[MS-CONFIM]:
Centralized Conference Control Protocol: Instant Messaging Extensions

Revision Summary

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			the technical content.
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.

Table of Contents

1   Introduction

This document specifies proprietary extensions to the framework for Instant Messaging (IM) conferences for the Centralized Conferencing Control protocol described in [MS-CONFBAS].

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)
base64
GUID
Transmission Control Protocol (TCP)

The following terms are defined in [MS-OFCGLOS]:

200 OK
202 Accepted
Best Effort NOTIFY (BENOTIFY)
conference
conference URI (conference-URI)
dialog
endpoint
focus
Globally Routable User Agent URI (GRUU)
IM MCU
INVITE
Multipoint Control Unit (MCU)
Multipurpose Internet Mail Extensions (MIME)
notification
participant
Session Description Protocol (SDP)
Session Initiation Protocol (SIP)
SIP response code
SUBSCRIBE
subscription
Transport Layer Security (TLS)
Uniform Resource Identifier (URI)
user agent client (UAC)
user agent server (UAS)

The following terms are specific to this document:

Instant Message Delivery Notification (IMDN): A notification that is sent from a multipoint control unit (MCU) to the sender of a message. It contains details about any failures that occurred when forwarding the message to other participants in a conference.

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 technical 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. Please check the archive site, http://msdn2.microsoft.com/en-us/library/E4BD6494-06AD-4aed-9823-445E921C9624, as an additional source.

[MS-CONFBAS] Microsoft Corporation, "Centralized Conference Control Protocol: Basic Architecture and Signaling Specification".

[RFC2045] Freed, N., and Borenstein, N., "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", RFC 2045, November 1996, http://ietf.org/rfc/rfc2045.txt

[RFC2046] Freed, N., and Borenstein, N., "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", RFC 2046, November 1996, http://ietf.org/rfc/rfc2046.txt

[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

[RFC2976] Donovan, S., "The SIP INFO Method", RFC 2976, October 2000, http://www.rfc-editor.org/rfc/rfc2976.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

[RFC3265] Roach, A. B., "Session Initiation Protocol (SIP)-Specific Event Notification", RFC 3265, June 2002, http://www.ietf.org/rfc/rfc3265.txt

[RFC3311] Rosenberg, J., "The Session Initiation Protocol (SIP) UPDATE Method", RFC 3311, September 2002, http://www.rfc-editor.org/rfc/rfc3311.txt

[RFC3428] Campbell, B., Ed., Rosenberg, J., Schulzrinne, H., et al., "Session Initiation Protocol (SIP) Extension for Instant Messaging", RFC 3428, December 2002, http://www.rfc-editor.org/rfc/rfc3428.txt

[RFC4028] Donovan, S., and Rosenberg, J., "Session Timers in the Session Initiation Protocol (SIP)", RFC 4028, April 2005, http://www.rfc-editor.org/rfc/rfc4028.txt

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

1.2.2 Informative References

[MS-CONFAV] Microsoft Corporation, "Centralized Conference Control Protocol: Audio-Video Extensions".

[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 framework of protocols for creating, controlling, and deleting **conferences** is described in [MS-CONFBAS]. This document specifies the extensions to this framework for Instant Messaging (IM) conferences.

[MS-CONFBAS] specifies the details of how the protocol client establishes the session to the **focus**. The protocols for the session to the **Multipoint Control Unit (MCU)** are specific to each media type. The details of how the protocol client establishes the session to the **IM MCU** are specified in section 3.1. Section 2.2.1 specifies the **endpoint-capabilities** that are specific to the IM media type. The **endpoint-capabilities** are sent in the conference state notify messages.

When the protocol client sends an IM to an IM MCU, the MCU forwards the IM to each **participant (2)** connected to the conference. The details of how the IM forwarding happens are specified in section 3.3. Section 3.3.2.5.2 specifies the **notifications** sent back to the sender about any failures in forwarding the message.

1.4 Relationship to Other Protocols

This protocol has the same relationship to other protocols as described in [MS-CONFBAS] section 1.4. This document depends upon **Session Initiation Protocol (SIP)**, as described in [RFC3261], and **Session Description Protocol (SDP)**, as described in [RFC4566]. It uses XML to send the **Instant Message Delivery Notification (IMDN)**.

1.5 Prerequisites/Preconditions

The prerequisites for this specification are the same as those described in [MS-CONFBAS] section 1.5.

1.6 Applicability Statement

The basic architecture and signaling rules for the Centralized Conferencing Control protocol, as described in [MS-CONFBAS], are applicable when the **user agent client (UAC)**, **user agent server (UAS)**, and MCU support SIP and use one or more aspects of the conferencing functionality described in [MS-CONFBAS] and this specification for Instant Messaging (IM) conferences.

1.7 Versioning and Capability Negotiation

[MS-CONFBAS] specifies how the **C3PVersion** attribute is used to indicate the version of the messages. The current protocol version is "1".

Explicit capability negotiation is done by using the **Supported** header to indicate support of various features. Using the **Supported** header is the standard SIP mechanism of doing capability negotiation.

1.8 Vendor-Extensible Fields

None.

1.9 Standards Assignments

None.

2 Messages

2.1 Transport

This specification does not introduce a new transport to exchange messages. Messages are exchanged using SIP, as specified in [RFC3261]. SIP messages are transported over, **Transmission Control Protocol (TCP)**, or **Transport Layer Security (TLS)**.

2.2 Message Syntax

This document relies on the SIP message format specified in [RFC3261]. SDP is used for the message body of the **INVITE** to specify the media type. [MS-CONFBAS] messages and IMDN messages use XML formatted messages in the SIP message body. This protocol extends the **conference-info** XML schema to add UAC capabilities specific to instant messaging. It also defines a new XML schema for sending IMDN messages.

2.2.1 IM Endpoint Capabilities Schema

The **endpoint** element in the conference state notification is specified in [MS-CONFBAS] section 2.2.2.6. It has an **endpoint-capabilities** element and the schema for this element depends on the media type of the **endpoint**. This element contains information about any media-specific capabilities of the **endpoint**. For the IM media type, this element contains the following:

- A list of the IM formats supported by the protocol client in the **supported-im-formats** element. Each format is specified using the **Content-Type** associated with the format, and the formats are separated by white space.

- A **user-agent** element specifying the **user-agent** header sent by the endpoint.

The XML schema of IM Endpoint Capabilities is specified in section 6.1.

An example message is as follows:

```
<endpoint entity="{E9F6FF05-1C46-4D93-889D-9CA1398FFA49}"
          msci:session-type="chat"
          msci:endpoint-uri=
              "sip:alice@contoso.com;
                  opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
  <status>connected</status>
  <joining-method>dialed-in</joining-method>
  <media id="1">
    <type>chat</type>
  </media>
  <msci:endpoint-capabilities>
    <msim:endpoint-capabilities>
      <msim:supported-im-formats> text/rtf application/x-ms-ink
                                  image/gif multipart/alternative
                                  application/ms-imdn+xml
      </msim:supported-im-formats>
      <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0
                       (Microsoft Office Communicator)
      </msim:user-agent>
    </msim:endpoint-capabilities>
  </msci:endpoint-capabilities>
</endpoint>
```

2.2.2   Instant Message Delivery Notification (IMDN) Schema

The IMDN message is sent from the IM MCU to the sender of an IM to indicate the status associated with forwarding the message to the other protocol clients. The IMDN message contains the **message-id** of the MESSAGE and a list containing status information associated with each attempted forward of the MESSAGE. The XML schema for an IMDN message is defined in section 6.2. An example IMDN message follows:

```
<?xml version="1.0" encoding="utf-8"?>
<imdn xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
 xmlns:xsd="http://www.w3.org/2001/XMLSchema"
 xmlns="http://schemas.microsoft.com/rtc/2005/08/imdn">
  <message-id>2</message-id>
  <recipient
   uri="&lt;sip:bob@contoso.com
                ;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu&gt;">
    <status>408</status>
    <entry>
      <key>ms-diagnostics</key>
      <value>6001;source="server.microsoft.com";
             reason="Request Timeout";component="ImMcu"
      </value>
    </entry>
  </recipient>
</imdn>
```

The **message-id** element contains the **message-id** for the MESSAGE request. This SHOULD be the same as the **Message-Id** header sent in the successful response to the MESSAGE request from the MCU to the protocol client, as specified in section 3.3.2.5.

The IMDN XML contains a list of **recipient** elements. Each **recipient** element contains the status information associated with an attempted forward of the MESSAGE request. The **uri** attribute contains the SIP **Uniform Resource Identifier (URI)** of the protocol client. The **status** element in the **recipient** element contains the SIP status code. In addition, it MAY contain a list of **entry** elements. Each **entry** element contains a key value pair. The key element in the **entry** element is a string element and the value element in the **entry** element is a string element corresponding to the key.

If the IMDN message does not contain any **recipient** elements, it implies that the MESSAGE was forwarded successfully to all the other participants (2). The IMDN message MUST contain all the errors in forwarding the MESSAGE. In addition to this, the IMDN message MAY contain the success information in forwarding the MESSAGE.

2.2.3   Ms-Sender Header

This document defines a new SIP header called **Ms-Sender**. The **Ms-Sender** header is included in the SIP MESSAGE requests that are forwarded to the other participants (2) in the conference by the MCU. The header contains the information about the actual sender who sent the message to the conference. The syntax of the **Ms-Sender** header in **Augmented Backus-Naur Form (ABNF)**, as defined in [RFC5234], is as follows:

```
Ms-Sender = "Ms-Sender" HCOLON (name-addr / addr-spec)
            *( SEMI generic-param)
```

name-addr, **addr-spec** and **generic-param** are defined in [RFC3261] section 25.

2.2.4   Message-Id Header

This document defines a new SIP header called **Message-Id**. The **Message-Id** header is included in the success response to the MESSAGE request sent from the MCU to the protocol client. It is also included in the MESSAGE requests forwarded to the other participants (2) in the conference. The **Message-Id** is used to assign a serial number to each MESSAGE request received by the MCU and also to associate the MESSAGE request with the IMDN message sent back to the sender. The details are specified in section 3.3. The syntax of the **Message-Id** header in ABNF, as defined in [RFC5234], is as follows:

```
Message-Id = "Message-Id" HCOLON 1*DIGIT
```

2.2.5   SDP for IM Session

This document specifies a new media type message for the media description field in SDP. This media type indicates an instant messaging session where the instant messages are sent using SIP MESSAGE requests on the INVITE **dialog**. The port for the media description MUST be set to "5060". The protocol MUST be set to "sip" and the media format description MUST be set to "null". The receiver of the SDP MUST ignore the port in the media description.

This document also specifies a new media level attribute field named **accept-types**. The **a=accept-types** attribute field MUST be associated with the **m=message** media description field. This attribute gives a list of the IM formats supported by the negotiating parties. This attribute is defined in ABNF, as defined in [RFC5234], as follows:

```
"a=accept-types:" "*" / ( im-format *(im-format) )
im-format = m-type SLASH m-subtype
```

m-type, **m-subtype** and **SLASH** are defined in [RFC3261] section 25.

If the **accept-types** attribute is not present, it implies that the protocol client only supports the "text/plain" IM format specified in [RFC2046] section 4.1. It is assumed that all protocol clients support the "text/plain" IM format, even if it is not listed in the **accept-types** attribute.

An example SDP is as follows:

```
v=0
o=- 0 0 IN IP4 10.56.64.122
s=session
c=IN IP4 10.56.64.122
t=0 0
m=message 5060 sip null
a=accept-types:text/rtf multipart/alternative application/ms-imdn+xml
```

Except for the new fields specified in the preceding code, the rest of the session description is standard SDP.

2.2.6   Ms-Focus-Uri Header

This document defines a new SIP header called **Ms-Focus-Uri**. The **Ms-Focus-Uri** header is included in the SIP INVITE request sent from the MCU to the protocol client. The header contains

the URI for the conference. The syntax of the **Ms-Focus-Uri** header in ABNF, as defined in [RFC5234], is as follows:

```
Ms-Focus-Uri = "Ms-Focus-Uri" HCOLON (name-addr / addr-spec)
               *( SEMI generic-param)
```

name-addr, **addr-spec**, and **generic-param** are defined in [RFC3261] section 25.

3   Protocol Details

This section specifies the protocol details between the protocol client and the IM MCU. The protocol client needs to first join a conference. After successfully joining a conference, the client can send MESSAGE and INFO requests to the other clients joined to the conference. Finally, the protocol client can leave the conference. Specifically, this section discusses:

- Joining a conference.

- Leaving a conference.

- Forwarding MESSAGE requests.

- Forwarding INFO requests.

All the other conference control and notification actions required for IM conferences are specified in [MS-CONFBAS]. For supporting IM conferences, the server MUST support the following conference control requests for the IM media type:

- **createConference**

- **deleteConference**

- **addUser**

- **deleteUser**

- **modifyConferenceLock**

3.1   Joining a Conference Details

When the protocol client joins a conference, it creates an INVITE session and a **SUBSCRIBE** session to the focus and a session to the MCU for each media type. The details of the sessions to the focus are specified in [MS-CONFBAS] section 2.2.1. This section specifies the details of how the session from the protocol client to the IM MCU is created.

The session between the protocol client and the MCU is established using the SIP INVITE transaction. As discussed in [MS-CONFBAS] section 3.2, there are two ways in which a protocol client can join the MCU in a conference. The protocol client can either dial into a conference on the MCU or the MCU can dial out to the protocol client. In the dial-in case, the protocol client initiates the SIP INVITE transaction to the MCU. So, the protocol client acts as the SIP UAC and the MCU acts as the SIP UAS. In the dial-out case, the MCU initiates the SIP INVITE transaction to the protocol client. So, the MCU acts as the SIP UAC and the protocol client acts as the SIP UAS. The details of these two scenarios are specified in the following sections.

The MCU MUST support the session timer extension specified in [RFC4028]. The protocol client SHOULD use the UPDATE request specified in [RFC3311] to refresh the INVITE session.

3.1.1   Common Details

Several details of conference joining are common to both the client and server roles.

3.1.1.1   Session Description (SDP) Exchange

The UAC and UAS exchange the session description in the INVITE request and the **200 OK** response of the INVITE transaction. The protocols specified in [RFC3261] and [RFC4566] MUST be followed to

establish the SIP INVITE dialog and exchange the SDP. The **m=message** line specified in section 2.2.5 MUST be used to indicate an instant messaging session. The **a=accept-types** line MUST be used to convey the IM formats supported.

3.1.1.2 Ms-Sender Extension

This document specifies a new **Supported** header named **ms-sender**. If this **Supported** header is present in the INVITE request or the 200 OK response from the protocol client, the protocol client supports the **ms-sender** header specified in section 2.2.3. This header is used by the MCU to notify the information about the sender of the message in the MESSAGE requests forwarded to the other participants (2) in the conference. Clients supporting this specification SHOULD support the **ms-sender** extension.

3.1.2 Client Details

3.1.2.1 Abstract Data Model

None.

3.1.2.2 Timers

None.

3.1.2.3 Initialization

None.

3.1.2.4 Higher-Layer Triggered Events

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC3265] MUST be followed. The protocol client MUST ignore the **ms-focus-uri** header if it is present in any **SIP** request or response.

3.1.2.4.1 Initiate IM Media Session to MCU in Dial-in Scenario

In the dial-in scenario, when the protocol client initiates the IM media session to the IM MCU, it starts the SIP INVITE transaction to the MCU, as specified in [RFC3261] section 8.1.1. The destination of the SIP INVITE request MUST be set to the IM MCU **conference URI (conference-URI)** for the conference.

3.1.2.5 Message Processing Events and Sequencing Rules

When the media session is created, the SDP exchange takes place, as specified in section 3.1.1. The protocol client MUST follow the appropriate protocol as specified, depending on whether it is the UAC or the UAS in the INVITE transaction. In addition, clients implementing this specification SHOULD support the "multipart/alternative" **content-type** specified in [RFC2046] section 5.1.4. For an example of the message flow, see section 4.1. The client MUST NOT specify the **accept-type** value of "*". If the client receives an SDP offer from the server with accept-types value of "*", it implies the server supports all **content-type** values in the original SDP offer.

3.1.2.5.1 INVITE Session with the MCU is Established

When the INVITE session with the MCU is established, the protocol client MUST notify the higher layer that the media session was successfully established.

3.1.2.5.2   Client Receives the Conference State Notification Corresponding to Another User

When the media session is established, the MCU sends a conference state notification to all the protocol clients, as specified in [MS-CONFBAS] section 3.4.4.2. When the protocol client receives a notification for the IM **endpoint (5)**, it SHOULD parse the IM **endpoint-capabilities** from the format outlined in section 2.2.1 and retrieve the **supported-im-formats** value to determine the capabilities of the other protocol clients in the conference and choose the common formats for the MESSAGE requests it sends to the MCU.

3.1.2.6   Timer Events

None.

3.1.2.7   Other Local Events

None.

3.1.3   Server Details

3.1.3.1   Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

Client data: The MCU maintains the following information for each protocol client in the conference:

- **IM formats supported by the protocol client:** A list of IM formats supported by the protocol client.

- **Ms-sender flag:** A Boolean flag that indicates whether the protocol client supports the **Ms-Sender** extension.

3.1.3.2   Timers

None.

3.1.3.3   Initialization

None.

3.1.3.4   Higher-Layer Triggered Events

3.1.3.4.1   Receive addUser Request to Dial out to Client

When the MCU receives the **addUser** request to dial out to the protocol client, it MUST initiate the IM media session to the protocol client, as specified in [MS-CONFBAS] section 3.2.4.2. The SDP exchange that happens during the INVITE session is described in section 3.1.1.

The MCU SHOULD<1> include the **MS-Focus-Uri** header described in section 2.2.6. If the header is included, it MUST contain the conference-URI.

3.1.3.4.2 Focus receiving the session establishing INVITE to the MCU

Similar to [MS-CONFAV] section 3.1.5.1, the focus can send an **addUser** request on the client's behalf when receiving the INVITE from the client. The format of the **addUser** request follows the syntax in [MS-CONFAV] section 2.2.3.4.

