



Cisco Collaboration Meeting Rooms (CMR) Premises

Solution Guide

Release 4.0

Cisco TelePresence Conductor XC3.0
Cisco TelePresence Management Suite 14.6
Cisco TelePresence Server 4.1
Cisco TelePresence MCU Series 4.5

January 2015

Contents

Introduction	4
About This Document	4
Overview of CMR Premises	6
Key Benefits	6
Conferencing Types	7
Supported Deployment Scenarios	7
Which Deployment to Use?	8
Core Architecture for CMR Premises	9
Solution Components and Required Versions	11
Infrastructure	11
Endpoints, Soft Clients and Peripherals	12
Deploying CMR Premises in Virtualized Environments	14
Deployments for Unified CM-Centric Networks	15
Unified CM-Centric Standard Deployment	15
Unified CM-Centric External Deployment	17
Unified CM-Centric with Microsoft Lync 2013 Deployment	18
Unified CM-Centric Legacy Deployment	19
Unified CM-Centric Combined Deployment	20
Deployments for Cisco VCS-Centric Networks	21
Cisco VCS-Centric Standard Deployment	21
Cisco VCS-Centric External Deployment	23
Cisco VCS-Centric Interop Deployment	24
Cisco VCS-Centric Combined Deployment	26
Deployments for Cisco Business Edition 6000 or 7000	27
Example Local Deployment	29
Example Deployment with Internet Access	30
Conferencing Services	31
Scheduled Conferencing	31
Non-Scheduled Conferencing	31
CMR Hybrid Conferencing	31
Endpoints	32
Conferencing Features and Options	33
ActiveControl to Endpoints	33
Cascading	33
ClearPath Packet Loss Resilience	34
Personal Multiparty Licensing (User-Based Licensing)	34
Administration for TIP Multiscreen Devices	35
TelePresence Server Resource Optimization	35
Microsoft Lync 2013 Interoperability	36
Segment-Switched Display of TelePresence Rooms	36
Conference Scheduling	37

Configurations for Scheduled Conferencing	37
Requirements for Scheduling—dedicated bridge	40
CMR Hybrid Conferencing	41
Conference Monitoring	42
Configuration and Technology Considerations	43
Locations, Pools and Service Preferences	43
Encryption	43
Unified CM Normalization Script Settings	44
Early Offer for SIP Messaging	44
Endpoints	45
Audio-Only Quality Setting in Ad Hoc Conferencing (TelePresence Servers)	45
IPv4	46
Content Channel	46
H.323 Interworking	46
Resilience and Clustering	46
Entry-Level Conferencing	48
Related Documentation	49
Appendix 1: Conferencing Fundamentals	51
Ad Hoc Conferences	51
Multiway Conferences	51
Personal CMR / rendezvous Conferences	51
Scheduled Conferences	51
Chained Conferences	51
Auto-Dialed Participants (ADP)	52
Appendix 2: Understanding Locations, Pools and Service Preferences	53
Locations	53
Pools	55
Service Preferences	55
More information	55
Accessibility notice	56
Document Revision History	57

Introduction

Cisco Collaboration Meeting Rooms (CMR) provide business-quality video collaboration services, which can be deployed on-premises or in the cloud. The CMR Premises solution is for on-premises implementations.

CMR is also available as:

- CMR Hybrid, which supports participation by Cisco WebEx users in video conferencing. Formerly known as Cisco WebEx Enabled TelePresence.
- CMR Cloud, which supports video conferencing (and web conferencing) services from the Cisco cloud.

Note: In previous releases CMR Premises was known as Optimized Conferencing.

About This Document

This document explains the recommended architecture to support CMR Premises Release 4.0 and provides a high-level view of Cisco's recommended solution for optimal deployment of video conferencing. For information about how to implement the solution, see the accompanying [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#).

This document and the product-related guides that it references are written for partners and technical sales people who have a good technical understanding of Cisco video infrastructure products and their place in a video architecture. We assume that you are familiar with installing and configuring the relevant products.

Terms and Product Names

Standards-based. Describes devices or technology that support the wider ITU-T standards for video conferencing (including H.323, H.320, and SIP). In contrast to SIP-only elements designed specifically for SIP environments.

The following short versions of Cisco product names are used:

Table 1: Product names in this document

Product	Short name
Cisco Collaboration Meeting Rooms (CMR) Premises	CMR Premises
Cisco Collaboration Meeting Rooms (CMR) Hybrid	CMR Hybrid
Cisco Unified Communications Manager	Unified CM
Cisco TelePresence Conductor	TelePresence Conductor
Cisco TelePresence Server	TelePresence Server
Cisco TelePresence MCU Series	MCU
Cisco TelePresence Management Suite	Cisco TMS
Cisco TelePresence Management Suite Provisioning Extension	Cisco TMSPE
Cisco TelePresence Management Suite Extension for Microsoft Exchange	Cisco TMSXE
Cisco TelePresence Video Communication Server	Cisco VCS
Cisco Business Edition 7000	BE7000

Table 1: Product names in this document (continued)

Product	Short name
Cisco Business Edition 6000	BE6000
Cisco Unified Communications Manager Session Management Edition	Unified CM SME

Overview of CMR Premises

CMR Premises comprises a SIP-based core conferencing architecture with a set of supported deployments and endpoints. Each supported deployment extends the core architecture in a specific configuration, depending on the call controller used and the conference services required.

Core architecture

The core architecture contains these key video conferencing elements:

- Cisco TelePresence Server (TelePresence Server) and/or Cisco TelePresence MCU Series (MCU) conference bridges.
- Cisco TelePresence Conductor (TelePresence Conductor) for managing bridge resources.
- Cisco TelePresence Management Suite (Cisco TMS) for scheduling and monitoring conferences.
- (Optional) Cisco TelePresence Management Suite Provisioning Extension (Cisco TMSPE) for large-scale provisioning of personal CMRs.

Call control

You can use either the Cisco Unified Communications Manager (Unified CM) or the Cisco TelePresence Video Communication Server (Cisco VCS) for call control. The Unified CM is recommended. Deployments with Unified CM are known as "Unified CM-Centric" and deployments with Cisco VCS are known as "Cisco VCS-Centric".

CAUTION: Support for any given deployment, feature, or component in CMR Premises Release 4.0 is dependent on the requirements described in this guide regarding supported device types, software versions, and interoperability.

Key Benefits

- Optimal user experience for conference participants, delivered in a consistent manner regardless of user location, device or meeting type.
- Flexible deployment, with virtualized and dedicated hardware options.
- Dynamic optimization of conference resources on the TelePresence Server for inbound calls, and service-level capping, ensuring that conferencing resources are fully utilized.
- Ability to increase the number of conference participants beyond the capacity of a single conference bridge.
- High scalability, with options for mid-market organizations and larger enterprise organizations.
- Resilience in the video network, which allows conference bridges to be taken offline for maintenance.

Conferencing Types

When three or more participants are involved in a call, the call becomes a conference. CMR Premises supports the following conference types:

Table 2: Conferencing capabilities in CMR Premises

Conference type	Description	Notes
Personal CMR / rendezvous	Pre-defined, permanently available addresses that allow conferencing without previous scheduling. The host shares the address with other users, who can call in to that address at any time.	Also known as just "CMR"
Ad hoc	Instant (or escalated) conferencing in Unified CM-Centric deployments. Manually escalated from a point-to-point call hosted on a Unified CM, to a multi-party call with three or more participants hosted on a conference bridge.	Also known as "instant CMR"
Multiway	Instant (or escalated) conferencing in Cisco VCS-Centric deployments. Manually escalated from a point-to-point call hosted on a Cisco VCS Control, to a multi-party call with three or more participants hosted on a conference bridge.	
Scheduled	Pre-booked conferences with a start and end time.	
CMR Hybrid	Joint participation by Cisco TelePresence users and WebEx users.	Formerly known as WebEx Enabled TelePresence

In all deployment models the solution supports conferencing between individuals in any [Location](#), using any of the endpoints listed in [Solution Components and Required Versions \[p.11\]](#). As conference attendees join the conference, they join at the resolution supported by their endpoint, provided that it is below or equal to the maximum level set by the conference administrator.

For more details, see [Conferencing Services \[p.31\]](#) and [Appendix 1: Conferencing Fundamentals \[p.51\]](#).

Supported Deployment Scenarios

Unified CM-Centric deployments

The standard Unified CM-Centric deployment supports CMR Premises within the local Cisco Unified Communications Manager-managed enterprise. It can be extended to support any of these scenarios:

- Participation by external users—remote and mobile workers registered to the local Cisco Unified Communications Manager, WebEx users, and business-to-business conferencing.
- Interoperability with Microsoft Lync.
- Interoperability with standards-based endpoints.

Cisco VCS-Centric deployments

The standard Cisco VCS-Centric deployment supports CMR Premises within the local Cisco VCS-managed enterprise. It can be extended to support any of these scenarios:

- Participation by external users—remote and mobile workers registered to the Cisco VCS Expressway, WebEx users, and business-to-business conferencing.
- Interoperability with Microsoft Lync.

Cisco Business Edition 6000/7000

CMR Premises is also available for Cisco Business Edition 6000 (BE6000) and Cisco Business Edition 7000 (BE7000) environments. The basic deployment for video conferencing in the local BE6000/BE7000 enterprise can be extended for remote access.

Which Deployment to Use?

The choice of which deployment to use is based on the primary call controller. Organizations that are exclusively Cisco Unified Communications Manager-based should use one or more of the Unified CM-Centric deployments. Organizations that are exclusively Cisco VCS-based should use one or more of the Cisco VCS-Centric deployments.

Cisco Unified Communications Manager is the recommended call control device for the solution.

Core Architecture for CMR Premises

The core elements of CMR Premises are:

- TelePresence Conductor.
- TelePresence Server and/or Cisco TelePresence MCU Series conference bridges.
- Cisco TMS and Cisco TMSPE CMR.

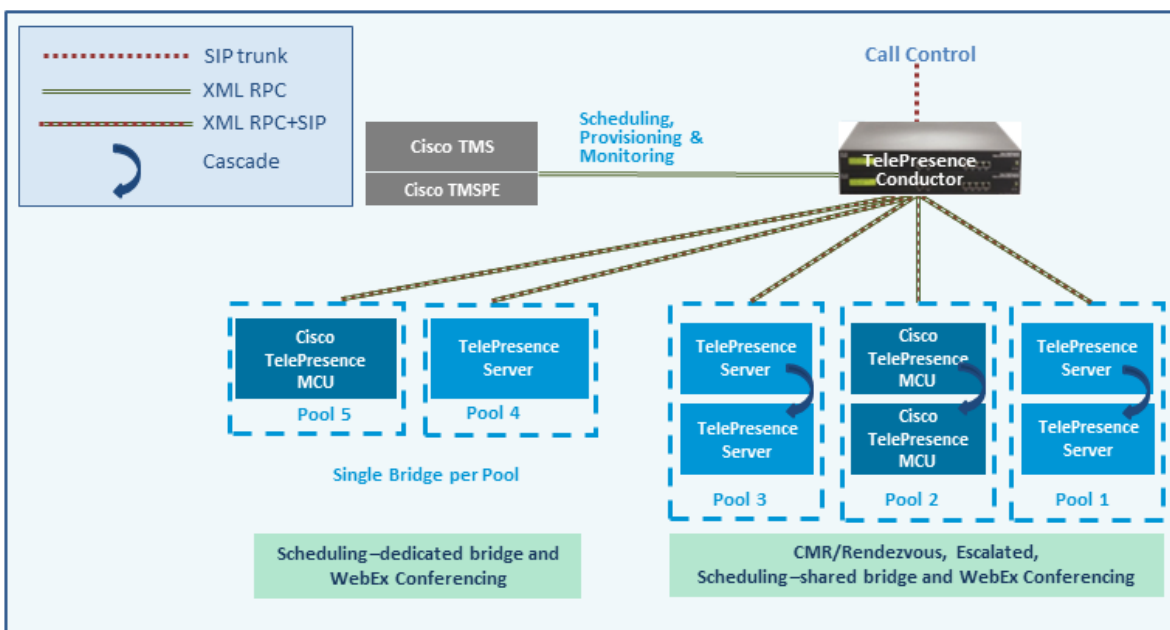
The TelePresence Conductor manages the conference bridges. SIP trunks connect the bridges to the TelePresence Conductor, which in turn is trunked to one or more call controllers. All XML RPC connections also route via the TelePresence Conductor. Cisco TMS provides conference management, including scheduling, provisioning and monitoring of conferences. XML RPC connections link Cisco TMS to the TelePresence Conductor.

The solution architecture is exclusively SIP. Conferencing with H.323 endpoints requires interworking by a Cisco VCS Control or Cisco Expressway-C.

Note: The solution is IPv4 based.

CMR Premises supports TLS encryption for SIP signaling and SRTP for media. Note that SRTP encryption requires the associated SIP signaling to use TLS for *all* call hops. More details are in [Encryption \[p.43\]](#).

Figure 1: High-level view of the CMR Premises architecture



Role of TelePresence Conductor

TelePresence Conductor manages the bridge resources for conferences. It selects which bridge or bridge pools to host a specific conference and balances the conference load across the bridges in the defined pools. The call control element (Cisco Unified Communications Manager or Cisco VCS) is unaware of the individual bridges in the network and communicates only with the TelePresence Conductor. The TelePresence Conductor also manages cascading of conferences.

TelePresence Server bridges are optimized dynamically by TelePresence Conductor if *Optimize resources* is enabled in the TelePresence Conductor conference template.

Role of Cisco TMS and Cisco TMSPE

Cisco TMS provides multiple services:

- Conference scheduling.
- Control of ongoing conferences, using the Cisco TMS [Conference Control Center](#).
- Automated bulk provisioning of personal CMRs by administrators, using Cisco TMSPE. A user portal allows individuals to define and manage their own CMRs within the provisioned parameters.

Depending on your conferencing needs, Cisco TMS and Cisco TMSPE are technically not required for the solution, but they are strongly recommended in order to take advantage of the scale and performance improvements that they provide. Cisco TMS is required if you schedule conferences, and both Cisco TMS and Cisco TMSPE are required to support CMR provisioning.

This guide assumes that the Cisco TMS and Cisco TMSPE are present. If that is not the case in your deployment, alternative configuration methods are available through the TelePresence Conductor web user interface, as described in the Conductor product documentation.

Conference Bridges

Note: Only Cisco multiparty conference bridges (such as the Cisco TelePresence Server and Cisco TelePresence MCU Series) are supported by the TelePresence Conductor. We do not support other conference bridges.

Conference bridges are grouped into pools of like devices in TelePresence Conductor, to which Conductor applies Service Preferences to prioritize use of the pools for specific conference calls. The illustration above shows co-located bridges in Pools 1-3 behind TelePresence Conductor.

Requirements for Conference Bridges

TelePresence Server bridges must be configured for remote management by the TelePresence Conductor.

Note: We strongly recommend that all conference bridges within a pool have the same capacity, so that conferences can be distributed efficiently across conference bridges. If there are conference bridges with different capacities in the same pool, this may lead to unbalanced conference placement in some scenarios.

Solution Components and Required Versions

This section lists the products used in CMR Premises and their required software/firmware versions. You may not use all the products but those that are used must be running the specified version. As a minimum, you need a TelePresence Conductor, one or more TelePresence Server or MCU conference bridges, and a Unified CM or Cisco VCS.

- [Infrastructure \[p.11\]](#)
- [Endpoints, Soft Clients and Peripherals \[p.12\]](#)

Note: In networks with multiple Unified CM or Cisco VCS installations, for full CMR Premises functionality every installed Unified CM or Cisco VCS must be at the required version.

