



# **Administering Avaya Microsoft Lync Integration on Avaya Aura<sup>®</sup>**

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# Chapter 1: New in this Release

The following section details what is new in *Administering Lync Integration on Avaya Aura*<sup>®</sup> (NN10850-014) for Release 6.3.2.

## **Support for Disconnected state**

Lync Integration displays the Disconnected state when the connection to Lync Integration is lost.

## **Installation with peer-to-peer calling**

This document contains a new procedure for installing Lync Integration with peer-to-peer calling enabled.

# Chapter 2: Introduction

*Administering Lync Integration on Avaya Aura*<sup>®</sup> (NN10850-014) provides the information needed to administer Avaya Aura<sup>®</sup> deployments on Lync Integration. Lync Integration can interwork with the following Lync clients. You can only have one Lync client installed at a time.

- Lync 2010 client (standard)
- Lync 2013 client (standard)
- Lync 2013 Basic client

Lync Integration is intended for a network environment where the Microsoft Lync Server is deployed. Lync Integration is a client side add-in to the Microsoft Lync 2010 and 2013 clients. Lync Integration can be used to control an H.323 or SIP desk phone or a VDI Communicator client.

## Terminology

### Microsoft product names:

The following product names are used for the Microsoft Lync solution.

- Microsoft Lync Server 2010 or 2013
- Lync Server 2010 or 2013
- Microsoft Lync 2010 or 2013 (client)
- Lync 2010 or 2013 (client)

## Related Links

[Avaya Client Applications Documents](#) on page 8

[Support](#) on page 10

[Avaya Mentor videos](#) on page 10

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## Avaya Client Applications Documents

### Table 1: ACA documents for Release 6.3.x.

The following table provides a brief description of the Avaya Client Applications (ACA) customer documentation being issued in Release 6.3.x.

 **Note:**

Lync Integration for CS 1000 documents are not being updated for Release 6.3.x Information about the CS 1000 for Avaya Aura® solution (formerly known as the Collaboration Pack solution) is provided in *Lync Integration Fundamentals for Avaya Aura®* (NN10850–014).

Document number	Document title	Document type
Lync Integration documents		
NN10850–014	<i>Lync Integration Fundamentals for Avaya Aura®</i>	Product overview, deployment, and administration information about Lync Integration on Avaya Aura®. This document also provides overview information on the CS 1000 for Avaya Aura® solution (formerly known as the Collaboration Pack solution).
NN10850–041	<i>Lync Integration 2010 User Guide for Avaya Aura®</i>	User guide describing how to navigate the Lync Integration 2010 interface on Avaya Aura® and use features.
NN10850–041	<i>Lync Integration 2010 Help Set for Avaya Aura®</i>	Help set integrated into the application. The help set contains the same information as the user guide.
02-604243	<i>Lync Integration 2013 User Guide for Avaya Aura®</i>	User guide describing how to navigate the Lync Integration 2013 interface on Avaya Aura® and use features.
02-604243	<i>Lync Integration 2013 Help Set for Avaya Aura®</i>	Help set integrated into the application. The help set contains the same information as the user guide.
Collaboration Services documents		
NN10850–031	<i>Avaya Client Applications Collaboration Services Fundamentals</i>	Product overview, deployment, and administration for the Avaya Client Applications Configurator and Collaboration Services.
02–604198	<i>Avaya Client Applications Configurator User Guide</i>	User guide for administrative users describing the configuration options and specializations available through the Configurator.
02–604198	<i>Avaya Client Applications Configurator Help Set</i>	Help set integrated into the Configurator tool and the Windows Start menu. The help set contains the same information as the Configurator User Guide.
02-604208	<i>Avaya Client Applications Collaboration Services User Guide</i>	User guide describing the features available to users with the Collaboration Services Office and Browser applications.
02–604208	<i>Avaya Client Applications Collaboration Services Help Set</i>	Help set integrated into the Collaboration Services task bar menu and the Windows Start menu. The

Document number	Document title	Document type
		help set contains the same information as the Collaboration Services User Guide.

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## Finding documents on the Avaya Support website

### About this task

Use this procedure to find product documentation on the Avaya Support website.

### Procedure

1. Use a browser to navigate to the Avaya Support website at <http://support.avaya.com/>.
2. At the top of the screen, click **Documents**.
3. In the **Enter Your Product Here** search box, type the product name and then select the product from the drop-down list.
4. If available, select the appropriate release number from the **Choose Release** drop-down list.
5. Use the **Content Type** filter on the left to select the type of document you are looking for, or click **Select All** to see a list of all available documents.

For example, if you are looking for user guides, you can select **User Guides** from the **Content Type** filter. Only documents in the selected category will appear in the list of documents.

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### Related Links

[Introduction](#) on page 8

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## Avaya Mentor videos

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Go to <http://www.youtube.com/AvayaMentor> and perform one of the following actions:

**Procedure**

- Enter a key word or key words in the Search Channel to search for a specific product or topic.
- Scroll down Playlists, and click the name of a topic to see the available list of videos posted on the site.

**Related Links**

[Introduction](#) on page 8

# Chapter 3: Lync Integration overview

Network administrators can use their Microsoft Lync 2010 or Lync 2013 network infrastructure to enhance existing communication services. Administrators of Microsoft networks can provide unified communication services to Lync clients utilizing their Avaya Aura® communications infrastructure.

Lync Integration joins Avaya Aura® communications with the Lync client using Microsoft supported APIs. The result is industry leading Avaya communications integrated into the look and feel of Microsoft Lync. When deployed with Avaya Aura®, Lync Integration extends the functionality of the Microsoft Lync client, providing the following telephony modes: Desk Phone mode, Other Phone mode, and Computer mode.

- Desk Phone or Shared Control mode allows the user to control the desktop phone, with media going over existing PBX telephony equipment.
- Other Phone mode allows the user to control a mobile, home, hotel, or other phone number.
- Computer mode allows the user to use the computer as a phone, using the media capabilities of the computer. Computer mode is not available if users are using VDI Communicator with Lync Integration instead of a desk phone.

For a description of the services available in Phone and Computer mode, see [Telephony services with Lync Integration](#) on page 31.

Lync Integration interacts with the Lync 2010 or the Lync 2013 client directly using Microsoft supported APIs. All telephony capabilities are integrated directly between Lync Integration and the Microsoft Lync client. The Avaya solutions telephony capabilities with the Lync 2010 or 2013 client requires only a Standard CAL (license), eliminating the need for a Microsoft voice infrastructure and the Microsoft Lync Enterprise CAL. Remote Call Control and Enterprise Voice must be disabled on the Lync server.

## Related Links

[Language support](#) on page 13

[Lync Integration features](#) on page 13

[Interoperability](#) on page 15

[Lync Integration network](#) on page 15

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## Language support

Lync Integration supports the following languages:

- English
- French, International
- German
- Italian
- Japanese
- Korean
- Portuguese, Brazilian
- Russian
- Spanish, International
- Chinese, Simplified

### Related Links

[Lync Integration overview](#) on page 12

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## Lync Integration features

The Lync Integration solution uses the Lync 2010 and 2013 user interface to provide voice services.

### Note:

For a detailed description of each voice service and a list of the services supported by each service provider, see [Telephony services with Lync Integration](#) on page 31.

The solution supports the following functionality:

- Support for Computer (soft client), Shared Control (CTI control of Desk phone), and Other Phone modes when Lync Integration is interworking with a desk phone. When Lync Integration is working with a VDI Communicator client, only the Shared Control and Other Phone modes are supported.
- Make calls from Contact list, or search dialog box utilizing contacts' published numbers.
- In conjunction with the Collaboration Services applications, you can make calls from Microsoft Office applications, as well as Internet Explorer and Google Chrome web browsers. See *Avaya Client Applications Collaboration Services Fundamentals* (NN10850-031).
- Translation of E.164 numbers to customer dial plan including insertion or deletion of appropriate digits.
- Publish Telephony Presences on behalf of the user when their client is signed in and on a call.

- Display a Conversation window with the following mid-call functionality:
    - Release/End call.
    - Place call on Hold and Retrieve call.
    - Insert DTMF digit in to an established call.
    - Speaker volume control and speaker mute function (Computer mode).
    - Microphone mute function (Computer mode).
    - Escalate to a video call.
  - Handling multiple calls:
    - Support for multiple Consult calls.
    - While on a Consult call, instigate a Call Transfer.
    - While on a Consult call, merge another call to form a Conference call.
    - Add additional Consult calls to this Conference call.
    - Call Waiting pop-up display.
  - Display an incoming call window with the following functionality:
    - Indicate the Incoming Caller line ID or Caller name.
    - Allow the user to answer or ignore the call.
    - While On a call, indicate that another call is waiting. Answering this call places the first call on Hold.
    - Graphically indicate which device (Computer or Phone mode) the call will be answered on.
  - Set Call Forward options.
  - Check for and access new voice mail messages.
  - Make a video call when Lync Integration is working with a desk phone:
    - Escalate an existing call to a video call.
    - Initiate a video call.
    - Mid call control ability to pause, resume, or stop video.
    - Incoming video call prompting to accept, decline, or view incoming video.
-  **Note:**
- Lync Integration interworking with a VDI Communicator client does not currently support video call functionality.
- Access the Share My Bridge feature:
    - Dial in to your conference bridge or launch web collaboration from the Lync Integration bar or from a Conversation window.
    - Share conference bridge and web conference details with another user via instant message or email.

## Related Links

[Lync Integration overview](#) on page 12

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## Interoperability

Lync Integration requires certain key components to work. Lync Integration can also optionally interoperate with Avaya applications including:

- Avaya Collaboration Services
- Avaya Aura<sup>®</sup> Conferencing and Collaboration Agent

**+ Tip:**

For easy access to Collaboration Agent web conferencing, you can select the **Remember Me** check box on the login page to save your username and password. With this option selected, you can automatically log in to your web conference without entering your credentials every time.

For additional information about Avaya Collaboration Services, see *Administering Avaya Collaboration Services* (NN10850–031).

For information about Avaya Aura<sup>®</sup> Conferencing and Collaboration Agent, see:

- *Deploying Avaya Aura<sup>®</sup> Conferencing*
- *Administering Avaya Aura<sup>®</sup> Conferencing*
- *Using Avaya Aura<sup>®</sup> Conferencing Collaboration Agent*

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## Lync Integration network

Microsoft Lync may be deployed within an Enterprise, on premise, or within a Hosted Office 365 deployment. Lync Integration will inter-operate with Lync 2010 or 2013 clients deployed on the user's PC. The following diagrams represent Lync Integration deployed within an Enterprise. For more information about Lync Integration deployed in a hosted service configuration, see [Lync Integration support for Microsoft Office 365](#) on page 17.

Lync Integration overview



Figure 1: Lync Integration deployed in an Enterprise with an H.323 endpoint

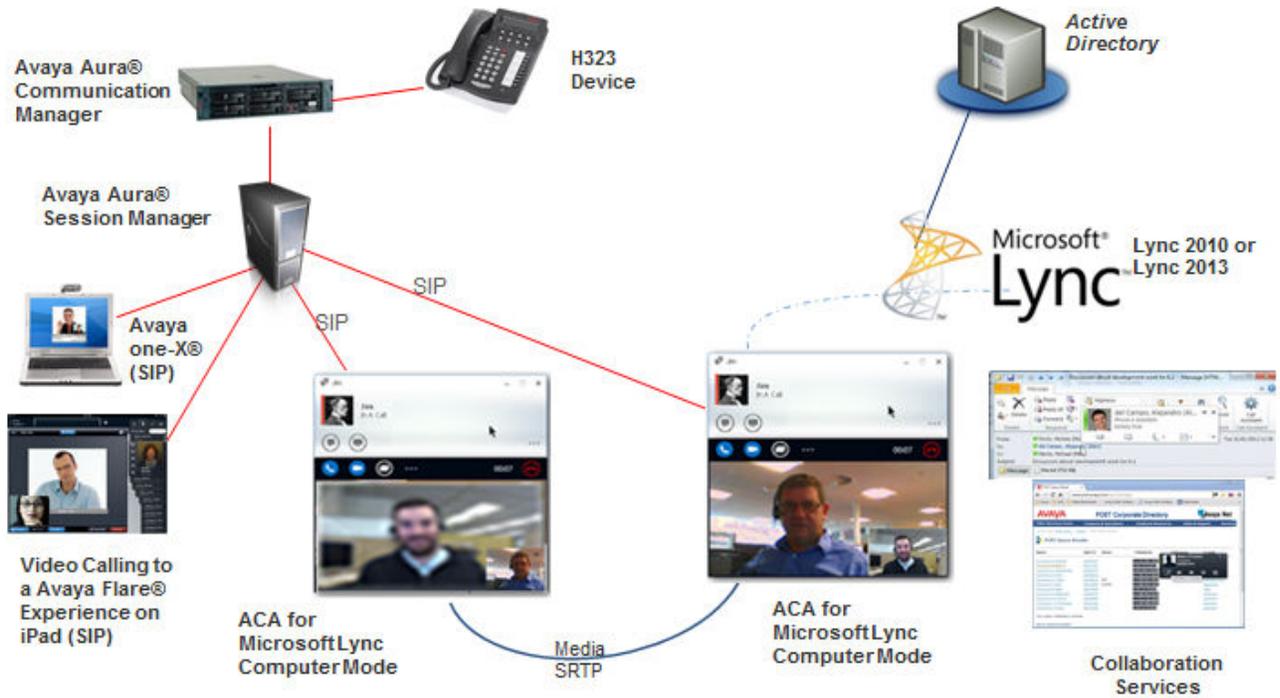
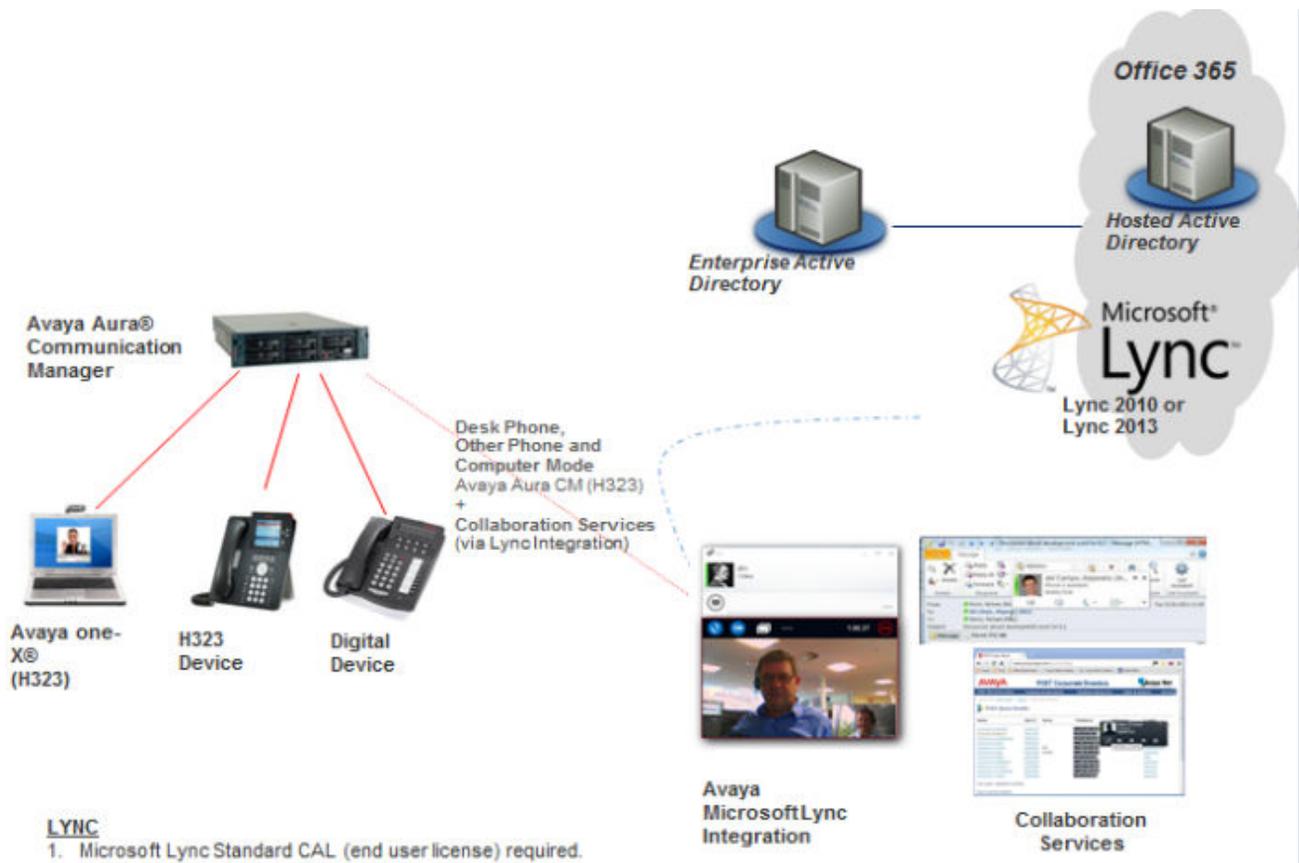


Figure 2: Lync Integration deployed in an Enterprise with a SIP client

## Lync Integration support for Microsoft Office 365



**Figure 3: Lync Integration with an H.323 endpoint deployed in a Microsoft Office 365 environment**

The following image shows Lync Integration with a SIP client in an Internet deployment. In this type of deployment, the SIP device is connected to Avaya Aura® Session Manager.



Figure 4: Lync Integration with a SIP client in an Internet deployment

### Authentication within an Office 365 deployment for Avaya Aura®

Lync Integration launches, once the Lync client is successfully logged in. After verifying that the published work number of the user matches the Lync Integration extension, authentication occurs between the Avaya UC engine and the Avaya Aura® system.

# Chapter 4: Lync Integration on Avaya Communication Server 1000 with Avaya Aura<sup>®</sup> architecture

The CS 1000 with Avaya Aura<sup>®</sup> solution (formerly known as the Collaboration Pack solution) is used to extend Lync Integration on Avaya Aura<sup>®</sup> functionality to CS 1000 users. This solution is suitable for users who want to retain their CS 1000 desk phone and add additional Avaya Aura<sup>®</sup> functionality such as point-to-point video support with Lync Integration. The solution does not use the Avaya ACE<sup>™</sup> server. Solution features include support for:

- Computer mode with point to point video.
- Other Phone mode.

The Avaya Aura<sup>®</sup> system controls calls over the user's extension, providing support for Computer mode. Lync Integration registers directly to Avaya Aura<sup>®</sup>, and voice and video calls are presented on the user's computer.

The following image provides an overview of the solution topology.