3.1.3.5 Message Processing Events and Sequencing Rules

3.1.3.5.1 MCU Receives Session Description (SDP) from Client

When the MCU receives the SDP from the protocol client, it MUST store the **a=accept-types** attribute and store the IM formats supported by the protocol client in the **Client data** state. This state is used later when forwarding the messages.

3.1.3.5.2 Invite Session with the Client is Established

The MCU MUST check to see if the protocol client supports the **Ms-Sender** extension. This is done by checking the INVITE or 200 OK from the protocol client for the **Supported Ms-Sender** header. This information is stored in the **Ms-Sender** flag in the **Client data** state. This state is used later when forwarding the messages.

As specified in section 2.2.1, this document extends the schema for the **conference-info** XML to add endpoint (5) capabilities specific to the IM media type. The MCU MUST send the **endpoint-capabilities** element for the IM endpoint (5) in the conference state notification sent to the protocol client.

As specified in section 3.3.2.1, the MCU forwards the MESSAGE request history for the first 40 seconds after the conference is created on the MCU. If the **Message history flag** (defined in 3.3.2.1) is "true", the MESSAGE request list MUST be forwarded to the protocol client. Each MESSAGE request in the list MUST be forwarded to the protocol client following the procedure described in section 3.3.2.5.1.

If the SDP in the INVITE request from the protocol client contains an **accept-types** attribute, as described in section 2.2.5, the value of the attribute MUST be sent in the **supported-im-formats** element. If the SDP does not contain the **accept-types** attribute, the value of the **supported-im-formats** element SHOULD be set to "text/plain".

As specified in section 2.2.1, this document extends the schema for the **conference-info** XML to add endpoint capabilities specific to the IM media type. The MCU MUST send the **endpoint-capabilities** element for the IM endpoint (5) in the conference state notification sent to the protocol client. If the protocol client does not support the **Ms-sender** extension, the **supported-im-formats** element SHOULD be set to "text/plain". If the protocol client supports the **Ms-sender** extension and the SDP in the INVITE request from the protocol client contains an **accept-types** attribute, as described in section 2.2.5, the value of the **accept-types** attribute MUST be sent in the **supported-im-formats** element. If the SDP does not contain the **accept-types** attribute, the value of the **supported-im-formats** element SHOULD be set to "text/plain". In addition, if the INVITE request from the protocol client contains a **user-agent** header, the value of the **user-agent** element is the value of the **user-agent** header. If the **user-agent** header is not sent by the protocol client, the **user-agent** element is not sent.

3.1.3.6 Timer Events

None.

3.1.3.7   Other Local Events

None.

3.2   Leaving the Conference Details

A participant (2) leaves the conference by one of two mechanisms: by either terminating the sessions to the focus and the MCU, or by being ejected from the conference. The details of the sessions to the focus are specified in [MS-CONFBAS] section 3.4.4.2. This section specifies the details of how the session to the MCU is terminated.

The termination of the INVITE session between the protocol client and the MCU MUST follow the protocols specified in [RFC3261] section 15. The protocol client and the MCU MUST use the BYE request as specified. The protocol client and MCU SHOULD use the session timer extension specified in [RFC4028] to determine if the SIP INVITE session is still active.

3.2.1   Client Details

3.2.1.1   Abstract Data Model

None.

3.2.1.2   Timers

None.

3.2.1.3   Initialization

None.

3.2.1.4   Higher-Layer Triggered Events

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC4028] MUST be followed.

3.2.1.4.1   Client Disconnects from the Conference

The protocol client MUST send a BYE request to the IM MCU to terminate the INVITE session, as specified in [RFC3261].

3.2.1.5   Message Processing Events and Sequencing Rules

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC4028] MUST be followed.

3.2.1.5.1   INVITE Session with the MCU is Terminated

When the INVITE session with the MCU is terminated, the protocol client MUST notify the higher layer that the media session was disconnected. If the protocol client receives a BYE request, it SHOULD process the request as specified in [RFC3261] section 15.

3.2.1.6   Timer Events

None.

3.2.1.7 Other Local Events

None.

3.2.2 Server Details

3.2.2.1 Abstract Data Model

None.

3.2.2.2 Timers

None.

3.2.2.3 Initialization

None.

3.2.2.4 Higher-Layer Triggered Events

3.2.2.4.1 Receive deleteUser Request to Disconnect Client

When a client is ejected from a conference, the client sends a **deleteUser** request, as specified in [MS-CONFBAS] section 3.8. When the MCU receives the **deleteUser** request to disconnect the client, the MCU MUST send a BYE request to the client to terminate the INVITE session, as specified in [RFC3261] section 15.

3.2.2.5 Message Processing Events and Sequencing Rules

3.2.2.5.1 Invite Session with the Client is Terminated

When the INVITE session with the protocol client is terminated, the MCU MUST send a conference state notification indicating that the endpoint (5) was deleted, as specified in [MS-CONFBAS] section 3.8.5.1. If the MCU receives a BYE request, it SHOULD process the request as specified in [RFC3261] section 15.

3.2.2.6 Timer Events

None.

3.2.2.7 Other Local Events

None.

3.3 MESSAGE Forwarding Details

The protocol client can use SIP MESSAGE requests, as defined in [RFC3428], on the media session to send instant messages to the other protocol clients in the conference. This section specifies the details of MESSAGE forwarding.

3.3.1   Client Details

3.3.1.1   Abstract Data Model

None.

3.3.1.2   Timers

None.

3.3.1.3   Initialization

The protocol client establishes the IM media session to the MCU using the protocols discussed in section 3.1.

3.3.1.4   Higher-Layer Triggered Events

3.3.1.4.1   Client Sends a MESSAGE

When the user sends a MESSAGE to the conference, the protocol client sends a SIP MESSAGE request on the INVITE session to the MCU. As specified in section 3.3.1.5.2, the protocol client SHOULD use the **endpoint-capabilities** of all the other participants (2) in the conference to determine the format of the message it sends. The protocol client can send a **multipart/alternative** message, specified in [RFC2045], that includes body parts with different IM formats to provide the best possible experience on protocol clients with different capabilities. If the protocol client sends a **multipart** body, the body parts MUST use the binary **Content-Transfer-Encoding**. Other **Content-Transfer-Encodings** MUST NOT be used.

3.3.1.5   Message Processing Events and Sequencing Rules

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC3265] MUST be followed.

3.3.1.5.1   Client Receives a Final Response to the MESSAGE Request Sent

If the protocol client receives a 200 OK response, it MUST treat it as if the MESSAGE request was forwarded successfully to all the other participants (2) in the conference.

If the protocol client receives a **202 Accepted** response, it MUST get the **message-id** from the **Message-Id** header in the response. If the **Message-Id** header is absent, the **message-id** would have the default value of 0. The client MUST start the **sendMessageTimer** (defined in section 3.3.1.6) and wait for an IMDN from the MCU. The schema for IMDN is specified in section 6.2, and the interpretation of the elements is described in section 2.2.2. If the **message-id** from the IMDN matches the **message-id** from the 202 Accepted response, the protocol client then notifies the status of the MESSAGE forward to the user by interpreting the IMDN and stops the **sendMessageTimer** if it is not yet fired. If the **sendMessageTimer** is fired, it is treated as if the protocol client received a failure IMDN with **status** of 408 for all recipients for the **message-id** received from the 202 Accepted response. If the **message-id** is not present in the 202 Accepted response, it takes the default value of 0.

3.3.1.5.2   Client Receives a MESSAGE Forwarded by the MCU

The protocol client MUST send a 200 OK response to the incoming MESSAGE request. The protocol client MUST get sender information for the MESSAGE from the **Ms-Sender** header, if present, and

display it to the user along with the message. Note that the **From URI** in the MESSAGE request contains the IM media session conference-URI.

3.3.1.6 Timer Events

The protocol client MUST maintain a **sendMessageTimer**. The usage of the timer is described in section 3.3.1.5.1. The default timer value is 10 seconds.

3.3.1.7 Other Local Events

None.

3.3.2 Server Details

3.3.2.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

Current message ID: An integer value maintained by the MCU for each conference. The value is initialized to "1" when the conference is created on the MCU. The value keeps track of the message ID that will be assigned to the next incoming MESSAGE. The message ID is sent in the response back to the sender of the MESSAGE, in the MESSAGE requests forwarded by the MCU, and in the IM delivery notification message sent back to the protocol client.

Client data: The MCU maintains the following information for each protocol client in the conference:

- **IM formats supported by the protocol client:** A list of IM formats supported by the protocol client.

- **Ms-sender flag:** A Boolean flag that indicates whether the protocol client supports the **Ms-Sender** extension.

Message history: The MCU maintains the history of the MESSAGE requests received for the first 40 seconds after the conference is created on the MCU. This history helps in forwarding the initial messages sent while the conference is being created and the protocol clients are still joining the conference. The following data is stored in the message history:

- **MESSAGE request list:** The MESSAGE requests are stored in a list. When a protocol client joins the conference within the first 40 seconds, the list of MESSAGE requests is forwarded to the protocol client.

- **Message history flag:** This flag is checked to determine whether incoming MESSAGE requests can be added to the history. It is "true" for the first 40 seconds. After that, it is set to "false".

MESSAGE forward status: The MCU maintains state about the outgoing MESSAGE forward transactions associated with an incoming MESSAGE. For each of the forwarded MESSAGE requests, it keeps track of the **SIP response code** and any **ms-diagnostics** headers that are present in the response. This information is used to send an IMDN to the sender of the MESSAGE.

3.3.2.2 Timers

Message history timer: A timer for 40 seconds is maintained for storing the message history once the conference is created on the MCU. If a protocol client joins the MCU before the timer expires, the message history is forwarded to the client. Once the timer expires, the message history is cleared and subsequent MESSAGE requests sent to the MCU are not added to the message history.

3.3.2.3 Initialization

The IM media sessions between the participants (2) and the MCU are set up using the protocols specified in section 3.1.

3.3.2.4 Higher-Layer Triggered Events

None.

3.3.2.5 Message Processing Events and Sequencing Rules

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC3265] MUST be followed.

3.3.2.5.1 MCU Receives MESSAGE from the Client

The MCU MUST send a 200 OK response to the incoming MESSAGE request if the sender is the only protocol client connected. The 200 OK response indicates that there will be no other delivery notification. If there are other protocol clients connected to the MCU, the MCU SHOULD send a 202 Accepted response to the protocol client. The 202 Accepted response indicates that the MCU will notify the protocol client later about the status of the MESSAGE forwarding using an IM delivery notification.

The MCU MUST add a **Message-Id** header to the 200 or 202 response with a header value equal to the current message ID and MUST increment the current message ID by 1.

The MCU MUST forward the MESSAGE request to each of the other protocol clients joined to the media session.

The MCU MUST also add a **Message-Id** header to the forwarded MESSAGE request with a header value set to the message ID sent in the response to the incoming MESSAGE.

If the **message history flag** is "true", the MESSAGE request MUST be added to the MESSAGE request list in the message history.

If the protocol client does not support the **Ms-Sender** extension and the **content-type** of the message is "text/plain", as specified in [RFC2046], the MCU SHOULD add the sender's URI to the message body of the forwarded MESSAGE requests. If the protocol client does not support the **Ms-Sender** extension and the **content-type** of the message is not "text/plain", the MCU SHOULD add error information with a 415 SIP response code for the protocol client to the **MESSAGE forward status** state.

If the protocol client supports the **Ms-Sender** extension, the following logic applies.

The MCU MUST add an **Ms-Sender** header to the forwarded MESSAGE request with a header value of the sender's URI.

If the incoming MESSAGE has a **multipart/alternative** body and the protocol client does not support the "multipart/alternative" **content-type**, the MCU SHOULD parse the **multipart** body as

specified in [RFC2045] and send the body part that the protocol client supports. If none of the parts in the **multipart** body are supported by the protocol client, the MCU SHOULD add error information with a 415 SIP response code for the protocol client to the **MESSAGE forward status** state.

If the incoming message does not have a **multipart** body, the MCU MUST forward the message to the protocol client. If the protocol client supports the "multipart/alternative" **content-type**, the MCU MUST forward the message to the protocol client.

3.3.2.5.2 MESSAGE Forward Transaction Completes

When the MESSAGE forward transaction from the MCU to one of the protocol clients completes with a success or failure response or a time-out, it MUST check the **MESSAGE forward status** state to see if all the MESSAGE forward transactions associated with the incoming MESSAGE have completed. If all the MESSAGE forward transactions associated with an incoming MESSAGE are complete, the MCU MUST send an IMDN message back to the protocol client. The MCU MUST add the **message-id** and the URI and status code information related to each failure to the IMDN. As defined in section 2.2.2, the **message-id** MUST be specified in the **message-id** element. The SIP URI of the protocol client MUST be specified in the **uri** attribute of the **recipient** element. The SIP status code MUST be specified in the **status** element.

The MCU SHOULD add the **message-id.** This information is used to match outstanding send.

The MCU MAY<2> add the URI and status code information related to successful forwards to the IMDN. This information is used only by other server features, and clients MUST NOT rely on this information.

The IMDN XML document MUST be sent in the message body of a **Best Effort NOTIFY (BENOTIFY)** SIP message from the MCU to the protocol client. The **Content-Type** header of the BENOTIFY message MUST be set to "application/ms-imdn+xml".

3.3.2.6 Timer Events

3.3.2.6.1 Message History Time-out

When the message history time-out expires, the MESSAGE request list in the message history MUST be cleared and the message history flag MUST be set to "false".

3.3.2.7 Other Local Events

None.

3.4 INFO Forwarding Details

The protocol client can use SIP INFO requests, as specified in [RFC2976], on the IM media session for conveying user typing or idle information. This section specifies the details of how INFO forwarding works. It is very similar to MESSAGE forwarding, as described in section 3.3, except that there are no **Message-ID**s and IMDNs. The MCU does not interpret the content of the message body in the INFO requests, and simply forwards the INFO requests to the other protocol clients.

3.4.1 Client Details

3.4.1.1 Abstract Data Model

None.

3.4.1.2 Timers

None.

3.4.1.3 Initialization

The protocol client establishes the IM media session to the MCU using the protocols specified in section 3.1.

3.4.1.4 Higher-Layer Triggered Events

3.4.1.4.1 Client Sends a SIP INFO Request

The protocol client sends a SIP INFO request on the INVITE session to the MCU for conveying user typing or idle information. The MCU does not interpret the content of the message body in the INFO request, and simply forwards the INFO request to the other protocol clients.

3.4.1.5 Message Processing Events and Sequencing Rules

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC3265] MUST be followed.

3.4.1.5.1 Client Receives a Final Response to the INFO Request Sent

If the protocol client receives a 202 Accepted response to the INFO request, it MUST treat it as if the INFO request was sent successfully to the MCU. The protocol client does not receive any notification of the forward status to the other protocol clients.

3.4.1.5.2 Client Receives an INFO Forwarded by the MCU

The protocol client MUST send a 200 OK response to the incoming MESSAGE request. The protocol client MUST get sender information for the INFO request from the **Ms-Sender** header, if present, and display it to the user. Note that the **From URI** in the INFO request contains the IM media session URI for the conference.

3.4.1.6 Timer Events

None.

3.4.1.7 Other Local Events

None.

3.4.2 Server Details

3.4.2.1 Abstract Data Model

This section describes a conceptual model of possible data organization that an implementation maintains to participate in this protocol. The described organization is provided to facilitate the explanation of how the protocol behaves. This document does not mandate that implementations adhere to this model as long as their external behavior is consistent with that described in this document.

Client data: The MCU maintains the following information for each protocol client in the conference:

- **Ms-sender flag:** A Boolean flag that specifies whether the protocol client supports the **Ms-Sender** extension.

3.4.2.2 Timers

None.

3.4.2.3 Initialization

The IM media sessions between the participants (2) and the MCU are set up using the protocols specified in section 3.1.

3.4.2.4 Higher-Layer Triggered Events

None.

3.4.2.5 Message Processing Events and Sequencing Rules

Unless otherwise noted in the following sections, the rules for message processing and error handling specified in [RFC3261] and [RFC3265] MUST be followed.

3.4.2.5.1 MCU Receives INFO from the Client

The MCU MUST send a 202 Accepted response to the incoming INFO request.

The MCU MUST check the **Ms-sender flag** of each protocol client joined to the media session before forwarding the INFO request. If the protocol client supports the **Ms-Sender** extension, the MCU MUST add an **Ms-Sender** header to the forwarded INFO request with a header value of the sender's URI. If the protocol client does not support the **Ms-Sender** extension, the MCU MUST NOT forward the INFO request to the protocol client.

3.4.2.5.2 INFO Forward Transaction Completes

When the INFO forward transaction from the MCU to one of the protocol clients completes with a success or failure response or a time-out, the MCU ignores the response. The MCU does not send any notification back to the sender about the status of the forwarded INFO transactions.

3.4.2.6 Timer Events

None.

3.4.2.7 Other Local Events

None.

4   Protocol Examples

The following sections contain actual protocol examples of common scenarios related to IM conferencing. Note the consistent convention throughout this set of examples:

- "Alice", "Bob", and "Carol" are arbitrary users of one of the client products supported by this protocol. Alice is the initiator of each conference.

- Leslie is an Office Communicator 2005 user, which is a legacy protocol client.

- The focus and IM MCU are logical entities inside one of the server products supported by this protocol.

