



SIP Trunking Configuration Guide

for

Microsoft Lync Server 2010 IP PBX

Version 1.2

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1 Audience

This document is intended for the SIP Trunk customer's technical staff and Microsoft Value Added Retailer (VAR) having installation and operational responsibilities.

2 Introduction

This Configuration Guide describes configuration steps for Cox SIP Trunking to a Microsoft Lync Server 2010 Standard Edition IP PBX. Cox SIP Trunking is a scalable and efficient IP trunking telecommunication solution for your business that provides all the traditional services such as Direct Inward Dialing, Hunting, Calling Name, Calling Number, Local/Long Distance and Cox network-based Business Continuity options, including:

- Burstable Trunk Capacity – Dynamically increases call capacity during peak busy periods so your customers never receive a busy signal.
- Call Forward Always – On the trunk group pilot number for all calls in case of an outage (flood, fire, power outage, etc.).
- Call Forward Not Reachable – On the trunk group pilot number that operates on a per-call contingency basis to forward the call to any PSTN number (e.g. call center or alternate office location) during temporary call completion impairments.
- Route Exhaustion – automatic reroute of trunk group calls to any PSTN phone number (i.e., a call center) if calls can't be completed to the PBX.
- Support for geo-redundant PBX deployments and automatic reroute of SIP Trunks to the backup customer data center.

All calls are routed over Cox's national fiber network with guaranteed Quality of Service (QoS); calls never traverse the Internet.

Cox National IP Backbone

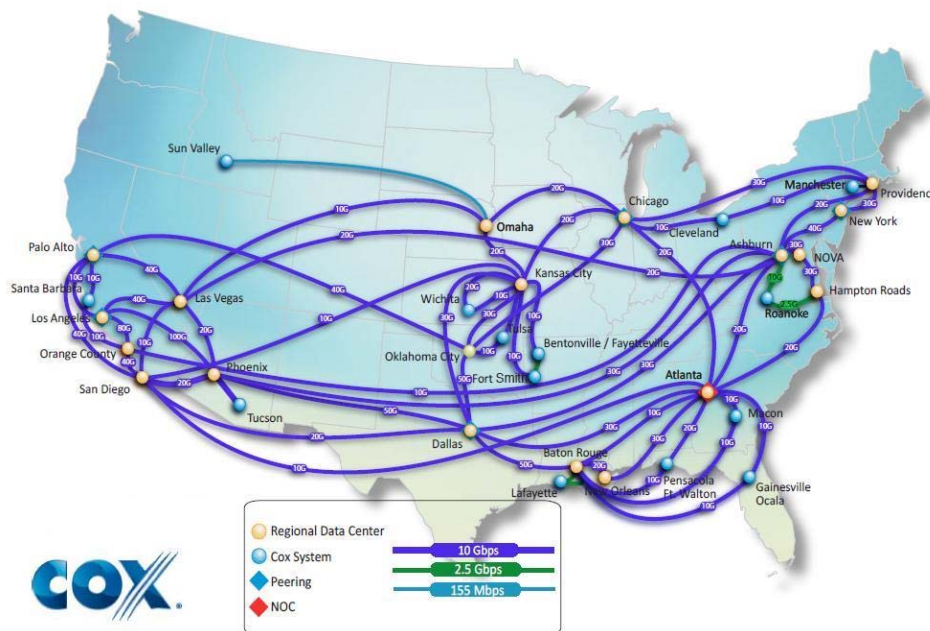


Figure 1 – Cox Fiber Network

3 Network Topology

The high level Cox SIP Trunk network architecture is depicted below. The key network elements are:

- IP PBX – Customer PBX for terminating SIP Trunks.
- Cox Enterprise Session Border Controller (E-SBC) – The E-SBC is a smart service demarcation device and SIP Application Layer Gateway (ALG) installed and managed by Cox.
- High Availability & Geo-Redundant (HAGR) Session Border Controllers and BroadSoft SIP Call Servers for maximum survivability and reliability.
- PSTN Gateway for connections to the Public Switched Telephone Network (PSTN).

