Unified Communications with XenApp and XenDesktop
The modern workforce is global, demanding real-time collaboration through unified communications solutions such as Microsoft Skype® for Business (formerly known as Lync®), Cisco Jabber, Avaya one-X Communicator, and Vidyo. These solutions enhance the productivity of a global workforce by allowing employees in different physical locations to communicate “in person” through face-to-face conversations over live video conferencing, audio chat, and instant messaging.

Combining the mobility and flexibility benefits of application and desktop virtualization from Citrix® XenApp® and XenDesktop® with the communication and collaboration abilities of the most popular unified communications solutions, you can deliver a virtual workspace that enables you to work anywhere with anyone.

**Challenges**

Users expect virtual apps to have the same high definition user experience as if they were local. Migrating these complex applications from the physical endpoint to a virtualized environment located in the datacenter can bring challenges.

- To deliver the best possible user experience, unified communications traffic for video and voice should be routed over the most direct path. With virtualization, the app is moved from the device where the user is located into the safety of the datacenter. This creates an indirect traffic pattern that routes through the datacenter, sometimes referred to as hairpinning. This increases network bandwidth consumption and server load, resulting in slight degradation of the audio-video quality due to transcoding and incremental latency.
- When the unified communications app is virtualized in the datacenter the actual endpoint location is somewhat distorted given that the final destination is actually the user device connecting to the virtual app, not the virtual app itself. This disjointedness can duplicate decompression and recompression activities as the incoming audio and video content is decompressed on the server before being recompressed and transmitted to the user’s device resulting in some loss of audio-video fidelity.
- From a datacenter server scalability perspective, the physical hypervisors hosting the virtual apps and desktops are executing all the compression and decompression activities for the audio and video datastreams. These compression and decompression tasks are CPU resource intensive which can impact the number of virtual desktops that a single physical server can host. This is an issue for administrators anticipating hundreds or thousands of simultaneous webcam calls.

**Improved design**

Citrix partners with unified communications vendors to enhance virtual app performance and delivery. This ensures that users have the exact local-like experience with the unified communication solution of their choice. XenApp and XenDesktop have been optimized to deliver the following key benefits:
• **Networking Optimizations:** One of the easiest ways to optimize real-time voice and video traffic is to send the traffic over the most direct route. Microsoft, Cisco, Avaya and Vidyo unified communications solutions are all optimized for XenApp and XenDesktop. When virtualized together with XenApp and XenDesktop, each solution will transmit compressed video directly between user endpoints. This peer-to-peer line of communication streamlines the traffic pattern and avoids sending uncompressed video over the network. The solutions are robust even in WAN environments and increase the scalability of deployments in LAN environments.

• **Protocol Optimizations:** UDP/RTP is typically deemed the best method for delivering real-time audio and video datastreams. XenApp and XenDesktop are based on the ICA® protocol. This intelligently separates audio and voice traffic from virtual desktop traffic to enable audio and video datastreams to route directly between endpoints over UDP/RTP. This delivery method enhances the end user experience and minimizes bandwidth consumption by reducing the number of datastreams on the networks.

• **Server Scalability:** Given the popularity and simplicity of video conferencing within unified communication solutions, the number of simultaneous video conferences is only expected to increase. This new peer-to-peer line of communication now relegates compression and decompression of audio and video data to the client, significantly increasing server scalability in the datacenter.

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**XenApp and XenDesktop with Microsoft Skype for Business**

Citrix delivers the complete range of Microsoft Skype® for Business (formerly known as Lync®) functionality including voice and video chat when the Skype for Business client is hosted on a XenApp and XenDesktop virtual app or desktop with the Citrix HDX™ RealTime Optimization Pack. The optimization pack includes support for Microsoft Skype for Business 2015 and Lync server and client versions 2010 - 2013. Citrix also supports Microsoft’s Lync 2013 VDI plug-in within Citrix Receiver™ for Windows specifically designed to optimize real-time audio and video communications within a virtual desktop environment. XenApp and XenDesktop deliver a full enterprise-grade unified communications experience including instant messaging, presence, conferencing, and enterprise voice and video. To further enhance the solution benefits, virtualizing Skype for Business with XenApp and XenDesktop can extend access to both Windows and non-Windows devices including Mac and Linux x86.
The HDX RealTime Optimization Pack for Microsoft Skype for Business is comprised of two key components. The Citrix HDX RealTime Connector for Skype for Business runs in the datacenter on the XenApp or XenDesktop environment. With an existing Citrix Receiver installation, the only change to the user’s client device is the introduction of a plug-in for Citrix Receiver, the Citrix HDX RealTime Media Engine, available for Windows, Linux and Mac. The HDX RealTime Connector for Microsoft Lync in the datacenter and the HDX RealTime Media Engine plug-in for Citrix Receiver on the client provide users the following key integration features:

