



Optimization Pack 1.1

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HDX RealTime Optimization Pack 1.1 for Microsoft Lync

Citrix® HDX™ RealTime Optimization Pack for Microsoft® Lync® offers clear, crisp high-definition video calls in conjunction with Microsoft Lync. Users can seamlessly participate in audio-video or audio-only calls to and from other HDX RealTime users and other standards-based video desktop and conference room systems.

Citrix® HDX™ RealTime Connector for Microsoft® Lync® runs in both the Citrix XenDesktop and VDI-in-a-Box virtual desktops and in the Citrix XenApp virtual application environment.

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About HDX RealTime Optimization Pack

1.1

HDX RealTime Optimization Pack provides a highly scalable solution for delivering real-time audio-video conferencing and USB or VoIP enterprise telephony through Microsoft® Lync® in XenDesktop, XenApp, and VDI-in-a-Box environments. HDX RealTime Optimization Pack leverages your existing Lync infrastructure and inter-operates with other Lync endpoints running natively on devices.

HDX RealTime Optimization Pack consists of both client and server components:

- The client component, called *Citrix HDX RealTime Media Engine*, is integrated with the Citrix Receiver on the endpoint device and performs all signaling and media processing directly on the user device itself, offloading the server for maximum scalability, minimizing network bandwidth consumption and ensuring optimal audio-video quality.
- The server-side (and virtual desktop) component, *Citrix HDX RealTime Connector*, is a connector to the Microsoft Lync client that drives the RealTime Media Engine on the endpoint. Connector runs in the virtual server environment alongside Microsoft Lync and communicates signaling information over a Citrix ICA virtual channel to the RealTime Media Engine running on the user device.

What's New

- VDI-in-a-Box support
- Enterprise Voice telephony features (PBX/PSTN integration)
- Emergency Services support (E911)
- Support for buttons (HID functions) on USB phones/headsets
 - Note:** Currently, Lync-certified USB phones like the Polycom CX300 and Plantronics P240-M are supported merely as Audio devices, with no support for the buttons, ringer, or display.
- Conformance to Microsoft Lync Call Admission Control specification
- SUSE Linux support (v11 SP1/SP2)
- Support for Logitech C920 webcam with built-in H.264 encoder
- TCP/IP fallback for firewall traversal through Edge Server when UDP is blocked
- Compatibility with XenDesktop Remote PC feature
- Compatibility with CloudGateway StoreFront 1.2 for automated updating of the HDX RealTime Media Engine plug-in to the Citrix Receiver for Windows

Fixed Issues

- When calling a Lync-compatible softphone or a PSTN phone by dialing a phone number using Lync optimization, the phone number portion of the caller-id did not display on the softphone or PSTN caller-id. In this release, when you place a call, the software uses the caller-id information stored in the Lync server. This enables the callee to see who is calling and to easily return phone calls dialed from RealTime Connector. [#86]
- Full screen video is not always available in XenApp Seamless mode running on a Linux terminal. [#11956]
- RealTime Media Engine: SIP Registration and calling was not supported through an OCS R1 Edge server. [#11969]
- The Receive Resolution is less than expected when using an H.264 encoding camera on HP T610 when the call is H.264 format video. [#12489, #12432]
- Inserting or removing a USB device (e.g. camera, headset) on Linux terminals while RealTime Media Engine is running can cause unpredictable results. The workaround is to restart RealTime Connector/RealTime Media Engine after inserting a device. [#12540, #12347]
- Sometimes declining an incoming call does not cause the incoming call ringing sound to stop. The workaround for this is to restart Lync. [#12874]
- You cannot reliably escalate an audio-only conference call to a video call. Sometimes the call remains an audio-only call. [#12899]
- The Print button on the installer for printing the end-user license agreement does not work. [#13217]
- The 20 second ring timeout is ignored by the recipient of a conference call invitation. The call continues to ring instead of timing out. [#13229]
- RealTime Media Engine is unable to register or grab the audio/video devices if an application such as Skype is running in the virtual desktop and has the camera/audio resources. [#13236]
- After a video call is established, RealTime Connector displays the Audio Call window for 2-3 seconds and then switches to video session window. [#13271, #12804]
- Sometimes if one participant changes the video status (start/stop) in a conference call the video state of the other participants is changed as well. [#13285]
- On a Linux terminal, if a user puts a conference call on mute, the incoming audio can be distorted. [#13310]
- Video encoding using the RTVideo codec can consume > 90% of the CPU on the terminal and sometimes produces low frame rates. [#13374]
- Sometimes RealTime Connector starts in Un-Optimized mode when it should start in Optimized mode. [#13433, #13154]
- Sometimes the user gets an error placing a call: "Please wait until the first call is established before attempting to place the second call." Open and close the settings

window or restart Lync. [#13438, #12777]

