

Video Conferencing with Microsoft Lync

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The video conferencing industry is in the midst of its third large scale transformation since its founding 30 years ago. The first such development was the shift from proprietary protocols and algorithms to ITU industry standards in the 1980s; the second fundamental shift took place at the end of the 20th century as customers shifted from public switched ISDN networks to video conferencing over IP. Both of these shifts drove dramatic increases in deployments because they made video conferencing more interoperable, more affordable, and ultimately, more capable of delivering higher performance audio and video. Now the industry is going through an equally important evolution that promises to make video conferencing far more usable and far more integrated into the enterprise workflow. Welcome to the age of unified communications.

Unified Communications Overview

While there is no universally accepted definition for unified communications (UC), it is safe to say that UC is not a specific product or service, but rather a concept in which a single user interface is used to access a variety of communications modalities – presence, instant messaging, telephony, and audio/video/web conferencing – on an ad-hoc basis. The UC interface can be a separate communicator application, or the UC capabilities can be embedded into other business applications such as CRM or ERP systems as well as contact centers and team workspaces. UC technologies also allow communications to be embedded in websites and custom dashboards. The fundamental paradigm is “click-to-communicate” or “click-to-collaborate.” An important point to keep in mind is that UC represents the platform for the next generation of software-based communications solutions and these solutions will impact the enterprise by dissolving the silos between communications capabilities, modalities (voice, video, text), and desktop workflow applications.

Microsoft and Unified Communications

Microsoft is playing a leading role in the UC market, affecting the direction of products, services, and technologies, a dynamic that began with the company’s introduction of Microsoft Live Communications Server 2003, continuing with Microsoft Office Communications Server, and most recently, with the November 2010 introduction of and evolution to Microsoft Lync.

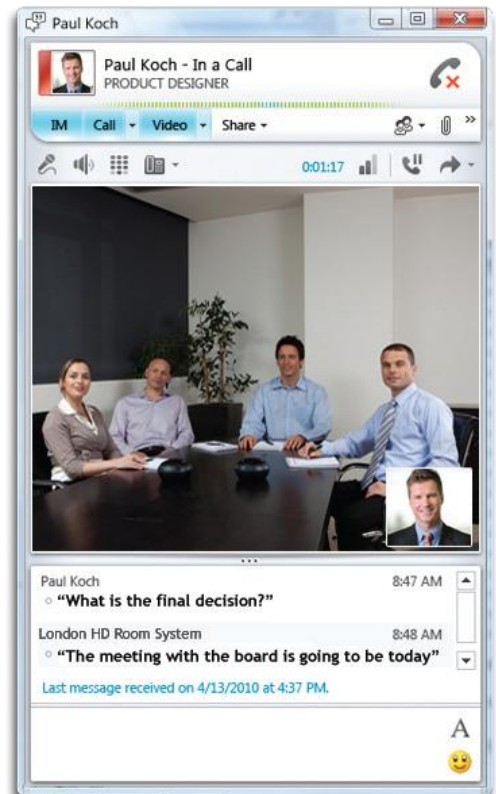
Lync is a real-time communications server that provides the infrastructure for enterprise instant messaging, presence, file transfer, peer-to-peer and multipoint voice and video calling, application and content sharing, ad-hoc and scheduled conferences along with PSTN connectivity through appropriate gateways. These features are available within an organization as well as between organizations and can be implemented via on-premises equipment as well as through hosted service providers. Lync treats all of these features and functions as rich media communications running on the IP network and unites them through a single user interface based on identity and presence.

Since implementing UC solutions, customers have discovered that benefits fall into four main areas.

- ❖ **Faster decision making and improved productivity:** Rich presence information helps employees find each other and choose the most effective way to communicate. Instead of e-mailing documents back and forth, workers can rely on real-time

collaboration through a combination of voice, video, and desktop sharing. By integrating UC into the business workflow, decision making delays can be reduced or eliminated. Faster decision making is a key contributor to higher efficiencies and profitability. For geographically dispersed teams, group chat can enable efficient, topic-specific, multi-party discussions that persist over time.