Infrastructure

Table 3: Required software versions for infrastructure products

Product	Required Version	Role
TelePresence Conductor	XC3.0	Conference resource allocation
Cisco TMS	14.6	Conference management & scheduling
TelePresence Server 7010 and MSE 8710, TelePresence Server on Multiparty Media 310/320, TelePresence Server on Virtual Machine, Cisco Multiparty Media 400v	4.1	Conference bridge resource
MCU 5300 Series, 4500 Series, 4501 Series, MCU MSE Series 8510	4.5	Conference bridge resource
Unified CM	9.1(2)SU2 or 10.5(2)	Call control
Cisco Expressway-C	X8.5 X8.2.2 or later if you only need Microsoft Lync interworking.	Remote endpoint registration, business-to-business connectivity, and Microsoft Lync interworking.
Cisco Expressway-E	X8.5	Secure firewall traversal
Cisco VCS Control	X8.5 X8.2.2 or later if you only need Microsoft Lync interworking. X7.2.3 or later if you only need H.323 interworking.	Call control (Cisco VCS-Centric deployments). Microsoft Lync interworking. H.323 interworking.
Cisco VCS Expressway	X8.5	Secure firewall traversal. Registration of standards-based endpoints across the Internet.
Cisco TMSPE	1.4	Conference provisioning

Table 3: Required software versions for infrastructure products (continued)

Product	Required Version	Role
Cisco TMSXE	4.1	[Optional] Conference scheduling for Microsoft environments
Microsoft SQL Server	Microsoft SQL Server 2012 R1 recommended. Microsoft SQL Server 2008 R2 64-bit minimum.	Database for Cisco TMS
Cisco WebEx	T29.11	Cloud conferencing with audio, video, and content sharing capabilities for WebEx clients

Endpoints, Soft Clients and Peripherals

Table 4: Required software versions for endpoints, soft clients and peripherals

Product	Required Version	Supported in deployments...
Cisco TelePresence IX5000	IX 8.0.1	Unified CM-Centric
Cisco TelePresence MX200 and MX300	TC7.1.3	Unified CM-Centric Cisco VCS-Centric
Cisco DX70, DX80	10.2(2)	Unified CM-Centric
Cisco DX650	10.2(2)	Unified CM-Centric
Cisco TelePresence EX Series EX60 and EX90	TC7.1.3	Unified CM-Centric Cisco VCS-Centric
Cisco TelePresence Quick Set C20, SX10, SX20, SX80		
Cisco TelePresence SX80 Codec		
Cisco TelePresence Codec C Series C40, C60, C90		
Cisco TelePresence Profile Series		
Cisco TelePresence MX200 and MX300		
Cisco TelePresence Systems CTS 3010, CTS 3210	CTS 1.10.5 or later	Unified CM-Centric
Cisco TelePresence System CTS 500-32, CTS 1100, CTS 1300	CTS 1.10.5 or later	Unified CM-Centric
Cisco TelePresence TX9000 and TX9200 immersive systems	TX6.1.2 or later	Unified CM-Centric
Cisco Unified IP Phone 9900 Series and 8900 Series	9.4(2)	Unified CM-Centric

Table 4: Required software versions for endpoints, soft clients and peripherals (continued)

Product	Required Version	Supported in deployments...
Cisco Jabber for Android	10.6	Unified CM-Centric
Cisco Jabber for iPad		Unified CM-Centric
Cisco Jabber for iPhone		Unified CM-Centric
Cisco Jabber for Mac		Unified CM-Centric
Cisco Jabber for Windows		Unified CM-Centric
Cisco Jabber Video for TelePresence	4.8.8	Cisco VCS-Centric
Microsoft Lync Client	Lync 2013 Client	Unified CM-Centric Cisco VCS-Centric

Deploying CMR Premises in Virtualized Environments

CMR Premises is supported for virtualized environments. As with all Cisco Unified Communications (UC) on Unified CM deployments, the following sizing guidelines and hardware requirements must be followed:

- http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Sizing_Guidelines
- http://docwiki.cisco.com/wiki/UC_Virtualization_Supported_Hardware

In particular, physical CPU cores may not be over-subscribed for UC virtual machines. So one physical CPU core must equal one virtual machine vCPU core.

Hyperthreading on the CPU should be enabled when available. However, the resulting logical cores do not change UC app rules. The UC rules are based on a one-to-one mapping of physical cores-to-vCPU, not logical cores-to-vCPU.

Further details on running UC in a virtualized environment are available in http://docwiki.cisco.com/wiki/Unified_Communications_in_a_Virtualized_Environment

Deployments for Unified CM-Centric Networks

For clarity each deployment type is shown separately in the deployment diagrams, although you can use any or all of the deployments together. The final diagram shows all deployments used in combination.

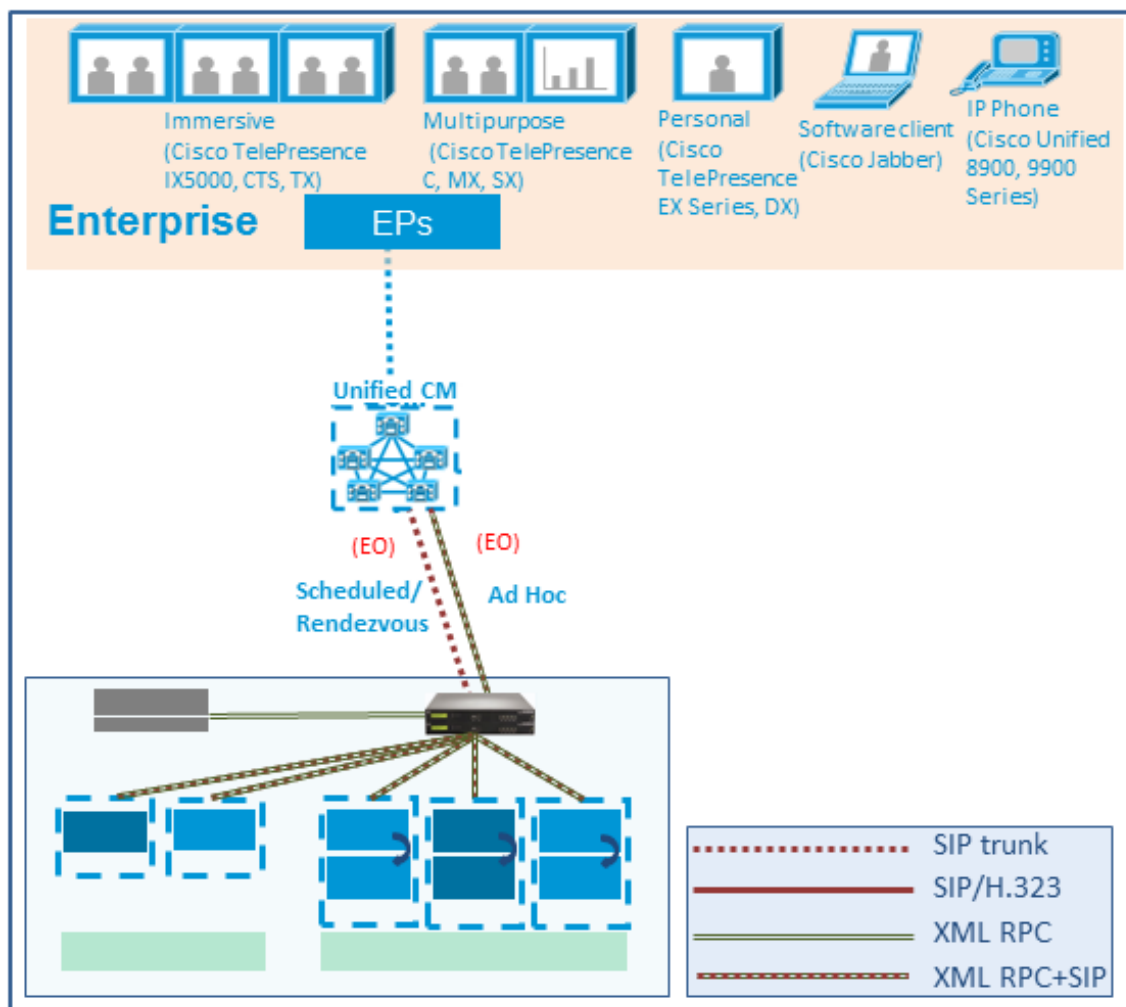
Unified CM-Centric Standard Deployment

The standard deployment has one or more Unified CMs for call control. The TelePresence Conductor is trunked to the Unified CM. Conference bridges can be TelePresence Servers, MCUs, or both. Conference management facilities are provided by Cisco TMS over XML RPC connections.

Conference bridges are trunked to the TelePresence Conductor where they are organized into pools and service preferences and managed by the TelePresence Conductor.

The standard deployment can be viewed as a single, large conference bridge behind the Conductor, combined with Unified CM call control and Unified CM-managed endpoints, and Cisco TMS for conference scheduling and management. These elements together provide CMR Premises for the local enterprise.

Figure 2: Unified CM-Centric standard deployment



Limitations and Requirements for all Unified CM-Centric Deployments

- Early Offer messaging is strongly recommended for all Unified CM-connected SIP trunks which carry TelePresence calls.
- The Multiway™ method of escalated conferencing is not supported in Unified CM-Centric deployments.
- The MCU auto attendant is not supported.
- Ad hoc call flows (which are managed by Unified CM) should not be used to add participants to conferences created by another method, such as a rendezvous conference. Other call flows should not be used to add participants to ad hoc conferences. This avoids any potential for [chained](#) conferences.

Conference Call Flows

The Unified CM provides call registration and routing of voice and video between the connected endpoints.

XML RPC connections are established between each Unified CM and the TelePresence Conductor for ad hoc calls.

Personal CMR / rendezvous, scheduled and ad hoc calls are carried over SIP trunks:

- Personal CMR / rendezvous and scheduled calls are routed along a single trunk from the Unified CM. The same trunk is used for outgoing calls.
- Note that Personal CMR / rendezvous and scheduled conferences can route from any Unified CM. If a Cisco Unified Communications Manager Session Management Edition (Unified CM SME) is deployed it is assumed that it will be used for these trunks. Unified CM SME deployments require a trunk for each location.
- Ad hoc calls route directly to the TelePresence Conductor from the Unified CM which created the conference, so multiple ad hoc trunks may exist. Each one has an associated XML RPC connection. Ad hoc conferences are controlled by their originating Unified CM. This requires an API/SIP trunk pair from each Unified CM that supports conferencing.

Conferences for endpoints registered to Unified CM are channeled through TelePresence Conductor to the conference bridge.

Notes:

- Personal CMR / rendezvous and scheduled calls go to one IP address on TelePresence Conductor and ad hoc calls go to another IP address.
 - Multiple Unified CMs can support the same location. Where they do so, they can use the same location destination(s) on TelePresence Conductor. One for ad hoc and one for Personal CMR / rendezvous and scheduled.
 - The Unified CMs do not need to be in the same physical location.
-

Scheduled Conferences

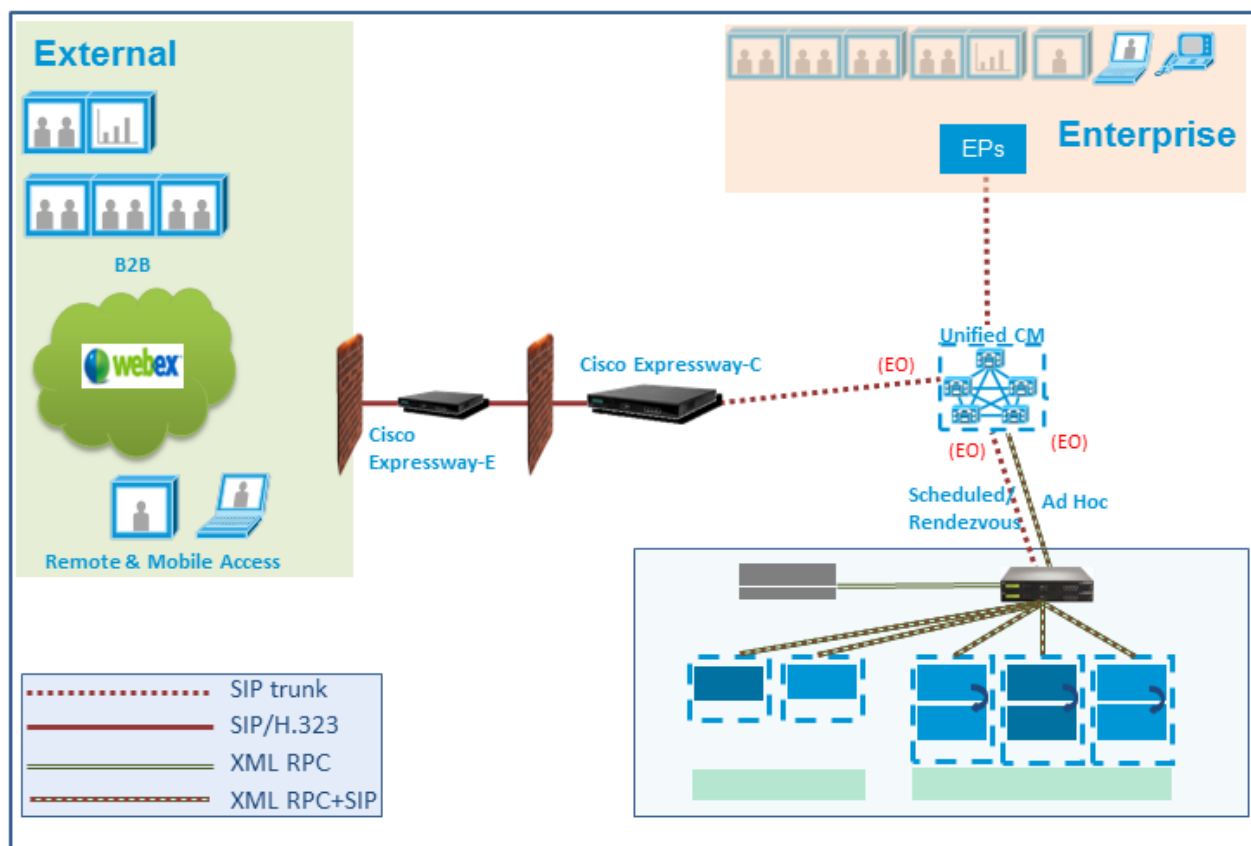
Conference scheduling and conference control functions are performed by Cisco TMS (via the TelePresence Conductor). Cisco WebEx and TelePresence users can participate jointly in scheduled meetings. For details about configuring Cisco TMS and the TelePresence Conductor for scheduled conferencing see [Cisco TelePresence Conductor with Cisco TMS Deployment Guide](#).

Unified CM-Centric External Deployment

By trunking a Cisco Expressway to the Cisco Unified Communications Manager, the standard Unified CM-Centric configuration can be extended to support access by participants who are external to the local enterprise:

- Remote and mobile workers registered to the local Cisco Unified Communications Manager.
- WebEx based users.
- Users in other organizations (business-to-business conferencing).