4.1   IM Conference Entry Scenarios

4.1.1   A Client Joins an IM Conference via addUser Dial-In

In this example, Alice has already started an IM conference with Bob, and now invites Carol into it.
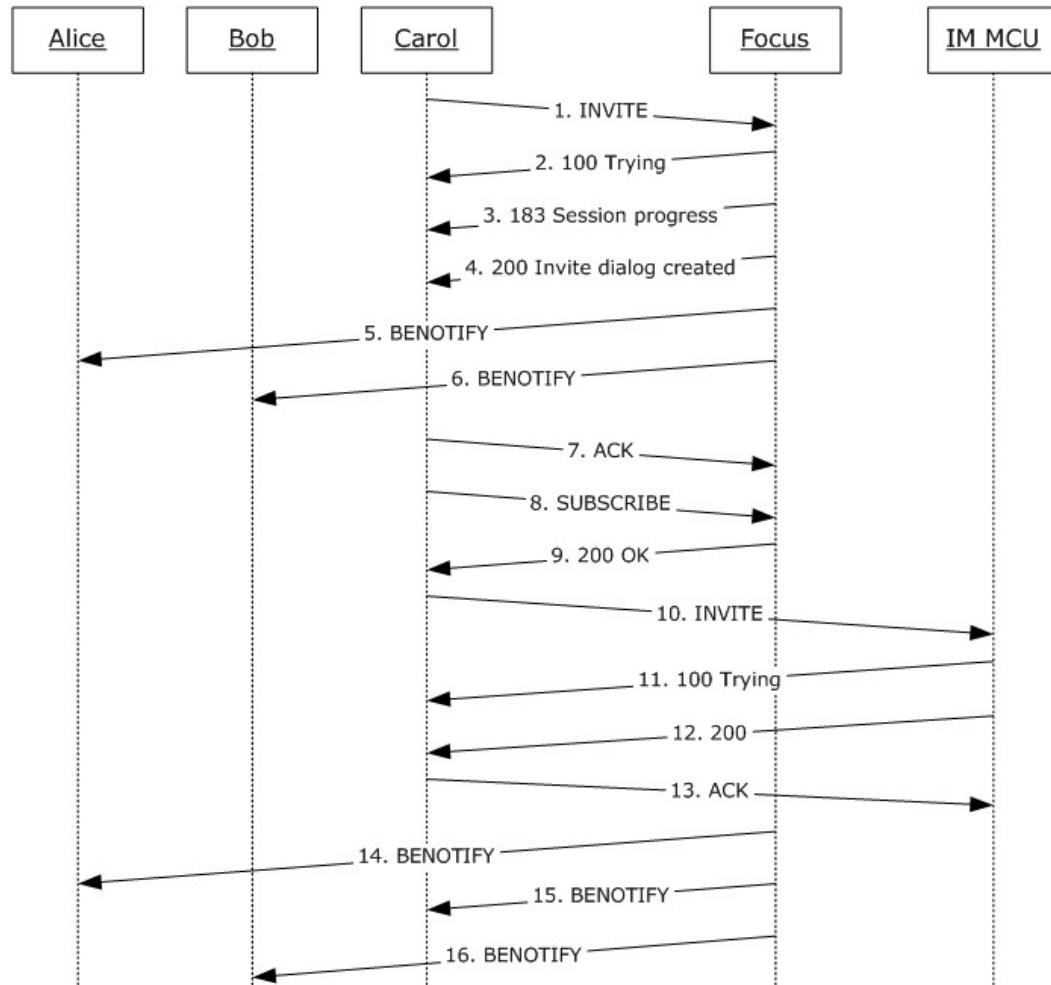
Figure 1: Carol joins the IM conference using dial-in

1. Carol sends an INVITE to the focus to join the conference. In this example, the specific request is **addUser**, and there is a single **user** element for the user being added. Carol is requesting to join the conference as an "attendee," and provides an **endpoint GUID**.

```
INVITE
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104
SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=a2d73820f1;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
Call-ID: f799d40aef33402a8e4095aba7915692
CSeq: 1 INVITE
Contact: <sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Supported: timer
Supported: ms-sender
Supported: ms-early-media
ms-keep-alive: UAC;hop-hop=yes
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="1af55b85", cnum="53", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff4e3f28efccba4ed9d2541a1d9c9772dc"
Content-Type: application/cccp+xml
Content-Length: 716
<?xml version="1.0"?>
<request xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions" C3PVersion="1"
to="sip:alice@contoso;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104"
from="sip:carol@contoso.com" requestId="0">
  <addUser>
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C8
94FE91E104" />
    <ci:user xmlns:ci="urn:ietf:params:xml:ns:conference-info"
entity="sip:carol@contoso.com">
      <ci:roles>
        <ci:entry>attendee</ci:entry>
      </ci:roles>
      <ci:endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions" />
    </ci:user>
  </addUser>
</request>
```

2. The focus responds to Carol with a provisional response.

```
SIP/2.0 100 Trying
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF2C71122A6517953A97522D9751D0B9C4",
srand="3BE002B6", snum="62", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: <sip:carol@contoso.com>;tag=a2d73820f1;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
Call-ID: f799d40aef33402a8e4095aba7915692
```

```
CSeq: 1 INVITE
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Content-Length: 0
```

3. The focus indicates to Carol that her request is being processed.

```
SIP/2.0 183 Session Progress
Contact: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com>;isfocus
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF5965F6504A7E7DE4436A105B0744F0ED",
srand="CD913F5D", snum="63", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: "Carol"<sip:carol@contoso.com>;tag=a2d73820f1;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=DB120080
Call-ID: f799d40aef33402a8e4095aba7915692
CSeq: 1 INVITE
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Content-Length: 0
```

4. The focus indicates to Carol that her request was successfully processed.

```
SIP/2.0 200 Invite dialog created
ms-keep-alive: UAS; tcp=no; hop-hop=yes; end-end=no; timeout=300
Contact: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com>;isfocus
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFC2412468DFF71A8EE5E16803DB0D9444",
srand="220BE74B", snum="64", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Content-Length: 1073
From: "Carol"<sip:carol@contoso.com>;tag=a2d73820f1;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=DB120080
Call-ID: f799d40aef33402a8e4095aba7915692
CSeq: 1 INVITE
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Allow: INVITE, BYE, ACK, CANCEL, INFO, UPDATE
Content-Type: application/cccp+xml
Session-Expires: 7200;refresher=uac
Require: timer
Supported: timer
<response xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
xmlns:msls="urn:ietf:params:xml:ns:msls" requestId="0" C3PVersion="1"
```

```
from="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91
E104" to="sip:carol@contoso.com" code="success">
  <addUser>
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C8
94FE91E104" />
    <ci:user entity="sip:carol@contoso.com">
      <ci:roles>
        <ci:entry>attendee</ci:entry>
      </ci:roles>
    </ci:user>
  </addUser>
</response>
```

5. Because Carol has been added to the conference, the other participants (2) need to be notified. In the following example, Alice receives notification. The conference roster is specified as "partial" in this notification, and only the new participant (2), Carol, appears. It is not necessary for Alice and Bob to appear in this notification because their states have not changed.

```
BENOTIFY sip:10.29.107.208:2308;transport=tls;ms-opaque=3c71125d8b;ms-received-
cid=200;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKBD95EA8F.E5BC3BD5;branched=FALSE
Authentication-Info: NTLM rspauth="01000000D1213103B7CBE9B364D52E88",
srand="D60E50C0", snum="147", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:alice@contoso.com>;tag=9d8927b7a1;epid=dceed2edfb
Content-Length: 1113
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=A62E0080
Call-ID: 0d47a20d5eaa49b399f1ca52ff210115
CSeq: 5 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104" state="partial" version="8">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
      <display-text>Carol</display-text>
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}" msci:session-
type="focus" msci:epid="bd4bd366c2" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
        <status>connected</status>
      </endpoint>
    </user>
  </users>
```

```
</conference-info>
```

6. Bob is notified, just as Alice was notified, that Carol has joined the conference.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bK0C3A7BF1.CB1C2022;branched=FALSE
Authentication-Info: NTLM rspauth="01000000030000007F634A41554C2961",
srand="9EA41327", snum="78", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=d9c47387e4;epid=65a77e620d
Content-Length: 1113
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=1C300080
Call-ID: ff5348b0e001463db5417d99102486e8
CSeq: 3 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@consoto.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104" state="partial" version="8">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
      <display-text>Carol</display-text>
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}" msci:session-
type="focus" msci:epid="bd4bd366c2" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
        <status>connected</status>
      </endpoint>
    </user>
  </users>
</conference-info>
```

7. Carol sends an **ACK** to the focus, and her dialog with it is established.

```
ACK
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104
SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=a2d73820f1;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=DB120080
Call-ID: f799d40aef33402a8e4095aba7915692
```

```
CSeq: 1 ACK
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="f67572f1", cnum="55", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff1db69c62045431ade2bdf53a25c4ebe7"
Content-Length: 0
```

8. Carol subscribes to the focus for conference state change information.

```
SUBSCRIBE
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104
SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=60442060d0;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
Call-ID: adec75c32a9c45d190c7fd370e192840
CSeq: 1 SUBSCRIBE
Contact: <sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Event: conference
Accept: application/conference-info+xml
Supported: com.microsoft.autoextend
Supported: ms-benotify
Proxy-Require: ms-benotify
Supported: ms-piggyback-first-notify
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="92521b84", cnum="56", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff0781788ecb7c06bdbf3a299c47fa7ef"
Content-Length: 0
```

9. The focus indicates a successful SUBSCRIBE. It also sends the full conference state, so that Carol
   knows who the participants (2) are and what their roles are.

```
SIP/2.0 200 OK
Contact: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com>;isfocus
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF7C2FD20F51A874D8DEE7BD3182733D54",
srand="A870FBAD", snum="66", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Content-Length: 5655
From: "Carol"<sip:carol@contoso.com>;tag=60442060d0;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=877E0080
Call-ID: adec75c32a9c45d190c7fd370e192840
CSeq: 1 SUBSCRIBE
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Expires: 3348
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3348
ms-piggyback-cseq: 1
```

```
Supported: ms-benotify, ms-piggyback-first-notify
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104" state="full" version="8">
  <conference-description>
    <conf-uris>
      <entry>

<uri>sip:alice@contoso.com;gruu;opaque=app:conf:meeting:id:FC275ECD12493E4E9C27C894FE9
1E104</uri>
        <display-text>meeting</display-text>
        <purpose>meeting</purpose>
      </entry>
      <entry>

<uri>sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E1
04</uri>
        <display-text>chat</display-text>
        <purpose>chat</purpose>
      </entry>
      <entry>
        <uri>sip:alice@contoso.com;gruu;opaque=app:conf:audio-
video:id:FC275ECD12493E4E9C27C894FE91E104</uri>
        <display-text>audio-video</display-text>
        <purpose>audio-video</purpose>
      </entry>
    </conf-uris>
  </conference-description>
  <users state="full">
    <user entity="sip:alice@contoso.com" state="full">
      <display-text>Alice</display-text>
      <roles>
        <entry>presenter</entry>
      </roles>
      <endpoint entity="{1D5E1076-AB39-46C0-8D74-46B79B1DCA27}" msci:session-
type="focus" msci:epid="dceed2edfb" msci:endpoint-
uri="sip:alice@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
        <status>connected</status>
      </endpoint>
      <endpoint entity="{E9F6FF05-1C46-4D93-889D-9CA1398FFA49}" msci:session-
type="chat" msci:endpoint-
uri="sip:alice@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
        <status>connected</status>
        <joining-method>dialed-in</joining-method>
        <media id="1">
          <type>chat</type>
        </media>
        <msci:endpoint-capabilities>
          <msim:endpoint-capabilities>
            <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
            <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
          </msim:endpoint-capabilities>
```

```
      </msci:endpoint-capabilities>
    </endpoint>
  </user>
  <user entity="sip:bob@contoso.com" state="full">
    <display-text>Bob</display-text>
    <roles>
      <entry>attendee</entry>
    </roles>
    <endpoint entity="{531D6008-B5B7-43E1-BD5A-21C45640F711}" msci:session-
type="focus" msci:epid="65a77e620d" msci:endpoint-
uri="sip:bob@contoso.com;opaque=user:epid:WnSWnXmF_1KSXbKtzArTKQAA;gruu">
      <status>connected</status>
    </endpoint>
    <endpoint entity="{28142307-B500-448D-B9D4-D9C76D3E68D7}" msci:session-
type="chat" msci:endpoint-
uri="sip:bob@contoso.com;opaque=user:epid:WnSWnXmF_1KSXbKtzArTKQAA;gruu">
      <status>connected</status>
      <joining-method>dialed-in</joining-method>
      <media id="1">
        <type>chat</type>
      </media>
      <msci:endpoint-capabilities>
        <msim:endpoint-capabilities>
          <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
          <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
        </msim:endpoint-capabilities>
      </msci:endpoint-capabilities>
    </endpoint>
  </user>
  <user entity="sip:carol@contoso.com" state="full">
    <display-text>Carol</display-text>
    <roles>
      <entry>attendee</entry>
    </roles>
    <endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}" msci:session-
type="focus" msci:epid="bd4bd366c2" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
      <status>connected</status>
    </endpoint>
  </user>
</users>
<msci:conference-view ci:state="full">
  <msci:entity-view ci:state="full"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104">
    <msci:entity-state>
      <msci:locked>false</msci:locked>
    </msci:entity-state>
  </msci:entity-view>
  <msci:entity-view ci:state="full"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:audio-
video:id:FC275ECD12493E4E9C27C894FE91E104">
    <msci:entity-capabilities>
      <msav:capabilities>
        <msav:supports-audio>true</msav:supports-audio>
        <msav:supports-video>true</msav:supports-video>
      </msav:capabilities>
    </msci:entity-capabilities>
```

```
      <msci:entity-state>
        <msci:media>
          <entry label="main-audio">
            <type>audio</type>
            <status>sendrecv</status>
          </entry>
          <entry label="main-video">
            <type>video</type>
            <status>sendrecv</status>
            <msci:modal-parameters>
              <msci:video-parameters>
                <msav:video-mode>dominant-speaker-switched</msav:video-mode>
              </msci:video-parameters>
            </msci:modal-parameters>
          </entry>
          <entry label="panoramic-video">
            <type>panoramic-video</type>
            <status>sendrecv</status>
          </entry>
        </msci:media>
      </msci:entity-state>
    </msci:entity-view>
    <msci:entity-view ci:state="full"
  entity="sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE9
  1E104">
      <msci:entity-state>
        <msci:locked>false</msci:locked>
        <msci:media>
          <entry label="chat">
            <type>chat</type>
          </entry>
        </msci:media>
      </msci:entity-state>
    </msci:entity-view>
    <msci:entity-view ci:state="full"
  entity="sip:alice@contoso.com;gruu;opaque=app:conf:meeting:id:FC275ECD12493E4E9C27C894
  FE91E104">
      <msci:entity-state application="27877e66-615c-4582-ab88-0cb2ca05d951">
        <msci:locked>false</msci:locked>
        <msci:media>
          <entry label="meeting">
            <type>meeting</type>
          </entry>
        </msci:media>
      </msci:entity-state>
    </msci:entity-view>
  </msci:conference-view>
</conference-info>
```

10. Now that Carol has joined the roster through the focus, she sends an INVITE to the IM MCU, including the SDP necessary for IM.

```
INVITE
sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E104
SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=b14a627091;epid=bd4bd366c2
```

```
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E104>
Call-ID: dea95d4f5d564a12861f6594763c674d
CSeq: 1 INVITE
Contact: <sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Supported: ms-delayed-accept
Supported: ms-renders-isf
Supported: ms-renders-gif
Supported: ms-renders-mime-alternative
Supported: timer
Supported: ms-sender
Supported: ms-early-media
Roster-Manager: sip:carol@contoso.com
EndPoints: <sip:carol@contoso.com>,
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E104>
Supported: com.microsoft.rtc-multiparty
ms-keep-alive: UAC;hop-hop=yes
Supported: ms-conf-invite
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="0b7f4014", cnum="57", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffffd4048674b73a7f3591efd886fc2c1a7a"
Content-Type: application/sdp
Content-Length: 203
v=0
o=- 0 0 IN IP4 10.56.64.122
s=session
c=IN IP4 10.56.64.122
t=0 0
m=message 5060 sip null
a=accept-types:text/rtf application/x-ms-ink image/gif multipart/alternative
application/ms-imdn+xml
```

11. The IM MCU gives a provisional response to Carol.

```
SIP/2.0 100 Trying
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFADB699DDCAD22AC841B5A6C0B622DE91",
srand="FE13C6B1", snum="67", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: <sip:carol@contoso.com>;tag=b14a627091;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E104>
Call-ID: dea95d4f5d564a12861f6594763c674d
CSeq: 1 INVITE
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Content-Length: 0
```

12. The IM MCU returns a successful response to Carol.

```
SIP/2.0 200 OK
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF9320C5AB3725FF9E3BD8E89E63FA20F4",
srand="27EFE1A1", snum="68", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
```

```
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
FROM: "Carol"<sip:carol@contoso.com>;tag=b14a627091;epid=bd4bd366c2
TO:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E104>;
tag=6fc7ff5a71
CSEQ: 1 INVITE
CALL-ID: dea95d4f5d564a12861f6594763c674d
RECORD-ROUTE: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com;ms-role-rs-from;ms-role-rs-to;ms-ent-dest;lr;ms-rgs-cid=29500;ms-
route-sig=aahm93yevt3VrZGZyF-SrsfazZGI9BDQWB1UuIVQAA>
CONTACT: <sip:poola.topa.contoso.com:5062;transport=tls;ms-fe=M17-
OCG.topa.contoso.com>;isFocus
CONTENT-LENGTH: 108
SUPPORTED: timer
CONTENT-TYPE: application/sdp
ALLOW: UPDATE
REQUIRE: timer
Session-Expires: 600;refresher=uac
v=0
o=- 0 0 IN IP4 0.0.0.0
s=session
c=IN IP4 0.0.0.0
t=0 0
m=message 5060 sip null
a=accept-types:*
```

13. Carol sends the **ACK** to the IM MCU to establish the dialog.

```
ACK sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-OCG.topa.contoso.com;ms-
role-rs-from;ms-role-rs-to;ms-ent-dest;lr;ms-rgs-cid=29500;ms-route-
sig=aahm93yevt3VrZGZyF-SrsfazZGI9BDQWB1UuIVQAA SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=b14a627091;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:FC275ECD12493E4E9C27C894FE91E104>;
tag=6fc7ff5a71
Call-ID: dea95d4f5d564a12861f6594763c674d
CSeq: 1 ACK
Route: <sip:poola.topa.contoso.com:5062;transport=tls;ms-fe=M17-OCG.topa.contoso.com>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="efef150b", cnum="58", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffffffbbeeb0ba9d76fc2514b61e970e0b20a"
Content-Length: 0
```

14. Next, all conference participants (2) are notified that Carol has joined the IM modality with the
media type "chat". First, Alice receives this notification.