- Sometimes RealTime Media Engine crashes when accepting an incoming Lync conference call. The workaround is to restart Lync. [#13455]
- The Pause video button does not indicate the paused video state if pressed while in full screen mode. [#13459]
- Users can only change device selections once per session. Subsequent attempts to change devices result in the GUI displaying the new device, but the system using the previously selected device. [#13460, #13386]
- If the user tries to access any Lync optimization menu items during initialization, the system displays a pop-up error with the following message: "Audio and Video Calling is disabled in this session. Error Code = 70." The workaround is to wait a minute and try it again. [#13842, #13280]
- After merging an incoming call into a multi-party call the user is presented with two session windows. The workaround is to close the second one after the call is over. [#14014]
- Dialing a number from a HID Compatible deskphone is not supported. [#14033]
- When an RTC user is in a point-to-point call with a telephone endpoint (PSTN) and the user adds a third party to the call, the PSTN user receives a second incoming call from the conference center. [#14040]
- Calls between two Lync optimization endpoints sometimes drop if placed on hold when one of the participants is connected via Link Edge server (i.e. using Firewall Traversal). [#14075]
- It is not possible for a user to participate in a conference call if they are behind a NAT and UDP protocol is blocked (i.e. conference call over TCP). [#14106]
- English strings are displayed for the Lync optimization menu items when the software is installed on a German machine with German selected as the language in Lync. [#14131]
- The Jabra Speak 410 USB goes Off Hook when a caller hangs up a call. [#14132]
- The Lync optimization application will not send location information in E911 request on VDI-in-a-Box. [#14142]
- The number dialing feature of a Jabra 520 Handset dials and then hangs up immediately after dialing. [#14196]
- Realtime Media Engine: Users of the Jabra Speak 410 speakerphone could not use the green button on the device to answer incoming conference calls. [#14221]
- The Linux installation script was not able to uninstall the RealTime Media Engine on 64-bit systems. [#14233]
- The display of a telephone participant that is added to an audio or video call sometimes shows extra SIP information that should not be displayed to the user. [#14237]
- Lync optimization can not successfully initiate a call with a LifeSize Express 220 that is registered with Lync. The error that returns is, "Unsupported Media Type (415)."

[#14262]

- RealTime Media Engine: using the dial out feature of a Plantronics Calisto P540-M Desk Phone, the call dialed and then hung up immediately after dialing. [#14317]
- The error message "Initializing the Audio/Video optimization pack" in the Audio/Video setting window is now localized. [#14338]
- The Lync Status is not always updated back to previous status after a call is ended. In particular, this can happen if the user places a call and does not touch the mouse for 15 minutes and then the call ends. [#14409, #102]
- Multi-party calls were not functioning in certain environments due to requiring that PSTN conferencing support be present in order to initiate the conference call. RealTime Media Engine now allows conferences to proceed without this restriction. [#14414]
- RealTime Media Engine was showing inconsistent frame rates and resolutions in calls between endpoints and in Lync conferences. Resolutions and Frame Rates depend on the particular characteristics of the endpoints that are being called from the Lync Optimization Pack as well as environmental conditions, such as scene motion and other factors. [#14415]
- RealTime Media Engine now supports Lync Director as well as the normal Lync auto-discovery protocol. [#14483]
- Call initiation on Linux terminals could take an extremely long time. It could take up to 30 seconds to see the Session Window display. [#14519]
- Users who are Muted in a conference call by another user (remote mute) may hear an electronic noise sound, also known as "robovoice." [#14555]
- Users in a conference call can receive video at a slow frame rate of about 15fps. [#14620]
- The RealTime Connector user interface will always display in English in a VDI-in-a-Box deployment no matter which language was selected. [#14667, #112]

HDX RealTime Optimization Pack 1.1

Known Issues

General

- Call forwarding is not available in this release.
- The Lync Optimization Pack does not work with the hosted version of Microsoft Lync (Office 365) because the hosted version only supports web-based certificate authentication and the RealTime Media Engine requires that the Lync server support NTLM authentication.
- With the HDX RealTime Connector installed and the Lync native voice and video calling disabled (TelephonyMode = 5), the Lync Call Forwarding functionality is disabled.
- With the HDX RealTime Connector installed and the Lync native voice and video calling disabled (TelephonyMode = 5), the Lync "Meet Now" feature does not provide the user with the option to join the meeting using Lync voice and video. The user can join the meeting using a telephone number. [#14543]
- When starting RealTime Connector and RealTime Media Engine in Local Mode on a Remote-PC enabled computer, the RealTime Media Engine initialization takes a long time. The workaround is to wait about one minute before attempting to place a call. [#14438]
- A user cannot place themselves on hold in a conference call if the user is connected via Citrix Access Gateway and UDP is blocked for the user. The user sees the error "The system could not place the call on hold. Please try again." The call remains up. The workaround is for the user to hang up and then call back. [#14436]
- Some users are prompted to log in each time they run Lync and some have to modify the login id to get RealTime Connector/ RealTime Media Engine to register properly. [#14366]
- When HDX RealTime Connector is running on a Windows XP system employing a VPN and an additional network adapter, DNS resolution of the SIP server and SIP proxy server host name may fail. SIP server host names are typically resolved via internal DNS, rather than external DNS. Some VPN implementations might circumvent effective DNS resolutions. To resolve this problem, add the domain name of the Internal Server and External Server to the Windows XP HOSTS configuration:
c:\windows\system32\drivers\etc\hosts.
- When you run RealTime Connector in a XenDesktop session the user device or the XenDesktop host may block traffic to or from the Media Engine host. You might see an error message such as "RealTime Connector is waiting for the connection from the Media Engine... or Failed to maintain RealTime Connector on this device. Communication to the Media Engine was disrupted. Please contact your system administrator." In such cases, create an exception in the Windows firewall.
- When attempting to make high-definition video calls from a home office, take into account your user's network bandwidth and ISP routing policies. If you observe pixilation of the video or problems with lip sync, adjust the Maximum Packet Size (MTU) on the network interface card properties to a lower value such as 900 to avoid situations where ISPs perform traffic shaping based on packet size.
- Occasionally on devices running Linux Ubuntu 11 on 32-bit systems, you can experience poor video quality—namely flickering image—during a call. To improve video quality, increase foreground and decrease background lighting and adjust the anti-flicker

setting on the transmitting camera.

- On some HP T610 terminals running Ubuntu 10.4 Linux operating system, the PulseAudio network sound server may not start at system initialization or become disabled during operation. In such cases, starting Lync on the virtual server can cause PulseAudio to display this error message repeatedly:

protocol-native.c: Denied access to client with invalid authorization data.