Figure 3: CMR Premises with external access (Unified CM-Centric)



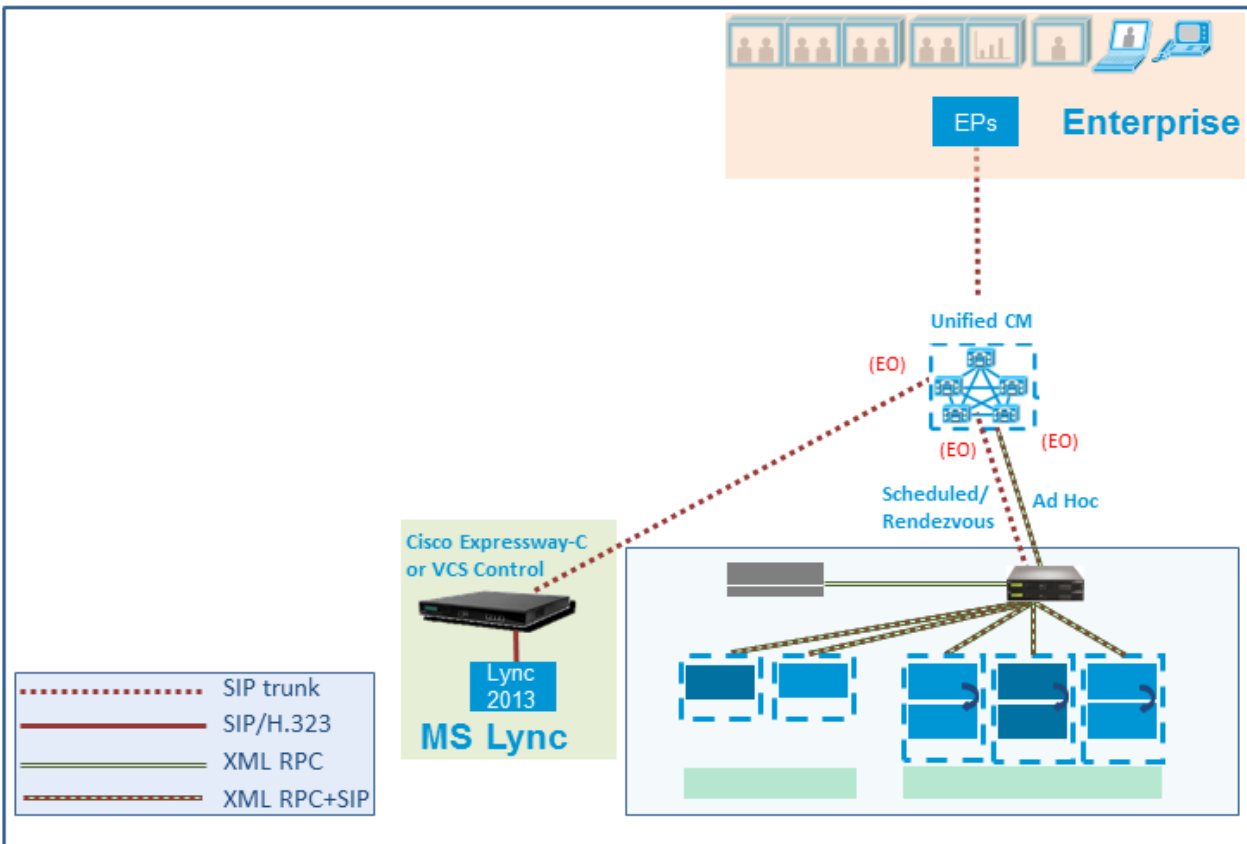
Requirements for external deployments

If you have not configured all SIP trunks for Early Offer (as recommended) you *must* configure Early Offer between any bridges used for CMR Hybrid calls and the Cisco Expressway.

Unified CM-Centric with Microsoft Lync 2013 Deployment

This deployment extends the standard Unified CM-Centric configuration to support interoperability with the Microsoft Lync 2013 service, over a Cisco Expressway-to-Unified CM or Cisco VCS-to-Unified CM trunk.

Figure 4: CMR Premises with MS Lync 2013 (Unified CM-Centric)



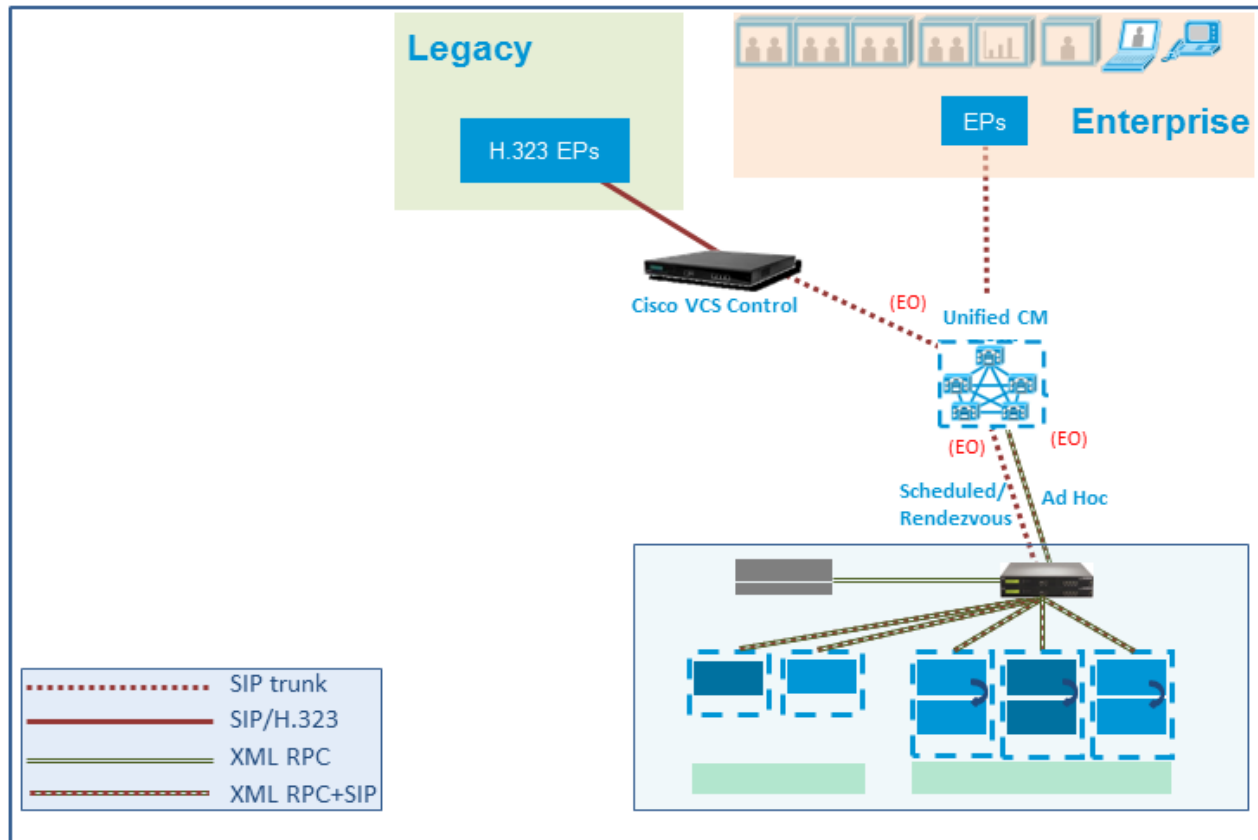
Limitations and requirements for Lync 2013 deployments

- Microsoft Lync Server 2013 and Lync 2013 clients.
- For capacity reasons we recommend that you implement separate Cisco Expressway-C or Cisco VCS Control devices for Lync access, and for other networking requirements respectively. [Figure 6: CMR Premises combined deployment \(Unified CM-Centric\) \[p.20\]](#) shows three devices: one for remote networking, one for Lync, and one for legacy interworking.
- You can optionally use a Cisco Expressway-C or a Cisco VCS Control as the Microsoft Lync gateway, depending on the Lync functionality required and your local organization preferences.
- The *Microsoft interoperability* key (formerly known as *Enhanced OCS Collaboration*) is required for the Cisco Expressway-C or Cisco VCS Control.
- Lync endpoints cannot share their content, although they can receive content as part of a composed TelePresence Server layout.
- Cisco TelePresence CTS 500-32 endpoints must be running TX6.1.2 or later.

Unified CM-Centric Legacy Deployment

This deployment extends the standard Unified CM-Centric configuration to support interworking with standards-based endpoints, over a Cisco VCS-to-Unified CM trunk.

Figure 5: CMR Premises with standards-based endpoints (Unified CM-Centric)



Conference support for endpoints

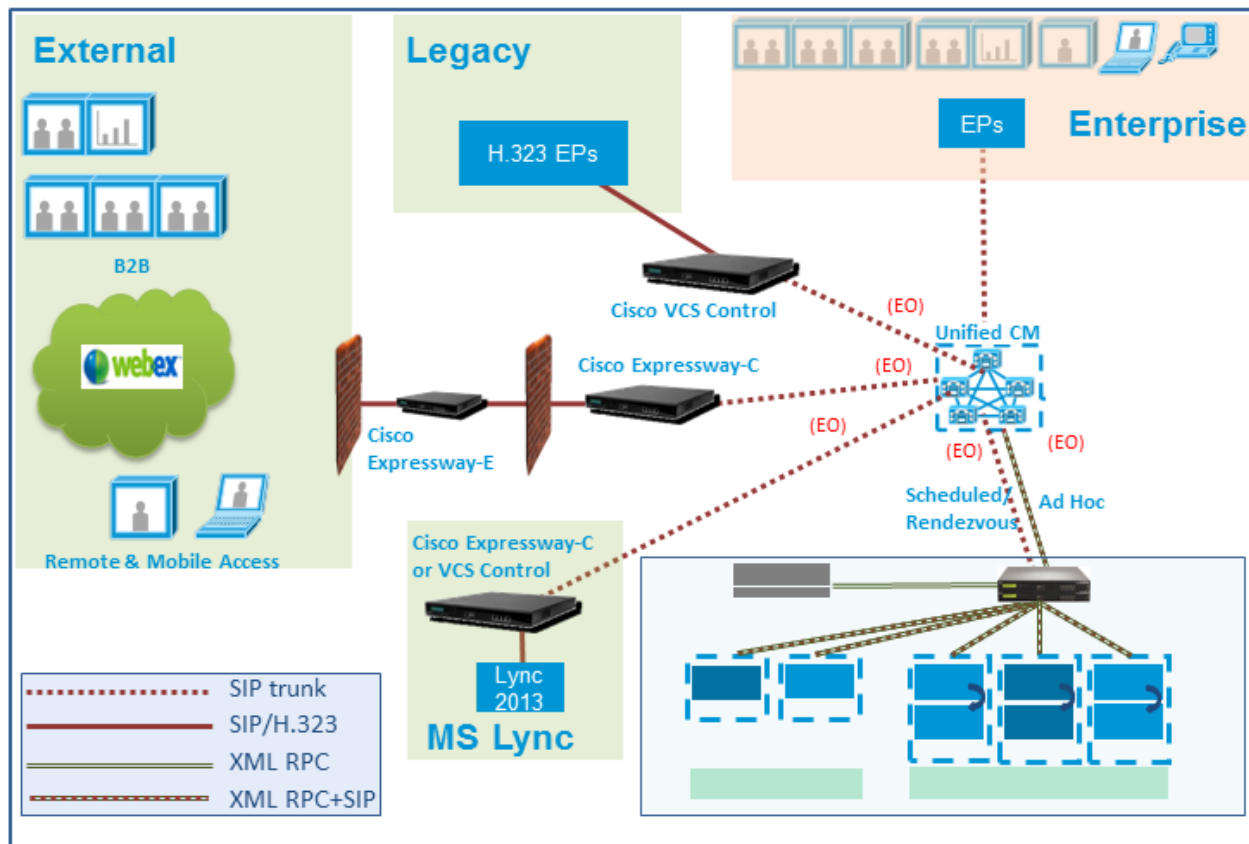
As in the standard deployment, Personal CMR / rendezvous conferences for endpoints registered to Unified CM are channeled through TelePresence Conductor to the conference bridge. Additionally for this deployment, endpoints registered to a Cisco VCS Control can be included in the following conferences:

- Personal CMR / rendezvous, scheduled, and CMR Hybrid conferences hosted on bridges behind the TelePresence Conductor connected to Unified CM.
- Ad hoc conferences can be initiated by an endpoint registered to Unified CM. Cisco VCS Control-registered endpoints cannot initiate ad hoc conferences, but can participate in them.

Unified CM-Centric Combined Deployment

Any or all of the extended Unified CM-Centric deployments can be used together. This diagram shows a combined configuration that uses all the available deployment types:

Figure 6: CMR Premises combined deployment (Unified CM-Centric)



Use dedicated gateways with the Lync 2013 deployment

If you use Lync 2013 interworking in a combined deployment, for capacity reasons we recommend that you implement separate Cisco Expressway-C or Cisco VCS Control devices for Lync access. A further dedicated Cisco VCS Control is recommended if you need to support standards-based devices.

Deployments for Cisco VCS-Centric Networks

For clarity each deployment type is shown separately in the deployment diagrams, although you can use any or all of the deployments together. The final diagram shows all deployments used in combination.

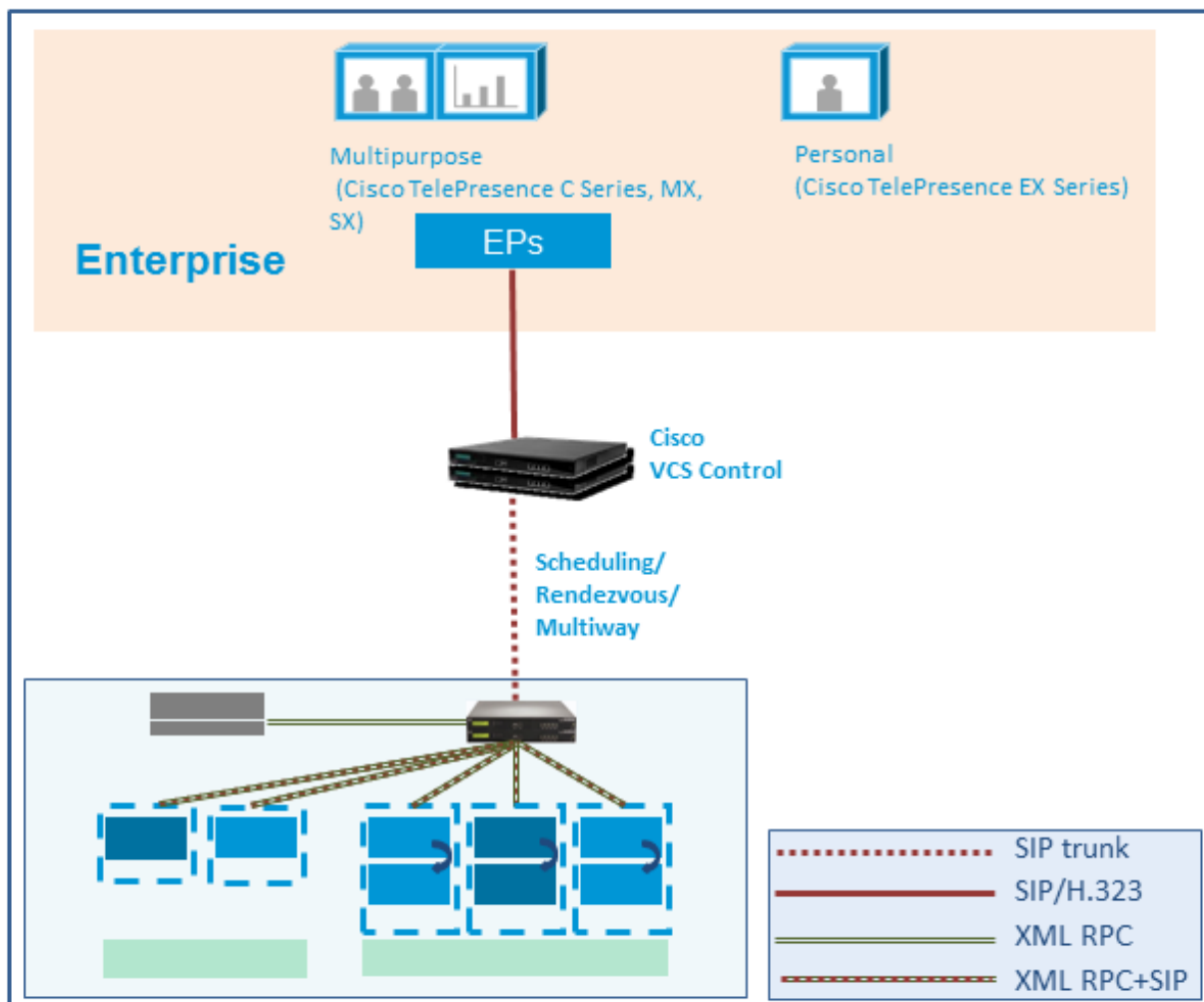
Cisco VCS-Centric Standard Deployment

The standard deployment has one or more Cisco VCSs for call control. The TelePresence Conductor is trunked to the VCS. Conference bridges can be TelePresence Servers, MCUs, or both.

Conference bridges are trunked to the TelePresence Conductor where they are organized into pools and service preferences and managed by the TelePresence Conductor.

