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SIP Conferencing: Sub-conferences and Sidebars
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Abstract

This document discusses the creation, management of operation of sub-conferences in a centralized conferencing architecture, also known as "sidebars". This work uses the SIP Conferencing Framework and builds on the descriptions of sub-conferences in that document. Examples of SIP and XCON protocols are given.

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1. Introduction

This document uses the concepts and definitions from the SIP high level conferencing requirements and the SIP conferencing framework [9] documents.

While the SIP conferencing framework document describes both SIP and XCON methods for creating and managing a centralized conference, this document will assume a non-SIP method, as sidebars are an advanced conferencing application. Examples of the non-SIP methods include the XCON protocols (used as examples) an IVR, or a web page.

2. Sidebars and Dialogs

Conference establishment using SIP dialogs is described in the SIP conferencing framework document. The set of XCON protocols to also establish a conference is currently being developed and designed by the XCON working group. Since the details are TBD, this document will refer to the protocol as CPCP (Conference Policy Control Protocol) [8] and omit the details of the messages until they are developed.

In SIP sessions, it is not uncommon to have a single dialog with multiple media sessions. The SIP Conferencing Framework assumes this - that a participant uses the Conference URI to establish an INVITE dialog that results in the establishment of one or more media streams. Media streams established using separate dialogs are usually assumed to be unrelated. For example, a pair of SIP/PSTN gateways may have a number of dialogs established between them, and the resulting media streams represent separate calls or sessions.

As a result, the simplest sidebar dialog model is to reuse the existing main conference dialog to establish the sidebar. This has the advantage of allowing even the simplest endpoints which are incapable of any local mixing to participate in a conference with

sidebars, provided a non-SIP method of controlling the conference is provided.

It is also possible for a sidebar to have a separate dialog. However, the motivation and advantages for this are not obvious. As a result, this document will be restricted to the case of a single dialog and the reuse of that dialog for sidebars.

As discussed in the framework, a sub-conference is identified by a URI. This URI is an alias for the main conference - that is, it must resolve to the same focus as the main conference. If an intended sidebar participant is not a participant in the main conference, the intended participant joins the conference using the sidebar URI using

normal SIP means and is added into the sidebar only. If that participant wishes to become part of the main conference, either a re-INVITE with the main conference URI in the Contact is used, or an INVITE with Replaces from the main conference is issued. Of course, if the participant wishes to maintain separate dialogs, a simple new INVITE would be sent to/from the main conference URI.

[3.](#) Sidebar mechanism requirements

A properly authorized participant in a conference which allows sidebars must be able to:

REQ-1 Create a sidebar conference.

REQ-2 Invite participants to join the sidebar, both members of the main conference and outside the conference.

REQ-3 Discover the status of the invited participants.

REQ-4 Remove participants from a sidebar.

REQ-5 Delete the sidebar.

In addition, any participant or potential participant in a sidebar must be able to:

REQ-6 Discover they have been invited to a sidebar.

REQ-7 Accept or deny an invitation to a sidebar.

REQ-8 Discover who else is a participant in the sidebar.

REQ-9 Switch back and forth between the sidebar and the main conference.

REQ-10 Add/delete media streams in the sidebar.

REQ-11 Leave the sidebar.

CPCP [8] can meet requirements REQ-1, REQ-2, REQ-5, REQ-6, and REQ-10.

As the conference package [5] contains sidebar rosters, notifications from the focus can meet requirements REQ-3 and REQ-8. In addition, if a "pending" user status is added to the conference package (or the existing "on-hold" status reused), it can meet requirement REQ-6.

The remaining requirements need to be met using controls provided by

the template, as discussed in the media policy document. Specifically, REQ-9 is needed if the nature of the media type limits the user to participation in only one stream at a time. For example, a user can effectively only listen to a single audio stream at a time, so they can only participate in either the main audio conference or in an audio sidebar but not both at the same time. On the other hand, a user can easily participate in multiple text sidebars while still participating actively in the main conference. Thus, the need for this requirement is media specific.