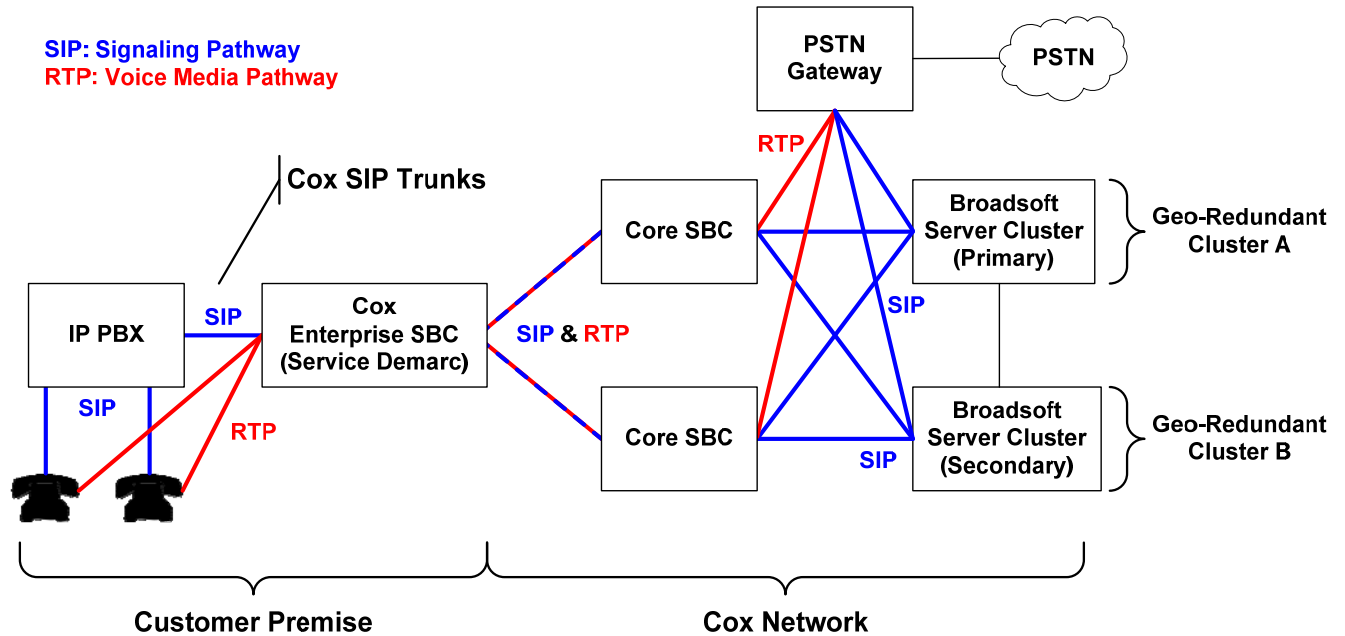


Figure 2 – Reference Network Architecture

This SIP Trunk network architecture is replicated across the Cox operating regions for scalability and operational autonomy.

Cox will deploy one or more Enterprise Session Border Controllers (E-SBCs) to meet call capacity, customer data center geo-redundancy and trunk group requirements. The E-SBC is owned and managed by Cox and is the service demarcation point. The E-SBC performs SIP ALG, SIP normalization, NAT, security, traffic shaping/prioritization, performance reporting and remote diagnostic functions.



4 Features Tested

4.1 SIP Trunk Supported Features

The following SIP Trunk capabilities and features are supported:

- Inbound and outbound calls
- G.711ulaw CODEC with 20 msec packetization rate
- Calling Party Number Presentation and Restriction
- DTMF translation to/from SIP signaling-based to RTP media-based (RFC 2833)
- End-to-end SIP Trunk voice Quality of Service (QoS)
- Burstable Trunk capacity
- Business Continuity: Trunk Group Route Exhaustion

4.2 Microsoft Lync Server 2010 Standard Edition Tested Features

The following Microsoft Lync IP PBX features were successfully tested with Cox SIP Trunking for calls that traverse the SIP Trunks:

- 3-Way Calling
- Auto-Attendant
- Authorization Codes
- Blind Call Transfer
- Call Forward Busy
- Call Forward No Answer
- Call Forward Always
- Call Hold
- Calling Line ID Blocking per Call
- Call Park
- Call Pickup
- Call Waiting
- Caller ID – Name and Number
- Call Intercept
- Consultative Call Transfer
- Customer defined Calling Line ID outside the Trunk Group DID range (“spoofing”)
- Caller ID – Blocked call to Off-net number
- Do Not Disturb
- Group ID Delivery
- Sequential Ring
- Simultaneous Hunt
- Voice Mail (DTMF digits)



4.3 Call Testing

The following call types and optional Cox network-based features were verified with Cox SIP Trunks:

- Account Codes (Network Based)
- Authorization Codes (Network Based)
- Auto Attendant (Network Based)
- Hunt Groups (Network Based)
- 211 – Community Information and Referral Services
- 311 – Non-Emergency Police and Other Governmental Services
- 411 – Local Directory Assistance
- 511 – Traffic and Transportation Information (US); Provision of Weather and Traveller Information Services (Canada)
- 611 – Repair Service
- 711 – Telecommunications Relay Service (TRS)
- 811 – One Call Services to Protect Pipeline and Utilities from Excavation Damage (US); Non-Urgent Health Triage Services (Canada)
- 911 – Emergency Services
- International Calls
- Long Distance – 10- and 11-Digit Dialing
- Local call – 7- and 10-Digit Dialing
- Premium Services 900/976
- Toll free 800/866/877/888
- Directory Assistance 7-, 10- and 11-Digit Dialing 1+(NPA)-555-1212
- 10-10 Dialing Around
- G.711 Fax and Modem

4.4 Features Not Supported

- G.729, G.726 CODECs
- T.38 Fax Relay

5 Caveats

New Acme 9200 HMR must be applied to the Microsoft Lync Server 2010 Standard Edition. This HMR is to resolved issue related to call “on hold” to off-net PSTN.

6 Lab Network Configuration

The lab network for the SIP Trunk reference configuration is illustrated in **Figure 3** and is representative of a Microsoft Lync Server 2010 Standard Edition deployment.

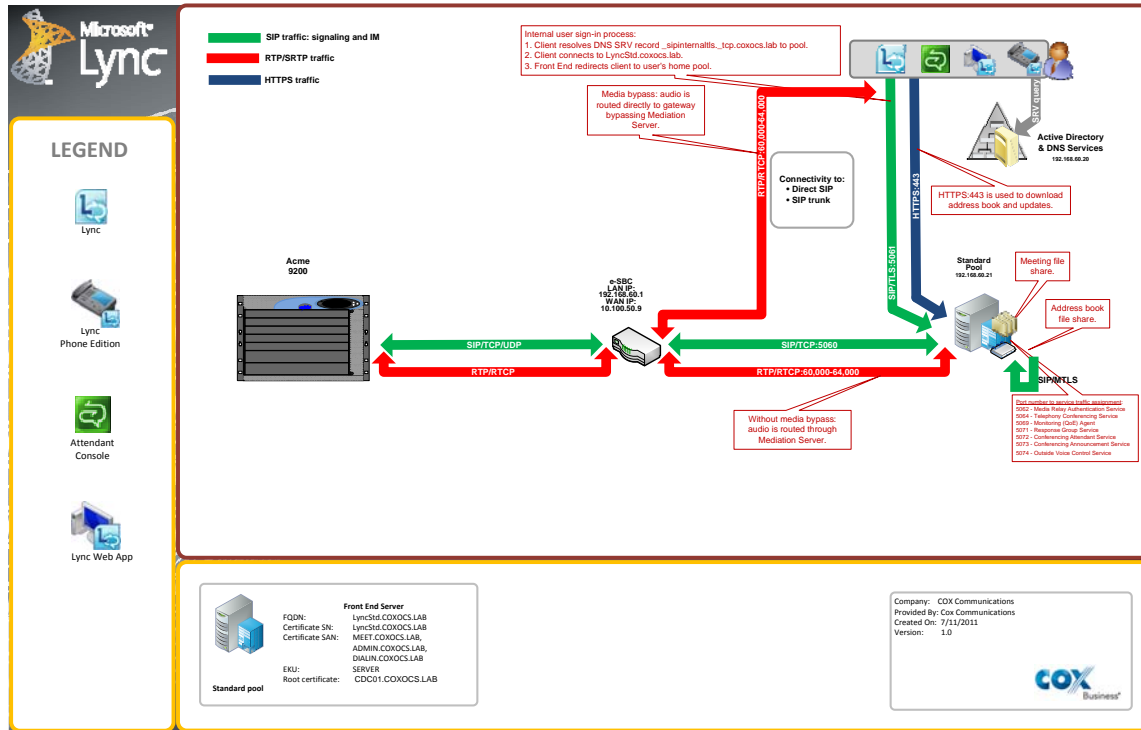


Figure 3 – SIP Trunk Lab Reference Network

6.1 Hardware Components

- Avaya s8800 Server for System Manager and Session Managers
- EdgeMarc E-SBC
- Acme Net-Net 9200 SBC

6.2 Software Requirements

- EdgeMarc E-SBC software release 9.12.5 or later
- Acme 9200 SBC release D7.1P6 or latest



7 Microsoft Lync Server 2010 Servers

Microsoft Lync Server 2010 delivers a fresh, intuitive user experience that brings together the different ways people communicate in a single interface. This unified experience facilitates rapid user adoption, while the ability to support a full range of communications from a single platform reduces both capital and operational costs. Microsoft Lync Server 2010 offers many features that are attractive to business users. Instant messaging (IM) with presence, Web Conferencing, and federation with business partners help users to efficiently conduct meetings without needing a formal conference facility. Edge services enable telecommuting by providing remote users, including business partners, access to meetings, messaging, and presence information.

