaf1206f1e795
6. X-MS-Server-Fqdn: SERVER.vdomain.com
7. X-MS-Correlation-Id: 2147483808
8. client-request-id: e17c53ce-064b-4b2e-8bdc-115ea79d09ca
9. X-MS-Correlation-Id: 2147483673
10. client-request-id: fcc2528c-8175-46d4-b504-c449b834ca69
11. Strict-Transport-Security: max-age=31536000; includeSubDomains
12. Date: Wed, 21 Jan 2015 22:43:23 GMT

# Security

## Security Considerations for Implementers

None.

## Index of Security Parameters

None.

# Appendix A: Full XML Schema

Body of requests use the InputType complex type described in [[MS-OCSMP]](%5BMS-OCSMP%5D.pdf#Section_53c3507cc98747a99bc8bb2baa18e1b9).

Resources are returned using the ResourceType complex type described in [MS-OCSMP].

The property names and possible values are listed for each resource or enumeration in sections [2.2.6](#Section_61b148682a1a4119a112c93e9d7410c9) and section [2.2.4](#Section_c2066e33969849219d11e4da6e8bdf24).

# Appendix B: Common Error Responses

The errors listed in the following table apply to most resources.

| Error  | Description  |
| --- | --- |
| ApplicationNotFound | The application resource does not exist.  |
| BadRequest | Something is wrong with the entire request (malformed XML/JSON, for example).  |
| DeserializationFailure | The request body could not be deserialized. Please check if the body confirms to allowed formats and does not have any invalid characters.  |
| EntityTooLarge | The request is too large.  |
| InactiveApplicationExpired | An inactive application expired.  |
| MethodNotAllowed | The requested HTTP method is not supported for this resource.  |
| MobileApplicationNoLongerAllowed  | User is no longer authorized for mobile applications.  |
| ParameterValidationFailure  | A parameter value is not valid.  |
| PreconditionFailed  | An If-Match precondition was not met.  |
| PreconditionRequired  | The operation requires an If-Match precondition.  |
| ResourceNotFound  | The resource does not exist.  |
| ServiceFailure  | Internal Server Error.  |
| ServiceTimeout  | Internal Server Error, remote timeout.  |
| TooManyApplications  | There are too many applications for this user.  |
| UnsupportedMediaType | The content-type is not supported.  |
| VersionNotSupported  | Requested Version is not supported.  |

# Appendix C: Product Behavior

The information in this specification is applicable to the following Microsoft products or supplemental software. References to product versions include updates to those products.

* Microsoft Lync Client 2013/Skype for Business
* Microsoft Skype for Business 2016
* Microsoft Skype for Business Server 2015
* Microsoft Skype for Business 2019
* Microsoft Skype for Business Server 2019
* Microsoft Skype for Business 2021

Exceptions, if any, are noted in this section. If an update version, service pack or Knowledge Base (KB) number appears with a product name, the behavior changed in that update. The new behavior also applies to subsequent updates 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.

# Change Tracking

This section identifies changes that were made to this document since the last release. Changes are classified as Major, Minor, or None.

The revision class **Major** means that the technical content in the document was significantly revised. Major changes affect protocol interoperability or implementation. Examples of major changes are:

* A document revision that incorporates changes to interoperability requirements.
* A document revision that captures changes to protocol functionality.

The revision class **Minor** means that the meaning of the technical content was clarified. Minor changes do not affect protocol interoperability or implementation. Examples of minor changes are updates to clarify ambiguity at the sentence, paragraph, or table level.

The revision class **None** means that no new technical changes were introduced. Minor editorial and formatting changes may have been made, but the relevant technical content is identical to the last released version.

The changes made to this document are listed in the following table. For more information, please contact dochelp@microsoft.com.

| Section | Description | Revision class |
| --- | --- | --- |
| [8](#Section_4cb9e28c1b804e4abfa0ca660b76e5ab) Appendix C: Product Behavior | Updated list of supported products. | Major |