In the main conference, the equivalent requirements to requirements REQ-7, REQ-9 and REQ-11 are met using the signaling protocol, i.e. an INVITE is accepted or rejected to join the main conference, a re-INVITE places media streams on and off hold, and a BYE is sent to leave the main conference. Since a sidebar shares the main conference dialog, clearly these signaling methods are not applicable, except for a participant who is only in the sidebar and not a participant in the main conference. However, the signaling could still be used as the channel to convey this information. For example, a re-INVITE could be initiated by the participant to accept the sidebar invitation if an SDP attribute were defined to convey

this information. A re-INVITE could also be used to switch between participation in the main conference and the sidebar, and to leave the sidebar.

Alternatively, a CPCP command could be used meet REQ-7, REQ-9 and REQ-11.

Until one approach or the other is chosen for this, the call flows will show CPCP/re-INVITE as the mechanism for accepting or denying a sidebar invitation. switching between participation in the main conference and the sidebar, and leaving a sidebar.

[4.](#) Creating Sidebars

The SIP conferencing architecture supports multiple media types and both centralized and distributed mixing. Sidebars also have this same property. The media type and mixing mode of a sidebar need not be the same as the main conference.

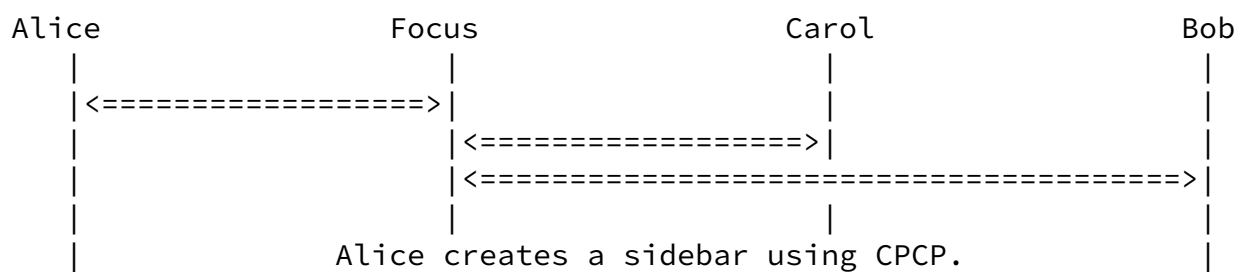
In the simplest case, the sidebar has the same media types as the main conference, and is centrally mixed. In this case, the focus changes the mix for the sidebar participants, and no SIP signaling is necessary - the existing main conference mix is replaced with the sidebar mix.

On the other hand, if the sidebar has different media types than the main conference, then the focus will need to re-INVITE, adding the

new media stream(s). Conference package notifications and SDP information will be used by the User Agent to render the new media stream in the proper context as a sidebar.

For fully distributed mixing of single dialog sidebars, the focus may need to re-INVITE to add a media stream if the media stream is not already being sent to the participant. The participant will be notified of the desired mix using a non-SIP protocol which will result in the creation of the sidebar.

Figure 1 shows a call flow for the creation of a sidebar conference. In this flow and those that follow, Alice, Bob, and Carol are participants in the main conference while Devon is not.