To correct this

1. Open an X Terminal.
 - a. Open the terminal menu and select ThinPro Control Center.
 - b. In the Control Center, open the Control Panel.
 - c. In the Control Panel, select Advanced.
 - d. In the Advanced window, select X Terminal.
2. In the X Terminal window, open `/etc/pluse/system.pa`, using `vi` or some other file editor.

3. Scroll to the section

```
### Load several protocols.
```

4. Add `auth-anonymous=1` to the two load-module lines:

```
### Load several protocols
.ifexist module-esound-protocol-unix.so
load-module module-esound-protocol-unix auth-anonymous=1
.endif
load-module module-native-protocol-unix auth-anonymous=1
```

5. Start PulseAudio by entering: `# pulseaudio --system`

HDX RealTime Media Engine

- The RealTime Media Engine software rejects incoming call attempts sent from the LifeSize Express 220 without signaling an incoming call dialog to the user. [#14762]
- During installation or un-installation it is possible to encounter certain error conditions where the error message string is not localized. [#14530, #93]
- If a user who is using a Plantronics Blackwire™ C620-M audio headset device attempts to answer an incoming call using the HID button on the chord, the action of answering the call in this manner freezes both the terminal and XenDesktop. At this time we recommend against using this device with Lync optimization. Users who have this device should only answer the calls using the incoming call dialog in the RealTime Connector. [#14526]
- Audio Device HID functions (Pickup Call, Mute, Hangup) do not work on certain USB audio devices in SUSE Linux Enterprise Desktop 11 on Wyse terminals such as the Z50D or in Ubuntu Linux 10.4 on terminals such as the HP T610. In particular the Logitech B350, Polycom CX300 and Plantronics Calisto P540-M are known to exhibit problems in this area. However, the devices themselves continue to work as audio devices. [#14253]
- The HID Mute button/function is not available on a Plantronics Blackwire C620-M. This is because the device is not following the Lync protocol specification. [#14165]
- Full screen video is not available with Linux version of RealTime Media Engine in Seamless mode. The full-screen display is letterboxed. [#13564]
- Full Screen video does not always function properly in XenApp Seamless mode. The Full Screen Control hides behind other apps in a Seamless session. [#10731, #3]
- In certain situations PIP displays a black square instead of the local video view when RealTime Media Engine is running on Ubuntu terminals. Toggle PIP. [#62]
- In some cases, when a user opens the Video page of Tools > Audio Video Settings, the display presents a black preview window, nor does RealTime Connector display video during a call. This problem has been observed in the following environment: a terminal device running SUSE Linux Enterprise Desktop (SLED) 11 SP1 and XenDesktop servers running Windows7. The problem occurs because RealTime Media Engine requires an accelerated video driver to use the XVideo extension. The standard SLED 11 SP1 distribution may not include that driver. As a result, no video is rendered on the terminal screen. To resolve the problem, update to SLED 11 SP2, which contains the required driver to render the video normally.

HDX RealTime Connector

- Sometimes the participant list displayed in multi-party calls can exclude newly added participants for some users in the conference call. [#14586, #14576]
- When switching between terminals connecting to the same XenDesktop sometimes the RealTime Connector will fail to start the RealTime Media Engine and connect with it properly. The software displays the popup message with error code 70. The workaround is to restart Lync and that restarts RealTime Connector and it will connect properly. [#14039]
- Selecting a device and then navigating to the advanced tab and back to the device tab causes the selected device to revert to the one which was originally selected. The workaround is to exit the dialog after selecting the new device. [#13450]
- RealTime Connector cannot start if only .NET framework 4 is installed on the Windows 7 VDA. [#11966]
- RealTime Connector can stop working after launching XenDesktop while the RealTime Connector was launched earlier (after sleep mode on terminal). The workaround is to restart Lync in the XenDesktop session. [#63]
- If an administrator installs RealTime Connector for a user, the first time the user right-clicks, menu items are sometimes displayed in English instead of the local language. Instruct your users to exit and restart Lync. After restarting Lync, right-click menus appear in the local language.
- RealTime Connector is loaded in Fallback mode the first time after installation. The workaround for this is to restart Lync and the software will then work in optimized mode.

System Requirements for HDX RealTime Optimization Pack 1.1

Environments

HDX RealTime Optimization Pack is supported in the following Citrix environments:

- XenDesktop 5.0, 5.5, 5.6, or 5.6 Feature Pack 1
- XenApp 6.5 for Windows Server 2008 R2
- XenApp 6 for Windows Server 2008 R2
- Remote PC deployments
- VDI-in-a-Box 5.2

For more information about XenDesktop and XenApp editions that include Lync optimization, see the following:

- [XenApp features by edition](#)
- [Compare XenDesktop features by edition](#)

HDX RealTime Connector

You install HDX RealTime Connector on XenDesktop virtual desktops or on servers in your XenApp farm.

- Supported operating systems:
 - desktops: Windows 7
 - servers: Windows Server 2008 R2
- Minimum 4 GB RAM, 120 MB paging file
- 100 MB disk space
- Full-duplex Ethernet TCP/IP local network connection
- Software:
 - DirectX 9 (minimum)
 - Microsoft .NET 3.5 SP1

- Microsoft Lync 2010

Before installing HDX RealTime Connector on a host running the Windows 7, turn off Administrator mode for Microsoft Lync.

1. Right-click the Microsoft Lync shortcut on your Desktop or in the list of programs in the Start Menu and choose Properties.
2. In the Properties dialog box, click the Compatibility tab.
3. On the Compatibility tab, ensure the checkbox Run this program as an administrator is unchecked.

HDX RealTime Media Engine/Client Device

You install the HDX RealTime Media Engine on the client device.

Important: Thin client manufacturers make changes to the specifications of a devices without notice. These lists apply to the configurations provided at the time of testing.