- **Supports Microsoft’s proprietary RT-Audio and RT-Video codecs.** Also supports industry standards G.771, G.722, G.722.1 and G722.1c for audio calls from 3 kHz to 14 kHz (ultra-wideband), both for audio-only calls and for audio-video calls.
- **Supports RT-Video, H.264, H.263, H.263+ and H.263++ video codecs.** Video call rates range from 128kb/s to 2048kb/s. All video will be encoded at up to 30fps (depending on the webcam used) and transmitted over RTP.
- **Includes HD support and these video resolutions on Windows and Linux client devices:** 720p30 (1280 X 720 pixels), 4CIF resolution (704 X 576 pixels), VGA resolution (640 X 480 pixels), CIF resolution (352 X 288 pixels) or SIF (352 X 240), QCIF resolution (176 X 144 pixels) or QSIF (176 X 120).
- **Designed with embedding and integration in mind.** All functionality is delivered entirely through APIs and embedded directly into the Lync GUI to ensure a familiar look and feel for the user.
- **Optimizes Quality-of-Experience (QoE) through adaptive jitter buffer, packet loss concealment, call rate adaptation, and other techniques.**
- **Supports firewall traversal** with Microsoft Lync Edge Server (using STUN, TURN and ICE).
- **Supports signaling** using SIP RFC 3261, RFC 3264, RFC 5168 and Microsoft SIP extensions.
- **Supports secure call signaling via AES and TLS.**

In many organizations, the Citrix XenApp and XenDesktop administrator is typically not the Microsoft Skype for Business administrator. With the HDX RealTime Optimization Pack for Microsoft Skype for Business, no modifications to the existing Skype for Business infrastructure are required. The XenApp and XenDesktop solution only requires two components to support this new technology. Citrix HDX RealTime Connector and the Citrix HDX Media Engine plug-in for Citrix Receiver make this solution very easy to deploy and integrate into an existing Microsoft Skype for Business 2015, Lync Server 2010 or 2013 environment with no changes to backend servers required. HDX Media Engine plug-in for Citrix Receiver can be centrally distributed by the administrator or downloaded from the Citrix website by the user. With Citrix Receiver already configured for updates the new Citrix Media Engine plug-in can be seamlessly delivered to Microsoft endpoints worldwide in one simple action. In addition, the HDX Media Engine is expected to be available on Linux based thin client devices through Citrix OEM partners.

The Optimization Pack for Skype for Business seamlessly integrates with an existing Microsoft Skype for Business environment both on the client-side and server-side. The XenApp and

*XenApp seamless app delivery is not supported.*
XenDesktop virtual desktop user is presented with an optimized Skype for Business menu. The menu provides a feature rich desktop video and audio conferencing experience while all presence and contact information is still managed through the traditional Skype for Business methods. By incorporating the Citrix HDX RealTime Connector within the virtual desktop and the HDX Media Engine plug-in on the client, Microsoft Skype for Business is able to use the exact same interfaces to communicate directly between the server and the client.

The Citrix HDX RealTime Connector for Microsoft Skype for Business is available with Enterprise and Platinum editions of XenApp and XenDesktop for new customers or existing customers with active Enterprise and Platinum levels of Subscription Advantage. For a complete list of Microsoft Skype for Business deployment options for XenApp and XenDesktop, refer to the Feature Matrix.

**XenApp and XenDesktop with Cisco Jabber**

Cisco Jabber with XenApp and XenDesktop is an optimized collaboration solution that integrates delivery of voice and video in a virtual desktop environment. Cisco Jabber is desktop virtualization aware and intelligently offloads real-time media processing activities from a virtual desktop in the datacenter to the Cisco Virtualization Experience Media Engine (VXME) located on the endpoint.

Cisco VXME leverages the computing and processing power of the endpoint to minimize the impact of rich media on network performance and datacenter resources. Cisco Jabber for Windows works out-of-the-box with XenApp and XenDesktop. Leveraging HDX optimized architecture, it provides an integrated solution with Cisco Precision Video Engine that dynamically optimizes every aspect of the voice and video collaboration process through:

- Cisco VXME software extends the Cisco Jabber collaboration experience by making the network aware of voice and video traffic and automatically prioritizing it to reduce jitter and delays. It also enables peer-to-peer communication that overcomes the hair-pinning effect for the best possible user experience.
- Cisco Jabber for Windows with XenApp, XenDesktop and Cisco Virtualization Experience Media Engine (VXME) on the endpoint provide compression and decompression optimizations built on an open architecture that supports media compression standards and codecs such as H.264, H.323, G.711, G.722, and G.729.
- Cisco Jabber can run natively on many of the devices that have Citrix Receiver like iPad, iPhone, Android, Mac, Windows and thin clients. In addition, Jabber can run in both a VDI and RDS-based virtual desktop environment giving the user complete voice and video capabilities whether in a virtual or native environment, on any device, any time.
- Video traffic is two-way, real-time, high-definition, and needs to be carefully prioritized to avoid dropouts and delays. Cisco WAAS optimization for XenApp and XenDesktop enhances the user experience of all applications and services, including video, improving efficiency across the WAN.
- Cisco networking solutions include collaboration-aware services such as Medianet (a network-based architecture for dynamically handling the special requirements of video to deliver an optimal experience tailored to each user), Call Admission Control (CAC), Quality of Service and session management which help ensure an optimal user experience under widely differing workloads.
- Cisco provides the industry’s only dual-protocol presence platform. Incorporating both native SIP/SIMPLE and native XMPP connectivity, it allows users to see aggregated...
availability information across endpoints supporting either standard and interoperates with Microsoft Lync, IBM Lotus Sametime, Google Talk and any other XMPP federated interface.