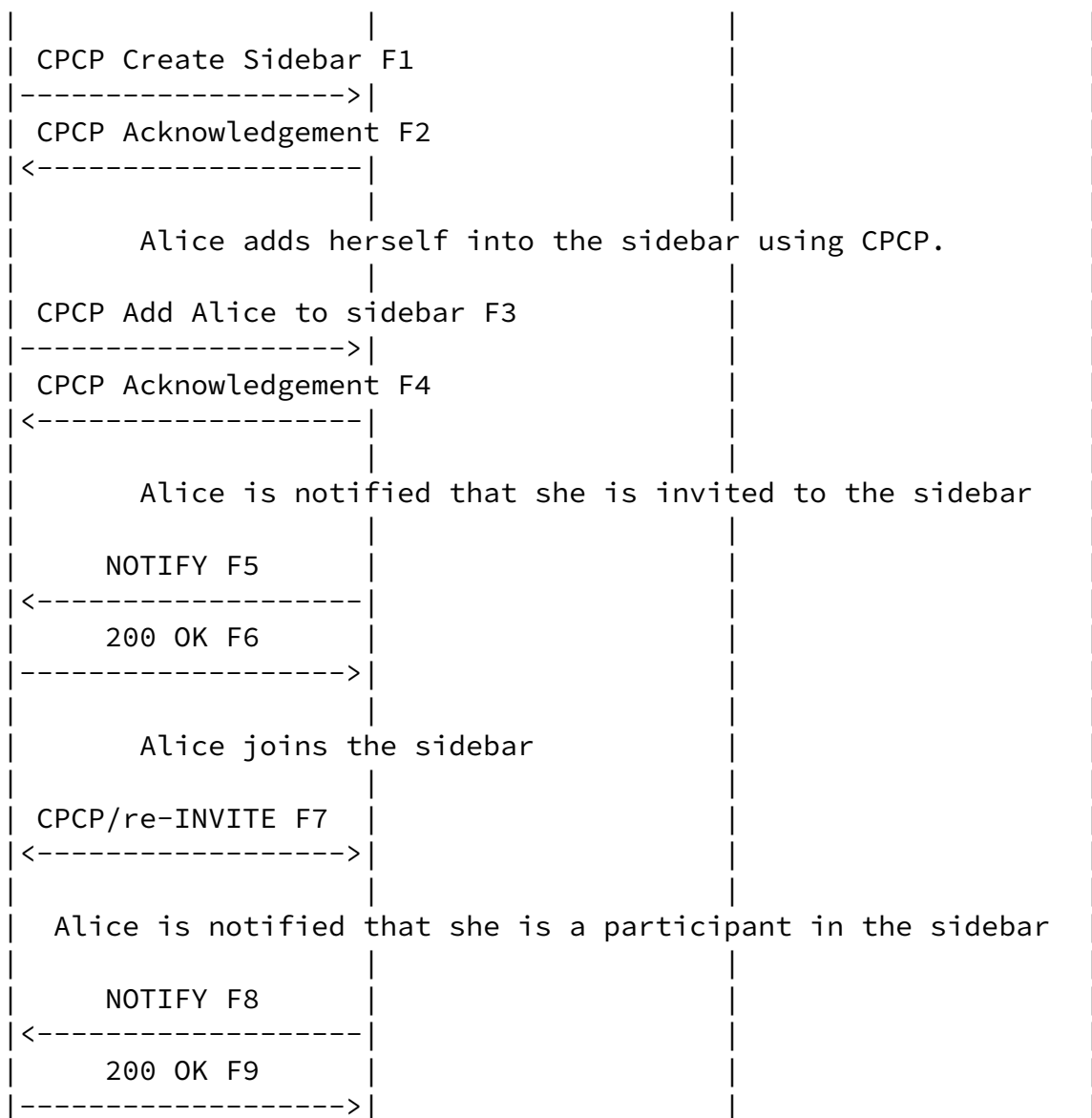


Figure 1. Creation of a Sidebar.

5. Adding Participants to a Sidebar

Participants can be added to a sidebar in a number of ways. If the intended sidebar participant is already a participant in the main conference and desires a single dialog, then some non-SIP means will be used to add the participant.

On the other hand, if the participant is not in the main conference, a SIP means such as a REFER with the Refer-To URI set to the sidebar URI can be used, or a non-SIP means. Either way, a new dialog will be established with the participant and they will join the sidebar using some non-SIP means.

