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# **CIC Integration to Microsoft® Lync™ Server Administrator's Guide**

## **Abstract**

This administrator's guide describes the Customer Interaction Center integration with Microsoft's Lync Server 2013 and Skype for Business Server 2015.

For the latest version of this document, see the PureConnect Documentation Library at: <http://help.genesys.com/cic>.

For copyright and trademark information, see [https://help.genesys.com/cic/desktop/copyright\\_and\\_trademark\\_information.htm](https://help.genesys.com/cic/desktop/copyright_and_trademark_information.htm).

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# Introduction to the CIC-Lync integration

## About this document

This document describes the following:

- Overview of the integration
- Configuration of the Lync software and users
- Configuration of Lync settings in Interaction Administrator
- Remote call control

## About Microsoft Lync Server

Microsoft's Lync Server (Lync) is a unified communications solution that facilitates multiple types of user collaboration, including instant messaging and audio/video conversations.

The Lync client application provides the user interface for Lync Server, and serves as an endpoint for audio/video conversations. The integration supports Lync Server 2013 and Skype for Business Server 2015.

## About Customer Interaction Center

Customer Interaction Center (CIC) is a suite of contact center applications, with interactive voice response and IP/PBX capabilities.

The CIC client is the desktop management software that comes with Customer Interaction Center. CIC client provides users with access to the contact center functionality and IP/PBX capabilities of CIC.

**Note:**

CIC supports several interaction management client applications. This documentation uses the term CIC client to refer to these applications, which include Interaction Connect and Interaction Desktop.

## Release feature information

For more information, see the CIC Integration with Microsoft Lync page on the Product Information website at:

<https://my.inin.com/products/integrations/Pages/Microsoft-Lync.aspx>.

## Purpose of the integration

Lync Server and Customer Interaction Center, when used together, provide a new range of capabilities to users of both systems:

- Users who previously used only Lync now have access to all the powerful contact center and IP/PBX capabilities of CIC.
- The integration provides CIC users with the instant messaging, voice, and video capabilities of Lync, and the functionality available in the Lync Server platform.
- Call center agents using CIC can now view the availability of non-CIC users without leaving the CIC client.

In addition to benefiting from the features of each system, users of the integrated systems can realize some more specific functionality. This functionality is described in the following sections.

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## Sharing and synchronization of presence information

CIC and Lync Server share and synchronize presence information between systems, as it is appropriate. Lync Server uses presence information to indicate the availability of a user to participate in instant message conversations. CIC uses presence information to determine whether a user is available to receive calls, participate in chats, and so on. Presence synchronization requires the installation and configuration of the Lync Presence Integration service. For more information about presence synchronization and the service, see [Configuring presence synchronization](#).

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## More call functionality

Lync users can now place calls from the Lync client to a Lync-enabled CIC user or to the PSTN. And CIC users can place calls to Lync users.

In addition, calls from the PSTN can be directed to Lync users.

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## CIC client with embedded Lync client

Lync-only users can use the Lync interface, while Lync-enabled CIC users can use the Lync functionality embedded in the CIC client.

With the embedded version, users can click a name in the directory and start an instant message conversation, voice call, or video call with that person. CIC handles voice communications, while Lync Server handles video communications.

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## Instant messaging

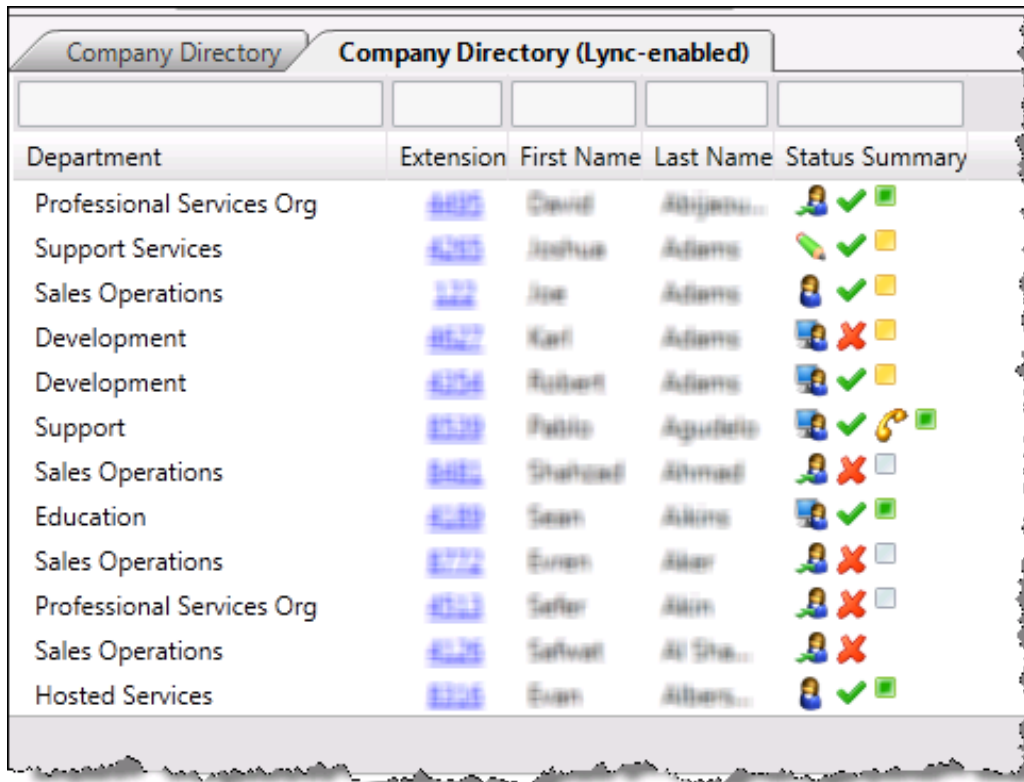
With the combined company directory in the CIC client, users can view directory entries that include Lync Server users and CIC users. When starting a chat with a person in the directory, one of the following occurs:

- If a user starts an instant message from the Lync-enabled company directory in the CIC client, then the CIC client instructs Lync to open the Lync instant messaging interface.
- If the person has a CIC user configuration, but does not have a Lync Server user configuration, the chat interaction appears in the CIC chat interface as it did previously.

---

## Merged company directory

When enabled, the merged, Lync-enabled company directory displays both CIC users and Lync users in one combined directory.



Department	Extension	First Name	Last Name	Status Summary
Professional Services Org	4000	David	Abigenu...	
Support Services	4200	Joshua	Adams	
Sales Operations	332	Joe	Adams	
Development	4027	Karl	Adams	
Development	4024	Robert	Adams	
Support	4030	Pablo	Aguilero	
Sales Operations	4001	Shaheed	Ahmed	
Education	4000	Sean	Akins	
Sales Operations	4072	Erwin	Akar	
Professional Services Org	4000	Seller	Alan	
Sales Operations	4076	Sahwat	Al Sha...	
Hosted Services	4000	Erwin	Albers...	

The directory lists user contact information and indicates user status information as follows:

- A user with a configuration in both CIC and Lync appears in the merged directory with a CIC status and Lync presence information.
- A user with only a Lync account appears as any other entry in the directory, but has Lync presence information and no CIC status.

In the merged company directory, users can collaborate with other users using various forms of communication (phone, instant message, video chat, share desktop, and more), depending on the user type.

Users can add the merged directory to the CIC client as a new view, and can configure the columns that appear. For more information about the merged company directory, see CIC client Help.

**Note:**

The I3\_Feature\_Lync license is required.

## Installation

This document assumes that you have already installed the third-party Lync components. If you plan to use the presence synchronization feature, install the Lync Presence Integration service. For more information about installing the service, see [Configuring presence synchronization](#).

## Concepts and terminology

As an administrator, be familiar with the following terms and concepts.

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### User types

This document discusses the following types of users:

Lync user

A Lync client user, configured in Lync Server. This user does not have a CIC user account.

CIC user

A CIC client user, configured in Interaction Administrator. This user does not have a Lync Server user account.

Lync-enabled CIC user

A user configured in both Lync Server and Interaction Administrator. This user benefits from the advanced integration features of both the CIC client and the Lync client.

For more information about configuring users for the Lync Server integration, see [Configuring users for the integration](#).

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### Auto off-hook

The CIC plug-in for the integration allows users to perform operations in Interaction Desktop without requiring input in the Lync user interface. For example, if a user clicks **Pickup** in the CIC client, the Lync endpoint automatically goes off-hook, as long as the endpoint is running on the same workstation as the CIC client. This feature is convenient when using the CIC client as a phone interface.

**Note:**

Auto off-hook only works with Interaction Desktop. If using any other client, the user must manually pick up the call.

## Components of the integration

The Lync integration with CIC uses several interfaces to communicate. These interfaces include:

- SIP
- Lync Client APIs
- Microsoft Unified Communications Managed API (UMCA)
- Active Directory
- Lync Presence Integration service

## Certification

This integration is a Microsoft-certified Direct SIP solution for Lync. For more information about the certification and a list of certified vendors, <https://technet.microsoft.com/en-us/office/dn788945>.

This integration is also a Microsoft-certified Lync contact center solution. For more information about the certification and a list of certified applications, see <https://technet.microsoft.com/en-us/office/dn788946>.

## Lync requirements

- Microsoft Lync Server 2013 or Skype for Business Server 2015, either Enterprise Edition or Standard Edition
- Microsoft Lync Server 2013 or Skype for Business Server 2015 mediation server
- Microsoft Lync 2013 or Skype for Business 2015 client, either 32-bit or 64-bit
- Microsoft Lync or Skype for Business Trusted Application Server

## CIC requirements

- CIC 2016 R1 or later

## Resources

The following resources are available to help you install, configure, and troubleshoot SIP-enabled CIC products.

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### CIC requirements

For information about requirements for CIC and the CIC clients, see the *Interaction Center Installation and Configuration Guide* in the [PureConnect Documentation Library](#).

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### Recommended third-party SIP devices

Genesys validates and recommends certain third-party SIP devices that work well with CIC products. For a list of recommended and validated devices, see the Testlab site at <http://testlab.genesys.com>.

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### Product Information site

The CIC Product Information site at <https://my.inin.com/products/cic/Pages/default.aspx> is the central location for the latest CIC release information, documentation, system software and hardware requirements, service updates, and downloads.

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### PureConnect documentation library

The PureConnect Documentation Library merges all help systems and documentation into a single searchable unit. The library enables you to:

- Access the entire documentation set from one location.
- View or search the entire documentation set for a document title, topic, term, or keyword.

You can view the PureConnect Documentation Library from:

- The CIC server, click **Start**, point to **Programs**, point to **PureConnect**, point to **Online Documentation**, then click **Documentation Library**, after completing the CIC server installation.
- The PureConnect Documentation Library website at <http://help.inin.com/cic>

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## Standards-supported RFCs and drafts

PureConnect uses SIP as its VoIP (Voice over IP) solution for communication with phones and gateways. Customer Interaction Center adheres to SIP standards and uses the Request for Comments (RFC) and RFC Drafts series of documents and specifications, which play a role in the Internet standards process.

## Overview of administrative tasks

This document assumes that the Lync Server and Lync client software are installed before you begin to install and configure the integration. A Lync feature license is required. Contact your Genesys representative for more information about the feature license.

As an administrator, you are responsible for the following tasks:

- Configure Lync Server.  
For more information, see [Configuring Lync Server](#).
- Configure lines, line groups, and the dial plan in Interaction Administrator.  
For more information, see "Configuring Lync" in Interaction Administrator.
- Configure stations in Interaction Administrator.  
For more information, see "Configuring stations" in Interaction Administrator.
- Configure users in Interaction Administrator.  
For more information, see [Configuring users for the integration](#).
- Configure the merged company directory.  
For more information, see [Configuring the merged company directory](#).
- Configure presence synchronization.  
For more information, see [Configuring presence synchronization](#).
- Configure remote call control (RCC) to allow users to receive calls on a CIC station using the Lync client.  
For more information, see [RCC](#).



# Network overview and protocol flows

This section includes information about the following possible ways to set up the integration:

- Endpoint media options
- Network component overview
  - Customer on-premises Solution (no cloud services)
  - CaaS cloud solution (local control model)
  - CaaS cloud solution (remote control model)
- Protocol flows: Inbound call routing options
  - Inbound call routing: Option 1: Front-end routing
  - Inbound call routing: Option 2: Initially all to CIC server
  - Inbound call routing: Option 3: Initially All to Lync
  - Calls to Lync endpoint configured as a CIC station

## Endpoint media options

The following table lists the endpoint media options that are available on the same servers at the same time.

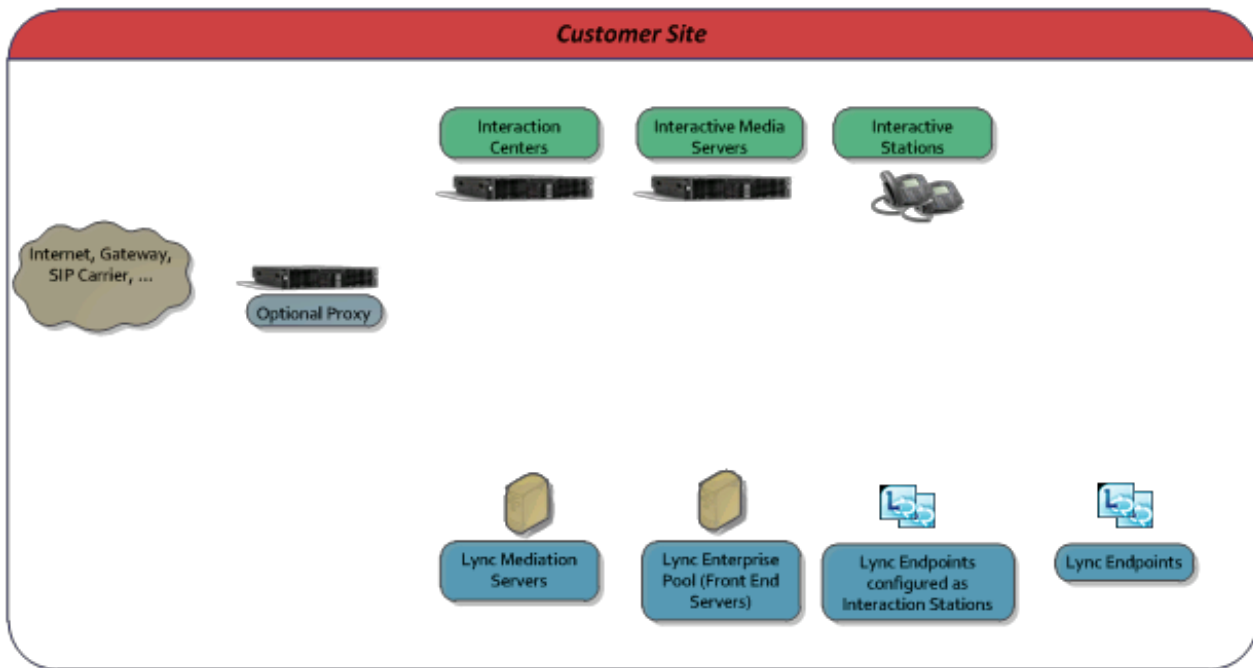
User type	User interface/call control	Phone options	Usage
CIC User	CIC client	CIC hard phone CIC soft phone	Typical CIC user
Lync User	Lync client	Lync hard phone Lync soft phone	Typical Lync user
Lync-enabled CIC user	CIC client	Lync hard phone Lync soft phone <b>Note:</b> These phones are configured as CIC stations.	CIC user (usually a call center agent) in the Lync environment
Lync-enabled CIC user	CIC client with Lync plug-in	Lync hard phone Lync soft phone <b>Note:</b> These phones are configured as CIC stations. The Lync client is required for the auto off-hook feature to work.	CIC User (usually a call center agent) in the Lync environment
Lync-enabled CIC user	Lync client	Lync hard phone Lync soft phone <b>Note:</b> These phones are configured as CIC stations. Auto off-hook is not supported.	Future release
Lync-enabled CIC user	Lync client	CIC hard phone CIC soft phone	RCC

## Network component overview

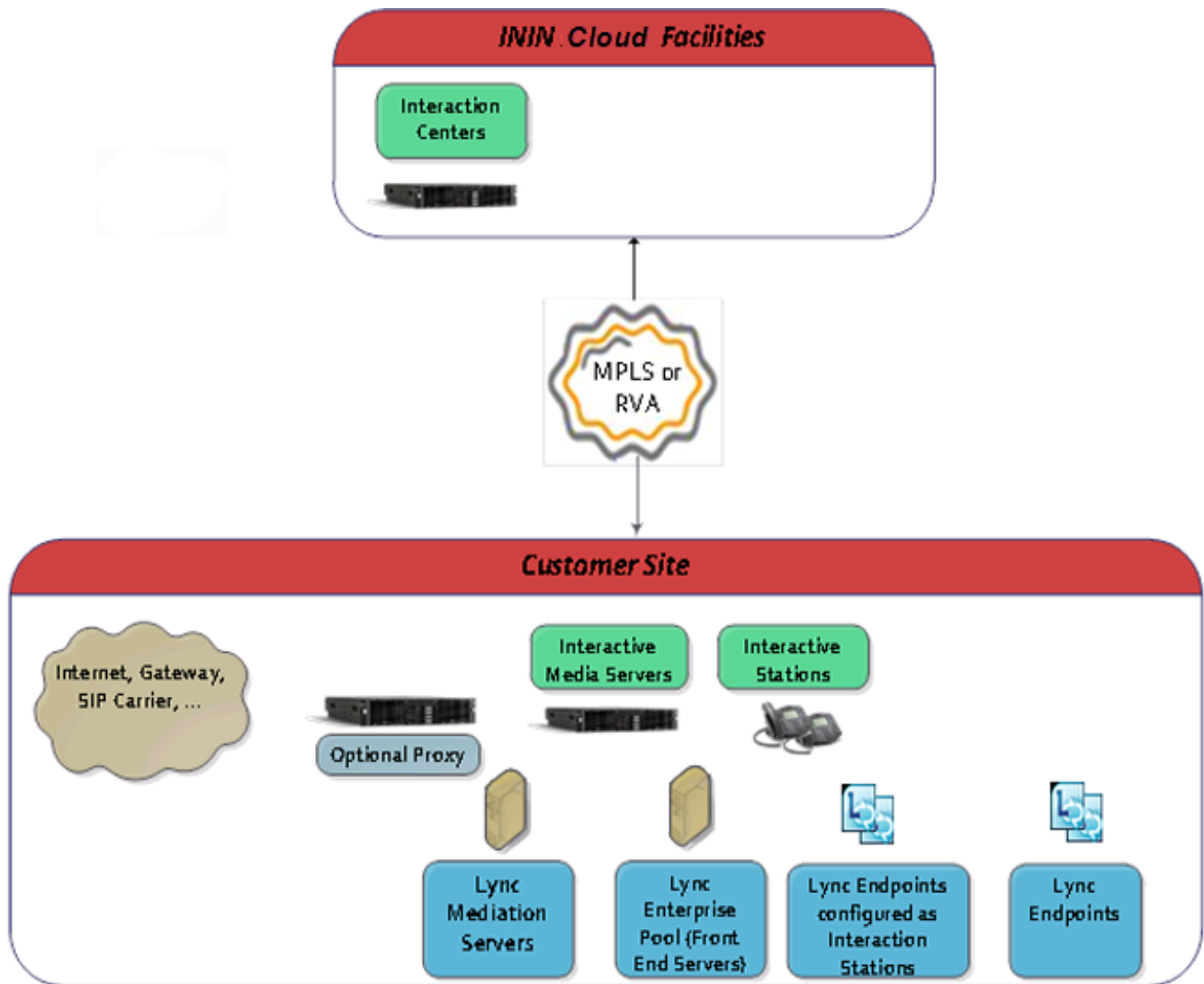
In this sections, diagrams show the network components for both on-premises and PureConnect Cloud environments.

## On-premises customer solution

The following diagram shows the components for an on-premises customer solution.