The Citrix and Cisco partnership is unique to the industry given the strategic commitment by both vendors to develop and deliver a unified communications solution for desktop virtualization that is optimized for the virtual desktop, network, datacenter, and endpoint devices. Cisco Jabber with XenApp and XenDesktop has been tested, validated, and documented in numerous Cisco Validated Designs to help reduce the integration burden and speed deployments. This joint solution is fully supported by Citrix and Cisco to help customers achieve resource efficiency and control, simplified management, security, collaboration and desktop delivery optimization.

**XenApp and XenDesktop with Avaya one-X Agent and Communicator**

Avaya one-X Communicator is an ideal unified communications solution for users who communicate frequently, manage multiple calls, set up ad-hoc conferencing, and need to be highly reachable. The solution provides users with anytime, anywhere access to voice calling, audio conferencing, corporate directories, and communication logs. Avaya, in partnership with Citrix, recognized that there were challenges in deploying the one-X Communicator as an app hosted within a virtual desktop. Therefore, the Avaya VDI Communicator was released to enable an enterprise-class unified communications solution for Avaya one-X Communicator within a virtualized environment and Avaya one-X Agent on the endpoint device.

In 2014, Avaya released version 2.0 of the VDI Communicator with full support for XenApp 6.5/7.5 and XenDesktop 5.6/7.5. Avaya VDI Communicator provides intelligent unified communications in a way that enhances the XenApp and XenDesktop virtual desktop user experience through reliable, quality communications. The Avaya VDI Communicator runs on the client endpoint device running one-X Agent and communicates directly with the Avaya one-X Communicator hosted on the XenApp and XenDesktop virtual desktop in the datacenter. This direct line of communication between the endpoint and the virtual desktop enables the solution to intelligently offload media processing of audio and voice datastreams from the datacenter server to the endpoint. This optimizes end user performance and improves virtual desktop density on the datacenter server. In the event of a connectivity issue between the endpoint and the virtual desktop, the Avaya VDI Communicator is able to establish a local session via downgraded user interface that still enables a local, active softphone to ensure business continuity. When Avaya VDI Communicator is deployed within a XenApp and XenDesktop virtual desktop, administrators can deliver both a highly scalable desktop virtualization solution and a high performance unified communications solution.

**XenApp and XenDesktop with VidyoDesktop**

VidyoDesktop Virtual Edition (VE) delivers a high performance, powerful video conferencing experience within a XenApp or XenDesktop virtual desktop environment. VidyoDesktop VE enables XenApp and XenDesktop users to participate in secure, feature rich, multi-point HD video conference meetings from virtually any device. Desktop, mobile, web, room systems, H.323/SIP endpoints and now virtual desktops have unmatched quality and scale for
deployments that exceed 100,000 users. Vidyo provides a software-based platform, VidyoWorks, that can work on any network, device or application. Vidyo leverages the XenApp and XenDesktop virtual channels to shift media processing from the server to the endpoint device.

**IBM Lotus Sametime**
Unified communications solutions vary in features, components, and integration dependencies. IBM Lotus Sametime is one of the most popular unified communications applications used in enterprises since the late 1990s. By integrating XenApp and XenDesktop for desktop virtualization and IBM Lotus Sametime for high-definition video conferencing, Citrix HDX technologies are able to seamlessly deliver real-time video and voice for video conferencing without any additional customizations or configurations making it a simple, yet powerful, collaboration solution.

The HDX Seamless Local Apps feature of XenApp and XenDesktop 7 Platinum edition provides an ideal solution for optimized delivery of IBM Lotus Sametime to Windows devices. The Sametime client runs locally on the user device, offloading all media processing from the server, while the user interface is seamlessly blended into the user’s virtual desktop, whether delivered as a VDI or RDS workload.

**References**
For more information please visit:
XenDesktop: [www.citrix.com/xendesktop](http://www.citrix.com/xendesktop)
XenApp: [www.citrix.com/xenapp](http://www.citrix.com/xenapp)

Feature Matrix for Delivering Microsoft Skype® for Business (formerly known as Lync®) from XenApp and XenDesktop: [http://support.citrix.com/article/CTX200279](http://support.citrix.com/article/CTX200279)