The standard deployment can be viewed as a single, large conference bridge behind the Conductor, combined with Cisco VCS call control and Cisco VCS-managed endpoints, and Cisco TMS for conference scheduling and management. These elements together provide CMR Premises for the local enterprise.

Figure 7: Cisco VCS-Centric standard deployment



Limitations and Requirements for all Cisco VCS-Centric Deployments

- The TelePresence Conductor must be deployed using its back-to-back user agent (B2BUA). The external policy server interface is not supported.
- The ad hoc method of escalated conferencing is not supported in Cisco VCS-Centric deployments.

Conference Call Flows

- The Cisco VCS provides call registration and routing of voice and video between the connected standards-based endpoints.
- Personal CMR / rendezvous, Multiway and scheduled calls are carried over SIP trunks. All these call types are routed along a single trunk from the Cisco VCS. The same trunk is also used for outgoing calls.
- Calls are managed by TelePresence Conductor on the conference bridges.

Conference Support for Endpoints

Endpoints registered to a Cisco VCS Control can be included in the following conference types, hosted on a TelePresence Conductor-managed conference bridge:

- Personal CMR / rendezvous.
- Multiway initiated by an endpoint registered to Cisco VCS Control
- Scheduled conferences created by Cisco TMS through TelePresence Conductor.

Scheduled Conferences

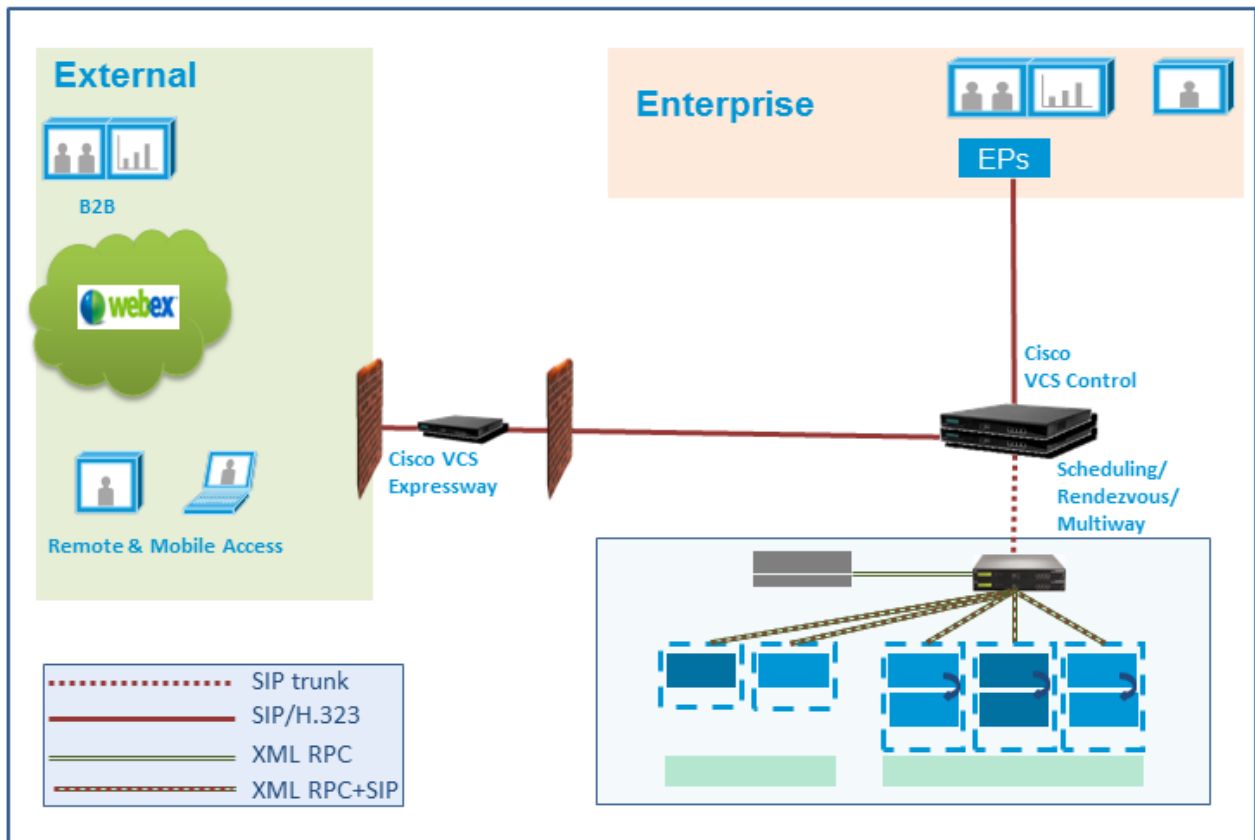
Conference scheduling and conference control functions are performed by Cisco TMS (via the TelePresence Conductor). Cisco WebEx and TelePresence users can participate jointly in scheduled meetings. For details about configuring Cisco TMS and the TelePresence Conductor for scheduled conferencing see [Cisco TelePresence Conductor with Cisco TMS Deployment Guide](#).

Cisco VCS-Centric External Deployment

By trunking a Cisco VCS Expressway to the Cisco VCS Control, the standard Cisco VCS-Centric configuration can be extended to support access by participants who are external to the local enterprise:

- Remote and mobile workers registered to the local Cisco VCS.
- WebEx based users.
- Users in other organizations (business-to-business conferencing).

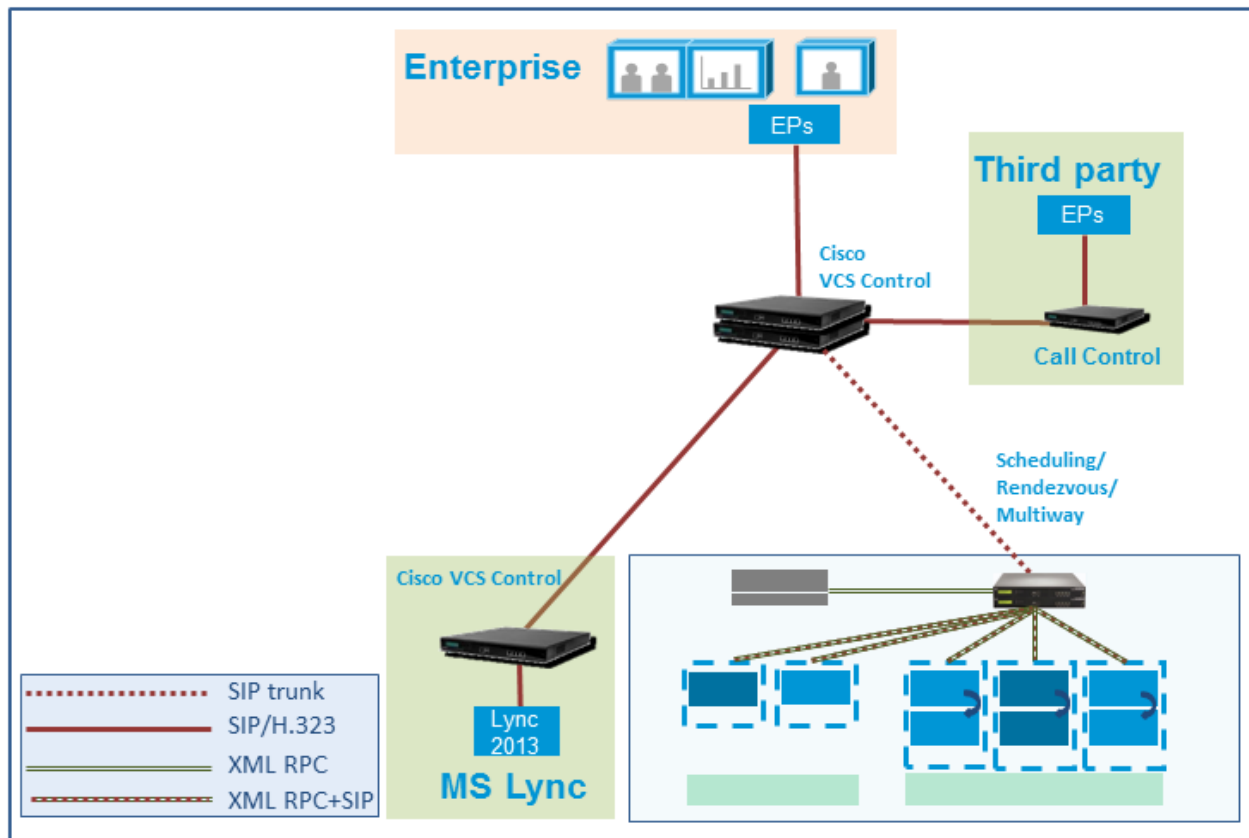
Figure 8: CMR Premises with external access (Cisco VCS-Centric)



Cisco VCS-Centric Interop Deployment

This deployment extends the standard Cisco VCS-Centric configuration to support interoperability with non-VCS call control systems and Microsoft Lync 2013 services within the enterprise.

Figure 9: CMR Premises with interop support (Cisco VCS-Centric)



Non-VCS call control

The diagram above shows a network configured to interoperate with a generic, third-party call control system for additional SIP-based voice and video endpoints.

Note: The third-party call control could be one or more Unified CM systems. However, we only recommend this approach for transitioning from a Cisco VCS-Centric model to a Unified CM-Centric model. Organizations that use the Unified CM are advised always to use the Unified CM-Centric model.

Calls managed by the third-party call controller are SIP-trunked to the Cisco VCS.

Limitations and requirements for interop deployments

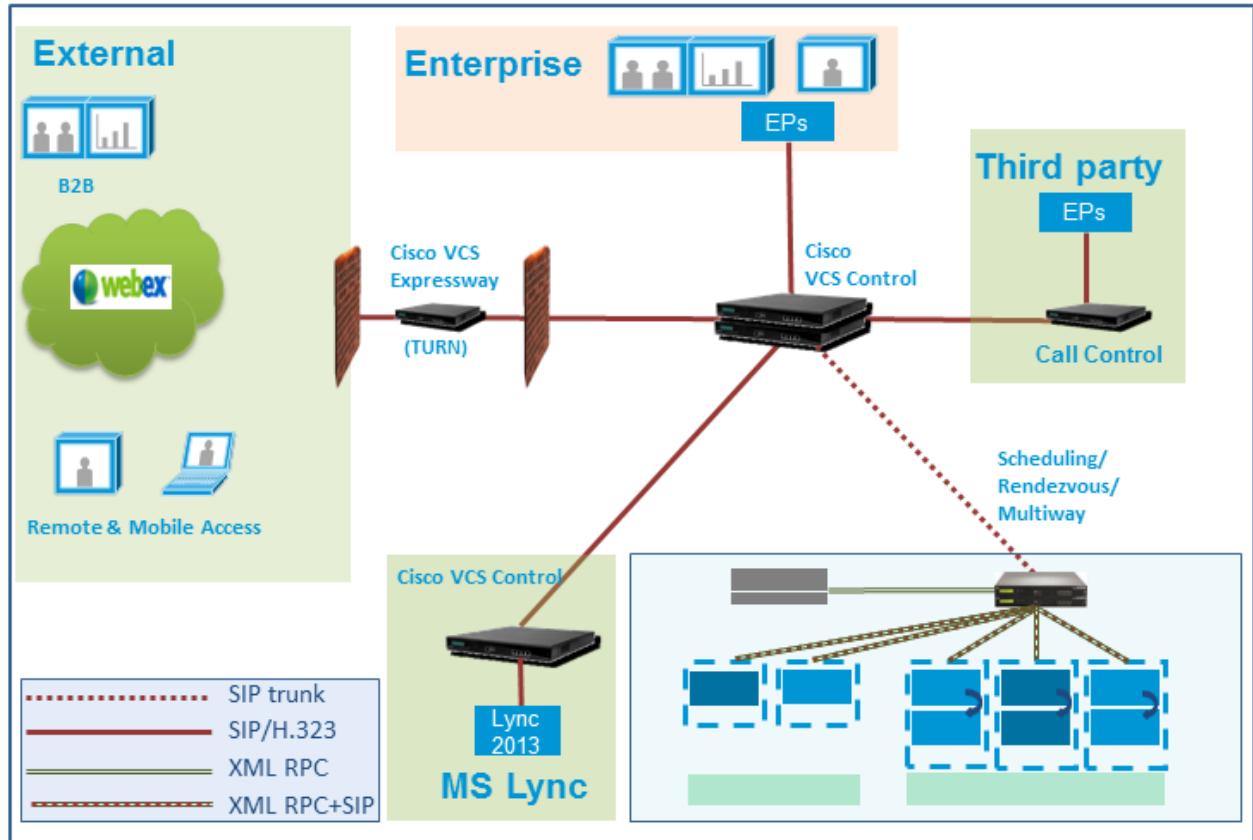
- Conference participation by users of some external services, including Cisco WebEx, requires SIP messaging to be [Early Offer](#). This is the default for VCS-managed systems. However, if you have a Unified CM in the network which is required to support WebEx or other Early Offer-based services, you must configure Early Offer messaging on the SIP trunks between the following elements:

- Bridges used for calls between Early Offer-based services and the Cisco Expressway.
- Any third-party call controller and the Cisco VCS Control.
- Any Unified CM-managed endpoints and the Cisco Expressway. The entire path from the calling device to the service must be configured to support Early Offer.
- If you do not need external Early Offer-based services, then any Unified CMs may be configured for either Delayed Offer or Early Offer.
- If you use Unified CMs, the Unified CM-based ad hoc conference method is not supported in Cisco VCS-Centric deployments.
- Encrypted CTS systems are not supported. We do not recommend using encrypted CTS endpoints in Cisco VCS-Centric deployments.
- The following requirements apply if you need Microsoft Lync interoperability:
 - Microsoft Lync Server 2013 and Lync 2013 clients.
 - For capacity reasons we recommend that you implement separate Cisco VCS Control devices for Lync access, and for general remote networking respectively. This is illustrated in [Figure 10: CMR Premises combined deployment \(Cisco VCS-Centric\) \[p.26\]](#), which shows separate devices for Lync and for remote networking.
 - The *Microsoft interoperability* key (formerly known as *Enhanced OCS Collaboration*) is required for the Cisco VCS Control.

Cisco VCS-Centric Combined Deployment

Any or all of the extended Cisco VCS-Centric deployments can be used together. The diagram shows a combined configuration that uses all of the individual deployment types.

Figure 10: CMR Premises combined deployment (Cisco VCS-Centric)



Use dedicated gateways with the Lync 2013 deployment

If you use Lync 2013 interworking in a combined deployment, for capacity reasons we recommend that you implement a separate Cisco VCS Control device for Lync access.

Deployments for Cisco Business Edition 6000 or 7000

The Cisco Business Edition 6000 (BE6000) and Cisco Business Edition 7000 (BE7000) allow multiple Cisco Unified Communications (UC) applications to be consolidated onto a single platform.

It is possible to build a CMR Premises deployment using the applications provided. This deployment uses the TelePresence Conductor and Cisco TelePresence Server on Virtual Machine together for conferencing and orchestration facilities, and Cisco TMS for conference provisioning and monitoring.

The default BE6000 and BE7000 configurations only support a single vTS.

Table 5: BE6000/BE7000 conferencing models

Model 1	Model 2
Ad hoc	
Personal CMR / rendezvous	
Scheduling—shared bridge	Scheduling—dedicated bridge

Important! If you want to use a dedicated bridge for scheduling use only, and separate bridges for non-scheduled conferencing methods, you need to use additional TelePresence Servers (vm, appliance).

Conferencing Architecture for BE6000/BE7000

Although many BE6000/BE7000 configurations are compatible with CMR Premises, only the following configuration is recommended:

- BE6000 Product ID BE6K-SW-9X10X-XU or BE7000 Product ID BE7K-SW-9X10X-XU
- Cisco Business Edition 6000/7000 High Density server (this has two 8-core CPUs)
- Hyperthreading enabled
- One-core virtualized Cisco TMS
- Two-core virtualized Cisco TelePresence Conductor (Select version)
- Eight-core Cisco TelePresence Server on Virtual Machine conference bridge

Call control may be run on the remaining cores or on another BE6000/BE7000 unit. The recommended call control is Unified CM, running a supported software release for CMR Premises (see [Solution Components and Required Versions \[p. 11\]](#)).