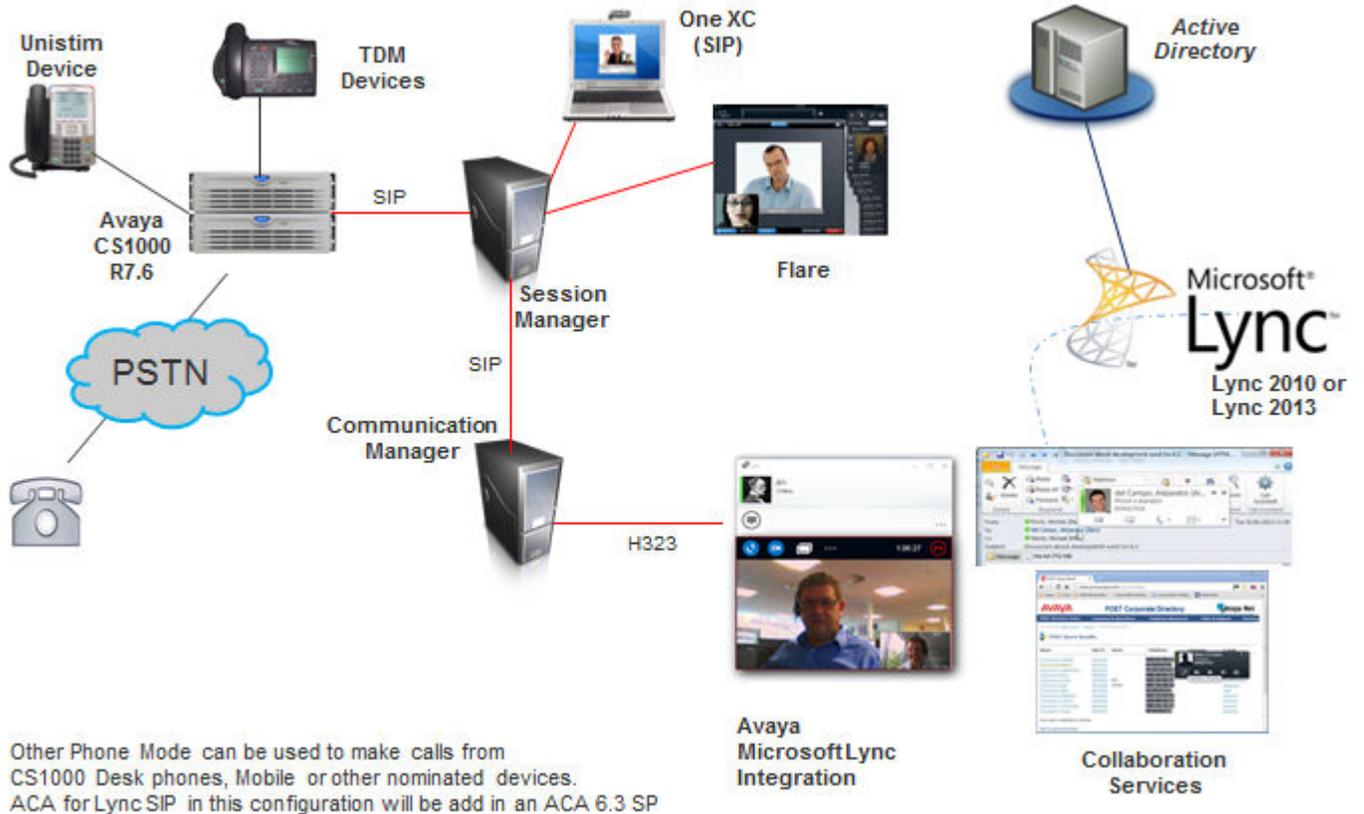


Figure 5: Topology for CS 1000 with Avaya Aura® solution

## CS 1000 with Avaya Aura® features

The CS 1000 with Avaya Aura® solution uses the Lync client for Presence and Instant Messaging, and leverages Lync Integration for voice and video call functionality.

The features that this solution offers in Computer mode and Other Phone mode are similar to the features offered with a standard Lync Integration on Avaya Aura® deployment. The solution includes the following key functionality.

- Support for video calls between peers is integrated into the Lync client.
- Ability to switch between Computer mode and Other Phone mode. Desk Phone mode is not supported.
- Ability to make Lync Integration voice or video call from:
  - Lync contact list
  - Microsoft applications, including Outlook, Word, Excel, PowerPoint, and SharePoint
  - Internet Explorer

- Google Chrome
- Ability to escalate and de-escalate from:
  - An IM conversation to a voice or video call
  - A voice call to a video call
- Voice and video call options for Auto-answer or manual Accept and Decline (Ignore).
- Support for mid call control operations through the Lync Integration Conversation window. These mid call control operations include:
  - Mute voice
  - Pause and play video
  - Hold and retrieve voice and video calls
  - Enter DTMF digits in an active call
  - Multi-call handling, such as voice and video call transfer as well as escalation or de-escalation of a video conference to an audio conference.
- Video interoperability with Avaya Aura®, Avaya Scopia®, and Polycom

**! Important:**

Video functionality is supported in Computer mode, but a video call cannot be started when Other Phone mode is being used to control the user's CS 1000 desk phone, mobile phone, or other device.

#### Related Links

[Telephony services with Lync Integration](#) on page 31

[Computer mode](#) on page 35

[Other Phone mode](#) on page 35

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## CS 1000 with Avaya Aura® administration

Lync Integration administration for the CS 1000 with Avaya Aura® solution is similar to the administration described in this document. However, there are some differences such as:

- PSTN trunking is done through CS 1000 and not Avaya Aura®.
- The primary work phone number for the user must be published as part of the solution configuration. The user's primary work phone number is not the standard CS 1000 desk phone number.

For more information about administering the CS 1000 with Avaya Aura® solution, see *White Paper/ Application Note: Configuring Avaya Communication Server 1000E and Avaya Aura® when deploying Avaya Client Applications for Microsoft Lync*.

# Chapter 5: Lync Integration Virtual Desktop architecture

Lync Integration supports Virtual Desktop Infrastructure (VDI) deployments in Shared Control (Desk Phone) and Other Phone modes. VDI is a desktop computing deployment strategy where a virtual machine in the data center houses user data and applications. Monitor, keyboard, and mouse functionality is extended to the desktop.

With this deployment, Lync Integration is installed on a centralized Citrix or VMware server in the data center. Citrix Xen Desktop, Xen Applications, or VMware Horizon viewers provide local users with access to applications and services, allowing users with a VDI setup to directly control their Avaya Aura® SIP desk phone.

The following image shows Lync Integration in architectural topology for VDI deployments.

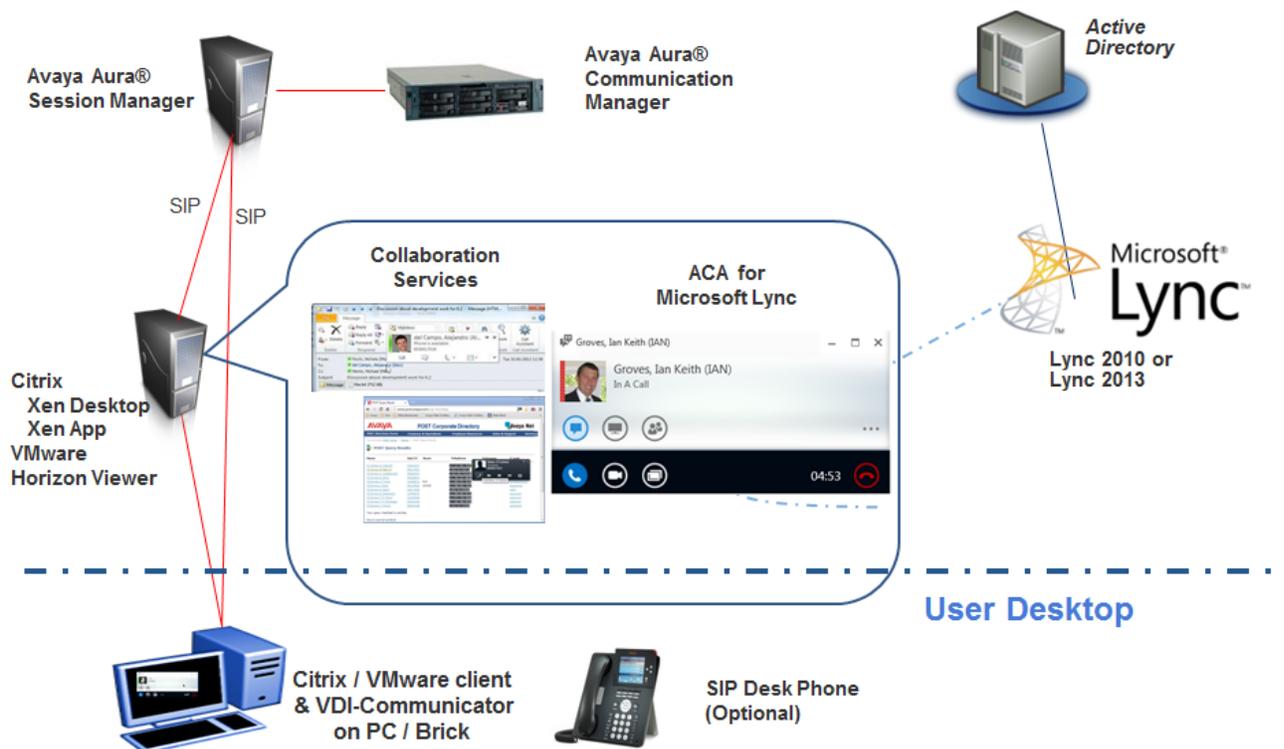


Figure 6: Virtual desktop topology

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## Lync Integration Virtual Desktop features

The Lync Integration VDI solution uses the Lync client for Presence and Instant Messaging, and leverages Lync Integration for voice call functionality. The solution offers Other Phone mode and Shared Control (Desk Phone) mode. Shared Control mode can either operate with an Avaya desk phone or a VDI Communicator client, with the experience similar to a standard Lync Integration on .Avaya Aura<sup>®</sup> deployment.

The Lync Integration VDI solution includes the following key functionality:

- Support for audio calls between peers is integrated into the Lync client.
- Ability to switch between Shared Control mode and Other Phone mode. Computer mode is not supported.
- Ability to make Lync Integration voice call from:
  - Lync contact list
  - Microsoft applications, including Outlook, Word, Excel, PowerPoint, and SharePoint
  - Internet Explorer
  - Google Chrome
- Ability to escalate and de-escalate from:
  - An IM conversation to a voice call
- Option to manually Accept and Decline (Ignore) voice calls.
- Support for mid call control operations through the Lync Integration Conversation window. These mid call control operations include:
  - Mute voice
  - Hold and retrieve voice calls
  - Enter DTMF digits in an active call
  - Multiple call handling, such as voice call transfer, or voice conference

### Related Links

[Telephony services with Lync Integration](#) on page 31

[Desk Phone or Shared Control mode](#) on page 35

[Other Phone mode](#) on page 35

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## Avaya VDI Communicator deployment

Lync Integration supports Avaya VDI Communicator deployments. With VDI becoming more prevalent, customers are looking to deliver unified communications (UC) and business productivity applications on a single desktop device, removing the need to deploy a desk phone. Avaya VDI

Communicator off-loads the media processing from the data center by sending real time media directly to the client.

Avaya VDI Communicator is a software deployed on a thin client (an appliance that connects the user's peripherals back to the data center) or a re-purposed PC used as a VDI client. VDI Communicator applications allow users to access their virtualized desktops in the data center. Traditional VDI deployments focus on application hosting from the data center and not real time communications. Real time communications that go through the data center before reaching the VDI application add delay, latency, and media processing. Using a VDI Communicator application instead of a traditional VDI deployment prevents these issues. VDI Communicator applications also provide survivability, without the Lync client, so you can continue communication sessions with VDI even after connectivity to the data center is lost.

For additional information on VDI deployment options with Lync Integration or Collaboration Services, see *Solution Description Document: Microsoft Lync 2013 with Avaya Aura® and Collaboration Services for Microsoft Applications and Web Browsers*.

---

## Lync Integration feature enhancements with Avaya VDI Communicator

When Lync Integration is connected to and controlling Avaya VDI Communicator, the following user experience changes exist to enhance the experience:

- The Switch Modes button indicates that you are controlling a VDI Communicator application.
- Mute microphone functionality is exposed to the user on the Lync Integration Conversation bar. This functionality only appears when Lync Integration is controlling an Avaya VDI Communicator application.

## Lync Integration limitations with VDI Communicator

The following limitations exist for VDI Communicator features:

- Video calls are not supported.
- Integration between Lync Integration for VDI Communicator and Session Border Controller is not supported.
- VDI deployments can only interwork with SIP endpoints. H.323 endpoints are not supported.

 **Note:**

As of Release 6.3.1, Lync Integration 2010 and 2013 both support VDI deployments. In Release 6.3, only Lync Integration 2013 supported VDI deployments.

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## Virtual Desktop interoperability requirements

The following table summarizes the main VDI product and server requirements.

**Table 2: VDI requirements**

Virtual Desktop versions	<ul style="list-style-type: none"><li>• Citrix Xen Desktop: Version 5.6</li><li>• Citrix Xen Applications: Version 6.5</li><li>• VMWare Horizon View: Version 5.3</li></ul>
Virtual Desktop servers	Windows 2008 R2 Enterprise for Citrix Xen Desktop, Citrix Xen Applications, and VMWare Horizon View.
VDI Communicator	Version 1.0

# Chapter 6: Lync Integration key components

Lync Integration features the following key components.

## Related Links

[Microsoft Lync client](#) on page 26

[Lync Integration](#) on page 26

[Microsoft Lync Server](#) on page 27

[Service providers](#) on page 27

[Supported desk phones \(hardware\)](#) on page 27

[Approved headsets](#) on page 28

[Camera](#) on page 28

[Client work station requirements](#) on page 29

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## Microsoft Lync client

Microsoft Lync is the unified communication desktop client providing IM and presence capabilities to the overall solution. Microsoft's Lync Server delivers IM and presence aggregation services to the end user.

Users can use one of the following Lync clients:

- Lync 2010 client (standard)
- Lync 2013 client (standard)
- Lync 2013 Basic client

## Related Links

[Lync Integration key components](#) on page 26

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## Lync Integration

This is a client side add-in to Microsoft Lync 2010 and 2013. It utilizes the Lync Client User interface to drive Avaya Voice capabilities to the end user. Lync Integration operates in three modes: Desk

Phone mode, Computer mode, and Other Phone mode. In Computer mode, it utilizes the Avaya Unified Communication (UC) desktop engine to deliver soft client functionality. In Phone mode, it provides CTI control over the end user's desk phone.

To use Lync Integration on the Lync 2013 client, you must download the minimum patch available at <http://support.microsoft.com/kb/2825630>.

#### Related Links

[Lync Integration key components](#) on page 26

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## Microsoft Lync Server

The Microsoft Lync Server provides the end user with IM and Presence aggregation functionality. Lync Integration builds on this Lync functionality and its Lync client user interface to deliver an Avaya voice experience.

#### Related Links

[Lync Integration key components](#) on page 26

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## Service providers

The following service provider is supported with Avaya Aura<sup>®</sup> based Lync deployments:

- Avaya Aura<sup>®</sup> Communication Manager (Computer and Desk Phone mode)
- Avaya Aura<sup>®</sup> Session Manager (for SIP)
- Avaya Session Border Controller for Enterprise (optional for SIP Shared Control or Desk Phone mode)

#### Related Links

[Lync Integration key components](#) on page 26

[SIP Shared Control mode interworking with Avaya Session Border Controller for Enterprise](#) on page 60

---

## Supported desk phones (hardware)

Avaya H.323 and SIP phone series 46xx, 24xx, 64xx, and 96xx (except 9610) are supported with Avaya Aura<sup>®</sup> based Lync deployments.

All SIP and H.323 16xx phones configured as 46xx phones on the Communication Manager server are also supported. All phones not listed here are not supported in the Desk Phone mode. For more

information about aliasing one telephone model as another, see **Using an Alias** in *Administering Avaya Aura® Communication Manager* (03-300509).

 **Note:**

Digital phones are not currently supported.

**Related Links**

[Lync Integration key components](#) on page 26

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## Approved headsets

### About this task

Use this procedure to obtain a list of approved headsets.

 **Warning:**

Use headsets according to manufacturer guidelines. Avaya recommends that headsets and web cameras are plugged in directly to the work station or docking station. The use of a USB hub may cause performance issues and is not recommended.

### Procedure

1. Open a web browser and go to the DevConnect web site at <http://www.avaya.com/devconnect>.
2. In the navigation list on the left, select **Tested Solutions**.
3. Select the **Solution** tab.
4. Under **Solution Platform**, select the **one-X Communicator** check box.
5. Click **Search**.

A list of approved headsets is displayed.

---

## Camera

Recommended USB cameras are listed below.

 **Note:**

Where possible, follow Microsoft Windows Operating System Recommended Hardware requirements based on the Operating System version information.

**Table 3: Driver versions with HD cameras**

HD Camera	Driver version
Creative Live! Cam Socialize HD	1.2.1.0
Microsoft Lifecam Cinema	3.20.240.0
Logitech® Webcam C905	13.0.1788.0

**Table 4: Driver versions with non HD cameras**

Non HD Camera	Driver version
Logitech® Webcam Pro 5000	12.0.1278.0
Logitech® Quick Cam Messenger	12.0.1278.0
Creative Live! Cam Notebook Pro	1.2.6.627
Logitech® Webcam Pro 9000	13.0.1783.0

**Related Links**

[Lync Integration key components](#) on page 26

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## Client work station requirements

The machine where Lync Integration is installed must meet the following requirements. For detailed information about interoperability and supported versions, see <http://support.avaya.com/CompatibilityMatrix/Index.aspx>.

**Table 5: Hardware requirements**

Processor	2 GHz
Memory	<ul style="list-style-type: none"> <li>• 2 GB (32 Bit)</li> <li>• 4 GB (64 Bit)</li> </ul>
Disk space	500 MB
Connectivity	Download bandwidth: 80 kbps Upload bandwidth: 80 kbps
Video	For deployments with video enabled, the following hardware requirements must be met: <ul style="list-style-type: none"> <li>• Intel Dual Core, Core 2 Duo, Core i3, or higher processor</li> <li>• 500 MB video RAM with 100 MB of PC memory dedicated to video</li> <li>• Minimum 4 GB memory on 64 Bit systems</li> <li>• Digital video camera (up to 720p is supported)</li> </ul>

**Table 6: Software requirements**

Operating system	<ul style="list-style-type: none"><li>• Microsoft Windows 7</li><li>• Microsoft Windows 8 and 8.1</li></ul> <p> <b>Note:</b> Apply the latest Microsoft patch to Windows 8.</p>
Microsoft .Net	Release 4.0 or higher
Microsoft Lync client	<ul style="list-style-type: none"><li>• Microsoft Lync 2010 version 4.0.7577.4103 or higher</li><li>• Microsoft Lync 2013 version 15.0.4535.1507 or higher</li></ul>

**Related Links**

[Lync Integration key components](#) on page 26

# Chapter 7: Lync Integration services

Lync Integration is an add-in application that extends Microsoft Office Lync 2010 and 2013 functionality using Lync supported APIs. Lync Integration can interwork with an H.323 or SIP desk phone, or a VDI Communicator client to provide telephony services.

Integrating Lync Integration with Microsoft Lync 2010 or 2013 enables telephony services in the Lync client. Lync Integration customizes and configures the Lync client as part of its installation.

**\* Note:**

If you are using the Lync client over a Microsoft Remote Desktop session, it is recommended that you use Remote Desktop client version 6.1.7600.16385 or higher. Remote Desktop client software is available from the Microsoft web site. You should download the latest available version of the client as well as any available updates.

## Related Links

[Telephony services with Lync Integration](#) on page 31

[Telephony presence with Lync Integration](#) on page 40

[Video telephony services with Lync Integration](#) on page 40

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## Telephony services with Lync Integration

Lync Integration controls a single line, based on the user's primary line. If the user's desk phone supports multiple lines, non-primary lines will not be represented by Lync Integration.

The following table lists supported functionality.