- ❖ Identified cost savings: Cost savings stem from three areas. 1) Consolidating messaging, voicemail, conferencing, and telephony systems into an integrated UC platform reduces hardware, software, and IT staff costs. 2) Voice over IP (VoIP) enables communications among geographically dispersed company locations without long distance charges. 3) Integrated voice, video, and web conferencing helps reduce travel costs as well as the cost of third-party conferencing services.
- ❖ Higher revenues due to increased customer responsiveness: Whether through UC-enhanced Web sites or via one-click call routing and management features, rich presence information can help ensure that sales and support opportunities are routed to the right person at the right time.
- ❖ Improved support for mobile and dispersed information workers: Because UC can create a seamless, immersive communications experience; customers can look for benefits in two dimensions. 1) Employees can work efficiently from non-traditional locations, including remote and home offices, thereby freeing up expensive HQ real estate. Many home workers enjoy the benefits of a new work/life balance while being able to support “off-hour” meeting demands. 2) Many information workers today could best be described as “mobile workers.” These can now get access to rich UC tools from anywhere with an Internet connection. An updated Lync mobile client makes joining and managing conferences, searching a global address list, and viewing presence information as easy as being in the office.



Microsoft Lync in a point-to-point call with a standards-based video conferencing room system connected via a gateway

Microsoft Lync - Under the Hood

Lync provides a platform for presence-based voice and video calling as well as for audio/video/web conferencing. In order to support this array of communications, the Microsoft Lync Server 2010 uses a variety of both Microsoft-specific and industry-standard protocols and algorithms for signaling, conference management and media streams. These include:

- ❖ SIP (Session Initiation Protocol) – An IETF (Internet Engineering Task Force) standard signaling protocol for initiating, managing, and terminating sessions between one or more participants, including Internet telephone calls, multimedia distribution and multimedia conference sessions.
- ❖ SRTP (Secure Real-Time Transport Protocol) – An IETF standard protocol that is used in Lync Server 2010 for securely transporting audio and video content.
- ❖ RTCP (Real-Time Control Protocol) – An IETF standard protocol used in conjunction with SRTP to convey information about the signal quality of an audio/video conferencing session to various devices.
- ❖ Real-Time Audio (RTA) and Real-Time Video (RTV) compression algorithms – these are the default voice and video codecs supported by Lync. RTA and RTV were developed by Microsoft for high-definition voice and video. Both codecs have the ability to sense network degradation and to automatically vary the bit rate of the media stream they are sending; they also include forward error correction algorithms. In addition to RTA and RTV, Lync supports other ITU standard algorithms including the G.711, G.722 and G.722.1.C audio algorithms as well as the H.263 video algorithm.
- ❖ CCCP (Centralized Conference Control Protocol) – A protocol for communicating conference creation and control commands from clients to the Lync Server.
- ❖ PSOM (Persistent Shared Object Model) – A protocol for transporting web conferencing content.

Lync as a Video Platform

Many enterprises are looking to UC in general and Lync in particular, as the best solution to integrate visual communications into the enterprise workflow. When the goals are to enable dispersed teams to work together more efficiently and to make better decisions and/or reduce business travel, then implementing video conferencing across the enterprise – from the immersive room system all the way down to desktop video applications becomes a requirement. To make the video deployment successful, it must be as easy and intuitive to use as a telephone. This is where Lync is destined to play a pivotal role – providing a “click-to-communicate” interface that spans all devices from room video systems to desktops, tablets and mobile phones.

Enterprise video conferencing solutions have been available for almost 30 years, and many businesses have made significant investments in video conferencing deployments. The vast majority of these deployments are room-based video conferencing systems utilizing the ITU H.323 standard. These room systems are specifically designed for the conference room environment with cameras that include advanced optics, pan, tilt and zoom capabilities along with display, microphone and speaker systems designed for large room environments. For these thousands of companies, there is a natural desire to utilize their existing and future room-based video conferencing equipment within their Lync environment. However, the video protocols and compression algorithms used natively by Lync are different from those used by the installed base of room systems sold by LifeSize, Polycom, RADVISION, and Cisco/Tandberg, among others. Hence these systems in general do not natively integrate with Microsoft Lync. This brings us to the fundamental options available to customers who want to merge these two visual communications worlds.

