



Cisco TelePresence Integration with Microsoft Lync Server

Solution Guide



TTG Solutions Practices Team

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1 Executive summary

Unified Communications (UC) is broadly understood as the seamless integration of communications devices, modalities and capabilities for the individual user; allowing the user to have a single identity rather than a myriad of device identities.

TelePresence is among the key communications modes within the UC ecosystem. As organizations begin to evaluate and plan for the deployment of UC solutions, TelePresence becomes a key driver to implementation. Cisco is the industry leader in TelePresence solutions. Cisco's pervasive video strategy, and open approach to UC leverages deep integrations with other UC desktop, voice, and network solutions, resulting in an end-to-end visual UC solution with high definition quality that works for everyone in the organization.

Cisco provides two primary integration paradigms with Microsoft Lync: a client-side integration and a server-side integration. This document focuses on Cisco's open and integrated approach to enabling a visual UC environment with Microsoft Lync Server. This is more than just making a typical TelePresence room work with a Microsoft Lync client; it enables an organization's TelePresence assets to work seamlessly with the broader UC environment, and enables a user to have one identity in a common corporate directory/phone book while having the freedom and flexibility to communicate with a wide range of devices in a variety of environments.

The Cisco approach to Microsoft Lync Server integration maximizes ROI by allowing organizations to:

- ▶ Support existing investments in standards-based TelePresence systems
- ▶ Migrate existing TelePresence assets into the UC environment with minimal disruption to both the TelePresence deployment and the rest of the communications environment
- ▶ Enable Microsoft Lync users to take advantage of the advanced functionality of the TelePresence network, while maintaining seamless connectivity with the rest of the UC environment

This document:

- ▶ Outlines how the Cisco integration with the Microsoft Lync Server can leverage TelePresence and High Definition (HD¹) video quality
- ▶ Explains how to integrate an existing deployment of Cisco or other standards-based video conferencing technology in a range of installations, from the simple to the more comprehensive:
 - ▶ HD video and the PC
 - ▶ Desktop TelePresence appliances
 - ▶ Conference room TelePresence systems

¹ For purposes of this document, HD means 720p at 30 fps, unless specified otherwise. This convention is used because 720p is the maximum video resolution supported by the Microsoft Lync client. It is important to note that the Cisco solution can support up to 1080p.

- ▶ Multiparty TelePresence
- ▶ Cross network connectivity
- ▶ Business to business (B2B) connectivity
- ▶ Immersive TelePresence connectivity

2 Business benefits

Communicating visually delivers on the promise of Unified Communications (UC) providing end users with a transformative communications experience changing a one-dimensional conversation into a multifaceted collaboration experience.

- ▶ **TelePresence:** TelePresence changes how we communicate and allows users to communicate more effectively, as proven in study after study. In today's competitive landscape, in which organizations are not only trying to reduce travel and their overall carbon footprint but also to do more with less, TelePresence allows organizations to implement "Green Initiatives" via tele-work to improve productivity with more effective meetings and individual conversations, and to engender a more tightly-knit workforce. TelePresence is bringing back the sense of community and camaraderie in the ever expanding global work environment, resulting in a more efficient, effective and productive workforce.

UC combines productivity drivers such as presence and TelePresence with more traditional and familiar communications tools such as voice and web collaboration in an effort by businesses and organizations to stay ahead in today's global economy. The ability to tie these communications channels into a combined and seamless experience for the end user is just the first step; ultimately the UC experience becomes interwoven with typical end users' business processes.

3 Visual communications network components

This chapter provides an overview of the components in a comprehensive TelePresence network. For further detail, see the Cisco web site (www.cisco.com).

3.1 TelePresence endpoints

TelePresence endpoints are purpose-built hardware appliances; often, they are completely integrated packages including the screen(s), camera(s) and microphone(s) in addition to the actual “engine”, which is known as the “codec”. These are always-on IP solutions which do not require a PC to operate. There are three categories:

Personal TelePresence Systems:

Cisco EX-Series and Cisco E20 shown



Multipurpose TelePresence Systems:

Cisco Dual 52” Profile, Cisco C90 Codec, Cisco C60 Codec, and Cisco C20 Codec shown



TelePresence Systems: Cisco Immersive CTS3010 and Cisco T3 shown



CAUTION: CTS-based systems do not support the VCS OCS Relay function; this means that presence is not published for CTS endpoints into Lync. If publishing presence is a requirement, endpoints that register to VCS must be used; for example, Cisco recommends the T3 for the immersive category of endpoint, the Profile/C Series family for multipurpose and the EX Series for personal endpoints. Although the OCS Relay naming convention hasn't changed, it is fully compatible with Lync integration implementations with VCS.

3.2 TelePresence infrastructure

Most communications solutions include network components (that the end-user does not see) that make them function; for example, a PBX or SIP registrar allows phones in an office to work. Equally, the TelePresence endpoints described in the previous section rely on a series of infrastructure components, enabling a scalable and manageable deployment with additional services beyond those capable with the endpoints alone.

3.2.1 Call control and management

The Cisco infrastructure products which provide call control and management for TelePresence integration into the Lync server are the Video Communications Server (VCS) and the Cisco Management Suite (TMS). There is also TelePresence call control and management in the Cisco Communications Manager (CUCM) and Cisco TelePresence Management Suite (CTS-Manager): see the *Personal TelePresence Solutions Guide* for more details of these platforms and how they integrate. For the purpose of this document, which is based around Microsoft Lync Server integration, the VCS is the call control and interconnect platform.

Cisco Video Communications Server (VCS): this appliance-based server provides:

- ▶ H.323 gatekeeper
- ▶ SIP registrar/proxy
- ▶ Protocol interworking
- ▶ Secure B2B connectivity
- ▶ Microsoft Lync Server interconnect
- ▶ PBX trunking
- ▶ Call control and bandwidth management
- ▶ Call routing

Cisco TelePresence Management Suite (TMS): even with Cisco or other vendors' endpoints registered individually to Lync Server, a software management platform is needed to manage these devices. TMS functionality includes:

- ▶ Management
- ▶ Monitoring
- ▶ Maintenance
- ▶ Scheduling
- ▶ Common directories
- ▶ Call Detail Records
- ▶ Software updates

3.2.2 Services

Additional core infrastructure products enable services such as:

- ▶ Multi-party conferencing between Lync and the standards-based video conferencing environment
- ▶ The ability to record calls from Lync
- ▶ Connectivity between Lync and ISDN-based video conferencing devices

A few examples of the Cisco network products that provide these services are:

Cisco product family of Multipoint Conferencing Units (MCUs): An MCU enables multiple TelePresence endpoints (including Lync clients) to meet together in a conference in which all participants are able to see one another. Key features include:

- ▶ HD video support
- ▶ Continuous presence - the ability to see all participants on one screen simultaneously
- ▶ Individual transcoding - important in mixed endpoint environments, it allows all users in the conference to have the best possible experience
- ▶ ClearVision - the ability to provide better video quality than that actually received from the endpoint (making low quality video connections look better)

Cisco Telepresence Server: an application-specific MCU, enabling multiparty TelePresence conferences including standards-based TelePresence conference rooms and multivendor video conferencing endpoints (including the Lync client)

Cisco ISDN Gateway: A gateway for ISDN-based video conferencing endpoints that allows IP-only devices, including Lync clients, to connect to ISDN-only devices

Cisco TelePresence Content Server (TCS): a network-based recording and streaming solution allowing the recording and streaming of any TelePresence session, including those using Lync clients. It also allows any TelePresence endpoint, including a Lync client, to become a studio for creating recordings for purposes such as a team announcement.

For a complete list of Cisco infrastructure products, see the Cisco web site: www.cisco.com

4 Cisco integration with Microsoft Lync Server

4.1 Background

This document focuses on the interoperability of the TelePresence environment with the Lync client via a network-centric integration between the VCS and Lync Server. It showcases how Cisco is able to support Lync Server integration deployments within a full and mature TelePresence estate. This document is not a solution guide about how an endpoint calls another endpoint; it focuses on integrating an entire Microsoft Lync infrastructure to an entire Cisco TelePresence estate, be that endpoints, MCUs, gateways, or network connectivity including the best-of-breed TelePresence firewall traversal solutions. Cisco's approach to this integration is called Comprehensive Video Integration (CVI).

4.2 Mobility - PC video peripherals

Users of video are demanding that communication from the conference room and on the road is clear, reliable and effective. Cisco's PrecisionHD™ USB Camera is the best in its class of enterprise-grade USB cameras, and was the first camera providing true 720p widescreen format video at 30fps to be certified as Optimized for Lync. This device has exactly the same capability and provides the same user experience with Microsoft Lync.

When used with Lync Server and the Lync client, the camera enables users to maximize their video communications in business-quality HD and with superior audio capabilities; meaning that they can connect with clarity and purpose anywhere, anytime, providing mobility of business quality communications.



Figure 1: Cisco PrecisionHD USB Camera

The camera was also designed to provide a view of the user suitable for today's demanding business communications environment. The following images show the same user at the same distance from a typical consumer-grade camera and from the enterprise-grade Cisco PrecisionHD USB camera, illustrating how the Cisco camera enables more effective communication.

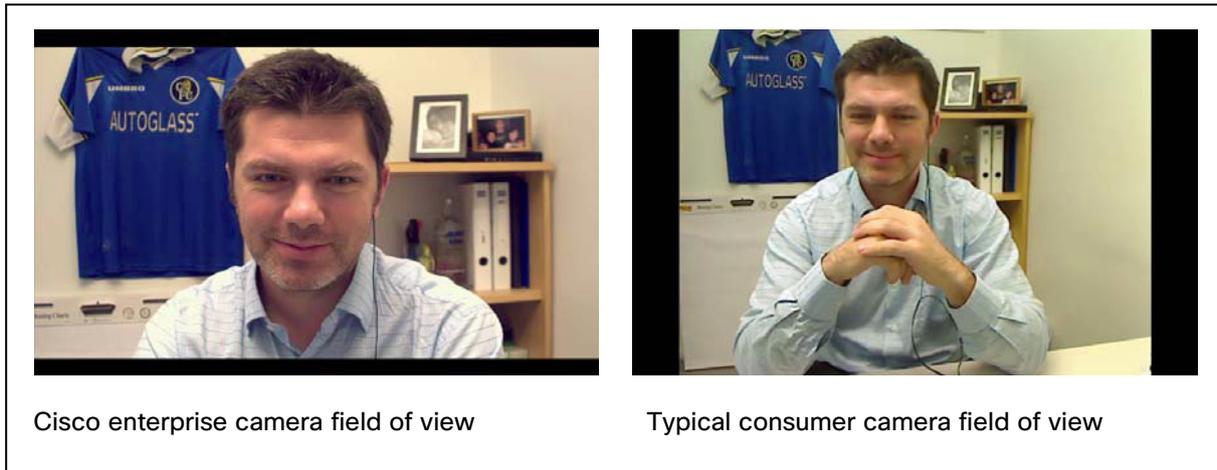


Figure 2: Cisco PrecisionHD USB Camera FOV vs. Consumer Camera FOV

Consumer-grade web cameras tend to have a wide field of view (FOV) resulting in much of the transmitted image being of the user's surroundings rather than of the actual individual when sitting a normal distance from the camera. The PrecisionHD USB camera has an optimized field of view resulting in a more favorable image of the user. Often in PC-based visual communications, the size of the display dedicated to the video image is only a portion of the total screen real estate; therefore it is critical for the image in the video window be optimized to see the far end participant's facial features and expressions. This improves the "in person experience" provided by communicating visually, as well as reducing "meeting strain".

4.3 Comprehensive Video Integration (CVI)

Full scale or Comprehensive Video Integration (CVI) is the joining of the Cisco TelePresence with the Microsoft Lync Server environment. This integration is based on the Cisco Video Communications Server (VCS) acting as a gateway, thereby providing a SIP trunk between the fully functioning TelePresence environment and Lync Server. This provides the richest feature set on the market of any video integration with Lync Server.

The benefits of this integration model are explained below and the model is described in detail in chapter 6.

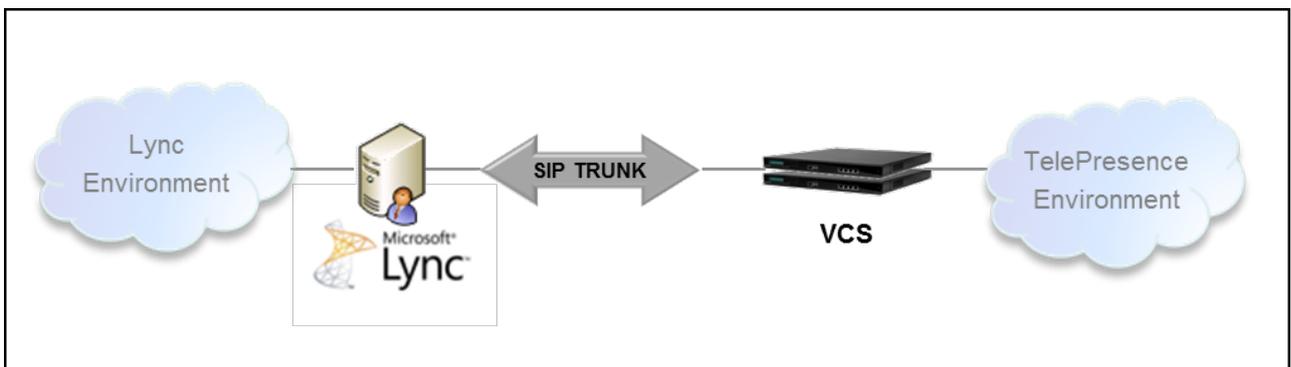


Figure 3: Comprehensive TelePresence Integration - Simplified Network Diagram

4.3.1 The benefits

Bandwidth management

Often referred to as Call Admission Control (CAC), the VCS has comprehensive bandwidth management features which are essential to deploying a robust, reliable TelePresence network: it manages the bandwidth for video calls between the two environments (in addition to the bandwidth for calls within the TelePresence environment).