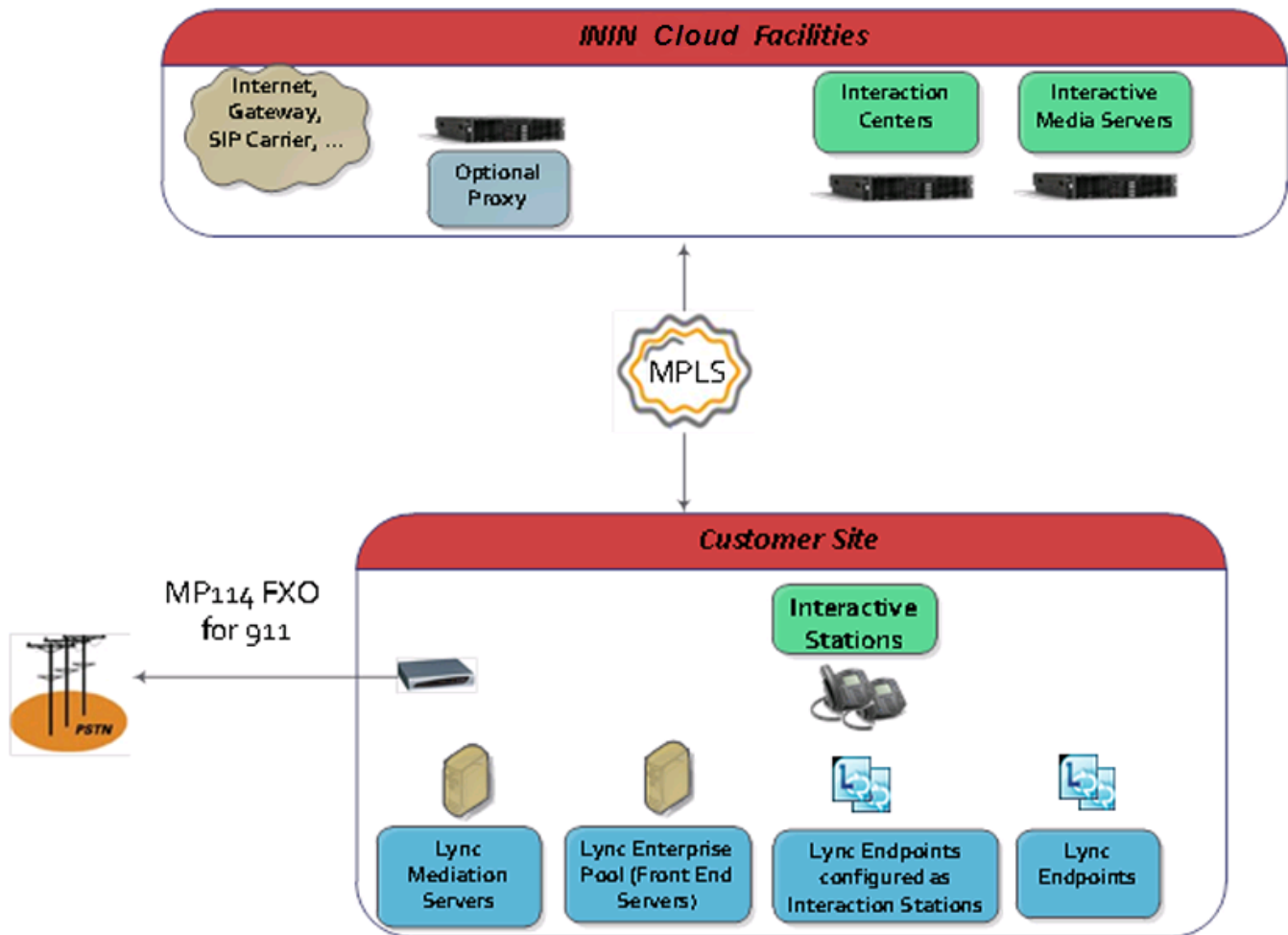


The following diagram shows the components for a PureConnect Cloud solution (local control model).



## PureConnect Cloud solution (remote control model)

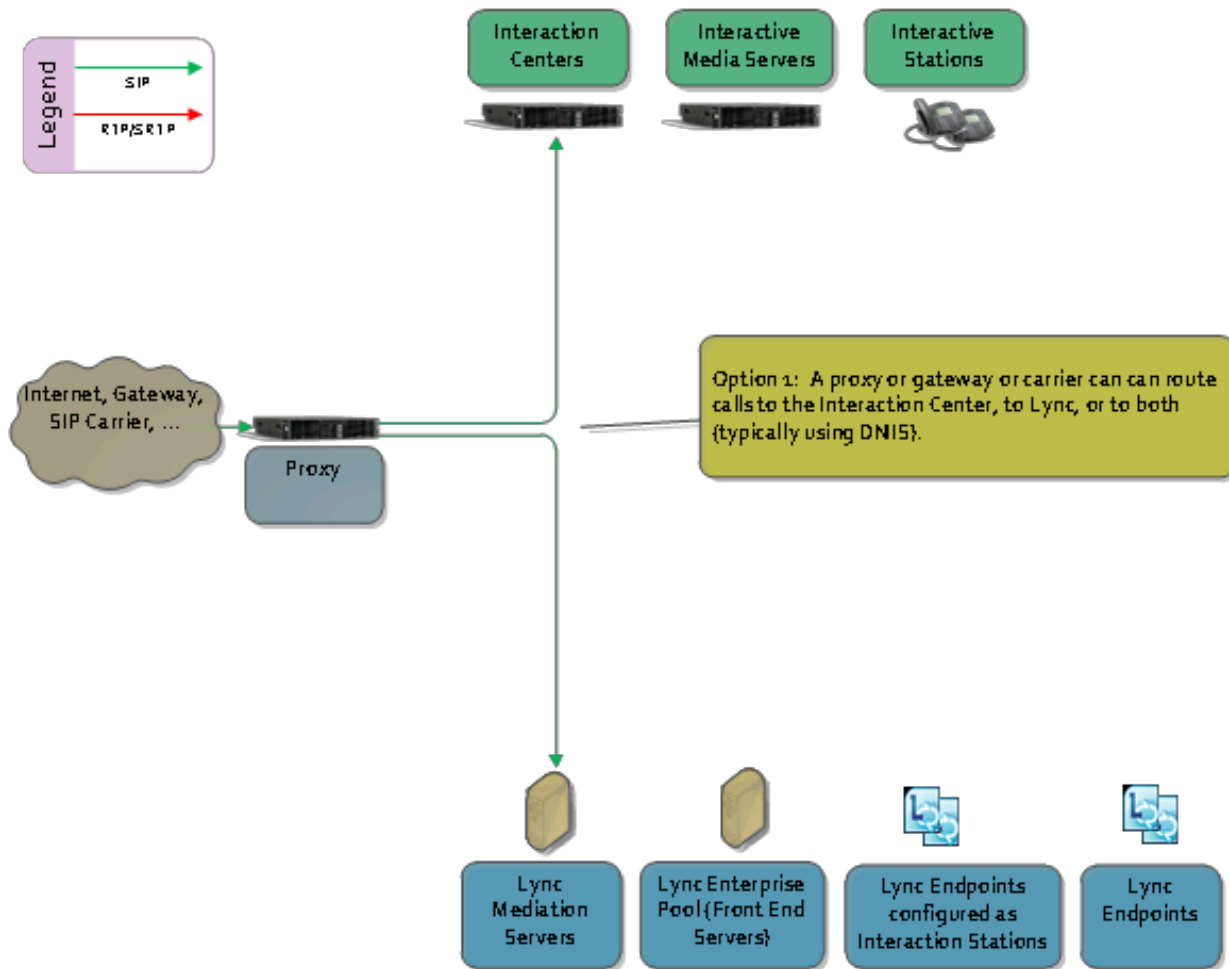
The following diagram shows the components for a PureConnect cloud solution (remote control model).



## Protocol flows

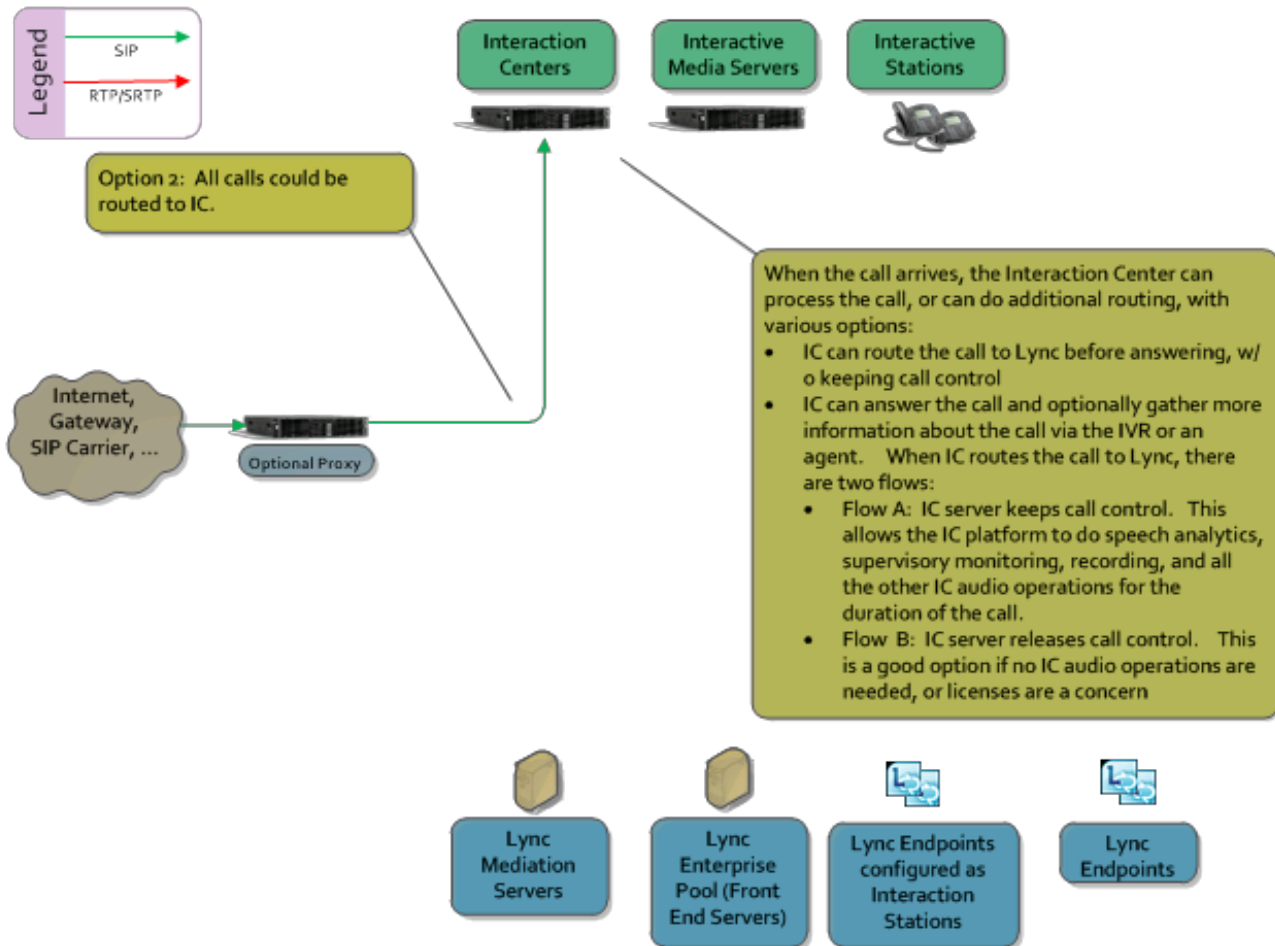
## Inbound routing option 1

This diagram shows the inbound call flow where all inbound calls are initially routed to a SIP proxy.



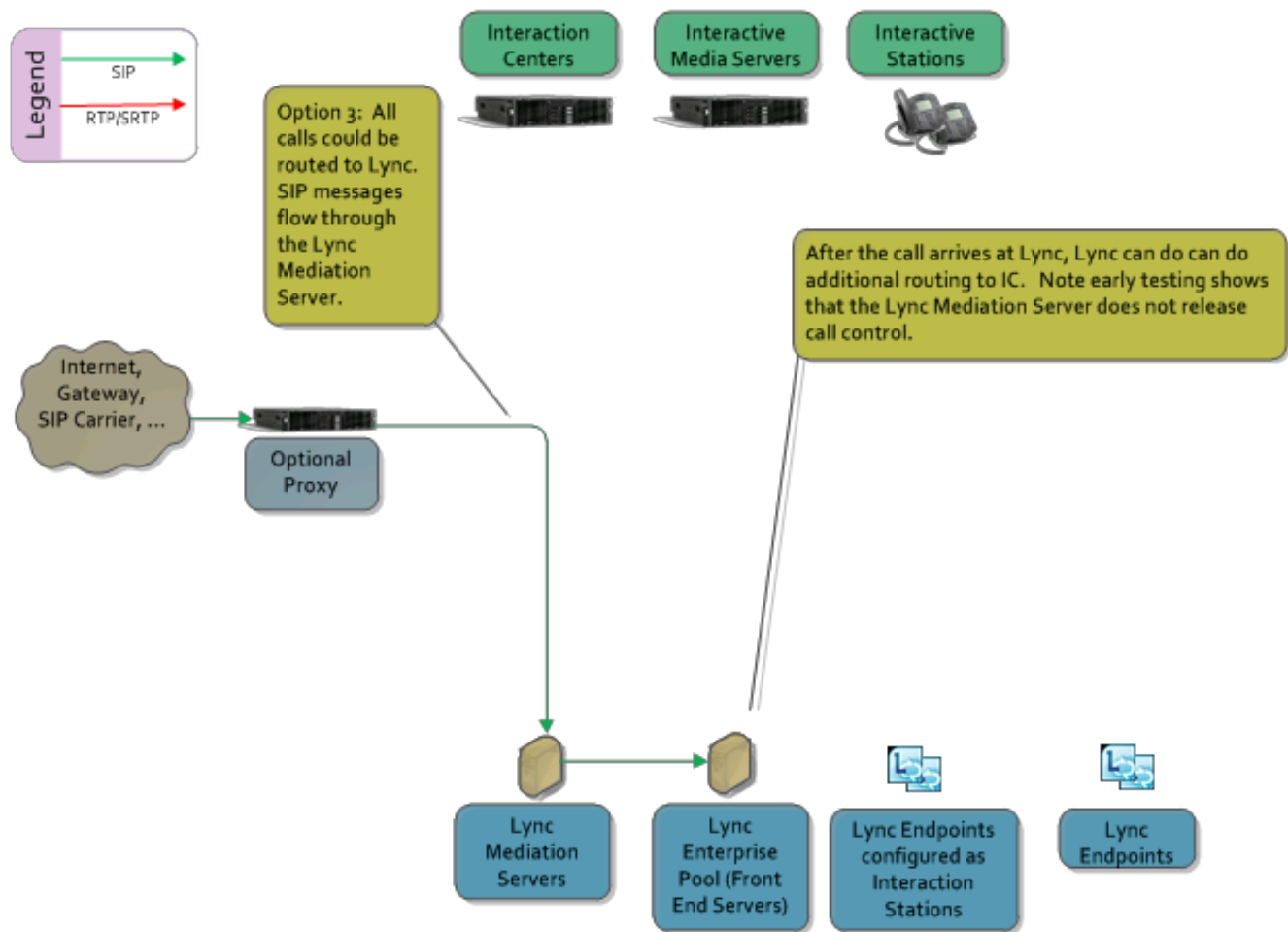
## Inbound routing option 2

This diagram shows the inbound call flow where all inbound calls are initially routed to the CIC server.



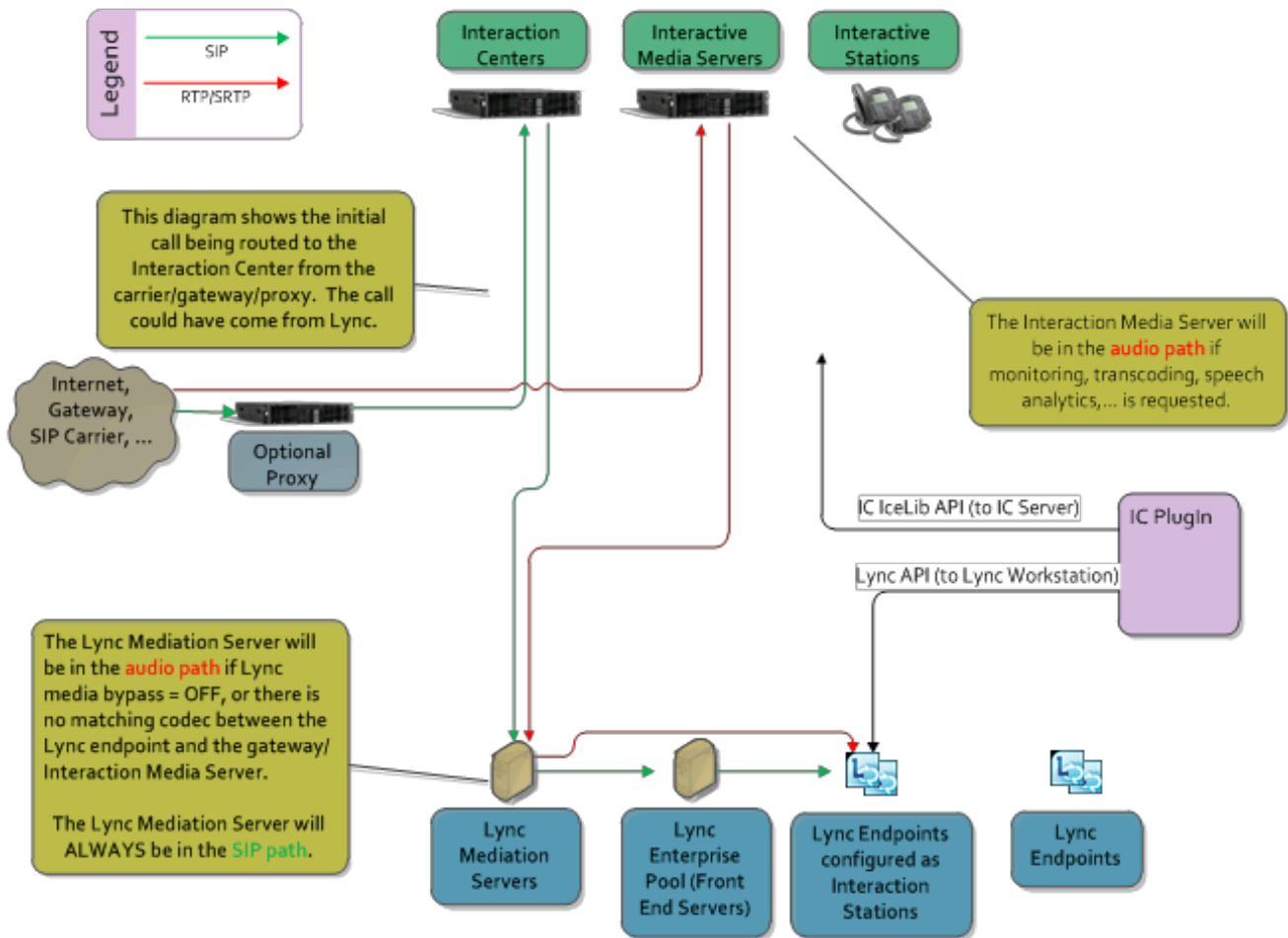
### Inbound routing option 3

This diagram shows the inbound call flow where all inbound calls are initially routed to Lync.



## Calls to Lync endpoint configured as CIC station

This diagram shows the inbound call flow where inbound ACD calls are routed to a Lync endpoint that is configured as a CIC station.





# Configuring Lync Server

Prior to configuring Lync Server, you must have already installed the Lync Server software, the mediation server, and the Lync client software. For more information, refer to your Lync Server documentation.

**Note:**

The term Lync Server is used for whichever version of the server you are configuring, including Skype for Business Server 2015.

This section describes the following configuration tasks you must perform to enable the Lync Server software and users for the integration:

- Create and verify DNS SRV records.
- Configure the Lync mediation server.
- Create voice routes for Lync Server.
  - Create a voice policy that redirects all dialed calls to the Lync mediation server, and then assign that voice policy to all Lync-enabled CIC users.
- Enable users for Lync Server.

**Note:**

There are numerous possible configurations for a Lync environment that might require additional configuration of your firewall and/or DNS entries. This documentation does not cover every possible configuration. Please consult with your Lync administrator for more information.

## Create and verify DNS SRV records

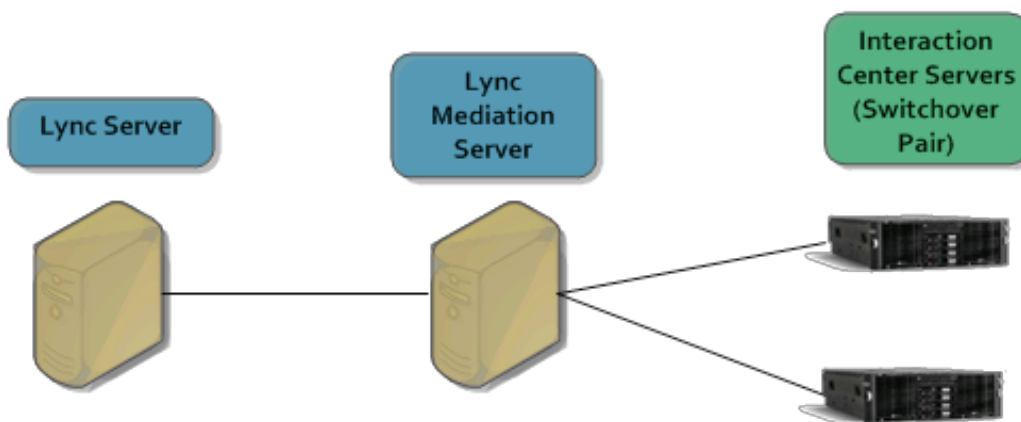
Because the status sync to Lync occurs directly with the server and does not require the agent to be logged in to a Lync client, the DNS server requires two SRV records, one for internal and one for external.

The SRV record authorizes the status sync service to log in on behalf of the agent, set the agent's status, then log out again.

1. For the internal server, create a DNS SRV record of `_sipinternaltls` and point it to the relevant Lync application pool.
2. For the external server, create a DNS SRV record of `_sip._tls` and point it to the relevant Lync application pool.
3. To process all traffic as SIP traffic, change the default port number for the external server entry to 5061.
4. See this Microsoft article on the DNS SRV records for more information: <http://technet.microsoft.com/en-us/library/gg398680.aspx>

## Lync mediation server configuration

The Lync mediation server connects the Lync Server with the CIC server switchover pair.



Microsoft Lync uses the Lync mediation server to interface to gateways. Each CIC server is a gateway. Configure the IC servers as IP/PSTN gateways before you configure the Lync mediation server.