Video Conferencing Options within Lync

Let's first look at the video conferencing capabilities within Lync. Microsoft Lync 2010¹, Lync's desktop client, has integrated video conferencing capabilities. This integration enables click-to-call dialing directly from the presence-based directory and makes starting a video call easy. With this conferencing model, users can also start with an instant message and escalate the session as desired to a voice or video call. Ad-hoc communications sessions and functional escalation are some of the key differences between UC-based video conferencing and traditional video conferencing applications. Ad-hoc conferencing works well for desktop deployments, but does not allow video calling to deployed H.323 room systems.

Lync Server 2010 supports both point-to-point video calls and multipoint calls (voice and/or video); multipoint calls are hosted on the Microsoft AV Conferencing Server which is integrated into the solution. Lync provides support for up to 720p30fps video for point-to-point calls. Multipoint calls on the AV Conferencing Server are supported up to VGA resolution and use "voice-activated switching," whereby the image of only the active speaker is displayed. This contrasts with the multipoint support more commonly used in room system-based video conferencing, which supports up to HD resolution for all participants and "continuous presence" (CP) display in which the images of multiple participants are displayed simultaneously. Utilizing a third-party multipoint control unit (MCU) in conjunction with Lync can provide these capabilities to the Lync environment.

Video Conferencing Interoperability with Lync

Because room systems are an important component of any video conferencing ecosystem and part of many enterprises' collaboration culture, and because Lync can communicate with only SIP-based room systems and with only reduced video quality, the video conferencing industry has come up with two very different approaches to interconnecting Lync users with conference room and telepresence systems. One is to support Microsoft's protocols and algorithms directly within the room system itself; the second is to provide a Lync gateway to connect the island of Lync users with the island of traditional video conferencing devices.

Solution #1: Direct Endpoint Integration

With direct endpoint integration, a third-party peripheral such as an IP telephone or an IP video system will appear to the Lync Server as just another standard Lync endpoint. Direct endpoint integration implies that the endpoint should support all Microsoft features and functions, which often, but not always, includes seeing the buddy list on the video or IP phone device.

From a technical perspective, in order for an endpoint to register to Lync it must support Microsoft's version of SIP; NTLM² to authenticate; ICE and TURN for NAT/firewall traversal³, CCCP⁴ for signaling, SRTP and TLS for media encryption⁵, and H.263 for video compatibility.

¹ Lync 2010 is the formal name of Microsoft's Lync desktop client. Lync Server 2010 is the formal name of the server side software.

² NTLM is NT LAN Manager, a suite of Microsoft security protocols that provides authentication, integrity, and confidentiality to users (source: Wikipedia).

Direct integration has several advantages. Generally, direct integration enables a plug-and-play solution. To authenticate a device, a person simply uses his Lync user name and password. Perhaps more importantly, there is usually no additional cost for the endpoint hardware - although some vendors may charge if a software upgrade is required. Directly registering devices to Lync allows administrators to use Lync's bandwidth management, directory management, and NAT/firewall traversal capabilities. Direct integration also eliminates the obvious costs associated with a separate Lync gateway.

However, one disadvantage of the direct endpoint integration approach is that typically only the latest products in a vendor's video conferencing portfolio can support the direct registration mode. A customer with a large installed base may find that many of their systems do not support direct registration. Direct integration may also mean compromise—for example lower quality voice and video algorithms and lack of content sharing, although these restrictions may disappear over time. In addition, it generally takes time for a vendor to do the software integration which has to be tested across multiple hardware devices and software revisions, including new releases of Lync itself.