Supported terminals:

Wyse

Model	Processor	Operating System
R90L	1.5GHz* AMD Sempron	Windows XP E
R90LE	1.5GHz AMD Sempron	Windows XP E
R90LW	1.5GHz AMD Sempron	WES 2009
R90LEW	1.5GHz AMD Sempron	WES 2009
R90L7	1.5GHz AMD Sempron	WES 7
R90LE7	1.5GHz AMD Sempron	WES 7
Z90SW	AMD G-T52R 1.5GHz	WES 2009
Z90DW	AMD G-T52R 1.5GHz	WES 2009
Z90S7	AMD G-T52R 1.5GHz	WES 7
Z90D7	AMD G-T52R 1.5GHz	WES 7
Z90DE7	Dual core AMD G-T56N 1.65 GHz	WES 7
Z50E	AMD GT-52R 1.5 GHZ	SUSE Linux 11 SP1/SP2
R50L	1.5 GHZ AMD Sempiron	SUSE Linux 11 SP1/SP2
R50LE	1.5 GHZ AMD Sempiron	SUSE Linux 11 SP1/SP2
X50m	Dual core AMD G-T56N 1.6 GHz	SUSE Linux 11 SP1/SP2

HP

Model	Processor	Operating System
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T610	AMD Dual Core 1.6 ghz	Ubuntu 10.04
T610	AMD Dual Core 1.6 ghz	WES 7

Supported PCs

HDX RealTime Media Engine may be installed on PCs used as terminal devices running these operating systems:

- Windows XP
- Windows 7
- Windows Thin PC (TPC)
- Windows Vista
- Linux (RedHat, Ubuntu SUSE)

Requirements for audio and video calling:

- RealTime Connector can support video calls in high-definition (HD) video. The connector measures the speed of the user device and then encodes HD video if the camera, the host device, the bandwidth setting, and the remote endpoint support high-definition specifications.
- Camera:
 - Logitech Webcam B910 or C920 recommended
 - Resolution: 320 x 240
 - Color space: 1420 or YUY2
 - Frame rate of at least 10 fps, 24 fps for HD video
 - Native driver or supporting Windows UVC driver
- Audio input/output must be DirectSound compatible and capable of 16-bit mono or stereo sound at 16,000, 32,000, or 44,100 samples per second. A USB headset is recommended.

Requirements for Lync-compatible USB telephone calling:

HDX RealTime Connect supports Lync-compatible USB HID telephone devices, including wired and wireless phones, speaker phones, headsets. For full information about supported devices, see the Microsoft USB HID device specification:

<http://download.microsoft.com/download/3/0/6/306d68d9-6d56-4ecd-a0cd-143431419290/lynclogorevf.zip>

This document defines several categories of USB connected devices and requirements for those devices to support specific USB commands.

Citrix Receiver requirements:

The terminal device must have one of the following installed:

- Citrix Receiver for Windows 3.1 or 3.0
- Citrix Receiver for Linux 12.0

Third-party Video Drivers and Citrix HDX RealTime Optimization Pack

The Windows operating system installed on thin client computers usually does not include Windows USB video class (UVC) drivers for web cameras, although these drivers have come with standard Windows XP and Vista operating systems since SP2. When you install a web camera on a terminal device, the installation program may report that it does not have required files.

Depending on the type of Windows operating system on the terminal device, and also on the specific webcam you plan to install on the terminal device, you may need to obtain certain video drivers from third-party sources.

The Logitech Webcam Pro 9000 for Business has been satisfactorily tested with RealTime Connector. The table below shows the third-party files needed so Wyse and HP terminals can support a Logitech 9000 Webcam Pro for Business. Note that the specific missing files may vary, depending on the type of Windows operating system.

Terminal/fps	Files Required	Source/Notes
Wyse R90LW 30 fps (320 x 240 res.)	<p>Wyse UVC driver package</p> <p>Microsoft 30 fps HotFix (KB949033)</p> <p>Windows video drivers:</p> <ul style="list-style-type: none"> • Ksuser.dll • Ksproxy.ax • Ks.sys • Kstvtune.ax • Ksxbar.ax • Kswdmcap.ax • Vfwwdm32.dll • Iyuv_32.dll • Msh263.drv • Msyuv.dll • Tsbyuv.dll 	<p>http://support.microsoft.com/kb/949033</p> <p>Copy video files from a “fat” PC with a similar operating system.</p>

System Requirements

HP t5740 25 fps	Logitech 9000 driver <ul style="list-style-type: none">· ksuser.dll· ksproxy.ax· ks.sys	Logitech webcam package Copy video files from a “fat” PC with a similar type of operating system.
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Installing HDX RealTime Optimization Pack

If you have not already downloaded the installation files for the HDX RealTime Optimization Pack, see [How to download HDX RealTime Optimization Pack 1.4.100](#).

The order of the Optimization Pack installation is important:

1. If Receiver is running, close it.
2. Install the RealTime Media Engine on your users' devices.
3. Start XenDesktop.
4. Install the RealTime Connector on your XenDesktop virtual desktops, VDI-in-a-Box virtual desktops, and XenApp servers.

See:

- [Install the RealTime Media Engine](#)
- [Install the RealTime Connector](#)

Deploy HDX RealTime Media Engine to your users

You install the HDX RealTime Media Engine on client devices. The media engine provides local media processing of audio/video calls and peer-to-peer communication with other callers using Microsoft Lync.

Your method for deploying HDX RealTime Media Engine to a user device depends on the operating system of the device:

- [Deploy HDX RealTime Media Engine to Windows devices](#)
- [Deploy HDX RealTime Media Engine to Linux terminal devices](#)
- Deploy HDX RealTime Media Engine to Mac devices

Deploy HDX RealTime Media Engine to Windows devices

Citrix HDX RealTime Connector requires the installation of the HDX RealTime Media Engine on the host terminal device. This topic describes the steps for deploying HDX RealTime Media Engine to thin client terminals running Windows operating systems.