```
BENOTIFY sip:10.29.107.208:2308;transport=tls;ms-opaque=3c71125d8b;ms-received-
cid=200;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKBE95EA8F.773328DC;branched=FALSE
Authentication-Info: NTLM rspauth="01000000873C25039A7899BB64D52E88",
srand="45E3281E", snum="149", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
```

```
To: <sip:alice@contoso.com>;tag=9d8927b7a1;epid=dceed2edfb
Content-Length: 1779
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=A62E0080
Call-ID: 0d47a20d5eaa49b399f1ca52ff210115
CSeq: 6 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104" state="partial" version="9">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
      <display-text>Carol</display-text>
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}" msci:session-
type="focus" msci:epid="bd4bd366c2" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
        <status>connected</status>
      </endpoint>
      <endpoint entity="{3ABCE98E-EA02-4130-B9C2-EA1DB1C8AE49}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
        <status>connected</status>
        <joining-method>dialed-in</joining-method>
        <media id="1">
          <type>chat</type>
        </media>
        <msci:endpoint-capabilities>
          <msim:endpoint-capabilities>
            <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
            <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
          </msim:endpoint-capabilities>
        </msci:endpoint-capabilities>
      </endpoint>
    </user>
  </users>
</conference-info>
```

15. Carol also receives the updated conference information.

```
BENOTIFY sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKE52284F1.39BCA2B8;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFD664C3760A40F18AA68DC6E2D256C629",
```

```
srand="416813A0", snum="70", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:carol@contoso.com>;tag=60442060d0;epid=bd4bd366c2
Content-Length: 1899
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=877E0080
Call-ID: adec75c32a9c45d190c7fd370e192840
CSeq: 2 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104" state="partial" version="9">
   <users state="partial">
     <user entity="sip:carol@contoso.com" state="full">
       <display-text>Carol</display-text>
       <roles>
         <entry>attendee</entry>
       </roles>
       <endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}" msci:session-
type="focus" msci:epid="bd4bd366c2" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
         <status>connected</status>
       </endpoint>
       <endpoint entity="{3ABCE98E-EA02-4130-B9C2-EA1DB1C8AE49}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
         <status>connected</status>
         <joining-method>dialed-in</joining-method>
         <media id="1">
           <type>chat</type>
         </media>
         <msci:endpoint-capabilities>
           <msim:endpoint-capabilities>
             <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
             <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
           </msim:endpoint-capabilities>
         </msci:endpoint-capabilities>
       </endpoint>
     </user>
   </users>
</conference-info>
```

16. Finally, Bob receives the updated conference information.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bK0D3A7BF1.A365C068;branched=FALSE
```

```
Authentication-Info: NTLM rspauth="01000000030000005BF0B403554C2961",
srand="7E195874", snum="79", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=d9c47387e4;epid=65a77e620d
Content-Length: 1779
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE91E104>
;tag=1C300080
Call-ID: ff5348b0e001463db5417d99102486e8
CSeq: 4 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:FC275ECD12493E4E9C27C894FE
91E104" state="partial" version="9">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
      <display-text>Carol</display-text>
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{34B0C35F-13A6-4DCF-A376-7C4EC2C9017D}" msci:session-
type="focus" msci:epid="bd4bd366c2" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
        <status>connected</status>
      </endpoint>
      <endpoint entity="{3ABCE98E-EA02-4130-B9C2-EA1DB1C8AE49}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu">
        <status>connected</status>
        <joining-method>dialed-in</joining-method>
        <media id="1">
          <type>chat</type>
        </media>
        <msci:endpoint-capabilities>
          <msim:endpoint-capabilities>
            <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
            <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
          </msim:endpoint-capabilities>
        </msci:endpoint-capabilities>
      </endpoint>
    </user>
  </users>
</conference-info>
```

4.1.2   A Client Joins an IM Conference Using addUser Dial-Out

In this example, Alice has already started an IM conference with Bob, and now invites Leslie into it. Leslie, being a legacy user, does not support the protocol described in [MS-CONFBAS]. Therefore, the IM MCU needs to dial out to her.
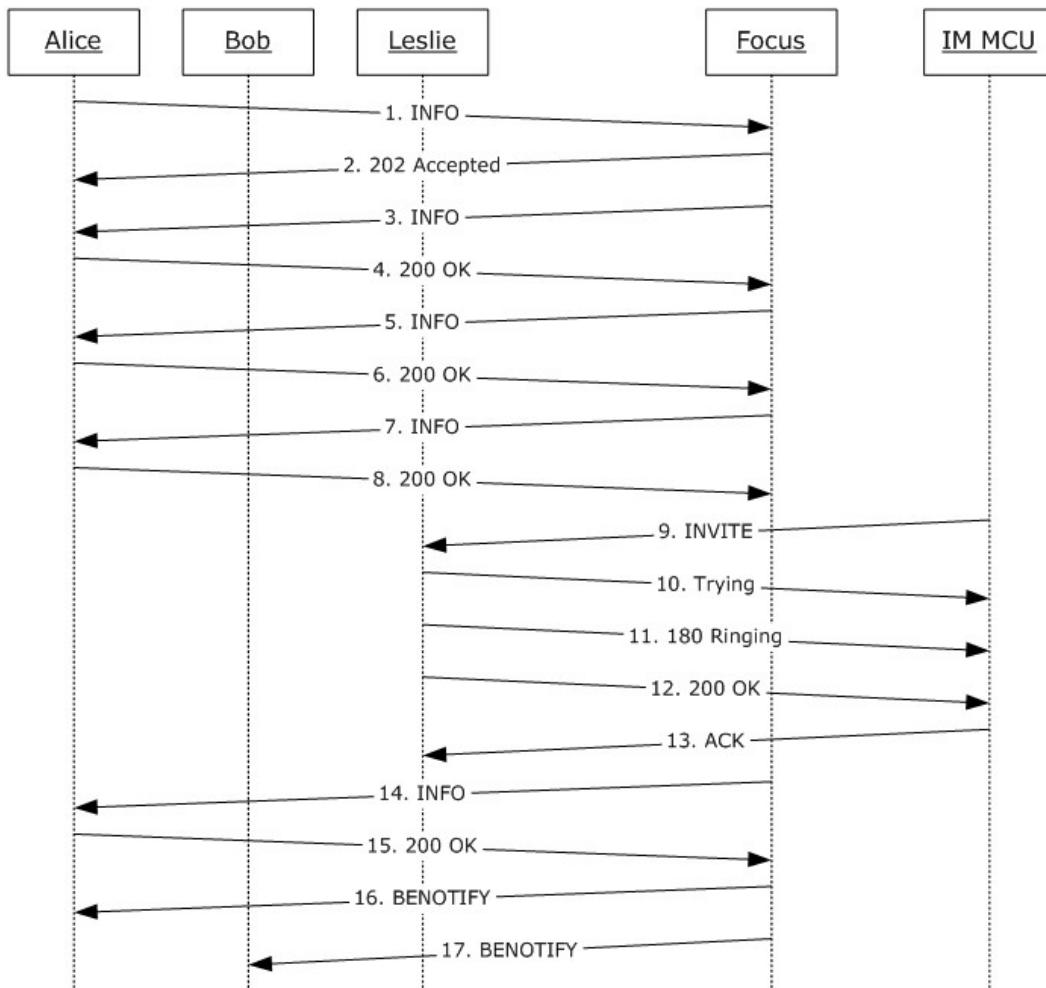

Figure 2: Alice invites Leslie to the conference using dial-out

1. Alice sends a request to the focus to dial out to Leslie for the "chat" media type (IM).

```
INFO
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539
SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 2 INFO
```

```
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Supported: timer
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="a8569a81", cnum="83", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff74b52c079bf13433f4d8fae53108a7c1"
Content-Type: application/cccp+xml
Content-Length: 1297
<?xml version="1.0"?>
<request xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions" C3PVersion="1"
to="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C355
39" from="sip:alice@contoso.com" requestId="29137360">
  <addUser
mscp:mcuUri="sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2
ADE7C35539" xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions">
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2
ADE7C35539" />
    <ci:user xmlns:ci="urn:ietf:params:xml:ns:conference-info"
entity="sip:leslie@fabrikam.com">
      <ci:roles>
        <ci:entry>attendee</ci:entry>
      </ci:roles>
      <ci:endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions" msci:refer-
to-uri="sip:leslie@fabrikam.com?ms-conversation-
id=AchaQv%2F0bJhX%2ByoHQQGl0Q2rtna75Q%3D%3D">
        <ci:joining-method>dialed-out</ci:joining-method>
        <ci:media id="chat">
          <ci:type>chat</ci:type>
          <ci:status>sendrecv</ci:status>
        </ci:media>
        <clientInfo
xmlns="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions">
          <conversation-id>AchaQv/0bJhX+yoHQQGl0Q2rtna75Q==</conversation-id>
        </clientInfo>
      </ci:endpoint>
    </ci:user>
  </addUser>
</request>
```

2. The focus responds to Alice with a 202 Accepted success code.

```
SIP/2.0 202 Accepted
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF642000353A2BC8ED1C8442F25B95B590",
srand="0D2C2E46", snum="102", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: "Alice"<sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 2 INFO
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Content-Length: 0
```

3. The focus sends more information to Alice about her pending request to add Leslie.

```
INFO sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6A64F456.1326F6C5;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF34EC34247FA471F089A3E945CFA13904",
srand="6B3211DD", snum="103", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
Content-Length: 1664
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 1 INFO
Content-Type: application/cccp+xml
<response xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
xmlns:msls="urn:ietf:params:xml:ns:msls" requestId="29137360" C3PVersion="1"
from="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C3
5539" to="sip:alice@contoso.com"
responder="sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2AD
E7C35539" code="pending">
  <addUser>
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2
ADE7C35539" />
    <user xmlns="urn:ietf:params:xml:ns:conference-info"
entity="sip:leslie@fabrikam.com">
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}" msci:refer-to-
uri="sip:leslie@fabrikam.com?ms-conversation-
id=AchaQv%2F0bJhX%2ByoHQQGl0Q2rtna75Q%3D%3D">
        <joining-method>dialed-out</joining-method>
        <media id="chat">
          <type>chat</type>
          <status>sendrecv</status>
        </media>
        <clientInfo
xmlns="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions">
          <conversation-id>AchaQv/0bJhX+yoHQQGl0Q2rtna75Q==</conversation-id>
        </clientInfo>
      </endpoint>
    </user>
  </addUser>
</response>
```

4. Alice sends a 200 OK for the INFO.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6A64F456.1326F6C5;branched=FALSE
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 1 INFO
Contact: <sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="33c48662", cnum="84", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff4c7cb411f10c90192534d3303de2deea"
Content-Length: 0
```

5. The focus sends more information to Alice about her pending request to add Leslie.

```
INFO sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6B64F456.FD279E92;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFCEB13F0462AF608DA37EB8BCA0222FC7",
srand="049CC604", snum="104", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
Content-Length: 1664
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 2 INFO
Content-Type: application/cccp+xml
<response xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
xmlns:msls="urn:ietf:params:xml:ns:msls" requestId="29137360" C3PVersion="1"
from="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C3
5539" to="sip:alice@contoso.com"
responder="sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2AD
E7C35539" code="pending">
  <addUser>
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2
ADE7C35539" />
    <user xmlns="urn:ietf:params:xml:ns:conference-info"
entity="sip:leslie@fabrikam.com">
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}" msci:refer-to-
uri="sip:leslie@fabrikam.com?ms-conversation-
id=AchaQv%2F0bJhX%2ByoHQQGl0Q2rtna75Q%3D%3D">
```

```
         <joining-method>dialed-out</joining-method>
         <media id="chat">
           <type>chat</type>
           <status>sendrecv</status>
         </media>
         <clientInfo
  xmlns="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions">
           <conversation-id>AchaQv/0bJhX+yoHQQGl0Q2rtna75Q==</conversation-id>
         </clientInfo>
       </endpoint>
     </user>
   </addUser>
 </response>
```

6. Alice sends a 200 OK for the INFO.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6B64F456.FD279E92;branched=FALSE
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 2 INFO
Contact: <sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="22861cfb", cnum="85", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffffb30b18a0a38d85b0044702a041526dd4"
Content-Length: 0
```

7. The focus sends more information to Alice about her pending request to add Leslie.

```
INFO sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6C64F456.E334F637;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF9E5193F895A282028995E7C819C05BDE",
srand="AFB0D237", snum="105", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
Content-Length: 1694
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 3 INFO
Content-Type: application/cccp+xml
<response xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
```

```
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
xmlns:msls="urn:ietf:params:xml:ns:msls" requestId="29137360" C3PVersion="1"
from="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C3
5539" to="sip:alice@contoso.com"
responder="sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2AD
E7C35539" code="pending">
  <addUser>
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2
ADE7C35539" />
    <user xmlns="urn:ietf:params:xml:ns:conference-info"
entity="sip:leslie@fabrikam.com">
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}" msci:refer-to-
uri="sip:leslie@fabrikam.com?ms-conversation-
id=AchaQv%2F0bJhX%2ByoHQQGl0Q2rtna75Q%3D%3D">
        <joining-method>dialed-out</joining-method>
        <media id="chat">
          <type>chat</type>
          <status>sendrecv</status>
        </media>
        <clientInfo
xmlns="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions">
          <conversation-id>AchaQv/0bJhX+yoHQQGl0Q2rtna75Q==</conversation-id>
        </clientInfo>
      </endpoint>
    </user>
  </addUser>
</response>
```

8. Alice sends a 200 OK for the INFO.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6C64F456.E334F637;branched=FALSE
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 3 INFO
Contact: <sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="69bc6c1f", cnum="86", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff51e0b86bd612120590ce3cfcf00a4971"
Content-Length: 0
```

9. The IM MCU sends an INVITE for Leslie to join the IM conference.

```
INVITE sip:10.24.33.4:4765;transport=tls;ms-received-cid=B5900 SIP/2.0
Record-Route: <sip:N14-OCG.fabrikam.com:5061;transport=tls;ms-role-rs-from;lr;ms-
route-sig=cbLRxV9otfGZAl-cwZMl2KqdGhpn9iYNEbQ-zQqgAA>;ms-
rrsig=cbQ0cFn49_R9QGcZ5AH3x_XlfaAjViYNEbQ-zQqgAA;tag=E9BDB643AF87DF74943EA82F42E627E3
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK7F4D7BCA.6260D11B;branched=FALSE;ms-
internal-info="ahelXO1WWLRuhjZGrLIkj71emISxpiYNEb23BsCgAA"
```

```
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF8A1DF9F866F845AFB7B659FF2A483142",
srand="24F28C29", snum="79", opaque="183BAF96", qop="auth", targetname="sip/N14-
OCG.fabrikam.com", realm="SIP Communications Service"
Max-Forwards: 66
Content-Length: 108
Via: SIP/2.0/TLS 10.29.105.34:1160;branch=z9hG4bK5A38F11B.69A2F80D;branched=FALSE;ms-
received-port=1160;ms-received-cid=C2200
Via: SIP/2.0/TLS 10.29.104.82:29668;branch=z9hG4bK9DC924FE.508FAC75;branched=FALSE;ms-
internal-info="bctZeI6t-xzqzJezp776EPtkjsRI9Qj6x1YrqmMgAA";ms-received-port=29668;ms-
received-cid=10800
Via: SIP/2.0/TLS 10.29.106.52:49624;branch=z9hG4bKB5D3EA37.6508FD2B;branched=FALSE;ms-
received-port=49624;ms-received-cid=7A00
Via: SIP/2.0/TLS 10.29.106.56:18179;branch=z9hG4bK4b88e8a;received=10.29.107.208;ms-
received-port=18179;ms-received-cid=32200
Record-Route: <sip:l16-
rtc.fabrikam.com:5061;transport=tls;lr>;tag=D76F601D7239923FBE84D78BF8821C85
ms-edge-proxy-message-trust: ms-source-type=DirectPartner;ms-ep-fqdn=l16-
rtc.fabrikam.com;ms-source-verified-user=verified;ms-source-network=federation
Record-Route: <sip:m05-ocg.contoso.com:5061;transport=tls;lr;ms-key-
info=jACAAIkddFISXE8OM1rIAQECAAADZgAAAKQAAM_xhydh8vyAC4KtNGvg2DiaGGvPDNkz5mHL2UZXEwxQY
taeVfcE37Npri0i63hQ_Zq87w1bA80HUi39J7cvcxez85p9IiTWeLnCKJCs1tRIr9UY43dvJZ029BLFtzNJhcq
QV1bXiOLQW763qjf0W79NXwQoOBIMbtzLBpktBU9-71RrqVD3Ho9YlrQHmxyrfT_v-
QhwbG9fmMwsPkbQeoEJJy4rpisLi37VPMTL-ryBLGP1N5irDDuB7C6lf-
EqM05NJTr_fv5kU6HticoUq4Hp6UcKFGkF7-iSwzyJxWFTohYX-_uyqWWfKnqfDUxzK4L5nZKzn-
hP1JBFVG1SZDwA;ms-route-sig=eaID_WOmTDfZ-NL7qojjIyNGM6oaBQj6x1I1ntnwAA>;ms-rrsig=eaHE-
O2PuobJMpMRB69Ys0E0naTolQj6x1I1ntnwAA;tag=1AB42EB9E9D70A8756AA69B1888A3CA1
ms-archiving: TRUE
Record-Route: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com;ms-role-rs-to;lr>;tag=8B7140E6B77464DE69D8A784B30A6DA4
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>;
tag=d52f12304d
To: <sip:leslie@fabrikam.com>;epid=4a5d495edf
CSeq: 5 INVITE
Call-ID: d2b732dc25b94a57a70c8d5d88ded80d
Contact: <sip:poola.topa.contoso.com:5062;transport=tls;ms-fe=M18-
OCG.topa.contoso.com>;isFocus
Referred-By: <sip:alice@contoso.com>
Ms-Focus-Uri:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
Supported: ms-delayed-accept
Supported: timer
Content-Type: application/sdp
Allow: UPDATE
Session-Expires: 600;refresher=uas
Ms-Conversation-ID: AchaQv/0bJhX+yoHQQGl0Q2rtna75Q==
v=0
o=- 0 0 IN IP4 0.0.0.0
s=session
c=IN IP4 0.0.0.0
t=0 0
m=message 5060 sip null
a=accept-types:*
```

10. The IM MCU receives a provisional response for the INVITE.