## Configure CIC servers as IP/PSTN gateways

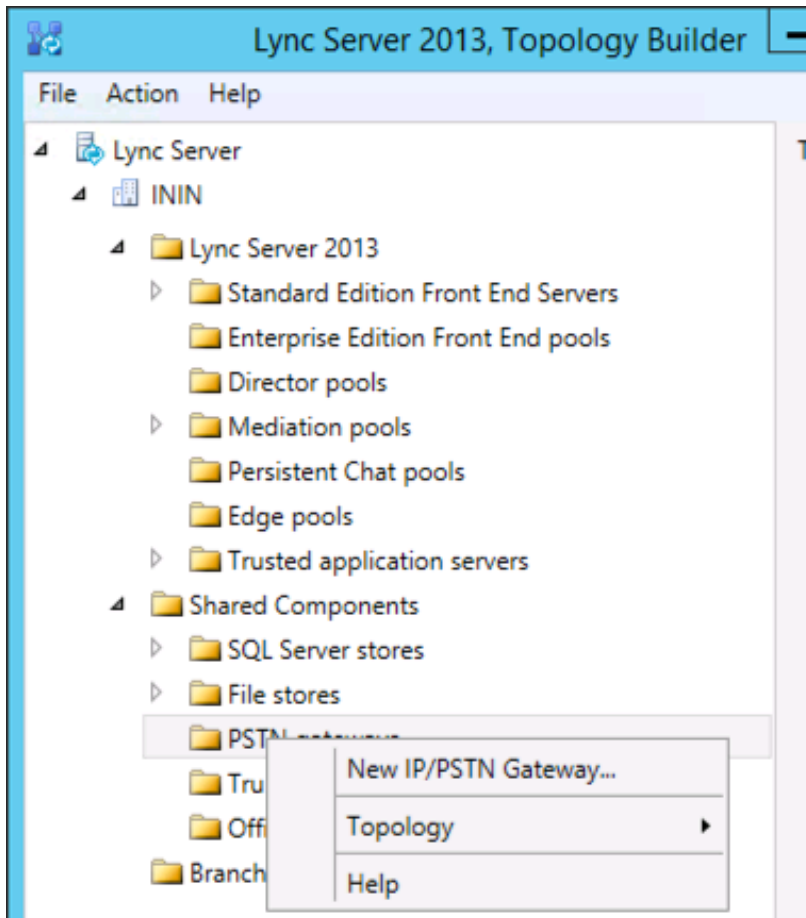
For calling integration scenarios to work with Customer Interaction Center, at least one CIC server must be configured as an IP/PSTN gateway in the Lync Server Topology Builder and then associated with the Lync mediation server.

**Note:**

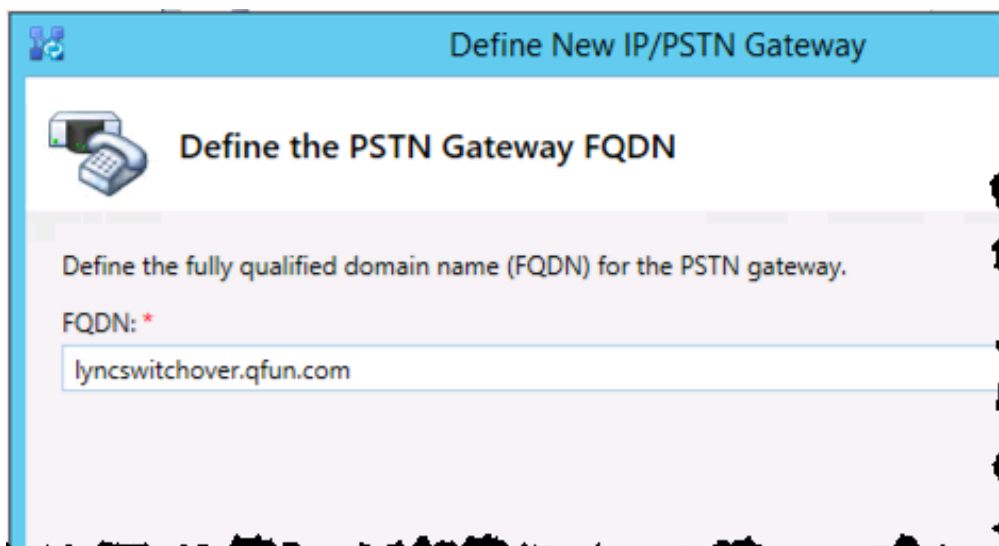
Only users with full administrative permissions can configure servers in the Lync Server Topology Builder.

To add CIC as an IP/PSTN gateway in the Lync Server Topology Builder:

1. Open the Topology Builder and load the topology to configure.
2. Right-click the **PSTN gateways** container, then click **New IP/PSTN Gateway**.



The **Define New IP/PSTN Gateway** wizard appears.



3. In the **FQDN** box, specify the fully qualified domain name of the Interaction Center server.  
For a switchover pair, specify the DNS AAAA or A record, which points to both the primary and secondary CIC servers. This setting allows the Lync mediation server to locate and connect to whichever CIC server is active at the time.

4. Click **Next**.
5. Leave **Enable IPv4** as the default, unless your network is set up to use IPv6.
6. Click **Next**.

- o The **Trunk name** and **Listening port** fields auto-populate based on the FQDN specified on step 1. Specify the port on which the CIC server listens for requests, if different from the default port. The default port for TCP is 5066.

**Note:**

For SIP traffic, these ports are non-standard values. Record this value now as you will need it later when configuring the CIC SIP line between Customer Interaction Center and Lync.

Under SIP Transport Protocol, choose **TCP** or **TLS**. If you choose **TLS**, do not use port 11001 here. That port is reserved for RCC. This is the port for connecting TLS.

The same fully qualified domain name will be used later when configuring the domain name setting in the line configuration. For more information about line configuration, see [Configure line settings](#).

- o For the **Associated Mediation Server**, select the CIC server or servers that you configured earlier.
- o Specify the port on which the CIC server listens for requests, if different from the default port. This must be within the range of the listening ports for the respective protocol allowed by the mediation server. This port range is defined under the mediation pool.

**Note:**

You use the same port and gateway FQDN later when you configure the proxy in the SIP line settings. For more information about line configuration, see [Configure line settings](#).

7. Click **Finish** to save your changes.

**Note:**

If you use an CIC server as your PSTN gateway, any outbound calls Lync-only users make go to the IVR. For Lync-only users to be able to make outbound calls, configure Lync-only users on a non-CIC server.

## Configure voice routing

Voice routing tells Lync Server where to direct various dialed numbers (Dial Plan), which users can access which calling features (Voice Policy), and which rights are authorized for the specified users (PSTN usage record). Voice routes allow users to place calls for which they have a matching PSTN Usage record.

You can configure the voice policy, add the related PSTN usage records, and then add the applicable routes for each PSTN usage record.

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### Access the voice routing group in Lync Server Control Panel

You can configure voice routing from the **Voice Routing** group in Lync Server Control Panel. To access the **Voice Routing** group, follow these steps.

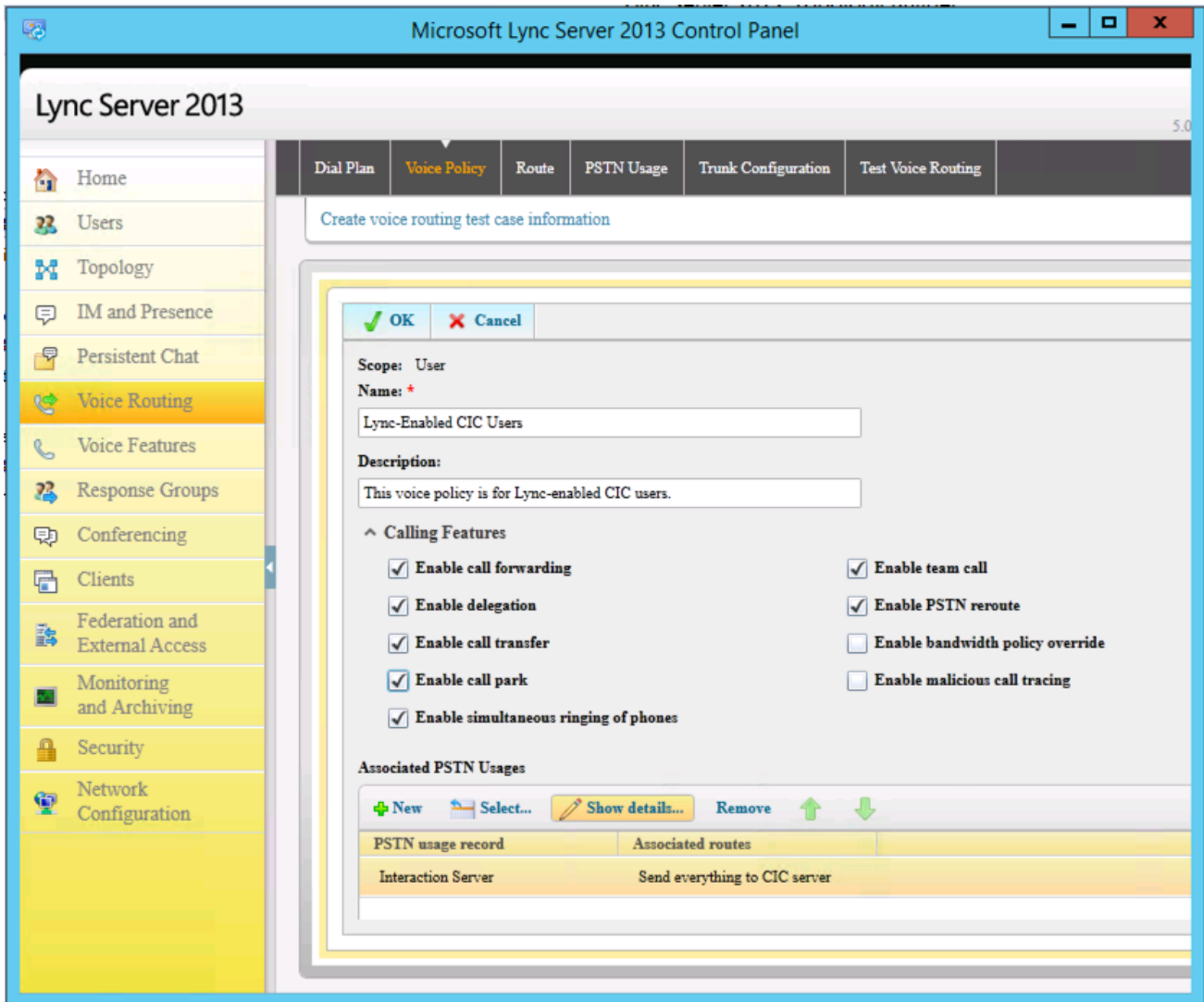
1. Start Lync Server Control Panel on the Lync Server.
2. Click the **Voice Routing** group.

---

### Create a voice policy

In the Lync Server Control Panel, follow these steps to create a voice policy that defines which call features are available and which users have permissions to use those features. The voice policy you create here applies to all Lync-enabled CIC users.

1. Click the **Voice Policy** tab.
2. Click **New > User policy** to create a new user voice policy.
3. In the **Name** box, specify a descriptive name for the voice policy.
4. In the Description box, type an optional description.
5. Under **Calling Features**, select the check box next to all features except for **Enable bandwidth policy override** and **Enable malicious call tracing**. For more information about the **Calling Features** options, see the Lync Server help for this dialog box. You can click the Help icon at the top of the dialog box to display the help.



- Under **Associated PSTN Usages**, click **New**.

**Note:**

The PSTN usage record identifies a class of calls (internal, local, or long distance) that the specified users can make. This record is associated with the voice policy you are creating.

- In the **Name** box, specify a name for the usage record (for example, *IC Server*).
- Under **Associated Routes**, click **New** to create a new route to the CIC server.  
The **New Route** dialog box appears.
- In the **Name** field, specify a name for the voice route.
- In the **Description** field, specify a description. This description is optional.
- In the **Build a Pattern to Match** section, in **Match this pattern**, specify which dialed number patterns should be routed to the CIC server through the mediation server you configured in the previous section.

**Note:**

The value to specify in the regular expression field should match the format string in the Interaction Administrator Lync Line URI configuration. For more information about the Lync Line URI, see *Interaction Administrator Help*.

- Under **Associated trunks**, click **Add** and select the CIC server to associate with the voice route.
- Click **OK** to return to the **New PSTN Usage Record** dialog box.
- Click **OK** to return to the **New Voice Policy** dialog box.
- Click **OK** to save the voice policy.
- Click **Commit**. Click **Commit All** to publish the configuration changes.

---

## Configure a SIP trunk

1. In the **Voice Routing** group, click the **Trunk Configuration** tab.
2. Click **New**. Then click **Pool trunk**.
3. In the **Select a Service** dialog box, select the IP/PSTN gateway, which is your CIC server or DNS AAAA or A record name that you configured earlier.
4. Click **OK**.  
The name of the service appears in the **Name** box in the **New Trunk Configuration** dialog box.
5. In the **Maximum early dialogs supported** box, use the default value of 20.  
This value specifies the maximum number of forked responses the PSTN gateway can receive to an invite that it sent to the Lync mediation server.
6. Under **Encryption support level**, select **Required**.
7. If the following boxes are not selected, select them:

Check box	Description
<b>Enable media bypass</b>	Media bypasses the Lync mediation server and is processed by the trunk peer.
<b>Central media processing</b>	Indicates that there is a well-known media termination point, such as a PSTN gateway where the media termination has the same IP address as the signaling termination.
<b>Enable refer support</b>	Indicates that the trunk peer supports receiving <code>SIP REFER</code> requests from the Lync mediation server. (In Lync Server 2013 this parameter is already set to <b>true</b> in the default configuration.)

**Note:**

For more information about these options, see the Lync Server Control Panel help.

8. Click **OK** to save the configuration.

## Configure the Lync dial plan

The dial plan you create here applies to a group of users-the Lync-enabled CIC users.

1. In the **Voice Routing** group, click the **Dial Plan** tab.
2. Click **New**. Then click **User dial plan**.
3. In the **Name** box, type a descriptive name, such as **Lync-enabled CIC\_Users**.  
The name you enter also appears in the **Simple Name** box.
4. In the **Description** box, specify more descriptive information about the dial plan. This data is optional.
5. Under **Associated Normalization Rules**, add one or more rules to indicate how to translate dialed phone numbers to E.164 format.
6. Click **OK**.
7. Click **Commit**. Click **Commit all** to publish the configuration.

## Enable users for Lync Server

Users must be enabled for Lync Server in the Lync Server Control Panel on the Lync front-end server.

1. For each Lync user, in the user configuration, select the **Enabled for Lync Server** check box.
2. From the **Telephony** list, select the appropriate setting for the user (**Enterprise Voice** or **Remote Call Control**).
3. In the **Line URI** box, specify the user's line URI.  
This line is the same as the user's station connection address that you configure later. For more information about the connection address, see [Configure station settings](#).
4. From the **Dial plan policy** list, select the dial plan policy that you configured earlier.
5. From the **Voice policy** list, select the voice policy that you configured earlier.

For more information about using the Lync Server Control Panel, refer to the Microsoft Lync Server Control Panel help.

# Configuring Lync in Interaction Administrator

## Configure line settings

In this procedure, you configure a SIP line to use for all calls between CIC and Lync. The line indicates how the CIC server should communicate with the Lync mediation server. In the next section, you'll configure stations and associate them with this line.

You configure line settings in Interaction Administrator on the CIC server.

1. In the **Lines** container in Interaction Administrator, right-click the list of line names. Click **New**.
2. Enter a line name, such as Lync. Click **OK**.
3. On the **Line Configuration** page of the **SIP Line Configuration** tab, select **Microsoft Lync** from the Line Usage list.

Selecting this **Line Usage** option does the following:

- Enables the auto off-hook logic. For more information about this feature, see Auto off-hook.
- Forces the **Deferred Answer** option to **On**.
- Forces the Enable **T.38 Faxing** option to **Off**.
- Adds the SIP header `ms-call-source` (set to `non-ms-rtc`) to all SIP messages that Customer Interaction Center sends to Lync.

**Note:**

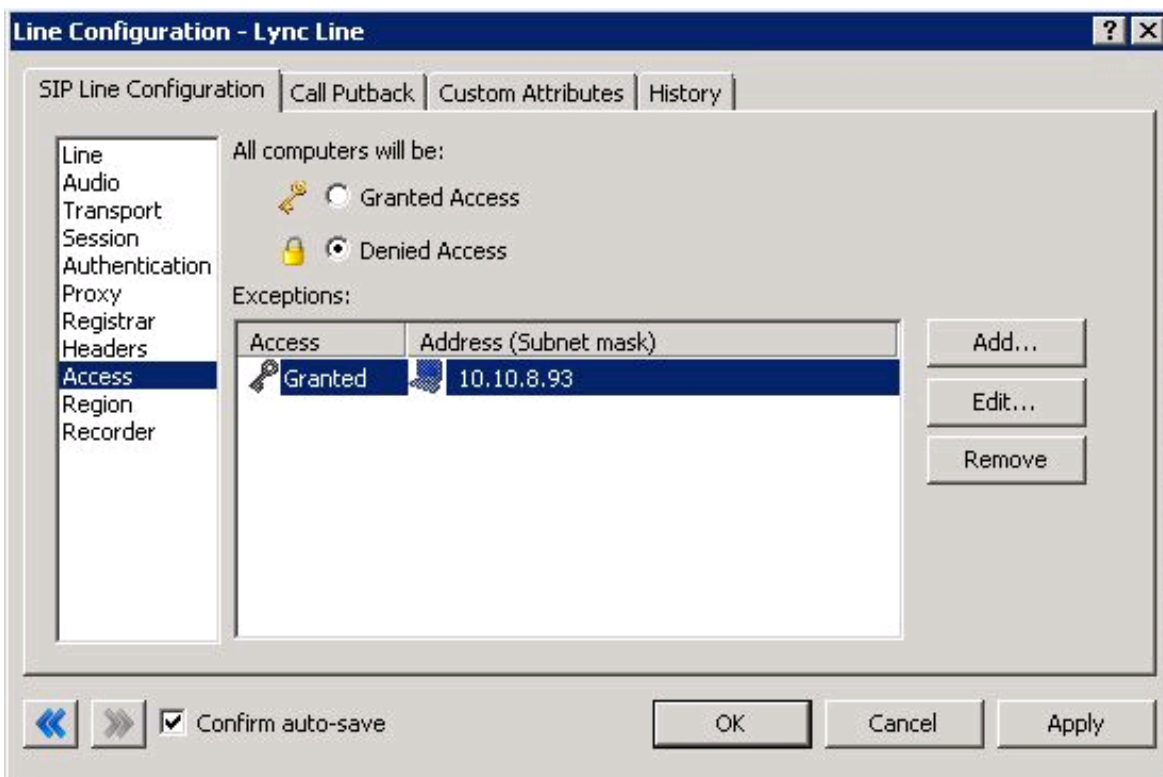
For more information about these settings, see "SIP Line Configuration" topic in *Interaction Administrator Help*.

4. In the **Domain Name** box, specify the fully qualified domain name of the CIC server. This domain name should resolve to the DNS AAAA or A record name that you specified in [Configure CIC servers as IP/PSTN gateways](#).
5. For **Identity (Out)**, click the ellipsis button for the **Calling Address Line Value 1** box.
  - a. For the **Name** box, specify the name you want in the "From" header. This value can appear in the `From` header if there is no other outbound identity information available.
  - b. For the **Address** line, specify the phone number that represents the CIC server. This number appears in the `From` header for outbound calls if no other information is available. Use the E.164 format.

**Note:**

Do not select the **Use Anonymous** check box under **Outbound Identity**. This setting causes problems on the Lync side of the integration.