Server Name	IP Address	Server Role
LYNCSTD.COXOCS.LAB	192.168.60.21/24	Consolidated Front-End Standard Edition
CDC01.COXOCS.LAB	192.168.60.20/24	Windows 2008 R2 Domain Controller
EdgeMarc E-SBC	192.168.60.1	Enterprise SBC

8 Microsoft Lync Server 2010 Infrastructure

Effective and efficient communication in an organization requires collaboration capabilities that facilitate real-time communication between individual users. COX uses the Lync Server 2010 platform to combine IM, enhanced presence, enterprise voice, conferencing, and e-mail into a familiar, integrated and unified communications experience.

Lync Server 2010 can provide presence, IM, and conferencing for organizations of literally any size, with up to 10,000 users per server, 100,000 users per pool, and an unlimited number of pools. Lync Server 2010 delivers a standalone voice offering to enhance or replace traditional PBX systems, and extends these capabilities outside the office via Internet access without requiring a VPN connection. This includes common calling features such as answer, forward, transfer, hold, divert, release, and park, along with Enhanced 9-1-1 calling for North America, and support for legacy devices and a broader range of IP and USB user devices from partners. The solution is designed to support high availability through Call Admission Control, branch office survivability*, and extended options for data resiliency. The new Lync Server Control Panel consolidates scenario-driven tasks in a single interface, while PowerShell support allows administrators to automate repetitive tasks using a familiar tool. Lync Server 2010 relies on Active Directory, eliminating the need for separate user and policy databases, and uses Role Based Access Control (RBAC) to allow the assignment of appropriate management roles and scopes to different administrators.

8.1 Microsoft Lync Server 2010 Software version

Microsoft Lync Server 2010, Administrative Tools	Microsoft Corporation	6/1/2011	2.29 MB	4.0.7577.108
Microsoft Lync Server 2010, Application Host	Microsoft Corporation	6/1/2011	386 KB	4.0.7577.0
Microsoft Lync Server 2010, Audio Test Service	Microsoft Corporation	6/1/2011	4.48 MB	4.0.7577.0
Microsoft Lync Server 2010, Bandwidth Policy Service	Microsoft Corporation	6/1/2011	1.73 MB	4.0.7577.0
Microsoft Lync Server 2010, Best Practices Analyzer	Microsoft Corporation	6/1/2011	1.39 MB	4.0.7577.118
Microsoft Lync Server 2010, Call Park Service	Microsoft Corporation	6/1/2011	1.42 MB	4.0.7577.0
Microsoft Lync Server 2010, Conferencing Announcement Service	Microsoft Corporation	6/1/2011	56.5 MB	4.0.7577.0
Microsoft Lync Server 2010, Conferencing Attendant	Microsoft Corporation	6/1/2011	42.6 MB	4.0.7577.0
Microsoft Lync Server 2010, Conferencing Server	Microsoft Corporation	6/1/2011	17.8 MB	4.0.7577.139
Microsoft Lync Server 2010, Core Components	Microsoft Corporation	6/1/2011	37.8 MB	4.0.7577.139
Microsoft Lync Server 2010, Core Management Server	Microsoft Corporation	6/1/2011	2.28 MB	4.0.7577.0
Microsoft Lync Server 2010, Front End Server	Microsoft Corporation	6/1/2011	53.9 MB	4.0.7577.139
Microsoft Lync Server 2010, Mediation Server	Microsoft Corporation	6/1/2011	2.56 MB	4.0.7577.139
Microsoft Lync Server 2010, Reach Fonts	Microsoft Corporation	6/1/2011	285 MB	4.0.7577.0
Microsoft Lync Server 2010, Resource Kit Tools	Microsoft Corporation	6/1/2011	17.9 MB	4.0.7577.0
Microsoft Lync Server 2010, Response Group Service	Microsoft Corporation	6/1/2011	5.70 MB	4.0.7577.0
Microsoft Lync Server 2010, Web Components Server	Microsoft Corporation	6/1/2011	154 MB	4.0.7577.139
Microsoft Lync Server 2010, Web Conferencing Server	Microsoft Corporation	6/1/2011	5.21 MB	4.0.7577.139
Microsoft Lync Server 2010, Web Scheduler	Microsoft Corporation	6/1/2011	3.51 MB	4.0.7577.0