```
SIP/2.0 100 Trying
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK7F4D7BCA.6260D11B;branched=FALSE;ms-
internal-info="ahelXO1WWLRuhjZGrLIkj71emISxpiYNEb23BsCgAA"
```

```
Via: SIP/2.0/TLS 10.29.105.34:1160;branch=z9hG4bK5A38F11B.69A2F80D;branched=FALSE;ms-
received-port=1160;ms-received-cid=C2200
Via: SIP/2.0/TLS 10.29.104.82:29668;branch=z9hG4bK9DC924FE.508FAC75;branched=FALSE;ms-
internal-info="bctZeI6t-xzqzJezp776EPtkjsRI9Qj6x1YrqmMgAA";ms-received-port=29668;ms-
received-cid=10800
Via: SIP/2.0/TLS 10.29.106.52:49624;branch=z9hG4bKB5D3EA37.6508FD2B;branched=FALSE;ms-
received-port=49624;ms-received-cid=7A00
Via: SIP/2.0/TLS 10.29.106.56:18179;branch=z9hG4bK4b88e8a;received=10.29.107.208;ms-
received-port=18179;ms-received-cid=32200
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>;
tag=d52f12304d
To: <sip:leslie@fabrikam.com>;epid=4a5d495edf;tag=f77278fb17
Call-ID: d2b732dc25b94a57a70c8d5d88ded80d
CSeq: 5 INVITE
User-Agent: LCC/1.3
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="183BAF96", crand="7479f237", cnum="61", targetname="sip/N14-OCG.fabrikam.com",
response="602306092a864886f71201020201011100ffffffff4cde33bff13fe575e5d4e0eff0affe8e"
Content-Length: 0
```

11. The IM MCU is notified that Leslie is being alerted.

```
SIP/2.0 180 Ringing
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK7F4D7BCA.6260D11B;branched=FALSE;ms-
internal-info="ahelXO1WWLRuhjZGrLIkj71emISxpiYNEb23BsCgAA"
Via: SIP/2.0/TLS 10.29.105.34:1160;branch=z9hG4bK5A38F11B.69A2F80D;branched=FALSE;ms-
received-port=1160;ms-received-cid=C2200
Via: SIP/2.0/TLS 10.29.104.82:29668;branch=z9hG4bK9DC924FE.508FAC75;branched=FALSE;ms-
internal-info="bctZeI6t-xzqzJezp776EPtkjsRI9Qj6x1YrqmMgAA";ms-received-port=29668;ms-
received-cid=10800
Via: SIP/2.0/TLS 10.29.106.52:49624;branch=z9hG4bKB5D3EA37.6508FD2B;branched=FALSE;ms-
received-port=49624;ms-received-cid=7A00
Via: SIP/2.0/TLS 10.29.106.56:18179;branch=z9hG4bK4b88e8a;received=10.29.107.208;ms-
received-port=18179;ms-received-cid=32200
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>;
tag=d52f12304d
To: <sip:leslie@fabrikam.com>;epid=4a5d495edf;tag=f77278fb17
Call-ID: d2b732dc25b94a57a70c8d5d88ded80d
CSeq: 5 INVITE
Record-Route: <sip:N14-OCG.fabrikam.com:5061;transport=tls;ms-role-rs-from;lr;ms-
route-sig=cbLRxV9otfGZAl-cwZMl2KqdGhpn9iYNEbQ-zQqgAA>;ms-
rrsig=cbQ0cFn49_R9QGcZ5AH3x_XlfaAjViYNEbQ-zQqgAA;tag=E9BDB643AF87DF74943EA82F42E627E3
Record-Route: <sip:l16-
rtc.fabrikam.com:5061;transport=tls;lr>;tag=D76F601D7239923FBE84D78BF8821C85
Record-Route: <sip:m05-ocg.contoso.com:5061;transport=tls;lr;ms-key-
info=jACAAIkddFISXE8OM1rIAQECAAADZgAAAKQAAM_xhydh8vyAC4KtNGvg2DiaGGvPDNkz5mHL2UZXEwxQY
taeVfcE37Npri0i63hQ_Zq87w1bA80HUi39J7cvcxez85p9IiTWeLnCKJCs1tRIr9UY43dvJZ029BLFtzNJhcq
QV1bXiOLQW763qjf0W79NXwQoOBIMbtzLBpktBU9-71RrqVD3Ho9YlrQHmxyrfT_v-
QhwbG9fmMwsPkbQeoEJJy4rpisLi37VPMTL-ryBLGP1N5irDDuB7C6lf-
EqM05NJTr_fv5kU6HticoUq4Hp6UcKFGkF7-iSwzyJxWFTohYX-_uyqWWfKnqfDUxzK4L5nZKzn-
hP1JBFVG1SZDwA;ms-route-sig=eaID_WOmTDfZ-NL7qojjIyNGM6oaBQj6x1I1ntnwAA>;ms-rrsig=eaHE-
O2PuobJMpMRB69Ys0E0naTolQj6x1I1ntnwAA;tag=1AB42EB9E9D70A8756AA69B1888A3CA1
Record-Route: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com;ms-role-rs-to;lr>;tag=8B7140E6B77464DE69D8A784B30A6DA4
User-Agent: LCC/1.3
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="183BAF96", crand="8f546af9", cnum="62", targetname="sip/N14-OCG.fabrikam.com",
response="602306092a864886f71201020201011100ffffffffe20b68f6d87e35473863be7b76a178eb"
```

```
Content-Length: 0
```

12. The IM MCU is notified that Leslie has accepted the conference INVITE.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK7F4D7BCA.6260D11B;branched=FALSE;ms-
internal-info="ahelXO1WWLRuhjZGrLIkj71emISxpiYNEb23BsCgAA"
Via: SIP/2.0/TLS 10.29.105.34:1160;branch=z9hG4bK5A38F11B.69A2F80D;branched=FALSE;ms-
received-port=1160;ms-received-cid=C2200
Via: SIP/2.0/TLS 10.29.104.82:29668;branch=z9hG4bK9DC924FE.508FAC75;branched=FALSE;ms-
internal-info="bctZeI6t-xzqzJezp776EPtkjsRI9Qj6x1YrqmMgAA";ms-received-port=29668;ms-
received-cid=10800
Via: SIP/2.0/TLS 10.29.106.52:49624;branch=z9hG4bKB5D3EA37.6508FD2B;branched=FALSE;ms-
received-port=49624;ms-received-cid=7A00
Via: SIP/2.0/TLS 10.29.106.56:18179;branch=z9hG4bK4b88e8a;received=10.29.107.208;ms-
received-port=18179;ms-received-cid=32200
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>;
tag=d52f12304d
To: <sip:leslie@fabrikam.com>;epid=4a5d495edf;tag=f77278fb17
Call-ID: d2b732dc25b94a57a70c8d5d88ded80d
CSeq: 5 INVITE
Record-Route: <sip:N14-OCG.fabrikam.com:5061;transport=tls;ms-role-rs-from;lr;ms-
route-sig=cbLRxV9otfGZAl-cwZMl2KqdGhpn9iYNEbQ-zQqgAA>;ms-
rrsig=cbQ0cFn49_R9QGcZ5AH3x_XlfaAjViYNEbQ-zQqgAA;tag=E9BDB643AF87DF74943EA82F42E627E3
Record-Route: <sip:l16-
rtc.fabrikam.com:5061;transport=tls;lr>;tag=D76F601D7239923FBE84D78BF8821C85
Record-Route: <sip:m05-ocg.contoso.com:5061;transport=tls;lr;ms-key-
info=jACAAIkddFISXE8OM1rIAQECAAADZgAAAKQAAM_xhydh8vyAC4KtNGvg2DiaGGvPDNkz5mHL2UZXEwxQY
taeVfcE37Npri0i63hQ_Zq87w1bA80HUi39J7cvcxez85p9IiTWeLnCKJCs1tRIr9UY43dvJZ029BLFtzNJhcq
QV1bXiOLQW763qjf0W79NXwQoOBIMbtzLBpktBU9-71RrqVD3Ho9YlrQHmxyrfT_v-
QhwbG9fmMwsPkbQeoEJJy4rpisLi37VPMTL-ryBLGP1N5irDDuB7C61f-
EqM05NJTr_fv5kU6HticoUq4Hp6UcKFGkF7-iSwzyJxWFTohYX-_uyqWWfKnqfDUxzK4L5nZKzn-
hP1JBFVG1SZDwA;ms-route-sig=eaID_WOmTDfZ-NL7qojjIyNGM6oaBQj6x1I1ntnwAA>;ms-rrsig=eaHE-
O2PuobJMpMRB69Ys0E0naTolQj6x1I1ntnwAA;tag=1AB42EB9E9D70A8756AA69B1888A3CA1
Record-Route: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com;ms-role-rs-to;lr>;tag=8B7140E6B77464DE69D8A784B30A6DA4
Contact: <sip:leslie@fabrikam.com:4765;maddr=10.24.33.4;transport=tls>;proxy=replace
User-Agent: LCC/1.3
Supported: ms-renders-isf
Supported: ms-renders-gif
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="183BAF96", crand="ac6b171b", cnum="63", targetname="sip/N14-OCG.fabrikam.com",
response="602306092a864886f71201020201011100ffffffffd3ef58bd606152b19a74f516be003112"
Content-Type: application/sdp
Content-Length: 112
v=0
o=- 0 0 IN IP4 10.24.33.4
s=session
c=IN IP4 10.24.33.4
t=0 0
m=message 5060 sip sip:leslie@fabrikam.com
```

13. The IM MCU acknowledges Leslie's acceptance.

```
ACK sip:leslie@fabrikam.com:4765;maddr=10.24.33.4;transport=tls;ms-received-cid=B5900
SIP/2.0
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK9B06E88E.4ECB311D;branched=FALSE
```

```
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF35F4DFB9188E7E2B41FF9A664B72EBE4",
srand="3CAA4B18", snum="80", opaque="183BAF96", qop="auth", targetname="sip/N14-
OCG.fabrikam.com", realm="SIP Communications Service"
Max-Forwards: 66
Via: SIP/2.0/TLS 10.29.105.34:1160;branch=z9hG4bK6DC122F3.A266CD9A;branched=FALSE;ms-
received-port=1160;ms-received-cid=C2200
ms-edge-proxy-message-trust: ms-source-type=DirectPartner;ms-ep-fqdn=l16-
rtc.fabrikam.com;ms-source-verified-user=verified;ms-source-network=federation
Via: SIP/2.0/TLS 10.29.104.82:29668;branch=z9hG4bK186D5E96.FB2C7DF6;branched=FALSE;ms-
received-port=29668;ms-received-cid=10800
Via: SIP/2.0/TLS 10.29.106.52:49624;branch=z9hG4bKF8F88A4D.7FB7A8EE;branched=FALSE;ms-
received-port=49624;ms-received-cid=7A00
Via: SIP/2.0/TLS 10.29.106.56:18164;branch=z9hG4bK927b268a;ms-received-port=18164;ms-
received-cid=31900
FROM:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>;
tag=d52f12304d
TO: <sip:leslie@fabrikam.com>;epid=4a5d495edf;tag=f77278fb17
CSEQ: 5 ACK
CALL-ID: d2b732dc25b94a57a70c8d5d88ded80d
CONTENT-LENGTH: 0
```

14. Because Leslie has successfully joined the conference, Alice is notified that her **addUser** request has completed. In this example, **response** now indicates that the **code** is "success" instead of "pending".

```
INFO sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6D64F456.E85BDF96;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF2A6BE14557A1A4A6951F11129725C637",
srand="BEB3B1F5", snum="106", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
Content-Length: 1664
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 4 INFO
Content-Type: application/cccp+xml
<response xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
xmlns:msls="urn:ietf:params:xml:ns:msls" requestId="29137360" C3PVersion="1"
from="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C3
5539" to="sip:alice@contoso.com"
responder="sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:DA8B6C8FE7CAA44F821DA2AD
E7C35539" code="success">
  <addUser>
```

```
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2
ADE7C35539" />
    <user xmlns="urn:ietf:params:xml:ns:conference-info"
entity="sip:leslie@fabrikam.com">
        <roles>
          <entry>attendee</entry>
        </roles>
        <endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}" msci:refer-to-
uri="sip:leslie@fabrikam.com?ms-conversation-
id=AchaQv%2F0bJhX%2ByoHQQGl0Q2rtna75Q%3D%3D">
          <joining-method>dialed-out</joining-method>
          <media id="chat">
            <type>chat</type>
            <status>sendrecv</status>
          </media>
          <clientInfo
xmlns="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions">
            <conversation-id>AchaQv/0bJhX+yoHQQGl0Q2rtna75Q==</conversation-id>
          </clientInfo>
        </endpoint>
      </user>
    </addUser>
</response>
```

15. Alice responds to the INFO message that was just received.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK6D64F456.E85BDF96;branched=FALSE
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE720080
To: <sip:alice@contoso.com>;tag=0e155e40fb;epid=bd4bd366c2
Call-ID: c48271cfc4be4af29565a4297d588e64
CSeq: 4 INFO
Contact: <sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="6d05d5e1", cnum="87", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff4e0aee918314e66c5254333e60136f73"
Content-Length: 0
```

16. Now that Leslie has joined the IM conference, each other conference participant (2) needs to be notified. First, Alice receives a BENOTIFY with the conference state.

```
BENOTIFY sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK13D58909.E4008D8E;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFFE3AE3A84F41CEF202FFD66BF5693880",
srand="8B9EE832", snum="107", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:alice@contoso.com>;tag=164c27e0db;epid=bd4bd366c2
Content-Length: 1375
```

```
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=905F0080
Call-ID: 6a839f70600f4683b445e3ca41705bed
CSeq: 7 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7
C35539" state="partial" version="10">
  <users state="partial">
    <user entity="sip:leslie@fabrikam.com" state="full">
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}" msci:session-
type="chat" msci:epid="4a5d495edf">
        <status>connected</status>
        <joining-method>dialed-out</joining-method>
        <joining-info>
          <by>sip:alice@contoso.com</by>
        </joining-info>
        <media id="1">
          <type>chat</type>
        </media>
        <msci:endpoint-capabilities>
          <msim:endpoint-capabilities>
            <msim:supported-im-formats>text/plain</msim:supported-im-formats>
            <msim:user-agent>LCC/1.3</msim:user-agent>
          </msim:endpoint-capabilities>
        </msci:endpoint-capabilities>
      </endpoint>
    </user>
  </users>
</conference-info>
```

17. Next, Bob receives a BENOTIFY with conference state to say that Leslie has joined the IM conference.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bK96AAF953.85081075;branched=FALSE
Authentication-Info: NTLM rspauth="0100000000000000EE053ECC554C2961",
srand="514386F5", snum="97", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=33f5d5521e;epid=65a77e620d
Content-Length: 1375
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7C35539>
;tag=AE560080
```

```
Call-ID: c9193f1e5da044849655eeb81ccb57ac
CSeq: 3 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:DA8B6C8FE7CAA44F821DA2ADE7
C35539" state="partial" version="10">
  <users state="partial">
    <user entity="sip:leslie@fabrikam.com" state="full">
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{6CD05EA1-25CD-44A5-AAF2-9DA093F5A638}" msci:session-
type="chat" msci:epid="4a5d495edf">
        <status>connected</status>
        <joining-method>dialed-out</joining-method>
        <joining-info>
          <by>sip:alice@contoso.com</by>
        </joining-info>
        <media id="1">
          <type>chat</type>
        </media>
        <msci:endpoint-capabilities>
          <msim:endpoint-capabilities>
            <msim:supported-im-formats>text/plain</msim:supported-im-formats>
            <msim:user-agent>LCC/1.3</msim:user-agent>
          </msim:endpoint-capabilities>
        </msci:endpoint-capabilities>
      </endpoint>
    </user>
  </users>
</conference-info>
```

4.2 IM Forwarding and Delivery Notification

4.2.1 SIP MESSAGE Forwarding

In this example, Alice, Bob, and Leslie are in a three-party IM conference. Alice sends an IM to the
IM MCU, which causes it to be forwarded to all other conference participants (2). Finally, the success
or failure result is communicated back to Alice. Leslie is a legacy user that does not understand
Multipurpose Internet Mail Extensions (MIME) **multipart/alternative**.
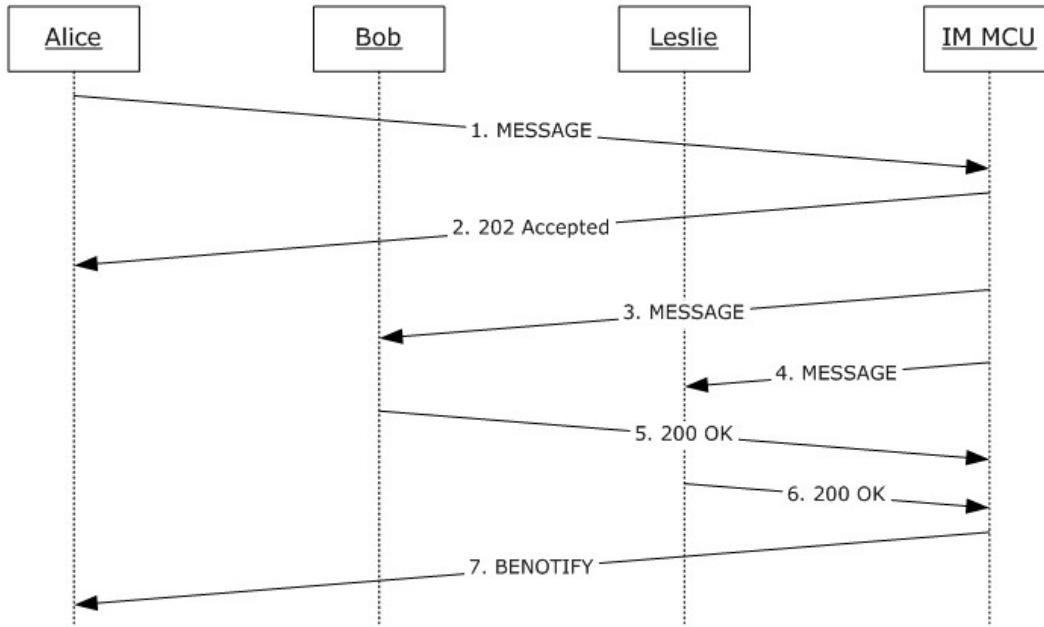
Figure 3: Forwarding of instant messages in the conference

1. Alice sends an IM to the IM MCU as **Content-Type** "multipart/alternative" (MIME) inside a SIP MESSAGE. The same message contents are sent in multiple formats so that the IM MCU can decide which part or parts to forward to each conference participant (2).