This deployment can be scaled up by running additional vTS instances on further BE6000/BE7000 systems or by adding dedicated hardware. Depending on their capacity requirements, scaled-up deployments may need either Conductor Select or full capacity Conductor licenses.

Figure 11: Conferencing architecture for CMR Premises in BE6000/BE7000 deployments - Model 1

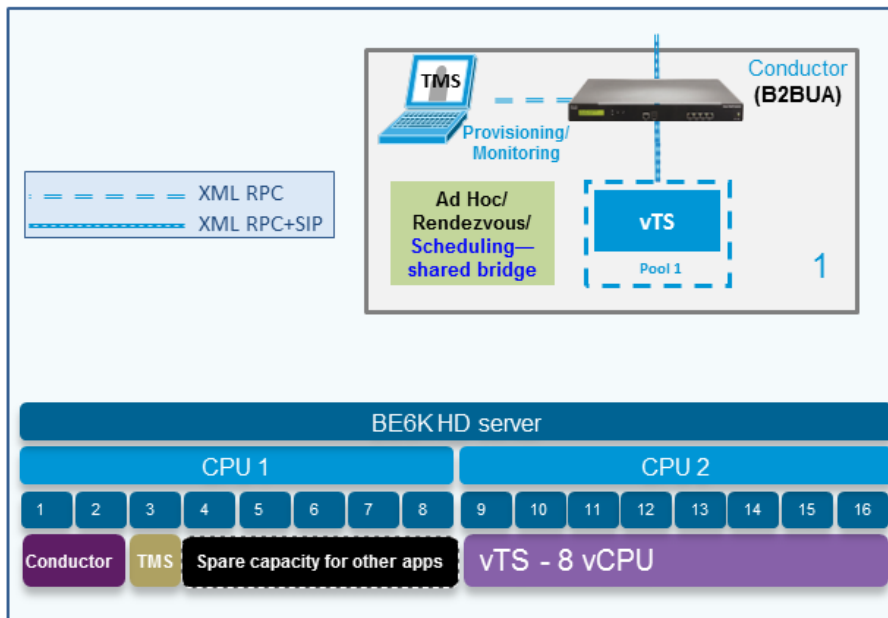
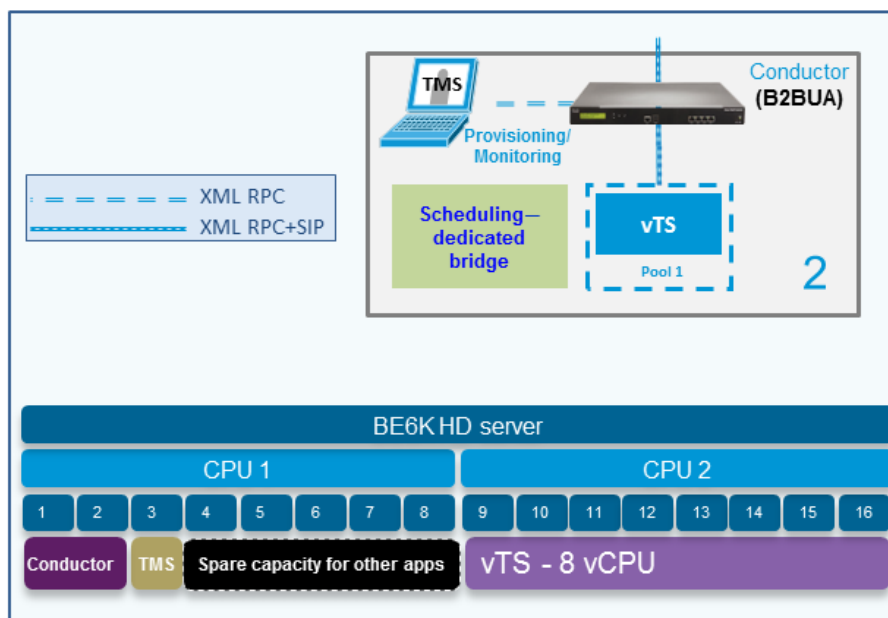


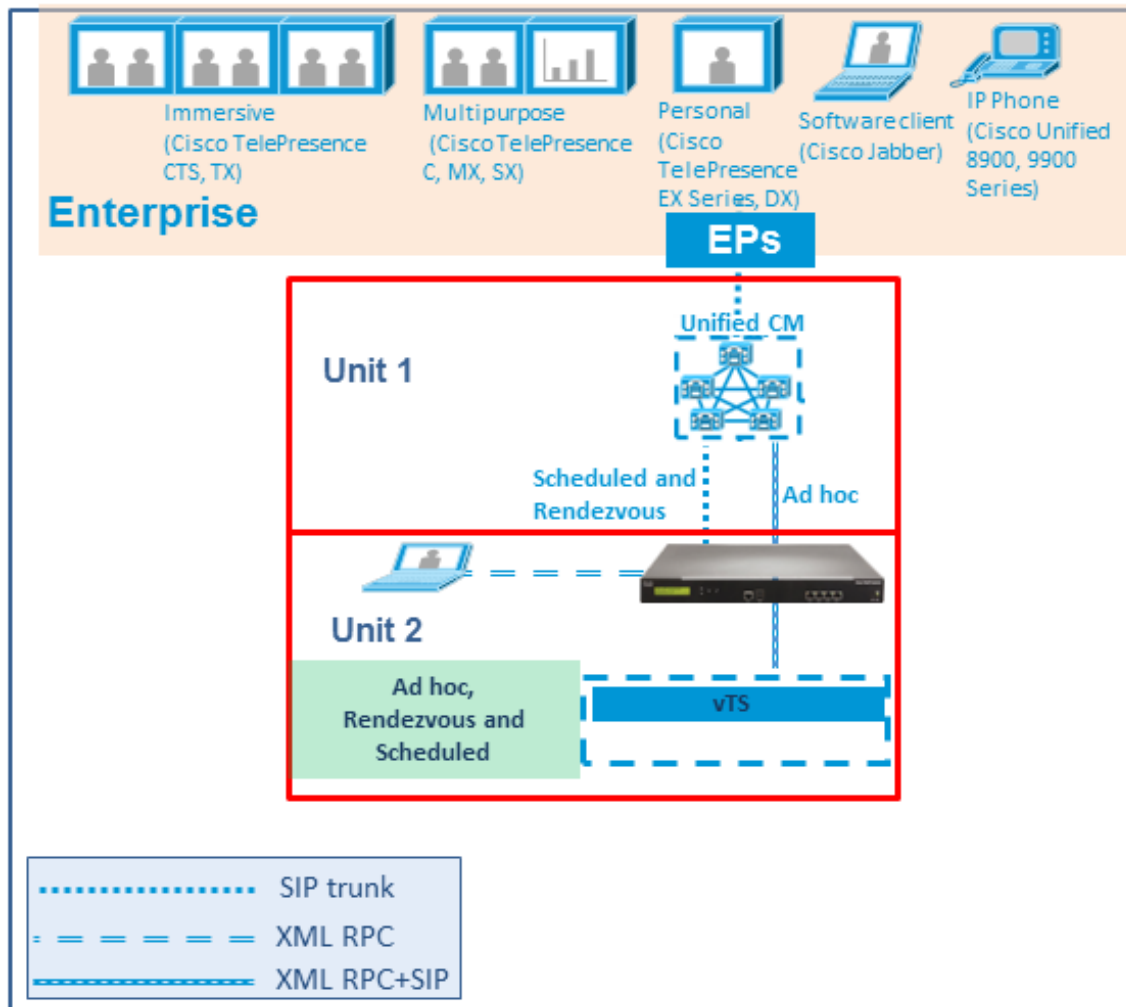
Figure 12: Conferencing architecture for CMR Premises in BE6000/BE7000 deployments - Model 2



Example Local Deployment

In this example of a BE6000/BE7000 deployment a Unified CM is used for call control, although a Cisco VCS could be used instead. The core conferencing elements are running on one BE6000/BE7000 unit and the Unified CM is running on a second unit.

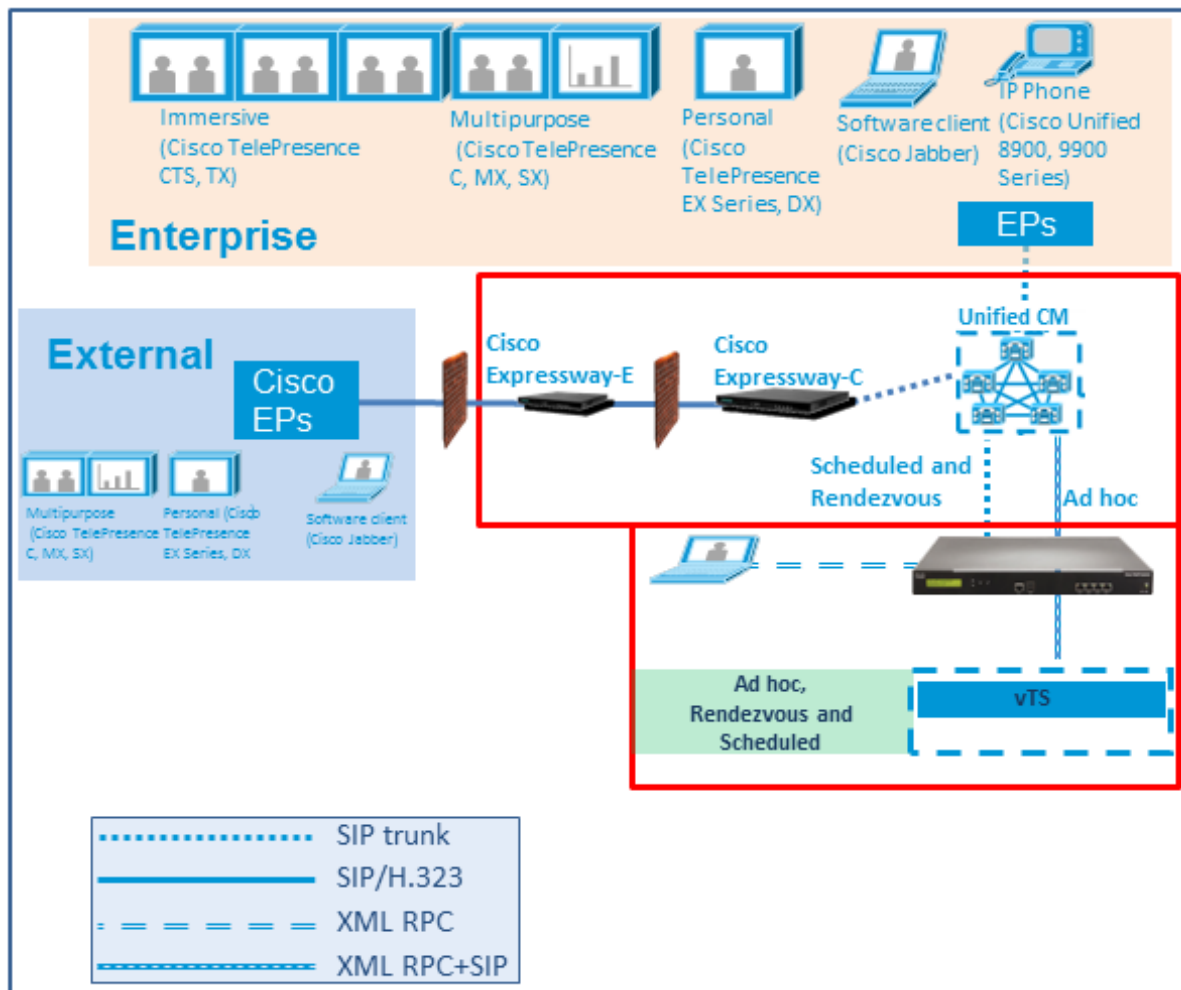
Figure 13: Standard deployment for CMR Premises in BE6000/BE7000



Example Deployment with Internet Access

By trunking an Expressway to the call controller the standard configuration can be extended to support access by remote and mobile users. The example shows a Unified CM for call control. If you use a Cisco VCS, the Cisco Expressway-C would typically be replaced by a Cisco VCS Control, and the Cisco Expressway-E by a Cisco VCS Expressway.

Figure 14: External deployment for CMR Premises in BE6000/BE7000



Conferencing Services

CMR Premises supports the following conference types (see [Appendix 1: Conferencing Fundamentals \[p.51\]](#) for details):

- Scheduled
- Non-Scheduled:
 - Personal CMR / rendezvous
 - Ad hoc
 - Multiway
- CMR Hybrid (for WebEx participation—formerly known as Cisco WebEx Enabled TelePresence)

Scheduled Conferencing

Conferences are scheduled on TelePresence Conductor-managed conference bridges, using Cisco TMS and its extension products in conjunction with the TelePresence Conductor API. See [Conference Scheduling \[p.37\]](#).

Non-Scheduled Conferencing

Using Cisco TMSPE, administrators can configure large-scale provisioning of personal CMRs on TelePresence Conductor for groups of users. Users can then activate and configure their own CMR through a user portal. For details, see [Cisco TelePresence Management Suite Provisioning Extension with Cisco Unified CM Deployment Guide](#).

In CMR Premises deployments, a Personal CMR / rendezvous conference is never statically defined on a single bridge. TelePresence Conductor load balances the conferences across the available bridges in a pool, when the conference is started. This increases conference resilience while keeping the ability to have unique conference settings per CMR.

CMR conferences in a Unified CM-Centric deployment require a SIP trunk between Unified CM and TelePresence Conductor. Unified CM routes CMR participants to the IP address of this SIP trunk.

Conference bridges can be set up in the TelePresence Conductor to host ad hoc conferences only, Personal CMR / rendezvous conferences only, or both. Selecting both conference types can minimize the number of bridges needed. You only need equipment for the overall maximum number of conference participants, rather than the maximum ad hoc participants and the maximum Personal CMR / rendezvous participants.

Multiway conference requests are routed from Cisco VCS direct to the TelePresence Conductor. The Multiway conference is hosted on a bridge connected to TelePresence Conductor. The endpoint user who escalates the call requires an endpoint that supports the **Merge and Accept** button. Multiway callers can be joined to a Personal CMR / rendezvous conference.

CMR Hybrid Conferencing

The CMR Hybrid solution combines the on-premises video conference and the WebEx cloud-based conference into a single meeting. Participants can join the meeting using the WebEx meeting client or a TelePresence device. They experience two-way video, audio, and content sharing from their respective devices.

You can deploy CMR Hybrid as part of CMR Premises to provide telepresence and WebEx integration for both scheduled meetings and personal CMRs.

Endpoints

Endpoints from other equipment providers can participate in conferences using standard SIP.

These requirements apply for escalated conferencing:

- Ad hoc conferences. Endpoints must be registered to Unified CM. In order to be hosts, endpoints need a conference button/softkey.
- Multiway conferences. In order to be hosts, endpoints need a join button/softkey.

Conferencing Features and Options

ActiveControl to Endpoints

ActiveControl provides conference control functions and conference information for endpoints that have Touch controllers and run appropriate TC software (Version TC7.1.3 or later). From the touchpad users can see a list of participants and other information during a conference. On certain endpoints they can change the conference layout displayed locally, and users can disconnect other participants.

The ActiveControl feature on the TelePresence Server supports up to 500 participants.

ActiveControl is not supported by Cisco Jabber or Cisco DX Series endpoints.

Configuration Information

From Version TC7.1, ActiveControl is set to auto mode by default. This means that by default ActiveControl is always enabled in the following cases:

- Unified CM-managed systems from Version 9.1(2) and later. These versions advertise iX protocol support.
- Cisco VCS systems from Version X8.2. These versions include an optional zone filter to disable the iX protocol from INVITE requests. By default the filter is off.