Single identity - call forking

An important attribute of the Lync Server environment is its support of a Single Identity. This is also a very important attribute of call forking and the FindMe functionality in VCS. VCS supports the Lync Server call forking model and extends it allowing users to have multiple TelePresence devices in addition to their Lync client/devices. Further, the VCS allows users to configure and control which of these devices ring when their Lync address is called. VCS makes it very easy to enable the single identity concept with both Cisco and 3rd party video conferencing endpoints.

Protocol interworking

There are two main voice and video over internet protocols, H.323 and SIP. Lync Server supports a Microsoft implementation of SIP. Many video conferencing systems support H.323; therefore, a converter between SIP and H.323 is required. The VCS is such a converter, providing interworking between the SIP and H.323 signaling protocols, thereby allowing Lync to connect individually to H.323 (“traditional”) video conferencing devices without the need for additional TelePresence components such as a multipoint control unit (MCU). In the Cisco integration with Lync Server, an MCU is only used when a conference is needed.

Password management

VCS is treated as a trusted host to Lync Server; TelePresence devices registered to VCS benefit from this and do not need to be individually authenticated to the Lync Server. This is a big benefit for administrators when maintaining their password management policies minimizing potential administrative issues.

Advanced conferencing experience

The Multiway functionality of VCS is available when there is a Cisco MCU in the network. The Multiway conferencing service allows Cisco endpoints to easily escalate a point-to-point video call to a multiparty conference by calling and connecting to additional users, including Lync clients.

3rd party video conferencing support

VCS supports standards-compliant 3rd party video conferencing equipment, and therefore acts as a gateway for legacy endpoints and network devices to interoperate with Lync Server. The benefits of the VCS integration with Lync Server also apply to these 3rd party endpoints.

Business to Business (B2B) and remote worker video conference connectivity

VCS supports the Cisco solution known as Expressway; an industry-proven, open-standard means of providing secure firewall traversal for audio and video media, easily enabling B2B, branch office and tele-worker connectivity. The Cisco integration with Lync Server allows Lync users to transparently leverage the Expressway solution to connect with customers, partners and remote workers TelePresence systems.

HD Video Support

VCS works with the Cisco Advanced Media Gateway (AM GW). This was the first product on the market to support Microsoft’s proprietary RT Video codec. It transcodes (in real-time) the RT

Video into standards-based H.264. This means that a Lync client can talk VGA or 720p to an open-standards TelePresence or video conferencing endpoint as long as the Microsoft prerequisites are met regarding the system requirements of the Lync client and the VCS has a SIP trunk integration into the Lync Server environment.

Presence enablement

Typically, H.323 video conference systems do not publish presence. VCS has an internal presence engine which can create presence on behalf of video conferencing systems and solutions that would never be able to publish presence to Lync Sever on their own behalf. This is important because it allows:

- ▶ The user to know whether a remote party is available for conferencing or engaged in a call
- ▶ The Lync experience to be transparent (identical) regardless of who or what the user is trying to reach

4.4 Advanced Media Gateway 3610

The Cisco TelePresence Advanced Media Gateway 3610 (Cisco AM GW 3610) is a HD media gateway that enables businesses to maximize the value of their existing video and collaboration infrastructure. Combined with the Cisco TelePresence VCS, the Cisco AM GW 3610 is the first and only network-centric solution that enables true HD communication between Microsoft Lync users and standards-based TelePresence and video conferencing devices. Individuals and teams can now use familiar business tools to collaborate in high definition across the enterprise.

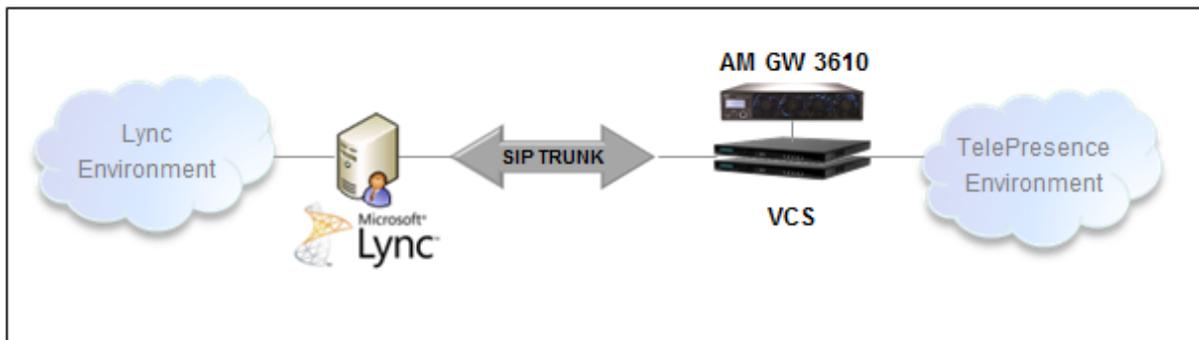


Figure 4: Comprehensive TelePresence Integration with AM GW 3610 - Simplified Network Diagram



Figure 5: Comparison Without and With Cisco AM GW 3610

For capability and configuration information for the Advanced Media Gateway see the [Deployment Guide](#).

Note: There is no difference between how the AM GW interoperates with OCS 2007 R2 and with Lync Server. See the [Roadmap](#) section for advanced supported functionality of the AM GW.

5 Comprehensive Video Integration - details

The integration between VCS and Lync Server is based on a SIP trunk between both environments (see [Figure 3](#)). Leveraging the SIP trunk capabilities of VCS enables the most dynamic combined environment by allowing them to work seamlessly with one another without limiting the unique capabilities of each environment. This section provides additional detail about this SIP trunk and two possible options for how to leverage it in a Lync Server environment. (Refer to the *Cisco Deployment Guide: Microsoft Lync and VCS Control X6* for details on how this trunk is configured.)

There are two elements to the SIP trunk between VCS and Lync Server: the SIP trunk itself and an application which runs on the VCS that uses it (the “OCS Relay”). This application enables additional advanced functionality above that possible with a standard SIP trunk in a Lync Server environment.

In order to leverage the SIP trunk between VCS and Lync Server, there are two main attributes which must be configured on Lync Server.

- ▶ **Trusted Applications:** The SIP Trunk between VCS and Lync Server leverages the Trusted Applications model supported by Lync Server; therefore, the VCS must be configured as a Trusted Application
- ▶ **Static Route:** In order to route calls from the Lync Server environment to the TelePresence environment, a static route can be defined on Lync Server. Lync Server allows the configuration of a static route to the same domain. For more information on this and detailed deployment guidelines and options, see the *Cisco VCS Deployment Guide - Microsoft Lync and VCS Control (X6.1)*.

Tech Tip: The VCS to Lync Server integration makes use of Lync Server routing logic. For this reason it is important to understand the call routing logic of the Lync Server. When the Lync Server receives a call, it checks whether the user is registered to Lync Server. The call is only proxied to the registered Lync user.

- ▶ If the user is not registered but there is an account in AD, Lync Server responds with a 480 Temporarily Unavailable
 - ▶ If the user is not in AD (and therefore not registered to Lync Server) the call is routed through the configured static route
-

5.1 SIP trunk base functionality

This section describes the basic level of functionality provided by VCS over the SIP trunk with Lync Server without the OCS Relay capability enabled. This is provided for customers who wish to enable and test the basic connection between VCS and Lync Server so they know what to expect before enabling the recommended OCS Relay capability for the best level of support and the most scalable solution described later in this chapter.

Basic SIP Trunk functionality includes:

- ▶ Authentication/authorization: AD accounts not required

- ▶ Basic presence: offline and available presence for TelePresence systems registered into the VCS network
- ▶ Protocol interworking: Microsoft SIP to SIP/H.323
 - Enables support for 3rd Party video conferencing systems
- ▶ **Bandwidth management** for calls between VCS and
- ▶ **Video conference feature set**
 - Dual stream support
 - Multiway

5.1.1 Security

5.1.1.1 Authentication/authorization

Many deployments do not have AD accounts configured for TelePresence endpoints. The SIP trunk between VCS and Lync Server allows these devices to be easily integrated into Lync Server environment with minimal additional configuration.

Example

An organization is trying to integrate their existing TelePresence network with their Lync Server deployment. The video conferencing network is deployed as conf.room@video.fictbiz.com and their Lync Server deployment is configured as first.last@company.com

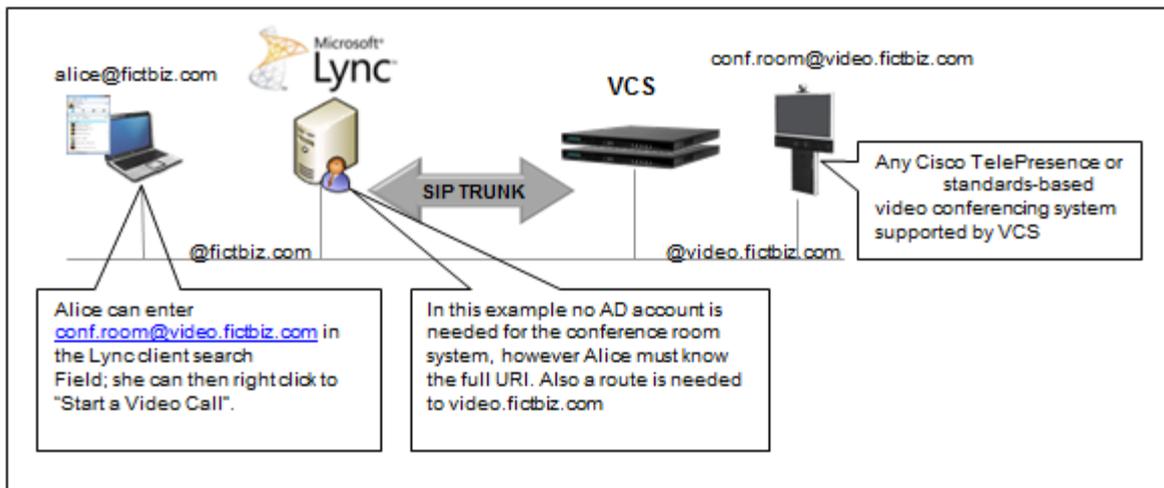


Figure 6: TelePresence to Lync Server Integration - AD Accounts Not Required

The organization configures their VCS to interface with Lync Server and defines a static route on Lync Server to interface with VCS. This configuration allows calling between Lync and the conference room in both directions.

The above case is an example of a multiple domain deployment. The VCS also supports single domain deployments. (The section on the Advanced capabilities of the SIP trunk covers how to leverage AD accounts in the integration so that users do not need to be aware of the multiple domains and can take advantage of the Lync search capabilities.)

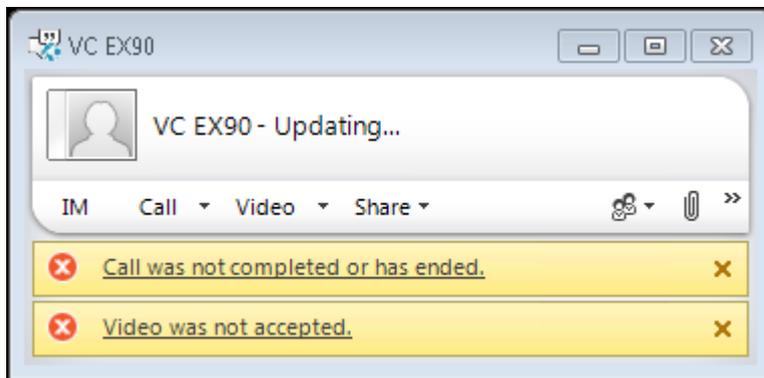
5.1.1.2 Signaling encryption (TLS vs. TCP)

Where the Lync gateway VCS communicates directly to a Lync Server Director or Front End Server (FES) (that is, not through a Hardware Load Balancer) using TCP in the initial deployment can facilitate functional verification and troubleshooting. Certificate creation, loading and then enabling TLS can be carried out after the system is operational. If hardware load balancers front end the Lync Server system, it is recommended that TLS is used from the outset. In general Cisco recommends using TLS in final deployments: the certificate creation guide and the VCS deployment guide lead you through to a successful TLS installation. See the [Reference](#) section of this document for further information on these guides.

5.1.1.3 Media encryption (SRTP)

Currently both Cisco and Microsoft have implementations of the SRTP (Secure Real Time Transport) protocol for encryption of media (that is, encryption of the audio and video traffic). These implementations are interoperable with the Enhanced OCS Collaboration license key for the VCS on version x6 and later. If this is the case, set encryption to “Required” on the Lync Server Front End Servers (which means encryption is turned on). Cisco recommends this implementation in order to allow all calls (Lync to Lync or Lync to TelePresence) to be encrypted.

Tech Tip: The Lync Server is delivered with the Front End Server encryption policy set to “Required”. While the Lync client has its encryption setting as “best effort” by default the Front End server setting has precedence; therefore this is all that is needed to force encryption in a Lync environment. However, some organizations also leverage a Group Policy object to set the registry on the client machine to “require” encryption as well. Cisco is not recommending this practice, only drawing attention to it in order to help with troubleshooting when there is a security mismatch.