   Each alternative part of the MIME body, as described in [RFC2045], declares its own **Content-Type** and **Content-Transfer-Encoding**, followed by the actual message contents. In this example, the first MIME part is of type "text/plain", and the charset is "UTF-8". An optional additional parameter, **msgr**, is also associated with the **Content-Type** and is opaque to the server. The **msgr** parameter describes the markup, if any, to be applied to **plaintext**. In this example, its value has been set to the **base64** encoding of the string "X-MMS-IM-Format: FN=MS%20Shell%20Dlg%202; EF=; CO=0; CS=0; PF=0".

2. **FN** (Font Name) in this case is "MS Shell Dlg 2", with spaces escaped using "%20".

3. **EF** (Effects) can be applied to the text. Available effects are "bold", "italic", "underline", or "strike-through". In this example, there are none.

4. **CO** (Color) is a 6-digit hex number that indicates the RGB components of the text's color or a single zero, which is a shortcut to indicate black.

5. **CS** (Character Set) is set to "0", which corresponds to ANSI_CHARSET. This parameter is not to be confused with the **charset** parameter described earlier.

6. **PF** (Pitch and Family) is zero or a two-digit number to indicate the font's general family and pitch. Available families are "Roman", "Swiss", "Modern", "Script", or "Decorative". Available pitches are "Default", "Fixed", or "Variable". In this example, the font family is "FF_DONTCARE" and the pitch is "Default".

   The second MIME part in this example is of type "text/rtf" and is simply included following the **Content-Type** and **Content-Transfer-Encoding**.

The protocol client in this example sends "binary" **Content-Transfer-Encoding** for each MIME part.

```
MESSAGE sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com;ms-role-rs-from;ms-role-rs-to;ms-ent-dest;lr;ms-rgs-
cid=278C00;ms-route-sig=gawBV3W7gW7wQGkGzvc60Eq2zMtUd1zTgz1UuIVQAA SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:4549
Max-Forwards: 70
From: <sip:alice@contoso.com>;tag=ed6cde9bad;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=1522e88d0
Call-ID: ceb555f8ac224a489bfb3008029724da
CSeq: 8 MESSAGE
Route: <sip:poola.topa.contoso.com:5062;transport=tls;ms-fe=M18-OCG.topa.contoso.com>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Supported: timer
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="FAD7FAF9", crand="28f68121", cnum="110", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff7d2a31d1cd1192c4601885b08a8c1909"
Content-Type: multipart/alternative; boundary="----
=_NextPart_036_0787_01246BBD.76AB26E4"
Content-Length: 856
This is a multi-part message in MIME format.
------=_NextPart_036_0787_01246BBD.76AB26E4
Content-Type: text/plain; charset=UTF-
8;msgr=WAAtAE0ATQBTAC0ASQBNAC0ARgBvAHIAbQBhAHQAOgAgAEYATgA9AE0AUwAlADIAMABTAGgAZQBsAGw
AJQAyADAARABsAGcAJQAyADAAMgA7ACAARQBGAD0AOwAgAEMATwA9ADAAOwAgAEMAUwA9ADAAOwAgAFAARgA9A
DAACgANAAoAADQA
Content-Transfer-Encoding: binary
This IM text will be broadcast to all other conference participants.
------=_NextPart_036_0787_01246BBD.76AB26E4
Content-Type: text/rtf
Content-Transfer-Encoding: binary
{\rtf1\ansi\ansicpg1252\deff0\deflang1033{\fonttbl{\f0\fnil\fcharset0 MS Shell Dlg
2;}}
{\colortbl ;\red0\green0\blue0;}
{\*\generator Msftedit 5.41.15.1507;}\viewkind4\uc1\pard\tx720\cf1\f0\fs20 This IM
text will be broadcast to all other conference participants.\par
}
------=_NextPart_036_0787_01246BBD.76AB26E4--
```

7. The IM MCU responds with 202 Accepted to indicate to the sender that the MESSAGE was successfully received by the MCU. Because the delivery of this message to all the conference participants (2) happens asynchronously, the **Message-Id** header specifies an integer value that can be correlated with a subsequent IMDN that arrives in a BENOTIFY, shown in the next example.

```
SIP/2.0 202 Accepted
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFC1DB6A39FB060F0A0174B78BE877941B",
srand="A7AA6C1F", snum="145", opaque="FAD7FAF9", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Via: SIP/2.0/TLS 10.56.64.122:4549;received=10.29.107.208;ms-received-port=4549;ms-
received-cid=278C00
FROM: <sip:alice@contoso.com>;tag=ed6cde9bad;epid=bd4bd366c2
```

```
TO:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=1522e88d0
CSEQ: 8 MESSAGE
CALL-ID: ceb555f8ac224a489bfb3008029724da
CONTENT-LENGTH: 0
Message-Id: 2
```

8. The message is forwarded to the first other participant (2). In this case, the participant (2) has previously indicated support for "multipart/alternative", so the MCU forwards the MIME. An **Ms-Sender** header was added by the IM MCU when forwarding this message. It contains the sender's display name and SIP address, or **Globally Routable User Agent URI (GRUU)**. This is what the receiving protocol clients use to determine who initiated the message.

```
MESSAGE sip:10.29.107.208:3099;transport=tls;ms-opaque=6aa03e3cda;ms-received-
cid=276D00;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKE10E8F31.CFFE0BBD;branched=FALSE;ms-
internal-info="cbSmwhbNjC62Wek1GebdqSnEtjCb_P_gu9EddarwAA"
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF3979126E3B5272B7CF271083BDCB5BCB",
srand="02B995A3", snum="111", opaque="CD48A57F", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 69
Via: SIP/2.0/TLS 10.29.106.56:32860;branch=z9hG4bK6a543dac;ms-received-port=32860;ms-
received-cid=280700
FROM:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=69e3d4d355
TO: <sip:bob@contoso.com>;epid=dceed2edfb;tag=8d5fe550ec
CSEQ: 7 MESSAGE
CALL-ID: 7d8a83ab0e114373a8a2c8478b041285
CONTENT-LENGTH: 856
CONTENT-TYPE: multipart/alternative; boundary="----
=_NextPart_036_0787_01246BBD.76AB26E4"
Ms-Sender:
"Alice"<sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
Message-Id: 2
This is a multi-part message in MIME format.
------=_NextPart_036_0787_01246BBD.76AB26E4
Content-Type: text/plain; charset=UTF-
8;msgr=WAAtAE0ATQBTAC0ASQBNAC0ARgBvAHIAbQBhAHQAOgAgAEYATgA9AE0AUwAlADIAMABTAGgAZQBsAGw
AJQAyADAARBsAGcAJQAyADAAMgA7ACAARQBGAD0AOwAgAEMATwA9ADAAOwAgAEMAUwA9ADAAOwAgAFAARgA9A
DAACgANAAoADQA
Content-Transfer-Encoding: binary
This IM text will be broadcast to all other conference participants.
------=_NextPart_036_0787_01246BBD.76AB26E4
Content-Type: text/rtf
Content-Transfer-Encoding: binary
{\rtf1\ansi\ansicpg1252\deff0\deflang1033{\fonttbl{\f0\fnil\fcharset0 MS Shell Dlg
2;}}
{\colortbl ;\red0\green0\blue0;}
{\*\generator Msftedit 5.41.15.1507;}\viewkind4\uc1\pard\tx720\cf1\f0\fs20 This IM
text will be broadcast to all other conference participants.\par
}
------=_NextPart_036_0787_01246BBD.76AB26E4--
```

9. The message is also forwarded to the other participant (2), a protocol client that does not understand "multipart/alternative". In this case, the IM MCU extracts one of the alternative parts

that the participant will understand and forwards only that. In the following example, the alternative part is "text/plain". Note that the **ms-sender** header was added by the IM MCU when forwarding this message.

```
MESSAGE sip:leslie@fabrikam.com:4765;maddr=10.24.33.4;transport=tls;ms-received-
cid=B5900 SIP/2.0
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK0AB665A2.75FBBEC2;branched=FALSE;ms-
internal-info="ciqPyXH2Akj5ksp0Wo3GaLo6DCCxh1-77C23BsCgAA"
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF182A5E33F648272908940BE72430A362",
srand="5CF74D5C", snum="38", opaque="A89755E7", qop="auth", targetname="sip/N14-
OCG.fabrikam.com", realm="SIP Communications Service"
Max-Forwards: 66
Via: SIP/2.0/TLS 10.29.105.34:1291;branch=z9hG4bK66AB579B.E60094D7;branched=FALSE;ms-
received-port=1291;ms-received-cid=126700
ms-edge-proxy-message-trust: ms-source-type=DirectPartner;ms-ep-fqdn=l16-
rtc.fabrikam.com;ms-source-verified-user=verified;ms-source-network=federation
Via: SIP/2.0/TLS 10.29.104.82:33068;branch=z9hG4bK4DD678D9.6C02C440;branched=FALSE;ms-
internal-info="cgdEjJwnxotYtXhcHufcu1-5V6kUVsAsRAYrqmMgAA";ms-received-port=33068;ms-
received-cid=15800
ms-archiving: TRUE
Via: SIP/2.0/TLS 10.29.106.56:32875;branch=z9hG4bK1CDBDCC0.5B60CDAF;branched=FALSE;ms-
received-port=32875;ms-received-cid=C700
Via: SIP/2.0/TLS 10.29.106.56:32876;branch=z9hG4bKc0ddca1c;ms-received-port=32876;ms-
received-cid=3C8E00
FROM:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=1f908ff25d
TO: <sip:leslie@fabrikam.com>;epid=4a5d495edf;tag=7e517ba081
CSEQ: 9 MESSAGE
CALL-ID: 2253fab3fcb147c3a8be00e941df6ed2
CONTENT-LENGTH: 86
CONTENT-TYPE: text/plain; charset=UTF-
8;msgr=WAAtAE0ATQBTAC0ASQBNAC0ARgBvAHIAbQBhAHQAOgAgAEYATgA9AE0AUwAlADIAMABTAGgAZQBsAGw
AJQAyADAARABsAGcAJQAyADAAMgA7ACAARQBGAD0AOwAgAEMATwA9ADAAOwAgAEMAUwA9ADAAOwAgAFAARgA9A
DAACgANAAoADQA
Ms-Sender:
"Alice"<sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
Message-Id: 2
Alice: This IM text will be broadcast to all other conference participants.
```

10. Bob signals that the MESSAGE was successfully received and processed.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKE10E8F31.CFFE0BBD;branched=FALSE;ms-
internal-info="cbSmwhbNjC62Wek1GebdqSnEtjCb_P_gu9EddarwAA"
Via: SIP/2.0/TLS 10.29.106.56:32860;branch=z9hG4bK6a543dac;ms-received-port=32860;ms-
received-cid=280700
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=69e3d4d355
To: <sip:bob@contoso.com>;tag=8d5fe550ec;epid=dceed2edfb
Call-ID: 7d8a83ab0e114373a8a2c8478b041285
CSeq: 7 MESSAGE
Contact: <sip:bob@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="CD48A57F", crand="c29d4077", cnum="87", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff19e829d40e0027ccb112257cbae0ae87"
```

```
Content-Length: 0
```

11. Leslie signals that the MESSAGE was successfully received and processed.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.5:5061;branch=z9hG4bK0AB665A2.75FBBEC2;branched=FALSE;ms-
internal-info="ciqPyXH2Akj5ksp0Wo3GaLo6DCCxh1-77C23BsCgAA"
Via: SIP/2.0/TLS 10.29.105.34:1291;branch=z9hG4bK66AB579B.E60094D7;branched=FALSE;ms-
received-port=1291;ms-received-cid=126700
Via: SIP/2.0/TLS 10.29.104.82:33068;branch=z9hG4bK4DD678D9.6C02C440;branched=FALSE;ms-
internal-info="cgdEjJwnxotYtXhcHufcu1-5V6kUVsAsRAYrqmMgAA";ms-received-port=33068;ms-
received-cid=15800
Via: SIP/2.0/TLS 10.29.106.56:32875;branch=z9hG4bK1CDBDCC0.5B60CDAF;branched=FALSE;ms-
received-port=32875;ms-received-cid=C700
Via: SIP/2.0/TLS 10.29.106.56:32876;branch=z9hG4bKc0ddca1c;ms-received-port=32876;ms-
received-cid=3C8E00
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=1f908ff25d
To: <sip:leslie@fabrikam.com>;epid=4a5d495edf;tag=7e517ba081
Call-ID: 2253fab3fcb147c3a8be00e941df6ed2
CSeq: 9 MESSAGE
Contact: <sip:leslie@fabrikam.com:4765;maddr=10.24.33.4;transport=tls>;proxy=replace
User-Agent: LCC/1.3
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="A89755E7", crand="9c90f6ff", cnum="30", targetname="sip/N14-OCG.fabrikam.com",
response="602306092a864886f71201020201011100ffffffff1881c2675c619de3a68ff1364d09374a"
Content-Length: 0
```

12. Because the IM MCU has confirmed successful delivery of the MESSAGE to all other conference participants (2), it sends a BENOTIFY to the originator of the message, indicating success through IMDN. The **message-id** node, "2" in this case, corresponds to the **Message-Id** value that was returned to the sender in the previous 202 response. **recipient** nodes in the IMDN are used to communicate failure reasons. Because there are no **recipient** nodes, it means that this message was successfully delivered to all IM conference participants (2).

```
BENOTIFY sip:10.29.107.208:4549;transport=tls;ms-opaque=232f90d8bd;ms-received-
cid=278C00;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK91A7D60F.8CA55DD1;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF582C9A91232D41E4679E9916568D21F",
srand="0B039919", snum="146", opaque="FAD7FAF9", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 69
Via: SIP/2.0/TLS 10.29.106.56:32860;branch=z9hG4bK92ef85b2;ms-received-port=32860;ms-
received-cid=280700
FROM:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:34EC7C6FEEC47347AC518A89994F01E5>;
tag=1522e88d0
TO: <sip:alice@contoso.com>;epid=bd4bd366c2;tag=ed6cde9bad
CSEQ: 1 BENOTIFY
CALL-ID: ceb555f8ac224a489bfb3008029724da
CONTENT-LENGTH: 230
CONTENT-TYPE: application/ms-imdn+xml
<?xml version="1.0" encoding="utf-8"?><imdn
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="http://schemas.microsoft.com/rtc/2005/08/imdn">
```

```
      <message-id>2</message-id>
   </imdn>
```

4.2.2 IMDN Failure Notification

When a protocol client sends an IM during a conference, it is first informed by the IM MCU that the IM was successfully received through a 202 Accepted. Later, the sender receives an autonomous notification from the IM MCU to reflect the delivery status of the message with respect to each of the other conference participants (2). When an IM is sent during a conference, and one of the participants (2) fails to receive the message, the flow is the same as the previous example, except for the IMDN XML in the final BENOTIFY.
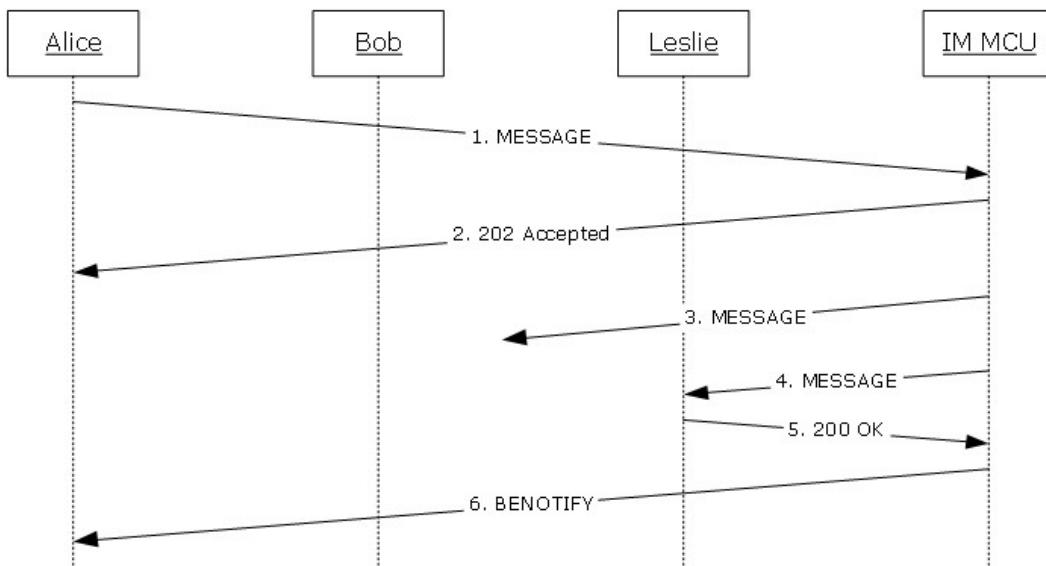
Figure 4: Alice is notified that Bob failed to receive an instant message

After the IM MCU has determined the delivery status of the message with respect to each participant (2), it sends a BENOTIFY to the originator of the message, giving details of any delivery failures.

As in the success case, the **message-id** node corresponds to the **Message-Id** value that was returned to the sender in the previous 202 response, which is "2".

In this example, one delivery failure is seen, as specified in the **recipient** node. The SIP status code, here "408", is returned in the **status** element. As shown in this particular example, a list of key-value pairs might also be present in an **entry** node under the **recipient** node to provide more detailed information about the failure. In this example, the key is "ms-diagnostics" and the value is a string that corresponds to the server diagnostic code associated with this delivery failure.