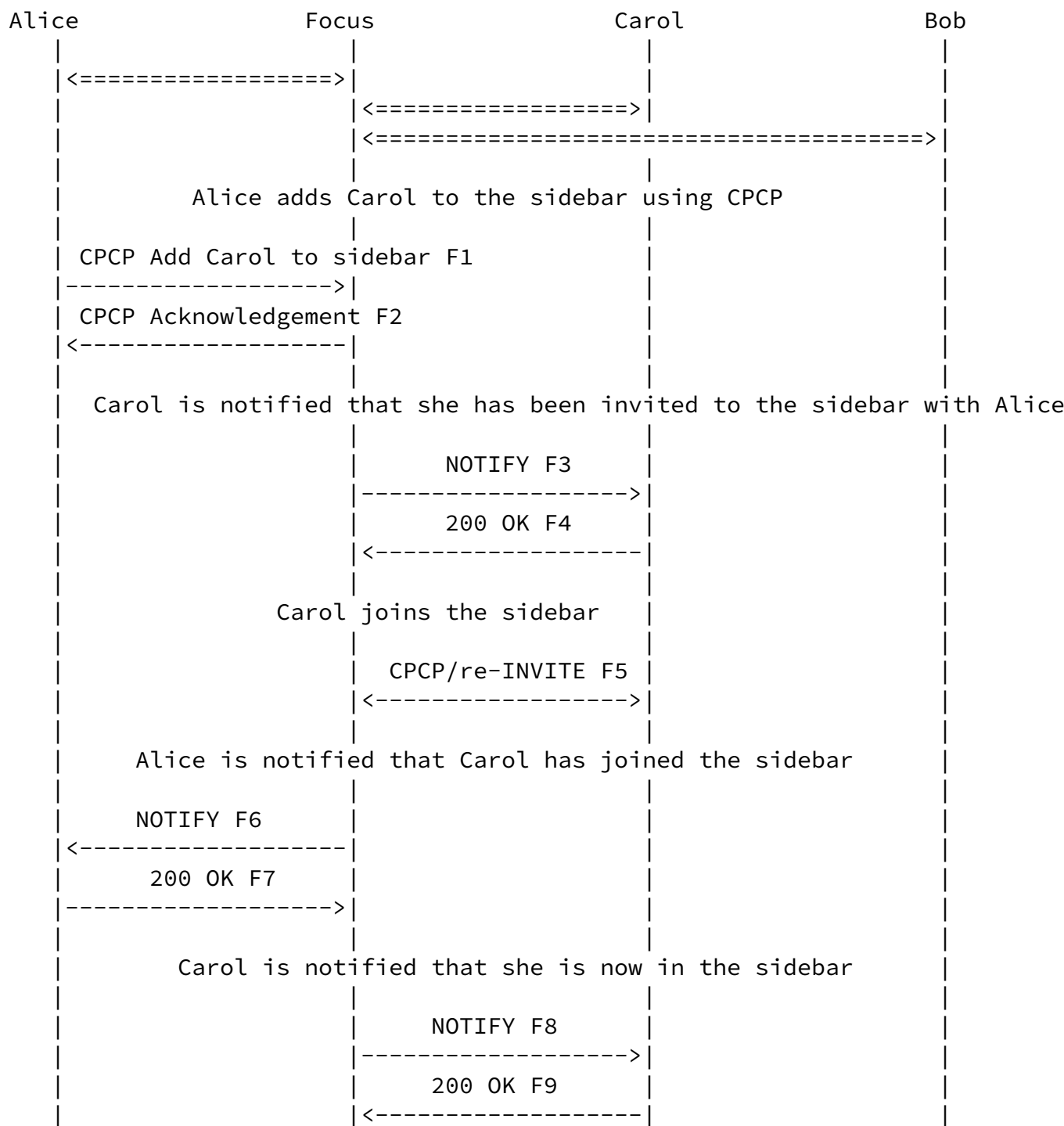


Figure 2. Adding a participant to a sidebar.

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Alice	Focus	Carol	Devon
<=====>	<=====>		
Alice adds Devon who is not in the conference to the sidebar.			
CPCP Add Devon to sidebar F1			
----->			
CPCP Acknowledgement F2			
<-----			
Alice sends a REFER to Devon to join to the sidebar			
	REFER Refer-To:sip:Sidebar-ID F3		
----->			
202 Accepted F4			
<-----			
	NOTIFY F5		
<-----			
	200 OK F6		
----->			
	INVITE sip:Sidebar-ID F7		
	<-----		
	180 Ringing F8		
	----->		
	200 OK Contact:sip:Sidebar-ID;isfocus F9		
	----->		
	ACK F10		
	<-----		
	RTP		
	<=====>		
	SUBSCRIBE sip:Sidebar-ID F11		
	<-----		
	200 OK F12		
	----->		
Devon is notified that she has been invited to a sidebar with Alice			
	NOTIFY F13		
	----->		
	200 OK F14		
	<-----		