**\* Note:**

The following features are not supported for Lync Integration with Avaya Aura®:

- Call History
- Single Step Transfer (Blind Transfer)

**Table 7: Telephony feature descriptions**

Capability	Description
Make Call	<p>Users can make a call on their phone by:</p> <ul style="list-style-type: none"> <li>• Clicking a contact in their contact list and selecting the  icon in Lync 2010.</li> <li>• Hovering over a contact's picture and selecting the  icon in Lync 2013.</li> <li>• Entering a number in the Lync 2010 or 2013 dialog box.</li> </ul>
Release Call	Users can Release a phone call by clicking the <b>End Call</b> button in the Lync Integration Conversation bar.
Answer Call	Users can accept an incoming call that is presented to them via a pop-up window.
Ignore Call	<p>Users can ignore a phone call by clicking the <b>Ignore Call</b> button in the Lync Integration Incoming Call Notification dialog box. On the PBX line, the call is treated as an unanswered call.</p> <p> <b>Note:</b></p> <p>In the Shared Control mode, the desk phone continues ringing after the called party clicks the <b>Ignore Call</b> button. To stop the phone from ringing, the calling party must end the call or the called party must manually hang up the desk phone.</p>
Caller ID	<p>Users receive Calling Party Name or Caller line ID in a pop-up window.</p> <p> <b>Note:</b></p> <p>Lync Integration attempts to match the incoming caller number to the user's Lync contacts. If this action is not successfully completed, the Avaya Aura<sup>®</sup> caller name is displayed.</p>
Forward Line	<p>Users can activate Call Forward on their PBX line for incoming calls by selecting the Call Forward button from the Lync Integration Bar. When the call forwarding feature is activated, you do not receive incoming call notifications. The user that the call is forwarded to receives an incoming call notification, and after answering the call, a video request also appears.</p> <p> <b>Note:</b></p> <p>When Lync Integration is in the Other Phone mode, call forwarding functionality is disabled.</p>
Call Hold and Retrieve	User can place call on hold using the hold button within the Lync Integration Conversation bar. The call may be retrieved by clicking somewhere within the text line when the call is in a held state.
Generate Digits (DTMF)	<p>Users can initiate sending of DTMF digits through the PBX system by selecting the dial pad button on the Add-in Conversation bar.</p> <p>This feature is disabled when:</p> <ul style="list-style-type: none"> <li>• The call is paused.</li> </ul>

Capability	Description
	<ul style="list-style-type: none"> <li>Lync Integration is in SIP Other Phone mode.</li> </ul> <p>In Lync 2013, the dial pad is dimmed when disabled. In Lync 2010, the DTMF button is not visible when disabled.</p>
Consult Call	<p>When on an active call, the user can:</p> <ul style="list-style-type: none"> <li>Answer a call.</li> <li>Instigate a second call by clicking a contact in their contact list or entering a number in the Lync 2010 or 2013 dialog box.</li> </ul> <p>When an additional call is answered or initiated, the previously active call is placed on hold.</p> <p>Multiple consult calls can be created.</p>
Consult Transfer	When one or more consult calls are established, users are able to select, from a list of held calls, the call they wish to transfer their active call to.
Consult Conference	When one or more consult calls are established, users are able to select, from a list of held calls, the call they wish to merge into a Conference call.
Call Waiting	When on an active call, a toast pop-up is presented indicating that an alternative call is waiting. If the user decides to answer this call, then current active call is placed on hold. The new call now becomes the active call.
Receiver Mute	Users can select to mute or un-mute the PC speaker(s) or headset receiver. This feature is only applicable in Computer mode.
Receiver Volume Control	Users can select to adjust the volume of the PC speaker(s) or headset receiver. This feature is only applicable in Computer mode.
Audio Devices Mute	Users can select to mute or un-mute the PC speaker(s) or headset microphone. This feature is only applicable in Computer mode.
Make Video Call	<p>Users can make a video call by clicking a contact in their contact list and selecting <b>Make Video Call</b>.</p> <p> <b>Note:</b></p> <p>When making a video call or escalating an audio call to a video call, the IM pane does not appear in Lync Integration 2013. This functionality does not apply to Lync Integration 2010.</p>
Share My Bridge feature	<p>With Lync Integration 2013, users can use the Share My Bridge feature to launch web collaboration, dial in to their conference bridge, or share conference details with another user via IM or email.</p> <p>This feature is not available for Lync 2010.</p>
Message Waiting Indication	<p>With Lync Integration 2013, the <b>Message Waiting Indicator</b> button on the Lync Integration bar lights up to indicate when users have a new voice mail message. Users can press this button any time to dial in to voice mail box.</p> <p>This feature is not available for Lync 2010.</p>

### Related Links

[Lync Integration services](#) on page 31

[Lync Integration desktop life cycle](#) on page 34

[Lync Integration operational modes](#) on page 34

[Lync Integration telephony service limitations](#) on page 37

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## Lync Integration desktop life cycle

Once installed, Lync Integration is launched as an end-user service when the user signs into Windows. The service waits in an idle state for the Lync 2010 or 2013 client to launch, and for the user's Lync client to successfully sign in to the Lync server. At this point, Lync Integration will attempt to bind to its service provider. This takes between 5 seconds and 2 minutes, depending on network latency and workstation capacity. When the user signs out of the Lync client, Lync Integration will unbind from the active service provider and transition to the idle state.

Lync Integration may be restarted after the computer returns from sleep or after an intermittent network outage. When Lync Integration is restarted, the Conversation bar is attached to each Conversation window. This makes the Conversation window appear active even though nothing has changed in the window.

If required, Lync Integration can be started from the Windows **Start** menu under **Programs > Avaya > Lync 2010 Integration** or **Lync 2013 Integration**. To stop Lync Integration for the current Windows session, use the `shutdown.bat` file available in the Program Files installation folder.

### Related Links

[Telephony services with Lync Integration](#) on page 31

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## Lync Integration operational modes

Lync Integration supports the following operational modes:

- Desk Phone (also called Shared Control when using a VDI Communicator client instead of a desk phone)
- Computer
- Other Phone

Select the mode from the Lync Integration bar. In order to select Other Phone mode, you must specify a telephone number in the Lync Integration **Settings > Devices** window. You can specify multiple devices, but only one device can be selected as your active device.

### Related Links

[Telephony services with Lync Integration](#) on page 31

[Computer mode](#) on page 35

[Desk Phone or Shared Control mode](#) on page 35

[Other Phone mode](#) on page 35

[Disconnected state](#) on page 36

## Computer mode

Computer mode allows the Lync client to use the computer as a phone. Lync Integration uses Avaya UC Desktop Engine capabilities to use the media capabilities of the computer.

Computer mode is not available when Lync Integration is interworking with the VDI Communicator client. This mode is only available when Lync Integration is interworking with a desk phone.

### Related Links

[Lync Integration operational modes](#) on page 34

## Desk Phone or Shared Control mode

Desk Phone or Shared Control mode allows Lync Integration to control the desk phone or VDI Communicator client. Lync Integration uses Avaya UC Desktop Engine capabilities to remotely control media anchored on the VDI client or desk phone.

The icon that indicates that the VDI Communicator client is in Shared Control mode looks like the Computer mode icon (  ) with a **Using VDI** tool tip.

### Related Links

[Lync Integration operational modes](#) on page 34

## Other Phone mode

Use Other Phone mode when you are away from the office and would like to use Lync Integration to make and receive calls in conjunction with another device such as your mobile, home, or hotel phone, or with a device at another office location. Unlike Computer mode, this mode is configured for toll-quality audio and optimizes audio through the other phone.

All calls made and received in Other Phone mode work through the Avaya Aura<sup>®</sup> system. This mode enables you to use the full feature set of your company's telephone system from a location other than your office. You place and handle calls via the Lync Integration interface, and use a separate telephone line at your remote location to speak and listen. All outgoing calls appear as originating from the primary work phone number because Avaya Aura<sup>®</sup> hides the identity of the other device from the remote party.

To use this mode, you must have a separate telephone line available at your remote location.

### Provisioning Telecommuter phone number

Before using Other Phone mode, provision telephone numbers for Other Phone mode (Telecommuter numbers) under the **Settings > Devices** panel in Lync Integration.

### Launching Other Phone mode

When launching Other Phone mode from the Lync Integration bar, select which Telecommuter number to use.

When Other Phone mode is activated, you are logged out of your normal phone extension. When you exit Other Phone mode, your extension number returns to the normal phone extension. If there is no desk phone or if the phone is unavailable, the line appears logged off from the phone system.

## Originating calls

When a call is initiated in Other Phone mode, Avaya Aura® makes an initial call to the Telecommuter number selected. The Telecommuter device rings, and when the call is answered, Avaya Aura® calls the remote party's number. To the remote party, the call appears to be initiated from your main work phone number. When the remote party answers the call, Avaya Aura® joins both calls into a single two-party call.

## Incoming calls

Incoming calls to your work phone number are directed to the Telecommuter number being used. The incoming call alert appears on Lync Integration. It is not possible to answer the call from an incoming call notification. Instead, you must answer the call on the device directly.

You cannot answer an incoming call in Other Phone mode if another call is already in progress.

## Managing active calls

You should manage all active calls in Lync Integration. The only active call action supported on the Telecommuter device is End Call. This is because the Telecommuter device is not aware of the work phone number or the features associated with this number. Any call operation invoked on the device occurs independently of Avaya Aura® and is not reflected on Lync Integration. These call operations are not visible to the remote party.

DTMF digits can optionally be entered on the device. If Lync Integration is provisioned for a SIP line, the DTMF digits must be entered on the device directly.

## Unsupported environments

- Video calls are not supported in Other Phone mode.
- You cannot use a co-worker's extension as a Telecommuter number. If you want to use a co-worker's phone, you must log out the co-worker's phone manually and log in to it with your credentials. This way, you can continue using the features provisioned for your extension on Lync Integration with the co-worker's phone device.

## Related Links

[Lync Integration operational modes](#) on page 34

## Disconnected state

The Disconnected state appears on the Lync Integration bar in place of the operational mode for Desk Phone mode, Computer mode, or Other Phone mode. The Disconnected state appears for several reasons, such as the following:

- Lync Integration cannot connect to Avaya Aura® Communication Manager or Avaya Aura® Session Manager.
- The configuration data is missing or incorrect.
- The network connectivity is lost or poor.
- The Shared Control resource (desk phone) is unavailable.
- Policy-based log outs are initiated by the server.

In the Disconnected state, Lync Integration automatically tries to connect to Avaya Aura®. If the connection is not established, you might need to select the mode from the Lync Integration mode menu to connect.

Lync Integration 2010 does not display the Disconnected state when the Lync 2010 client is not logged in to the Lync server.

### Related Links

[Lync Integration operational modes](#) on page 34

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## Lync Integration telephony service limitations

Lync Integration telephone service has the following limitations.

### Audio controls

- When a conversation is initiated, if the audio device setting is already at the lowest setting, Lync Integration does not present the conversation as muted.
- Audio Device settings may appear unsynchronized with the PC settings.
- Audio Settings cannot be adjusted from the **Settings** panel when a call is in progress.
- Lync Integration does not support call control using the headset directly. Call control must be invoked on the phone set, or using the Lync Integration application.

### Lync server restarts

Lync Integration does not function during a Lync server outage. Within Phone mode, mid-call control may return when Lync becomes available. Users retain the ability to use their desk phone to make calls until full functionality is restored.

If a user is on a Computer mode call when the Lync server becomes unavailable, the call will be maintained, but mid-call control may be lost. The ability to end the call is maintained by a pop-up window. If the Lync client is able to reconnect to the Lync server prior to the call being completed, Lync Integration will begin providing service once the existing call is completed.

### Lync client machine restarts

Active Computer mode calls are not terminated when a machine running the Lync 2010 client is restarted. The remote party can either wait for the call to reconnect or terminate the call. If the telephony infrastructure detects that the endpoint is no longer sending media, the call may be terminated.

### Call Forwarding

An incoming call originated by the user, which is eventually routed back to the originator, is not presented to the user. For example, a user sets call forwarding from device B to device A. The user then uses device A to call device B. Device A receives a call back, but the user cannot accept the call. The call may route to No Answer treatment.

### Consult Transfer and Consult Conference

- Transferring into a conference is not supported.
- Presentation of only one conference is supported.
- It is not possible to add a call that is in the ringing state into a conference call. The call must be in the established state.
- Conference participants that are not Lync Integration users are removed from the conference leader's window if the conference leader sends an IM.

- The Conversation window of a conference participant does not show other conference participants.
- Participants may see a Conference window instead of the standard Conversation window with the conference host. In the Conference window, individual conference participants might not be listed.
- After a participant drops in a three-party conference call, the Conference window might not become a Conversation window as expected.
- Consult Conference behavior is not guaranteed if the conference is initiated or manipulated via the phone or hard client.

### **DTMF in Computer Mode**

When entering DTMF digits into a conversation, the DTMF tone played back on the speaker may be picked up by the microphone. In this case, the digit sequence may be corrupted. There are two workarounds:

- Use a headset when inserting DTMF digits into a conversation.
- Mute the microphone while DTMF digits are being inserted.

### **Multiple Avaya Unified Communication clients**

Multiple Avaya UC Clients may be deployed on a user workstation, but only a single UC client can be used for telephony services at any time. Having multiple Avaya soft phone clients (such as Avaya one-X<sup>®</sup> Communicator and Avaya Communicator for Windows) logged in simultaneously on the same work station is not supported.

### **Multiple Lync Integration sessions**

Microsoft Lync supports multiple client sessions for each user. However, Lync Integration does not. For each user, only a single Lync Integration session can be running. To avoid contention for telephony resources, only a single session of Lync Integration can run on a workstation at any time.

### **Multiple published work phone numbers**

Lync Integration cannot support multiple published work phone numbers. The published work phone number must match the number defined in Active Directory.

### **Common phone numbers for multiple users**

Multiple Lync Integration users should not publish the same Home, Mobile, or Other phone number in the Lync client. If multiple users have a common phone number, such as a reception or hunt group phone number, the users must create a new contact for the common phone number.

### **Multiple calls to the same contact**

Only one Conversation window can be active against a Lync contact at a time. If a user needs to make a second call to the same contact while already on another active call with that contact, the user must make the call by entering the contact's alternative phone number in the Lync Search bar or by creating a separate contact for the phone number.

### **Unique work phone numbers for all users**

All Lync Integration users must publish unique phone numbers in the Microsoft Address Book. Multiple users cannot publish the same work phone number in their Lync clients.

## Conference calls with the People Options button

In a Lync Conversation window, users cannot use the **People Options** button to escalate a call or an instant messaging conversation to a conference call. The **People Options** button can only be used to add people to an instant messaging conversation.

## Telephony service limitations specific to Avaya Aura®

### Avaya Bridge Call Appearance Integration with Lync Integration

The Lync Integration application is not supported on lines with the Bridged Call Appearance feature on Avaya Aura® Communication Manager.

### Hold and Retrieve operations when Lync Integration is set to Other Phone mode

If Lync Integration is set to Other Phone mode and the other device is another Communication Manager extension, invoking the Hold and Retrieve operations on the desk phone results in the call being unmanageable. This is not an issue if the Hold and Retrieve operations are invoked on the Lync client directly or if the other device is a non Communication Manager device, such as a home or mobile phone number.

### Multiple Device Access

Lync Integration does not support Multiple Device Access (MDA) configuration. You can only log in to Lync Integration with one extension at a time.

### Dual provisioning (H.323 and SIP)

Lync Integration can be provisioned for either SIP or H.323 provisioning, but does not support dual provisioned SIP and H.323 lines.

## Limitations specific to SIP Shared Control mode

### Support for 96x0 series phones

SIP 96x0 endpoints are not currently supported in Shared Control mode.

### Support for 1100 series phones

SIP 1100 series endpoints are not currently supported in Shared Control mode.

### No support for video

Video calls are not currently supported in SIP Shared Control mode.

### Conversation window does not re-appear after logging out and logging back in

When you sign out of the Lync client and sign back in while on an active call, the Lync Integration Conversation window should re-appear. However, in SIP Shared Control mode, when the user logs back in to the Lync client, the Conversation window does not re-appear as expected and the user cannot control the call with Lync Integration.

---

## Telephony presence with Lync Integration

The Lync Integration telephony presence implementation enables the **Busy – In A Call** status for a Lync user. Other Lync users see the appropriate presence status depending on their relative level of access. Lync Integration publishes the **Busy – In A Call** status when the user initiates a call, or when the user answers an incoming call. If the user has a call on hold, then **Busy – In a Call** is still published. If the user is part of multiple calls, **Busy – In A Call** is published until Lync Integration detects that the user is not part of any call. The **Busy – In a Call** presence is an application state that should not be selected manually. If the user is not in a call and manually changes the presence state to **Busy – In a Call**, Lync Integration automatically changes the presence state back to **Available**.

The Custom Presence definition file is provided as a configuration item within the Lync Integration installation package. When custom presence is enabled on the Lync client, the presence option **Busy – In A Call** is available in the list of presence options.

### Do Not Disturb

While the Lync user presence status is **Do Not Disturb**, incoming call notifications are not displayed on the user's computer. If the user's phone line is supported by Avaya Aura® Communication Manager using Shared Control or Computer mode, the incoming call will be treated with the Ignore command automatically. In Phone mode, the telephony device will continue to ring, and can be answered.

---

## Lync Integration presence service limitations

### Do Not Disturb presence state

In the Phone mode, even if the presence status is **Do Not Disturb**, the phone rings.

### Instant messages not delivered

When you try to send an IM, you receive an error message: `unknown@number could not be found so the message was not sent.`

---

## Video telephony services with Lync Integration

Lync Integration deployed with the Avaya Aura® communication system can support video telephony services when interworking with a desk phone.

### \* Note:

Video telephony services are not supported when Lync Integration is interworking with a VDI Communicator client.

The following table lists the functionality supported for Lync Integration.

**Table 8: Video telephony feature descriptions**

Capability	Description
Make Video Call	<p>Users can make a video call with Lync Integration 2010 by right-clicking a contact name and selecting <b>Make Video Call</b> from the Persona menu.</p> <p>With Lync Integration 2013, users can initiate a video call in one of the following ways:</p> <ul style="list-style-type: none"> <li>• Right-click a contact name and select <b>Make Video Call</b> from the menu</li> <li>• Hover over a contact's name or presence status icon. When the  icon appears, select the appropriate number under <b>Voice and Video Call</b> in the contact card.</li> </ul>
Escalate to video call	Users can escalate a current call to a video call by clicking the video icon in the Conversation bar.
Pause and Resume video	Users can pause and resume video using the Video window menu.
Stop video	Users can stop video using the Video window menu. Stopping video does not end the call.

---

## Video codec levels

The Lync Integration **Settings > Video** panel provides an option to adjust the H.264 codec level.

When you set the video codec resolution to a high level, the encoded video resolution also improves. As your video resolution becomes higher, the CPU usage required for video also increases. However, some applications do not support low video codec levels.

 **Tip:**

Avaya recommends keeping the video codec level setting to 3.1. This is the default level for Avaya UC clients.

---

## Video telephony service limitations

The following limitations apply to video calls.

### Video calls in SIP Shared Control mode

Video calls are not currently supported in SIP Shared Control mode.

### Video between SIP and H.323 endpoints

Escalation and de-escalation of video calls between SIP and H.323 signaling endpoints is not always possible. The signaling of the remote endpoint is hidden from Lync Integration, so even if the call is initialized as a voice and video call, you may not be able to re-escalate the call to a video call from Lync Integration.

### **Transferring video calls**

Active video calls with Avaya Scopia® endpoint using Lync Integration cannot be transferred to any other Avaya Scopia® endpoints.

### **Video calls with Avaya Scopia® endpoints and Polycom HDX H.323 endpoints**

On a video call with Avaya Scopia® endpoints registered to IView Gatekeeper or with Polycom HDX H.323 endpoints registered to Polycom CMA:

- Video cannot be restarted once stopped.
- Sending DTMF digits causes video to drop. Audio is unaffected.

### **No video support for Polycom HDX SIP endpoints**

Video calls with Polycom HDX SIP endpoints are not currently supported.

# Chapter 8: Dialing rules fundamentals

By default, Lync Integration uses the configured dial plan information specified in the Configurator or defined within the Lync Integration **Settings** panel. These dial plan settings normalize phone numbers and match presented phone numbers with Lync contacts. Dialing between users must be either extension dialing or E.164 dialing. In this document, this is referred to as a simple dial plan.

Simple dial plans are not always specific enough to handle all types of phone numbers. For these scenarios, an advanced dial plan must be configured. With an advanced dial plan, it is possible to manipulate incoming and outgoing phone numbers by creating a `dialingRules.xml` file.

## Related Links

[Supported phone number formats](#) on page 43

[Simple dial plan](#) on page 44

[Advanced dial plan](#) on page 47

---

## Supported phone number formats

Lync Integration normalizes phone numbers, as presented when a call is ringing, into a format that matches Lync contacts. Lync Integration also takes the phone numbers of Lync contacts and makes them dialable for the call server. Simple and advanced dialing rules must be configured for Lync Integration to perform these normalizations and dialable transformations.

Phone numbers published in the Lync client can be entered in one of the following formats as long as the appropriate dial plan is in place to support it:

- E.164 DID
- Extension
- E.164 non-DID

The following table provides an example and a description for each of the number formats listed above.

**Table 9: Supported phone number formats**

Format	Example	Description
E.164 DID	+17776671234	A number in the E.164 format with no extension at the end.