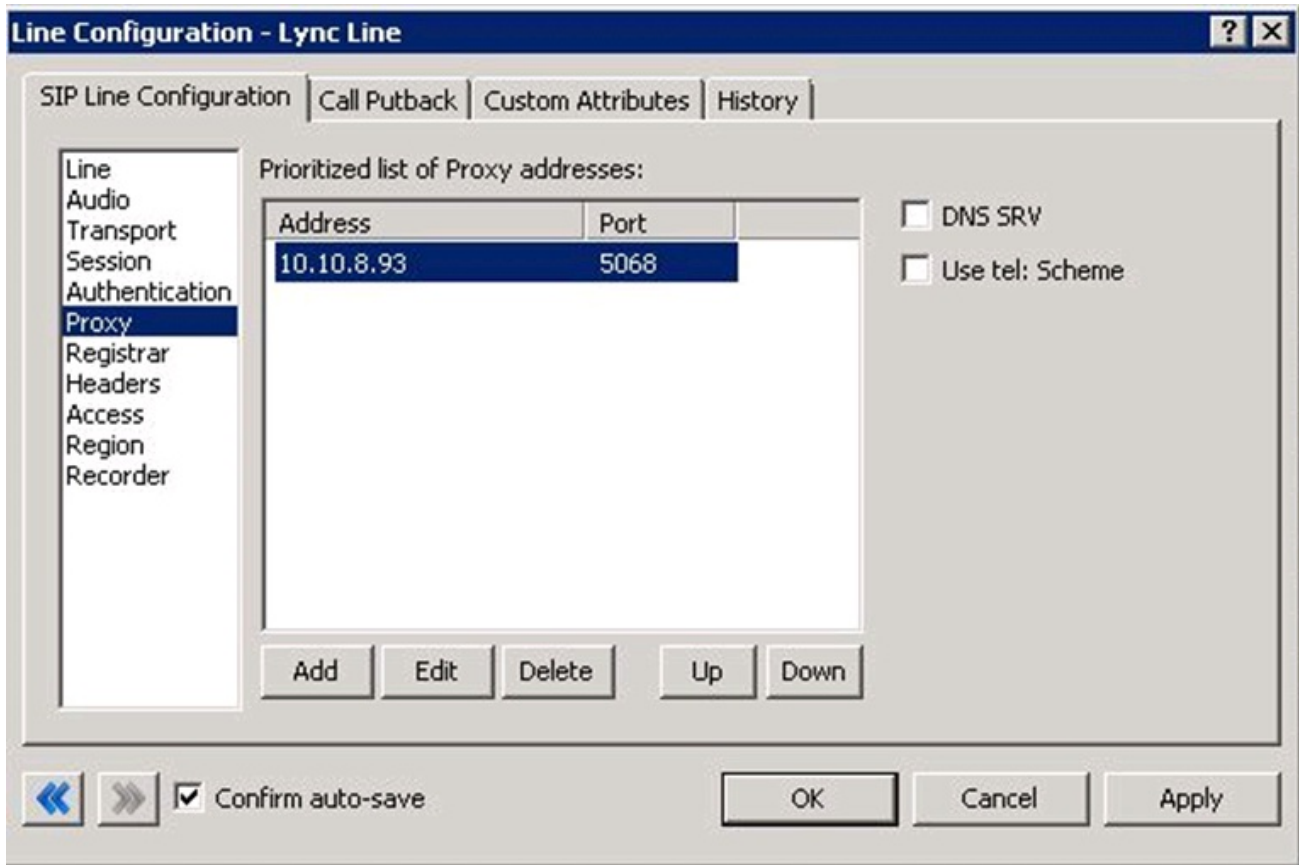
6. On the **Access** page, choose **Denied Access** and **Add the IP address of the Lync mediation server** under the **Exceptions** list.



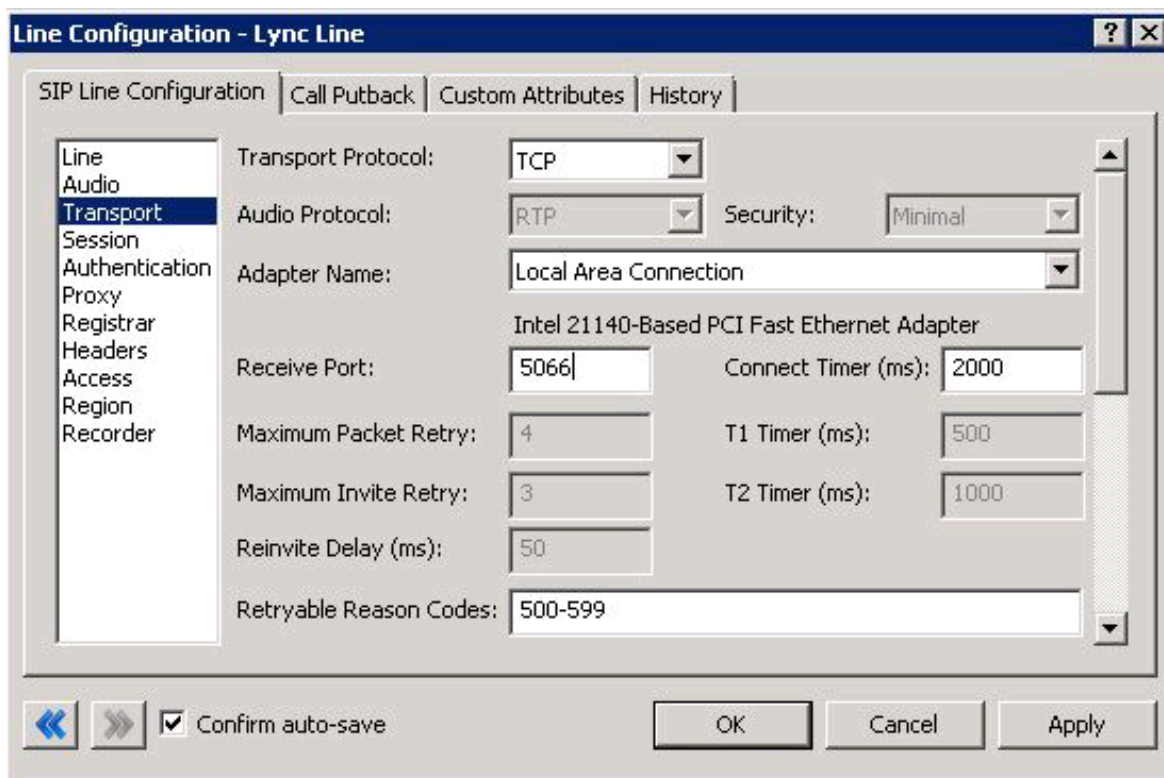


These settings deny access to this line from all computers, except for the Lync mediation server.

7. On the **Proxy** page of the **SIP Line Configuration** tab, add the IP address and port number of the Lync mediation server. This port should be the same port you specified in [Configure CIC servers as IP/PSTN gateways](#).

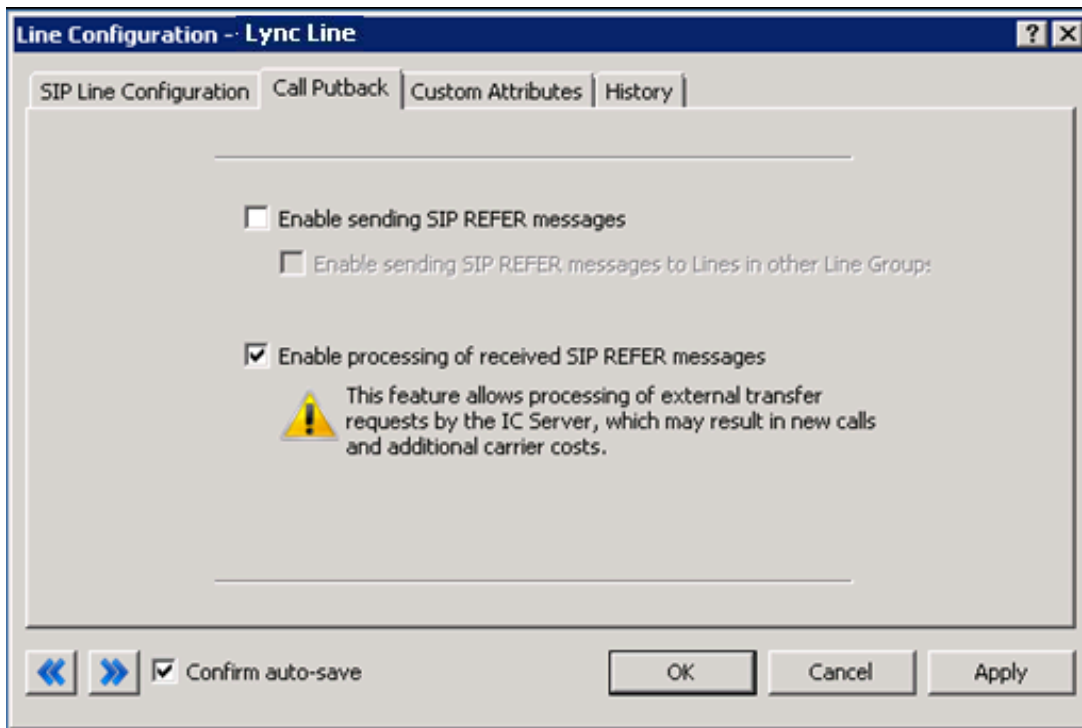


8. On the **Transport** page, specify the **Receive Port** (5066 for TCP). This port is the same as the listening port you specified when you defined the IP/PSTN gateway in the Lync Topology Builder. Also, the transport chosen for the line has to match the one specified for the IP/PSTN gateway in the Lync Topology Builder.



9. On the **Call Putback** tab, select the **Enable processing of received SIP REFER messages** check box.

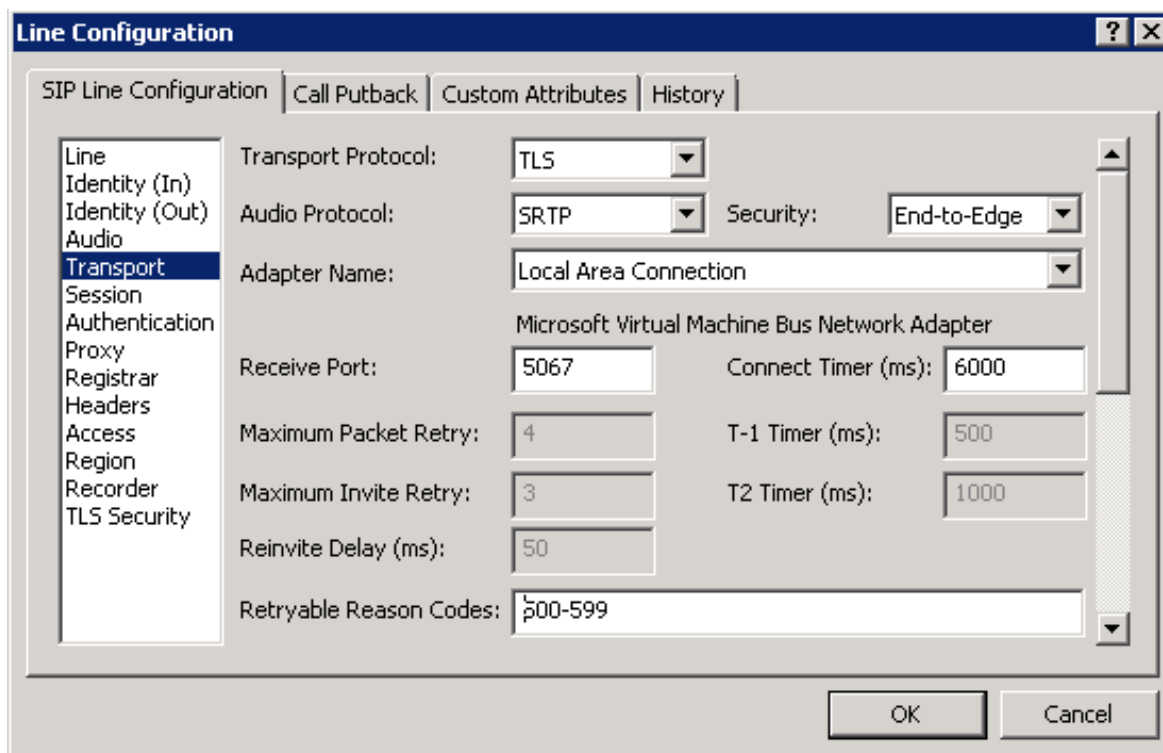




10. Click **OK** to save the line settings.

## Set up TLS and MTLS

If you configured the Lync gateway using TLS in [Configuring Lync Server](#):



1. On the Lync Server, export the CIC server's Trusted Certificate, including all Certificates in the Certificate Path to include the Root CA Certificate. Export it in PKCS#12 (.PFX) format. Export the private key also.
2. On the CIC server, you need to extract the Public and Private Key. This can be completed by using openssl or `ssl_app-w32r-1-2.exe`:
  - a. Extract the private key:

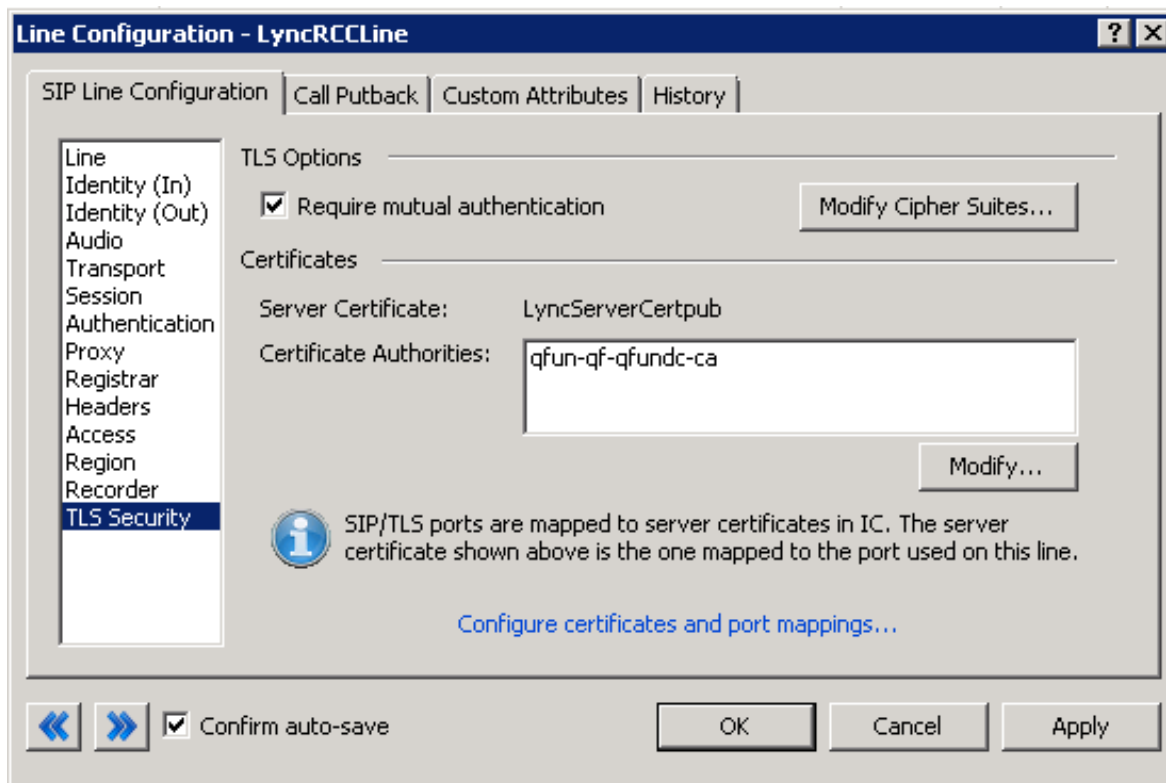
```
ssl_app-w32r-1-2.exe pkcs12 -in <pfx_file_name>.pfx -nocerts -nodes -out priv.pem
```

b. Extract the public key:

```
ssl_app-w32r-1-2.exe x509 -inform pem -in privpub.pem -pubkey -out pub.pem -outform pem
```

3. If checking the **Require mutual authentication** (MTLS) check box, make sure the certificate that Lync uses to connect to CIC has Client Authentication X509 Extended Key Usage (client EKU). Instructions for how to configure this in Lync can be found in the following articles:

- <http://technet.microsoft.com/en-us/library/gg398409.aspx>
- [http://technet.microsoft.com/en-us/library/bb694035.aspx#BKMK\\_siteserver1](http://technet.microsoft.com/en-us/library/bb694035.aspx#BKMK_siteserver1)



4. Import the Line Authority Certificates in CIC.

- In Interaction Administrator, choose **System Configuration, Certificate Management, and Authority Certificates**.
- Add the root Certificate Authority (CA) and all the intermediate CA certificates used to sign the Lync certificate.

5. On the **Port-To-Certificate Mappings** tab, click **Add**. Choose the CIC server Certificate created on the Lync Server and select **Port: 5066** (the port we chose for the Lync line).

## Configure a line group

You can define a line group in Interaction Administrator to reserve a group of one or more lines for a specific use. In this procedure, you define a line group for calls going from Customer Interaction Center to Lync.

To configure a line group:

- In the **Line Groups** container in Interaction Administrator, right-click in the list of line group names and click **New**.
- Enter a line name, such as **Lync LG** and click **OK**.
- In the **Description** box, specify the purpose of the line.
- Select **Use as Dial Group** to indicate that the dial plan should use this group in the dial plan phone number configuration.
- On the **Members** tab, select the **Lync** line and add it to the **Currently Selected Lines** list.  
This association links the Lync line with the line group.
- Click **OK** to save the line group configuration.

## Configure CIC dial plan

There are two options you can use to configure the dial plan.

- The preferred option is to add phone numbers for all Lync-only users to the dial plan.

**Regional Dial Plan - Edit Pattern**

Input Pattern:  Standardized Number:

Location Filter:  Default Dial String:

List Name:  Display String:

Classification:  Edit Base:

Account Code Verification

Description:  Components:

Dial Group	Filter	Classification	Dial String
Lync LG	<All>	Local	+1317555XXXXZ

Buttons: Add Group, Edit, Remove, Up, Down, <<, >>, OK, Cancel, Help

- The alternate option is to give all Lync-only phone numbers a prefix, such as Lync, so you can easily create a pattern that encompasses that group of users and numbers.

**Regional Dial Plan - Edit Pattern**

Input Pattern:  Standardized Number:

Location Filter:  Default Dial String:

List Name:  Display String:

Classification:  Edit Base:

Account Code Verification Components:

Description:

Dial Group	Filter	Classification	Dial String
Lync LG	<All>	Local	+Z

Add Group Edit Remove Up Down

<< >> OK Cancel Help

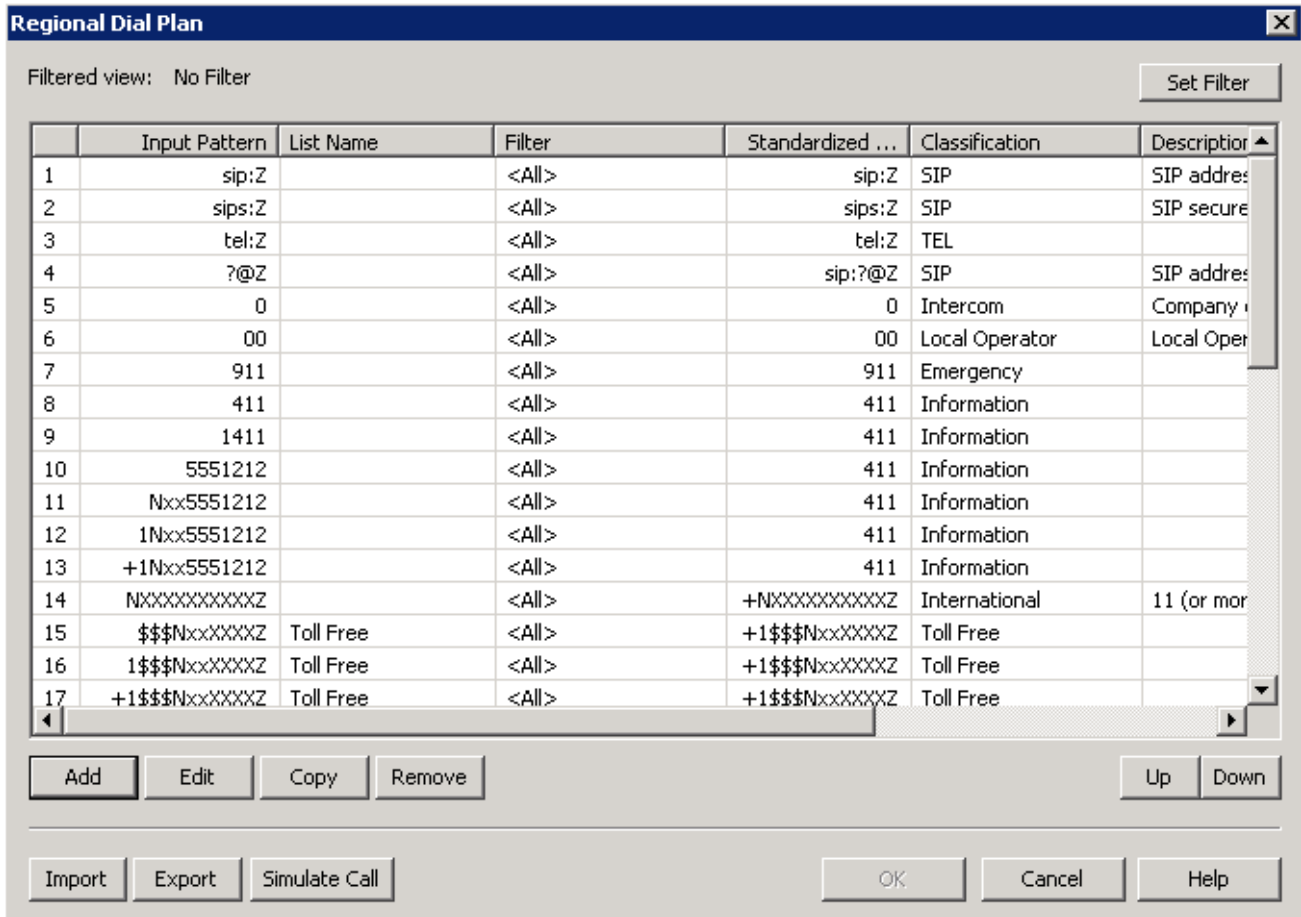
**Note:**

If your organization has any Lync-only users, you should create Dial Plan entries that use the Lync line when dialing the Lync-only users. This Dial Plan entry prevents the calls from dialing through the PSTN.

For example, if you dial a Lync-only user from the Lync-enabled company directory, a call is placed to a number, such as +13177155555. There should be a Dial Plan rule that captures this process and sends it to the Lync line. You can, for example, create an entry that captures all numbers that start with +1317715.

This procedure assumes that you are using the preferred option, where you specify a block or range of phone numbers.

1. Click **Phone Numbers** under System Configuration.
2. Double-click the default configuration.
3. On the **Regional Dial Plan** tab, click **Dial Plan**.