You can deploy HDX RealTime Media Engine to your users' Windows devices either with or without the use of Merchandising Server. This topic describes both methods of deployment.

Prerequisites

Before deploying HDX RealTime Media Engine to a Windows client device:

- Ensure that Citrix Receiver is installed on the user device and is able to connect through XenDesktop or to XenApp.
- If the device is using RAM disk, increase it to its maximum size.

To maximize RAM disk space

1. Log on to the device as a local administrator.
 - If there is a red ball (labeled FBWF) in the Windows notification area, skip to the next step. The write filter is disabled.
 - If there is a the green ball in the Windows notification area, click the green ball and choose DISABLE so that the ball turns red.
2. Restart your device and log on as a local administrator.
3. Open Control Panel > Ramdisk.
4. In the Ramdisk Configuration dialog box, increase the size of the RAM disk to the maximum amount.
5. Restart your device and Microsoft Lync if you are running it as a published application.

Deploying HDX RealTime Media Engine through Merchandising Server

Citrix supplies a metadata file, CitrixHDXRealTimeMediaEngineMetadata.xml, so you can deploy Media Engine to your users from Citrix Merchandising Server. CitrixHDXRealTimeMediaEngineMetadata.xml identifies the terminal plug-in as Citrix HDX Real Time Media Engine.msi. To configure Merchandising Server for deployment of the Media Engine to a group of terminals, navigate to the location of these two files and select them as the metadata file and plug-in.

Deploying HDX RealTime Media Engine without Merchandising Server

After ensuring system requirements and prerequisites are met, you can deploy the media engine to your users through Citrix Merchandising Server or by making the installer available from a flash drive, web page, or network drive.

To install HDX RealTime Media Engine without the use of Merchandising Server

1. Log on to the terminal or computer as a local administrator.
2. Run Citrix HDX RealTime Media Engine.msi. After accepting the terms of use, the installer runs silently.
3. Install a web camera on the device, following manufacturer's installation instructions.

Deploy HDX RealTime Media Engine to Linux terminal devices

HDX RealTime Connector requires the installation of the Citrix HDX RealTime Media Engine on the terminal device. This section describes how to install the Media Engine for these Linux distributions:

- Fedora 16 (Verne) x86, RPM-based
- Ubuntu 11.10 (Oneiric Ocelot) x86-64, Debian-based

Prerequisites

Before deploying HDX RealTime Media Engine to a Linux terminal device running Ubuntu:

- If the Ubuntu system is newly installed, install all available updates from the Update Manager before proceeding.
- If the Ubuntu system does not have a directory called `/usr/lib32`, create it with this command: `sudo mkdir /usr/lib32`

To prepare terminals running Ubuntu for installation of HDX RealTime Media Engine

When performing the following steps, place all installation files in a directory, such as `/downloads`, and run commands in that directory.

1. Download the 64-bit Debian Citrix Receiver package from <http://www.citrix.com/English/ss/downloads/details.asp?downloadId=2316611&productId=1689163>. The download is under the heading `icaclient_12.0.0_amd64.deb`.
2. Download the RPM Open Motif version 2.3.3 package from <http://motif.ics.com/open-motif/download/openmotif-233-1e153i386rpm>. The file name is `openmotif-2.3.3-1.e15.3.i386.rpm`. The RPM package is necessary because there is no Debian package for version 2.3.3 of Open Motif.
3. Convert the Open Motif RPM package to a Debian package. For information, refer to steps 2b-2d in <http://support.citrix.com/article/CTX125285>.
4. Install these libraries required by Citrix Receiver:

```
sudo apt-get download libmotif4:i386 libxmu6:i386
sudo dpkg -x libmotif4* /tmp
sudo dpkg -x libxmu6* /tmp
sudo cp -r /tmp/usr/lib/* /usr/lib32/
```

The two `sudo dpkg` commands cause Linux to remove write privileges from both "group" and "user" for the /tmp directory. Be sure to reset privileges of /tmp back to 777 using this command: `sudo chmod 777/tmp`

5. Install the converted Open Motif package: `sudo dpkg -i openmotif_2.3.3-2_i386.deb`
6. Install the Citrix Receiver Debian package: `sudo dpkg -i icaclient_12.0.0_amd64.deb`
7. To fix any unresolved dependencies, run this command: `sudo apt-get install -f`
8. Verify that Citrix Receiver can connect through XenDesktop or to XenApp.
9. Go to "To run the HDX RealTime Media Engine installation script," later in this topic.

To prepare terminals running Fedora for installation of HDX RealTime Media Engine

When performing the following steps, place all installation files in a directory, such as /downloads, and run commands in that directory.

1. Download the 64-bit RPM Citrix Receiver package from <http://www.citrix.com/English/ss/downloads/details.asp?downloadId=2316611&productId=1689163>. The download is under the heading ICAClient-12.0.0-0.x86_64.rpm.
2. Download the RPM Open Motif version 2.3.3 package from <http://motif.ics.com/open-motif/download/openmotif-233-1el53i386rpm>. The file name is openmotif-2.3.3-1.el5.3.i386.rpm.
3. Install Open Motif: `sudo yum install -y openmotif-2.3.3-1.el5.3.i386`
4. Install the Citrix Receiver package: `sudo yum install -y ICAClient-12.0.0-0.x86_64.rpm`
5. Remove the files from the /tmp directory using these commands:

```
sudo rm -rf .X11-unix/  
sudo rm -rf .ICE-unix/  
sudo rm -rf .X0-unix/
```
6. Verify that Citrix Receiver can connect through XenDesktop or to XenApp.
7. Continue with "To run the HDX RealTime Media Engine installation script," next.