The fact that there is only one **recipient** node implies that all other IM conference participants (2) successfully received the message.

```
BENOTIFY sip:10.56.64.122:3411;transport=tls;ms-opaque=7d628159ec;ms-received-cid=4300;grid
SIP/2.0
Via: SIP/2.0/TLS 10.29.105.158:5061;branch=z9hG4bK78EF956F.5D6163CC;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF57915829E714A206FFD92C0E6418FC15",
```

Release: October 8, 2012

```
srand="BCAB27CA", snum="97", opaque="B2E1665B", qop="auth", targetname="sip/C20-
OCG.contoso.com", realm="SIP Communications Service"
Max-Forwards: 69
Via: SIP/2.0/TLS 10.29.105.158:2013;branch=z9hG4bK8989ef39;ms-received-port=2013;ms-received-
cid=7900
FROM:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:EEA460DFBFB7EF478D51BA84F07727F9>;tag=7ad
513c20
TO: <sip:alice@contoso.com>;epid=bd4bd366c2;tag=60561d8186
CSEQ: 1 BENOTIFY
CALL-ID: 5932d2d309f845e2aeb907d4efd81b3d
CONTENT-LENGTH: 485
CONTENT-TYPE: application/ms-imdn+xml
<?xml version="1.0" encoding="utf-8"?><imdn xmlns:xsi="http://www.w3.org/2001/XMLSchema-
instance" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
xmlns="http://schemas.microsoft.com/rtc/2005/08/imdn">
  <message-id>2</message-id>
  <recipient
uri="&lt;sip:bob@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu&gt;">
    <status>408</status>
    <entry>
      <key>ms-diagnostics</key>
      <value>6001;source="C20-OCG.contoso.com";reason="Request
Timeout";component="ImMcu"</value>
    </entry>
  </recipient>
</imdn>
```

4.3   IM Conference Exit Scenarios

4.3.1   A User Is Ejected from an IM Conference

In this example, Alice, Bob, and Carol are in a conference and Alice ejects Carol from it.
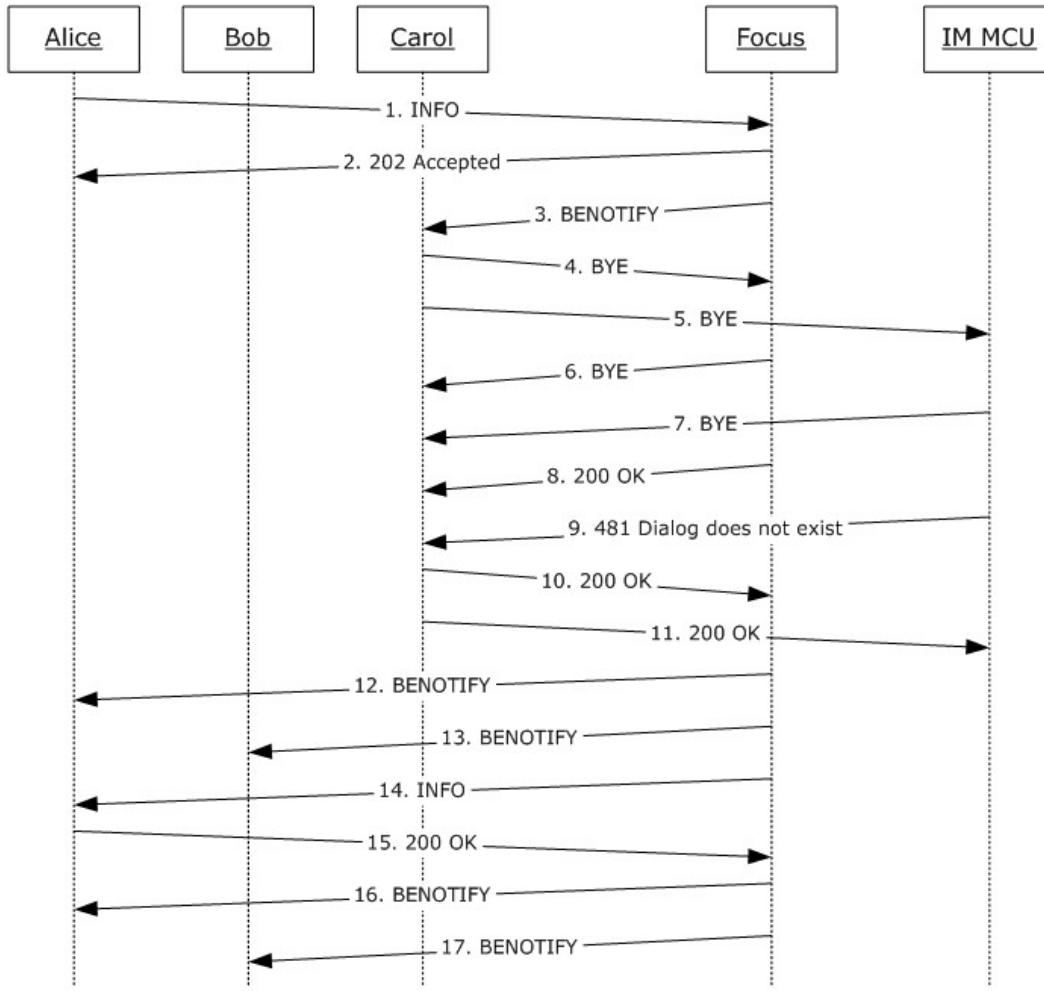
Figure 5: Alice ejects Carol from the conference

1. Alice sends the **deleteUser** request to the focus to eject Carol.

```
INFO
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038
SIP/2.0
Via: SIP/2.0/TLS 10.56.64.122:2157
Max-Forwards: 70
From: <sip:alice@contoso.com>;tag=58b76ebb1c;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=3C150080
Call-ID: cfc48d02676c47379c7083eb783ad2ab
CSeq: 2 INFO
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Supported: timer
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="e9a45dde", cnum="133", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff6bc0b1f134b8369e09f6e0791f085db7"
Content-Type: application/cccp+xml
```

```
Content-Length: 477
<?xml version="1.0"?>
<request xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions" C3PVersion="1"
to="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E80
38" from="sip:alice@contoso.com" requestId="63022864">
  <deleteUser>
    <userKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775
DBA09E8038" userEntity="sip:carol@contoso.com" />
  </deleteUser>
</request>
```

2. The focus responds that the command has been accepted for processing.

```
SIP/2.0 202 Accepted
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF86443316ED4CA391BB37E9718D648540",
srand="5EA04670", snum="172", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: "Alice"<sip:alice@contoso.com>;tag=58b76ebb1c;epid=bd4bd366c2
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=3C150080
Call-ID: cfc48d02676c47379c7083eb783ad2ab
CSeq: 2 INFO
Via: SIP/2.0/TLS 10.56.64.122:2157;received=10.29.107.208;ms-received-port=2157;ms-
received-cid=29500
Content-Length: 0
```

3. Carol is notified by the focus that she has been forcibly ejected from the conference.

```
BENOTIFY sip:10.29.107.208:2308;transport=tls;ms-opaque=3c71125d8b;ms-received-
cid=200;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKBF1B21E7.AE524FDD;branched=FALSE
Authentication-Info: NTLM rspauth="0100000000000000B11BC12064D52E88",
srand="CFD01F89", snum="212", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:carol@contoso.com>;tag=d468b2a0c0;epid=dceed2edfb
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=99000080
Call-ID: 87434074d1244e8d89881d1f8d243783
CSeq: 3 BENOTIFY
Event: conference
subscription-state: terminated;expires=0;reason=ParticipantRemoved
Expires: 0
Content-Length: 0
ms-diagnostics-public: 3118;reason="Participant Removed"
```

4. Carol sends a BYE to the focus.

```
BYE
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038
SIP/2.0
Via: SIP/2.0/TLS 10.56.65.217:2308
```

```
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=dfccec5fb4;epid=dceed2edfb
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=0D440080
Call-ID: 1e294f6aa2ff4fccaf796b2e7fb723be
CSeq: 2 BYE
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="183d43f6", cnum="144", targetname="M17-
OCG.topa.contoso.com", response="01000000b8d32206fa814f9364d52e88"
Content-Length: 0
```

5. Carol also sends a BYE to the IM MCU.

```
BYE sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-OCG.topa.contoso.com;ms-
role-rs-from;ms-role-rs-to;ms-ent-dest;lr;ms-rgs-cid=200;ms-route-sig=aal-
PcEIaipyZlYF3-1w9yVGO7MuY3Nw2L1UuIVQAA SIP/2.0
Via: SIP/2.0/TLS 10.56.65.217:2308
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=8d9b5cc1fb;epid=dceed2edfb
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:7ECB5F9BFFB1F343B36775DBA09E8038>;
tag=740746dec
Call-ID: 08501c03562b4515a1ad55e367dd503d
CSeq: 2 BYE
Route: <sip:poola.topa.contoso.com:5062;transport=tls;ms-fe=M18-OCG.topa.contoso.com>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="6dc12184", cnum="145", targetname="M17-
OCG.topa.contoso.com", response="010000004067620356426f864d52e88"
Content-Length: 0
```

6. The focus sends a BYE to Carol.

```
BYE sip:10.29.107.208:2308;transport=tls;ms-opaque=3c71125d8b;ms-received-cid=200;grid
SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK84AB2CF9.FE5FB404;branched=FALSE
Authentication-Info: NTLM rspauth="010000000000000081CFA34164D52E88",
srand="7F2A719B", snum="213", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=0D440080
To: <sip:carol@contoso.com>;tag=dfccec5fb4;epid=dceed2edfb
Call-ID: 1e294f6aa2ff4fccaf796b2e7fb723be
CSeq: 2147483645 BYE
Reason: SIP;cause=481;text="Participant Removed"
Content-Length: 0
ms-diagnostics-public: 3118;reason="Participant Removed"
```

7. The IM MCU also sends a BYE to Carol.

```
BYE sip:10.29.107.208:2308;transport=tls;ms-opaque=3c71125d8b;ms-received-cid=200;grid
SIP/2.0
```

```
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK813470AD.FD03477F;branched=FALSE;ms-
internal-info="ca3SzQzTPM7Vg7kxWWw15db-EJmXn9A0d_EddarwAA"
Authentication-Info: NTLM rspauth="010000000000000061385D6F64D52E88",
srand="461D78BD", snum="214", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 69
Via: SIP/2.0/TLS 10.29.106.56:18164;branch=z9hG4bK86ed724f;ms-received-port=18164;ms-
received-cid=31900
FROM:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:7ECB5F9BFFB1F343B36775DBA09E8038>;
tag=740746dec
TO: <sip:carol@contoso.com>;epid=dceed2edfb;tag=8d9b5cc1fb
CSEQ: 2 BYE
CALL-ID: 08501c03562b4515a1ad55e367dd503d
CONTENT-LENGTH: 0
```

8. The focus gives a success response to Carol's BYE request.

```
SIP/2.0 200 OK
Authentication-Info: NTLM rspauth="01000000000000001D5B9E5464D52E88",
srand="583C12F1", snum="215", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: "Carol"<sip:carol@contoso.com>;tag=dfccec5fb4;epid=dceed2edfb
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=0D440080
Call-ID: 1e294f6aa2ff4fccaf796b2e7fb723be
CSeq: 2 BYE
Via: SIP/2.0/TLS 10.56.65.217:2308;received=10.29.107.208;ms-received-port=2308;ms-
received-cid=200
Content-Length: 0
```

9. The IM MCU gives a failure response to Carol's BYE request, because it had already terminated
   her dialog.

```
SIP/2.0 481 Dialog does not exist
Authentication-Info: NTLM rspauth="01000000372D4F439939FAA764D52E88",
srand="7B435466", snum="216", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Via: SIP/2.0/TLS 10.56.65.217:2308;received=10.29.107.208;ms-received-port=2308;ms-
received-cid=200
FROM: <sip:carol@contoso.com>;tag=8d9b5cc1fb;epid=dceed2edfb
TO:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:7ECB5F9BFFB1F343B36775DBA09E8038>;
tag=740746dec
CSEQ: 2 BYE
CALL-ID: 08501c03562b4515a1ad55e367dd503d
CONTENT-LENGTH: 0
Ms-Diagnostics: 6019;source="M18-OCG.topa.contoso.com";reason="Dialog does not
exist";component="ImMcu"
```

10. Carol responds with success for the BYE that she received from the focus.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK84AB2CF9.FE5FB404;branched=FALSE
```

```
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=0D440080
To: <sip:carol@contoso.com>;tag=dfccec5fb4;epid=dceed2edfb
Call-ID: 1e294f6aa2ff4fccaf796b2e7fb723be
CSeq: 2147483645 BYE
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="cae34494", cnum="146", targetname="M17-
OCG.topa.contoso.com", response="0100000030303030552db08d64d52e88"
Content-Length: 0
```

11. Carol responds with success for the BYE that she received from the IM MCU.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK813470AD.FD03477F;branched=FALSE;ms-
internal-info="ca3SzQzTPM7Vg7kxWWw15db-EJmXn9A0d_EddarwAA"
Via: SIP/2.0/TLS 10.29.106.56:18164;branch=z9hG4bK86ed724f;ms-received-port=18164;ms-
received-cid=31900
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:7ECB5F9BFFB1F343B36775DBA09E8038>;
tag=740746dec
To: <sip:carol@contoso.com>;tag=8d9b5cc1fb;epid=dceed2edfb
Call-ID: 08501c03562b4515a1ad55e367dd503d
CSeq: 2 BYE
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="ea343736", cnum="147", targetname="M17-
OCG.topa.contoso.com", response="010000003030303048aabbdd64d52e88"
Content-Length: 0
```

12. An update is sent to each participant (2), after first sending to Alice.

```
BENOTIFY sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bK74B6E95E.6011A72A;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFFD50AB313D0DA217BA3A547727FE3C08",
srand="E8F4A9CD", snum="173", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:alice@contoso.com>;tag=8ca1c2ecee;epid=bd4bd366c2
Content-Length: 1541
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=0C390080
Call-ID: e4687f7cae464055aae47121f976c941
CSeq: 9 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
```

```
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA0
9E8038" state="partial" version="10">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
      <display-text>Carol</display-text>
      <roles>
        <entry>attendee</entry>
      </roles>
      <endpoint entity="{C263F024-15CC-4B33-971D-FCF9BE23BB0D}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
        <status>connected</status>
        <joining-method>dialed-in</joining-method>
        <media id="1">
          <type>chat</type>
        </media>
        <msci:endpoint-capabilities>
          <msim:endpoint-capabilities>
            <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
            <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
          </msim:endpoint-capabilities>
        </msci:endpoint-capabilities>
      </endpoint>
    </user>
  </users>
</conference-info>
```

13. The same update is sent to Bob.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bK8ED5B734.E117FD72;branched=FALSE
Authentication-Info: NTLM rspauth="0100000003000000BFBFB46E554C2961",
srand="286F1714", snum="121", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=1975ba9368;epid=65a77e620d
Content-Length: 1541
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=9A750080
Call-ID: f41a3d199b074484b257db390ef4a60d
CSeq: 5 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA0
9E8038" state="partial" version="10">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
```

```
        <display-text>Carol</display-text>
        <roles>
          <entry>attendee</entry>
        </roles>
        <endpoint entity="{C263F024-15CC-4B33-971D-FCF9BE23BB0D}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
          <status>connected</status>
          <joining-method>dialed-in</joining-method>
          <media id="1">
            <type>chat</type>
          </media>
          <msci:endpoint-capabilities>
            <msim:endpoint-capabilities>
              <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
              <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
            </msim:endpoint-capabilities>
          </msci:endpoint-capabilities>
        </endpoint>
      </user>
    </users>
</conference-info>
```

14. The final "success" is issued for Alice's **deleteUser** request.

```
INFO sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKAFA26818.12DEDCF4;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF1DA63C4524C86AACE81AF0D61DB55BB1",
srand="F4849582", snum="174", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
Content-Length: 1017
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=3C150080
To: <sip:alice@contoso.com>;tag=58b76ebb1c;epid=bd4bd366c2
Call-ID: cfc48d02676c47379c7083eb783ad2ab
CSeq: 1 INFO
Content-Type: application/cccp+xml
<response xmlns="urn:ietf:params:xml:ns:cccp"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:mscp="http://schemas.microsoft.com/rtc/2005/08/cccpextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
xmlns:msls="urn:ietf:params:xml:ns:msls" requestId="63022864" C3PVersion="1"
from="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E
8038" to="sip:alice@contoso.com" code="success">
  <deleteUser>
    <conferenceKeys
confEntity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775
DBA09E8038" />
    <ci:user entity="sip:bob@contoso.com" />
```

```
        </deleteUser>
    </response>
```

15. Alice sends a 200 OK for the INFO she just received.

```
SIP/2.0 200 OK
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKAFA26818.12DEDCF4;branched=FALSE
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=3C150080
To: <sip:alice@contoso.com>;tag=58b76ebb1c;epid=bd4bd366c2
Call-ID: cfc48d02676c47379c7083eb783ad2ab
CSeq: 1 INFO
Contact: <sip:alice@contoso.com;opaque=user:epid:XVjJHDlexlmisnhQrAkWqwAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: Kerberos qop="auth", realm="SIP Communications Service",
opaque="4EBBA7AE", crand="062bc3b8", cnum="134", targetname="sip/M17-
OCG.topa.contoso.com",
response="602306092a864886f71201020201011100ffffffff9135b124523d72e9f52eff1ae4231214"
Content-Length: 0
```

16. An update is sent to each participant (2), after first sending it to Alice.