CAUTION: Enabling ActiveControl may cause call failures in some situations. ActiveControl, or more specifically the iX protocol which supports it, must be used with care if you connect the CMR Premises network to external networks or to older systems. In these cases limitations exist on where you can enable iX. For details of the configuration requirements, see [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#).

Cascading

Within the local CMR Premises enterprise network, larger conferences that exceed the capacity of a single conference bridge can be cascaded (distributed) across one or more additional bridges. The bridges must be routable with each other and with TelePresence Conductor.

Links between cascaded bridges are managed through the API of the TelePresence Server or MCU, depending on the bridge type.

Note: Cascading is not supported from one conference bridge to another bridge that is outside the boundaries of the local enterprise network.

The following conference types can be cascaded:

- Scheduled conferences, subject to certain exceptions (see below)
- Rendezvous / personal CMRs

Limitations and Requirements for Cascading

- Cascade links share only a single screen of video between TelePresence Server.
- Cascading is not supported from a TelePresence Server bridge to an MCU, or from an MCU to a TelePresence Server.
- On cascade-enabled conferences, cascading resources are reserved from the start of the conference for the configured **Maximum number of cascades**, whether or not they are actually used. For this reason we

recommend using the cascade option sparingly—typically for large-scale meetings or for rendezvous conferences / personal CMRs used by VIP personnel.

- Cascading should not be enabled where certainty of resource availability is critical, such as the dedicated bridge scheduling case (where a single bridge in its own pool is reserved for scheduling).
- The ActiveControl feature on the TelePresence Server supports up to 500 participants.

ClearPath Packet Loss Resilience

Cisco ClearPath technology is supported for conferences, and uses advanced error correction techniques to optimize video quality over low quality connections. No configuration is required as ClearPath is enabled by default in all supported devices.

Personal Multiparty Licensing (User-Based Licensing)

In Unified CM deployments, Personal Multiparty licensing allows product licenses for video conferencing to be purchased based on user numbers rather than device capacities. Two Personal Multiparty licensing models are available:

- **Personal Multiparty Basic**
Supports ad hoc and rendezvous / CMR conferences for up to four participants, including a named host. Available through the Cisco Unified Workspace Licensing (Cisco UWL) Professional license package, or as separate licenses.
- **Personal Multiparty Advanced**
Supports ad hoc, rendezvous / CMR, and scheduled conferences for any number of conference participants, up to the level enabled by the licenses purchased (subject to available conference bridge resources).

Each license enables a named host to set up a conference on supported devices, using a dedicated personal conference address.

Requirements for Personal Multiparty licensing

- In CMR Premises, only Unified CM-Centric deployments support Personal Multiparty licensing.
- Personal Multiparty licensing is supported on Cisco TelePresence Server conference bridges.
- Personal Multiparty Basic supports ad hoc and rendezvous / personal CMR conferences. Personal Multiparty Advanced supports ad hoc, rendezvous / personal CMR, and scheduled conferences.
- The number of conference aliases must not exceed the number of licenses.
- Personal Multiparty Basic supports video resolution only up to HD 720p30 and content quality up to 1280 x 720p 5fps. Personal Multiparty Advanced supports up to 1080p30 for both video and content.
- On multiscreen endpoints, Personal Multiparty Basic supports one screen; Personal Multiparty Advanced supports multiple screens.
- The named host must be present for the conference to begin.

Configuration information

For information about configuring Personal Multiparty licenses, see the *Personal Multiparty Appendix* in [Cisco TelePresence Conductor with Unified CM Deployment Guide](#).

Administration for TIP Multiscreen Devices

This feature applies to deployments with Cisco TIP multiscreen endpoints and TelePresence Server bridges. (MCU bridges do not support TIP.) Cisco TIP devices are automatically allocated the appropriate number of screens, up to the *Default maximum screens* setting in the template, except in the following cases:

- Pre-configured endpoints. Resources are allocated according to the configured settings.
- Ad hoc conferences. The default maximum screens defined in the conference template are allocated (although on subsequent successful connection, the allocation is optimized down if appropriate).

Manual configuration may still be needed for multiscreen devices that do not support TIP, and for some third-party devices. For details about resource allocation and optimization settings, see [Cisco TelePresence Conductor Administrator Guide](#)

TelePresence Server Resource Optimization

TelePresence Server resources are allocated to an individual endpoint based primarily on the number of screens it should use and the quality settings to be applied for that endpoint. Resources are initially allocated when a participant joins the conference. Resource optimization refers to the ability subsequently to free up any unused portion of the initial allocation and make those resources available for other conferences or later attendees. MCU bridges do not support resource optimization.

The TelePresence Server takes into account the receive bandwidth advertised by an endpoint, as well as the maximum resolution capabilities of the endpoint.

Notes:

- Resource optimization does not occur for out-dialed participants. Out-dialed calling methods have their own mechanisms for defining specific quality requirements, which it would be inappropriate to override.
- For conferences on bridges that are dedicated for scheduling (one scheduling bridge per pool) Cisco TMS plans bridge usage ahead of actual usage, which means that the resources recovered by optimization are not actually re-used.

One of the following TelePresence Server optimization profiles can be applied via the TelePresence Conductor advanced template parameters, to define varying levels of media token optimization for conference participants:

Table 6: TelePresence Server resource optimization levels

Setting	Description
maximizeEfficiency	Participants will be assigned a very low number of far end media tokens based on their call capabilities and call bandwidth.
favorEfficiency	Participants will be assigned a low number of far end media tokens based on their call capabilities and call bandwidth.
favorExperience	Participants will be assigned a high number of far end media tokens based on their call capabilities and call bandwidth.
maximizeExperience	Participants will be assigned a very high number of far end media tokens based on their call capabilities and call bandwidth.
capabilitySetOnly	Participants will be assigned the maximum number of far end media tokens based on their call capabilities only. (This was the behavior in previous releases.)

Microsoft Lync 2013 Interoperability

CMR Premises supports interoperability with Microsoft Lync 2013 environments via interworking by the Cisco Expressway-C or Cisco VCS Control, which interworks as follows:

- Between Microsoft H.264 SVC (Scalable Video Coding) and standard H.264 SVC.
- Between Microsoft H.264 SVC and standard H.264 AVC (Advanced Video Coding).

Lync users can participate in rendezvous / personal CMR, ad hoc, and scheduled conferences.

Requirements for Lync 2013 interoperability

Requirements for Lync 2013 interoperability are detailed in [Unified CM-Centric with Microsoft Lync 2013 Deployment \[p.18\]](#) and [Cisco VCS-Centric Interop Deployment \[p.24\]](#) respectively.

Configuration information

CMR Premises deployments use either Cisco Expressway-C or Cisco VCS acting as a SIP back-to-back user agent and media helper, as a Lync gateway.

- For configuration details in Unified CM-Centric deployments, see [Cisco Expressway and Microsoft Lync Deployment Guide \(X8.5\)](#)
- For configuration details in Cisco VCS-Centric deployments, see [Cisco VCS and Microsoft Lync Deployment Guide \(X8.5\)](#)

Segment-Switched Display of TelePresence Rooms

By default, Cisco TelePresence Server conference bridges use segment switching when displaying speakers in TelePresence rooms with multiple cameras onto multiscreen endpoints.

- With traditional room-based switching, all of the streams from a multi-camera room are switched simultaneously when the loudest speaker is in that room, into the display on multiscreen endpoints (assuming those endpoints had enough screens).
- With segment switching, the TelePresence Server independently switches the display for each individual camera (segment). So only the stream for the speaker's table segment is switched, not the other streams in the room. Segment switching is also known as speaker switching or panel switching.

Conference participants with Cisco CTS or TX Series endpoints can manually choose between segment-switched or room-switched mode.

Configuration information

For instructions on how to switch modes, see [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#).

Conference Scheduling

Conferences are scheduled on TelePresence Conductor-managed conference bridges, using Cisco TMS and its extension products in conjunction with the TelePresence Conductor API.

Two resource allocation methods are possible for scheduled conferences:

- Scheduling—dedicated bridge. Deploy one or more bridges that are dedicated just for scheduled conferences, with each bridge in a pool of its own. Optionally a second dedicated bridge and pool combination can be used as a backup.
- Scheduling—shared bridge. Allow bridges to be used for non-scheduled as well as scheduled conferences. In this case resource availability for scheduled conferences cannot be guaranteed, as the necessary resources might already be in use by non-scheduled conferences.

Note: When configuring conference bridge pools dedicated for scheduling, we recommend the following:

- Give the conference bridge pool a name indicating that it should only be used for scheduled conferences.
- Check that the pool is only used in a single Service Preference.
- Check that the Service Preference is not used in a CMR or ad hoc conference.

Third-party endpoints from other equipment providers can participate in scheduled conferences.

The configuration tasks to enable scheduling in CMR Premises are summarized in [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#) and detailed in [Cisco TelePresence Conductor with Cisco TMS Deployment Guide](#).

Resilience

CAUTION: If you use clustered TelePresence Conductors, be aware that Cisco TMS only recognizes one TelePresence Conductor node. If that cluster node should fail, the Cisco TMS scheduling service and its CMR provisioning service will be out of service (until the TelePresence Conductor is brought back up or Cisco TMS is updated to communicate with a different TelePresence Conductor in the cluster).

Configurations for Scheduled Conferencing

Various configurations of TelePresence Conductor Service Preference are possible to support scheduled conferencing in CMR Premises. This section provides some examples and summarizes the advantages and disadvantages of each approach.

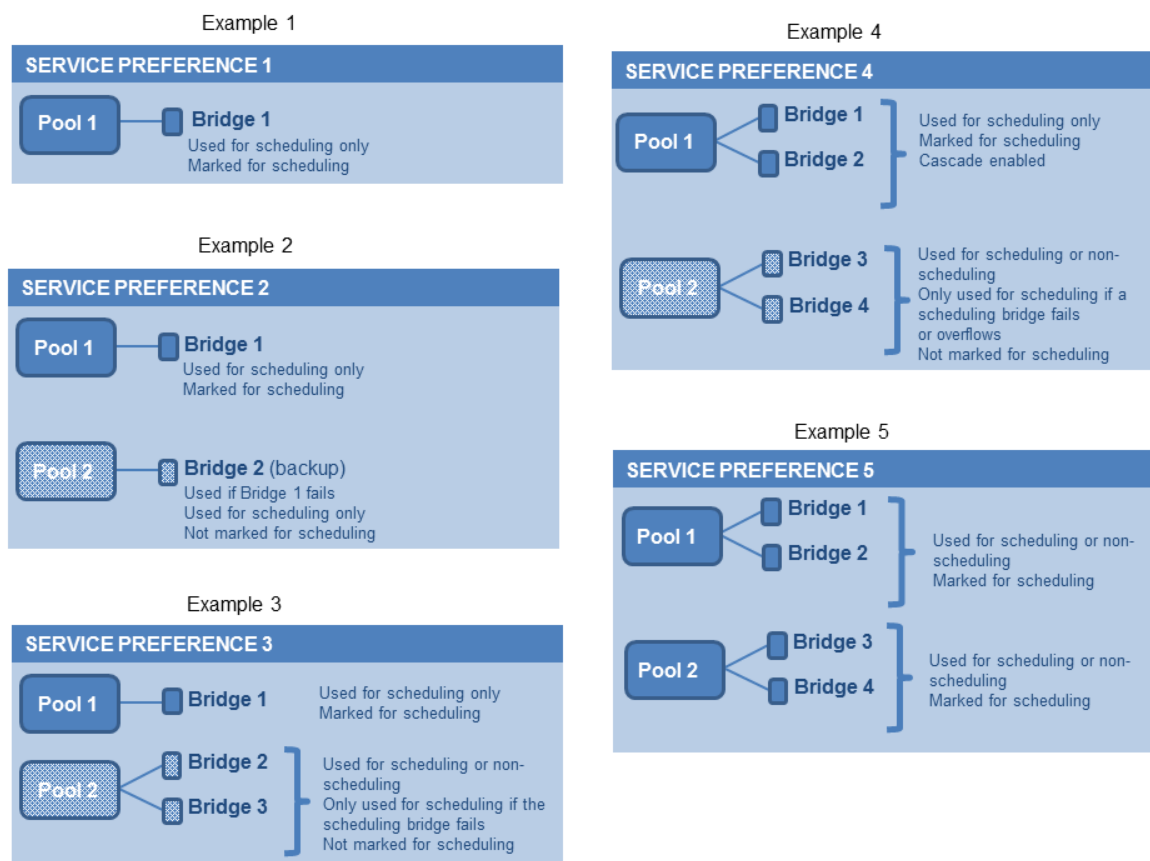
Table 7: Comparison of scheduling scenarios

	Service Preference contains ...	Configuration	Advantages	Disadvantages
Example 1	Dedicated bridge for scheduled conferences.	Single pool, with a single conference bridge. Pool marked to be used for scheduling in the TelePresence Conductor Service Preference. Pool is reported to Cisco TMS in capacity information requests.	Conference availability is guaranteed, subject to bridge failure (or full capacity). Maximizes use of resources, as Cisco TMS will book ports until the bridge is full.	Uses one conference bridge exclusively for scheduling. Cascaded conferencing does not occur: to avoid wasting resources, cascading should be disabled.
Example 2	<ul style="list-style-type: none"> ■ Dedicated bridge for scheduled conferences ■ Dedicated backup bridge 	Two pools. Both pools contain a single conference bridge. The second pool is used as a backup if the bridge in the highest priority pool fails. Only the first pool is marked for scheduling in the TelePresence Conductor Service Preference and reported to Cisco TMS.	As for Example 1, with added benefit of fallback in case of bridge failure.	Uses two conference bridges exclusively for scheduling. Consumes backup resources. To avoid wasting resources, cascading should be disabled.
Example 3	<ul style="list-style-type: none"> ■ Dedicated bridge for scheduled conferences ■ Shared-use backup bridges for both scheduled and non-scheduled conferences 	Two or more pools. Highest priority pool with one bridge only, used for scheduled conferences. Other pools contain bridges for both scheduled (as backup) and non-scheduled conferences. Only the first pool is marked for scheduling in the TelePresence Conductor Service Preference and reported to Cisco TMS.	As for Example 1, with possible benefit of fallback in case of bridge failure if the other pools have spare capacity.	Uses one conference bridge exclusively for scheduling. To avoid wasting resources on the dedicated bridge, cascading should be disabled.

Table 7: Comparison of scheduling scenarios (continued)

	Service Preference contains ...	Configuration	Advantages	Disadvantages
Example 4	<ul style="list-style-type: none"> ■ Dedicated bridges for scheduled conferences ■ Shared-use backup bridges for both scheduled and non-scheduled conferences 	<p>Two or more pools.</p> <p>Highest priority pool with two or more bridges, used for scheduled conferences. Cascading enabled on the associated conference template.</p> <p>Other pools contain bridges for both scheduled (as backup and overflow) and non-scheduled conferences. For planned overflow you need to set Capacity Adjustment for the service preference to more than 100% in Cisco TMS.</p> <p>Only the first pool is marked for scheduling in the TelePresence Conductor Service Preference and reported to Cisco TMS.</p>	<p>As for Example 1, with possible benefit of fallback in case of bridge failure and overflow resource when cascading is used in a scheduled conference.</p> <p>Bridges in the backup pools are used for scheduling if:</p> <ul style="list-style-type: none"> ■ A bridge in Pool 1 fails. ■ Cascading in Pool 1 uses up bridge resources that Cisco TMS expected to be available for scheduling. 	<p>Uses conference bridges exclusively for scheduling.</p> <p>If scheduled conferences are cascaded, they may need resources from a shared-use pool.</p>
Example 5	Shared-use bridges for scheduled and non-scheduled conferences	<p>One or more pools, shared for scheduled and non-scheduled conferences.</p> <p>All pools are marked for scheduling in the TelePresence Conductor Service Preference and reported to Cisco TMS.</p>	<p>Cascaded conferencing available (if enabled).</p> <p>Targeted management of bridge resources. Over time, monitoring of use patterns can identify the most appropriate pool configuration.</p>	<p>Resource availability for scheduled conferences not guaranteed (could be used up by non-scheduled conferences). This risk can be reduced by under-subscribing resources for the service preference in Cisco TMS using the Capacity Adjustment feature.</p>

Figure 15: Illustration of scheduling scenarios



Requirements for Scheduling—dedicated bridge

If you use a dedicated conference bridge for scheduling, the following points apply:

- The bridge resources will only be used for conferencing (subject to correct configuration). In Capacity API responses to Cisco TMS, the TelePresence Conductor only returns pools that are "marked" for scheduling in the Service Preference (**Pools to use for scheduling** option).
- For additional resilience you can include one or more additional bridges / pools in the Service Preference used for scheduling. These pools should not be marked for scheduling (so they are not reported to Cisco TMS) and the additional bridges will only be used if the primary bridge becomes unavailable.
- To avoid wasting resources we recommend that you disable cascading. Even though cascading cannot physically happen, resources will still be reserved if cascading is enabled.
- Although TelePresence Server resource optimization will occur, no benefit is gained when the primary conference bridge is in use. Cisco TMS plans bridge usage ahead of actual usage, so the resources recovered by optimization are not actually re-used. If you use backup bridges which are shared resources with non-scheduled conferences, then the optimization will reduce the capacity needed on the shared backup bridge(s).