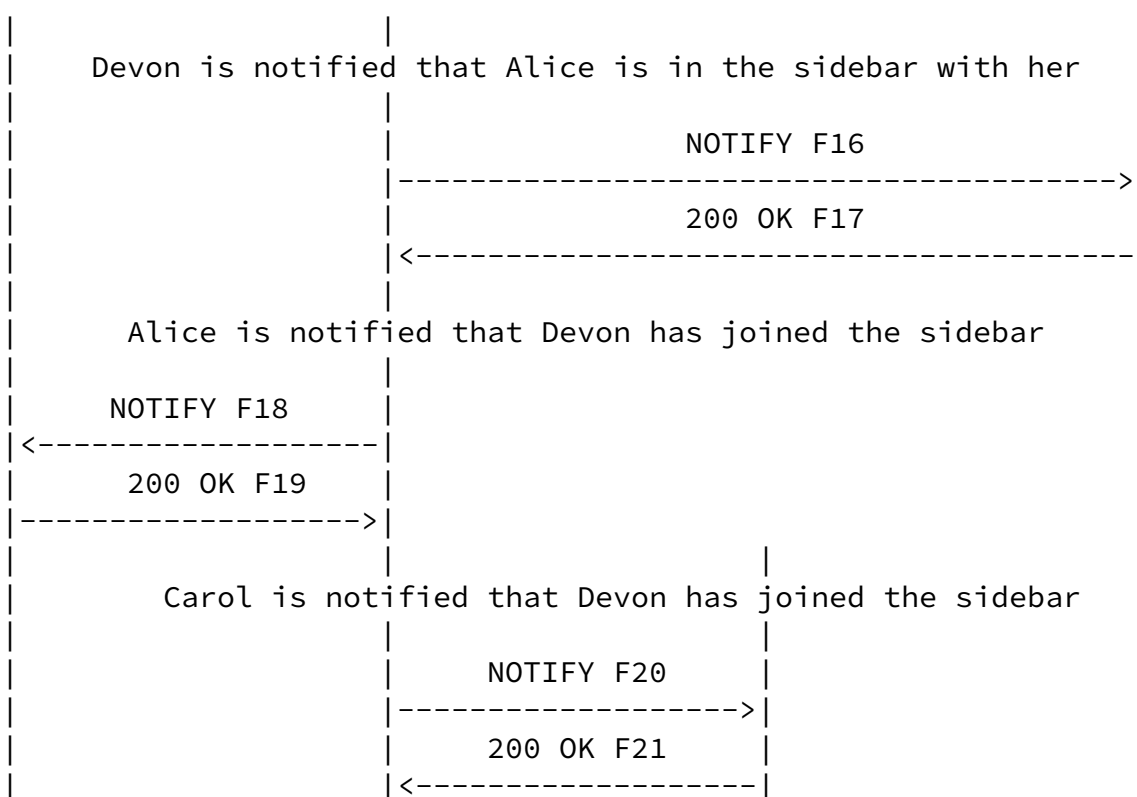
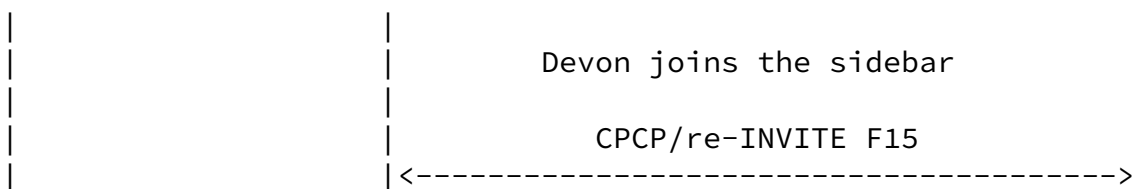