If there is a security incompatibility when calling between Lync and the TelePresence environment over the Cisco VCS Gateway integration with Lync Server, check the following:

-Using PowerShell: type “Get-CsMediaConfiguration” and check if EncryptionLevel is set to SupportEncryption as it should be.

```

PS C:\Users\administrator.LYNC> Get-CsMediaConfiguration

Identity           : Global
EnableQoS          : False
EncryptionLevel    : SupportEncryption
EnableSiren        : False
MaxVideoRateAllowed : Hd720p15M

PS C:\Users\administrator.LYNC>

```

If EncryptionLevel is set to “RequireEncryption” (the default value), it can be changed typing `New-CsMediaConfiguration -EncryptionLevel SupportEncryption`. For additional information and full details, see the *Cisco VCS Deployment Guide - Microsoft Lync and VCS Control (X6.1)*.

5.1.2 Presence/Contact search

The Cisco VCS supports **SIP** for **I**nstant **M**essaging and **P**resence **L**everaging **E**xtensions (SIMPLE) for presence. With the base SIP trunk between VCS and Lync Server, the “offline” and “available” call states are supported via standards-based SIMPLE interoperability. Lync Server has implemented a variation of the SIMPLE protocol when it comes to the “in call” presence state; therefore, “in call” presence is not supported.

With the basic SIP trunk between VCS and Lync Server, Lync users must enter the entire name/address of the user/room that they are trying to connect to if that user/room does not have a valid AD account.

Tech Tip: Lync leverages AD to search for users. Because the basic SIP trunk between VCS and Lync Server does not require an AD account for the TelePresence system, the Lync user must enter the entire name of the video system they are trying to reach. After the name has been entered in Lync, the contact can be added to the Contact list like any other contact and called like any other contact (right click and select Start a video call).

The OCS Relay function of VCS supports both the “in call” presence state and actual search from Lync; *although this is called OCS Relay it is fully compatible with Lync integrations*—another reason why Cisco recommends that the basic SIP trunk capabilities between VCS and Lync Server be used only for initial set up and testing, as well as to understand the interworking between VCS and Lync. However, the recommendation is to leverage the OCS Relay function of VCS which provides advanced capabilities over the basic SIP trunk capabilities. OCS Relay is described later in this document.

Tech Tip: In a “Lync Gateway” deployment, enable the VCS presence server for the OCS Relay / Lync Domain on the Lync Gateway VCS.

5.1.3 Basic SIP trunk summary

The implementation of the basic SIP trunk as outlined in this section enables the core integration capabilities between the VCS and Lync Server. After the SIP trunk is in place, the VCS can be used for the following Lync scenarios:

- ▶ Basic presence indication of TelePresence systems in Lync (offline and available)

- ▶ Point-to-point calling to/from Lync to TelePresence systems regardless of protocol, including:
 - Immersive TelePresence
 - Multipurpose TelePresence
 - Personal TelePresence systems
 - External H.323 video conferencing systems
- ▶ Multiparty conferences on standards-based MCUs
- ▶ TelePresence system calling to PSTN via Lync-based audio gateway
- ▶ Bandwidth management for the above call scenarios

These scenarios are covered in more detail in the CVI use cases chapter.

5.2 SIP trunk advanced capabilities - OCS Relay

VCS contains an application called “OCS Relay”; which provides advanced functionality in addition to the basic SIP Trunk between VCS and Lync Server. Although called OCS Relay, it is fully compatible with Lync integrations.

OCS Relay allows TelePresence systems which are registered into the VCS environment to have their registration “proxied” into Lync Server allowing TelePresence systems to appear as Lync clients to the Lync Server. This provides several benefits, which are described in more detail later in this document:

- ▶ Simplifies password management on TelePresence endpoints
- ▶ Support for contact search from Lync
- ▶ Single identity support
- ▶ Improved presence support

Tech Tip: OCS Relay requires additional configuration, as described in the Configuration Guide and a valid AD/Lync account.

Tech Tip: OCS Relay works in both a “same domain” and “separate domain” configuration. In both cases OCS Relay enables the appearance of a single domain as far as the Lync user is concerned.

The following diagrams show how OCS Relay is used for both the personal device and conference room scenarios. OCS Relay can be extended to any SIP or H.323 registration on VCS; for example, Immersive TelePresence systems and conferences hosted on an MCU. This is very useful when enabling 3rd party devices with Lync Server, as well as for older video conferencing systems which only support H.323 and may never be able to register directly with Lync Server.

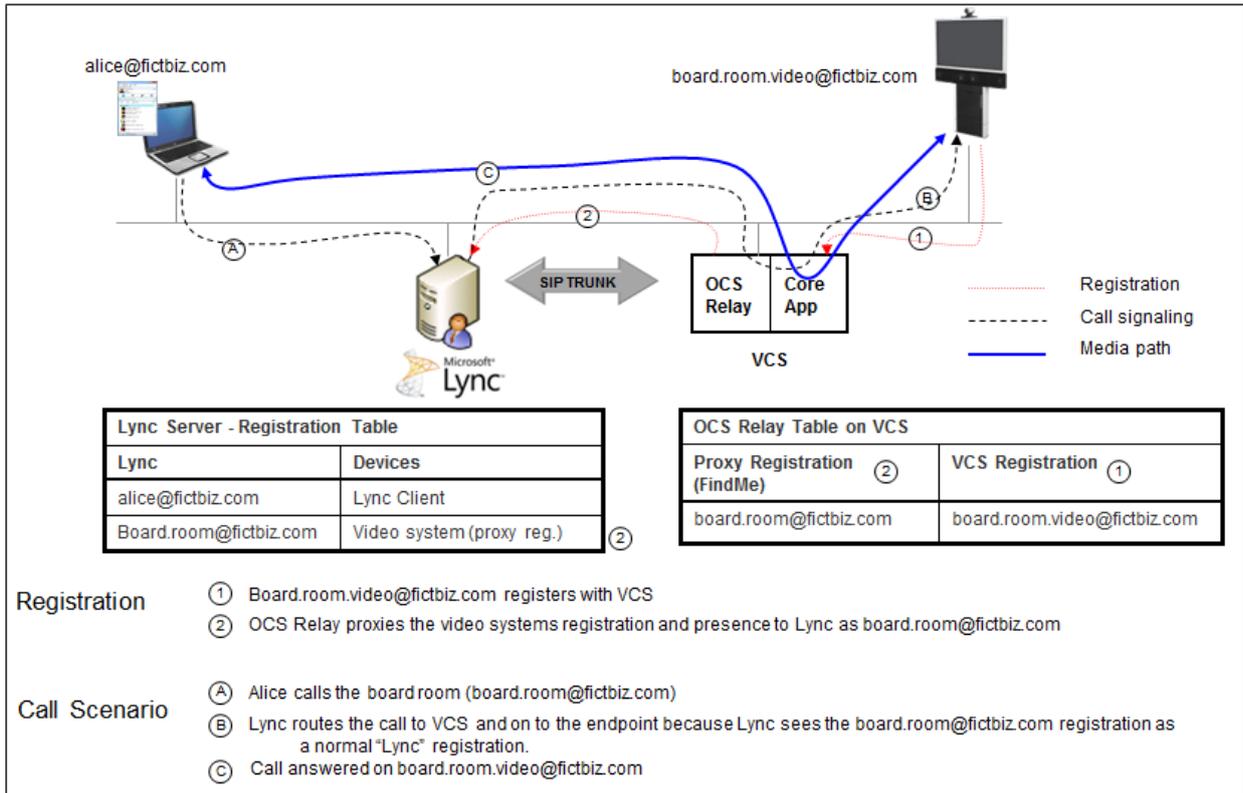


Figure 7: OCS Relay - Conference Room Model

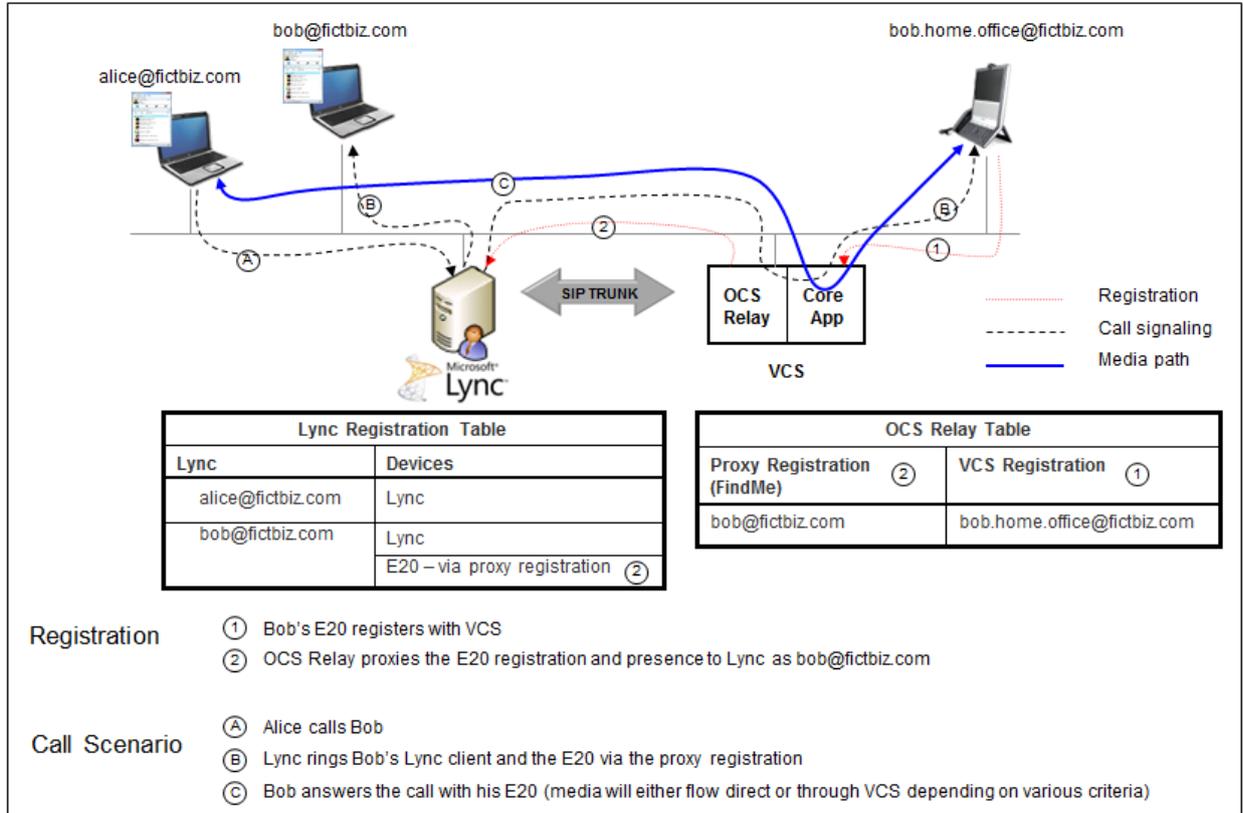


Figure 8: OCS Relay - Personal System and Single Identity Support

5.2.1 Simplified password management - authentication/authorization

The Individual registration model (which isn't supported by Cisco) requires that the video conferencing devices register and authenticate directly with the Lync Server, which can present some administrative challenges. Often organizations have password expiration policies that require users to reset their passwords at a set interval. This is common practice and easily adhered to in a PC environment; however, it may present issues when video conferencing devices are registered individually to Lync Server because most video conferencing devices often do not provide a user interface that is conducive to accessing and changing passwords. This has traditionally been the domain of the video conferencing equipment administrator.

The VCS provides a better approach to password management, leveraging the Trusted Host relationship with Lync Server. Both personal TelePresence systems and Multipurpose TelePresence systems may be registered with VCS and then the OCS Relay proxies their registration into Lync Server making them appear like any other Lync registration without the need to administer password credentials on the video conferencing systems themselves. Note there are authentication mechanisms which may be employed between the endpoint and VCS. (See the Cisco endpoint and VCS Administrator guides for additional information.)

5.2.2 Presence/Contact search

The VCS's OCS Relay application has three key elements relating to presence:

- ▶ Implementation of the Lync Server enhanced presence model
- ▶ Support for single identity
- ▶ Presence aggregation

There are described below in turn.

Enhanced presence model

The OCS Relay application on VCS leverages the Lync Server Enhanced Presence Model. Implementation of the model simplifies configuration of the corresponding Lync account; there is no need to disable "enhanced presence" for these accounts, and doing so limits user functionality provided by Lync Server.

Single identity

The notion of a "single identity" is a very important paradigm in Unified Communications. Microsoft has a function called MPOP (Multiple Points of Presence): the ability for the Lync Server platform to support multiple devices registered as a single user. For example, MPOP allows a user to be logged in on Lync on two different PCs as well as running Lync on any other compatible device or platform. The presence from all three devices is then aggregated by Lync Server and calls to this user are forked to all three devices, as appropriate. VCS supports a similar call forking mechanism based on its FindMe functionality. The OCS Relay ties these "single identity" mechanisms together, allowing users to have both Lync devices and TelePresence devices under one single identity in the combined Lync Server and VCS environment.