Avoid escalations

Participants in a scheduled conference should not escalate to an ad hoc / instant conference. An escalation will create a new three-party conference, where one of the participants is the scheduled meeting. This results

in a chained conference and a degraded conference experience for the participants (see [Chained Conferences \[p.51\]](#) for more information).

CMR Hybrid Conferencing

Cisco WebEx and Cisco TelePresence users can participate jointly in scheduled meetings or personal CMRs. Both SIP and PSTN-based audio are supported for the audio portion of the call between WebEx and the conference bridges (the audio connections between WebEx participants and the WebEx conference can be PSTN audio, SIP audio, or computer telephony).

Requirements for CMR Hybrid conferencing

- The standard requirements for dedicated-bridge scheduling apply (see [Requirements for Scheduling—dedicated bridge \[p.40\]](#) above).
- Early Offer messaging is required (see [Early Offer for SIP Messaging \[p.44\]](#)).

More Information

For instructions about how to set up scheduled conferencing, see [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#).

Conference Monitoring

Conference Control Center

The solution supports the following subset of the standard Cisco TMS **Conference Control Center** features. These allow administrators to control certain aspects of ongoing conferences—see which conferences are running on conference bridge resources, add or remove participants, hand over conference controls to a participant, and end a conference:

Table 8: Cisco TMS Conference Control Center features in the solution

On a conference	On a participant
Set picture mode (only applied to participants who join after the setting is changed)	Mute/unmute audio
Add participant	Mute/unmute outgoing audio
End	Mute/unmute video
	Disconnect
	Change display name (the new name is not updated in the TMS interface)
	Send message
	Show snapshot (MCU bridges only)
	Set picture mode

Notes:

- Some **Conference Control Center** features are not available on certain conference bridge models.
- **Conference Control Center** functions are not supported for cascaded conferences, except for visibility of which bridge a participant is connected to.

More Information

For detailed information about using the **Conference Control Center**, see [Cisco TelePresence Management Suite Administrator Guide](#) and the Cisco TMS help.

Configuration and Technology Considerations

Locations, Pools and Service Preferences

In the context of CMR Premises, Locations are configured in the TelePresence Conductor and are used for two purposes:

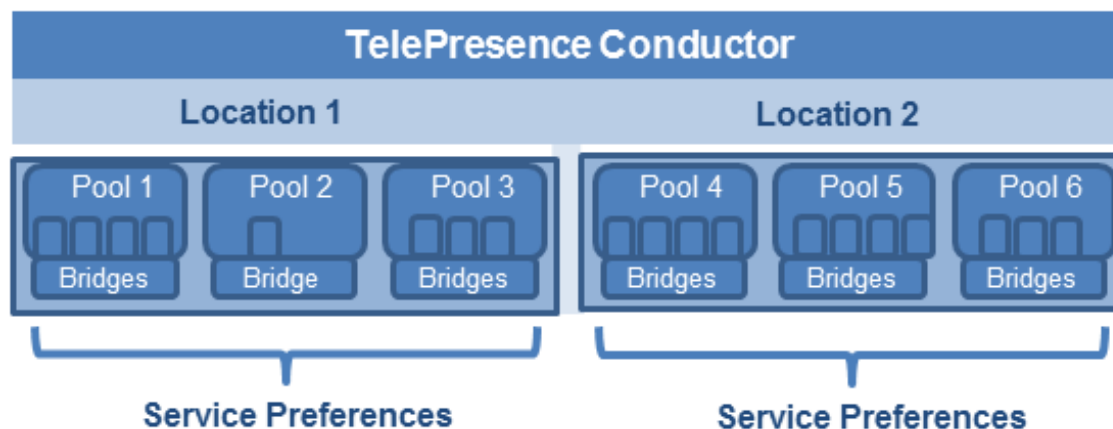
- Unified CM-Centric deployments. To support Unified CM's need for separate trunks from Unified CM to TelePresence Conductor -- one for each Unified CM location.
- Cisco VCS-Centric deployments. To define a connection between the TelePresence Conductor and Cisco VCS via the back-to-back user agent (B2BUA) on TelePresence Conductor.

Pools are configured in the TelePresence Conductor to organize and manage conference bridges. Each bridge is assigned to a conference bridge pool. Service Preferences are configured to define a prioritized order in which to use the conference bridge pools. At least one Service Preference is required. You can optionally place all pools into a single Service Preference. Conference bridges within a pool should all be the same capacity.

Each standard TelePresence Conductor license supports up to 30 bridges and 30 locations. See [Appendix 2: Understanding Locations, Pools and Service Preferences \[p.53\]](#) for detailed information.

For Personal CMR / rendezvous conferences, TelePresence Conductor uses the dialed number in order to select the conference bridges that it will use to host the conference. (Unified CM needs to select the trunk—Location trunk—based on the Personal CMR / rendezvous number or URI dialed.)

Figure 16: Locations, Pools and Service Preferences in CMR Premises



Encryption

CMR Premises supports TLS encryption for SIP signaling. TLS is mandatory for TelePresence Conductor-to-bridge SIP communication. Other SIP (and XML RPC) communication can optionally be TLS-encrypted between the endpoint and the call manager, and between the call manager and TelePresence Conductor. More details are in [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#).

Unified CM Normalization Script Settings

This section applies if you use any of the SIP normalization scripts in Unified CM (for encryption and TLS on SIP trunks used for TelePresence).

Table 9: Normalization scripts for Cisco Unified Communications Manager

Script	Install on...
telepresence-conductor-interop	SIP trunks that directly interface with a TelePresence Conductor as the next hop peer.
vcs-interop	SIP trunks that directly interface with a Cisco VCS Control or Cisco Expressway-C as the next hop peer.

The script content is identical in each case, but they are designed to apply in different situations.

You must set the following threshold values for each script that you use.

Setting	Value
Memory Threshold	1000
Lua Instruction Threshold	2000

To work with script settings, on the Unified CM go to **Device > Device Settings > SIP Normalization Script**. To apply the scripts to SIP trunks, on the Unified CM go to **Device > Trunk**. Details about how to download the scripts and add them to Unified CM are in the latest [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide, Appendix: Adding the Normalization Scripts](#).

Early Offer for SIP Messaging

This section is only relevant to Unified CM-Centric deployments. It provides the recommended approach for configuring outbound trunks as Early Offer.

For the CMR Premises solution we recommend that all SIP trunks which carry TelePresence calls are configured for Early Offer. With Early Offer the session initiator sends its capabilities in the SIP Invite and the called device chooses the preferred codec.

Early Offer is *required* in these cases:

- If you support CMR Hybrid calls (WebEx participation), configure Early Offer for the SIP trunks between:
 - TelePresence Conductor and Unified CM
 - Unified CM and Cisco Expressway-C or Cisco VCS Control
- For any other services that require Early Offer, such as Cisco WebEx and some third party conferencing services, configure Early Offer from Cisco Unified Communications Manager endpoints to Cisco Expressway. The entire path from the calling device to the service must be configured.

Cisco VCS-Centric deployments always run in Early Offer mode, except for H.323 to SIP interworked calls. (Because H.323 uses Slow Start signaling mode on Cisco VCS and Cisco Expressway, SIP messaging for interworked calls is done using Delayed Offer.)

Note: The default configuration for Unified CM trunks is **Delayed Offer**, and so must be reconfigured.

Configuration information

Details about how to configure Early Offer are in [Cisco Collaboration Meeting Rooms \(CMR\) Premises Deployment Guide](#).

Endpoints

Any TelePresence endpoints registered to Unified CM should be configured with a Media Resource Group List (MRGL) that does not contain any MTP resources. So that when the endpoints place a call that traverses one of the above trunk types an MTP will not be available within the MRGL of the endpoint.

Audio-Only Quality Setting in Ad Hoc Conferencing (TelePresence Servers)

TelePresence Conductor supports audio-only as a quality setting, or service level, for TelePresence Server conference bridges. A default audio-only option is provided in **Conference configuration > Quality settings**, which like other quality settings is applied through the conference template, auto-dialed participant, or pre-configured endpoint codec values.

This section describes some limitations and recommendations to be aware of when using the audio-only quality setting with ad hoc conferencing in Unified CM deployments. System behavior may not be as you expect.

Note: The issues described in this section apply to ad hoc conferences only and are not relevant to scheduled conferences or rendezvous / personal CMR conferences.

Limitations

- For Intelligent Bridge Selection purposes, in ad hoc conferences Unified CM always treats TelePresence Conductor as a video resource regardless of the Conductor template settings. It does not differentiate between audio and video templates. The implications of this are described in the example below.
- TelePresence Conductor does not support the audio-only quality setting for MCU bridges.

Example: audio-only handling for ad hoc conferences

Assume a single-TelePresence Conductor configuration with these templates defined for Unified CM Media Resource Group 1:

- Cond-Video (*HD* specified for **Participant quality**)
- Cond-Audio (*Audio-only* specified for **Participant quality**)

The Conductor is added to Unified CM as two separate conference bridges, using separate IP addresses. One address is linked to the Cond-Video template and the other to Cond-Audio.

Unified CM's Intelligent Bridge Selection does not favor the Cond-Video resource for ad hoc conferences involving two or more video endpoints, and the Cond-Audio resource for ad hoc conferences involving audio-only endpoints. Instead, because Unified CM believes all Conductor resources to be video resources, load balancing is performed between Cond-Video and Cond-Audio. This may result in a group of video endpoints being allocated to the Cond-Audio resource and having no video (because audio and video templates are not differentiated).

Recommendations for audio-only in ad hoc conferences in Unified CM

- Use a dedicated Media Resource Group (MRG) for TelePresence Conductor conference bridges with an audio-only template, and use this with audio-only phones.
- Do not add any other type of audio conference bridge (such as PVDMs) to the MRG.
- Assign the MRG to a Media Resource Group List (MRGL) and assign this MRGL to your audio-only endpoints.

IPv4

CMR Premises deployments support IPv4 only. All Unified CM bridges and endpoints within the deployment must be configured to use IPv4.

Content Channel

Most TelePresence endpoints support the use of a second video channel known as the content channel. Typically this is used for presentations running alongside live video.

Configuration information for MCU conference bridges

For MCU bridges, in **Advanced parameters** set the **Content mode** for the Conference template in Conductor to *Transcoded*.

Transcoded mode is only relevant for MCU bridges. When this mode is selected in a TelePresence Conductor template, a dedicated content port or video port will be allocated depending on the MCU model and configuration.

H.323 Interworking

The CMR Premises network is SIP-based. If you want to connect H.323 endpoints to conferences within the CMR Premises network, the call must be interworked before reaching the TelePresence Conductor. This can be done by configuring the Cisco VCS Control or Cisco Expressway-C to perform the necessary SIP/H.323 interworking, as in [Figure 5: CMR Premises with standards-based endpoints \(Unified CM-Centric\) \[p.19\]](#).

- To perform interworking only for locally registered endpoints, set the **H.323 <-> SIP interworking mode** to *Registered only* (accessed from **VCS configuration > Protocols > Interworking**).
- If you want to allow interworking of business-to-business H.323 calling between external networks and your conferences, set the **H.323 <-> SIP interworking mode** to *On*. This will interwork all incoming calls.

Resilience and Clustering

The following capacity versions of the TelePresence Conductor can be deployed as a cluster:

- Full capacity TelePresence Conductor
- TelePresence Conductor Select

The TelePresence Conductor Essentials does not support clustering.

Deploying clusters of TelePresence Conductors ensures service availability even if individual conference bridges or Conductors are taken out of service. Clustering does not increase the maximum number of conference bridges / concurrent calls that can be supported. So for example, the full capacity Conductor can

manage up to 30 conference bridges or 2400 concurrent conference calls, and this remains at 30 bridges / 2400 calls in a clustered deployment.

CAUTION: If you use clustered TelePresence Conductors, be aware that Cisco TMS only recognizes one TelePresence Conductor node. If that cluster node should fail, the Cisco TMS scheduling service and its CMR provisioning service will be out of service (until the TelePresence Conductor is brought back up or Cisco TMS is updated to communicate with a different TelePresence Conductor in the cluster).

Configuration information

For details see the appropriate clustering deployment guide:

- [Cisco TelePresence Conductor Clustering with Cisco Unified Communications Manager Deployment Guide](#)
- [Cisco TelePresence Conductor Clustering with Cisco VCS \(B2BUA\) Deployment Guide](#)

Entry-Level Conferencing

CMR Premises supports entry-level SIP-based video conferencing, with lower cost platforms—virtualized or physical—that can support lower capacity configurations. Capacity can be grown subsequently by adding screen licenses. Single-bridge configurations can use a trial version of Cisco TelePresence Conductor (TelePresence Conductor Essentials), which does not need a release key, running as a virtual machine.

Table 10: Bridges that support entry-level SIP-based video conferencing in an CMR Premises deployment

Bridge	Type
Cisco TelePresence Server on Multiparty Media 310	Physical
Cisco TelePresence Server on Multiparty Media 320	Physical
Cisco TelePresence Server on Virtual Machine	Virtual

All bridges support a conference service level (quality setting) for 360p30 video. Physical bridges can be clustered (stacked) as two units together in any combination to increase capacity.

Note: The overall media capacity of clustered bridges is restricted to the normal call limits for the relevant bridge type.