Registering video endpoints directly to the Lync server is best suited for small video deployments where investments in video infrastructure are to be avoided or for greenfield opportunities. Direct integration is not likely to be attractive to those who are moving to Lync and have a large installed base of video systems along with supporting infrastructure (gateways, MUCs, gatekeepers, NAT/firewall traversal). In these situations, a gateway approach is the optimum solution.

Solution #2: Lync Video Gateways

A Lync video gateway is a device that connects an island of Lync users to an island of non-Lync users, typically room and desktop video systems that use the H.323 or SIP signaling protocols. A signaling gateway handles differences between the Microsoft signaling protocols and the signaling protocols used by others. A transcoding gateway adds the capability to

³ NAT is an abbreviation for Network Address Translation, a network security technique used to hide internal IP addresses as well as a way to extend the IPv4 network address space. ICE is an abbreviation for Interactive Connectivity Establishment, a technique used to help real-time media traverse a NAT. TURN is Traversal Using Relay NAT, a protocol that allows a device behind a NAT to receive unsolicited TCP or UDP network connections.

⁴ CCCP is an abbreviation for Centralized Conference Control Protocol, a scheme used to control conferences.

⁵ SRTP is Secure Real-time Protocol while TLS is Transport Layer Security, a cryptographic protocol used to provide communications security over the Internet.

“translate” between the different compression algorithms and video resolutions used by the different endpoints. Transcoding gateways make interoperable HD video calling possible.

The advantage of the gateway approach is that Lync users can connect to new and traditional industry-standard desktop video systems, room systems, and even multi-codec telepresence systems using Lync’s familiar user interface. A Lync gateway preserves ease of use by allowing any H.323 video endpoint or infrastructure resource (MCU) to be displayed in the Lync contact list with full status indicators. Users can search the Lync directory for any video conferencing device and place a call exactly the same way they would connect to any other Lync contact.

Unlike an MCU which is designed to handle multipoint conferencing connections, a gateway is based on logic specific to one-to-one connections. Gateways are measured by the number of simultaneous calls or sessions the device can support.



Microsoft Lync in a continuous presence multipoint call including a telepresence system

The disadvantage of the Lync gateway approach may lie in cost, scalability, and a potential single-point-of-failure architecture. Some vendors’ gateway solutions involve multiple, expensive boxes supporting a limited number of simultaneous gateway calls. However, there are cost-effective, scalable solutions available today that are based on a robust, distributed architecture approach. Therefore, any enterprise with a large installed base of video systems should definitely consider the gateway approach – either as a standalone solution or as part of a mixed gateway/native integration solution.

	Biggest Advantage	Biggest Weakness
Direct Lync Integration	Requires no additional equipment	Applicable to only the latest hardware versions; unlikely to work with most installed systems
Lync Gateway	Brings all traditional standards-based desktop, room, and telepresence systems into the Lync environment	Requires additional infrastructure investment