Format	Example	Description
Extension	1234	An extension number. These types of numbers are not preceded by a +. Phone numbers entered in this format are not fully qualified and require dialing rules.
E.164 non-DID	+17776670000;ext=1234	A number in the E.164 format with an extension at the end. The first part of the number describes the switchboard or reception from which you can request the extension number. When this phone number format is detected, the system dials: +17776670000,1234. This allows the Avaya Aura® auto-attendant functionality to route the call to extension 1234.

Even though advanced dial plan transformations could theoretically allow for any mixture of number formats in Lync contacts, in practice a limited number of transformations will be put in place to normalize all numbers into the same format within an enterprise. This means that all Lync contact numbers within an enterprise should be presented in the same format so that a search and match can be performed.

**!** **Important:**

The three supported number formats for Lync Integration are not all immediately supported by the Microsoft Lync Address Book. The Microsoft Lync server needs to be configured to understand the allowable number formats when obtaining numbers from the Active Directory and inserting them in the Lync Address Book. See documentation on the Microsoft web site for more information about the `Company_Phone_Number_Normalization_Rules.txt` file and the Lync Server Resource Kit Tools – ABSConfig Tool.

Phone numbers for contacts outside the enterprise are always presented in E.164 DID format so that the default simple dial plan will normalize and correctly match those numbers with the Lync contacts.

---

## Recommendation for publishing phone numbers

Do not leave users to publish their own phone numbers in the Lync client. Instead, enter the work phone number for all users in the enterprise in Active Directory. This allows for consistent phone number formatting throughout the enterprise.

---

## Simple dial plan

You must configure a dial plan to enable the telephony features of Lync Integration. You can configure a default dial plan in the Configurator when building the Lync Integration install package. Users can also modify the dial plan in the Lync Integration **Settings** window by selecting the **Dialing Rules** tab.

## Simple dial plan examples

### North American dial plan example

E.164 Number +1 613 77[67] xxxx	
Number to dial to access an outside line	9
Your country code	1
Your area/city code	613
PBX Main Prefix	777
Number to dial for long distance calls	1
Number to dial for international calls	011
Extension length for internal extensions calls	4
Length of national phone numbers (including area/city code)	10
Include area/city code when making a local call	check

### Results using a simple dial plan: North America

Dialed number is	Dialing number as	Entered number	Dialed number
Extension	E.164	+16133568293	8293
	International	01116133568293	901116133568293
	National	6133568293	8293
	Local	3568293	8293
	Extension	8293	8293
	Short code	500	500
Local	E.164	+16139078177	96139078177 (Include area code) or 99078177
	International	01116139078177	901116139078177
	National	6139078177	96139078177 (Include area code) or 99078177
	Local	9078177	99078177
National	E.164	+19088485596	919088485596
	International	01119088485596	901119088485596
	National	19088485596	919088485596
	Short code	911	911
International	E.164	+441628515068	9011441628515068
	International	011441628515068	9011441628515068

### United Kingdom dial plan example

E.164 Number +44 1628 5xxxxx
------------------------------

Number to dial to access an outside line	9
Your country code	44
Your area/city code	01628
PBX Main Prefix	5
Number to dial for long distance calls	0
Number to dial for international calls	00
Extension length for internal extensions calls	5
Length of national phone numbers (including area/city code)	10, 11
Include area/city code when making a local call	unchecked

**Results using a simple dial plan: United Kingdom**

Dialed number is	Dialing number as	Entered number	Dialed number
Extension	E.164	+441628515068	15068
	International	00441628515068	900441628515068
	National	01628515068	15068
	Local	515068	15068
	Extension	15068	15068
	Short code	4190	4190
Local	E.164	+441628777700	901628777700 (Include area code) or 9777700
	International	00441628777700	900441628777700
	National	01628777700	901628777700 (Include area code) or 9777700
	Local	777700	9777700
National	E.164	+441483308721	901483308721
	International	00441483308721	900441483308721
	National	01483308721	901483308721
	Special number	08001111	908001111
	Short code	999	999
International	E.164	+16133568293	90016133568293
	International	0016133568293	90016133568293

## Advanced dial plan

Simple dialing rules may not be specific enough to handle all situations. Advanced dialing rules may be needed to:

- Interpret any numbers dialed and convert them into a form that can be used by the PBX.
- Match call progress updates with the display of the call in progress.
- Take incoming numbers and normalize them into the correct form to find the associated Lync contact.
- Match the normalized numbers to contacts from the user's Outlook or Active Directory contact list.

Simple dialing rules alone may not be enough to perform these operations. See the following examples.

Operation	Extensions cannot be defined as a number of digits at the end of full E.164 numbers.
Example	E.164: +441628433000 - +441628434999 > Extension: 3000 - 4999

Operation	There is not a direct relation between extensions and their E.164 representations.
Example	E.164: +441628515000 - +441628515999 > Extension: 55000 - 55999

Operation	The PBX serves a number of locations with different country and area/city codes.
Example	Extension: 3000 > E.164: +441628433000 Extension: 4000 > E.164: +35391734000

Operation	A company uses private network dialing between sites.
Example	Local Extension: 3000 > E.164: +441628433000 Remote Extension: 3563000 > E.164: +35391733000

Operation	The PBX presents other special numbers to the phones that are not directly convertible into E.164 form.
-----------	---

Operation	The PBX presents a number that should not be turned into an E.164 number when looking for a Lync contact because the contact's phone number is expected to contain an extension number.
Example	Extension: 3000 > Extension: 3000.  This is an example of an advanced rule that matches an extension and leaves the number unchanged so that the simple dial plan does not get a chance to normalize the extension to an E.164 number.

When the simple dialing rules are not sufficient, it is possible to manipulate incoming and outgoing phone numbers by creating a `dialingRules.xml` file. This file defines patterns used to match incoming or outgoing numbers which are then manipulated by inserting and removing digits.

Dialing plans may differ per site or region and must be managed appropriately.

When crafting the advanced dialing rules, you must consider all of the possible number forms that are to be sent and received. See [Simple dial plan examples](#) on page 45 for examples of dialable translations, and the advanced dial plan examples below for the normalized translations.

**! Important:**

Advanced dialing rules must be tested before they are deployed. Lync Integration will not generate error messages if the `dialingRules.xml` file contains incorrect dialing rules.

## Advanced dial plan examples

### North American dial plan example

E.164 Number + 1 613 77[67] xxxx	
Number to dial to access an outside line	9
Your country code	1
Your area/city code	613
PBX Main Prefix	777
Number to dial for long distance calls	1
Number to dial for international calls	011
Extension length for internal extensions calls	4
Length of national phone numbers (including area/city code)	10
Include area/city code when making a local call	check

### Example of outside line digit not removed in number received to displayed number: North America

Received number is	Received number as	Number received	Number displayed
Extension	Extension	8293	+16133568293
Short code	Short code	500	500
Local	National	96139078177	+16139078177
	Local	99078177	+16139078177
National	National	919088485596	+19088485596
Short code	Short code	9911	911
International	International	011441628515068	+441628515068

### United Kingdom dial plan example

E.164 Number + 44 1628 5xxxxx	
Number to dial to access an outside line	9
Your country code	44
Your area/city code	01628

PBX Main Prefix	5
Number to dial for long distance calls	0
Number to dial for international calls	00
Extension length for internal extensions calls	5
Length of national phone numbers (including area/city code)	10, 11
Include area/city code when making a local call	unchecked

### Example of outside line digit not removed in number received to displayed number: United Kingdom

Received number is	Received number as	Number received	Number displayed
Extension	Extension	55068	+441628515068
Short code	Short code	4190	4190
Local	National	901628777700	+441628777700
	Local	9777700	+441628777700
National	National	901483308721	+441483308721
Special number	Special number	908001111	08001111
Short code	Short code	9999	999
International	International	90016133568293	+16133568293

## The dialingRules.xml file

The `dialingRules.xml` file contains the advanced dialing rules. This file is read by Lync Integration at start up. The following conditions apply to an advanced dial plan using a `dialingRules.xml` file.

- Rules defined in the `dialingRules.xml` file have to match and complete any digit manipulation on their own. If a number is matched and transformed by a `dialingRules.xml` pattern then no further change will be made by the simple dialing rules.
- The order of the rules in the `dialingRules.xml` file is important as these are checked in order and only the first match takes effect.
- If no `dialingRules.xml` patterns are matched then the simple dialing rules are applied.

Dialing rules contained in the `dialingRules.xml` file are applied only when using Lync Integration. They are not applied when using the desk phone. As a result, telephone numbers may be presented differently in Lync Integration and the desk phone.

You can create a `dialingRules.xml` file using the Avaya one-X<sup>®</sup> Communicator Centralized Administration Tool (CAT) or by using a text editor.

Deploy the `dialingRules.xml` using the Configurator. When you are performing the procedure to build the install package using the Configurator, you can specify the `dialingRules.xml` file to be included.

You can make changes to the `dialingRules.xml` file without reinstalling the Lync Integration software. Modify the `dialingRules.xml` using the CAT and deploy the new file using the `updateRules.wsf` tool. Changes to this file will take effect at the next Lync client sign in.

**\* Note:**

If the new dial plan rules are not applied after a Lync client restart, reboot the workstation to ensure that the Lync Integration process has been restarted.

### dialingRules.xml file example

Pattern	Type	Prefix	Delete Length	Min Length	Max Length
\+441628515[0-4]	Dialable	5	9	13	13
4190	Normalize	+441483309700	4	4	4
^55[0-4]	Normalize	+44162851	1	5	5
^5[89]	Normalize	+44148330	1	5	5

Below is a sample `dialingRules.xml` file based on the above table.

**\* Note:**

The `DialingRulesPatternList` string that begins on the second line is a single string on one line. Do not introduce carriage return characters into the string. If you cut and paste from this document, the string will contain carriage returns. Ensure that you remove any carriage returns that are introduced.

The `DialingRulesPatternList` string is composed of four segments separated by spaces. The line below indicates the location of the spaces.

```
<DialingRulesPatternList<space>xmlns:xsi="http://www.w3.org/2001/
XMLSchema-instance"<space>xmlns:xsd="http://www.w3.org/2001/
XMLSchema"<space>xmlns="http://xml.avaya.com/endpointAPI">
```

```
<?xml version="1.0" encoding="utf-8"?>
<DialingRulesPatternList xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://xml.avaya.com/endpointAPI">
  <!-- Turn extensions dialed as E.164 numbers into extensions -->
  <DialingRulesPattern>
    <type>0</type>
    <pattern>\+441628515[0-4]</pattern>
    <subString>5</subString>
    <minLength>13</minLength>
    <maxLength>13</maxLength>
    <deleteLength>9</deleteLength>
  </DialingRulesPattern>
  <!-- Displayed number when calling voicemail, display as voicemail E.164 number -->
  <DialingRulesPattern>
    <type>1</type>
    <pattern>4190</pattern>
    <subString>+441483309700</subString>
    <minLength>4</minLength>
    <maxLength>4</maxLength>
    <deleteLength>4</deleteLength>
  </DialingRulesPattern>
  <!-- Displayed number is local extension, display as E.164 number -->
  <DialingRulesPattern>
```

```

<type>1</type>
<pattern>^55[0-4]</pattern>
<subString>+44162851</subString>
<minLength>5</minLength>
<maxLength>5</maxLength>
<deleteLength>1</deleteLength>
</DialingRulesPattern>
<!-- Displayed number is extension from another site, display as E.164 number -->
<DialingRulesPattern>
  <type>1</type>
  <pattern>^5[89]</pattern>
  <subString>+44148330</subString>
  <minLength>5</minLength>
  <maxLength>5</maxLength>
  <deleteLength>1</deleteLength>
</DialingRulesPattern>
<DialingRulesPattern>
  <type>1</type>
  <pattern>^9[1-9]</pattern>
  <subString>+441628</subString>
  <minLength>7</minLength>
  <maxLength>7</maxLength>
  <deleteLength>1</deleteLength>
</DialingRulesPattern>
<DialingRulesPattern>
  <type>1</type>
  <pattern>^90[1-9]</pattern>
  <subString>+44</subString>
  <minLength>11</minLength>
  <maxLength>12</maxLength>
  <deleteLength>2</deleteLength>
</DialingRulesPattern>
<DialingRulesPattern>
  <type>1</type>
  <pattern>^900[1-9]</pattern>
  <subString>+</subString>
  <minLength>7</minLength>
  <maxLength>32</maxLength>
  <deleteLength>3</deleteLength>
</DialingRulesPattern>
</DialingRulesPatternList>

```

## Additional dialing rule scenarios

**Incoming calls from 6133568 prefix cannot be normalized to match the E.164 numbers.**

**Incoming rule:** Insert the +1 to properly normalize the incoming dialed number.

**Example:**

```

<DialingRulesPattern>
  <type>1</type>
  <pattern>^6133568</pattern>
  <subString>+1</subString>
  <minLength>10</minLength>
  <maxLength>10</maxLength>
  <deleteLength>0</deleteLength>
</DialingRulesPattern>

```

**Outgoing calls to the 1613967 require the leading 1 to be passed to Communication Manager because 613967 is a toll call, but other calls to 1613 are not toll calls.**

**E.164 number:** +1613967XXXX

**Outgoing rule:** Detect pattern and pass number.

**Outgoing calls to the 1613967 require the leading 1 to be passed to Communication Manager because 613967 is a toll call, but other calls to 1613 are not toll calls.**

**Example:**

```
<DialingRulesPattern>
  <type>0</type>
  <pattern>1613967</pattern>
  <subString></subString>
  <minLength>10</minLength>
  <maxLength>12</maxLength>
  <deleteLength>0</deleteLength>
</DialingRulesPattern>
```

**Incoming call from extension 4190 to be presented as +35391733380**

**Incoming rule:** Detect pattern and replace with +35391733380.

**Example:**

```
<!-- Short code expansion -->
<DialingRulesPattern>
  <type>1</type>
  <pattern>4190</pattern>
  <subString>+35391733380</subString>
  <minLength>4</minLength>
  <maxLength>4</maxLength>
  <deleteLength>4</deleteLength>
</DialingRulesPattern>
```

**These rules apply when the internal extension is not a subset of the published E.164 number.**

**Outgoing rule:** Change published E.164 prefixes of 16137778xxx to extension 9xxx.

**Example:**

```
<DialingRulesPattern>
  <type>0</type>
  <pattern>16137778</pattern>
  <subString>9</subString>
  <minLength>10</minLength>
  <maxLength>12</maxLength>
  <deleteLength>9</deleteLength>
</DialingRulesPattern>
```

**Outgoing rule:** Variation on change published E.164 prefixes of 16137778xxx to extension 9xxx.

**Example:**

```
<DialingRulesPattern>
  <type>0</type>
  <pattern>16137778</pattern>
  <subString>9</subString>
  <minLength>10</minLength>
  <maxLength>12</maxLength>
  <deleteLength>8</deleteLength>
</DialingRulesPattern>
```

**Outgoing rule:** Incoming notification, with a 4 digit extension starting with 99xx, will be converted to 161377789xx.

**Example:**

```
<DialingRulesPattern>
  <type>1</type>
```

**These rules apply when the internal extension is not a subset of the published E.164 number.**

```
<pattern>99</pattern>
<subString>+16137778</subString>
<minLength>4</minLength>
<maxLength>4</maxLength>
<deleteLength>1</deleteLength>
</DialingRulesPattern>
```

**Advanced dialing rules when an enterprise is using extensions for Lync enterprise contact phone numbers**

If using extensions for enterprise contacts' phone numbers, then the simple and advanced dialing rules should aim to normalize all enterprise numbers into extensions when possible. All numbers outside the enterprise should resolve to E.164 numbers. The dialable rules should similarly turn all enterprise numbers into extensions and all non-enterprise numbers into numbers that can be dialed with the appropriate prefixes. The simple dialing rules will try to normalize all numbers into E.164 numbers so advanced rules are needed to convert enterprise numbers into extensions.

**Example:**

The following normalization rule keeps 4 digits extensions starting with 5 unchanged rather than converting them to E.164 numbers (normalize: 5xxx -> 5xxx)

```
<?xml version="1.0" encoding="utf-8" ?>
<DialingRulesPatterList xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://xml.avaya.com/endpointAPI">
<DialingRulesPattern>
<type>1</type>
<pattern>^5</pattern>
<subString />
<minLength>4</minLength>
<maxLength>4</maxLength>
<deleteLength>0</deleteLength>
</DialingRulesPattern>
</DialingRulesPatternList>
```

**Advanced dialing rules when an enterprise is using non-DID extensions for Lync enterprise contact phone numbers****Example:**

+441628515000 x5001

If using non-DID E.164 numbers with extensions for enterprise contacts then the simple and advanced dialing rules should aim to normalize all enterprise numbers into extensions when possible except for the common reception or IVR E.164 number. All numbers outside the enterprise should resolve to E.164 numbers. The dialable rules should similarly turn all enterprise numbers into extensions and all non-enterprise numbers into numbers that can be dialed with the appropriate prefixes. The simple dialing rules will try and normalize all numbers into E.164 numbers so advanced rules are needed to convert enterprise numbers into extensions.

If non-DID E.164 numbers with extensions are used in an enterprise then all Lync users must have their work numbers set in this format.

**Example:**

**Advanced dialing rules when an enterprise is using non-DID extensions for Lync enterprise contact phone numbers**

This normalization rule converts the reception number into an E.164 format, but keeps the extension number unchanged. The following example shows the normalization rule for an E-164 number, with a 4 digit extension starting with 5 at the end (normalize: 5xxx -> 5xxx)

```
<?xml version="1.0" encoding="utf-8" ?>
<DialingRulesPatternList xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema" xmlns="http://xml.avaya.com/endpointAPI">
<DialingRulesPattern>
<type>1</type>
<pattern>^5</pattern>
<subString />
<minLength>4</minLength>
<maxLength>4</maxLength>
<deleteLength>0</deleteLength>
</DialingRulesPattern>
</DialingRulesPatternList>
```

# Chapter 9: Work flow for deploying Lync Integration

This section illustrates the high level work flow required to deploy Lync Integration and lists the requirements for the network components.

## Lync Integration deployment notes

The following limitations apply to deployment of Lync Integration:

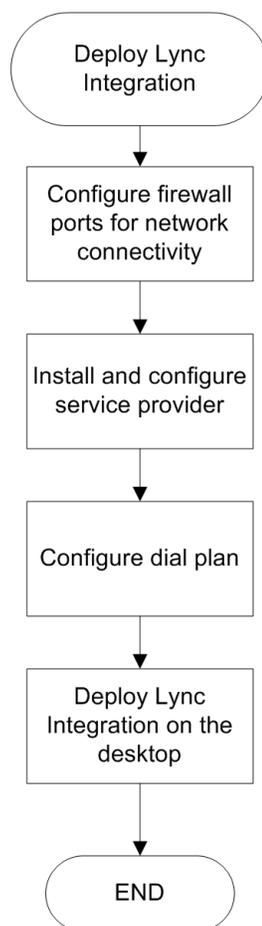
- Lync Integration builds on Lync's IM and Presence capabilities. This requires the Lync 2010 Standard CAL. Upon deployment of Lync Integration, the Microsoft Lync 2010 UC (Voice and Video) capabilities are disabled.
- Lync Integration cannot be installed in conjunction with any other Lync Extension.
- Lync Integration supports a single extension per end user.
- Lync Integration may not integrate with other third party add-ins to the Microsoft Lync software. If Lync Integration fails to load after the installation of a third party add-in, you must reinstall Lync Integration.
- If Lync Integration and Avaya one-X<sup>®</sup> Communicator Release 6.1 or earlier are installed on the same machine, the Avaya one-X<sup>®</sup> Communicator must be installed with the following functions set to **Disabled**:
  - ENABLECLICKTODIALIE
  - ENABLECLICKTODIALFF
  - ENABLEOUTLOOKADDIN

See the **Silent Installation** section in *Overview and Planning for Avaya one-X<sup>®</sup> Communicator*.

## Deploying Lync Integration work flow

The work flow shows the tasks you perform to deploy Lync Integration.

## Work flow for deploying Lync Integration



# Chapter 10: Port configuration

Firewall rule configuration is required for the solution deployment to work. This may require advance planning in order to comply with customer site IT governance and policy enforcement.