To run the HDX RealTime Media Engine installation script

The installation package for Citrix HDX RealTime Media Engine includes the following components. Use this package for both Ubuntu and Fedora. The software detects the type of Linux and installs the appropriate package.

- EULA.docx
 - HDXRTME_insdll.sh
 - /i386 subdirectory containing the Debian and RPM packages:
 - citrix-hdx-realtime-media-engine-1.0.1.i386.deb
 - citrix-hdx-realtime-media-engine-1.0.1.i386.rpm
1. Place the entire installation package in the directory from which you are running commands.
 2. At the prompt of the directory in which the software resides, enter `./HDXRTME_insdll.sh` and then follow the instructions provided by the script.
 3. If you have Microsoft Lync running as a published application, restart it (Microsoft Lync).

Install HDX RealTime Connector on your servers and VDAs

HDX RealTime Connector enables video conferences. To make Citrix HDX RealTime available to your users in XenApp and XenDesktop environments, you install HDX RealTime Connector on your XenApp servers and XenDesktop virtual desktops.

To install into a XenDesktop environment

Install HDX RealTime Connector onto a XenDesktop virtual desktop you want to make available to your users. Before installation, ensure that Microsoft Lync is not running on the XenDesktop virtual desktop.

To install HDX RealTime Connector

1. Start a XenDesktop virtual desktop and log on as Administrator.
2. On the virtual desktop, run the installation wizard HDX RealTime Connector LC.msi and follow the instructions.
3. Restart the virtual desktop.

To install into XenApp environment

Install HDX RealTime Connector on each server in a XenApp farm where you want to make HDX RealTime available. Before installation, ensure the Microsoft Lync is not running in any sessions on the servers.

1. Log on to a XenApp server as Administrator.
2. Run the installation wizard HDX RealTime Connector LC.msi and follow the instructions.
3. Restart the XenApp server.

Configuring Your Environments for HDX RealTime Optimization Pack

For information about configuring firewall ports, see the following posts in Citrix forums:

<https://forums.citrix.com/message.jspx?messageID=1674923#1674923>

To optimize performance of HDX RealTime conversations in XenDesktop virtual desktops and XenApp sessions, you can increase display memory.

To increase display memory in a XenDesktop virtual desktop or XenApp farm, you increase the Display memory limit of the Citrix Computer Policy Queuing and tossing. The recommended setting is between 8 and 16 MB.

Important: Increasing the display memory limit can affect the scalability of your XenApp farm, so do so with caution.

To modify Citrix Computer Policies, you must be a member of the Administrators group on the XenDesktop virtual desktop you are modifying and a Citrix Administrator for the XenApp farm you are modifying.

For more information for XenDesktop 5, see [Working with XenDesktop Policies](#).

For information for XenApp 6.5 for Windows Server 2008 R2, see:

- [Working with Citrix Policies](#)
- [Configuring HDX Broadcast Display Settings](#)

For information for XenApp 6 for Windows Server 2008 R2, see:

- [Working with Citrix Policies](#)
- [Configuring HDX Broadcast Display Settings](#)

Configuring client devices for use with RemoteScan and Citrix HDX RealTime Optimization Pack

You can use RemoteScan to initiate scans directly from your virtual desktop to any TWAIN or WIA compliant scanner. To run RemoteScan on client devices in XenDesktop or XenApp environments using Microsoft Lync with the Citrix HDX RealTime Optimization Pack installed:

1. Close RemoteScan if it is running on the client.
2. Open RegEdit on client device and go to [HKEY_LOCAL_MACHINE]/SOFTWARE/Citrix/ICA client/Engine/configuration/Advanced/Modules/ICA 3.0.

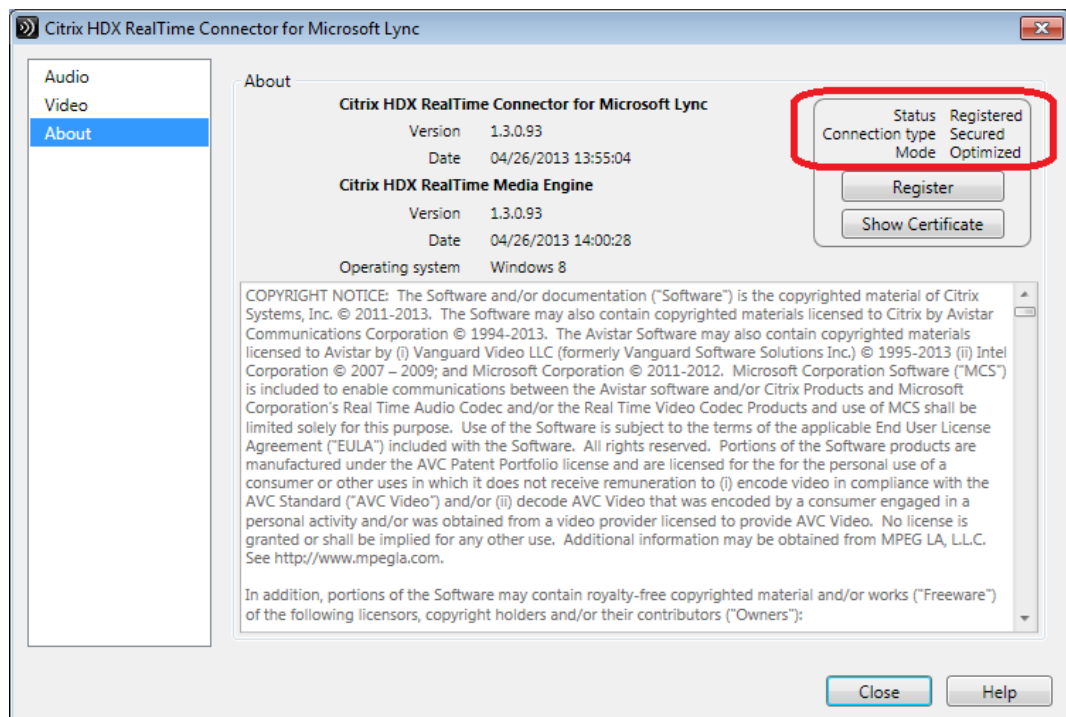
Configure

3. Remove RSICAWorkStationProxy from the VirtualDriver key.
4. Add RSICAWorkStationProxy to the VirtualDriverEx key. Place it following all other virtual driver entries.
5. On the client device, edit `c:\program files\remotescan server\server.ini` and add the following entry in the `[server]` section: `noicaregistry=1`
6. Start RemoteScan on the device.