Figure 4 – Microsoft Lync Server 2010 software services versions

8.2 Consolidated Front End Enterprise Edition

With Lync Server 2010 Standard Edition in the consolidated configuration, all the Lync server components such as A/V Conferencing Server, Web Conferencing Server, and Web Components Server are all installed on a single Windows 2008 R2 server.. The Front End Server is the core server role, and runs many basic Lync Server functions. A Front End pool is a set of Front End Servers configured identically, that work together to provide services for a common group of users.

Front End Server includes the following functionality:

- User authentication and registration
- Presence information and contact card exchange
- Address book services and distribution list expansion
- IM functionality, including multiparty IM conferences
- Web conferencing and application sharing (if deployed)
- Application hosting services, for both applications included with Lync Server (for example, Conferencing Attendant and Response Group application) and third-party applications
- Application services for application hosting and hosts applications (for example, Response Group application, and several others)

Additionally, the Lync server also runs the Central Management Server, which manages and deploys basic configuration data to all servers running Lync Server 2010. The Central Management Server also provides Lync Server Management Shell and file transfer capabilities.

8.3 A/V Conferencing Service

A/V Conferencing Service provides A/V conferencing functionality in the Lync Server deployment. It is collocated with Front End Server.

8.4 Mediation Server Service

Mediation Server is a necessary component for implementing Enterprise Voice and dial-in conferencing. Mediation Server translates signaling and, in some configurations, media between your internal Lync Server infrastructure and a public switched telephone network (PSTN) gateway, IP-PBX, or a Session



Initiation Protocol (SIP) trunk. For COX communications deployment we have collocated Mediation role on the Lync front end standard server.

9 DNS Entries for the Lync Server 2010

The following tables show the internal and external DNS records that are needed for Lync Server deployment. The DNS record must match the fully qualified domain name (FQDN) for the external interface(s) and that the certificate subject name or subject alternate name (SAN) match the FQDN. The client receives the proper DNS information for Audio/Video and Web Conferencing from in-band provisioning after contacting and authenticating to sip.advisory.com.

Table 1 – Internal DNS Records

Internal DNS record	Usage	Record type	Port	IP address
_sipinternaltls._tcp.coxocs.lab	Client auto-connect	SRV Record Resolved host: lyncstd.coxocs.lab	5061	n/a
lyncstd.coxocs.lab	Name-based service resolution	A Record lyncstd.coxocs.lab	n/a	192.168.60.21

10 Certificate Infrastructure Requirements

Lync server 2010 requires a public key infrastructure (PKI) to support TLS and mutual TLS (MTLS) connections. By default, Lync Server is configured to use TLS for client-to-server connections.

Lync server uses certificates for the following purposes:

- TLS connections between client and server
- MTLS connections between servers
- Federation using automatic DNS discovery of partners
- Remote user access for instant messaging (IM)
- External user access to A/V sessions, application sharing, and Web conferencing

For Lync server, the following common requirements apply:

- All server certificates must support server authorization (Server EKU).
- All server certificates must contain a CRL Distribution Point (CDP).
- Auto-enrollment is supported for internal Lync server servers.
- Auto-enrollment is not supported for Lync Edge Servers.



10.1 Certificates for Lync Server 2010

Internal Lync servers that require certificates include Enterprise Edition Front End Server, Group Chat Server and private interface of Edge Server. The following table shows high-level certificate requirements for internal Lync 2010 servers. Although an internal Enterprise certification authority (CA) is recommended for internal servers, you can also use a public CA.

Table 2 – Certificate for Enterprise Pool: Consolidated Server Topology

Server role	Certification Authority	Subject Name/ Common Name	Subject Alternate Name
Lync Front End Server All server roles (which are collocated)	cdc01.coxocs.lab	lyncstd.coxocs.lab	admin.coxocs.lab meet.coxocs.lab dialin.coxocs.lab

11 IIS Requirements for Enterprise Pool Servers

For each Enterprise pool, the Lync Server 2010 installer creates virtual directories in IIS for the following purposes:

- To enable users to download files from the Address Book Service
- To enable computer-based clients, such as Lync 2010, to obtain updates.
- To enable Web conferencing with Lync Web App.
- To enable users to download meeting content
- To enable unified communications (UC) devices to connect to Device Update Service and obtain updates
- To enable users to expand distribution groups
- To enable phone conferencing and pin access
- To enable response group features

The following table lists the URIs for the virtual directories for internal access and the file system resources to which they refer. The file system folders to which the virtual directories refer are described in Storage Requirements.