Port configuration is required for the following network elements:

- **Client PC:** The Windows firewall is automatically traversed by Lync Integration. However, for Computer mode, a firewall rule may be required to traverse proprietary firewalls.

# Chapter 11: Service provider configuration

Your service provider must be installed and functional. The service provider requirements are described in the following section:

- [Avaya Aura requirements](#) on page 58

## Related Links

[Avaya Aura requirements](#) on page 58

---

## Avaya Aura<sup>®</sup> requirements

- Lync Integration requires the following Communication Manager configuration settings. These settings allow Avaya IP soft phones to register with Communication Manager every minute, allowing reasonable switch mode behavior between Lync Integration Computer mode and Phone mode.

Configuration category	Variable	Setting
Communication Manager system parameters — features	Unnamed registrations and PSA for IP Telephones?	N
Communication Manager system parameters — features	Unhold?	N
Communication Manager system parameters ip-options	Periodic Registration Timer (min)	1

- The PBX user line name cannot contain single digits delineated by spaces, For example, "Line 1" will cause problems but "Line-1" will not.

If the user line name contains single digits, the call terminator does not get an incoming call notification for a call that is forwarded from another user. For a Computer mode user, the call is unanswerable.

- Perform the procedure [Configuring Lync Integration as an H.323 or SIP endpoint on Communication Manager](#) on page 59 for all Lync Integration endpoints.
- Perform the procedure [Configuring Lync Integration as a video endpoint on Communication Manager](#) on page 60 for all Lync Integration endpoints that use video.

---

## Configuring Lync Integration as an H.323 or SIP endpoint on Communication Manager

### Before you begin

You must know:

- The Communication Manager IP address.
- A user ID and password for logging in to the Communication Manager server.
- The terminal type you are logging in from.

### Procedure

1. Log in to the Communication Manager interface.
  - a. Use the Communication Manager IP address to establish an SSH session.
  - b. Log in to the Communication Manager.
  - c. Enter `sat`.
  - d. Enter your terminal type.  
For example, enter **W2KTT**.  
The SAT **Command:** prompt displays.
2. Determine the maximum number of Avaya one-X® Communicator endpoints your voice system supports:
  - a. Use the `display system-parameters customer-options` command to access the Optional Features form.
  - b. On page 9 of the form, verify the **oneX\_Comm** setting. This number is provided by the RFA license file.
3. Perform one of the following steps on Communication Manager:
  - If you want to add a new station that uses Lync Integration, use the `add station` command.
  - If you want to modify an existing station that uses Lync Integration, use the `change station xxxx` command, where `xxxx` is the number of the station you want to modify.Communication Manager displays the Station form.
4. Enter the appropriate information for this station:
  - a. Set **IP Softphone** to **y**.
  - b. Set **IP Video Softphone** to **y**.
5. Repeat steps 3 on page 59 and 4 on page 59 for each Lync Integration endpoint you want to configure on Communication Manager.

## SIP Shared Control mode interworking with Avaya Session Border Controller for Enterprise

SIP endpoints in Lync Integration Shared Control (Desk Phone) mode can interwork with the Avaya Session Border Controller for Enterprise to provide additional network security and allow users to use Lync Integration in Shared Control mode without logging in to the enterprise network.

For information about enabling Shared Control on the Avaya Session Border Controller for Enterprise and about setting up remote user support on the SIP endpoint, see the following documents:

- *Administering Avaya Session Border Controller for Enterprise*
- “Shared Control” in the *Release 6.2 Avaya Session Border Controller for Enterprise Release Notes*

---

## Configuring Lync Integration as a video endpoint on Communication Manager

The following procedure works for both H.323 and SIP endpoints.

### Before you begin

You must know:

- The Communication Manager IP address.
- A user ID and password for logging in to the Communication Manager server.
- The terminal type you are logging in from.

### Procedure

1. Log in to the Communication Manager interface.
  - a. Use the Communication Manager IP address to establish an SSH session.
  - b. Log in to the Communication Manager.
  - c. Enter `sat`.
  - d. Enter your terminal type.  
For example, enter **W2KTT**.  
The SAT **Command:** prompt displays.
2. Use the `display system-parameters customer-options` command to verify the **Maximum Video Capable IP Softphones** (page 2 of form). This number is provided by the RFA license file.
3. Use the `change cos` command to set **Priority Video Calling** (page 2 of form) for the appropriate COS levels.

4. Use the `add station` command to add an Avaya IP Softphone station, and set the following parameters for that station:
  - a. Set **IP Softphone** to **y**.
  - b. Set **IP Video Softphone** to **y**.
  - c. If you want this station to be able to make priority video calls, make sure you select a COS level that has **Priority Video Calling** enabled.
  - d. On page 2 of the form, set **Direct IP-IP Audio Connections** to **y**.
5. Repeat steps [2](#) on page 60, [3](#) on page 60, and [4](#) on page 61 for each Lync Integration endpoint you want to configure for video calling.

# Chapter 12: Configure a dial plan

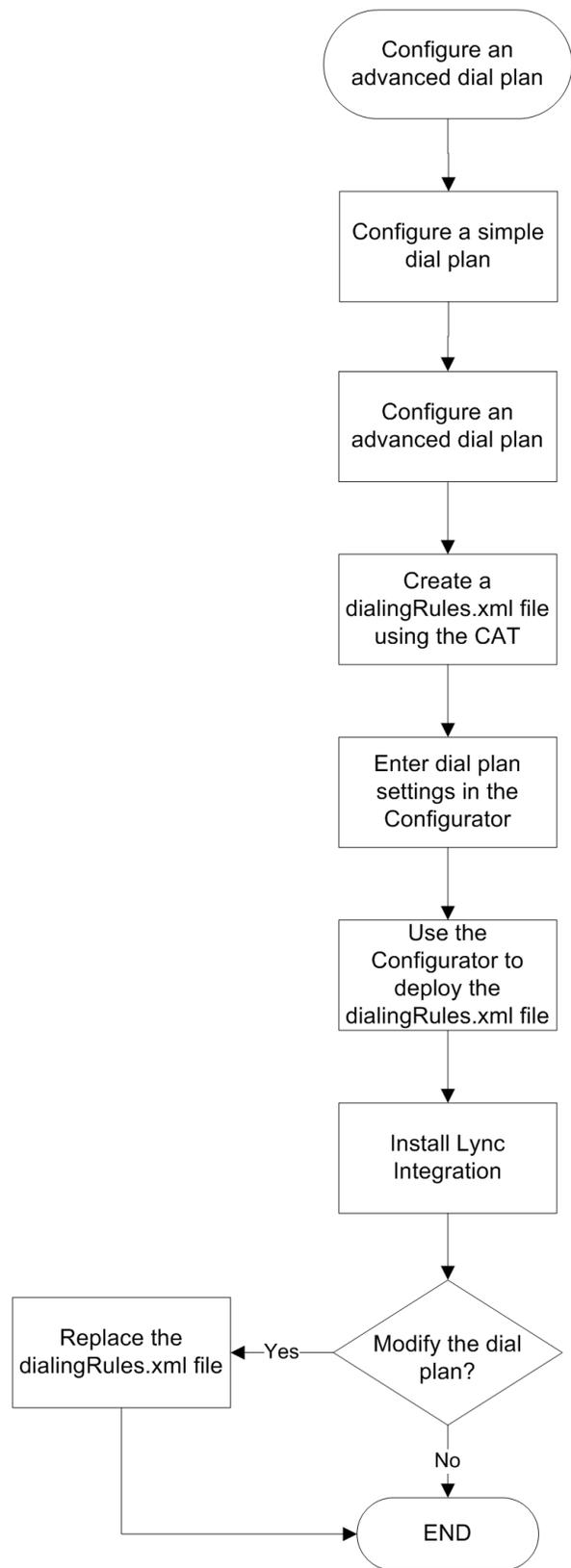
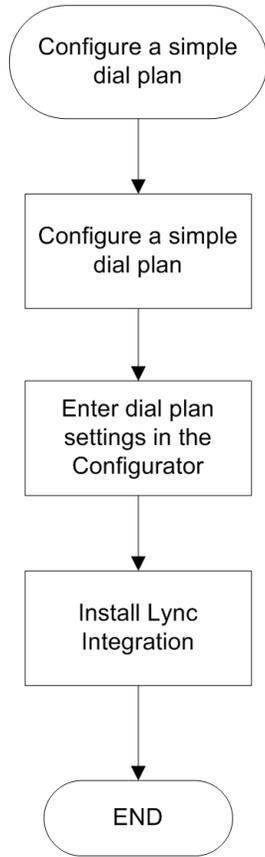
You must configure a dial plan to enable the telephony features of Lync Integration. You can configure a simple or advanced dial plan. You create a simple dial plan by configuring the **Dialing Settings** in the Configurator. To create an advanced dial plan, you must configure the **Dialing Settings** in the Configurator and use the Configurator to deploy a `dialingRules.xml` file.

## Prerequisites

You must understand the structure of a dial plan. For a description of dial plans, see [Dialing rules fundamentals](#) on page 43.

## Configure a dial plan procedures

This task flow shows the procedures you perform to configure a dial plan.



## Related Links

[Configuring a simple dial plan](#) on page 64

[Configuring an advanced dial plan](#) on page 65

---

# Configuring a simple dial plan

You can configure a simple dial plan in the Configurator when building the Lync Integration install package. Users can modify the dial plan in the Lync Integration **Settings** window by selecting the **Dialing Rules** tab.

Use the dial plan checklist to create a simple dial plan. The settings are described in [Dial plan variables](#) on page 65.

For examples of a simple dial plan, see [Simple dial plan examples](#) on page 45

---

## Dial plan checklist

<b>Phone Settings</b>	
IP address of the telephone server or servers	
<b>Dialing Rules Settings</b>	
Enable Call Forward	
Digit(s) you must dial to access an outside line	
Country code	
Area/city code	
PBX Main Prefix	
Digit(s) you must dial to make long-distance calls	
Digit(s) you must dial to make international calls	
Extension length for internal extensions	
Length of national phone numbers (Includes area and city codes)	
Do you have to dial the area/city code when making a local call?	
<b>Extension Settings</b>	
Phone Extension	
Phone Password	

## Dial plan variables

Variable	Description
Enable Call Forward	When Call Forward is enabled, the Call Forward icon is displayed.
Number to dial to access an outside line	The digit or digits you must dial to access an outside line.
Your country code	The dialing code for your country.
Your area/city code	The area code or the city code where your phone server is located. You can enter multiple codes separated by commas. For example, 406, 208. In this example, Lync Integration treats all calls made the 406 or 208 regions as local calls.
PBX Main Prefix	The main prefix of your PBX. This is the digit(s) that comes after the area/city code and before the internal extension. If you cannot obtain the extension number by removing digits up to and including the PBX main prefix from an E.164 representation of the number, then this field should remain blank.
Number to dial for long distance calls	The digit or digits you must dial to make a long distance call.
Number to dial for international calls	The digit or digits you must dial to make an international call.
Extension length for internal extensions calls	<p>The number of digits that comprise an internal extension. For example, if your internal extensions consist of five digits, enter 5. In this example, any number that consists of five digits or less would be treated as an internal extension. If your company supports internal extensions of varying lengths, enter the length numbers separated by commas. For example, if you use three-digit, five-digit, and seven-digit extensions, enter 3, 5, 7.</p> <p> <b>Note:</b></p> <p>If you specify multiple extension lengths, Lync Integration performs exact matches. For example, if you specify 3, 5, 7, then a four-digit number will not be recognized as an internal extension.</p>
Length of national phone numbers (including area/city code)	The number of digits you must dial (including area/city code) for a call within your country.
Include area/city code when making a local call	Check the box if you are required to prefix the area or city code while making a local call.

---

## Configuring an advanced dial plan

In deployments where the simple dialing rules are not enough, you must manipulate incoming and outgoing phone numbers by creating a `dialingRules.xml` file. You can create a `dialingRules.xml` file using the Avaya one-X® Communicator Centralized Administration Tool (CAT) or by using a text editor. For examples of an advanced dial plan, see [Advanced dial plan examples](#) on page 48.

Deploy the `dialingRules.xml` using the Configurator. When you are performing the procedure to build the install package using the Configurator, you can specify the `dialingRules.xml` file to be included.

You can make changes to the `dialingRules.xml` file without reinstalling the Lync Integration software. Modify the `dialingRules.xml` using the CAT and deploy the new file using the `updateRules.wsf` tool. Changes to this file will take effect at the next Lync sign in. See [Replacing the dialingRules.xml file on the workstation where Lync Integration is installed](#) on page 81.

---

## Creating a dialingRules.xml file using the Centralized Administration Tool

You can create or modify a `dialingRules.xml` file using a text editor or by using the Avaya one-X<sup>®</sup> Communicator Centralized Administration Tool (CAT). The CAT is distributed with the Avaya one-X<sup>®</sup> Communicator. Download the Avaya one-X<sup>®</sup> Communicator Admin Tool R6.1 SP2 or higher.

This document provides the procedures for working with a `dialingRules.xml` file. See the Avaya one-X<sup>®</sup> Communicator Centralized Administration Tool documentation for further details. When creating dialing rules in CAT, only use the **Dialing Rules** tab. The remaining tabs are not used.

### Dialing rules interface

#### Add

Click this button to open the **Add Rule** dialog box.

#### Add Rule window

Use this window to specify a pattern match rule.

Field	Description
Pattern	Field to enter a regular expression. The pattern can exist anywhere in the input string, not necessarily from the beginning or the end of the input string.
Type	List box to specify whether to apply the <b>Dialable</b> rule to all the outgoing numbers before storing the number in the call log or to apply the <b>Normalize</b> rule to all the incoming numbers before storing the number in the call log.  Specify <b>0</b> for Dialable or <b>1</b> for Normalize.
Prefix	Field to enter the string to be prefixed to the input string after deleting the specified number of characters.
Delete Length	Field to enter the number of characters, including the + character, to delete from the beginning of the input string.
Minimum Length	Field to enter the minimum length, including the + character, of the input string.
Maximum Length	Field to enter the maximum length, including the + character, of the input string.

Field	Description
OK	Button to add the pattern match rule and close the <b>Add Rule</b> dialog box.
Cancel	Button to cancel adding the pattern match rule and close the <b>Add Rule</b> dialog box.

### Remove

Click this button to remove an existing pattern match rule.

### Save

Click this button to save the Avaya one-X Communicator dialing rules settings.

### Open

Click this button to open the existing `dialingRules.xml` file.

## Configuring dialing rules

Use the **Dialing Rules** tab to configure dialing rules.

### Procedure

1. Click the **Dialing Rules** tab.
2. Click **Add** to open the Add Rule dialog box.
3. Enter the appropriate information.
4. Click **OK** to add a new pattern match rule.
5. Click **Save** to save the Dialing Rules settings.

## Modifying dialing rules

Use the **Dialing Rules** tab to modify the existing dialing rules settings.

### Procedure

1. Click the **Dialing Rules** tab.
2. Click **Open**.
3. Select the `dialingRules.xml` file.
4. If you want to add additional pattern match rules, click **Add** to open the Add Rule dialog box, enter the appropriate information, and click **OK**.
5. If you want to remove a pattern match rule, select a rule and click **Remove**.
6. Click **Save** to update the dialing rules settings.

# Chapter 13: Deploy Lync Integration on the desktop

## Prerequisites

The machine where Lync Integration is installed must meet the following requirements:

**Table 10: Hardware requirements**

Processor	2 GHz
Memory	<ul style="list-style-type: none"><li>• 2 GB (32 Bit)</li><li>• 4 GB (64 Bit)</li></ul>
Disk space	500 MB
Connectivity	Download bandwidth: 80 kbps Upload bandwidth: 80 kbps
Video	For deployments with video enabled, the following hardware requirements must be met: <ul style="list-style-type: none"><li>• Intel Dual Core, Core 2 Duo, Core i3, or higher processor</li><li>• 500 MB video RAM with 100 MB of PC memory dedicated to video</li><li>• Minimum 4 GB memory on 64 Bit systems</li><li>• Digital video camera (up to 720p is supported)</li></ul>

**Table 11: Software requirements**

Operating system	<ul style="list-style-type: none"><li>• Microsoft Windows 7</li><li>• Microsoft Windows 8 and 8.1</li></ul> <p> <b>Note:</b> Apply the latest Microsoft patch to Windows 8.</p>
Microsoft .Net	Release 4.0 or higher
Microsoft Lync client	<ul style="list-style-type: none"><li>• Microsoft Lync 2010 version 4.0.7577.4103 or higher</li><li>• Microsoft Lync 2013 version 15.0.4535.1507 or higher</li></ul>

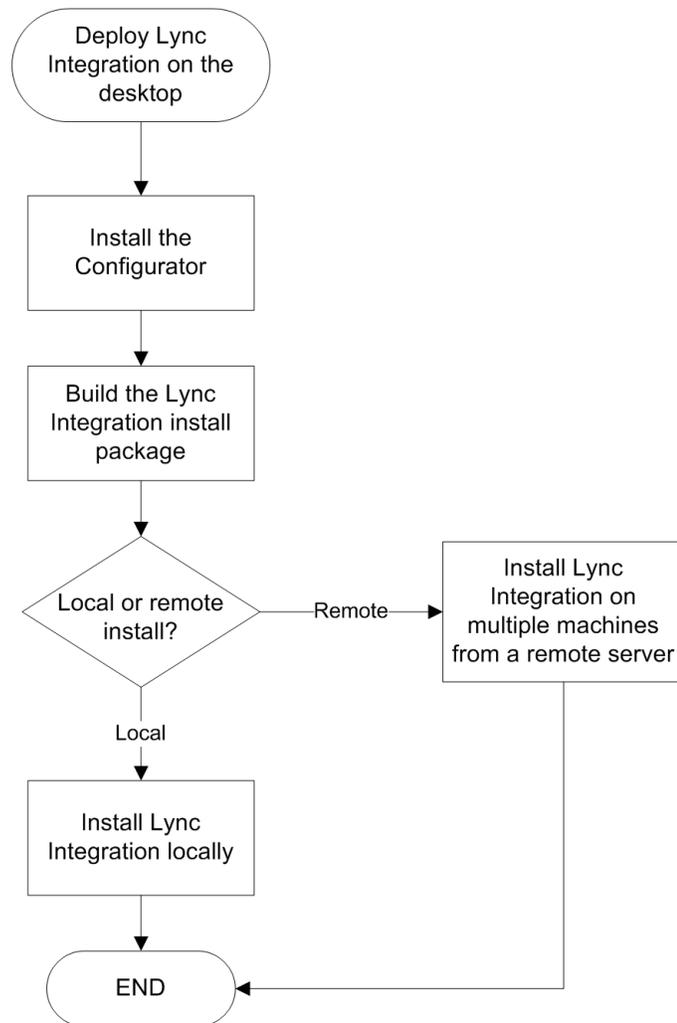
## Deploy Lync Integration on the desktop

Microsoft Lync SDKs are backward and forward compatible, allowing customer applications written for the Lync 2010 client to also work with the Lync 2013 client. Lync Integration 2013 uses the Lync 2013 client SDK to achieve the optimal integrated experience. This means that if both Lync Integration 2013 and Lync Integration 2010 are installed on the same workstation, the Microsoft custom menu commands appear once for each instance of Lync Integration installed. Therefore, you should only have one version of Lync Integration installed on the workstation.

This task flow shows the procedures you perform to deploy Lync Integration on the desktop. This task flow applies to a first time installation of Lync Integration. If you previously installed Lync Integration and are upgrading to a new version, see [Upgrade Lync Integration](#) on page 109.

### ! Important:

To avoid performance issues, apply the latest Microsoft recommended patches to each workstation before deploying Lync Integration.



## Related Links

[Installing the Configurator](#) on page 70

[Building the install package](#) on page 71

[Installing Lync Integration locally](#) on page 73

[Installation using a command line](#) on page 74

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## Installing the Configurator

Install the Avaya Configurator. The Configurator is an administrative tool used to configure and build the install packages for Lync Integration prior to distribution to end users.