When OCS Relay is enabled and configured, the accounts which have been registered to Lync Server via the OCS Relay have valid AD accounts. Therefore searching for these users is just like searching for any other valid contact from within Lync: just start entering the name in the search field and Lync does the look up. This applies to both personal TelePresence users and Multipurpose TelePresence systems. For personal TelePresence users, the Lync URI is found and there is no indication whether the user has a corresponding OCS Relay

registration. This is the normal and correct behavior because it allows the user to have a single identity regardless of what devices may be associated with the user. Then it is possible to initiate a video call to that user and the called party is able to answer the call on the device that is most convenient, possibly a PC with a USB camera or their Cisco TelePresence endpoint.

Presence aggregation

The use of OCS Relay also has deployment benefits: when OCS Relay is implemented, the TelePresence systems publish presence to the Lync Server. It is then the responsibility of Lync Server to manage presence subscriptions from Lync clients. OCS Relay leverages the Lync Server for managing and distributing presence across the organization.

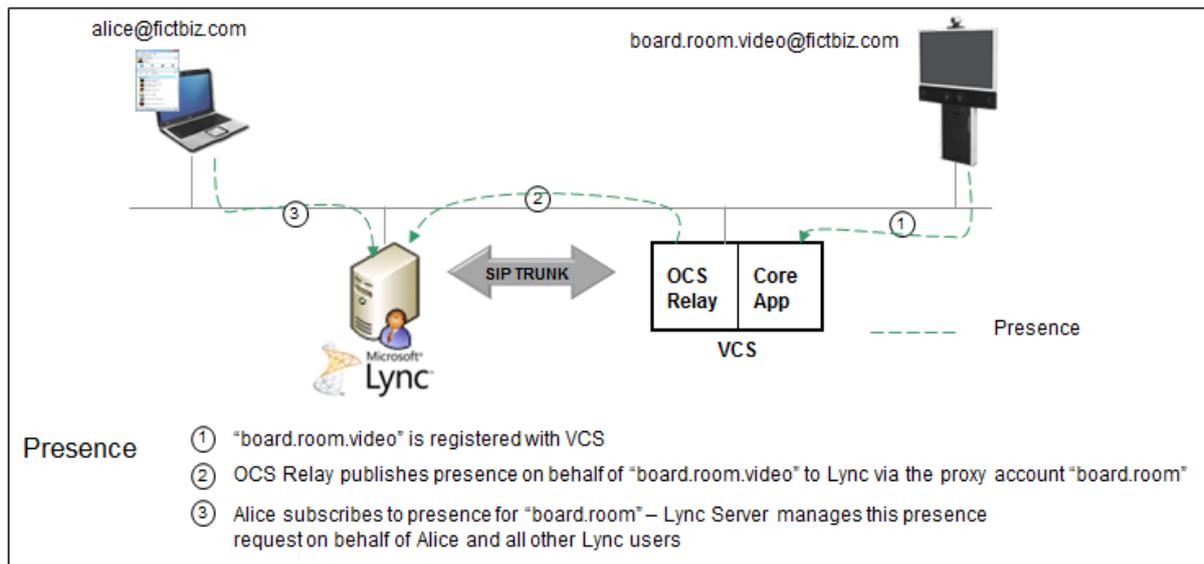


Figure 9: OCS Relay and Presence Aggregation

5.3 Integrated architecture - VCS considerations

There are two main VCS architecture options for integration with Lync Server.

- ▶ **Recommended architecture** based on a separate VCS environment serving as the gateway to Lync Server, called the "Lync Gateway" in this document.
- ▶ **Simplified architecture** based on enabling the Lync Server gateway functionality on the VCS environment, which also acts as the VCS Control for the TelePresence environment.

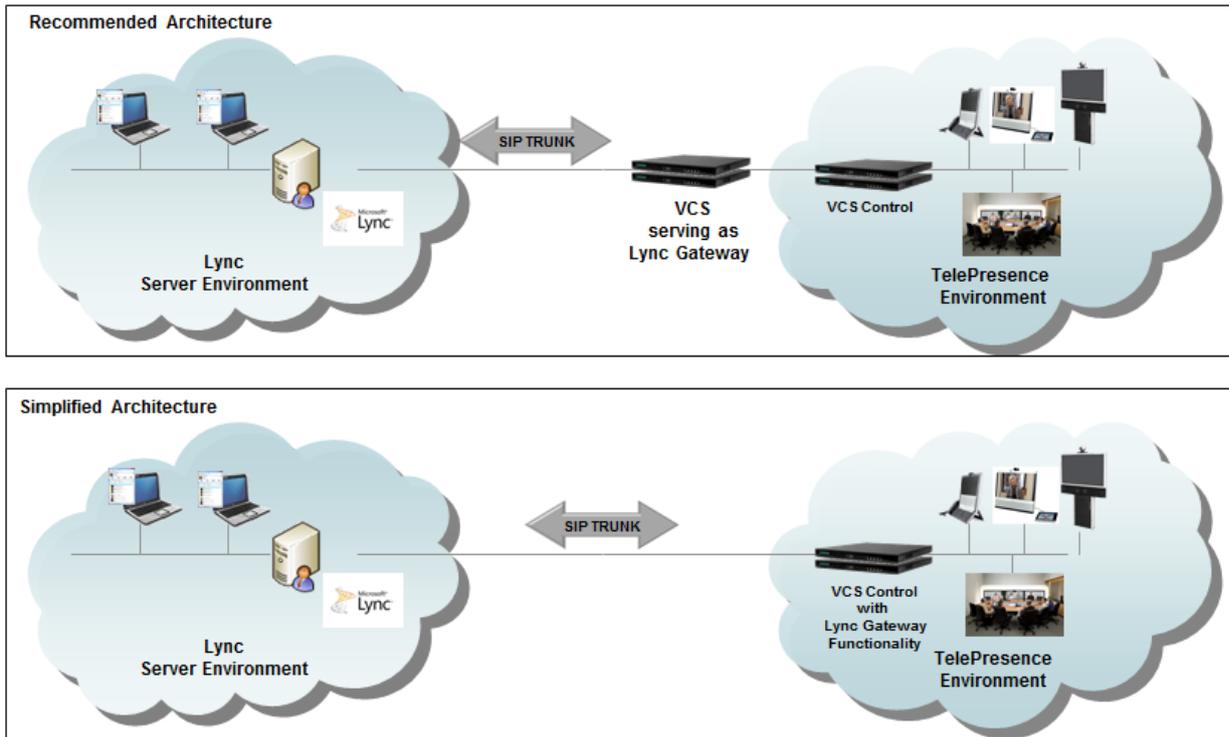


Figure 10: VCS Architecture Options

Consider the following benefits of a dedicated VCS acting as a Lync Gateway when determining the architecture for a given deployment.

Simplified administration

- ▶ All Lync-related functionality is running on a dedicated VCS environment
- ▶ All TelePresence call control is running on a dedicated VCS environment
- ▶ Limits the number of “trusted devices” configured on Lync Server
- ▶ Simplifies “domain” support between the Lync Server environment and the TelePresence environment

VCS license utilization

Lync Server interworking requires that all calls are interworked and therefore routed through the VCS in order to modify the Microsoft signaling to work with the standards-based TelePresence and video conferencing environment. This means that VCS must have Call Routed Mode set to “Always”. Because in a typical TelePresence deployment, Cisco recommends Call Routed Mode be set to “Optimal” in order to make the most efficient usage of the call licenses, a separate VCS environment acting as a Lync Gateway is recommended.

Presence propagation

A separate VCS environment acting as the Lync Gateway which is configured as the TelePresence network’s presence server allows the Lync Gateway to handle the subscriptions and presence requests from Lync Server for the TelePresence network. This prevents presence requests from having to propagate through the TelePresence network.

Advanced configuration

The OCS Relay function leverages a configuration tool on the VCS known as CPL (Call Processing Language). CPL is also used on VCS for advanced functions such as defining policy for ISDN gateway usage or the policy for compliance recording of TelePresence calls. It is often difficult to combine CPL for various functions; therefore, enabling a separate VCS environment to act as a Lync Gateway provides separate CPL scripts for the appropriate portions of the network.

See the *Cisco Deployment Guide: Microsoft Lync and VCS Control X6* for:

- ▶ Additional information behind the importance of a dedicated VCS environment acting as Lync Gateway, specifically the section, *Why add an Lync Gateway VCS Control*
- ▶ Architecture implications of the Microsoft Director server, specifically the appendix, *VCS and Microsoft Lync Director*
- ▶ Architecture implications of hardware load balancers in the Microsoft Lync Server environment, specifically the section, *VCS and hardware load balancers in front of a bank of FES*

6 Comprehensive video integration (CVI) use cases

The following use cases are based on an environment configured with OCS Relay. The diagram below depicts the elements required in the solution for the various call scenarios: not all elements are required for all call scenarios.

Note: The VCS Control shown in this diagram has been simplified for the purpose of illustration: the VCS Control image represents both a VCS environment acting as the Lync Gateway and the VCS Control for the TelePresence network.

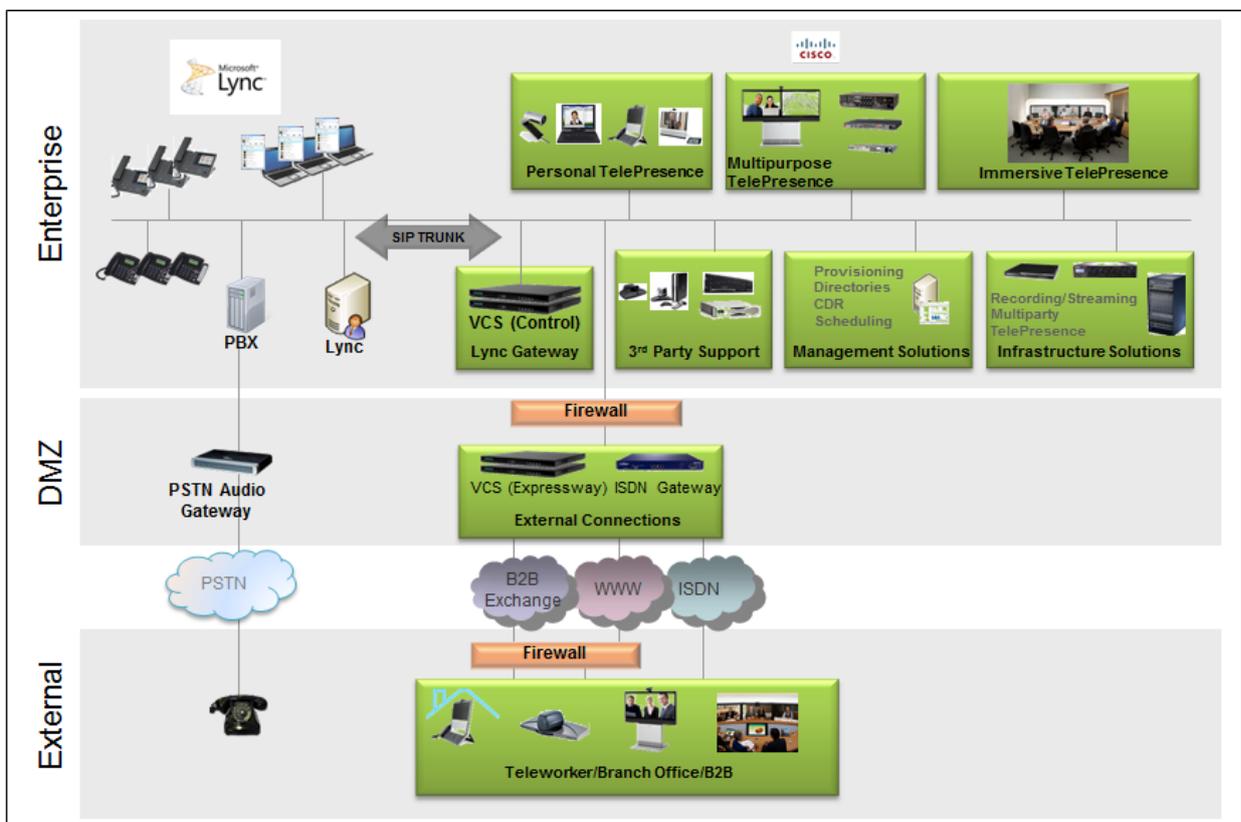


Figure 11: Example CVI Architecture

6.1 Lync to Multipurpose TelePresence

This model extends the reach to any standards-based video conferencing system supported by VCS. These can be SIP- or H.323-based video conferencing systems (Cisco TelePresence and 3rd party video conferencing equipment), and the Lync Gateway model removes these protocol complexities from the end user allowing them to use the interface that they are familiar with.

In order to make a TelePresence call from Lync to a Multipurpose TelePresence endpoint, users:

- ▶ Search for the Multipurpose TelePresence system, if it is not already in the user's Contact list.

- ▶ Right-click on the Multipurpose TelePresence system contact.
- ▶ Start the TelePresence call.