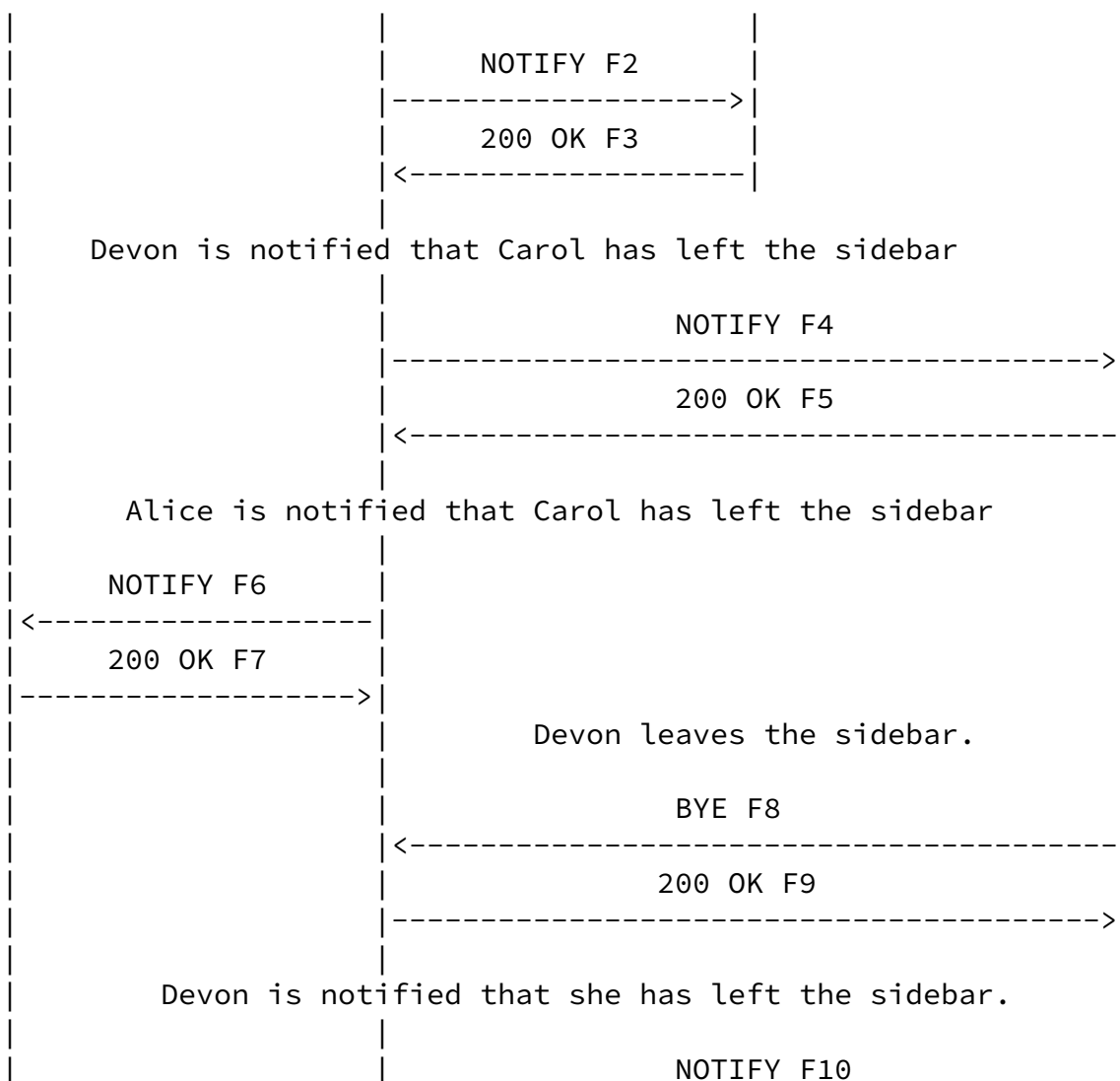
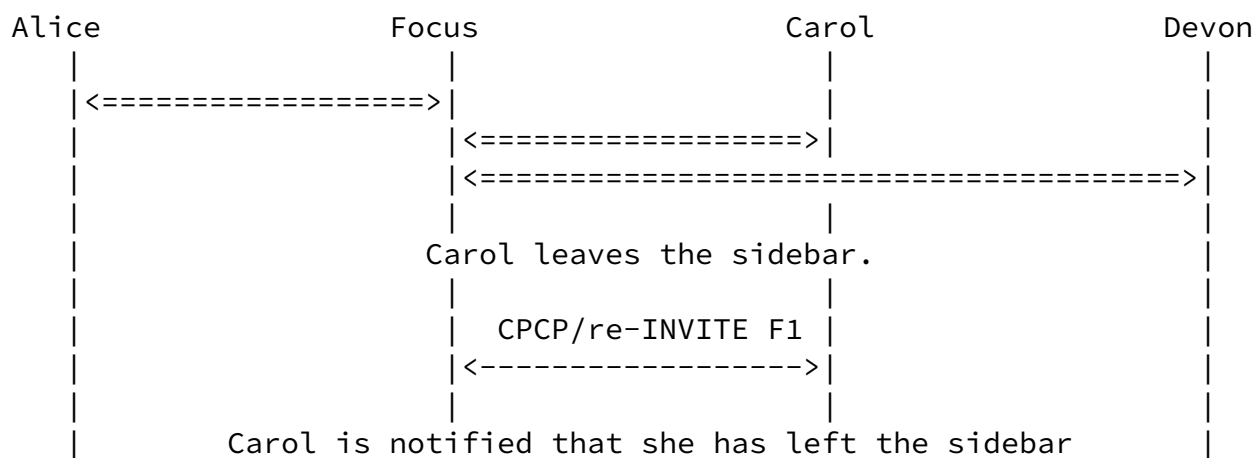