### Before you begin

- You are running one of the following operating systems:
  - Microsoft Windows 7
  - Microsoft Windows 8
  - Microsoft Windows 8.1
- You have Microsoft .NET Framework 4.
- You have the Configurator.msi file on your desktop.

### Procedure

1. Double-click the Configurator.msi file to launch the Windows installer for the Avaya Collaboration Services Configurator.
2. When the Avaya Collaboration Services Configurator installer opens, click **Next**.
3. When the Avaya Collaboration ServicesConfigurator setup wizard opens, click **Next**.
4. In the License Agreement window, click **I Agree** to accept the license agreement.
5. In the Select Installation Folder window, specify a path to the installation folder for theAvaya Collaboration Services Configurator, and click **Next**.
6. In the Confirm Installation window, click **Next** to start the installation.

The system displays the message: Please use Windows Update to check for any critical updates to the .NET Framework.

7. In the Installation Complete window, click **Close** to exit the setup wizard.

The Avaya Collaboration ServicesConfigurator icon appears on your desktop.

### Related Links

[Deploy Lync Integration on the desktop](#) on page 68

## Building the install package

Build the install package for Lync Integration.

Lync Integration can integrate with the Collaboration Services (Office and Browser Add-in applications) to provide a unified user experience across all Avaya desktop applications. For more information, see *Administering Avaya Collaboration Services* (NN10850–031).

### \* Note:

When Lync Integration is installed, it is automatically enabled in Internet Explorer (IE). For Collaboration Services to work with Lync Integration installed, you must disable the Lync Browser Helper add-in.

The Configurator builds the following files:

- `LyncIntegration.zip` — The Lync Integration software.

### Before you begin

- You have installed the Configurator.
- You must be able to define the following configuration variables:

Variable	Description
<b>General Settings</b>	
Signal Protocol	From the drop-down menu, select whether you are using SIP or H.323 signaling.
Communication System Type	The options are: <ul style="list-style-type: none"> <li>• <b>Avaya Aura</b></li> <li>• <b>Avaya Aura: VDI</b></li> <li>• <b>CS 1000: Aura</b></li> </ul>
Integration Type	For Avaya Aura <sup>®</sup> , the options are: <ul style="list-style-type: none"> <li>• <b>Computer Only</b></li> <li>• <b>Phone Only</b></li> <li>• <b>Computer &amp; Phone</b></li> </ul> For CS 1000 with Avaya Aura <sup>®</sup> , the available option is: <ul style="list-style-type: none"> <li>• <b>Computer Only</b></li> </ul>
Preferred Integration Type	This variable is enabled if the <b>Integration Type</b> is <b>Computer &amp; Phone</b> . You can select which one of the two modes is presented to the user when they start the client.
Server Address	<b>Avaya Aura:</b> A comma separated list of call servers applicable to the extension. Each server can be identified by IP address, FQDN, or host name.

Variable	Description
	<p> <b>Important:</b></p> <p>Do not add call servers that are not applicable to the extension. The Lync Integration client may continue to search the call server list and become unresponsive.</p>
Server Transport Protocol	<p>Choose one of the following options:</p> <ul style="list-style-type: none"> <li>• TCP</li> <li>• TLS</li> <li>• UDP</li> </ul>
Server Port	<p>If required, update the server port number. The default port number is 5061.</p>
SIP Domain	<p>Specify the SIP domain name if you are using a SIP endpoint. For example, <code>transport=tls</code>.</p> <p> <b>Important:</b></p> <p>To use Lync Integration with a SIP endpoint in Shared Control mode, the transport type must be set to TLS. The TCP transport type works for Computer mode, but not for Shared Control mode.</p>
Specify Local UDP/TCP Port Range Preference	<p>Update the default low and high UDP and TCP port range if required.</p>
Support Email Address	<p>Enter a support email address for users to report issues and send log files.</p>
Support Multiple Devices	<p>Select this option to enable multiple devices for Lync Integration.</p>
Enable Video	<p>If selected, video is enabled by default in the Lync Integration deployment.</p>
Answer Video Automatically	<p>If selected, Answer Video Automatically is enabled by default in the Lync Integration deployment.</p> <p>When enabled, incoming video calls automatically open in a video call window. When disabled, you must accept the video call to open the window.</p>
<b>Dialing Settings</b>	
<p>See <a href="#">Configure a dial plan</a> on page 62</p> <p>If you are configuring an advanced dialing plan and will be deploying a <code>dialingRules.xml</code> file, you must know the location of the file.</p>	

## Procedure

1. Double-click the Avaya Collaboration Services Configurator icon to open the Configurator tool.
2. Read the information in the **Welcome** screen, and then click **Next**.
3. In the **Collaboration Service Configuration** screen, under **Lync Integration**, select **Build Lync Integration**, and then click **Next**.
4. In the Microsoft Lync Settings window, click **Change**.

5. Under the **General Settings** and **Dialing Settings** tabs, enter the details for your deployment.
6. If you are deploying a `dialingRules.xml` file, click the **Specify Dialing Rules XML File** check box under the **Dialing Settings** tab, and then click the folder icon. Navigate to the file location and click **Open**.
7. If required, under the **Additional Settings** and **Video Settings** tabs, specify the settings that you want to use.
8. Click **OK** to return to the Configurator wizard.
9. In the Microsoft Lync Settings window, click **Next**.
10. Follow the instructions in the Configurator wizard to finish configuring the installation packages. For more information, see **Configuring the installation packages for the Collaboration applications with Lync Integration** in *Administering Avaya Collaboration Services* (NN10850–031).
11. When you are ready to build the installation packages, in the Configurator wizard's **Build** screen, select the destination folder for the output and then click **Build**.
12. Unzip the Lync Integration files, and extract the `.msi` file.

#### Related Links

[Deploy Lync Integration on the desktop](#) on page 68

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## Installing Lync Integration locally

Use this procedure to install Lync Integration where the installation software is local to the machine where it is being installed. The Lync Integration is installed on end user machines coresident with Lync 2010 or Lync 2013.

When using this procedure to install Lync Integration, no installation log file is created. If you experience problems with installation, perform the installation from the command line and view the log file. See [Installing Lync Integration on multiple machines from a remote server](#) on page 76.

### Before you begin

- You must have administrative privileges on the local desktop.
- You must have the Lync Integration `.msi` file. Extract the `.msi` file from the `.zip` file created by the Configurator.
- The Microsoft Lync client must be installed before Lync Integration is installed.

### About this task

The log and support directories can be found under `APPDATA`.

**\* Note:**

AppData is a hidden Windows folder that contains user data and settings information. The location of the AppData folder can vary.

**Procedure**

1. If open, exit Microsoft Lync.
2. If open, exit Internet Explorer.
3. Open the Windows Explorer tool and navigate to the location of the Lync Integration .zip file.
4. Unzip the file.
5. Double-click the Microsoft Lync SDK installation file:  
`LyncSdkRedist-4.0.7577.124.msi` for 2010 installations or `lyncRuntime.msi` for 2013 installations, and then follow the instructions to complete the installation.
6. Double-click the Lync Integration installation file `LyncIntegration-<release#>.msi` and follow the instructions to complete the installation.

You may receive a prompt to restart the system. If this occurs, you must reboot the machine to complete the installation.

7. Start the Lync client.
8. Start Lync Integration.

From the Windows **Start** menu, select **Programs > Avaya**. For Lync 2010 clients, select **Lync 2010 Integration > Lync Integration**. For Lync 2013 clients, select **Lync 2013 Integration > Lync Integration**.

**\* Note:**

You only need to start Lync Integration after the initial installation. For subsequent Lync client startups, Lync Integration also starts.

9. If the Lync Integration Settings window opens with the **Phone** tab displayed, enter your **Extension** number and the **Password** for your extension.

**Related Links**

[Deploy Lync Integration on the desktop](#) on page 68

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## Installation using a command line

You can install Lync Integration using a command line. Installation command lines start with `msiexec /i LyncIntegration-msi` and follows with other command information depending on the type of deployment you are performing.

**Table 12: Command line format**

Switch	Description	Value	Default value	Usage example
Signalprotocol	SIP protocol installation.	SIP	H.323	signalprotocol=SIP
For SIP protocol				
ONXSIPPROXYSERVERLIST	IP address of the SIP server.	<ipaddress>	N/A	ONXSIPPROXYSERVERLIST=xxx.xxx.xx xx.xxx
ONXSIPCONTROLLERLIST	IP address of the SIP controller.	<ipaddress>:<port>;transport=<tcp or tls>	N/A	<b>Example for SIP,</b> ONXSIPCONTROLLERLIST=xxx.xxx.xx x.xxx;transport=tls.  <b>For H.323 ,</b> ONXSIPCONTROLLERLIST=xxx.xxx.xx x.xxx
ONXSIPDOMAIN	SIP domain.	<sip domain>	N/A	ONXSIPDOMAIN=xxx.com
For REST				
ENABLERESTMODE	Enables or disables REST mode	true or false	false	ENABLERESTMODE=false
RESTSERVERHOST	The REST server name	<REST server>	N/A	RESTSERVERHOST=<REST server>  , set if the switch ENABLERESTMODE is set to true
RESTSERVERDOMAIN	The REST server domain	<REST domain>	N/A	RESTSERVERDOMAIN=<REST domain>  , set if the switch ENABLERESTMODE is set to true
Video				
ADMINENABLEVIDEO	Enable or disable video.	1 or 0	1	ADMINENABLEVIDEO=1
VIDEOANSWERWITH	Answer video automatically.	1 or 0	1	VIDEOANSWERWITH=1
Phone modes				
ENABLECM323SCMODE	To enable the Desk Phone mode on Avaya Aura®.	True or false	False	ENABLECM323SCMODE=true
ENABLECM323MODE	To enable the Computer mode on Avaya Aura®.	True or false	True	ENABLECM323MODE=true

Switch	Description	Value	Default value	Usage example
ENABLETCMODE	To enable the Other Phone mode on Avaya Aura®.	True	False	ENABLETCMODE=true
VDIENV	Installation for the VDI environment.	True	False	VDIENV=true
Dialing rules				
ONEXDIALPLANO UTSIDELINEACCE SSCODE	Number to dial to access an outside line.	<value>	N/A	ONEXDIALPLANOUTS IDELINEACCESSCO DE=<x>
ONEXDIALPLANC OUNTRYSOURCE	Your country code.	<value>	N/A	ONEXDIALPLANOUN TRYSOURCE=<x>
ONEXDIALPLANA REACODE	Your area or city code.	<value>	N/A	ONEXDIALPLANARE ACODE=<x>
ONEXDIALPLANP BXPREFIX	PBX main prefix.	<value>	N/A	ONEXDIALPLANP BXPREFIX=<x>
ONEXDIALPLANL ONGDISTANCEAC CESSCODE	Number to dial for long distance calls.	<value>	N/A	ONEXDIALPLANL ONGDISTANCEACCE SSCODE=<x>
ONEXDIALPLANIN TERNATIONALAC CESSCODE	Number to dial for international calls.	<value>	N/A	ONEXDIALPLANIN TERNATIONALACCE SSCODE=<x>
ONEXDIALPLANE XTENSIONLENGT HLIST	Extension length for internal extension calls.	<value>	N/A	ONEXDIALPLANE XTENSIONLENGTHL IST=<x, y>
ONEXDIALPLANN ATIONALPHONEN UMBLENGTH	Length of national phone numbers.	<value>	N/A	ONEXDIALPLANN ATIONALPHONEN UMBLENGTH=<x>
ONEXDIALPLANN ATIONALPHONEN UMBLENGTH	Include area or city code while making a local call.	<value>	N/A	ONEXDIALPLANN ATIONALPHONEN UMBLENGTH=<x>

## Installing Lync Integration on multiple machines from a remote server

To facilitate the integration of the Lync Integration software into bulk software distribution and installation infrastructure, the Lync Integration software can be installed without end-user intervention, using the following command:

```
msiexec /i LyncIntegration-<release#>.msi<extension 1><extension 2><extension 3> REBOOT=ReallySuppress /L*v LyncIntegration.install.log /q
```

### Installation notes

- The Microsoft Lync 2010 or 2013 client must be installed before Lync Integration is installed.

- You must have the Lync Integration .msi file. Extract the .msi file from the .zip file created by the Configurator.
- The /q parameter stops running the Lync 2010 or 2013 client, Lync Integration, and one-X engine processes. The installation cannot proceed if the Microsoft Lync Client is running.
- You may receive a prompt to restart the system. If this occurs, you must reboot the machine to complete the installation.
- Any interaction with the Microsoft Lync Client by an end user during the installation can result in a failed installation. The LyncIntegration.install.log will indicate the operation is complete. Allow enough time for completion of the operation prior to re-starting the Lync client (up to 1 minute for slower machines). Failure to do so will result in an unsuccessful installation and the installation process must be repeated.
- You must have administrator privileges to install the application. On Windows 7, you must open the Command Prompt window using the **Run as administrator** option. To run the Command Prompt as administrator:
  1. From the Windows start menu, type **Command Prompt** in the **Search programs and files** box.  
The Command Prompt application is displayed in the list under **Programs**.
  2. Right-click **Command Prompt** and select **Run as administrator**.

Lync Integration will start the next time Microsoft Lync is started after logging into Windows. To start Lync Integration without restarting Windows, from the Windows **Start** menu, select **Programs > Avaya**. For Lync 2010 clients, select **Lync 2010 Integration > Lync Integration**. For Lync 2013 clients, select **Lync 2013 Integration > Lync Integration**.

To validate the installation, view the log file LyncIntegration.install.log. The file contains text readable output of the installation process and indicates successful installation of Lync Integration.

---

## Installing Lync Integration on a shared server for Virtual Desktop Infrastructure deployments

### Before you begin

- You must have administrative privileges on the local desktop.
- Build the install package for VDI with the Configurator.
- You must have the Lync Integration .msi file. Extract the .msi file from the .zip file created by the Configurator.
- The Microsoft Lync client must be installed before Lync Integration is installed.

### About this task

Use this procedure to install Lync Integration where the installation software is on a shared server, such as Citrix. Lync Integration must be installed on the same machine as the Microsoft Lync client.

### Procedure

1. If open, exit Microsoft Lync and Internet Explorer.

2. Open Windows Explorer and navigate to the location of the Lync Integration zip file.
3. Unzip the file to a folder on your machine.
4. Open a Command window.
5. In the Command window, change to the directory where you unzipped the contents of the Lync Integration zip file.
6. Double-click the Microsoft Lync SDK installation file:  
`LyncSdkRedist-4.0.7577.124.msi` for 2010 installations or `lyncRuntime.msi` for 2013 installations, and then follow the instructions to complete the SDK file installation.
7. In the Command window, enter `msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3> VDIENV=true /L*v [LyncIntegration].install.log /q`
8. Follow the instructions to complete the installation.

If you receive a prompt to restart, you must reboot your machine to complete the installation.

### Next steps

Once the installation is complete, you should check the log files. The log and support directories are located under `APPDATA`.

#### **Note:**

AppData is a hidden Windows folder that contains user data and settings information. The location of the AppData folder can vary.

---

## Installing Lync Integration with Lync peer-to-peer calling enabled

### Before you begin

You must disable either Avaya Video or Microsoft Video on the computer to avoid resource conflicts for the camera.

### About this task

Use the following procedure to enable the Lync Integration UC Telephony setting during a command line installation.

#### **Important:**

Lync peer-to-peer calling should not be enabled in conjunction with virtual desktop infrastructure deployments.

### Procedure

1. In the command line, use `CD` to change the directory to the location with the extracted folder that contains the Lync Integration set up.
2. Enter the following string: `msiexec /i Lync2013Integration<x64 or x86>-<release#>.msi LYNCTELEPHONYMODE=?,` where `?` indicates a Microsoft UC Telephony setting of 0 or 5.

If Lync UC is on, the setting is 0. If Lync UC is off, the setting is 5.

**\* Note:**

If the file name is different from `Lync2013Integration<x64 or x86>-<release>.msi`, change the file name.

You can make calls using two different call controls when the Lync UC is active. Avoid running both the call paths simultaneously as one call cannot be on hold when another call is active.

3. If an error occurs, reverse the registry entry.

You can manually change the Lync **TelephoneMode** to a value of 5 on the affected computer by modifying the registry.

```
HKEY_CURRENT_USER\Software\Policies\Microsoft\office\15.0\Lync
```

---

## Extracting signed Lync Integration certificates from the Configurator

### About this task

The Lync Integration digital signature is invalid when you install Lync Integration using the Configurator. Use the following procedure to extract the signed Lync Integration digital certificate from the Configurator.

### Procedure

1. Open the Configurator installer: `ACA.Configurator.msi`.
2. Use the following command line to extract all files to the desired location.

```
msiexec /a ACA.Configurator.msi /qb TARGETDIR="<desired path>"
```

For example, if you want to extract files to `C:\Users\Downloads\ACA installer`, the command line is:

```
msiexec /a ACA.Configurator.msi /qb TARGETDIR="C:\Users\Downloads\ACA installer"
```

3. From the extracted files, navigate to the following location: `<extracted file path>\Install Packages\Lync Integration\<x64 or x86>\Lync*.zip`.
4. Unzip the files.
5. Install using the following command line.

The command line should be followed by any other required command information depending on your deployment requirements.

```
msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3>
```

## Examples of installation commands when extracting signed certificates from the Configurator

The following are examples of installation command lines for step 5 on page 79.

### Installation with Avaya Aura® deployments

```
msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3>  
debug=true ENABLERESTMODE=false ENABLECM323SCMODE=true ENABLECM323MODE=true  
ENABLETCMODE=true ONEXSIPPROXYSERVERLIST=xxx.xxx.xxx.xxx
```

### Installation with logs

```
msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3>  
debug=true ENABLERESTMODE=false ENABLECM323SCMODE=true ENABLECM323MODE=true  
ENABLETCMODE=true ONEXSIPPROXYSERVERLIST=xxx.xxx.xxx.xxx /L*v install.log
```

### Installation in Computer mode with the SIP signaling protocol

```
msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3>  
debug=true signalprotocol=SIP
```

### Installation in Phone mode or Other Phone mode with the SIP signaling protocol

```
msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3>  
debug=true ENABLERESTMODE=false ENABLECM323SCMODE=true signalprotocol=SIP
```

### Installation in a VDI or Citrix environment

```
msiexec /i LyncIntegration<release#>.msi<extension 1><extension 2><extension 3>  
VDIENV=true /L*v install.log /q
```

# Chapter 14: Replacing the dialingRules.xml file on the workstation where Lync Integration is installed

There are two ways of replacing the `dialingRules.xml` file used.

- Build a new Lync Integration installer including the updated file and then follow the procedures to uninstall and reinstall Lync Integration.
- Use the `updateRules.wsf` script to update the `dialingRules.xml` file on a workstation where Lync Integration is installed. This script is intended to be used in conjunction with a company's preferred workstation software deployment method (for example, run as a Microsoft SMS deployed script).

## Before you begin

- You must have an updated `dialingRules.xml` file. See [Modifying dialing rules](#) on page 67
- You must be able to run the `updateRules.wsf` script with Administrative privileges.

### Note:

If the new dial plan rules are not applied after a Lync client restart, reboot the workstation to ensure that the Lync Integration process has been restarted.

## Procedure

1. On the machine where Lync Integration is installed, open a command prompt window.
2. Navigate to the location of the `updateRules.wsf` tool. The tool is located in the `ProgramFiles` system property under **Lync Integration**.
3. Run the tool. Enter  

```
cscript updateRules.wsf /?
```

Details on how to replace the `dialingRules.xml` file are displayed.
4. Once the new file is deployed, log out and log back in to the Lync client to apply the changes.

# Chapter 15: Troubleshooting Lync Integration

Use the information in this chapter to help troubleshoot issues related to Lync Integration configuration.

For the most detailed log information, run Lync Integration in debug mode. Click  to open the Settings window and then select the **Support** tab.

For additional troubleshooting information, see *Avaya one-X<sup>®</sup> Communicator Troubleshooting* (16-603218).