Related Documentation

Title	Link
Cisco Collaboration Meeting Rooms (CMR) Premises Deployment Guide 4.0	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-installation-and-configuration-guides-list.html
Cisco Collaboration Meeting Rooms (CMR) Premises Release Notes 4.0	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-release-notes-list.html
Cisco TelePresence Conductor with Cisco Unified Communications Manager Deployment Guide Unified CM 10.x [see Appendix for 9.x]	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-installation-and-configuration-guides-list.html
Cisco TelePresence Management Suite Provisioning Extension with Cisco Unified CM Deployment Guide	http://www.cisco.com/c/en/us/support/conferencing/telepresence-management-suite-extensions/products-installation-guides-list.html
Cisco TelePresence Conductor with Cisco TelePresence VCS (B2BUA) Deployment Guide	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-installation-and-configuration-guides-list.html
Cisco TelePresence Management Suite Provisioning Extension with Cisco VCS Deployment Guide	http://www.cisco.com/c/en/us/support/conferencing/telepresence-management-suite-extensions/products-installation-guides-list.html
Cisco TelePresence Conductor Administrator Guide XC3.0	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-maintenance-guides-list.html
Cisco Unified Communications Manager Administration Guide, Release 10.5n	http://www.cisco.com/c/en/us/support/unified-communications/unified-communications-manager-callmanager/products-maintenance-guides-list.html
Cisco Unified Communications Manager Administration Guide, Release 9.1n	http://www.cisco.com/c/en/us/support/unified-communications/unified-communications-manager-callmanager/products-maintenance-guides-list.html
Cisco Unified Communications Manager with Cisco Expressway (SIP Trunk) Deployment Guide, Cisco Expressway X8.5	http://www.cisco.com/c/en/us/support/unified-communications/expressway-series/products-installation-and-configuration-guides-list.html
Cisco Unified Communications Manager with Cisco VCS (SIP Trunk) Deployment Guide, Cisco VCS X8.5	http://www.cisco.com/c/en/us/support/unified-communications/telepresence-video-communication-server-vcs/products-installation-and-configuration-guides-list.html
Cisco TelePresence Multiway™ Deployment Guide, Cisco VCS, MCU, Conductor	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-installation-and-configuration-guides-list.html
Cisco Expressway Basic Configuration Deployment Guide X8.5	http://www.cisco.com/c/en/us/support/unified-communications/expressway-series/products-installation-and-configuration-guides-list.html
Cisco TelePresence Video Communication Server Basic Configuration (Control with Expressway) Deployment Guide Cisco VCS X8.5	http://www.cisco.com/c/en/us/support/unified-communications/telepresence-video-communication-server-vcs/products-installation-and-configuration-guides-list.html

Title	Link
Cisco TelePresence Conductor with Cisco TelePresence Management Suite Deployment Guide	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-installation-and-configuration-guides-list.html
Cisco TelePresence Management Suite Administrator Guide Version 14.5	http://www.cisco.com/c/en/us/support/conferencing/telepresence-management-suite-tms/products-maintenance-guides-list.html
Cisco Collaboration Meeting Rooms (CMR) Hybrid Configuration Guide	http://www.cisco.com/c/en/us/support/conferencing/telepresence-management-suite-tms/products-installation-and-configuration-guides-list.html
Cisco TelePresence Conductor Product Programming Reference Guide XC3.0 (includes Conductor Provisioning API reference)	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/products-programming-reference-guides-list.html
Cisco Expressway Administrator Guide X8.5	http://www.cisco.com/c/en/us/support/unified-communications/expressway-series/products-maintenance-guides-list.html
Cisco TelePresence Video Communication Server Administrator Guide X8.5	http://www.cisco.com/c/en/us/support/unified-communications/telepresence-video-communication-server-vcs/products-maintenance-guides-list.html

More Product Documentation on Cisco.com

Product	Link
TelePresence Conductor	http://www.cisco.com/c/en/us/support/conferencing/telepresence-conductor/tsd-products-support-series-home.html
Cisco TMS	http://www.cisco.com/c/en/us/support/conferencing/telepresence-management-suite-tms/tsd-products-support-series-home.html
Cisco TMSPE and Cisco TMSXE	http://www.cisco.com/c/en/us/support/conferencing/telepresence-management-suite-extensions/tsd-products-support-series-home.html
Unified CM	http://www.cisco.com/c/en/us/support/unified-communications/unified-communications-manager-callmanager/tsd-products-support-series-home.html
MCU 5300 Series	http://www.cisco.com/c/en/us/support/conferencing/telepresence-mcu-5300-series/tsd-products-support-series-home.html
MCU 4500 Series	http://www.cisco.com/c/en/us/support/conferencing/telepresence-mcu-4500-series/tsd-products-support-series-home.html
MCU MSE Series	http://www.cisco.com/c/en/us/support/conferencing/telepresence-mcu-mse-series/tsd-products-support-series-home.html
TelePresence Server	http://www.cisco.com/c/en/us/support/conferencing/telepresence-server/tsd-products-support-series-home.html
Cisco Expressway	http://www.cisco.com/c/en/us/support/unified-communications/expressway-series/tsd-products-support-series-home.html
Cisco VCS	http://www.cisco.com/c/en/us/support/unified-communications/telepresence-video-communication-server-vcs/tsd-products-support-series-home.html

Appendix 1: Conferencing Fundamentals

Ad Hoc Conferences

Point-to-point calls hosted on a Unified CM can be escalated to an ad hoc conference hosted on a bridge. A third-party calling one of the parties already in a point-to-point call can be added to the ad hoc conference. Alternatively, a third-party can be added by one of the parties in the point-to-point call by putting the call on hold, dialing the third-party and adding them to the conversation using the conference button on the phone. For details on the actual steps to escalate a point-to-point call, refer to the user documentation supplied with the endpoints. Only endpoints with the conference key can create an ad hoc conference.

Optionally an ad hoc conference can be further extended by adding more participants. As participant(s) leave, the conference is automatically returned to a point-to-point call when only two participants remain.

The ability to escalate point-to-point calls into an ad hoc conference now includes Unified CM-managed endpoints which are located remotely from the enterprise CMR Premises network and registered through Cisco Expressway to the Unified CM.

Multiway Conferences

Cisco TelePresence Multiway conferences are instant conferences that escalate from a point-to-point call on a Cisco VCS Control to a three-party call, similar to ad hoc call escalation on Unified CM.

Multiway enables endpoint users to introduce a third-party into a call, or when the third-party calls one of the parties already in the point-to-point call and the participants wish to include the third-party in the call.

Personal CMR / rendezvous Conferences

Personal CMR / rendezvous conferences can occur at any time spontaneously without the need for the conference to be scheduled. They provide permanent conference aliases for hosts to share with other meeting participants. A conference occurs when one or more participants dial the configured alias.

These conferences can be created as generic conferences or with a unique configuration for a specific user or group.

Scheduled Conferences

Scheduled conferences are pre-booked conferences with a start and end time, and optionally a pre-defined set of participants. Participants for scheduled conferences can be configured to dial in or dial out.

Chained Conferences

A chained conference is a situation where rather than all participants being part of the same conference, some participants are part of one conference, other participants are part of another conference and the two conferences are 'chained' together. For example, if a participant in an ad hoc conference (that is, managed by Unified CM) is added into a Personal CMR / rendezvous, Multiway, or scheduled conference, or vice versa. In this case, rather than the first conference simply being extended to include the new participants, a second conference is created and "chained" to the first. The result is a degraded conference experience because each of the conferences appears as a single participant in the other conference (so multiple participants will appear in a single video stream).

Auto-Dialed Participants (ADP)

Both TelePresence Conductor and Cisco TMSPE support auto-dialing participants for permanent conferences. This is particularly useful for conferences which need to be recorded or when senior management need to easily join a conference. Auto-dialed participants are addresses that are automatically dialed when a conference starts. The address can relate to a device such as an endpoint or recording device (multiscreen endpoints are not supported), or could be any dial-able ID.

Appendix 2: Understanding Locations, Pools and Service Preferences

Note: From Release 4.0, scheduled calls behave in the same manner as Personal CMR / rendezvous calls.

Locations

TelePresence Conductor **Locations** do the following:

- Provide IP destination addresses to which Unified CM trunks can connect, to allow Unified CM to support locations.
- Define the conference bridges to use for ad hoc conferences.

Usage in Unified CM

The Locations feature in Unified CM enables administrators to implement call admission control and determine the maximum permitted bandwidth between and within Locations. To avoid overloading the network, administrators often configure Unified CM with different Locations for each office site or campus.

Note: If you do not use call admission control to limit the audio and video bandwidth on an IP WAN link, an unlimited number of calls can be active on that link at the same time. This can cause the audio quality of each audio call and the video and audio quality of each video call to degrade as the link becomes oversubscribed.

Usage in Cisco VCS

In Cisco VCS-Centric deployments, a Location is used to allow the Cisco VCS to forward conference call requests directly to the TelePresence Conductor back-to-back user agent (B2BUA). A single Location can be set up for all traffic between any Cisco VCS (or Cisco VCS cluster) and the TelePresence Conductor.

Connecting Unified CM to bridges through TelePresence Conductor

TelePresence Conductor supports conferences from endpoints registered with Unified CM. Unified CM call admission control is supported by TelePresence Conductor if the TelePresence Conductor is configured with a location for each location that Unified CM supports.

The steps required to connect TelePresence Conductor to Unified CMs which are configured to support Locations are described in [Cisco TelePresence Conductor with Cisco Unified Communications Manager Deployment Guide](#). The end result of the configuration is:

- A SIP trunk is established between Unified CM and TelePresence Conductor for each location for rendezvous / personal CMR and scheduled calls.
- TelePresence Conductor is configured with Locations to support ad hoc, Personal CMR / rendezvous or both types of conferences, according to the specific requirements of each Location.
- Locations define the template to use for ad hoc conferences.
- Personal CMR / rendezvous and scheduled conferences rely on the dialed number/URI to determine the bridge used, and so appropriate configuration is needed in TelePresence Conductor and Unified CM to ensure that the bridges selected are the correct ones.

Notes:

- Personal CMR / rendezvous and scheduled calls go to one IP address on TelePresence Conductor and ad hoc calls go to another IP address.
- Multiple Unified CMs can support the same location. Where they do so, they can use the same location destination(s) on TelePresence Conductor. One for ad hoc and one for Personal CMR / rendezvous and scheduled.
- The Unified CMs do not need to be in the same physical location.

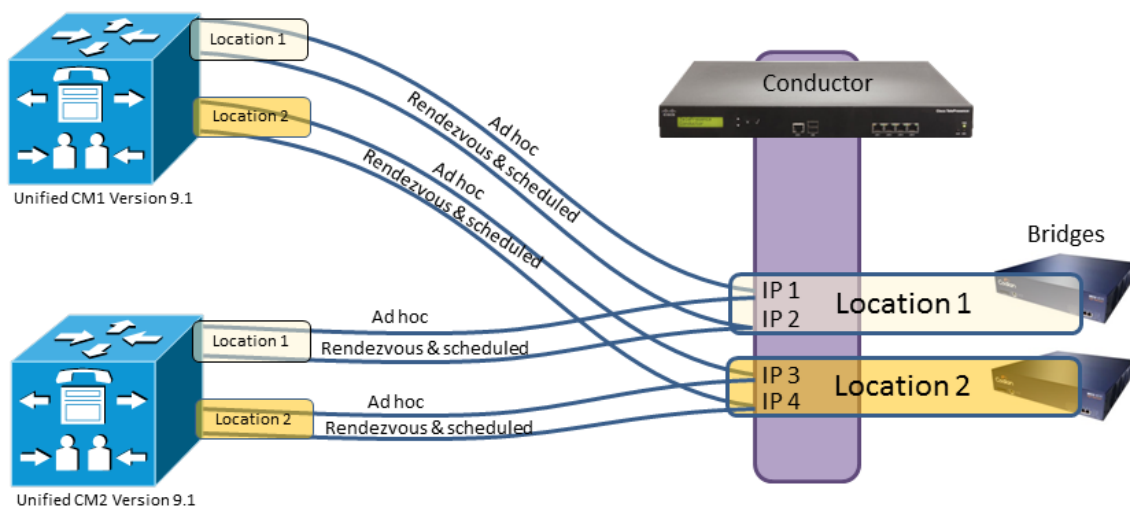
Note: When supporting different locations for conference bridges, bridge pools and Service Preferences configured in TelePresence Conductor should only contain bridges within the same physical location.

Outbound calls from conference bridges to participants registered on or available via Unified CM are supported. Bridge pools are assigned a Location within TelePresence Conductor and outbound calls use the same SIP trunk as incoming Personal CMR / rendezvous or scheduled calls. Outbound calls are typically used for automatic dialing of conference participants into a conference, or to add a participant to an existing conference via the Cisco TMS Conference Control Center, or to add a recording server or an audio bridge.

The conference administrator must ensure that aliases dialed from endpoints connected to Unified CM only use bridges in the Location expected by Unified CM. If bridges in a different Location are specified and used, TelePresence Conductor will place the call on the bridge in a different Location from that expected by Unified CM. This means Unified CM will account for the call bandwidth in the wrong Location, and wrongly allocate the bandwidth to the expected Location with no bandwidth allocation to the actual Location.

Multiple Unified CM clusters can support the same Location. The following illustration shows multiple Unified CM clusters communicating with specific IP addresses on a TelePresence Conductor. For example, both UCM1 and UCM2 route ad hoc calls to Location 1 using the same IP address on TelePresence Conductor. UCM1 and UCM2 route ad hoc calls to Location 2 using another IP address. Similarly, Personal CMR / rendezvous and scheduled calls are routed from both UCM1 and UCM2 to a single IP for Location 1 and to a single IP for Location 2.

Figure 17: Using Locations with Unified CMs running 9.1



Pools

Each conference bridge in the deployment must be assigned to a conference bridge pool in TelePresence Conductor. A conference bridge can belong to only one pool. All bridges in a pool are configured with the same capabilities.

All conference bridges in a TelePresence Conductor pool must be of the same type (MCU or TelePresence Server). Usually it is best to configure a pool with bridges from the same location, although this is optional, not mandatory. For example, in [Figure 1: High-level view of the CMR Premises architecture \[p.9\]](#) Pool 1 could be a group of TelePresence Servers located in the London office, Pool 2 a group of MCUs with HD ports in New York, and Pool 3 a group of TelePresence Servers with SD ports, also in New York.

Note: We strongly recommend that all conference bridges within a pool have the same capacity, so that conferences can be distributed efficiently across conference bridges. If there are conference bridges with different capacities in the same pool, this may lead to unbalanced conference placement in some scenarios.

Any conference bridge that is dedicated for scheduling use must be in a pool on its own.

Service Preferences

A Service Preference is a prioritized list of conference bridge pools set up through TelePresence Conductor, which defines the order to use pools. For any particular conference the administrator can determine the order of preference for the pools that TelePresence Conductor will attempt to use to host that conference. If no conference bridges in the first pool can be used to host a conference (for example insufficient resources are available to meet the conference requirements), TelePresence Conductor will check whether the second pool in the list can be used.

A Service Preference can contain anywhere between 1 and 30 conference bridge pools. A single conference bridge pool can be used in any number of Service Preferences. As with pools, all conference bridges in a Service Preference must be of the same type (MCU or TelePresence Server). If Unified CM call admission control is implemented to control bandwidth usage, each Service Preference must only contain pools of bridges for a single location.

More information

See the appropriate deployment guide for details:

- [Cisco TelePresence Conductor with Unified Communications Manager Deployment Guide](#) for Unified CM-Centric deployments
- [Cisco TelePresence Conductor with Cisco VCS \(B2BUA\) Deployment Guide](#) for Cisco VCS-Centric deployments

Accessibility notice

Cisco is committed to designing and delivering accessible products and technologies.

The Voluntary Product Accessibility Template (VPAT) is available here:

http://www.cisco.com/web/about/responsibility/accessibility/legal_regulatory/vpats.html#telepresence

You can find more information about accessibility here:

www.cisco.com/web/about/responsibility/accessibility/index.html

Document Revision History

Date	Description	Changes
January 2015	Initial issue	First version.
January 2015	Re-issue	Updated links to product deployment guides.

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY THIS REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSE OR LIMITED WARRANTY, CONTACT YOUR CISCO REPRESENTATIVE FOR A COPY.

The Cisco implementation of TCP header compression is an adaptation of a program developed by the University of California, Berkeley (UCB) as part of UCB's public domain version of the UNIX operating system. All rights reserved. Copyright © 1981, Regents of the University of California.

NOTWITHSTANDING ANY OTHER WARRANTY HEREIN, ALL DOCUMENT FILES AND SOFTWARE OF THESE SUPPLIERS ARE PROVIDED "AS IS" WITH ALL FAULTS. CISCO AND THE ABOVE-NAMED SUPPLIERS DISCLAIM ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THOSE OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT OR ARISING FROM A COURSE OF DEALING, USAGE, OR TRADE PRACTICE.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Cisco and the Cisco Logo are trademarks of Cisco Systems, Inc. and/or its affiliates in the U.S. and other countries. A listing of Cisco's trademarks can be found at www.cisco.com/go/trademarks. Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1005R)

Any Internet Protocol (IP) addresses and phone numbers used in this document are not intended to be actual addresses and phone numbers. Any examples, command display output, network topology diagrams, and other figures included in the document are shown for illustrative purposes only. Any use of actual IP addresses or phone numbers in illustrative content is unintentional and coincidental.

© 2015 Cisco Systems, Inc. All rights reserved.