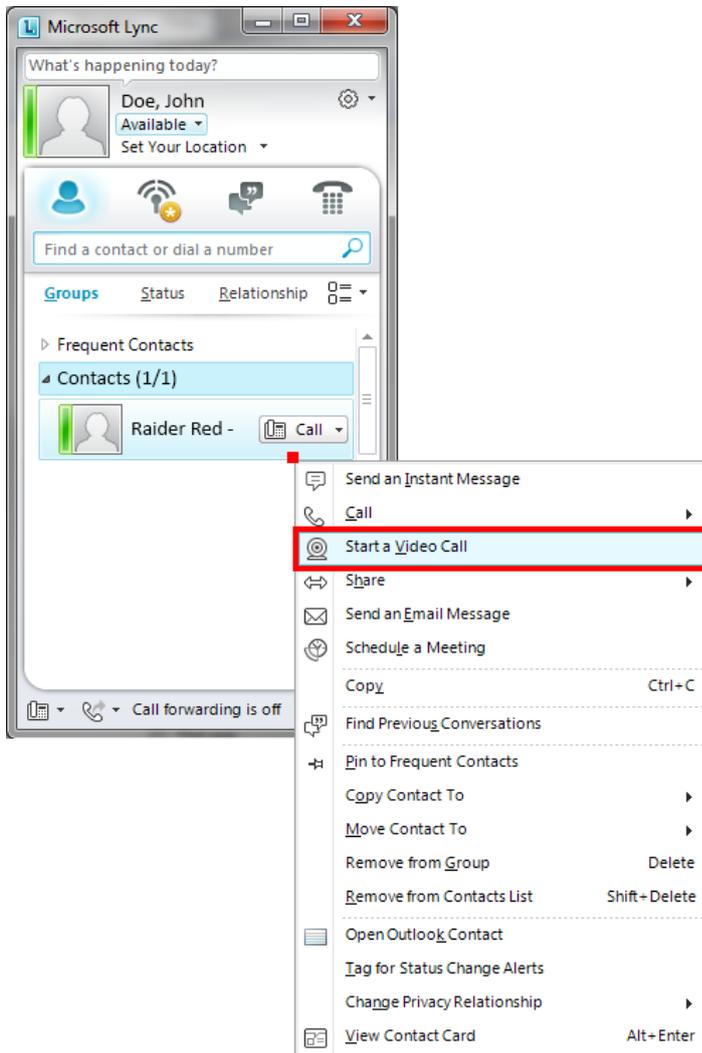


Figure 12: Calling from Lync

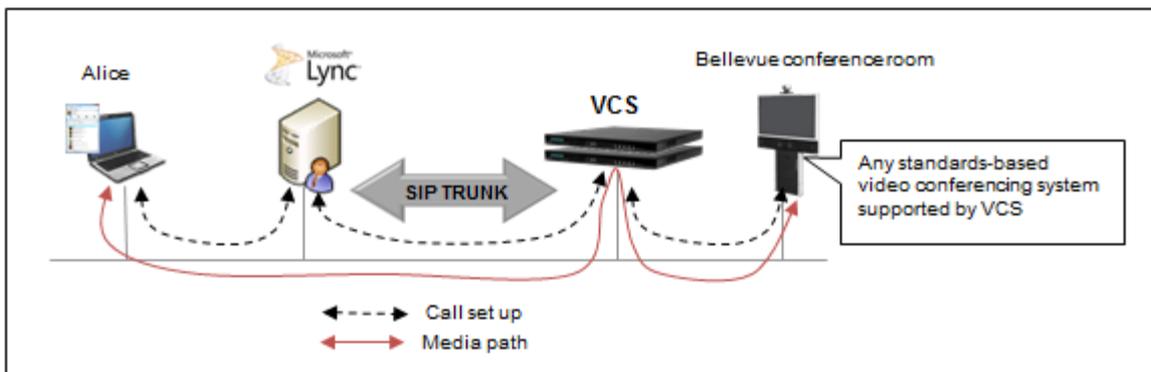


Figure 13: Lync to/from Multipurpose TelePresence

Note: The figure shows the media path going through the VCS. In a basic end-to-end SIP call (that is, one in which the Multipurpose TelePresence system supports SIP), the media path goes directly between the Lync client and the TelePresence system. In all call scenarios in which interworking is required, the media traverses the Lync Gateway VCS so it performs the necessary interworking. (An example of an interworked call scenario is Lync to H.323 video conference systems.)

When leveraging the media encryption between the environments (SRTP) using the Enhanced OCS Collaboration license on the VCS (fully compatible with Lync), SRTP call media also passes through the VCS. For most flexibility, Cisco recommends setting supported encryption on the Lync Server; for full details see the *Cisco VCS Deployment Guide - Microsoft Lync and VCS Control (X6.1)*.

When users on the Multipurpose TelePresence endpoint want to call a Lync user, they search for the address of the Lync user in the TelePresence system's directory. This applies to all standards-based video conference systems supported by VCS. (Populating directories on TelePresence systems is discussed in the section Management and directories.)



Figure 14: Photo of a Contact in the Directory on a Cisco EX90 Endpoint (inTouch Panel)

6.2 Personal system (MPOP) calling scenario

In the typical Personal TelePresence system scenario, a user has a Cisco TelePresence system such as the EX60, EX90 or the E20 on their desk. (Note: the VCS integration allows any TelePresence device to be used as a personal system; for example, some executives have their own personal large screen system in their office such as the MX200.) The device is often also used as their phone replacement because it can provide audio-only calling in addition to business-quality video performance in high definition.

Reasons why users have a dedicated TelePresence system on their desk in addition to running Lync on their PC include:

- ▶ The ability to provide a “Personal TelePresence” experience
- ▶ Dedicated screen real estate to TelePresence participants leaving the PC screen for content
- ▶ Dedicated processing leaving the PC to be used for processing intensive data activities
- ▶ Always-on functionality and reliability: no PC is required

When calling a user with both a Lync client and a Cisco Personal TelePresence system, the calling party does not need to know what devices the callee has: they simply call the individual. The call is forked to both the Lync client and the TelePresence system. Typically, the user answers the call with the Personal TelePresence system when in the office. When on the road, the call can be answered with the Lync client.

This model extends the reach of this scenario to any standards-based video conferencing system supported by VCS. These can be SIP- or H.323-based video conferencing systems and the Lync Gateway model abstracts all of these protocol complexities from the end user allowing them to use the interface that they are familiar with.

The figure below shows the following call scenario:

- ▶ Alice finds Bob in the Contact list.
- ▶ Alice right-clicks on Bob to start a video call.
- ▶ The call rings on Bob's PC with Lync and on the EX90.
- ▶ Bob is in the office; therefore, he answers the call on the EX90.

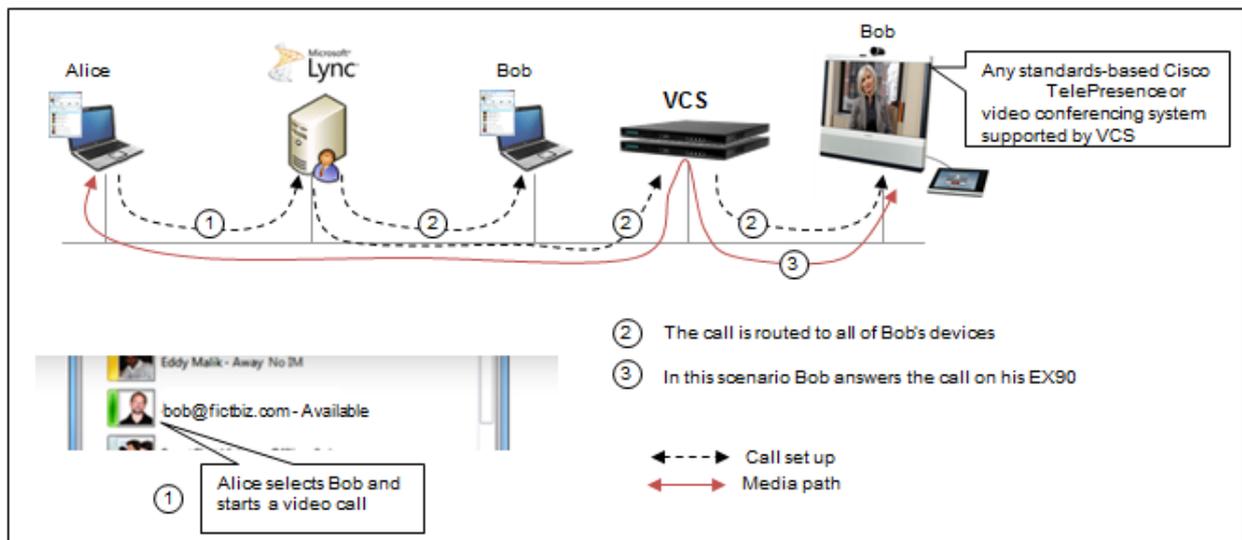


Figure 15: Personal TelePresence System (MPOP) Calling Scenario

6.3 Lync to/from external H.323/SIP TelePresence system calling (Expressway)

The same user experience of calling from Lync to a TelePresence system (Multipurpose or Personal) can also be extended to home office workers with a TelePresence system, and to other organizations that have TelePresence solutions.

These external connectivity scenarios are made possible with the Cisco Expressway solution. Expressway is a secure and standards-based mechanism for firewall traversal. A full description of Expressway is at

http://www.cisco.com/en/US/prod/collateral/ps7060/ps11305/ps11315/ps11337/data_sheet_c78-626491.html

6.3.1.1 Home office worker with a TelePresence system

In the following example Bob has an E20 in his home office. When Alice tries to reach Bob she doesn't need to know anything about Bob's communications capabilities; she need only search for Bob in the Lync contact list, right-click on the contact name and select Start a video call. If Bob happens to be in his home office he can take the call on his E20.

Conversely, Bob can use his E20 in his home office to call anyone in his organization by using the directory on the E20. This will also route back through the Lync Server and can ring a Lync user. See below and note that TMS is required for e20 directories and with the Lync integration in place TMS also will require Active Directory synchronization.

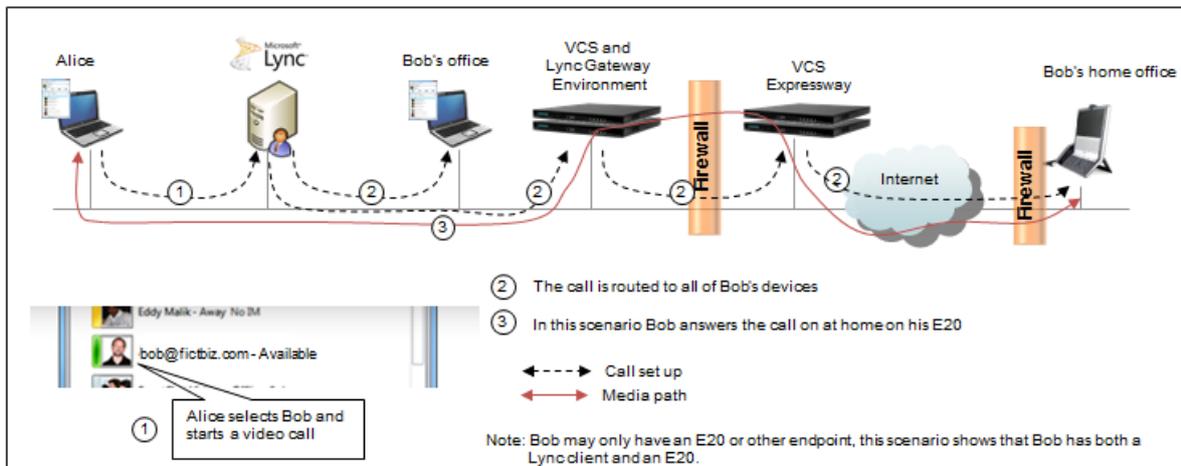


Figure 16: Home Office Worker TelePresence System Connectivity

6.3.1.2 Connecting with an external organization's TelePresence system by URI dialing

Another scenario that the Lync Gateway and Expressway solution enables is the ability for Lync users to call directly to TelePresence systems in other organizations by entering the full URI of the external organization's Multipurpose TelePresence system or Personal TelePresence system; for example: boardroom@widget.com.

The Lync user does not see presence for this external system because there is no presence capability for the external party's TelePresence system; however, this contact can be added to the user's Lync Contact list just like any other contact and the user can right-click on the entry to make a video call.

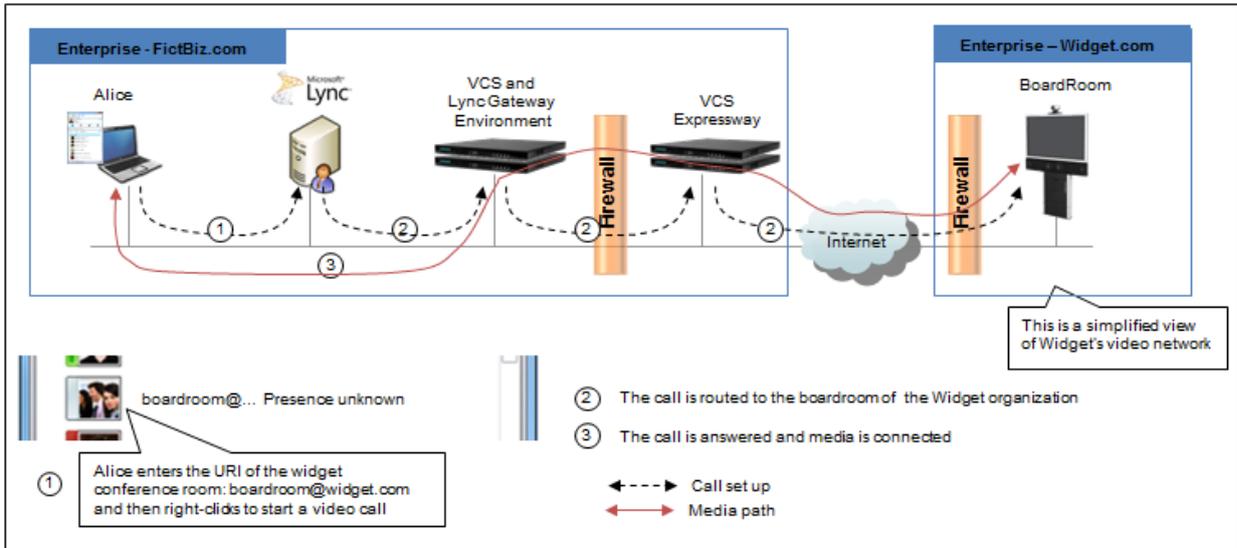


Figure 17: External Organization TelePresence Connectivity by URI Dialing

Tech Tip: The domain of the external company needs to be configured in the Lync route table to ensure that the call is routed via the Lync Gateway.