## Related Links

- [Active call ends when logging in to the desk phone](#) on page 83
- [Add-in disappears when windows are maximized](#) on page 84
- [Application crashes](#) on page 84
- [Application does not launch](#) on page 85
- [Audio call cannot be escalated to a video call in Shared Control mode](#) on page 85
- [Call and video status not updated after network connection is lost](#) on page 86
- [Calls fail to originate when the phone is off the hook and the Headset button is lit](#) on page 86
- [Call forwarding disabled with certain digital phones](#) on page 87
- [Different behaviors for calls made from the right-click menu and from the Phone icon](#) on page 87
- [Enabling debug when Lync Integration is not starting](#) on page 88
- [G729 or G722 Codec negotiation fails](#) on page 88
- [Incoming call error with Avaya Aura Communication Manager 5.2](#) on page 89
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- [Install or uninstall failure: script could not be run](#) on page 90
- [Invalid phone number format: published phone number does not appear to My Contacts](#) on page 91
- [Launching web collaboration in a Citrix XenApp environment with Google Chrome](#) on page 92
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- [Lync Integration cannot connect to servers](#) on page 92
- [Lync Integration Communicator Bar does not appear](#) on page 93
- [The Lync Integration Contact Card button does not appear](#) on page 94
- [Lync Integration does not accurately display Adhoc conference participants](#) on page 94
- [Lync Integration may disable PC](#) on page 95

[Lync Integration Share Now window is displayed instead of Conversation window](#) on page 95

[Lync video pane has excessive black border around video frame when using H.264 video codec](#) on page 96

[Making a call displays Call number is not defined dialog](#) on page 96

[Poor video quality when Auto Select Camera setting is selected](#) on page 98

[Privacy settings block contact display: published phone number does not appear to My Contacts](#) on page 98

[Scripting access to WMI is not working](#) on page 99

[Corrupt Office installation prevents Lync Integration from launching](#) on page 99

[Performance issues during video calls](#) on page 100

[Video is not presented](#) on page 101

[Presence state flickers when the user is on a call](#) on page 101

[User receives error messages after making a second call](#) on page 102

[Lync Integration uninstallation from Control Panel fails](#) on page 103

[Video calls cause high CPU usage](#) on page 103

[Warning message when you accept an incoming call from a user set to Do Not Disturb](#) on page 105

---

## Active call ends when logging in to the desk phone

### User Alert

When you are in an active call in Computer mode and you log in to your desk phone while the call is in progress, the call ends without warning. Lync Integration does not provide an indication that a call is in progress when you log in to your desk phone.

### Logs/Alarms

When you log in to your desk phone while in Computer mode, you receive a warning message saying `Computer mode was logged out`. At this point, your active call is terminated.

### Root Cause

When you log in to your desk phone, Lync Integration prepares to take control of your extension. Lync Integration does not indicate that an active call is in progress.

### Recovery Action

Re-initiate the lost call.

---

## Add-in disappears when windows are maximized

### User Alert

The Lync Integration add-in disappears when users click the  icon to maximize the Conversation window or the main Lync client window. The video screen is no longer visible and users cannot control calls with Lync Integration.

### Logs/Alarms

None.

### Root Cause

Microsoft takes control of the screen when windows are maximized in the Lync client.

### Recovery Action

Minimize the Conversation window or the main Lync client window. Expand the window by stretching it manually.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

---

## Application crashes

### User alert

Lync Integration suddenly stops working and shuts down.

### Logs/Alarms

No Lync Integration logs for this issue.

The following error alert appears under **Control Panel > Administrative Tools > Event Viewer > Applications and Services Logs**:  
Faulting application name: LyncAddin.exe, version 1.0.0.0, time stamp: 0x12345678  
Faulting module name: ntdll.dll, version 6.1.7601.17725, time stamp 0x12345678  
Exception code: 0xc0000005....

### Root Cause

Incompatible software is installed on the work station.

### Recovery Action

Do the following:

1. Perform the Clean Boot operation to determine the issue. For more information, see <http://support.microsoft.com/kb/929135>.
2. Uninstall and re-install Lync Integration to make sure the issue is resolved.

---

## Application does not launch

### User Alert

Lync Integration does not launch when signing into the Lync client. The Windows **Start** menu does not contain the Lync Integration menu item.

### Logs/Alarms

None.

### Root Cause

Lync Integration application was not installed successfully.

### Recovery Action

Examine Lync Integration installation log, rectify the failing condition, and repeat the installation. Microsoft Installer (MSI) error codes can be found here: <http://support.microsoft.com/kb/229683>.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

---

## Audio call cannot be escalated to a video call in Shared Control mode

### User Alert

If the Lync Integration user is on a desk phone audio call before Lync Integration launches, the call cannot be escalated to a video call after Lync Integration launches in Shared Control mode.

### Logs/Alarms

None.

### Root Cause

Lync Integration is not aware of the media capabilities at the remote end. Escalation to video is not supported if the call is established before Lync Integration launches.

### Recovery Action

After Lync Integration launches, hang up and make the call again.

## Call and video status not updated after network connection is lost

### User Alert

If the other party is dropped from a call or video communication due to a failure, such as loss of network connection, the Lync Conversation bar of the active party is not updated to show that the call or video is inactive.

### Logs/Alarms

None.

### Root Cause

The Lync Integration may not be notified immediately when the other party drops from a call due to a failure.

### Recovery Action

If no audio can be heard, the call can be ended. If video is frozen, but audio is still active, the video window can be closed.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

---

## Calls fail to originate when the phone is off the hook and the Headset button is lit

### User Alert

Calls fail to originate if the Lync Integration shuts down when the desk phone handset is off the hook or the **Headset** button on the phone is lit. Users cannot make calls.

### Logs/Alarms

None.

### Root Cause

This issue is caused by an inconsistency in the way that the Avaya Media and Signaling engine manages the hook state of the phone line. If the Avaya Media and Signaling engine is in the wrong state when it shuts down or when Lync Integration shuts down, the state is not updated correctly on recovery.

### Recovery Action

Put the handset back in the cradle or press the **Headset** button on the phone to extinguish the light.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

---

## Call forwarding disabled with certain digital phones

### User Alert

When you are in the Desk Phone mode on certain digital phones, such as the 1416 digital phone, call forwarding is disabled automatically after 50 seconds. Although you set call forwarding successfully, the call is not forwarded

### Root Cause

Call forwarding is not supported on certain digital phones, such as the 1416 digital phone.

### Recovery Action

None. This issue does not occur with the 1408 digital phone.

---

## Different behaviors for calls made from the right-click menu and from the Phone icon

### User Alert

When a Lync Integration user makes a call by right-clicking a contact and selecting **Make Voice Call**, the call fails. When the user makes the call by clicking the Phone icon, the call is successful.

### Logs/Alarms

The following example shows the type of information in the Lync Integration log file when the user makes a call by right-clicking the contact and selecting **Make Voice Call**. For the most detailed log information, run Lync Integration in debug mode.

```
2012-09-06 12:13:18.499 10 Debug DiallingRules: NormalizeUri: incoming number 8672 to +75557778672 using default implementation
2012-09-06 12:13:18.499 10 Debug LyncClientManager: GetNativeContact for uri tel: +75557778672
2012-09-06 12:13:18.604 10 Debug DiallingRules: GetTranformedString: matched rule: +75557778672
2012-09-06 12:13:18.605 10 Debug DiallingRules: NormalizeUri: incoming number +75557778672 to +85557778672 using pattern match
```

### Root Cause

The normalized phone number is re-normalized a second time into a different phone number. For example:

- The default implementation normalizes 8672 to +75557778672.
- Pattern match then normalizes +75557778672 to +85557778672.

The number resulting from the first normalization operation should not be re-normalized. All numbers must be completely normalized by the first normalization operation.

### Recovery Action

Remove the second normalization operation, and add another normalization rule to convert the first number format into the final form. From the example above, the new normalization rule must convert 8672 to +85557778672.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

---

# Enabling debug when Lync Integration is not starting

## User Alert

The user cannot get Lync Integration running, and you require more logs and debug information to resolve the issue.

## Logs/Alarms

You must enable debug mode.

## Root Cause

Unknown.

## Recovery Action

1. Uninstall Lync Integration.
2. Reinstall Lync Integration using the following command line parameter:  

```
msiexec /i LyncIntegration-6.2.0-SNAPSHOT.msi DEBUG=true
```
3. Restart Lync Integration.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

---

# G729 or G722 Codec negotiation fails

## User Alert

No User Alert Displayed

## Logs/Alarms

No log exceptions. QueryConnection Response missing connection state details.

## Root Cause

One or more endpoints or media elements has codecs disabled.

## Recovery Action

- Verify the G729 and G722 codecs are enabled on Communication Manager.
- Verify that the following four lines exist in the Lync Integration `config.xml` file :

```
<parameter>  
<name>EnableG729</name>  
<value>1</value>  
</parameter>
```

The `config.xml` file can be found under **AppData > Roaming > Avaya > Lync Integration**.

**\* Note:**

AppData is a hidden Windows folder that contains user data and settings information. The location of the AppData folder can vary.

**Related Links**

[Troubleshooting Lync Integration](#) on page 82

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## Incoming call error with Avaya Aura® Communication Manager 5.2

### User Alert

With Lync and Avaya one-X® Communicator on a 5.2 Avaya Aura® Communication Manager server, if three parties are involved in a cyclic call scenario (user A calls user B, user B calls user C, and user C calls user A), the final call cannot be successfully answered. Any further attempts to re-initiate the call may result in the user not being able to control the Conversation window. When the uncontrollable Conversation window is closed, the call is not terminated.

### Logs/Alarms

None.

### Root Cause

Unknown.

This issue does not exist on Communication Manager 6.2.

### Workaround

Sign out of the Lync client and then sign back in. If this behavior persists, consider upgrading to an Avaya Aura® Communication Manager 6.2 server or higher.

**Related Links**

[Troubleshooting Lync Integration](#) on page 82

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## Incoming call notification shows caller as unknown@number

### User Alert

The Conversation window in Lync Integration displays `unknown@number`.

On receiving an incoming call notification, Lync Integration attempts to match the incoming call number with the user's Lync contacts. If the matching is not successful, then the Avaya Aura® calling name is displayed (if available) in the pop-up window. When the user answers the call, Lync

Integration passes the calling number to Lync. Lync Integration provides name resolution against the Lync address book and the user's Outlook contacts. This may result in a different name format being presented in the Lync Conversation window to that shown in the incoming call notification pop-up window. If Lync does not provide a name match, then the caller's number is displayed. If the calling number is not presented by Avaya Aura®, then the incoming call notification window and the Conversation window associated with this call displays `unknown@number`.

### Logs/Alarms:

The Lync Integration log file displays the following information:

```
mm/dd/yyyy 15:16:18.098 Verbose 30 DiallingRules: NormalizeUri: incoming number 7000260 to 7000260 using default implementation
```

```
dd/mm/yyyy 15:16:18.099 Verbose 1 DiallingRules: NormalizeUri: incoming number +000000000000 to +000000000000 using default implementation
```

```
mm/dd/yyyy 15:16:18.099 Verbose 1 CallEventHandler: CallEvtHandler CallEventArgs: sessionID=2; state=alerting; calling=tel:+000000000000; called=tel:7000262;phone-context=enterprise; reason=;32
```

### Root Cause

Lync Integration cannot normalize the incoming call due to a mismatch in the dialing rules. Normalization does not occur when the caller's extension is not of the same length as provisioned in the **Extension Length** field in the **Settings > Dialing Rules** pane.

### Recovery Action

The extension length of the telephone number in the **Settings > Dialing Rules** pane should match the configured dial plan of the network. In this case, update the extension length to 7,11.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

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## Install or uninstall failure: script could not be run

### User Alert

There is a problem with the Windows Installer package. A script required for this install to complete could not be run. Contact your support personnel or package vendor.

### Logs/Alarms

The Windows Installer log, if enabled, contains the following log entry.

```
Action start xx:xx:xx: stopOneXClientsForUninstaller.  
MSI (s) (B0:04) [xx:xx:xx:xxx]: Product: Avaya MC Add-in - Error 1720. There is a problem with this Windows Installer package. A script required for this install to complete could not be run. Contact your support personnel or package vendor. Custom action stopOneXClientsForUninstaller script error -2147217406, : Line 111, Column 15, Scripting access to WMI is not working.
```

### Root Cause

The Windows Management Instrumentation (WMI) repository is corrupt.

## Recovery Action

Perform the following steps to complete the installation or uninstallation of Lync Integration. Note that this procedure may not resolve the underlying Windows operating system issue.

1. Open a command prompt window. Choose one of the following.
  - On Windows 7, you must open an elevated command prompt window. From the Windows **Start** menu, select **All Programs**, then **Accessories**, then right-click **Command Prompt**, and select **Run as Administrator**.
2. Type in the following command and press Enter.  

```
net stop winmgmt
```
3. Open a Windows Explorer window and navigate to the folder C:\Windows\System32\Wbem\Repository.
4. Rename the Repository folder.
5. Return to the command prompt window and type in the following command and press Enter.  

```
net start winmgmt
```
6. Type in the following command and press Enter.

```
EXIT
```

### Related Links

[Troubleshooting Lync Integration](#) on page 82

---

# Invalid phone number format: published phone number does not appear to My Contacts

## User Alert

The Microsoft Lync client presents the following warning: This number is not a valid phone number. Check the number and try again.

## Logs/Alarms

None.

## Root Cause

The telephone number is not a valid phone number. Only direct inward dial numbers are supported with the solution.

## Recovery Action

Phone numbers must use a Microsoft supported phone number format. See the Microsoft Lync documentation for information on supported formats. The following are links to online documents:

- For Lync 2010, [Set Phones options and numbers for Lync 2010](#)
- For Lync 2013, [Set Phone options and numbers for Lync 2013](#)

### Related Links

[Troubleshooting Lync Integration](#) on page 82

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## Launching web collaboration in a Citrix XenApp environment with Google Chrome

In a Citrix XenApp environment, when you launch web collaboration from Lync Integration, or from an Outlook Meeting Invitation or Reminder window with Collaboration Services, and your default web browser is Google Chrome, the web collaboration link does not open properly. The Google Chrome browser opens but you are not automatically directed to the web collaboration as expected.

### Recovery action

Before trying to launch web collaboration from Outlook or Lync Integration, make sure the Google Chrome browser is open. If the browser is already open, web collaboration should launch successfully as expected.

---

## Log file uninstallation error

### User Alert

The following error message appears when uninstalling Lync Integration through the Windows Control Panel:

```
Error opening installation log file. Verify that the specified location exists and is writable.
```

### Root Cause

This issue occurs when Windows Installer Logging is enabled, but the Windows Installer engine cannot write the uninstallation log file correctly. For more information, see <http://support.microsoft.com/kb/2564571/en-us>.

### Recovery Action

Stop and restart the Explorer.exe process using Task Manager.

---

## Lync Integration cannot connect to servers

### User Alert

Server or connection to the server is down. Please contact your administrator.

The following message displays in the Configure Settings Window on the client: Communication servers are not available. Please contact your administrator.

## Logs/Alarms

2011-06-23 15:19:26.341 1 Debug PopupManager.ShowErrorMsgDialog: The selected mode cannot be accessed without configuring login settings.

Do you wish to exit the Lync Integration? Select **Yes** to exit the Lync Integration. To restart the Lync Integration, please sign-out and sign-in to the Lync client. 2011-06-23 15:19:27.825 1 Debug PopupManager.ShowErrorMsgDialog: The selected mode cannot be accessed without configuring login settings.

Do you wish to exit the Lync Integration? Select **Yes** to exit the Lync Integration. To restart Lync Integration, please sign-out and sign-in to the Lync client.

## Root Cause

No network connectivity between user's Lync Integration machine and Communication Manager.

## Recovery Action

- Use the ping command to ensure that the Communication Manager or Call Server is reachable. This may require establishing the VPN tunnel to the enterprise network.
- Check that Communication Manager is functioning and has no alarms.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

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# Lync Integration Communicator Bar does not appear

## User Alert

No user alert displayed.

## Logs/Alarms

No Lync Integration logs.

## Root Cause

The Lync Integration process is not running because:

- The process was not started after a local install.
- The process has exited.

## Recovery Action

Start Lync Integration.

- From the Windows **Start** menu, select **Programs > Avaya**. For Lync 2010 clients, select **Lync 2010 Integration > Lync Integration**. For Lync 2013 clients, select **Lync 2013 Integration > Lync Integration**.
- From the Lync client **Tools** menu, select **Avaya Microsoft Lync Integration**.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

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## The Lync Integration Contact Card button does not appear

### User Alert

When you hover over or click a contact in the Lync client, the Lync Integration **Contact Card** button (also called the **Phone** button) does not appear. You cannot view Lync Integration contact cards.

### Logs/Alarms

None.

### Root Cause

The system has lost track of the active tuple for contacts.

### Recovery Action

Switch to a different contact view, and then switch back to the desired contact view. The contact view options, displayed in the main Lync client window, are:

- Groups
- Status
- Relationships
- New

If switching the contact view does not resolve the issue, you will need to sign out of the Lync client and then sign back in.

---

## Lync Integration does not accurately display Adhoc conference participants

### User Alert

During a conference call, the Lync Integration Conversation window does not accurately list all participants. Instead, participants are listed with a name such as `Conference2@audioconference`.

### Logs/Alarms

None.

### Root Cause

Avaya Aura® indicates when a conference call is in progress, but does not display each conference participant.

### Recovery Action

None. The Lync Integration conference experience is similar to the conference experience on the desk phone.

---

## Lync Integration may disable PC

Lync Integration may disable the computer on which it is running. The computer displays a blue screen and is not responsive.

### User Alert

No user alert displayed.

### Logs/Alarms

No Lync Integration logs.

### Root Cause

The problem occurs because the computer graphics driver is not up to date and is conflicting with a Microsoft security update. The problem can be avoided by ensuring that the current graphics driver is installed.

### Recovery Action

1. Remove Security Update MS11-011 KB2393802.
2. Update graphics display driver to the latest manufacturer recommended version.
3. Reinstall the MS11-011 KB2393802 security patch.

If the workaround described above is not successful, do the following:

1. Restore a system update to a snapshot before installing the MS11-011 KB2393802 security patch.
2. Update graphics display driver to the latest manufacturer recommended version.
3. Reinstall the MS11-011 KB2393802 security patch.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

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## Lync Integration Share Now window is displayed instead of Conversation window

### User Alert

When making a call, a Share Now window appears instead of the Conversation window.

### Logs/Alarms

None.

### Root Cause

The issue is caused by a misconfiguration of the dialing rules.

## Recovery Action

The dialing rules must be corrected.

- Users must update the dialing rules in Lync Integration by selecting the **Dialing Rules** tab in the Lync Integration **Settings** panel.
- If the issue still persists, you must update the dialingRules.xml file using the Avaya one-X<sup>®</sup> Communicator Centralized Administration Tool (CAT) or a text editor

See [Dialing rules fundamentals](#) on page 43 for more information.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

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# Lync video pane has excessive black border around video frame when using H.264 video codec

## User Alert

When using H.264 video encoding with certain video cameras, both the local video preview and the remote received video picture will be surrounded by a thick black border. As a result, the video picture presented in both the local preview and the picture presented to the remote user are smaller than desired.

## Logs/Alarms

None.

## Recovery Action

A different web camera may not present this issue. Disabling the H.264 video encoding option in the Lync Integration settings also prevents this behavior.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

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# Making a call displays Call number is not defined dialog

## User Alert

When making a call, the **Call number is not defined** dialog is displayed.

## Logs/Alarms

None.

## Root Cause

The dialing rules are not configured correctly.

Dialing rules should be defined so that the result of the normalization rule is the end result. The number should not be re-normalized to another number. If a normalized number is passed through dialable translations, the number should also be normalized back to the same form that it was in before the dialable translation.

Below is an example of an entry in the `dialingRules.xml` file that normalizes the number 3509 to 19876543210.

```
<DialingRulesPattern>
<type>1</type>
<pattern>^3509</pattern>
<subString>19876543210</subString>
<minLength>4</minLength>
<maxLength>4</maxLength>
<deleteLength>4</deleteLength>
</DialingRulesPattern>
```

With this example setup if a number is entered as 3509 it will first be normalized to 19876543210 using the `dialingRules.xml` file. This number can then be passed through the dialable rules before being sent to the call server. If the information in the simple dialing rules does not correspond with the normalized number; for example, if the number is longer than the national phone number length or if the area/city code in the simple dialing rules is different from the caller's number, then the number will be dialed unchanged as 19876543210 when it is passed through the dialable rules. If this number is normalized again, it will be discovered as an E.164 number (+19876543210) with the simple dialing rules. The E.164 number resulting from the re-normalization does not match the result of the initial normalization, so the dialing rules are incorrect.