4. Click **Add**, and then add a dial plan entry with the following information:

In this field	Specify
Input Pattern	+13175559XXX (some pattern to identify numbers for Lync-only users)
Class	SIP
Standardized Number	+13175559XXX
Display String	+13175559XXX
Edit Base	+13175559XXX

5. Click **Add Group** and select the line group (for example, Lync LG) that you created earlier.
6. Click **OK**.
7. In the list of dial plan entries, move the new entry above the ?@Z entry. Click **OK**.
8. Use the simulator to test the dial plan entry (+13175559123).  
For more information, see the Interaction Administrator help.
9. Click **OK** twice.

**Note:**

You can edit the **Display String** field to format the string that appears in the company directory in the CIC client.

## Association of Lync and CIC client calls

Lync sends the CIC client an event that a new call was added. If the Lync client does not send that event in less than 1200 ms, the association is not made and the call is not answerable from the CIC client. The timeout is now configurable by setting a server parameter.

---

## Configure Lync interaction timeout

The default timer is set to 2500 milliseconds (2.5 seconds). If your environment has significant latency or if you are experiencing problems with auto-answer, you may want to increase the timeout.

1. Open Interaction Administrator.
2. Click **Server Parameters**.
3. Right-click in the area on the right and click **New**.
4. Type `LyncInteractionCorrelationTimeout` in the name box.
5. Enter the increased wait time in milliseconds. The default is 2500 (2.5 seconds), so you want to set it higher than 2500.

# Configuring stations in Interaction Administrator

## Configure the global SIP station

Interaction Administrator propagates the global SIP station configuration to the individual station configurations that use the <Use Global SIP Station Setting> option. Therefore, changes to the global SIP station affect those individual stations.

**Note:**

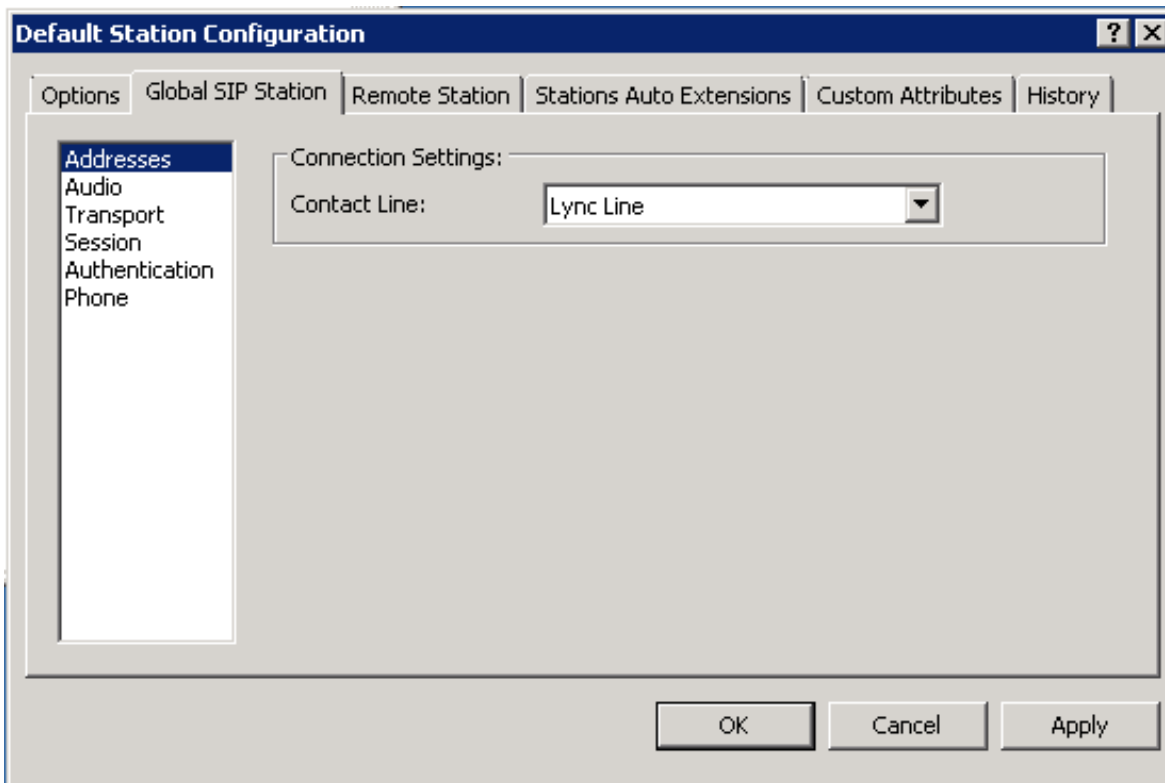
For sites using phones from different manufacturers:

The global SIP station is a configuration object that, by default, is referred to by many stations. Changes to the global SIP station affect all stations that refer to it. You can set the global SIP station for only one manufacturer. If your site uses a mixture of phone manufacturers, such as Lync and Polycom, then the global SIP station should only be referred by the stations of one of those manufacturers.

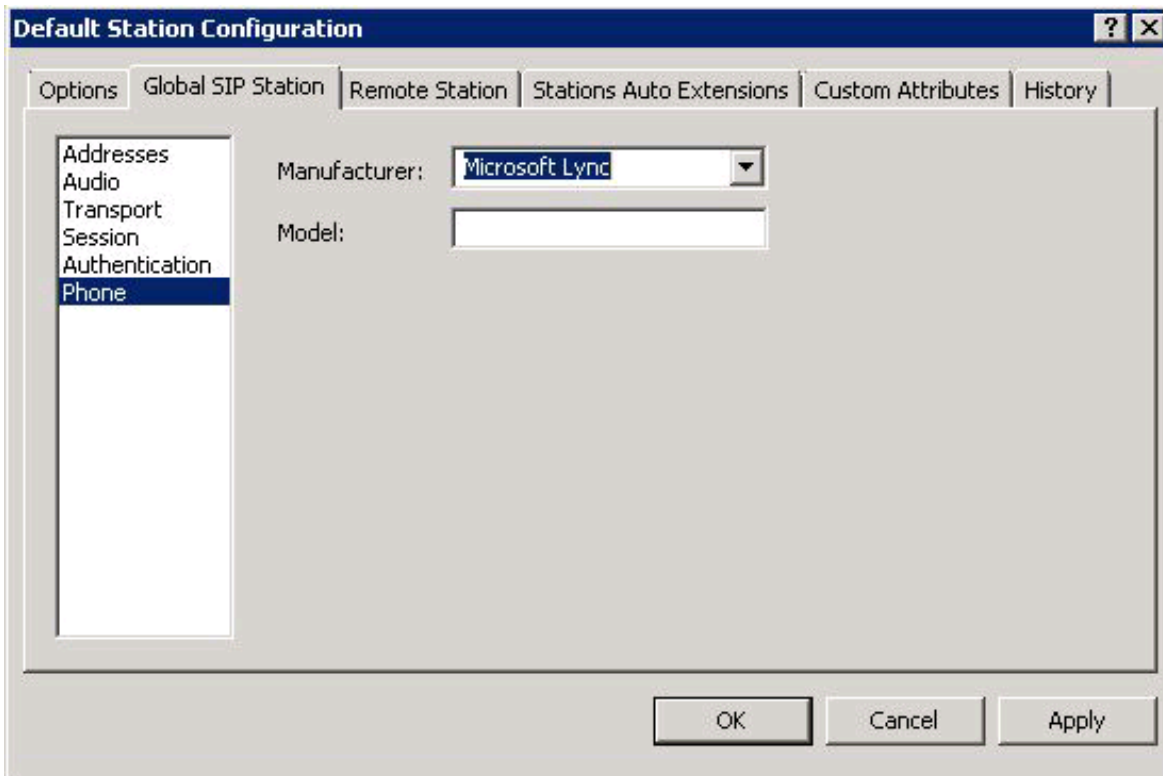
For example, if your global SIP station is set to **Polycom**, then the stations created for Lync endpoints should have the multiple **Use Global SIP Station Settings** check boxes cleared.

Follow these steps on the CIC server to configure the global SIP station.

1. In Interaction Administrator, click **Stations** to expand the group.
2. Click **Default Station**.
3. Double-click **Configuration**.
4. On the **Global SIP Station** tab, select the SIP line you created in the previous section.



5. On the **Phone** page of the **Global SIP Station** tab, select **Microsoft Lync** from the Manufacturer list.



When you set the Manufacturer setting to **Microsoft Lync**, Interaction Administrator changes the following settings on the **Session** page:

Session page setting	New value
Call appearances	1
Connection call warm down time	0

**Note:**

For more information about these settings, see *Interaction Administrator Help*.

6. Click **OK** to save the global SIP station configuration for Lync.

## Configure station settings

Follow these steps for each user to configure individual station settings on the CIC server:

1. In Interaction Administrator, click **Stations** to display the list of stations.
2. Double-click the name of the station to configure.
3. On the **Addresses** page of the **Configuration** tab, click **Edit** next to the **Identification Address** box to specify the user's line URI in E.164 format.  
Use the same value you specified when you configured the Lync user in [Enable users for Lync Server](#).
4. Click **OK**.
5. Under **Connection Settings**, do the following:
  - o Click **Use the following settings**.
  - o Click **Edit** next to the **Address** box to display the **Connection SIP Address** dialog box:
  - o Select the **Use an alternate format** option, and then specify an address that matches the user's line URI in Lync (for example, tel:+3175551010).



**Connection SIP Address**

Use a predefined format (sip:user@host:port)

User Portion:  Host:  Port:

Address:

Use an alternate format

Address:

OK Cancel

- Click **OK**.

**Note:**

By default, the  $\pi$  header that is sent to Lync for this station is a combination of this address and the proxy address for the line.

- The station configuration must use the Lync line as created previously. Your settings should be similar to the following:

**Station Configuration - LyncStation\_tsvm\_user**

Call Forwarding Configuration | Emergency Information Licensing | Custom Attributes Access Control | History Station Options

Station Extension:   Active

**Addresses**

Identification Address:  Edit...

Connection Settings:

Obtain settings automatically

Address: Not registered

Contact Line: Not registered

Use the following settings

Address:  Edit...

Contact Line:

Confirm auto-save  OK Cancel Apply

- Click **OK** to save the settings and return to the Station Configuration dialog box.

**Note:**

The **Phone** page shows that the **Use Global SIP Station Phone Information Settings** check box is selected.

The screenshot shows the 'Station Configuration - Lync' dialog box with the following elements:

- Navigation Tabs:** Call Forwarding, Emergency Information, Custom Attributes, History, Configuration, Licensing, Access Control, Station Options.
- Station Information:** Station Extension: 1001,  Active.
- Left-Hand Menu:** Addresses, Audio, Transport, Session, Authentication, **Phone** (selected), General, Appearances, Region.
- Phone Configuration:**
  - Use Global SIP Station Phone Information Settings
  - Manufacturer: [Empty dropdown menu]
  - Model: [Empty text box]
- Bottom Controls:** Navigation arrows,  Confirm auto-save, OK, Cancel, Apply buttons.

# Configuring users for the integration

This section describes how to enable Lync-enabled CIC users. Lync Server sets the user attributes in Active Directory and CIC reads the attributes to obtain Lync configuration information for each user.

## Requirements

Before being enabled for the integration, a user must:

- Be associated with a Windows NT domain account in their Interaction Administrator user configuration. If there is no domain association, an error dialog appears.
- Have an extension specified in their Interaction Administrator user configuration.
- Be enabled for Lync Server. To enable a user for Lync Server, use the Microsoft Lync Server Control Panel on the Lync front-end server. For more information about enabling users for Lync Server, see [Enable users for Lync Server](#).

## Configure user settings

To configure user settings on the CIC server:

1. In Interaction Administrator, click **Users** under **People** to display the list of users.
2. Double-click the user name to display the **User Configuration** dialog box.
3. Under **Microsoft Lync Settings** on the **Configuration** tab, do one of the following:
  - Specify the user's SIP address in the **User Address** box, and specify the station's contact address in the **Line URI** box. The station's contact address is the same address you specified in the station configuration.
  - Click **Lookup Settings** to auto-fill the Microsoft Lync Settings information with the user's Windows NT domain information from Active Directory.
4. Select the **Enable Presence Synchronization** check box.

**User Configuration - JohnMiller**

Client Configuration | Phonetic Spellings | Options | Security | Custom Attributes | History  
Configuration | Licensing | Personal Info | Workgroups | Roles | Password Policies | ACD | MWI

Extension: 1000      Mailbox User: John Miller ...  
Password: .....      Preferred Language: <System Default>  
Confirm Password: .....      Default Workstation: JohnMillerLyncStation  
IC Privacy Name: |      NT Domain User: QFUN\JohnMiller ...  
Outbound ANI:       Exclude From Directory  
Location: <Default Location>

Microsoft Lync Settings  
User Address: sip:JohnMiller@Qfun.com      Lookup Settings  
Line URI: tel:+13175551010      User Type: Enterprise Voice  
 Enable Presence Synchronization

Current Status: Available      Home Site: 1 (CustomerSite)  
Current Site: <Not Set>

Confirm auto-save       OK      Cancel      Apply

5. Click **OK** to save the settings.

# Configuring the merged company directory

The merged company directory appears in the CIC client when the Lync-enabled **Company Directory** view is added. It combines the list of Customer Interaction Center users with the list of Lync users and enables communication between them.

The merged company directory is a server feature that takes Lync contacts from Active Directory and merges them with the list of CIC users. The directory indicates the CIC status and/or Lync presence information for each user, depending on the user type:

For users of this type	The merged company directory displays
CIC-only users	CIC status
Lync-enabled CIC users	CIC status and Lync presence
Lync-only users	Lync presence

For more information about the user types, see [User types](#).

As the administrator, you can enable and configure the merged company directory to supplement the default CIC company directory.

## How the merged directory is created

To create the merged company directory, the LDAP Data Manager queries Active Directory at a specified interval to pull in attributes for Lync users. Then, Session Manager merges the Lync contacts with the company directory.

Users must add the Lync-enabled **Company Directory** view in the CIC client and configure the columns to show the **Status Summary** column.

## Requirements

The merged company directory requires the `I3_Feature_Lync` feature license. You should acquire that license before installing CIC.

## Create a user with access to Active Directory

The next step is to create a user account with permissions to read Active Directory (access control, workgroups, general directories, view permission, LDAP directory).

## Configuration of the merged directory in Interaction Administrator

CIC automatically creates an LDAP data source for Lync contacts, as long as the Lync feature license is present. If the license isn't present when CIC is installed, then manual creation of the data source is required.

The following is a list of the Lync configuration tasks in Interaction Administrator.

- Create and/or configure the CIC data source.
- Create a contact list source.
- Create a user with access to Active Directory.

## Create or configure the CIC data source

A data source is created automatically if the Lync feature license is present when CIC is installed. If the license is not present at the time of the installation, you need to manually create the data source. See the following procedure to manually create the data source. Otherwise, continue to [Configure the data source](#).

## Create a data source

If the Lync license wasn't present when CIC was installed, you will manually create a read-only Active Directory data source in Interaction Administrator.

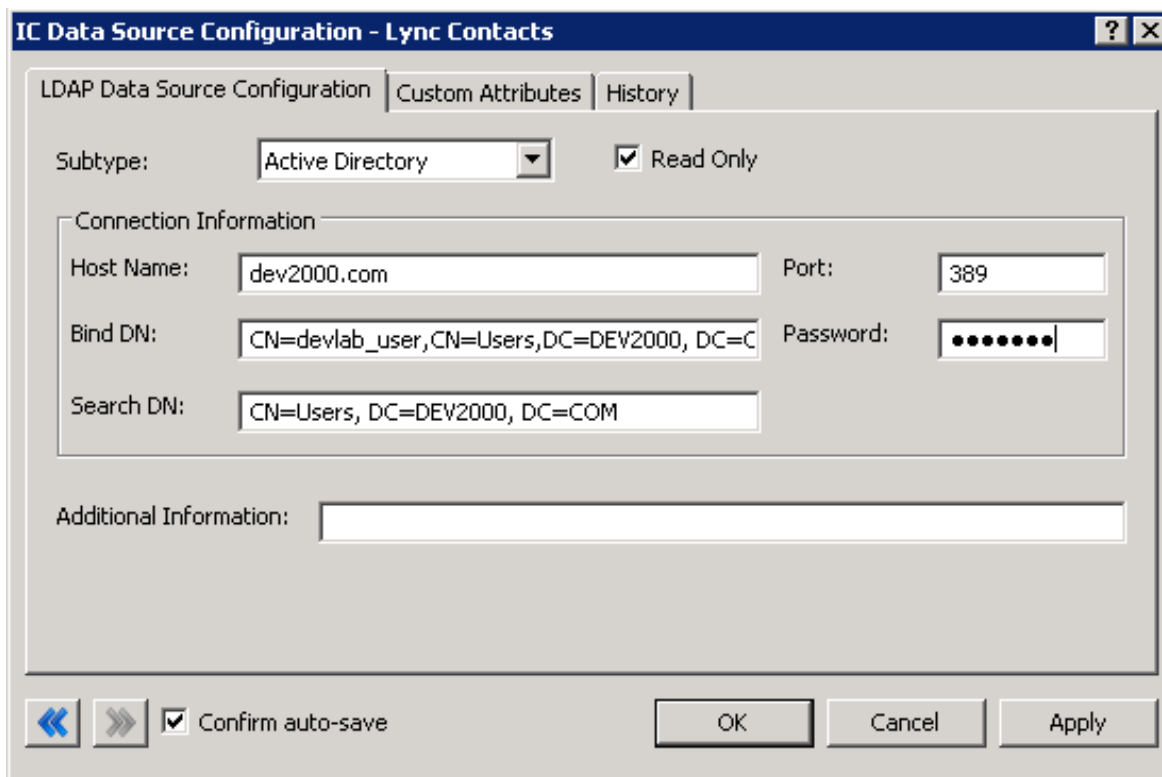
1. In Interaction Administrator, click **IC Data Sources**.
2. Right-click under the **IC Data Source Name** column, and click **New**.
3. In the **Entry Name** dialog box, specify a name for the data source, such as `Lync Contacts`, and click **OK**.
4. From the **Type** list, select **LDAP**, and click **Next**.
5. Continue to the next section, [Configure the data source](#).

## Configure the data source

1. Continue from above or open the data source in Interaction Administrator.
2. In the **LDAP Data Source Configuration** tab in the **IC Data Source Configuration** dialog box, specify the information in the following table:

In this field:	Type or select:
<b>Subtype</b>	Active Directory
<b>Read Only</b>	(Select)
<b>Host Name</b>	Connection information for the domain where Lync is installed.
<b>Bind DN</b>	The distinguished name (DN) used to authenticate the password.
<b>Search DN</b>	The path to use when reading users in LDAP.
<b>Port</b>	389 (the standard port for Active Directory)
<b>Password</b>	The password used to bind with.

For example:



The screenshot shows the 'IC Data Source Configuration - Lync Contacts' dialog box. The 'LDAP Data Source Configuration' tab is active. The 'Subtype' is set to 'Active Directory' and 'Read Only' is checked. The 'Connection Information' section contains the following fields: 'Host Name' (dev2000.com), 'Port' (389), 'Bind DN' (CN=devlab\_user,CN=Users,DC=DEV2000, DC=C), 'Password' (masked with dots), and 'Search DN' (CN=Users, DC=DEV2000, DC=COM). The 'Additional Information' field is empty. At the bottom, there are navigation arrows, a 'Confirm auto-save' checkbox (checked), and 'OK', 'Cancel', and 'Apply' buttons.

3. Click **Finish** if you're configuring a data source you just added, or click **OK** if you are configuring an existing data source.

## Create a contact list source

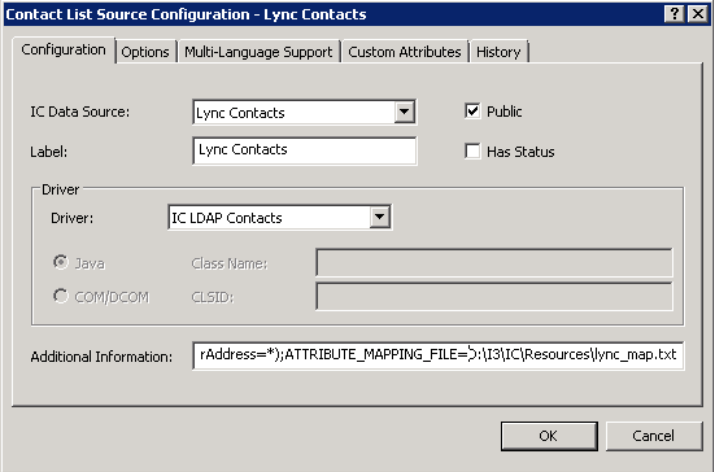
Session Manager uses the contact list source to merge Lync contacts into the company directory.

1. In Interaction Administrator, under **System Configuration**, expand the **Contact Data Manager** container, and click **Contact List Sources**.
2. Right-click under the **Contact List Source Name** column, and click **New**.
3. In the **Entry Name** dialog box, type `Lync Contacts`, and click **OK**.

**Note:**

If you don't name the entry `Lync Contacts`, the merging will not work.