6.3.1.3 Connecting with an external organization's video conference system by IP dialing

Many organizations still have their TelePresence systems outside their firewall on a public IP address, or in the DMZ and also reachable via a public IP address. The Lync Gateway and Expressway solution enables Lync users to connect to these systems by dialing the IP address of the external party with a domain that has been configured in Lync Server for this external calling scenario.

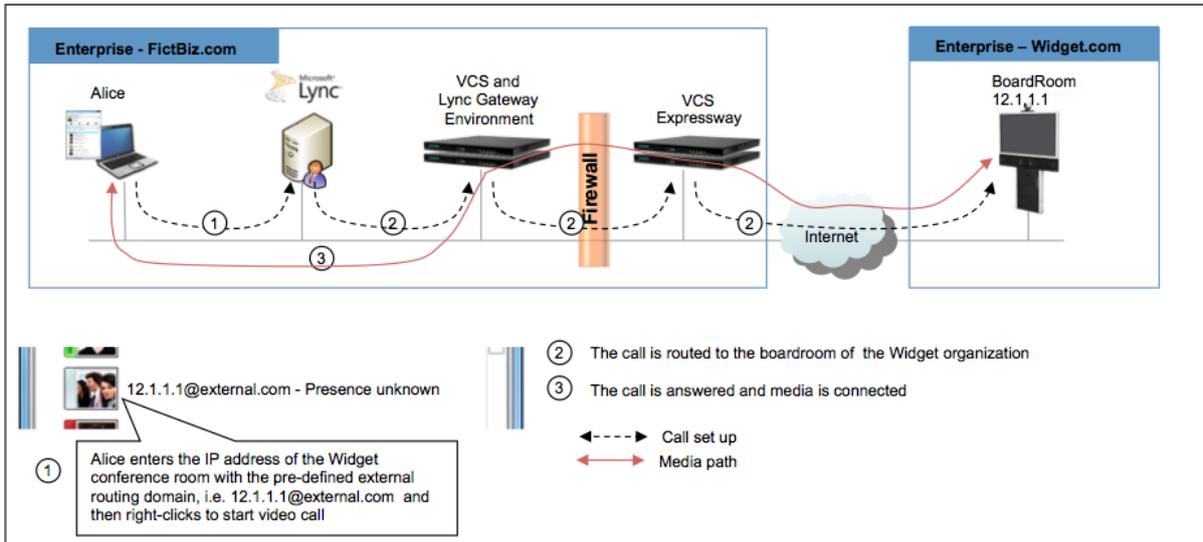


Figure 18: External Organization TelePresence Connectivity by IP Dialing

For example, it is possible to configure a route in Lync Server to the domain “external.com”. If the Lync user needs to reach a partner or customer who provided an IP address of 12.1.1.1, the user would enter 12.1.1.1@external.com in Lync and right-click to start a video call. This routes

the call to the Lync Gateway VCS which is provisioned to strip the domain and then route the call over the public internet to 12.1.1.1.

Tech Tip: A fictitious domain for external IP calling needs to be configured in the Lync Server route table to ensure that the call is routed via the Lync Gateway. Also, the Cisco VCS environment needs a transform to remove the domain and route the call to the public IP address.

Example: dial IP<IP Address>@external.com to dial <IP Address>

VCS Transform: IP(\d+\.\d+\.\d+\.\d+)@external.com→\1

Search rule for local zone:

Source = Any

Mode = anyIPAddress

Target zone = local zone

6.4 Lync call features

The Lync Gateway supports additional Lync call features with Cisco endpoints registered to the VCS. It is possible that some of the following functionality works with 3rd Party endpoints; however, this is beyond the scope of this document and should be verified with the individual 3rd party endpoint manufacturer. The additional Lync call features include the following functions when initiated from the Lync client.

- ▶ Call transfer
- ▶ Call forward
- ▶ Call redirect
- ▶ Call hold/resume
- ▶ Audio and video mute
- ▶ Audio and video pause

Note: Redirect: VCS provides loop detection. If a call comes from the VCS side of the solution and is redirected back to the VCS side of the solution, VCS blocks this scenario and the redirect fails. This is done in order to prevent endless call loops.

Note: Additional configuration may be required to leverage the above features. For example, in order to redirect an incoming call to Lync, the numbers which the call can be redirected to must be pre-provisioned. Also, the dial plan needs to be established between the TelePresence network and the Lync environment.

6.5 Multiparty calling with Cisco endpoints

Several of the Cisco endpoints (EX Series and C Series devices for example) support a feature called Multisite. Multisite is the ability for the TelePresence system to host a multiparty call, similar to the second and third line conferencing capability of many phones.

Multiple Lync users can call into the TelePresence system or the TelePresence system can call out to multiple users. The call process is the same as that described previously in this document when calling between Lync and a TelePresence system in that each Lync user starts a video call

with the TelePresence system, the TelePresence system calls out to each Lync participant, or some combination. The Multipurpose TelePresence endpoint manages the multiple connections and the combined video image showing all participants.

Refer to the Cisco endpoints datasheet and Administrator guide for more information on the number of sites which may be hosted in a multisite call as well as the video layouts supported.

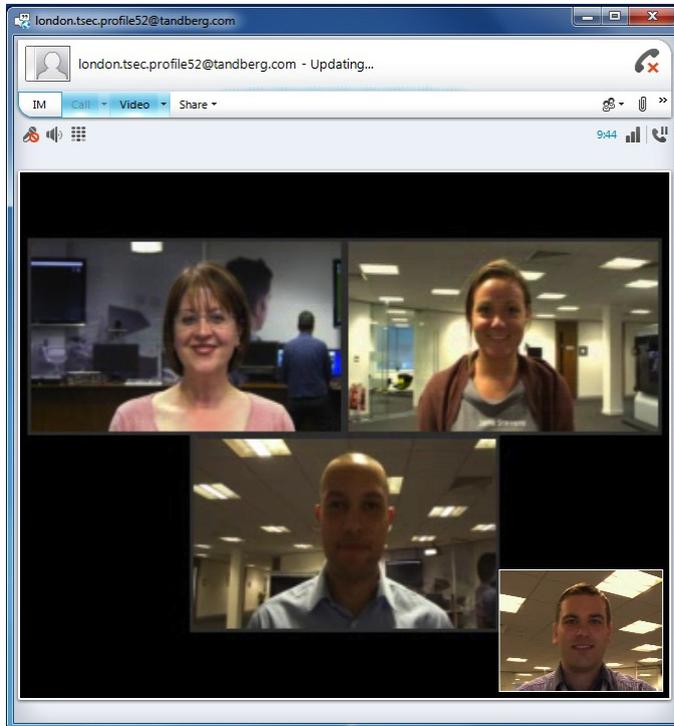


Figure 19: Lync in a Multiparty Call Hosted on a Cisco MCU with the Lync Client Self-view Feature Turned On (Bottom Right).

6.6 Lync to/from ISDN video calling

The TelePresence environment still consists of large number of systems which use the ISDN network. Organizations that have migrated to IP for TelePresence often have an ISDN video gateway that allows their IP-based TelePresence systems to connect with remote sites, partners, and customers who have ISDN-based video conferencing systems. This is very similar to the migration to VoIP, much of which still uses a PSTN-based audio gateway for external connectivity.

The Lync Gateway allows IP-based Lync users to leverage the Cisco ISDN Gateway to make and receive video calls from remote sites, partners and customers that have ISDN video conferencing systems.

Note: Minimum software load for this functionality on the Cisco ISDN Gateway is Release 1.5.

6.6.1 Outbound calling from Lync to an ISDN video system

The Lync user dials the ISDN address of the external party with a domain that has been configured in Lync for this external ISDN calling scenario. For example, it is possible to configure a route in Lync to the domain “@ISDN.com”. To reach a partner or customer who has provided an ISDN video conferencing number, the Lync user enters [15558675398@isdn.com](tel:15558675398@isdn.com) in the Lync

client and right-clicks to start a video call. This routes the call to the Lync Gateway VCS which is provisioned to strip the domain and then route the call to the ISDN video gateway and out over the public ISDN network.

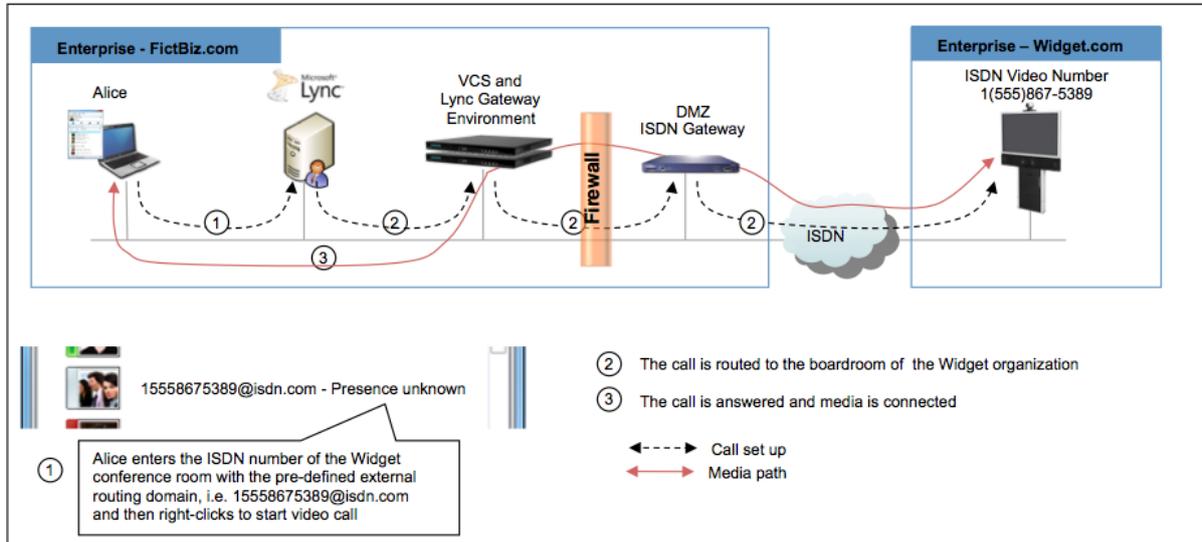


Figure 20: Calling ISDN Video Systems from Lync

Note: A fictitious domain for external ISDN calling needs to be configured in the Lync Server route table to ensure that the call is routed via the Lync Gateway. Also, the Cisco VCS environment needs a transform to remove the domain and route the call to the Cisco ISDN Gateway.

6.6.2 Inbound calling to Lync from an ISDN video system

Inbound calling from the ISDN network to a Lync client is more complex than the outbound scenario. It is important to consider the Lync audio number plan; probably DID-based (Direct Inward Dial) numbers have been assigned to the Lync users. If this is the case, this number space is occupied and it is not possible to get the same numbers for ISDN inbound calling.

Therefore, Cisco recommends leveraging IVR-based dialing when calling Lync users. An inbound ISDN caller dials the number of the ISDN Gateway. They are prompted to enter the extension of the party they are trying to reach (the pre-assigned audio number for the Lync user).

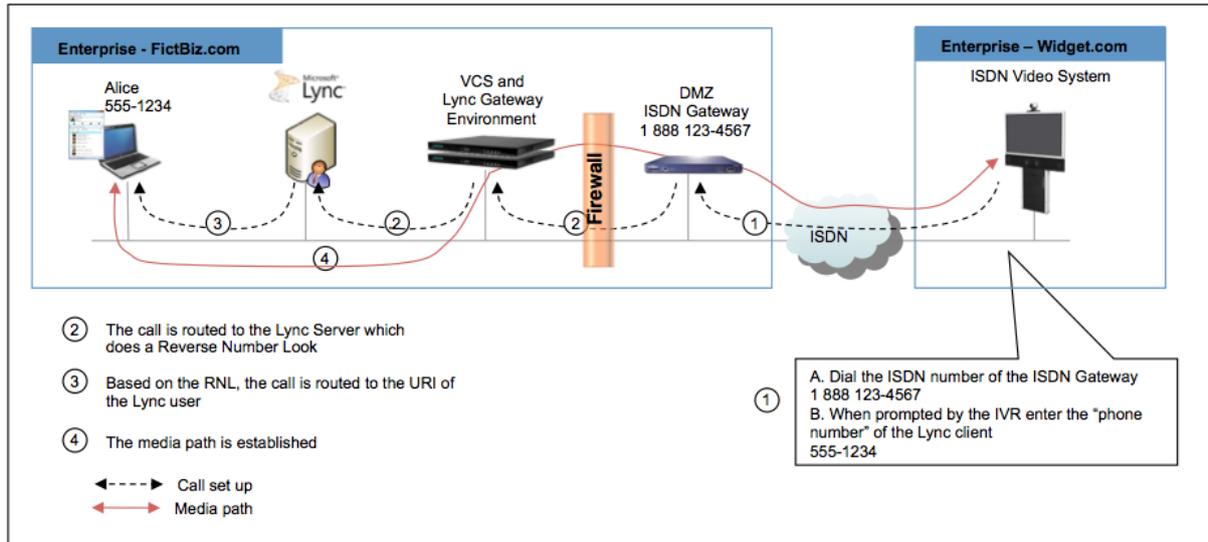


Figure 21: Calling Lync from an ISDN Video System

6.7 Immersive TelePresence

The Cisco Immersive TelePresence solution can be added to the overall integrated solution, as described in this document. It can be used to make/receive calls to/from Lync in the same manner as previously described in this chapter for typical Multipurpose TelePresence systems. A Cisco Immersive TelePresence endpoint appears to Lync like any other TelePresence endpoint; equally, to the Cisco Immersive TelePresence endpoint, a Lync client is just another video endpoint.