# Index

A

Abstract data model

 [server](#section_64852388a58a4ba0a0b1f454f5a673e3) 20

[Applicability](#section_62b5cf2dec5e4e3e8594234cf1ce156c) 8

[Attributes](#section_1c9e49cdbf5140e1b16e2e7f8601a253) 14

C

[Capability negotiation](#section_c4619091963f43be9249693f06a4c05e) 8

[Change tracking](#section_e12875f9e1484746988a3680d275ef31) 44

[Common data structures](#section_61b148682a1a4119a112c93e9d7410c9) 15

[Complex types](#section_99a943155fc146bf9b632999ba7356dc) 9

[Creating an application example](#section_3ddc5b286bd24f8f9474430372769fa2) 28

[Custom HTTP headers](#section_9e3a253030754a2ab030ed2980ef29d1) 9

D

Data model - abstract

 [server](#section_64852388a58a4ba0a0b1f454f5a673e3) 20

E

Events

 [local - server](#section_705886e9ceed4b2ba96b96d23f9ec10d) 27

 [timer - server](#section_f03a8823fa2c42aea42b06fb5cf46c4b) 27

[Examples](#section_43386e751b014bee9198be6e13c9c209) 28

 [creating an application](#section_3ddc5b286bd24f8f9474430372769fa2) 28

 [Creating an Application example](#section_3ddc5b286bd24f8f9474430372769fa2) 28

 [handling resource versions](#section_0da132b39fbb45ae83390d2e05cce236) 37

 [Handling resource versions example](#section_0da132b39fbb45ae83390d2e05cce236) 37

 [receiving a phone audio invitation](#section_f22a0c10e39848a99607ab1a608ad0da) 37

 [Receiving a Phone Audio Invitation example](#section_f22a0c10e39848a99607ab1a608ad0da) 37

 [starting a phone audio](#section_8ed1fdc4914842849e4fecad0e4a9bc8) 30

 [Starting a Phone Audio Conversation example](#section_8ed1fdc4914842849e4fecad0e4a9bc8) 30

 [stopping phone audio](#section_243d3aebd4a34fb4bad16463746848d7) 37

 [Stopping Phone Audio example](#section_243d3aebd4a34fb4bad16463746848d7) 37

 [working with ansynchronous operations](#section_78b5523176f340a2b0f9b6f36f445e90) 38

 [Working with Asynchronous Operations example](#section_78b5523176f340a2b0f9b6f36f445e90) 38

F

[Fields - vendor-extensible](#section_71b5e8f6bc074b819daade5902a53074) 8

[Full XML schema](#section_3fd00ab99ce74dc69112a741005a2413) 41

G

[Glossary](#section_1a3fcfcfc4074438b04f9916666b50bd) 6

H

[Handling resource versions example](#section_0da132b39fbb45ae83390d2e05cce236) 37

Headers

 [custom http](#section_9e3a253030754a2ab030ed2980ef29d1) 9

Higher-layer triggered events

 [server](#section_9fb467608a1e4ac0a236f6798029ce74) 21

I

[Implementer - security considerations](#section_0d6b3e896dd549e8a34851bca9d4ed34) 40

[Index of security parameters](#section_1884562891fc4b1c8c13cde163b24f10) 40

[Informative references](#section_b9d7ead3d1864a32b53733f6a4d8bea6) 7

Initialization

 [server](#section_af76ac59ec294f9faa6cb0668909ea3c) 21

[Introduction](#section_3340653cf9a24370a5376861a4dbb372) 6

L

Local events

 [server](#section_705886e9ceed4b2ba96b96d23f9ec10d) 27

M

Message processing

 server ([section 3.1.5](#section_0adc9b784faf4b8783e46a2d1f4e9d24) 21, [section 3.1.5.2](#section_3e2c2d60da764885840fda383e42bef6) 21)