## Recovery Action

To fix the issue described above, perform one of the following actions.

- Make sure that the normalized number cannot be normalized again by making sure that the initial normalization converts the number to the E.164 form. To normalize the number in the example scenario above to the E.164 form, you must change the `subString` field in the `dialingRules.xml` file to:

```
<subString>+19876543210</subString>
```

- Make sure that the normalized number cannot be normalized again to a different number by adding a second rule to stop the simple dialing rules from affecting the normalized number.

After the example scenario above, you could add a rule to normalize the number 19876543210 to +19876543210, and to override the simple dialing rule normalization of 19876543210 to +19876543210.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

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## Poor video quality when Auto Select Camera setting is selected

### User Alert

When the **Auto Select Camera** option is selected under Video Settings, you may experience poor video quality. This video quality only affects your local machine. The video quality for the other party is not affected.

### Logs/Alarms

None.

### Root Cause

Underlying Avaya Media and Signaling Engine issue.

### Recovery Action

1. Under Lync Integration Settings, click the **Video** tab.
2. In the Video Settings window, under **Preferred Camera**, select your camera manually instead of using the **Auto Select Camera** option.

---

## Privacy settings block contact display: published phone number does not appear to My Contacts

### User Alert

When the user selects a contact and opens the Lync Integration contact card, or uses the **Make Voice Call** or **Make Video Call** buttons from the Lync Integration Conversation bar, the user is presented with a “No call options available” message.

### Logs/Alarms

None.

### Root Cause

The contact has not published a phone number, or has not granted you access per the Microsoft Lync Privacy Relationship.

### Recovery Action

The rules that apply to Microsoft Lync presence and privacy relationships also apply to Lync Integration. For information on presence and privacy relationships, see the Microsoft Lync documentation. The following are links to online documents:

- For Lync 2010, [Presence and Privacy Relationships for Lync 2010](#).
- For Lync 2013, [Presence and Privacy Relationships for Lync 2013](#).

### Related Links

[Troubleshooting Lync Integration](#) on page 82

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## Scripting access to WMI is not working

### User Alert

There is a problem with this Windows Installer package. A script required for this install to complete could not be run. Contact your support personnel or package vendor.

### Logs/Alarms

None.

### Root Cause

The WMI repository on Windows is corrupted.

### Recovery Action

Use the following steps to fix a corrupted WMI repository on Windows. For more information, see *Avaya one-X® Communicator Troubleshooting* (16–603218).

1. From the **Start** menu, select **Run**.
2. In the Run window, type `CMD.EXE`.
3. Enter the following command `net stop winmgmt`. Then press **Enter** on your keyboard.
4. Rename the folder `%windir%\System32\Wbem\Repository` (for example, you can rename the folder as `%windir%\System32\Wbem\Repository_Bad`).

#### **Note:**

`%windir%` represents the path to the Windows directory, which is typically `C:\Windows`.

5. Open the Command Prompt window. To launch this window from the **Start** menu, do the following:
  - Click **Start > Programs > Accessories > Command Prompt**.
6. Type the following command:

```
net start winmgmt
EXIT
```

Press **Enter** on your keyboard after each line.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

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## Corrupt Office installation prevents Lync Integration from launching

### User Alert

Lync Integration does not launch.

### Logs/Alarms

Logs indicate a `LyncClientException` with error code 0x80080005.

### Root Cause

The error shown in the logs indicates that the cause of this issue is a corrupt Microsoft Office installation.

### Recovery action

Try rebooting the work station. If this does not resolve the issue, use the Microsoft Office Installer to repair the Microsoft Office installation on the work station.

---

## Performance issues during video calls

### User Alert

User experiences poor work station performance while on a Lync Integration video call. During this time, the work station is unresponsive.

### Logs/Alarms

None.

### Root Cause

Insufficient memory or virtual memory.

### Recovery Action

Update your system properties to improve performance. For more information, see [Solution: Enhancing system performance](#) on page 100.

---

## Solution: Enhancing system performance

### Procedure

1. On your computer, navigate to **Control Panel > System > Advanced system settings**.
2. In the System Properties window, select the **Advanced** tab.
3. Click **Settings** under the Performance section.
4. In the Performance Options window, select the **Advanced** tab.
5. Click **Change** under the Virtual memory section.
6. Deselect **Automatically manage paging file size for all drives**.
7. Adjust the maximum virtual memory size to match the recommended virtual memory size.
8. Adjust the initial virtual memory size to be 99% of the recommended virtual memory size.
9. Click **Set**.

10. Click **OK** on all open windows to apply the new settings.
11. Restart your computer if prompted.

---

## Video is not presented

### User Alert

On a Lync Integration video call, video is not presented as expected.

### Logs/Alarms

None.

### Root Cause

Negotiation for the initial video session failed.

### Recovery Action

If the Video window is present but the remote video stream is not presented, do the following:

1. Pause the video
2. Wait for a few seconds and then resume the video

If the Video window is not present, do the following:

1. Hold the audio call in Lync Integration
2. Wait a few seconds and then retrieve the held call
3. Re-escalate the call to video

---

## Presence state flickers when the user is on a call

### User Alert

The user's presence constantly switches from **Busy — In a Call** to another presence state while the user is on an active call.

### Logs/Alarms

None.

### Root Cause

In the Custom Presence definition file, another presence state has the same ID number as the **Busy — In a Call** state. As a result, when the user is on a call, the **Busy — In a Call** state is constantly overridden by another presence state.

### Recovery Action

In the Custom Presence definition file, Lync Integration uses the ID number 1 for the **Busy — In a Call** state. Make sure all other presence states have a different ID number assigned to them.

## User receives error messages after making a second call

### User Alert

When the user makes a second call, Lync Integration attempts to retrieve the first call from the held state and terminate the second call. The user receives one of the following error messages:

- End call failed message on the call control bar.
- The Conversation window is closed. The call is still in progress. Do you wish to terminate the call? pop-up message.

### Logs/Alarms

The following example shows the type of information that appears in the Lync Integration log file when the user makes the second call. For more detailed log information, run Lync Integration in debug mode.

```
SparkXMLProxy: SENT: <?xml version="1.0" encoding="utf-8"?>
<HoldSessionRequest xmlns="http://www.avaya.com/schemas/UISchema.xsd">
<clientId>1</clientId>
<requestId>18</requestId>
<targetId>-2</targetId>
<connectionId>1</connectionId>
</HoldSessionRequest>
```

```
SparkXMLProxy: SENT: <?xml version="1.0" encoding="utf-8"?>
CreateSessionRequest xmlns="http://www.avaya.com/schemas/UISchema.xsd">
<clientId>1</clientId>
<requestId>19</requestId>
<targetId>-2</targetId>
  <mediaType>audio</mediaType>
<remoteAddress>211601</remoteAddress>
<subject>Make a call</subject>
<requestURL/>
<applyDialingRules>true</applyDialingRules>
<reuseDialingSession>false</reuseDialingSession>
<emergency>false</emergency>
<editDialing>false</editDialing>
<onhookDialing>false</onhookDialing>
</CreateSessionRequest>
```

```
OneXSparkXMLProvider: RECEIVED: <HeldEvent xmlns="http://xml.avaya.com/endpointAPI">
<connectionId>1</connectionId>
</HeldEvent>
```

```
OneXSparkXMLProvider: RECEIVED: <HoldSessionResponse xmlns="http://xml.avaya.com/
endpointAPI">
<clientId>1</clientId>
<requestId>18</requestId>
<statusCode>0</statusCode>
<reason>success</reason>
<connectionId>1</connectionId>
</HoldSessionResponse>
```

```
OneXSparkXMLProvider: RECEIVED: <UnheldEvent xmlns="http://xml.avaya.com/endpointAPI">
<connectionId>1</connectionId>
</UnheldEvent>
```

### Root Cause

The **Unhold** dial plan parameter setting under **Conference/Transfer** in Avaya Aura<sup>®</sup> Communication Manager is set to Y. The logs display an unexpected <UnheldEvent> message.

## Recovery Action

Change the **Unhold** setting in Communication Manager to **N**.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

---

# Lync Integration uninstallation from Control Panel fails

## User Alert

Lync Integration uninstallation from the Control Panel fails because a dependent process did not shut down successfully.

## Logs/Alarms

An error message pop-up window, such as the following, appears in Control Panel:

```
The following application is running and cannot be terminated:  
Avaya Media and Signaling Engine (4456)
```

```
The uninstaller cannot proceed. Continue by choosing one of the following options:  
- Restart the system and repeat the uninstall from the Control Panel  
- Uninstall using the command line procedure
```

## Root Cause

An engine dependency did not shut down successfully when you exited Lync Integration. Even though the Lync Integration application is not running, one or both of the following processes might still be running:

- LyncAddin.exe
- AvayaMediaandSignalingEngine.exe

## Recovery Action

Check the **Processes** tab in Task Manager to see if the following processes are still running:

- LyncAddin.exe
- AvayaMediaandSignalingEngine.exe

If both processes are running, use the `shutdown.bat` file to shut them both down. If only the engine process is still running, manually terminate the process in Task Manager.

---

# Video calls cause high CPU usage

## User Alert

High CPU usage during video calls. The computer may appear inoperable.

## Logs/Alarms

None.

## Root cause

One or more of the following issues causes the computer to appear inoperable during Lync Integration video calls:

- The computer barely meets the minimum video hardware requirements
- Video codec selection involves a high CPU utilization codec
- The computer is running many other programs at the same time, causing the computer to lag during video calls

## Recovery Action

### Action 1:

1. Add or modify the following text in the `config.xml` file. The file is located under **AppData > Roaming > Avaya > Lync Integration**.

```
<parameter>
<name>VideoH264Level</name>
<value>30</value>
</parameter>
```

#### Note:

AppData is a hidden Windows folder that contains user data and settings information. The location of the AppData folder can vary.

2. Sign out of the Lync client and then sign in again.

### Action 2:

If the first recovery action does not resolve the problem, do the following:

1. Add or modify the following text in the `config.xml` file.

```
<parameter>
<name>VideoH264Level</name>
<value>22</value>
</parameter>
```

2. Sign out of the Lync client and then sign in again.

### Action 3:

If the second recovery action does not resolve the problem, do the following:

1. Add or modify the following text in the `config.xml` file.

```
<parameter>
<name>VideoH264Level</name>
<value>13</value>
</parameter>
```

2. Sign out of the Lync client and then sign in again.

## Related Links

[Troubleshooting Lync Integration](#) on page 82

## Warning message when you accept an incoming call from a user set to Do Not Disturb

### User Alert

With Lync 2010, when you accept an incoming call from a user who has their presence status set to Do Not Disturb, a dialog box shows the following message. This person does not want to be disturbed and may not see your conversation invitation. Do you want to send anyway?

With Lync 2013, only a warning message appears in the Conversation window. A dialog box does not appear.

### Recovery Action

In the Lync 2010 client, you can select the **Do not show this message again** check box in the dialog box.

In the Lync 2013 client, no dialog box appears.

### Related Links

[Troubleshooting Lync Integration](#) on page 82

# Chapter 16: Uninstall Lync Integration

This section contains the procedures for uninstalling the Lync Integration software deployed on the desktop.

## Related Links

[Uninstalling Lync Integration from the local desktop](#) on page 106

[Uninstalling Lync Integration from multiple machines](#) on page 107

---

## Uninstalling Lync Integration from the local desktop

### Note:

- Lync Integration must be uninstalled before the Microsoft Lync client is uninstalled.

### Before you begin

- You must have administrator privileges to uninstall the application.
- Close the Lync client before performing the uninstall.

#### Uninstallation notes

- If you attempt to uninstall Lync Integration from the Control Panel while an instance launched by a different user is still running, you receive the following message:

```
The following application is running and cannot be terminated: Lync Integration
. The uninstaller cannot proceed.
```

Continue by choosing one of the following options:

- Restart the system and repeat the uninstall from the Control Panel.
- Uninstall using the command line procedure Uninstalling Lync Integration from multiple machines.

- With Windows 7 Professional, when you attempt to uninstall Lync Integration from the Control Panel, you may receive the following Windows Installer error:

```
Error opening installation log file. Verify that the specified log file location
exists and is writable.
```

To work around this issue, stop and restart the `Explorer.exe` process using Task Manager. For more information, see <http://support.microsoft.com/kb/2564571/en-us>.

- You may receive a prompt to restart the system. If this occurs, you must reboot the machine to complete the uninstallation.

**Uninstallation notes**

- If a version of the Avaya one-X<sup>®</sup> Communicator client lower than Release 6.1 is installed on the same machine as Lync Integration, then the Avaya one-X<sup>®</sup> Communicator software must be re-installed after the Lync Integration uninstallation.
- Based on industry standard practice, the uninstall process does not remove the Lync Integration registry keys. The registry keys can be removed manually from `HKey_Current_User\Software\Avaya\Avaya Microsoft Integration`.
- The uninstall process does not remove the existing product log files. When upgrading from a previous version of the Lync client to a more recent version of the Lync client or from the Communicator client to the Lync client, the log destination folder changes. The log files from the previous client must be removed manually.

**Procedure**

1. From the Windows **Start** menu, select **Settings, Control Panel**, then **Add or Remove Programs**.
2. In the Add or Remove Programs window, select **Lync Integration** and then click **Remove**.
3. You are prompted to confirm the uninstall. Click **Yes**.

**Related Links**

[Uninstall Lync Integration](#) on page 106

---

## Uninstalling Lync Integration from multiple machines

 **Note:**

- Lync Integration must be uninstalled before the Microsoft Lync client is uninstalled.

To facilitate the integration of the Lync Integration software into bulk software distribution and installation infrastructure, the Lync Integration software can be uninstalled without end-user intervention, using the following command.

```
msiexec /x LyncIntegration-<release#>.msi REBOOT=ReallySuppress /L*v
LyncIntegration.uninstall.log /q
```

**Uninstallation notes**

- The `/q` parameter kills the running Lync client, Lync Integration, and Avaya Media and Signaling engine processes. The uninstallation cannot proceed if the Microsoft Lync Client is running.
- Any interaction with the Microsoft Lync client by an end user during the uninstallation can result in a failed uninstallation. The `LyncIntegration.install.log` will indicate the operation is complete. Please allow enough time for completion of the operation prior to restarting the Lync client (up to 1 minute for slower machines). Failure to do so will result in an unsuccessful uninstallation and the uninstallation process must be repeated.

## Uninstall Lync Integration

- You must have administrator privileges to uninstall the application. On Windows 7, you must open the Command Prompt window using the **Run as administrator** option. To run the Command Prompt as administrator:
  1. From the Windows start menu, type **Command Prompt** in the **Search programs and files** box.

The Command Prompt application is displayed in the list under **Programs**.
  2. Right-click **Command Prompt** and select **Run as administrator**.
- You may receive a prompt to restart the system. If this occurs, you must reboot the machine to complete the uninstallation.
- If a version of Avaya one-X<sup>®</sup> Communicator lower than Release 6.1 is installed on the same machine as Lync Integration, then the Avaya one-X<sup>®</sup> Communicator software must be re-installed after the Lync Integration uninstallation.
- Based on industry standard practise, the uninstall process does not remove the Lync Integration registry keys. The registry keys can be removed manually from `HKey_Current_User\Software\Avaya\Lync Integration`.
- The uninstall process does not remove the existing product log files. When upgrading from a previous version of the Lync client to a more recent version of the Lync client or from the Communicator client to the Lync client, the log destination folder changes. The log files from the previous client must be removed manually.

To validate the uninstallation, view the log file `LyncIntegration.uninstall.log`. The file contains text readable output of the uninstallation process and indicates successful uninstall of Lync Integration.

### Related Links

[Uninstall Lync Integration](#) on page 106

# Chapter 17: Upgrade Lync Integration

This section contains the procedures for upgrading the Lync Integration software deployed on the desktop.

## Related Links

[Upgrading Lync Integration](#) on page 109

[Changing the Lync Integration signaling protocol](#) on page 110

---

## Upgrading Lync Integration

### Before you begin

- You must review the chapters listed under [Work flow for deploying Lync Integration](#) on page 55 to ensure that all prerequisites are met.

 **Note:**

The **Preferred Integration Type** setting in the Configurator applies to the first time you start Lync Integration. The **Preferred Integration Type** setting is default for all users. After an upgrade, Lync Integration starts with the previously used integration type setting.

- You must close the Lync client before performing the upgrade.

### About this task

Use this procedure to upgrade Lync Integration.

### Procedure

1. Uninstall the old version of Lync Integration.
2. Install the Configurator.
3. Build the `.msi` file using the Configurator tool.

 **Note:**

If an old version of the Configurator is installed, it must be removed before the installation of the new Configurator.

4. Install Lync Integration.

**\* Note:**

- At the first startup after an upgrade, Lync Integration uses the last used mode if that mode was the Computer mode or the Desk Phone (Shared Control) mode. If the last used mode was the Other Phone mode, Lync Integration starts using the default provider as defined in the Configurator.
- When you upgrade Lync Integration from Release 6.2.x or 6.3.x to Release 6.3.2, you might be prompted to enter a username and password after the upgrade. This occurs because the old `config.xml` files are not copied to the new `AppData/Avaya/Avaya Microsoft Lync Integration` location. This is not normal Lync Integration behavior. With standard Lync Integration behavior, old `config.xml` files are copied to the new location, and you are not prompted to enter a username and password after the upgrade.

**Related Links**

[Upgrade Lync Integration](#) on page 109

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## Changing the Lync Integration signaling protocol

### About this task

To change the Lync Integration signaling protocol (SIP or H.323), you must upgrade to a new version of Lync Integration with the appropriate protocol. You cannot change the signaling protocol in an existing version of Lync Integration.

### Procedure

1. Uninstall Lync Integration.
2. Remove all files and directories under `<User Data>\Avaya\Lync Integration\`.
3. Install the new version of Lync Integration with the appropriate signaling protocol.

**Related Links**

[Upgrading Lync Integration](#) on page 109

[Building the install package](#) on page 71

# Chapter 18: Back up and restore Avaya Microsoft Lync Integration

---

## Back up requirements for Lync Integration data

Lync Integration user data is stored under **AppData > Roaming > Avaya > Lync Integration**.

**\* Note:**

AppData is a hidden Windows folder that contains user data and settings information. The location of the AppData folder can vary.

### Files to back up

You should back up the following xml files on your machine:

- addresses.xml
- config.xml
- devices.xml
- dialingRules.xml
- dirserver.xml
- userprofile.xml

### Files that do not need to be backed up

You do not need to back up the `history.xml` file because this file is provided as part of the installation.

---

## Recovering Lync Integration

### Before you begin

Back up required data. For more information, see [Back up requirements for Lync Integration data](#) on page 111.

### About this task

If the Lync Integration application installation becomes corrupt, use the following procedure to recover the application.

## Procedure

1. Uninstall Lync Integration.
2. Re-install Lync Integration.

### **Warning:**

Do not restore Lync Integration data until after the initial login following the installation. This will prevent Lync Integration back-up data from being overwritten.

## Related Links

[Uninstall Lync Integration](#) on page 106

[Installing Lync Integration locally](#) on page 73

[Installing Lync Integration on multiple machines from a remote server](#) on page 76

[Installing Lync Integration on a shared server for Virtual Desktop Infrastructure deployments](#) on page 77

# Chapter 19: Migrating from Communicator Add-in to Lync Integration

The Communicator Add-in is no longer supported as of Release 6.3.

This section describes the steps to follow when migrating from Microsoft Communicator with Communicator Add-in to Microsoft Lync with Lync Integration.

## **Upgrade Lync Integration procedures**

This task flow shows the procedures you perform to upgrade Lync Integration.

## Migrating from Communicator Add-in to Lync Integration