4. In the **Contact List Source Configuration** dialog box, specify the information in the following table:

In this field:	Type or select:
<b>IC Data Source</b>	The name of the CIC data source that you configured earlier (for example, <code>Lync Contacts</code> ).
<b>Label</b>	The name to display for the contact list in the CIC client (for example, <code>Lync Contacts</code> ).
<b>Public</b>	(Select.) This field indicates that the contact list is public, rather than private.
<b>Has Status</b>	(Do not select.) This field indicates whether the data source supports status information.
<b>Driver</b>	IC LDAP Contacts
<b>Additional information</b>	<p>Enter the following, where <code>D:\</code> is the drive where CIC is installed:</p> <pre>SEARCH_FILTER=(msRTCSIP-PrimaryUserAddress=*) ;ATTRIBUTE_MAPPING_FILE=D:\I3\IC\ Resources\lync_map.txt</pre> <p>For example:</p> 

5. Click **OK**.

## Disable the merged company directory

The merged company directory is enabled when the data source is created. To disable the directory, remove the data source.

# Configuring presence synchronization

The integration includes a presence synchronization feature that synchronizes Lync presence information and Customer Interaction Center status information.

The presence synchronization feature requires the installation and configuration of the Lync Presence Integration service.

In Customer Interaction Center, an administrator must configure the service by making changes to an XML configuration file. In future releases, configuration options will be available in Interaction Administrator. The XML configuration is available for advanced users who want to use the service prior to the configuration being available in Interaction Administrator.

## Introduction to presence synchronization

Presence synchronization is how the Lync Server and the CIC server show a user's status after a change is made. This synchronization can occur from Lync to CIC, or from CIC to Lync, or both. How it actually syncs is configurable.

Due to technical limitations, a user's status might not always synchronize with Lync the moment a switchover connection is restored. Generally, the service will not try to synchronize on startup. However, if the user is in a workgroup, or if the user's CIC client reconnects to the CIC server after the Lync Presence Integration service reconnects to the CIC server, the user's status should synchronize automatically.

## Introduction to configuring presence synchronization

This section describes how to configure the server to host the service in CIC. It also describes the configuration options that affect the behavior of the synchronization.

There are two procedures to get the service up and running.

1. Prepare the Lync environment by configuring the Lync Trusted Application Server/Lync Trusted Application. The Lync Trusted Application Server/Lync Trusted Application is a Microsoft requirement and a Lync administrator should perform this step. This document provides minimal guidance for performing this procedure because documentation is available from Microsoft.
2. Install and configure the Lync Presence Integration service.

For a recorded webinar on this topic, visit: [http://msdn.microsoft.com/en-us/library/lync/hh347300\(v=office.14\).aspx](http://msdn.microsoft.com/en-us/library/lync/hh347300(v=office.14).aspx).

## About the Lync trusted application server configuration

The Lync Presence Integration service is a Microsoft UCMA (Unified Communications Managed API) trusted application. The following list summarizes this trust relationship.

- Lync Server does not challenge trusted applications for authentication.
- Lync Server does not throttle trusted applications for SIP transactions, connections, and outgoing VoIP calls.
- Trusted applications can impersonate any user and can join conferences without appearing in rosters.
- Trusted applications are highly available and resilient.

Application activation is the process where UCMA applications are configured to use Lync Server functionality. Most of the commonly used configuration data exists in Active Directory, the Central Management store, and the computer that hosts the application's local certificate store.

Activation is necessary to deploy a ready-to-ship application and to test an application during the application development phase.

For more information about trusted applications, and to become familiar with the implications and steps to administer and deploy a UCMA trusted application server, see [http://msdn.microsoft.com/en-us/library/lync/hh347291\(v=office.14\).aspx](http://msdn.microsoft.com/en-us/library/lync/hh347291(v=office.14).aspx).



## Prerequisites for activation

Activation requires the following:

- Lync 2013 requires the UCMA 4.0 Runtime.
- Skype for Business 2015 requires the UCMA 4.0 or 5.0 Runtime.
- Microsoft Lync Server Core Components provide access to PowerShell cmdlets, which are necessary for activating the application. The Core Components also install the binaries necessary to enable a local replica, or copy, of the Central Management Store.
- A valid server topology with Microsoft Lync Server and an Active Directory domain controller.
- Appropriate permissions and memberships.

To download the UCMA Runtime and Microsoft Lync Server components, see <http://www.microsoft.com/en-us/download/details.aspx?id=20958>

For more information about activating a trusted application, see [http://msdn.microsoft.com/en-us/library/lync/hh347291\(v=office.14\).aspx](http://msdn.microsoft.com/en-us/library/lync/hh347291(v=office.14).aspx)

## General trusted application activation

The following information is a summary of the steps needed to activate a UCMA Trusted Application. For more information about activating a trusted application, see [http://msdn.microsoft.com/en-us/library/lync/hh347354\(v=office.14\).aspx](http://msdn.microsoft.com/en-us/library/lync/hh347354(v=office.14).aspx).

All trusted applications require entries in the Microsoft Lync Server topology document to specify the computers on which the application runs, and the trusted service ports required by the trusted applications. In addition, to communicate with Lync Server, an application computer also requires a machine certificate. Lync Server only supports Mutual Transport Layer Security (MTLS) with trusted servers. Optionally, an application can be associated with one or more trusted application endpoints that are bound to SIP URIs in the same way that a user is associated with a SIP URI.

All trusted applications must complete the following steps.

1. Create a pool of trusted application computers in the Lync Server topology.
2. Request or import a certificate for the application computer.
3. Add a trusted service port for the application.
4. Add the application and its port to the list of firewall exceptions.
5. Optionally, create one or more Active Directory contact objects for the application.
6. Optionally, create Active Directory user objects for the application.

All of these steps, except for the firewall exceptions, are discussed in detail on the Microsoft website described earlier in this section. The default name of the trusted application in the XML configuration file is `InteractionCenterLyncIntegrationService`. If you choose to name it something else, make sure that you note that in the `<lyncFarm>` XML attribute in your XML configuration file.

## Activate an auto-provisioned application

The Lync Presence Integration service is an Auto-Provisioned UCMA application. The following information is a summary of the steps to auto-provision a UCMA application. For a detailed list of steps, see: [http://msdn.microsoft.com/en-us/library/lync/hh347300\(v=office.14\).aspx](http://msdn.microsoft.com/en-us/library/lync/hh347300(v=office.14).aspx)

You can provision trusted applications at run time in one of these two distinct ways:

- Auto-provisioning, which requires a local Central Management Store replica.
- Manual provisioning, which does not require a local Central Management Store replica.

The recommended way to provision a UCMA-based application is auto-provisioning. With this style of provisioning, applications can auto-discover, auto-provision, monitor, and react to settings that are relevant in a Microsoft Lync Server environment.

**Note:**

See [Create and verify DNS SRV records](#) for configuration steps required for auto-provisioning to work.

To activate an auto-provisioned application:

1. Ensure that the computers on which the application will run are joined to the domain on which Lync Server will run.
2. Install the Central Management Store replication service.
3. Enable the Central Management Store replication.
4. Set the certificate so that the Lync Server topology is aware of the trusted application computer.

For more information, see the Microsoft website described earlier in this section.

## Install the Lync Presence Integration Service

### Note:

In the latest version of CIC, the service is 64-bit only. If you installed the Lync Presence Integration Service in CIC on a 64-bit machine or operating system, the new install automatically updates the service. If you are using the service on a 32-bit machine or operating system, install the service on a 64-bit machine and then uninstall it from the 32-bit machine.

To install the service:

1. Locate and start `MicrosoftLyncIntegrationService_64bit.msi`.

This installation file is available here: <https://my.inin.com/products/integrations/Pages/Microsoft-Lync.aspx>.

### Note:

If you have not correctly configured the server with the UCMA Runtime version that is compatible with your Lync deployment, the following error message appears and the install ends: **Microsoft Unified Communications Managed API 3.0 Runtime must be installed before proceeding.**

If there is not a UCMA error, the Destination Folder dialog box appears.

2. Choose the installation destination folder, and then click **Next**.

The **Logging File Path** dialog box appears.

**IC Integration to Microsoft Skype for Business 2015 R3 ...**

### Web Configuration Server

Enter the Web Configuration Server information.

The IC Integration to Microsoft Skype for Business for Integrations 2015 R3 has a web configuration GUI which is accessible through a web browser. The server will be accessible under the address:

http://machinename:port

Access to the configuration GUI is protected through HTTP digest authentication. Specifying 0(zero) for the port disables the configuration server and a blank username disables authenti...

Web Configuration Server HTTP Port:

Web Configuration Server HTTPS Port:

Administrator Login Name:

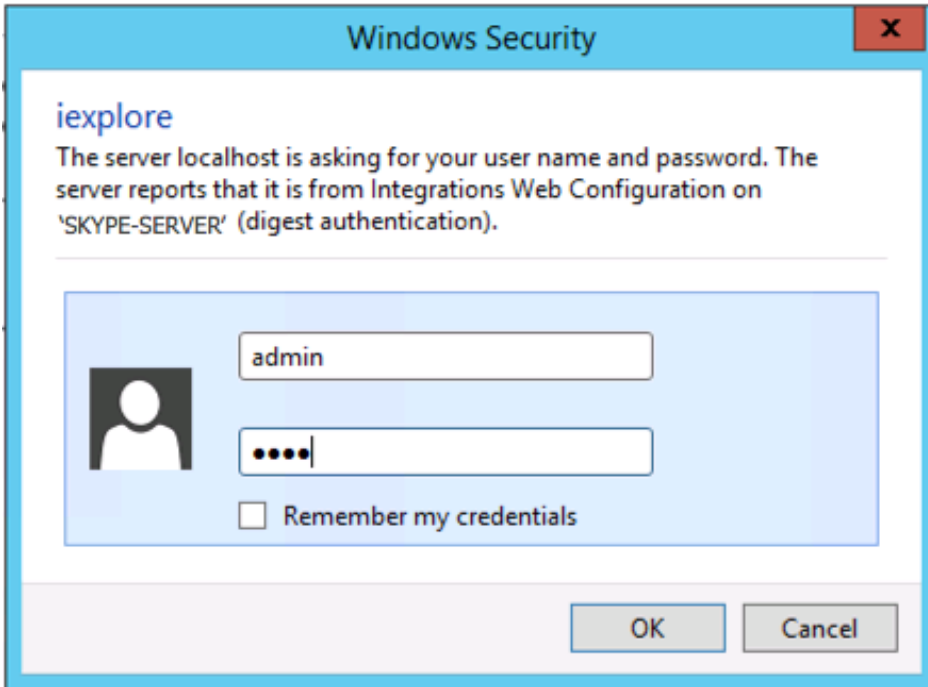
Administrator Login Password:

Confirm Password:


3. Specify the path for the log file, and then click **Next**.
4. Type the port and credential information for the CIC web configuration server, and then click **Next**.  
The **Ready to Install IC Integration to Skype for Business** dialog box appears.
5. Click **Install** to begin the service installation.
6. When the installation completes, click **Finish**.
7. Click **Yes** to restart the computer, or click **No** if you plan to restart it later.

## Configure the CIC server for the Lync Presence Integration Service

1. Using the server/port combination you used for the web configuration, log on to the web administrator to configure the CIC server to use with the integration. Example: `http://localhost:8084`.  
The **Windows Security** dialog box appears.



2. Enter the credentials.  
The **Integrations Web Configuration Status** page appears.

Status		
 <b>About</b>	<b>Machine Name</b>	SKYPE-SERVER
	<b>Machine Uptime</b>	0d 18h 21m 52s
	<b>Local IP Address</b>	172.11.11.111
	<b>Installed Integrations</b>	Microsoft Skype for Business Integration

3. Click **Config**.
4. Click **Add Server** (or **Edit** for existing servers).  
The **Configuration** page appears.

5. Specify the Notifier Host and credential information, then select the **Microsoft Skype for Business Integration** check box.
6. Click **Add** (or **Apply Changes** for existing servers) to complete the CIC server configuration.  
The **CIC server is now configured** message appears.

## Lync Presence Integration Service XML configuration

Inside the Lync Presence Integration Service installation folder is a sample configuration file named `ININIntegrationService-w64r-x-x.exe.config` (x-x represents the build number).

This file loads at service start time and controls the presence logic between CIC and Lync. There is a watcher for the config file within the service that detects when changes are made to it. This watcher enables real-time changes in the config file to take effect while the service is running. While most of the configuration options within the XML are noted inside this file, there are a few attributes to point out. Use the sample configuration file as a reference when using this document.

**Note:**

Users must be configured for presence sync in the XML file and in Interaction Administrator. For more information, see [Configure user settings](#).

The following is a list of parameters in the XML configuration file.

<lyncFarm>

The service uses this attribute with UCMA Runtime to indicate which trusted application is attempting to connect to the Lync environment.

ucmaAppId

The application that is listed for the preconfigured trusted application in Lync. To obtain the ID, run `Get-CsTrustedApplication` in Lync Server Management Shell. The shell returns a result in this form: `urn:application:[applicationName]`.

Use the `applicationName` value from the result as the `ucmaAppId`.

ucmaUserAgent

For the name, you can use anything but you must enclose it in quotes. For example: "Lync Presence Service".

ucmaAppName

This parameter is for future use.

## ucmaVersion

UCMA version number will be 4 or 5, depending on which version you are running. See Prerequisites for activation.

## <profiles>

This attribute begins the present logic configuration portion of the XML file. Each profile can have different presence sync behaviors.

## <profile>

This attribute indicates the start of a profile. A profile includes a scope and a qualifier.

- scope = Global / Qualifier = EnterpriseVoice, Rcc, or ImOnly This profile applies if the user does not have a User or Custom profile.
- scope = Custom / Qualifier = *arbitrary description* You can apply a custom profile to a list of users and the profile can include a list of conditions.

All profiles can have multiple augmentation configurations. If all the conditions are met in more than one augmentation configuration, the service uses the configuration with the lowest order value.

## <users>

A list of CIC users in the custom scope.

## <user>

An individual CIC user who belongs to the custom scope.

## <augmentationConfigurations>

A collection of <augmentationConfiguration> elements that are selected based on evaluated conditions.

## <augmentationConfiguration>

The highest level of presence sync logic. Base decisions are configured in this attribute.

- Name: name of configuration
- Order: value that determines the priority of the <augmentationConfiguration>. A lower number means higher priority.
- enableIcToLyncSync: a Boolean that indicates whether to push CIC status changes to Lync
- enableLyncToIcSync: a Boolean that indicates whether to push Lync presence changes to CIC.
- addInQueueText: a Boolean that indicates whether to add the text (**In Queue**) to an agent's Lync presence when they are in an ACD Available status in CIC.

## <conditions>

A group of conditions to be evaluated to determine which <augmentationConfiguration> should be selected. If all conditions return true, then the valid <augmentationConfiguration> with the lowest order goes into effect.

## <condition>

The service currently considers two conditions: UserState and UserType.

- Name: the name of the condition to evaluate.

## <qualifications>

A group of <qualification> elements to evaluate to determine if a condition is present.

## <qualification>

Checks are executed on UserState and UserType conditions. If any qualification attribute returns true, then a condition is met. This check applies to both global and custom profiles.

UserState qualification values

- LoggedOut: user is logged out of CIC.
- LoggedInToRCC: user is logged on to CIC through Lync Remote Call Control.
- LoggedInToClient: user is running the CIC clien.

UserType qualification values

- EnterpriseVoice: user is a Lync Enterprise Voice user.
- RCC: user is a Lync RCC user.

- IMOnly: user is configured as an IM Only user.

The `UserType` qualification value corresponds to the user setting configured in [Configuring users for the integration](#).

#### <presenceMap>

A group of <presenceMapping> elements for a particular <augmentationConfiguration>. If a presence change occurs in an <augmentationConfiguration> where there is no <presenceMapping>, no presence change occurs for either direction.

#### <presenceMapping>

The heart of how presence sync is executed within the service. Each <presenceMapping> controls what happens on each system when the service detects presence/status changes. Remember that CIC statuses are reported using a string (for example, Available) and Lync presence values are numeric (for example, 3500). The Lync baseline numeric presence values are listed in the next section. When a CIC status is pushed to Lync, the CIC text **Away from Desk** is pushed to Lync along with the availability value.

- `icStatus`: the presented CIC status or the CIC status to which to change
- `lyncPresenceFromIc`: the presented Lync presence or the Lync presence to which to change
- `lyncPresenceToIcStart`: a Lync presence value that is used in conjunction with the `direction` property
- `lyncPresenceToIcEnd`: a Lync presence value that is used in conjunction with the `direction` property
- `direction`: allows you to specify which service should allow synchronization to the other service.
  - `OneWayToIc`: disallows synchronization on CIC status changes. Any presence values between the `lyncPresenceToIcStart` and `lyncPresenceToIcEnd` values result in the CIC user having the `icStatus` status.
  - `OneWayToLync`: disallows synchronization on Lync presence changes. CIC status changes are detected when a user changes status to `icStatus` and Lync presence becomes the `lyncPresenceFromIc` equivalent.
  - `TwoWay`: allows all synchronization.
  - `None`: disables the synchronization of this status for the time being.

## Lync baseline presence values

Lync Presence Values: <http://msdn.microsoft.com/en-us/library/hh380072%28v=office.14%29.aspx>

The following is a list of the Lync baseline numeric presence values.

- 3500 Available
- 6500 Busy
- 9500 Do not disturb
- 12500 Be right back
- 15500 Away
- 18500 Offline

# Configuring Remote Call Control

Remote Call Control (RCC) is a feature within Lync Server that offers the ability to make and receive calls on a CIC station using the Microsoft Lync client.

For example, with RCC enabled in Lync, if a CIC station rings, an alert appears in the Lync client to allow the user to answer the call. Or, when a number is clicked in the Lync client, the CIC station can go off-hook in speakerphone mode and dial the number.

RCC allows multiple ways to logons:

- Using the RCC station (default)
- Using a remote number

RCC must be configured on both the Lync Server and the CIC server.

## Prerequisites

Ensure that all CIC user accounts that will be used with RCC have client licenses enabled.

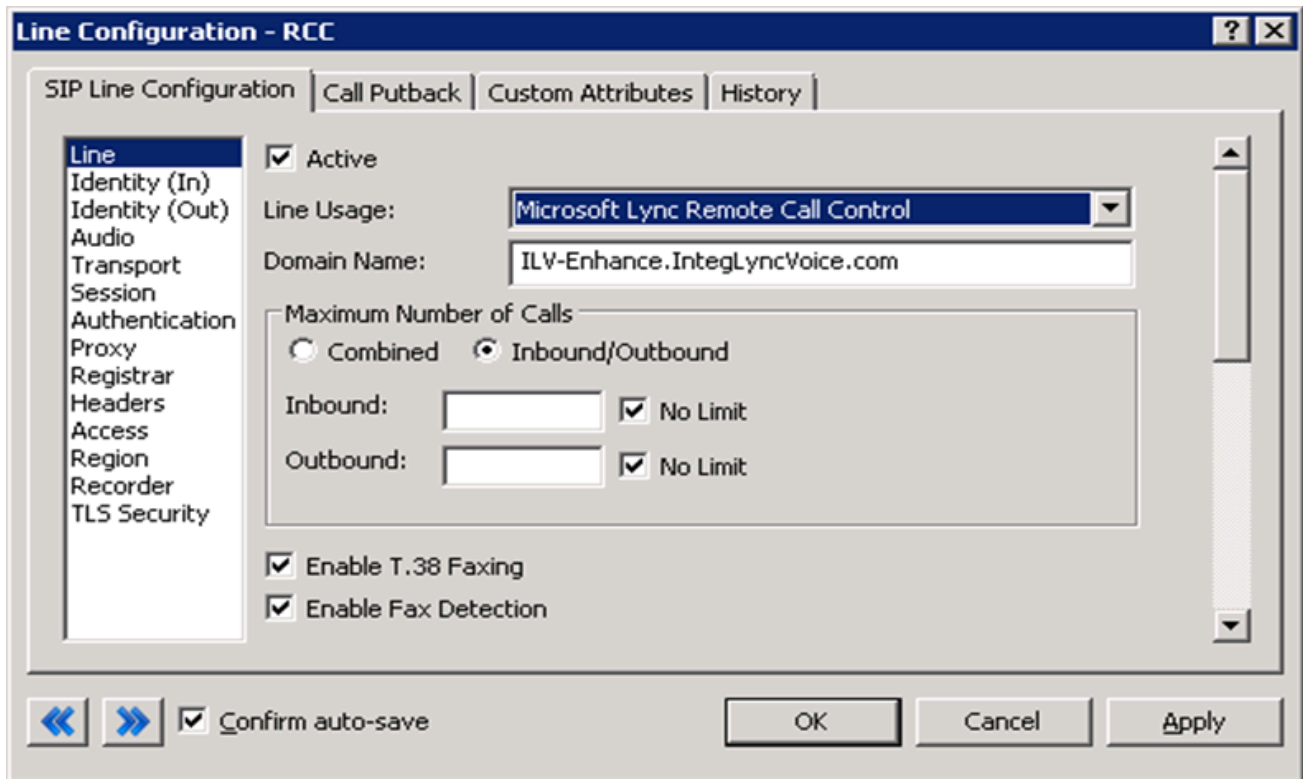
In addition, enable the RCCServer subsystem on Customer Interaction Center. See the following section.

To use RCC, you must have the I3\_FEATURE\_LYNC license. The Lync RCC implementation now checks for this license.

## Configure the CIC server for RCC

1. Click **Lines** container in Interaction Administrator.
2. Create a **line** to be used for RCC, right click in the lines grid and then click **New**.
3. In the **SIP Line Configuration** tab, click **Line** on the left.