Figure 3. Adding a participant to a sidebar who is not a member of the main conference.

6. Terminating a Sidebar

Participation in a single dialog sidebar is terminated by non-SIP means. When the last participant leaves it, the sidebar ceases to exist. A multiple dialog sidebar is terminated by a BYE on the dialog for each of the participants. When the last participant leaves it, the sidebar ceases to exist, and the sidebar URI becomes unusable. Note that a single participant sidebar is permissible - another participant may join later.



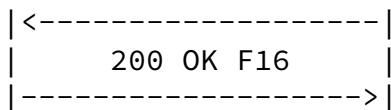
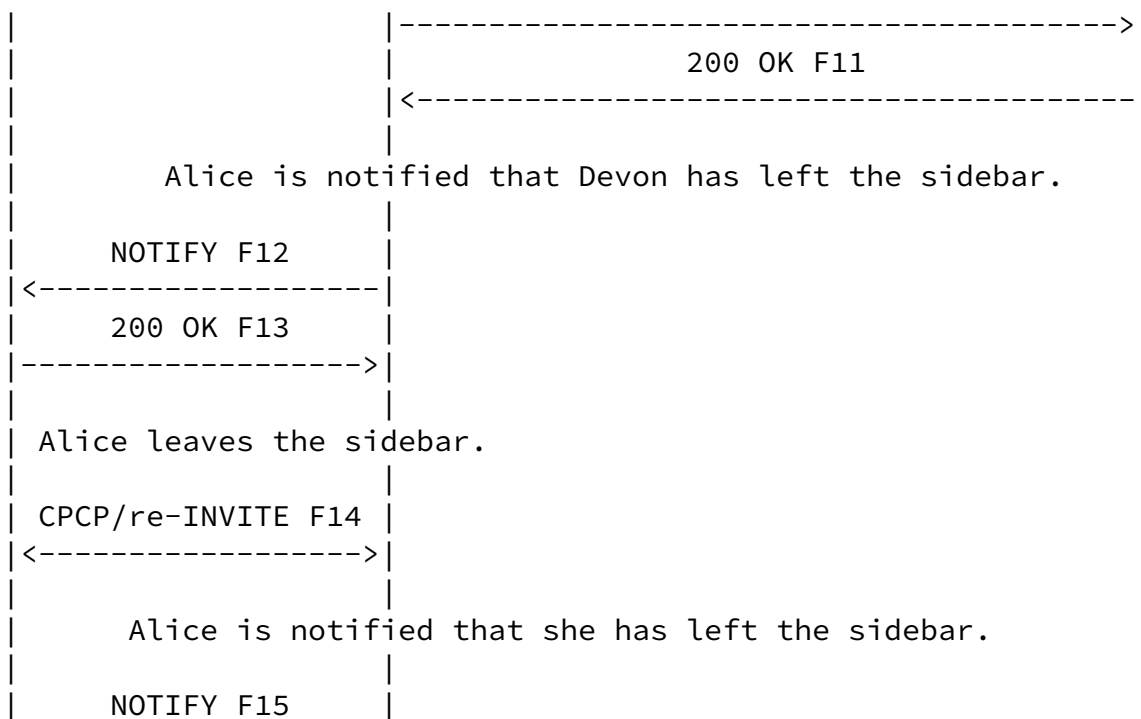


Figure 4. Terminating a sidebar.

7. Security Considerations

This document discusses call control for SIP conferencing. Both call control and conferencing have specific security requirements which will be summarized here. Conferences generally have authorization rules about who may or may not join a conference, what type of media may or may not be used, etc. This information is used by the focus to admit or deny participation in a conference. It is recommended that these types of authorization rules be used to provide security for a SIP conference. For this authorization information to be used, the focus needs to be able to authenticate potential participants. Normal SIP identity mechanisms including Digest challenge, certificates, and identity header fields can be used. These conference specific security requirements are discussed further in the requirements and framework documents.

For call control security, a user agent must maintain local policy on who is permitted to perform call control operations, initiate REFERS, and replace dialogs. Normal SIP authentication mechanisms are also appropriate here. The specific authentication and authorization schemes are described in the multiparty call control framework document.

8. IANA Considerations

None.

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[9.2](#) Informative References

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