Messages

 [attributes](#section_1c9e49cdbf5140e1b16e2e7f8601a253) 14

 [common data structures](#section_61b148682a1a4119a112c93e9d7410c9) 15

 [complex types](#section_99a943155fc146bf9b632999ba7356dc) 9

 [namespaces](#section_be0defe89ef24986b093791de2d0434c) 9

 [simple types](#section_c2066e33969849219d11e4da6e8bdf24) 10

 [syntax](#section_a04fe195e7064a9d9a8ce4348ab5c77e) 9

 [transport](#section_3ec0c9dae59f4c76be2d0ad1ba8bbee3) 9

N

[Namespaces](#section_be0defe89ef24986b093791de2d0434c) 9

[Normative references](#section_b3e19a5474994d03bbb751e1a4e5902b) 7

O

[Overview (synopsis)](#section_57ec8de9296149119dd9acee896e994e) 7

P

[Parameters - security index](#section_1884562891fc4b1c8c13cde163b24f10) 40

[Preconditions](#section_201ff70aa0ee47808244650e8a1777a5) 8

[Prerequisites](#section_201ff70aa0ee47808244650e8a1777a5) 8

[Product behavior](#section_4cb9e28c1b804e4abfa0ca660b76e5ab) 43

Protocol Details

 [Server](#section_07ae768df01c46bda793e233259d3552) 20

Protocol examples

 [Creating an Application](#section_3ddc5b286bd24f8f9474430372769fa2) 28

 [Handling resource versions](#section_0da132b39fbb45ae83390d2e05cce236) 37

 [Receiving a Phone Audio Invitation](#section_f22a0c10e39848a99607ab1a608ad0da) 37

 [Starting a Phone Audio Conversation](#section_8ed1fdc4914842849e4fecad0e4a9bc8) 30

 [Stopping Phone Audio](#section_243d3aebd4a34fb4bad16463746848d7) 37

 [Working with Asynchronous Operations](#section_78b5523176f340a2b0f9b6f36f445e90) 38

R

[Receiving a phone audio invitation example](#section_f22a0c10e39848a99607ab1a608ad0da) 37

References

 [informative](#section_b9d7ead3d1864a32b53733f6a4d8bea6) 7

 [normative](#section_b3e19a5474994d03bbb751e1a4e5902b) 7

[Relationship to other protocols](#section_2effad9f3877489ab1316088763ec239) 7

S

Security

 [implementer considerations](#section_0d6b3e896dd549e8a34851bca9d4ed34) 40

 [parameter index](#section_1884562891fc4b1c8c13cde163b24f10) 40

Sequencing rules

 [server](#section_0adc9b784faf4b8783e46a2d1f4e9d24) 21

Server

 [Abstract data model](#section_64852388a58a4ba0a0b1f454f5a673e3) 20

 [Higher-layer triggered events](#section_9fb467608a1e4ac0a236f6798029ce74) 21

 [Initialization](#section_af76ac59ec294f9faa6cb0668909ea3c) 21

 [local events](#section_705886e9ceed4b2ba96b96d23f9ec10d) 27

 message processing ([section 3.1.5](#section_0adc9b784faf4b8783e46a2d1f4e9d24) 21, [section 3.1.5.2](#section_3e2c2d60da764885840fda383e42bef6) 21)

 [Message processing events and sequencing rules](#section_0adc9b784faf4b8783e46a2d1f4e9d24) 21

 [Other local events](#section_705886e9ceed4b2ba96b96d23f9ec10d) 27

 [sequence rules](#section_3e2c2d60da764885840fda383e42bef6) 21

 [sequencing rules](#section_0adc9b784faf4b8783e46a2d1f4e9d24) 21

 [Timer events](#section_f03a8823fa2c42aea42b06fb5cf46c4b) 27

 [Timers](#section_6a092b2ebcab4d8a94720935086950b0) 20

[Simple types](#section_c2066e33969849219d11e4da6e8bdf24) 10

[Standards assignments](#section_c8c01c140ff3455781c1fe9e6b62ae68) 8

[Starting a phone audio example](#section_8ed1fdc4914842849e4fecad0e4a9bc8) 30

[Stopping phone audio example](#section_243d3aebd4a34fb4bad16463746848d7) 37

Syntax

 [messages - overview](#section_a04fe195e7064a9d9a8ce4348ab5c77e) 9

T

Timer events

 [server](#section_f03a8823fa2c42aea42b06fb5cf46c4b) 27

Timers

 [server](#section_6a092b2ebcab4d8a94720935086950b0) 20

[Tracking changes](#section_e12875f9e1484746988a3680d275ef31) 44

[Transport](#section_3ec0c9dae59f4c76be2d0ad1ba8bbee3) 9

 [namespaces](#section_be0defe89ef24986b093791de2d0434c) 9

Types

 [complex](#section_99a943155fc146bf9b632999ba7356dc) 9

 [simple](#section_c2066e33969849219d11e4da6e8bdf24) 10

V

[Vendor-extensible fields](#section_71b5e8f6bc074b819daade5902a53074) 8

[Versioning](#section_c4619091963f43be9249693f06a4c05e) 8

W

[Working with ansynchronous operations example](#section_78b5523176f340a2b0f9b6f36f445e90) 38

X

[XML schema](#section_3fd00ab99ce74dc69112a741005a2413) 41