Troubleshooting HDX RealTime Optimization Pack

You can verify your installation and collect troubleshooting information from your users through the following:

- Confirm audio and video device detection. On the user device, from the Lync tools menu, choose Tools > Audio Video Settings.
- Open the Lync **About** page and confirm connection attributes (status, connection type, and mode). The following screenshot shows the correct connection values.



If the RealTime Connector is in fallback or non-optimized mode, the value of the Mode field is Un-Optimized. For fallback mode, video and audio processing occurs on the server and the media is sent from the terminal to the server and then back to the terminal.

- During a call, you can view information about your network health by typing Alt-N. The Network Health window appears, as shown in the following example. Values in red indicate potential problems with the network. To write the values to a text file whose default name is call_statistics_<date>.txt, click Save Statistics.

	Audio	Video	Total
Receive Packets Lost (%)	0.27	0.27	0.27
Receive Packets Lost	3	3	6
Sent Packets Lost (%)	0.00	0.00	0.00
Sent Packets Lost	0	0	0
Late Packets (%)	0.00	0.00	0.00
Dropped Packets (%)	0.00	0.35	0.18
Skipped Frames (%)	0.09	2.53	0.86
Jitter Buffer Size(ms)	0	10	-
Average Data Sent (kb/s)	34	194	228
Average Data Received (kb/s)	0	230	230

	Sent	Received
Video Frame Rate	15.06	30.11
Video Resolution	352 x 288	704 x 528
Limited by	Bandwidth	Codec
Video Codec	RT Video	RT Video
Audio Codec	RT Audio	RT Audio

Buttons: Save Statistics, Close

Find log files

MediaEngineHost.exe writes client-side error logs to %TEMP%\Citrix\RestrictedMediaEngine\ on the local terminal.

The RealTime Connector client application also writes logs to your XenApp or XenDesktop servers. You can find them in the following locations, depending on the client-side operating system.

- For Windows XP users: C:\Documents and Settings\USERNAME\Local Settings\Temp\Citrix\RealTimeConnector\MediaEngine\MediaEngineDebugLogs
- For Windows 7 users: C:\Users\USERNAME\AppData\Local\Temp\Citrix\RealTimeConnector\MediaEngine\MediaEngineDebugLogs

Determine whether your connection problems are related to DNS issues

If you have DNS problems on the terminal, these can cause the RealTime Connector and the Citrix HDX RealTime Media Engine to fail registration while the Lync application can register successfully. If this occurs, debug and fix the DNS problems from the remote terminal.

Save crash logs for Dell Wyse terminals

On Dell Wyse terminals, the log file of an application crash is not saved when the user works in User mode. To save crash logs, the user must work in Administrator mode. You can find crash logs in MS-RAMDRIVE, which is drive Z by default on Wyse terminals.

Change the location of Citrix HDX RealTime Media Engine error logs

Normally, the error logs from a client application are created on the local, client device. However, such local error logs are sometimes deleted when a terminal user logs off, so a system administrator is unable to retrieve them.

HDX RealTime Media Engine avoids this by writing error messages into the Media Engine error logs on the virtual desktop running on the client device.

To change the write location of Media Engine Host error messages from the virtual desktop back to the local client device

1. In the registry of the remote desktop running on the client device, in `HKEY_CURRENT_USER\Software\Citrix\HDXRTConnectorLC\MediaEngine`, create an optional registry key `\EnableRemoteDebugLogging`.
2. Set the registry key to `dword = 0` (disabled).

To re-enable remote error message logging on the virtual desktop, set the value of the key to 1 (enabled) or remove the key entirely.

Limit the video frame rate for Citrix HDX RealTime Media Engine

If you are having video problems attributable to a high Frames Per Second (FPS) rate, such as the image breaking up, you can limit the supported FPS with this registry key value:

```
[HKEY_CURRENT_USER\Software\Citrix\HDXRTConnectorLC\MediaEngine]  
"MaxAllowableFrameRate" = "15".
```

Determine whether your firewall is blocking the RealTime Connector

The RealTime Connector can fail to initialize if a personal firewall blocks the network initialization for too long. This condition resolves itself the next time the program is run after you unblock the application.

When the firewall is blocked, an error message such as the following can appear:

- RealTime Connector is waiting for the connection from the Media Engine...
- Failed to maintain RealTime Connector on this device. Communication to the Media Engine was disrupted. Please contact your system administrator.

In such cases, create an exception in the Windows firewall.

Restore Lync to a normal size after starting a second session

Occasionally, when you start a second session on a second terminal while a first session remains open, Microsoft Lync does not open in the second session. It stays minimized in the task bar. To maximize it, right-click the task bar and select Maximize. Then, to restore Lync to a normal size, restart Lync.

Resolve an “Application Not Running” error in the App Center Console

The error `Application Not Running` can appear when a published application is closed. To resolve this issue, add `LyncMonitor.exe` to a registry key in the XenApp server. For information, refer to <http://support.citrix.com/article/CTX133328> and <http://support.citrix.com/article/CTX891671>.