That being said, the Cisco Immersive TelePresence solution has some additional functionality which provides the industry's best integration between Lync and an Immersive TelePresence system. When a Lync client is connected to the Cisco Immersive TelePresence solution, the Lync user is not treated as a "second class" participant in the conference: the Lync user sees all other members of the conference.

A critical element to the Cisco Immersive TelePresence solution is the Cisco TelePresence Server. This is an application-specific MCU for Immersive three-screen TelePresence that provides the industry's most robust offering for multipoint TelePresence conferencing and interoperability.

The Cisco architecture for integrating from VCS to Lync Server via a SIP trunk makes it easy to add the Cisco Immersive TelePresence solution (Multipurpose TelePresence and the TelePresence Server) to a Lync Server environment.

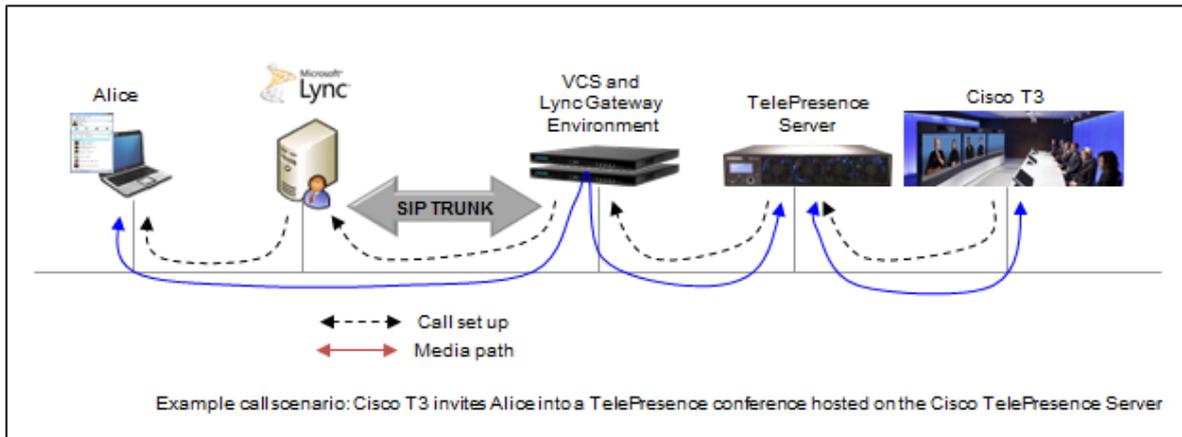


Figure 22: Immersive TelePresence Integrated with Lync Server

The typical use case for connecting a Lync client to a point-to-point or multiparty TelePresence conference is for the Immersive TelePresence room to call out to the Lync user. (TelePresence conferences are typically a “high value” event and, as a result, are often scheduled. A Lync user is often a last minute addition to the meeting, typically due to being a subject matter expert.) It is possible for Lync users to call individually into a Cisco Immersive TelePresence system; however, this is beyond the scope of this document.

The following call scenarios are a representative, rather than exhaustive, list of call scenarios possible between the Cisco Immersive TelePresence solution and Lync.

- ▶ Single CTS 3010 to briefer (see the note below)
- ▶ Single CTS 3010 to multiple briefers
- ▶ Point-to-point CTS 3010 plus a call out to one or more briefers.
- ▶ Multiple CTS 3010 and T3's in a conference with one or more briefers

Cisco's flagship TelePresence product is the CTS 3010 and is shown below. Cisco also offers the T3 (shown overpage).



Figure 23: Cisco CTS 3010 Immersive TelePresence System



Figure 24: Cisco T3 Immersive TelePresence System

Note: Cisco uses the term “briefer” when talking about TelePresence interoperability with standards-based video conferencing. A briefer is a standards-based video conferencing endpoint or Lync client that is connected into a TelePresence conference.

The term distinguishes between devices with true TelePresence functionality (TelePresence environment etc) and the myriad of other possible video devices that may be connected to a meeting (both HD-capable systems as well as standard definition solutions.)

6.8 Conferencing

6.8.1 Conferencing background

The Lync Server environment provides multiparty video conferencing capability via the Microsoft AVMCU (Audio/Video Multipoint Control Unit). Currently, the Microsoft AVMCU does not interoperate with any standards-based video conferencing endpoints because:

- ▶ The Microsoft AVMCU only supports the proprietary Microsoft RT Video (Real Time Video) video codec. The video conferencing industry supports the standard H.264 video codec.
- ▶ The Microsoft AVMCU requires the endpoint connecting to it to support CCCP for conference generation and initiation. This is a proprietary signaling mechanism which works with other proprietary mechanisms such as focus factory. For full details, see the Microsoft documentation.

Note: While RT Video is a proprietary Microsoft video codec, in order to provide interoperability between the video conferencing industry standard of H.264, Cisco has licensed RT Video from Microsoft and the AM GW provides transcoding between RT Video and H264 at both VGA and 720p. For more information see: <http://www.cisco.com/en/US/products/ps11345/index.html>

Additional items to note about the Microsoft AVMCU and why a Cisco MCU can add value in a Lync Server environment are:

- ▶ The Microsoft AVMCU only supports the “voice switched” conferencing mode. Voice-switched conferencing is a term used to describe a multi-party video conference in which only the active speaker is visible to the other participants. This is in contrast to “continuous presence” or “Hollywood squares” in which multiple (typically all) participants are visible simultaneously. (See below for more information)
- ▶ The Microsoft AVMCU only supports RT Video - CIF at 15FPS and VGA up to 30FPS (but typically lower), whereas the Cisco MCU is capable of resolutions up to HD at full frame rate. Also note that the participants in the conference all use the lowest common denominator, so if 10 people are in the conference and 1 person is on a single core machine only capable of CIF at 15FPS, everyone will get CIF at 15FPS with Microsoft AVMCU

6.8.1.1 Voice-switched versus continuous presence

Typical views are shown below.



Figure 25: Active Speaker View



Figure 26: Four-way Continuous Presence

Continuous presence conference views are often a hybrid of the voice-switched and continuous presence views (see below) with the active speaker being switched into the large image known as a “pane” but other participants are also visible. In the video industry this is still referred to as a continuous presence view.



Figure 27: 7+1 Continuous Presence

6.8.2 Conferencing call scenarios

The Lync Server platform does not provide a mechanism to “replace” the AVMCU with a 3rd Party MCU such as the Cisco MCU (in which case the user scenario for conference creation would be identical regardless of MCU). Given this condition, the Cisco MCU must integrate with the Lync Server solution differently than AVMCU; and the result is a slightly different user model for conferencing on a Cisco MCU compared to on the Microsoft AVMCU.

Note this document does not cover any call scenarios based on the Microsoft AVMCU; see the Microsoft documentation for that detail.

The following call scenarios define how the Cisco MCU can be used in a Lync Server environment. The Cisco integration with Lync Server via the Cisco VCS and the Comprehensive Video Integration model provides four main mechanisms for multiparty conferencing support:

- ▶ Scheduled conferencing
- ▶ Pre-provisioned conferencing (Virtual Conference Room)
- ▶ Ad hoc conferencing
- ▶ Multiway (conference initiation from Cisco endpoints only)

These are described in turn.

6.8.2.1 Scheduled Cisco MCU conferences with Lync

The Cisco TMS software suite has a scheduling component which can be integrated with Microsoft Exchange allowing users to book meetings directly from their Outlook calendar. The Cisco integration synchronizes the calendar between Exchange and TMS, allowing TMS to automatically launch the call at the scheduled date and time. Full coverage of the Cisco Exchange integration is beyond the scope of this document, see the Cisco TMS documentation on the Cisco web site.

The remainder of this section focuses on scheduling directly from TMS.

TMS allows users to book TelePresence systems as well as “users”. The following image shows the TMS booking interface and the selection of users. It is possible to reserve ports for inbound callers, similar to how users call into an audio bridge. TMS can be configured to send an email to

the meeting organizer with the necessary conference information including dial-in information. This information can then be forwarded to the required participants.

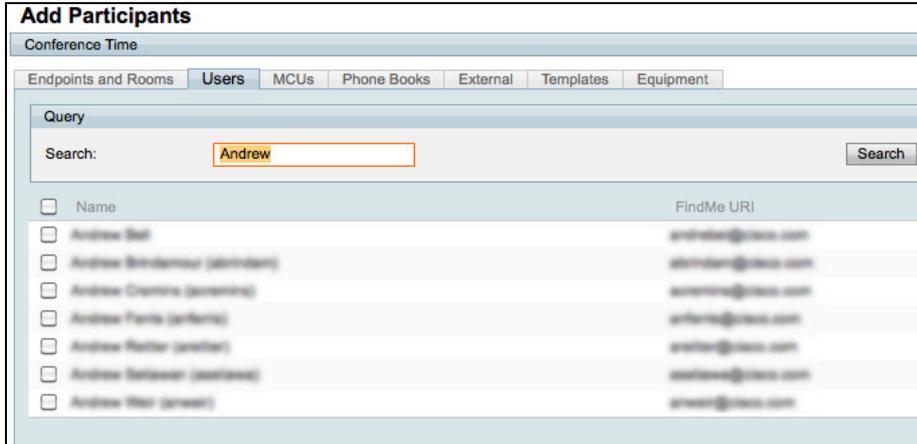


Figure 28: Adding Lync Users when Scheduling a Multiparty Conference in TMS

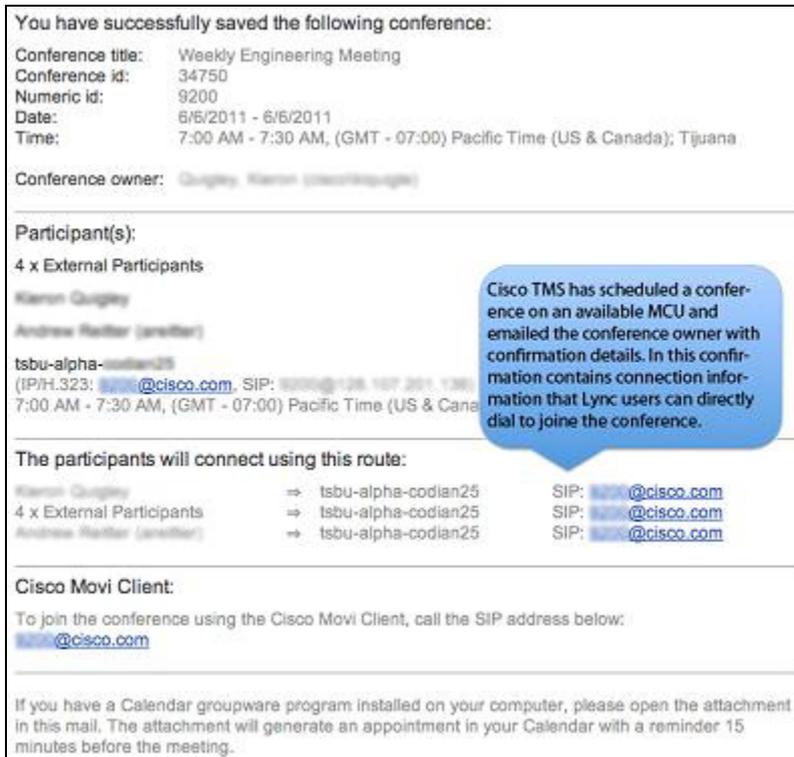


Figure 29: Example TMS Confirmation Message with Connection Information

At the time of booking Cisco TMS verifies that the necessary conferencing resources will be available at the scheduled time and reserves these resources.

At the time of the scheduled meeting, TMS automatically sets up the conference and dials out to the numbers (conference rooms and or users), which were selected at the time of booking. In addition, TMS allocates the specified dial in ports allowing participants to call into the meeting from either a TelePresence system or from their Lync client.

6.8.2.2 Pre-provisioned conference (virtual meeting room)

The concept behind this conference option is to emulate the conference room experience, albeit virtually. The Cisco MCU is pre-provisioned with conferences. These conferences are given AD accounts and configured with OCS Relay so they can show “in call” state presence.

The end users are informed of the name range for these virtual meeting rooms. For example, the marketing team may have the following virtual meeting rooms:

MarketingMeetingRoom1

MarketingMeetingRoom2

MarketingMeetingRoom3

The marketing team could then create a group in their Lync Contact list for their virtual meeting rooms. When a group of users needs to collaborate they can look in their Contact list, see which virtual meeting room is “Available” and agree to meet in that virtual meeting room. Each Lync user then makes a video call into that room. Equally, a group of users in a physical conference room can look up that virtual meeting room in the directory and also call into the meeting. The team is then all connected in that virtual meeting room on the Cisco MCU and they are able to collaborate visually with a mix of Lync clients and standards-based video conferencing systems.