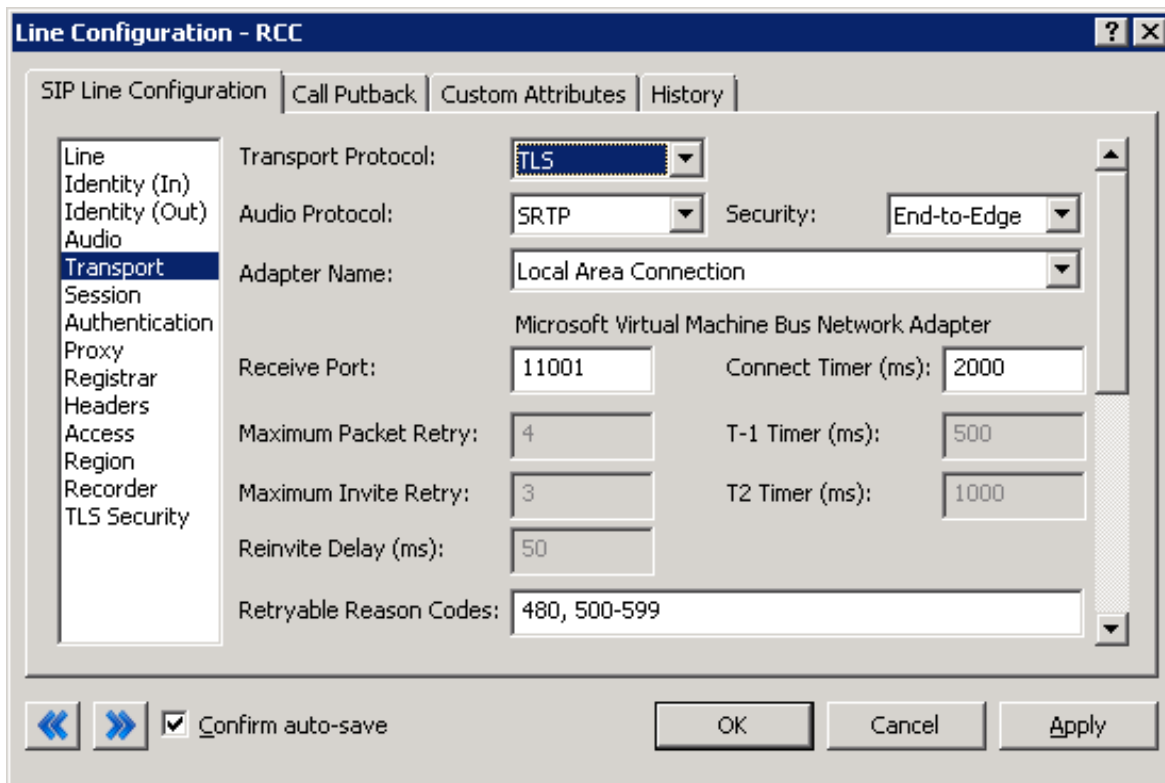
Verify that Line Usage is set to **Microsoft Lync Remote Call Control**.



4. To enable the SIP Session Timer (SIP Session Keep-Alive) for the RCC SIP line, click **Session** on the left and set the SIP Session Timeout <n> seconds.  
The default is 60 seconds. A setting of 0 (zero) will disable the keep-alive functionality. If the keep-alive feature is enabled, an INFO message is sent by the CIC server to the Lync Server every n seconds. This keep-alive feature helps keep the connection between the CIC server and the Lync Server steady. The setting must be kept under 20 minutes (1200 seconds).
5. In the **SIP Line Configuration** tab, click **Transport** on the left.



The Receive Port is now configurable. The 11001 port is the default and it is best to keep this default. Transport can be either TCP or TLS/MTLS. (UDP is given as an option, but should not be used.)



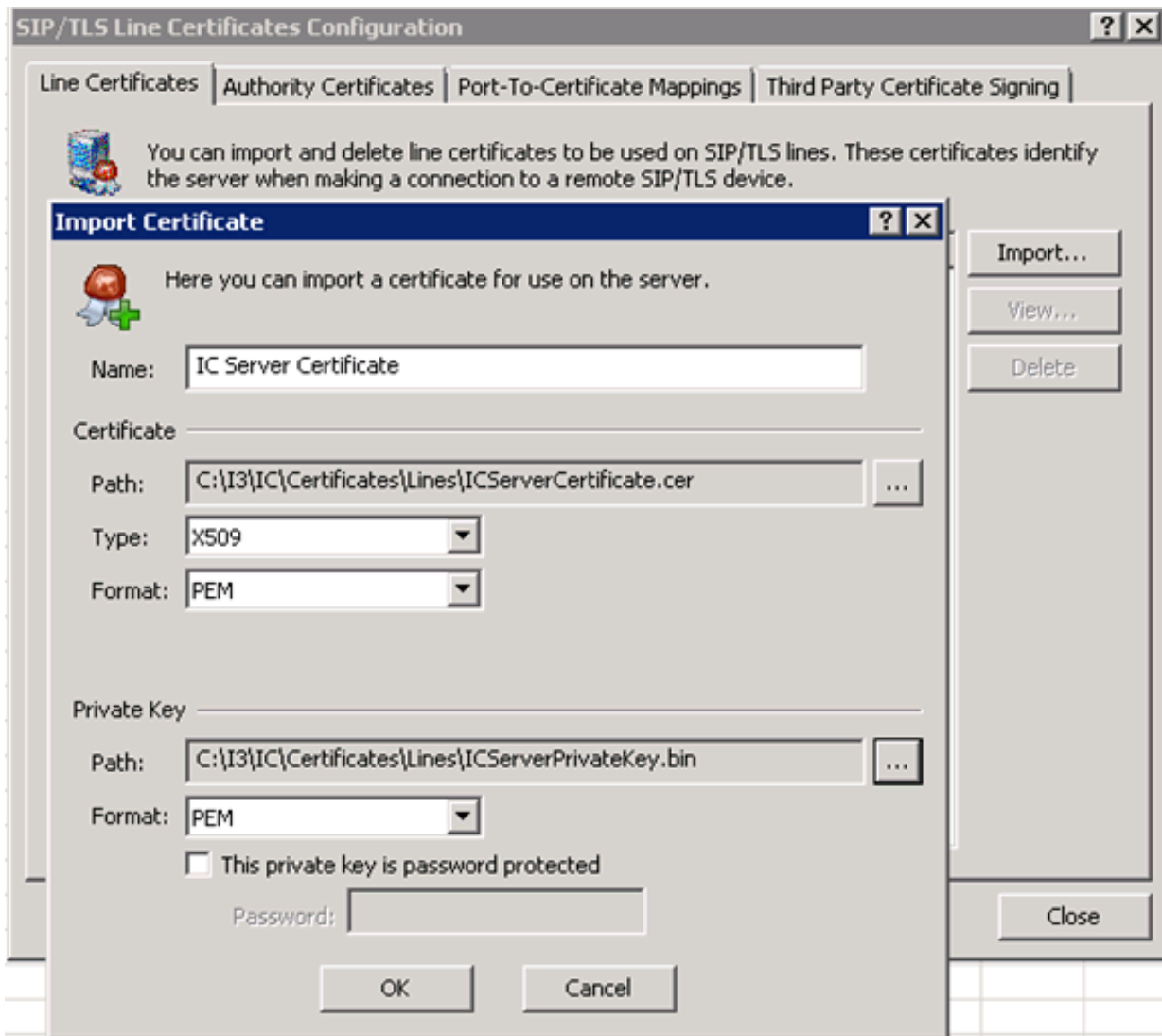
6. If using TLS/MTLS:
  - a. On the Lync Server, generate a certificate to use with CIC. Refer to the Lync documentation for this task.
  - b. Export the CIC server's Trusted Certificate from the Lync Server, including all certificates in the certificate path to include the Root CA Certificate. Export it in PKCS#12 (.PFX) format. Export the private key also.
  - c. On the CIC server, we need to extract the public and private keys. The extract is accomplished by using openssl or ssl\_app-w32r-1-2.exe:
    - i. Extract the private key:
 

```
ssl_app-w32r-1-2.exe pkcs12 -in <pfx_file_name>.pfx -nocerts -nodes -out priv.pem
```
    - ii. Extract the public key:
 

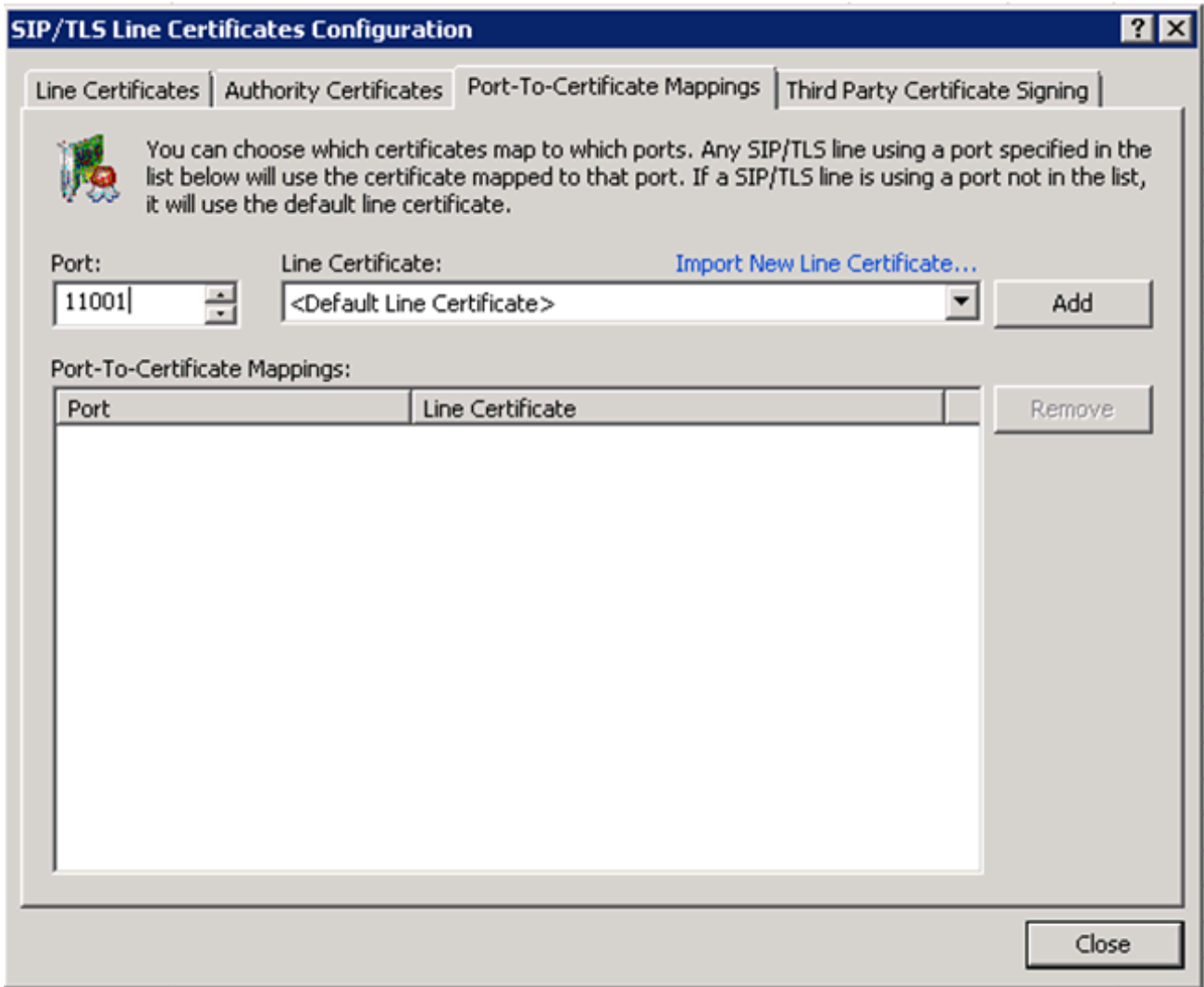
```
ssl_app-w32r-1-2.exe x509 -inform pem -in privpub.pem -pubkey -out pub.pem -outform pem
```
7. In the **SIP Line Configuration** tab, click **TLS Security** on the left.
 

If checking the **Require mutual authentication** check box (for MTLS), make sure the certificate that Lync uses to connect to CIC has Client Authentication X509 Extended Key Usage (client EKU). Instructions for how to configure the Lync certificate can be found in the following articles:

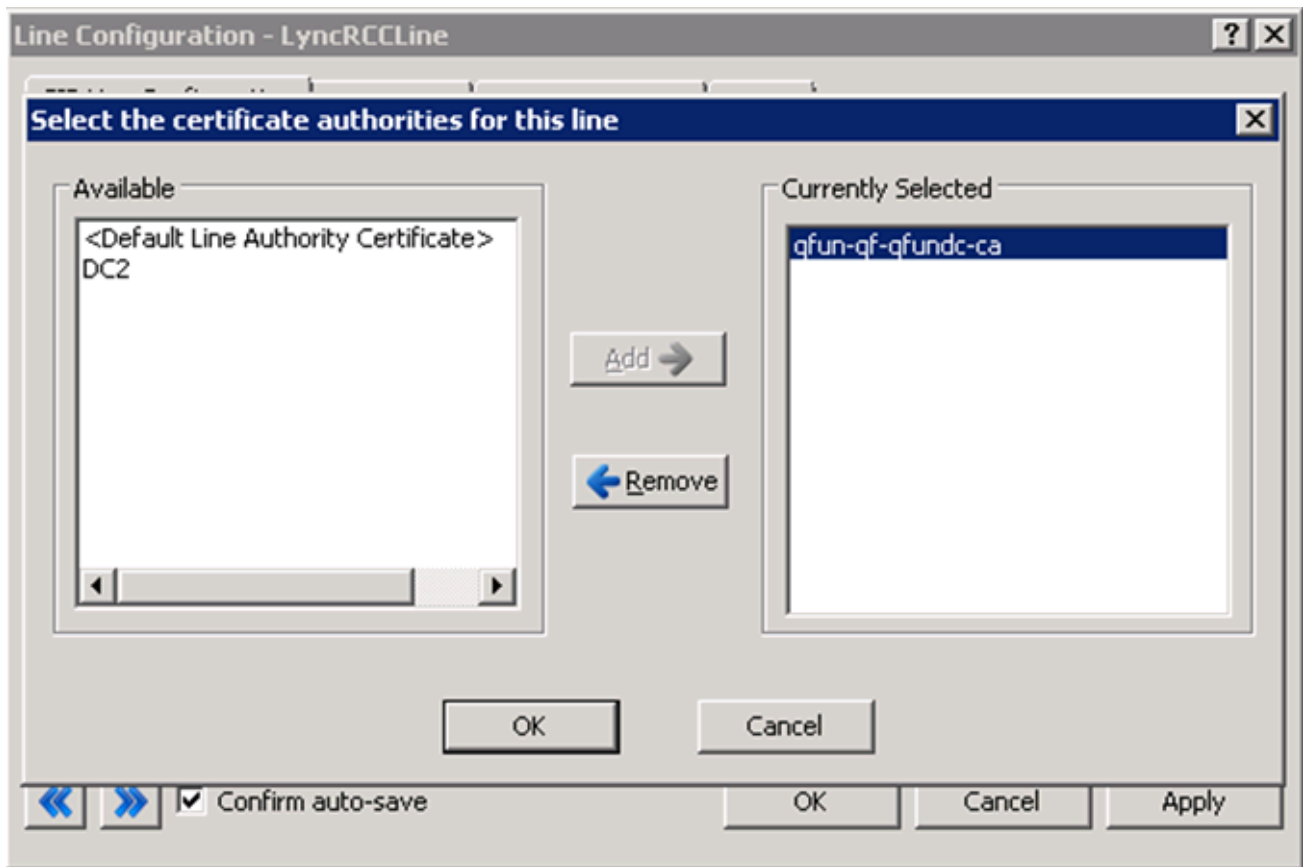
  - <http://technet.microsoft.com/en-us/library/gg398409.aspx>
  - [http://technet.microsoft.com/en-us/library/bb694035.aspx#BKMK\\_siteserver1](http://technet.microsoft.com/en-us/library/bb694035.aspx#BKMK_siteserver1)
8. In the **SIP Line Configuration** tab, click the **Configure certificates and port mappings** link at the bottom of the screen.
  - a. In the **SIP/TLS Line Certificates Configuration** window on the **Line Certificates** tab, click **Import**.
  - b. Add the CIC server certificate created on the Lync Server on the line certificates to the **Path:** box. Set **Type:** to X509 and **Format:** to PEM.
  - c. Click **OK**.
  - d. Import the Root Certificate Authority (CA), and all intermediate CAs used to sign the Lync Certificate.



9. On the **Port-To-Certificate Mappings** tab, in the **Line Certificate:** box choose the CIC server Certificate created on the Lync Server and select **Port: 11001** (the port we chose for the Lync RCC line). Click **Add**. Click **Close**.



10. In the **Line Configuration** window, in the **SIP Line Configuration** tab, click **Modify**.
  - a. Select the Root CA certificate in the Available list.
  - b. Click **Add** to move it to the **Currently Selected** list.
  - c. Click **OK**.
  - d. Click **OK**.



**Note:**

Any change of the RCC SIP line settings in Interaction Administrator will be picked up by the RCCServer only after restarting the RCCServer.

## Enable the RCCServer subsystem in CIC

1. Open the IC System Manager.
2. Under **View**, clear the **Disabled Subsystems** check box.
3. In the **disabled** list, locate **RCCServer**.
4. Double-click **RCCServer**, then change the startup type to **Automatic**.
5. Start the RCCServer subsystem.

## Configuring Lync Server for RCC

This section provides instructions that should work for most implementations of RCC with Customer Interaction Center. For detailed instructions on configuring Lync Server for RCC, refer to Microsoft's documentation at <http://technet.microsoft.com/en-us/library/gg558664.aspx>.

This procedure uses the Lync Server Management Shell for most of the RCC configuration for Lync Server. A small part of the configuration is managed through the Lync Server Control Panel.

The configuration consists of these procedures:

- Build a trusted application pool.
- Configure a trusted application that lives on the pool.
- Specify the address of the CIC server.

Narrow the trusted application pool's IP address to the IC Server (or SIP proxy), and then publish the topology. Each of these procedures is described in the following sections.

---

## Build a trusted application pool

A trusted application pool is required to trust the CIC server.

### Note:

This example is pointing to a single CIC server, so it is using the CIC specific information. In a switchover configuration, this pool parameter would point to a network or hardware load balancing, which would determine which CIC server to use.

Create the pool type by doing one of the following:

1. For a non-switchover environment, enter the following in the Lync Server Management Shell:  

```
New-CsTrustedApplicationPool <IC Server FQDN> -Registrar <Lync Pool FQDN> -Site 1 -  
TreatAsAuthenticated $true -ThrottleAsServer $true -RequiresReplication $false
```
2. For a switchover environment, use the command above, but replace `<IC Server FQDN>` with the SIP proxy FQDN or IP address.

---

## Configure the trusted application

Next, configure a trusted application that lives on the pool you built in the previous section so that Lync will trust requests from this server and port combination.

Configure the trusted application by entering this command in the Lync Server Management Shell:

```
New-CsTrustedApplication -ApplicationID CIC -TrustedApplicationPoolFQDN <IC Server FQDN> -Port  
11001 EnableTcp
```

### Note:

Make sure that the port is set to match the RCC SIP line port configured in CIC. If you set it to a different port, the CIC server will never hear traffic from Lync. Also, to use TCP include `EnableTcp` in the command because without `EnableTCP` Lync sets trusted applications to use TLS. If you are using TLS or MTLS, leave the `-EnableTcp` off of the above line.

---

## Specify the IP address of the CIC server

At this point, you have configured Lync to trust traffic from the IC server on port 11001. The next step is to tell Lync how to send traffic to the CIC server. With OCS, this configuration is accomplished with the Static Routes tab, which was accessible in the user interface, but with Lync, this is managed either through the Lync Server Management Shell or using the Topology Builder. Both methods are described below.

### To specify the IP address of the CIC server using the Lync Server Management Shell

1. Enter this command in the Lync Server Management Shell:  

```
Enable-CsTopology
```
2. Enter this command to create a static route that matches the CIC server's domain (in this example, `rcc.dev2000.com`), with a next hop of the CIC server and listening port. This step adds the route in a PowerShell variable:
  - a. For TCP  

```
$staticRoute = New-CsStaticRoute TCPRoute Destination <CIC Server IP> -Port 11001 MatchUri  
rcc.dev2000.com
```
  - b. For TLS/MTLS  

```
$staticRoute = New-CsStaticRoute -TLSSRoute -Destination <CIC Server FQDN> -Port 11001 -  
MatchUri rcc.dev2000.com -UseDefaultCertificate $true
```

### Note:

Don't be concerned about the URI value and attempting to map it in your domain. You can essentially use any value. This value is used later when configuring a user's Line Server URI in the User configuration. If MTLS is configured you will need to set up the Certificate Authority.

3. Add the route from the previous step to the routing configuration using this command:  

```
Set-CsStaticRoutingConfiguration Route @{Add=$staticRoute}
```
4. Enter the following command in the PowerShell to download the current topology so you can narrow the Trusted Application Pool's IP address list to only the IC server (or SIP proxy).  

```
Get-CsTopology AsXml | Out-File c:\rcc.xml
```
5. Open the `rcc.xml` file and manually edit the section `Cluster Fqdn="<IC Server FQDN>"` from `0.0.0.0` to the IP address of the IC server, and then edit and save the file.