```
BENOTIFY sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKCCF83472.D64644E4;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFFC91491E6E9586D10FDF01BBFF8CABF38",
srand="E9DC5768", snum="175", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:alice@contoso.com>;tag=8ca1c2ecee;epid=bd4bd366c2
Content-Length: 790
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=0C390080
Call-ID: e4687f7cae464055aae47121f976c941
CSeq: 10 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA0
9E8038" state="partial" version="11">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="deleted" />
  </users>
</conference-info>
```

17. The same update is sent to Bob.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bK8FD5B734.557049F6;branched=FALSE
Authentication-Info: NTLM rspauth="0100000003000000023490E0E554C2961",
srand="6498AFAD", snum="122", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=1975ba9368;epid=65a77e620d
Content-Length: 790
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA09E8038>
;tag=9A750080
Call-ID: f41a3d199b074484b257db390ef4a60d
CSeq: 6 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:7ECB5F9BFFB1F343B36775DBA0
9E8038" state="partial" version="11">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="deleted" />
  </users>
</conference-info>
```

4.3.2   A Client Leaves an IM Conference

In this example, Alice, Bob, and Carol are in a conference, and Carol decides to leave the conference.
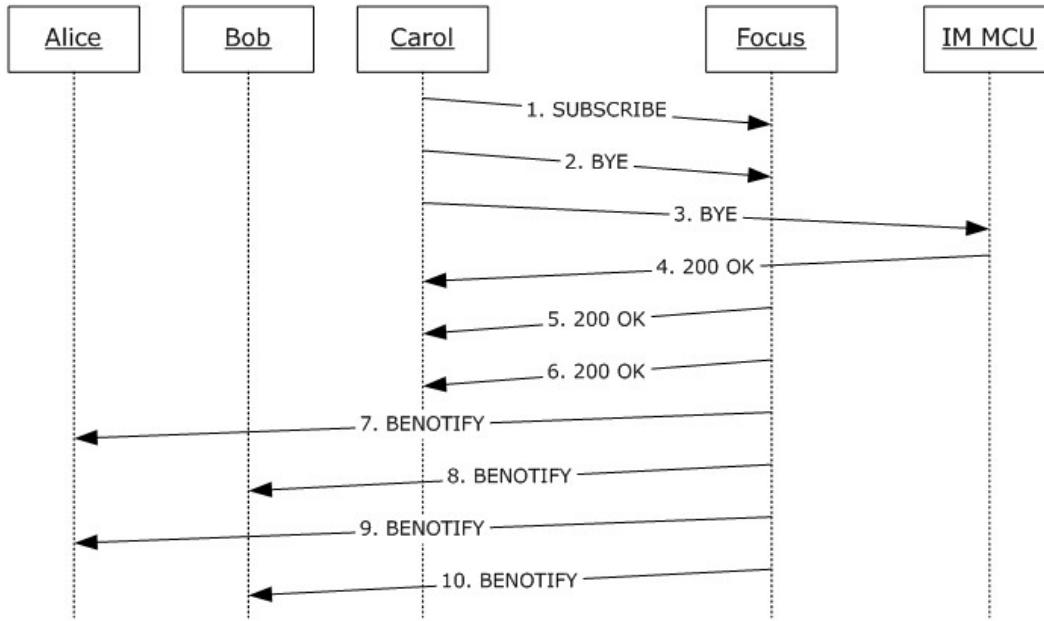
Figure 6: Carol leaves the conference

1. Carol sends a SUBSCRIBE to the focus to terminate her previous **subscription**.

```
SUBSCRIBE
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E
SIP/2.0
Via: SIP/2.0/TLS 10.56.65.217:2308
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=3641b258ee;epid=dceed2edfb
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=B74D0080
Call-ID: 63b1db1e79d34b2a9f7c80eed08749dd
CSeq: 2 SUBSCRIBE
Contact: <sip:carol@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Event: conference
Expires: 0
Accept: application/conference-info+xml
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="a349f34b", cnum="159", targetname="M17-
OCG.topa.contoso.com", response="010000000000000073b4432564d52e88"
Content-Length: 0
```

2. Then, Carol sends a BYE to the focus.

```
BYE
sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E
SIP/2.0
Via: SIP/2.0/TLS 10.56.65.217:2308
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=a7fb635ce5;epid=dceed2edfb
```

```
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=1C490080
Call-ID: cc0aea8a111245e483889ee3046b0cdd
CSeq: 2 BYE
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="6f11123a", cnum="160", targetname="M17-
OCG.topa.contoso.com", response="010000000000000039e331d064d52e88"
Content-Length: 0
```

3. And Carol also sends a BYE to the IM MCU.

```
BYE sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-OCG.topa.contoso.com;ms-
role-rs-from;ms-role-rs-to;ms-ent-dest;lr;ms-rgs-cid=200;ms-route-
sig=aaNmLvrONmtomq224PODzEBNDcYdNsahem1UuIVQAA SIP/2.0
Via: SIP/2.0/TLS 10.56.65.217:2308
Max-Forwards: 70
From: <sip:carol@contoso.com>;tag=4e8a884047;epid=dceed2edfb
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:5DF1BD8C2B991B4390685C6D219C8C2E>;
tag=6dbfbd40f5
Call-ID: 9326d544b5de45869fe39ff75eef2287
CSeq: 2 BYE
Route: <sip:poola.topa.contoso.com:5062;transport=tls;ms-fe=M18-OCG.topa.contoso.com>
User-Agent: UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office Communicator)
Proxy-Authorization: NTLM qop="auth", realm="SIP Communications Service",
opaque="5CA5FA8B", crand="421e39e4", cnum="161", targetname="M17-
OCG.topa.contoso.com", response="01000000f030240621df7d6f64d52e88"
Content-Length: 0
```

4. The IM MCU sends Carol a 200 OK for her BYE.

```
SIP/2.0 200 OK
Authentication-Info: NTLM rspauth="01000000DC53270358568D7264D52E88",
srand="8D3D0370", snum="231", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Via: SIP/2.0/TLS 10.56.65.217:2308;received=10.29.107.208;ms-received-port=2308;ms-
received-cid=200
FROM: <sip:carol@contoso.com>;tag=4e8a884047;epid=dceed2edfb
TO:
<sip:alice@contoso.com;gruu;opaque=app:conf:chat:id:5DF1BD8C2B991B4390685C6D219C8C2E>;
tag=6dbfbd40f5
CSEQ: 2 BYE
CALL-ID: 9326d544b5de45869fe39ff75eef2287
CONTENT-LENGTH: 0
```

5. The focus sends Carol a 200 OK for her unSUBSCRIBE.

```
SIP/2.0 200 Sub dialog terminated
Contact: <sip:poola.topa.contoso.com:5061;transport=tls;ms-fe=M17-
OCG.topa.contoso.com>;isfocus
Authentication-Info: NTLM rspauth="010000007465652E8E37A51664D52E88",
srand="3B053A7C", snum="232", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: "Carol"<sip:carol@contoso.com>;tag=3641b258ee;epid=dceed2edfb
```

```
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=B74D0080
Call-ID: 63b1db1e79d34b2a9f7c80eed08749dd
CSeq: 2 SUBSCRIBE
Via: SIP/2.0/TLS 10.56.65.217:2308;received=10.29.107.208;ms-received-port=2308;ms-
received-cid=200
Expires: 0
Content-Length: 0
```

6. The focus also sends Carol a 200 OK for her BYE.

```
SIP/2.0 200 OK
Authentication-Info: NTLM rspauth="010000006F73742EA96BE9EF64D52E88",
srand="9D061EB1", snum="233", opaque="5CA5FA8B", qop="auth", targetname="M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
From: "Carol"<sip:carol@contoso.com>;tag=a7fb635ce5;epid=dceed2edfb
To:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=1C490080
Call-ID: cc0aea8a111245e483889ee3046b0cdd
CSeq: 2 BYE
Via: SIP/2.0/TLS 10.56.65.217:2308;received=10.29.107.208;ms-received-port=2308;ms-
received-cid=200
Content-Length: 0
```

7. Because Carol has terminated her IM, the focus sends a BENOTIFY to each remaining participant (2), after first sending it to Alice.

```
BENOTIFY sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKEA706A80.806C351F;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF8814AB945CAE28D7A87FC47DC25AB434",
srand="596D4EDD", snum="204", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:alice@contoso.com>;tag=60d87b19a5;epid=bd4bd366c2
Content-Length: 1541
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=0D440080
Call-ID: 3ba565d959df4655a7b9790211317473
CSeq: 7 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D21
9C8C2E" state="partial" version="10">
  <users state="partial">
```

```
        <user entity="sip:carol@contoso.com" state="full">
          <display-textCarol</display-text>
          <roles>
            <entry>attendee</entry>
          </roles>
          <endpoint entity="{EE12854F-3E10-4EBC-A10D-9E157AF08598}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
            <status>connected</status>
            <joining-method>dialed-in</joining-method>
            <media id="1">
              <type>chat</type>
            </media>
            <msci:endpoint-capabilities>
              <msim:endpoint-capabilities>
                <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
                <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
              </msim:endpoint-capabilities>
            </msci:endpoint-capabilities>
          </endpoint>
        </user>
      </users>
    </conference-info>
```

8. The same information is relayed to Bob.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bKCB8BD123.83A98F12;branched=FALSE
Authentication-Info: NTLM rspauth="01000000DC86C10061FD476C554C2961",
srand="8D126FC1", snum="138", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=88a2ee1c94;epid=65a77e620d
Content-Length: 1541
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=404B0080
Call-ID: 718c30adefb34d93bd272cf7d465e71b
CSeq: 3 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D21
9C8C2E" state="partial" version="10">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="full">
      <display-text>Carol</display-text>
      <roles>
```

```
            <entry>attendee</entry>
        </roles>
        <endpoint entity="{EE12854F-3E10-4EBC-A10D-9E157AF08598}" msci:session-
type="chat" msci:endpoint-
uri="sip:carol@contoso.com;opaque=user:epid:d7NL6_mHNFSL3I1rbITi2gAA;gruu">
            <status>connected</status>
            <joining-method>dialed-in</joining-method>
            <media id="1">
               <type>chat</type>
            </media>
            <msci:endpoint-capabilities>
               <msim:endpoint-capabilities>
                  <msim:supported-im-formats>text/rtf application/x-ms-ink image/gif
multipart/alternative application/ms-imdn+xml</msim:supported-im-formats>
                  <msim:user-agent>UCCP/2.0.6362.0 OC/2.0.6362.0 (Microsoft Office
Communicator)</msim:user-agent>
               </msim:endpoint-capabilities>
            </msci:endpoint-capabilities>
        </endpoint>
     </user>
   </users>
</conference-info>
```

9. Finally, each participant (2) is informed that Carol has left the conference. First, Alice gets this notification.

```
BENOTIFY sip:10.29.107.208:2157;transport=tls;ms-opaque=ae7937d6e6;ms-received-
cid=29500;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.52:5061;branch=z9hG4bKEB706A80.2CE486D7;branched=FALSE
Authentication-Info: Kerberos
rspauth="602306092A864886F71201020201011100FFFFFFFF4C4A157D74AA7FAFB1917742FA66B285",
srand="B85FB625", snum="205", opaque="4EBBA7AE", qop="auth", targetname="sip/M17-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:alice@contoso.com>;tag=60d87b19a5;epid=bd4bd366c2
Content-Length: 790
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=0D440080
Call-ID: 3ba565d959df4655a7b9790211317473
CSeq: 8 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D21
9C8C2E" state="partial" version="11">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="deleted" />
  </users>
</conference-info>
```

10. Then Bob is notified that Carol has left the conference.

```
BENOTIFY sip:10.29.107.208:3346;transport=tls;ms-opaque=28d3eab13b;ms-received-
cid=16C000;grid SIP/2.0
Via: SIP/2.0/TLS 10.29.106.56:5061;branch=z9hG4bKCC8BD123.3F686649;branched=FALSE
Authentication-Info: NTLM rspauth="01000000DC86C100B8299779554C2961",
srand="61EC0ED3", snum="139", opaque="6F277244", qop="auth", targetname="M18-
OCG.topa.contoso.com", realm="SIP Communications Service"
Max-Forwards: 70
To: <sip:bob@contoso.com>;tag=88a2ee1c94;epid=65a77e620d
Content-Length: 790
From:
<sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D219C8C2E>
;tag=404B0080
Call-ID: 718c30adefb34d93bd272cf7d465e71b
CSeq: 4 BENOTIFY
Content-Type: application/conference-info+xml
Event: conference
subscription-state: active;expires=3600
<conference-info xmlns="urn:ietf:params:xml:ns:conference-info"
xmlns:msacp="http://schemas.microsoft.com/rtc/2005/08/acpconfinfoextensions"
xmlns:msav="http://schemas.microsoft.com/rtc/2005/08/avconfinfoextensions"
xmlns:msci="http://schemas.microsoft.com/rtc/2005/08/confinfoextensions"
xmlns:msdata="http://schemas.microsoft.com/rtc/2005/08/dataconfinfoextensions"
xmlns:msim="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
xmlns:ci="urn:ietf:params:xml:ns:conference-info"
xmlns:cis="urn:ietf:params:xml:ns:conference-info-separator"
entity="sip:alice@contoso.com;gruu;opaque=app:conf:focus:id:5DF1BD8C2B991B4390685C6D21
9C8C2E" state="partial" version="11">
  <users state="partial">
    <user entity="sip:carol@contoso.com" state="deleted" />
  </users>
</conference-info>
```

5 Security

5.1 Security Considerations for Implementers

None.

5.2 Index of Security Parameters

None.

6   Appendix A: Full XML Schema

6.1   IM Endpoint Capabilities Schema

Following is the schema for IM endpoint capabilities.

```
<xs:schema targetNamespace="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
 elementFormDefault="qualified"
 attributeFormDefault="unqualified"
 version="1.0"
 xmlns:ms="urn:microsoft-cpp-xml-serializer"
 xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/imconfinfoextensions"
 xmlns:xs="http://www.w3.org/2001/XMLSchema">

    <xs:complexType name="settings-type"
                    ms:className="C3PImMcuSettingsType">
        <xs:sequence>
            <xs:any namespace="##any" processContents="lax" minOccurs="0"
                    maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="settings" type="tns:settings-type" ms:ignore="true"/>

    <xs:simpleType name="supported-im-formats-type">
        <xs:annotation>
            <xs:documentation>
                A string indicating the im content types that can be
                rendered by the endpoint
            </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
            <xs:maxLength value="512"/>
        </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="user-agent-type">
        <xs:annotation>
            <xs:documentation>
                A string indicating the user agent of the endpoint
            </xs:documentation>
        </xs:annotation>
        <xs:restriction base="xs:string">
            <xs:maxLength value="128"/>
        </xs:restriction>
    </xs:simpleType>
    <xs:complexType name="endpoint-capabilities-type"
                    ms:className="C3PImMcuEndpointCapabilitiesType">
        <xs:sequence>
            <xs:element name="supported-im-formats"
                        type="tns:supported-im-formats-type"
                        minOccurs="0"/>
            <xs:element name="user-agent" type="tns:user-agent-type"
                        minOccurs="0"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0"
                    maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>
    <xs:element name="endpoint-capabilities" type="tns:endpoint-
```

```
                    capabilities-type" ms:ignore="true"/>

    </xs:schema>
```

6.2 Instant Message Delivery Notification (IMDN) Schema

Following is the schema for Instant Message Delivery Notification (IMDN).

```
<xs:schema
 targetNamespace="http://schemas.microsoft.com/rtc/2005/08/imdn"
 elementFormDefault="qualified"
 attributeFormDefault="unqualified"
 version="1.0"
 xmlns:tns="http://schemas.microsoft.com/rtc/2005/08/imdn"
 xmlns:xs="http://www.w3.org/2001/XMLSchema">
    <!--
        imdn element
    -->
    <xs:element name="imdn" type="tns:imdn-type"/>

    <!--
        imdn type
    -->
    <xs:complexType name="imdn-type">
        <xs:sequence>
            <xs:element name="message-id" type="xs:unsignedInt"/>
            <xs:element name="recipient" type="tns:recipient-type"
                        minOccurs="0" maxOccurs="unbounded"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0"
                    maxOccurs="unbounded"/>
        </xs:sequence>
    </xs:complexType>

    <!--
        recipient type
    -->
    <xs:complexType name="recipient-type">
        <xs:sequence>
            <xs:element name="status" type="xs:unsignedInt"/>
            <xs:element name="entry" type="tns:key-value-pair-type"
                        minOccurs="0" maxOccurs="unbounded"/>
            <xs:any namespace="##other" processContents="lax" minOccurs="0"
                    maxOccurs="unbounded"/>
        </xs:sequence>
        <xs:attribute name="uri" type="xs:anyURI" use="required"/>
    </xs:complexType>
    <!--
         KEY VALUE PAIR TYPE
    -->
    <xs:complexType name="key-value-pair-type">
        <xs:sequence>
            <xs:element name="key" type="xs:string"/>
            <xs:element name="value" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>

    </xs:schema>
```

Release: October 8, 2012

7   Appendix B: Product Behavior

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

▪ Microsoft® Office Communications Server 2007

▪ Microsoft® Office Communications Server 2007 R2

▪ Microsoft® Office Communicator 2007

▪ Microsoft® Office Communicator 2007 R2

▪ Microsoft® Lync® Server 2010

▪ Microsoft® Lync® 2010

▪ Microsoft® Lync® Server 2013

▪ Microsoft® Lync® 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 3.1.3.4.1: Office Communications Server 2007, Office Communicator 2007: This behavior is not supported.

<2> Section 3.3.2.5.2: Office Communications Server 2007, Office Communicator 2007: This behavior is not supported.

8 Change Tracking

This section identifies changes that were made to the [MS-CONFIM] protocol document between the July 2012 and October 2012 releases. Changes are classified as New, Major, Minor, Editorial, or No change.

The revision class **New** means that a new document is being released.

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 or functionality.

- An extensive rewrite, addition, or deletion of major portions of content.

- The removal of a document from the documentation set.

- Changes made for template compliance.

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 **Editorial** means that the language and formatting in the technical content was changed. Editorial changes apply to grammatical, formatting, and style issues.

The revision class **No change** means that no new technical or language changes were introduced. The technical content of the document is identical to the last released version, but minor editorial and formatting changes, as well as updates to the header and footer information, and to the revision summary, may have been made.

Major and minor changes can be described further using the following change types:

- New content added.

- Content updated.

- Content removed.

- New product behavior note added.

- Product behavior note updated.

- Product behavior note removed.

- New protocol syntax added.

- Protocol syntax updated.

- Protocol syntax removed.

- New content added due to protocol revision.

- Content updated due to protocol revision.

- Content removed due to protocol revision.

- New protocol syntax added due to protocol revision.

- Protocol syntax updated due to protocol revision.

- Protocol syntax removed due to protocol revision.

- New content added for template compliance.

- Content updated for template compliance.

- Content removed for template compliance.

- Obsolete document removed.

Editorial changes are always classified with the change type **Editorially updated.**

Some important terms used in the change type descriptions are defined as follows:

- **Protocol syntax** refers to data elements (such as packets, structures, enumerations, and methods) as well as interfaces.

- **Protocol revision** refers to changes made to a protocol that affect the bits that are sent over the wire.

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

Section	Tracking number (if applicable) and description	Major change (Y or N)	Change type
1.3 Overview	Changed the name from 'Protocol Overview (Synopsis)' to 'Overview'.	N	Content updated for template compliance.

9 Index