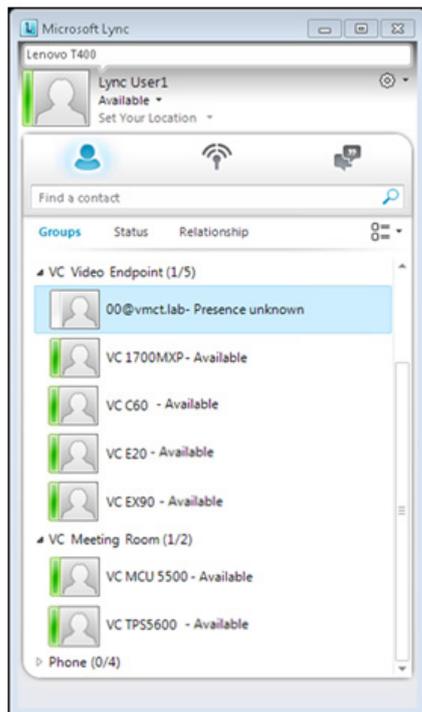


Figure 30: Example Contact List with a Group of Virtual Meeting Rooms

6.8.2.3 Ad hoc Cisco MCU conference

A third approach to conference integration supported by the Cisco integration with Microsoft Lync Server is to allow for ad hoc conference creation on the Cisco MCU and “on the fly” conference creation from a Lync client or TelePresence system.

The Cisco MCU supports an ad hoc conference mechanism that is outlined in this section (refer to the MCU documentation on the Cisco web site for more details).

The Cisco MCU can be provisioned to match on a pattern and create a conference if the pattern is matched - or to direct a user to the appropriate conference if the pattern is matched and a

conference has already been started. Note that the Lync Server environment also needs to be configured to route calls to the VCS based on the same pattern match.

Example

Alice is chatting with Bob and Charlie and they agree that a video call would be better. Alice sends an IM to Bob and Charlie asking them to call her at her personal meetme conference number (nothing more than a number prefix followed by her unique phone extension, for example 55 8675389). The Cisco MCU is configured for ad hoc conferencing on the pattern match of 55.

When the first user calls 55 8675389, the MCU recognizes the 55 pattern as an indication to create an ad hoc conference. Before creating the conference the MCU checks whether 8675389 already exists as a valid conference; if not, the MCU creates a conference with a unique ID of 8675398. When the next user calls 55 8675389 a new conference is not created because the Cisco environment recognizes that 8675389 is already a valid conference; instead, the user is connected to this conference. Both Microsoft Lync users and users of standards-based video conferencing systems can call the 55 8675389 number to join Alice's meetme conference.

This mechanism provides a scalable means to add multiple Cisco MCUs to a mixed Lync Server and TelePresence environment. It allows an organization to start with one MCU and add MCUs as more ports are needed, while leaving the user experience untouched.

OCS Relay is not used for this ad hoc conferencing model. The ad hoc conferences are created and removed on the fly as they are used. Not using OCS Relay means that AD accounts are not needed, which allows for a dynamic ad hoc conference creation environment.

6.8.2.4 Multiway

The fourth conference mechanism supported is based on the Cisco feature known as Multiway. Multiway is a feature that allows Cisco video conferencing endpoints (MXP, C Series and E20) to easily escalate a point-to-point call into a multiparty call with three or more participants. It leverages the Cisco MCU for ad hoc multiparty conferencing without the need for pattern matches or scheduling.

Only Cisco TelePresence endpoints can initiate Multiway calls, however Lync clients can be called.

Two main Multiway scenarios for a Cisco TelePresence endpoint in a call with another endpoint or Lync are:

- ▶ Placing the initial call on hold, calling another endpoint/Lync and then conferencing all three sites together, which moves all participants to a multiparty conference on the Cisco MCU
- ▶ Receiving a call from another endpoint/Lync. The Cisco TelePresence endpoint can place the first call on hold, answer the second call and then join both participants in a conference hosted on an MCU

6.8.3 Call policy enforcement - bandwidth limited calls

The bandwidth of the calls in the use cases outlined in this section can be controlled via the call policy functions of the VCS. For example, an enterprise deployment may have a branch office with a Cisco TelePresence endpoint in the conference room. The branch office is connected to the corporate network over a limited bandwidth connection such as a T1/E1. In order to preserve bandwidth for data activities over this connection, the VCS can be configured to allow a maximum of 768kbps of bandwidth for video calling. In this case, two 384kbps calls would be allowed over the connection; a third call would not be allowed. This is done to ensure that:

- ▶ The video calling adheres to the applied policy rules
- ▶ The quality of the existing calls is maintained

It is possible to configure the VCS to allow more than two 384kbps calls over the pipe, it was just an example. The actual configuration is based on the customer's objectives and policies.

The benefit of the VCS integration with Lync Server is that when calls go between the Lync client and a TelePresence environment with the VCS acting as a Lync Gateway, then the VCS call policy can be enforced for those calls.

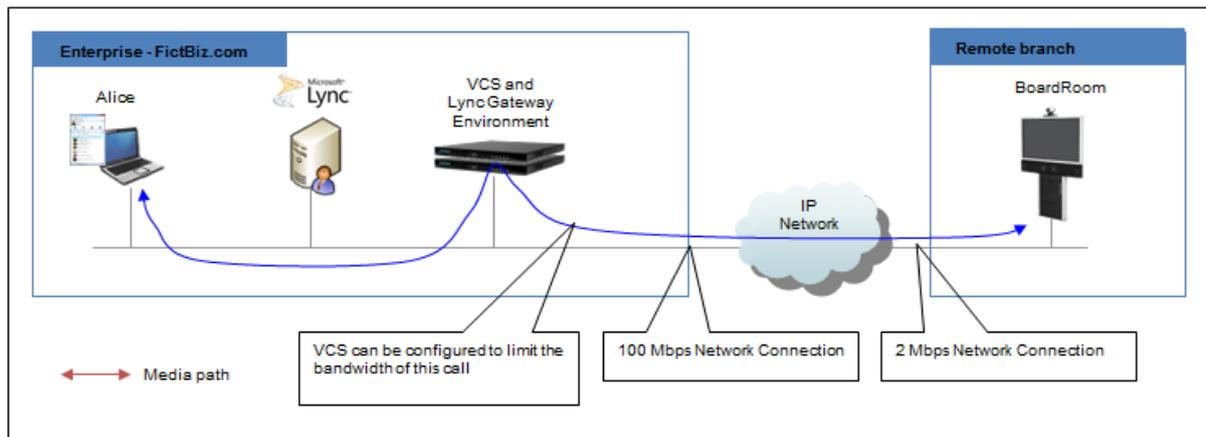


Figure 31: Main Office and Branch Office Connected with a Bandwidth Policy in Place

7 Deployment preparation

7.1 Required Cisco software versions

The following software versions are required:

- ▶ VCS X6.1 or later
- ▶ TMS 12.5 - when using VCS Clustering in X5 and FindMe, otherwise earlier versions of TMS may be acceptable. See the TMS documentation for the devices it supports.
- ▶ MCU 3.0 and later
- ▶ ISDN Gateway (1.5)
- ▶ AM GW v1 or later

8 Solution limitations

8.1 Calling scenarios not supported

The following call scenarios are not supported with the current integration:

- ▶ External Lync clients
 - Lync users must be on the network, either physically or via VPN, for video calling to work between Lync and the TelePresence solution. There is no interoperability with the Microsoft AV Edge server technology at this time. (The roadmap section indicates when Cisco will be supporting MS ICE for external connectivity.)
- ▶ Microsoft Conferencing (AVMCU)
 - Today there is no support for interoperability with the Microsoft Audio/Video MCU, therefore if a video conferencing endpoint is invited into an AVMCU conference it will not connect with video. However with MS ICE and RTV enabled (ICE on the VCS roadmap – see the [Roadmap](#) section) and RTV on the AM GW, this limitation will be addressed.
- ▶ Data collaboration via LiveMeeting or Desktop Sharing
 - The video conferencing industry supports standards known as H.239 over H.323 and BFCP over SIP; mechanisms to share content in a second video stream. The Microsoft model does not support these standards and the video conferencing space does not support the LiveMeeting or R2 based Desktop sharing mechanism.
 - It is possible to share content via BFCP/H.239 from a video conferencing system in the Cisco solution while that same PC can be connected to a Live Meeting data collaboration session in which the content will be shared with the Live Meeting participants. All participants can be connected via audio and video into the Cisco MCU.

9 Understanding HD video calling with Lync

It is important to understand how Lync operates in order to ensure the user is getting the experience they expect from the Cisco PrecisionHD USB camera or any camera with the Lync client. Refer to the PrecisionHD USB Camera documentation at:

<http://www.cisco.com/en/US/products/ps11334/index.html>

Microsoft requirements for supporting HD video

- ▶ The Lync Server software ships with HD video disabled by default. The administrator must enable support for HD video on the Front End server.
- ▶ The Lync client requires a PC with a quad-core CPU in order to support HD video. If the user's PC is dual core, Lync will support a maximum resolution of VGA, and if it is a single core it will only support CIF resolution video.
- ▶ When a call is initially established with the Lync client, it is in CIF resolution by default. The user must select the appropriate video window size to enable HD. Note that the "small" window supports CIF, the "medium" window supports VGA and the "large" window supports HD.
- ▶ Support for HD video in Lync uses the Microsoft proprietary RT Video codec only. Therefore interoperability of HD video with any standards-based video conferencing solution requires the video conferencing solution to support RT Video because there is no support for H.264 within Lync. (The TelePresence industry has standardized on H.264 for HD video.)

Appendix A: Roadmap

The Cisco VCS is a major part of the Cisco UC Gateway technology. Cisco will be adding hardware and software to enhance the integration between the standards-based TelePresence environment and Microsoft Lync. The Cisco roadmap is designed around allowing customers to implement the solution today based on the CVI model and then layer-on the added roadmap functionality. For more detailed product roadmap information contact your Cisco representative.

9.1.1.1 External Lync connectivity

Cisco is exploring solutions that will provide interoperability with the Microsoft Access Edge server technology. This will allow an organization to enable their remote Lync clients to connect with the corporate enterprise video conferencing environment without the need for a VPN. Currently early field trials have started and this functionality will be fully supported in VCS x7.

9.1.1.2 AM GW v1.1

AM GW v1.1 will support SRTP alongside the release key available for the VCS. It will also support the external Lync connectivity with VCS x7.

9.1.1.3 CTS Integrations

Cisco is exploring how to bring the traditional CTS line of TelePresence infrastructure and endpoints into the Lync integration. Looking forward to CTS1.9, calling scenarios will be tested using the AM GW and H.264 interoperation.

Appendix B: VCS details

This chapter is a helpful primer on the basic workings of the VCS. This provides an important foundation for understanding the capabilities that VCS enables in a Lync Server environment. This chapter is not intended to cover the VCS in its entirety—refer to additional documentation on the VCS for this.

The VCS is a powerful platform allowing corporate TelePresence environments based on the H.323 standard to continue to operate over H.323 while introducing connectivity to SIP-based environments such as Microsoft's Lync Server platform.

The VCS can be thought of as two core products with several applications and capabilities:

- ▶ At its core, the VCS is both a H.323 gatekeeper and a SIP Server
 - On top of this, VCS does SIP to H.323 interworking, making the VCS a very powerful tool in the video conferencing network by allowing migration from H.323 to SIP
- ▶ The VCS also is a Call Policy server that defines bandwidth rules for a network, and enforces call policy based on those user-defined rules

A couple of applications that run on VCS and work seamlessly together are FindMe and the Office Communications Server Relay:

- ▶ FindMe brings the notion of a PBX-based hunt group to the video conferencing world
- ▶ OCS Relay allows any standards-based video conferencing device which can register with VCS to be proxied into Lync Server making it appear to Lync Server as a Lync client registration.

Finally, the VCS is the Cisco platform for secure firewall traversal: the marketing term for this is Expressway. Expressway is not to be confused with firewall bypass: Expressway traverses the corporate firewall and consequently helps preserve IT policy by not circumventing the corporate firewall.

In summary, the VCS provides:

- ▶ H.323 gatekeeper
- ▶ SIP server (registrar/proxy and more)
- ▶ SIP to H.323 interworking
- ▶ IPv4 to IPv6 interworking. (Note this was not addressed in this document; refer to the VCS references in the References section.)
- ▶ Call policy server - bandwidth management
- ▶ FindMe - FindMe follow-me type functionality
- ▶ Lync Server integration via OCS Relay
- ▶ Firewall traversal platform
- ▶ Conference factory (Multiway). (For additional information, refer to the VCS references in the References section)

Appendix C: References

See the following documents on www.cisco.com for additional information.

VCS

This list shows the more relevant documents for Lync Server integration:

- ▶ Cisco VCS Administrator Guide (X6.1)
- ▶ Cisco FindMe User Guide (X5)
- ▶ Cisco VCS Deployment Guide - Microsoft Lync and VCS Control (X6.1)
- ▶ Cisco VCS Deployment Guide - Certificate creation and use with VCS
- ▶ Cisco VCS Deployment Guide - Multiway Deployment (X5)

Telepresence Management Suite (TMS)

This list shows TMS-related documentation:

- ▶ Cisco Telepresence Management Suite v12.2 Administrators Guide
- ▶ Cisco Conferencing eXtensions for Microsoft Exchange Administrator Guide

MCUs, Endpoints and Cameras

In addition you can search for Cisco endpoint, MCU and PrecisionHD USB Camera documentation at the aforementioned site.

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