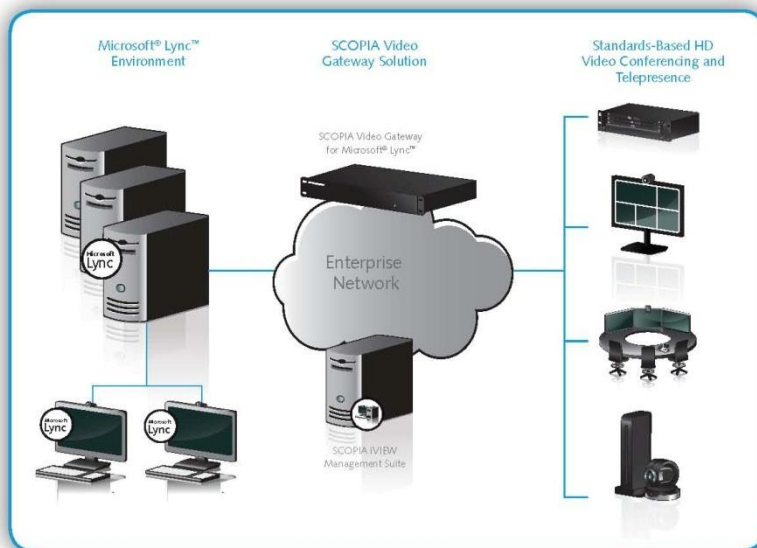
Solution Summary

When enabling video conferencing services with a Lync deployment, different approaches will appeal to different customers. Those with a large installed base of endpoints and infrastructure will find the UC gateway to be the most attractive approach for connecting to Lync users and for integrating their systems to a UC environment. For Lync users who want to add new room-based systems, deploying products that support direct integration may be optimum. No matter which solutions are being evaluated, the options are likely to evolve as Microsoft upgrades the native capabilities of Lync itself while the video conferencing vendors continue to provide 1) higher levels of performance, 2) appliance devices that are independent of the PC platform, and 3) sophisticated infrastructure products that bridge Lync with the traditional video conferencing worlds.

Introducing the RADVISION SCOPIA Video Gateway

In close partnership with Microsoft, RADVISION developed its SCOPIA Video Gateway for Microsoft Lync as a means to provide a flexible connectivity solution for customers who want to incorporate their room-based systems into a Lync environment. RADVISION's transcoding gateway supports all the protocols and algorithms used by both Microsoft and H.323/SIP systems, making the SCOPIA gateway a cost-effective and easily deployable solution that supports Lync interoperability while eliminating the need for software, firmware or even forklift upgrades to existing telepresence and video conferencing systems.

The SCOPIA Video Gateway works with both Lync and Office Communications Server and provides customers with five important benefits.



Lync video gateway deployment

1. Enhances the value of both Lync deployments and traditional video conferencing deployments by enabling users of each to communicate with the other. Extending the reach is one of the key factors that help drive utilization and improve ROI.
2. Provides a simplified and consistent user interface by extending Lync's familiar "click-to-communicate" interface to existing video conferencing systems. Presence is displayed in

the Lync contact list for any H.323 device, not just Lync-enabled devices, allowing users to make smart and efficient communication choices directly from Lync.

3. Extends professional video conferencing infrastructure benefits to Lync users. RADVISION's gateway delivers high-quality video, connections to continuous presence multipoint devices, and interoperability with telepresence systems to Lync endpoints.
4. Maintains a secure and yet open video conferencing environment. Robust enterprise security is maintained through TLS and SRTP, while also providing firewall traversal for seamless connectivity across corporate boundaries.
5. Provides investment protection to savvy IT and conferencing managers. While users will realize the benefits and simplicity of Lync at the desktop in conjunction with their current investments in video conferencing systems and infrastructure, IT and conferencing managers can have confidence that their existing systems and new investments in video communications will interoperate within the UC environment. The SCOPIA Video Gateway is based on a hardware architecture optimized for scalability and dynamic resource allocation.

About RADVISION

RADVISION (Nasdaq: RVSN) is a leading provider of video conferencing and telepresence technologies over IP and wireless networks. RADVISION teams with channel and service provider partners to offer end-to-end visual communications that help businesses collaborate more efficiently. RADVISION propels the unified communications evolution forward with unique technologies that harness the power of video, voice and data over any network and enabling video on smartphones and tablets. RADVISION offers tailored solutions for markets including healthcare, finance and government, as well as measurement and analysis tools. Visit www.radvision.com, check our [blog](#), and follow us on [Facebook](#), [LinkedIn](#), [Twitter](#) and [YouTube](#).

About Wainhouse Research

Wainhouse Research, LLC (www.wainhouse.com) provides analysis and consulting on the market trends, technologies/ products, vendors, applications, and services in the collaboration and conferencing fields. Areas of coverage include hardware, software, and services related to audio, video, and web conferencing, unified communications, and team workspaces/ enterprise social networking. The Company publishes market intelligence reports, provides customized strategic and tactical consulting, produces industry conferences, and publishes the conferencing industry's leading newsletter, the Wainhouse Research Bulletin.