Resolve video quality issues when using a wireless network connection

If you experience issues with video quality when using a wireless network connection, try moving closer to the wireless access point. If that does not resolve the issue, try a wired network connection instead. When using a wired network connection, disable the wireless network adapter to avoid transmission issues.

Install a root certificate for the RealTime Media Engine on Windows terminals

Certain Windows terminals do not include a VeriSign root certificate for RealTime Media Engine in the default set of trusted root certificates. If a terminal does not have the required certificate, these issues appear immediately after Lync starts:

- Lync does not connect to Media Engine.
- The camera preview does not work.
- The HDX RealTime Connector program information page does not include an entry for Media Engine.
- The terminal error log includes the following entry: `Media Engine package search failure. It is impossible to launch MediaEngineHost.`

For more information about root certificate issues, refer to the following articles:

- <http://support.citrix.com/article/CTX129998>
- <https://knowledge.verisign.com/support/code-signing-support/index?page=content&actp=CROSSLINK&id=AD220>
- <https://knowledge.verisign.com/support/code-signing-support/index?page=content&actp=CROSSLINK&id=SO14649>

Obtain a root certificate.

1. Go to <https://www.verisign.com/support/roots.html>.
2. Under VeriSign Root Package, click Download a root package to download the roots.zip archive.
3. Extract files from the roots.zip archive to the Windows terminal.

Install the root certificate manually or through the Microsoft Management Console (MMC).

- To perform a manual installation:
 1. From the Windows terminal, navigate to the \roots folder containing the extracted files and then open the folder Verisign Root Certificates > Generation 5 (G5) PCA.
 2. In that folder, right-click VeriSign Class 3 Public Primary Certification Authority - G5.cer and then click Install Certificate.
 3. Scroll below the Security Warning to open the Certificate Import wizard and then click Next.
 4. On the Certificate Store wizard page, click Place all certificates in the following store and then click Browse.

5. In the Select Certificate Store dialog box, select the Show physical stores check box.
 6. Open the Trusted Root Certification Authorities folder, select Local Computer, and then click OK.
 7. Click Next, review your settings, and then click Finish.
- To perform the installation with the MMC:
 1. From the Windows terminal, click Start and then type `run`.
 2. In the Run field, type `mmc` to open the terminal Console.
 3. In the Console File menu, select Add/Remove Snap-in.
 4. In the Add/Remove Snap-in dialog box, click Add.
 5. Select Certificates and then click Add.
 6. Select Computer Account and then click Next.
 7. Select Local computer and then click Finish.

Resolve installation issues

For software in general, the most common installation problems are related to corrupt system files needed for installation. These errors are rare, but difficult to troubleshoot.

The Media Engine installer requires Microsoft .NET 3.5.1. If it is missing from the computer, install it to resolve the problem. If it is already installed, run a repair installation on .NET.

On some Windows machines, customers encounter errors during software installation when embedded custom-action VB scripts run. Common errors presented to the user or captured in install logs are 2738 and 1720. Some customers have encountered these errors when an anti-virus program places the `vbscript.dll` ClassID under the `HKEY_CURRENT_USER` registry hive instead of under `HKEY_LOCAL_MACHINE` where it is needed for the proper elevated run level.

Run the following registry queries to determine if the `vbscript.dll` ClassID is installed for the current user, system wide, or both:

- `% reg query HKEY_CURRENT_USER\SOFTWARE\Classes\CLSID{B54F3741-5B07-11CF-A4B0-00AA004A55E8}`
- `% reg query HKEY_LOCAL_MACHINE\SOFTWARE\Classes\CLSID{B54F3741-5B07-11CF-A4B0-00AA004A55E8}`

The ClassID should appear only for `HKEY_LOCAL_MACHINE`. If it is under `HKEY_CURRENT_USER`, follow these steps. If ClassID is under `HKEY_LOCAL_MACHINE` and not `HKEY_CURRENT_USER`, start with step 2.

1. Run an anti-virus clean-up utility:

- a. If the terminal has an anti-virus program installed and the vendor has a clean-up utility, run the clean-up utility.
- b. Re-run the Media Engine installer MSI.
- c. If the issue persists, go to the next step.

2. Register vbscript.dll:

The vbscript.dll file or registry reference to its ClassID can become unregistered or corrupted. Follow these steps to register or repair it.

- a. Run CMD.exe as an administrator: Click Start, type `cmd`, right-click `cmd`, and click Run as administrator.
- b. Enter in the Command window:
 - For the 32-bit version of Windows: `cd %windir%\system32`
 - For the 64-bit version of Windows: `cd %windir%\syswow64`
- c. Enter in the Command window: `regsvr32 vbscript.dll`
- d. Re-run the Media Engine installer MSI.
- e. If the issue persists, go to the next step.

3. Remove the vbscript.dll ClassID:

- a. In the Registry Editor, locate and remove registry key `HKEY_Current_User\SOFTWARE\Classes\CLSID{B54F3741-5B07-11CF-A4B0-00AA004A55E8}`.
- b. Click Start > Control Panel, navigate to the User Account Control Settings, and then move the slider to Never notify.

After you complete the troubleshooting, you can revert this change if needed.

- c. Re-run the Media Engine installer MSI.
- d. If the issue persists, go to the next step.

4. Repair corrupt system files with System File Checker:

- a. Run CMD.exe as an administrator: Click Start, type `cmd`, right-click `cmd`, and click Run as administrator.
- b. In the Command window, enter: `sfc /scannow`
- c. Re-run the Media Engine installer MSI.
- d. If the issue persists, go to the next step.

5. Restore corrupt registry entries to their original state:

- a. Restart the Windows terminal and during the restart, insert the OS installation DVD to boot from it.

The OS installation DVD must match the Windows service pack installed on the terminal.

- b. Follow the installation steps, selecting the option to repair the OS.
- c. Re-run the Media Engine installer MSI.