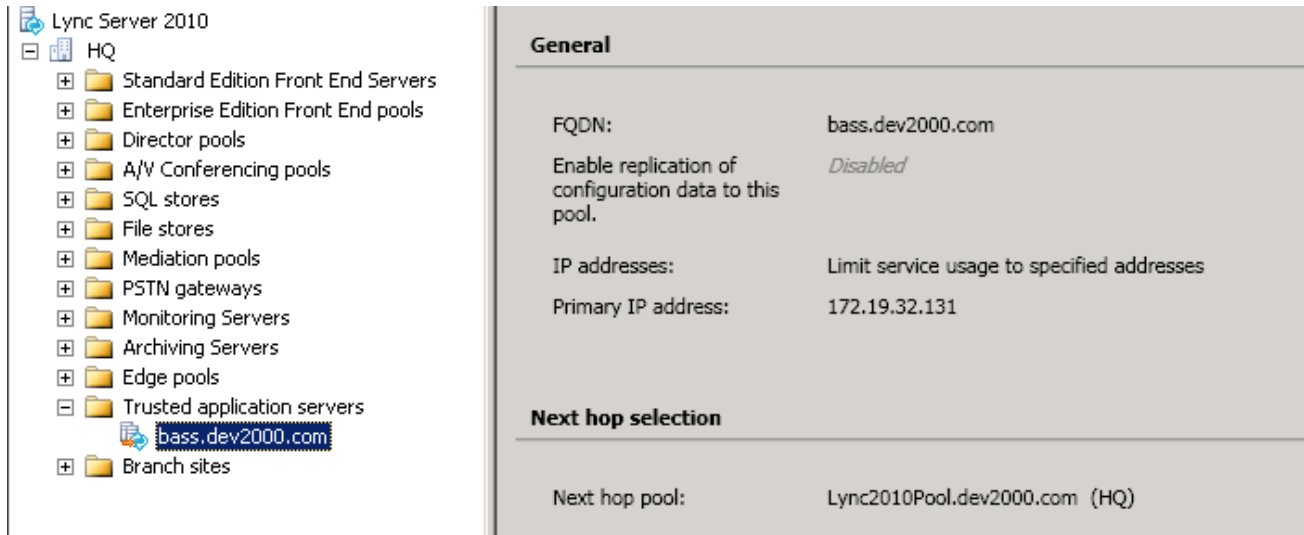
6. Enter the following command to publish the change and complete the setup:

```
Publish-CsTopology FileName c:\rcc.xml
```

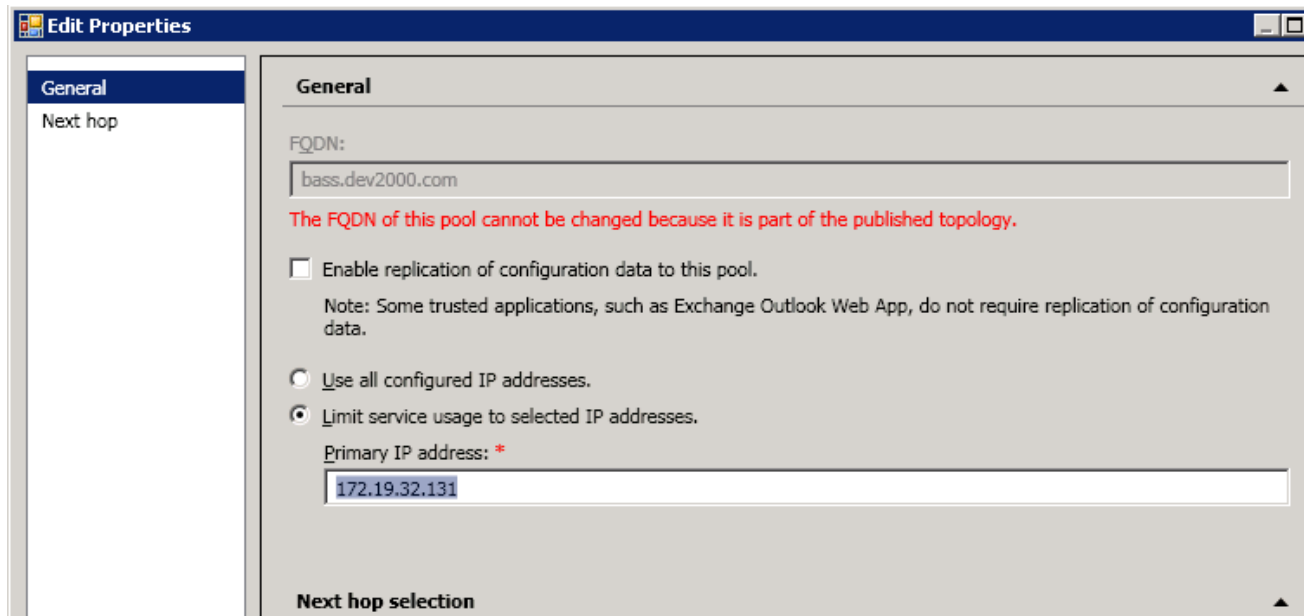
Everything should now be configured at the Lync Server level to run RCC with the CIC client.

### To specify the address of the IC server using the Topology Builder:

1. Open the Topology Builder and expand the **Trusted Application Servers** container.  
You should see the trusted application pool that you created in the Lync Server Management Shell.



2. Right-click the pool to display a shortcut menu, and then select **Edit Properties**.

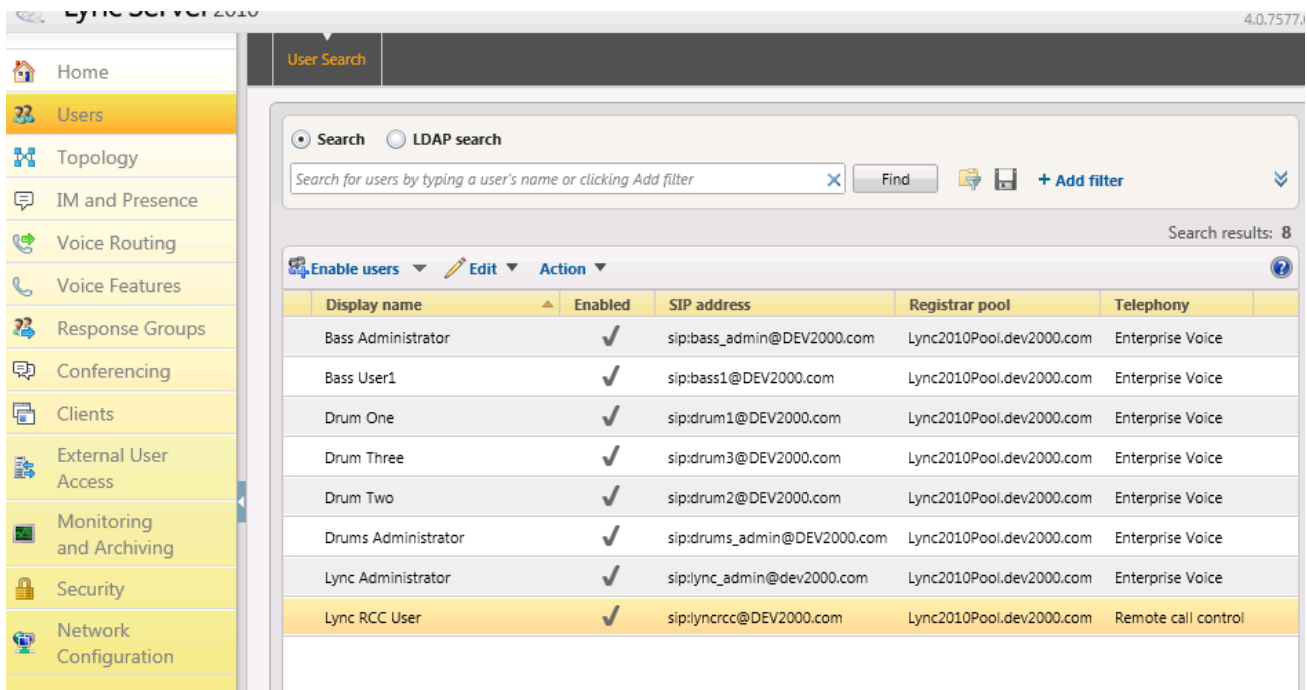


3. On the **General** page, select the **Limit service usage to selected IP addresses** option button, and then enter the IP address of the IC server (or SIP proxy).
4. Click **OK**, and then publish the topology for the settings to take effect.

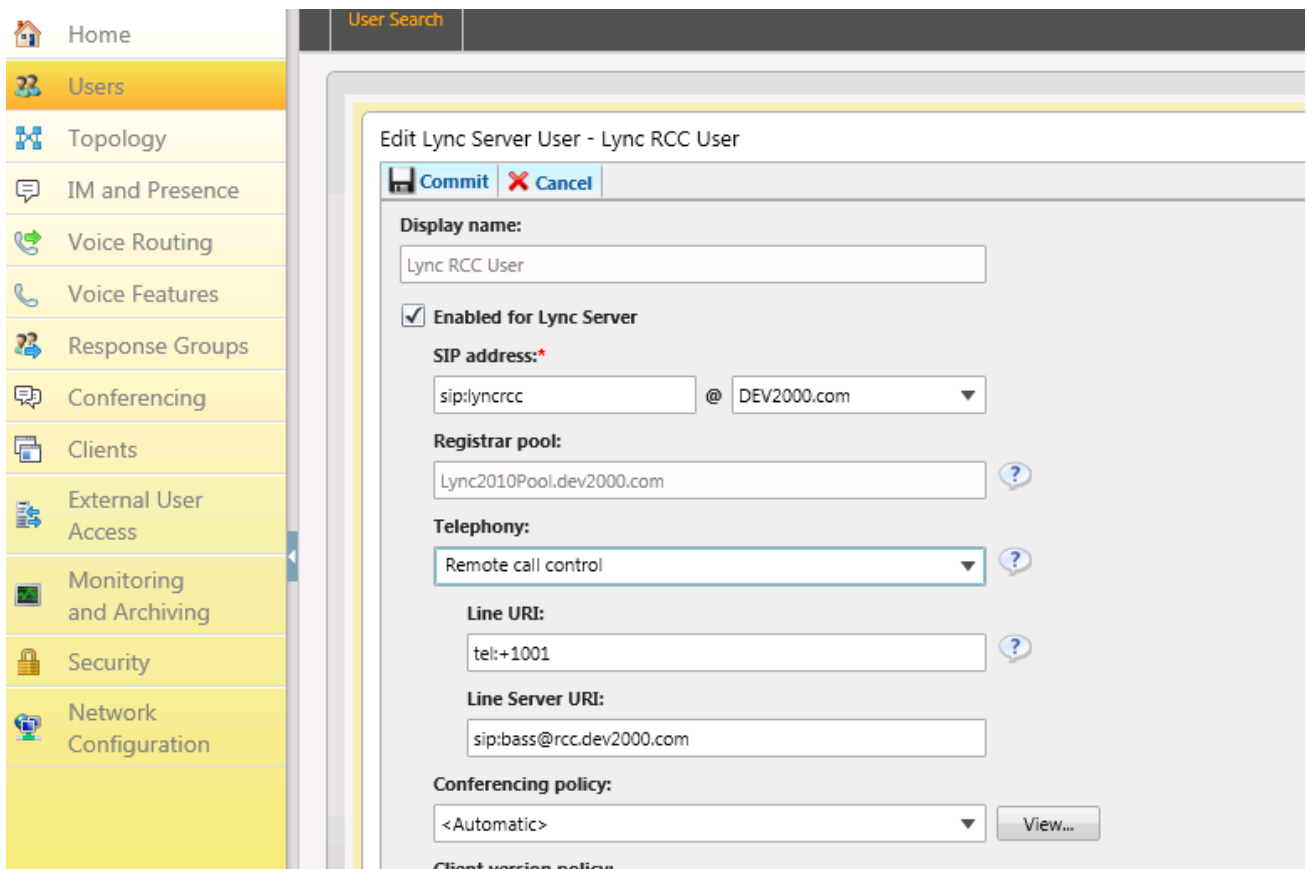
At this point, everything should be configured at the Lync Server level to run RCC with CIC. The next step is to configure a user in Lync to use RCC.

## Configure a Lync user to use RCC

1. Open the Lync Server Control Panel and either enable a new user or find an existing user that you want to configure to use RCC.



2. Double-click the selected user to edit the properties.



3. Under **Telephony**, select **Remote call control**.
4. In the **Line URI** field, specify the station on which the user will log on the CIC server. Use this format, where *x* is the extension of the station on the CIC server: `tel:+X`
5. In the **Line Server URI** field, use a format that matches the static route you created earlier.  
In the example shown, `rcc.dev2000.com` is the host that matches the static route and `sip:bass@rcc.dev2000.com` is the entire URI, where `bass` is the name of the CIC server (however, it can be anything). The important thing to remember here is that any traffic that needs to be routed to `X@rcc.dev2000.com` goes out the static route.

**Note:**

The Lync user account is associated with the domain account. For RCCServer to map the Lync user to a CIC user, there must be only one CIC user configured with this domain account and the CIC user must have a client license enabled.

6. Click **Commit**.
7. In Interaction Administrator, verify that the Windows NT Domain user is configured correctly for the user.

## Configure the Lync client for RCC

To enable RCC, configure the Microsoft Lync client on each user's desktop.

1. Log on to Microsoft Lync client on the user's desktop.
2. From the **Tools** menu, click **Options**.
3. On the **Lync - Options** dialog, click **Phones**.
4. Under **Phone Integration**, select **Enable integration with your phone system**.
5. Click **Advanced** then select **Automatic Configuration**.
6. Click **OK**. Click **OK**.
7. Log out of the Microsoft Lync client, and then log back in.

If there is an error, a folder icon with an exclamation point appears. Refer to the Troubleshooting section for more information.

## RCC behavior during switchover

Switchover on Lync-enabled client workstations is supported. The supported switchover situations are:

- Hardware Load Balancing
- Network Load Balancing
- SIP Proxy

During the switchover, no phone calls routed through Customer Interactions Center can be activated through the Lync client. However, Lync to Lync calls can occur. The connectivity indicator will change appearance to indicate switchover is occurring. It will change to an icon of a phone with an x on it. The switchover connection is restored automatically, allowing phone calls as usual. The phone icon with an x on it will disappear.

If you encounter any issues with switchover, refer to the Troubleshooting section for more information.

For more information about switchover features and configuration, see the *Automated Switchover System Technical Reference* in the [PureConnect Documentation Library](#).

## Phone number normalization when using Lync RCC

For a CIC-only user, the IC server normalizes the phone numbers that a user dials from the phone or client. When a user is Lync-enabled, the Lync Server performs the phone number normalization. But, when a Lync user is enabled for RCC, the Lync Address Book Service does the normalization.

You should review your organization's normalization patterns, keeping in mind that all numbers dialed by the RCC-enabled users pass through the Address Book Server before being dialed. Your organization's normalization pattern is important when you consider how Lync hands off these dial strings to CIC. For more information about this process, see the following:

- <http://technet.microsoft.com/en-us/library/gg429711.aspx>
- <http://technet.microsoft.com/en-us/library/gg429691.aspx>

## Troubleshooting

### Lync Status Sync

If you uninstall SU 1 without uninstalling the whole application, the config file (`ininintegrationservice-w64r-1-0.exe.config`) will not be restored. Without the config file, the service fails to start. To fix this problem,

1. Go to **Add or remove programs in the Control Panel**.
2. Click **IC Integration to Microsoft Lync**.
3. Click **Repair**.



---

## RCC

If you saw an error indicator when you logged back in after configuring Microsoft Lync for RCC, follow these troubleshooting suggestions:

- You can use the Wireshark application to see if the traffic reaches the CIC server properly. If it does not reach the server, the problem is probably the routing in the Lync Server configuration or the user's Server URI.
- If CIC is receiving the SIP traffic, but rejecting the logon, try:
  - Restart RCCServer to refresh its Active Directory cache. Or, you can reload `RCCServerU.exe` using the `-reload` flag.
  - Verify that the TEL URI for the user matches a valid CIC station extension and that the station is not in use by another CIC user. If so, `Cs_StationInUseByAnotherUser` appears in the RCCServer log.
  - Verify that the CIC user account that corresponds to the Lync user has the domain account configured correctly. If not configured correctly, the account will not be found by RCCServer.
  - Verify that the CIC user account that corresponds to the Lync user has a valid CIC license applied and enabled. If not, `Cs_NoClientLicense` appears in the RCCServer log.
    - Check the RCCServer log for any other clues.
    - If the RCC connection periodically stops working, it could be that the port is not always being kept open. Create a 5060 listen port that stays open to send back messages.
    - If it appears that RCC is configured correctly and there is not an error icon in the Microsoft Lync client, verify that the preferred calling device is set up correctly for the user in the Lync client. If a call between Lync RCC and a Remote Station was active during a switchover and the call is disconnected by the Remote Station after the switchover, the RCC user's Lync Client remains "In a Call" status and the RCC phone remains connected to dead air after the call was disconnected. In this case, the CIC server loses control of the call and the Lync client thinks it still has a call. This problem condition is a limitation of the functionality in the eventuality of a switchover.  
The user has to take explicit steps to reset the Lync client status, depending on the Lync client version. Do one of the following:
      - Close the Lync call notification
- Log out of the Lync client, then log on again. If the Lync client lost control of the call but you still can use either the phone or CIC client to control the call, log out of the Lync client and log back in. Typically this behavior is due to the Lync Server losing its connection to RCC. Some Lync implementations do disconnect and reconnect every 8 hours.
- If the call is answered from the phone or CIC client, some of the Lync GUI controls are unavailable. This behavior is a limitation of the Lync 2013 client. Use the phone or CIC client to hold the call and then take the call off hold to enable these controls.

# Change log

Date	Changes
31-January-2013	Updated for CIC 4.0 SU 3. Added Microsoft certification, Lync presence sync content.
02-May-2013	<p>Added example of a CIC data source configuration in Interaction Administrator and corrected default port in the section "Configure the Data Source".</p> <p>Updated Copyright and Trademarks page for CIC 4.0 SU 4. Added a note about creating Dial Plan entries for calls to Lync-only users. Added a section about creating a contact list source.</p>
20-September-2013	<p>Added support for Lync Server 2013. Removed most references to Lync 2010 or specified that the integration supports both 2010 and 2013.</p> <p>In <a href="#">Configuring users for the integration</a>, added detail for enabling presence sync for the user in the <b>User Configuration</b> dialog box.</p> <p>In the XML configuration, added a note about configuring a user sync in both the XML file and in Interaction Administrator.</p> <p>Added a note to the Presence Integration Service installation section about how the install works if SU3 is already installed.</p> <p>Added note to "Endpoint Media Options" that Lync client is required for Lync-enabled CIC user/CIC client combination.</p> <p>Fixed an error in the \$staticRoute command line.</p> <p>Removed the section "Instant Message Conferencing" because it no longer applies.</p> <p>Clarified the first bullet under the "Instant Messaging" section.</p> <p>Clarified the endpoint requirements under the section "Auto Off-Hook."</p> <p>In the "Lync Requirements" section, specified that Lync client can be 32-bit or 64-bit.</p> <p>In the "Configure User Settings" section, split out the options for specifying the Microsoft Lync Settings information. Added a step to select the <b>Enable Presence Synchronization</b> check box.</p> <p>Moved section "Create a User with Access to Active Directory" earlier in the section.</p> <p>Changed name of sample file in "Lync Presence Integration Service XML Configuration", clarified ucmaApplD parameter value, and removed <code>scope=User/Qualifier=IC user name</code> from the <code>&lt;profile&gt;</code> parameter description. Added <b>IMOnly</b> as a UserType qualification value for the <code>&lt;qualification&gt;</code> parameter.</p>
08-October-2013	Removed leftover note from Trusted Application Server requirement.
23-October-2013	Corrected typo above CaaS Cloud Solution diagram.
04-March-2014	Added Microsoft contact center qualification to Certification section.
19-August-2014	Added steps for configuring compression on the Lync Server. Added the Introduction to presence synchronization.
29-August-2014	Added changes required in the transition to CIC 2015 R1, such as updates to product version numbers, system requirements, references to Genesys site URLs, and copyright and trademark information.
20-November-2014	Clarified XML file naming convention.
15-December-2014	Removed index. Reapplied template. Updated RCC section for 2015R2
19-January-2015	Updated copyright page for 2015 and cloud terminology.
25-February-2015	Removed reference to the Lync Presence Integration Service configuration file appearing on the Product Information page.
01-April-2015	Updated 2015 R2 references to R3. Reapplied template and updated copyright page. Replaced in-line graphics with text. Updated documentation to reflect the addition of two CIC client applications, Interaction Desktop and Interaction Connect.

18-May-2015	Added note in the section "Configure IC servers as IP/PSTN gateways" about Lync-only users placing outbound calls.
26-June-2015	Updated 2015 R3 references to R4. Added Create and verify DNS SRV records section.
10-September-2015	Updated prerequisites for activating presence synchronization.
16-September-2015	Updated 2015 R4 references to 2016 R1. Removed references to retired Interaction Client .NET Edition.
27-October-2015	Updated presence sync installer and web configuration app with new Interactive Intelligence branding. Replaced Lync 2010 client support with Skype for Business 2015. Added Skype for Business 2015 server support. Fixed typos related to TCP.
04-November-2015	Removed Lync Server 2010 support. Updated Lync mediation server configuration screenshots and steps to reflect Lync Server 2013 environment. Updated description of <b>LyncInteractionCorrelationTimeout</b> setting.
03-May-2018	Rebranded from Interactive Intelligence to Genesys, and from CaaS to PureConnect Cloud.

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