11.1 Virtual Directories for Internal Access

Table 3 – Virtual Directories for Internal Access

Feature	Virtual Directory URI	Purpose
Address Book Server	https://lyncstd.coxocs.lab/ABS/int/Handler	Locations of Address Book Server download files for internal users.
Client updates	https://lyncstd.coxocs.lab/AutoUpdate/Int	Location of update files for internal computer-based clients.
Conf	https://lyncstd.coxocs.lab/Conf/Int	Location of Web conferencing resources for internal users.
Meeting	https://lyncstd.coxocs.lab/etc/place/null	Location of meeting content location for internal users.
Group Expansion and Address Book Web Query service	https://lyncstd.coxocs.lab/GroupExpansion/int/service.asmx	Location of the Web service that enables group expansion for internal users. Also, the location

		of the Address Book Web Query service that provides global address list information to internal Communicator Mobile for Windows Mobile clients.
Phone Conferencing	https://lyncstd.coxocs.lab/PhoneConferencing/Int	Location of phone conferencing data for internal users.
Device updates	https://lyncstd.coxocs.lab/RequestHandler	Location of the Device Update Service Request Handler that enables internal UC devices to upload logs and check for updates.

11.2 Lync 2010 Deployment Summary

The deployment process for Enterprise Edition is described in the following table.

Table 4 – Lync Server 2010 Deployment Summary

Phase	Steps	Permissions
Install prerequisite software.	Manually install Windows Updates, and then install prerequisites for Lync 2010.	RTCUniversalServerAdmins group DomainAdmins group
Prepare AD DS.	Prepare the schema, forest, and domain for Lync Server 2010.	Member of Schema Admins group and Administrator rights on the schema master Member of EnterpriseAdmins group for the forest root domain Member of EnterpriseAdmins or DomainAdmins group
Prepare DNS.	Configure DNS A and SRV records.	DNS Admins group
Install Topology Builder	From the Lync Setup wizard, install Topology Builder.	Administrators group
Create a new Topology with a new Enterprise pool.	Using the Topology Builder, create a new topology with a pool name, file share, pstn gateways and backward compatibility with OCS 2007 R2. After creating the topology, publish it to Active Directory and save the file locally.	RTCUniversalServerAdmins group CSAdministrators DomainAdmins group
Deployment Wizard	Select Install or Update the Lync server System. This step will access AD to get the information regarding the topology and install and configure the settings for Lync	RTCUniversalServerAdmins and CSAdministrators

Configure the pool and applications.	Using the Lync Control Panel, configure settings that will apply to all servers in the pool, including voice, conference, client version and voice policies	RTCUniversalServerAdmins group CSAdministrators
Configure certificates for Lync server.	Request a mutual TLS (MTLS) certificate for Lync Server, and then assign the certificate to each server in the Enterprise pool by using both Setup and Internet Information Services (IIS) Manager.	Administrators group RTCUniversalServerAdmins group CSAdministrators
Start the services.	Confirm that AD DS replication has completed, and then start Lync server services.	RTCUniversalServerAdmins group CSAdministrators
Create and enable users.	Enable users for Lync using Lync Control Panel or via Power shell, so that they can connect to the server.	To create users, DomainAdmins group To enable users and configure user accounts for Lync Server, RTCUniversalServerAdmins group
Deploy clients.	Deploy the Lync clients that will connect to Lync Server 2010.	Administrators group

12 AD Users and Groups

Prep Forest creates the universal security groups that administrators need to be members of to administer servers and create and manage users of Lync Server. These universal security groups are created in the Users organizational unit (OU) and can be found using DSA.MSC. They are summarized as follows:

Table 5 – AD Users and Groups

Group	Purpose
RTCUniversalServerAdmins	Allows members to manage server and pool settings, including all server roles, global settings, and users.
RTCUniversalUserAdmins	Allows members to manage user settings and move users from one server or pool to another.
RTCUniversalReadOnlyAdmins	Allows members to read server, pool, and user settings.
RTCUniversalGlobalWriteGroup	Grants write access to global setting objects for Lync Server.
RTCUniversalGlobalReadOnlyGroup	Grants read-only access to global setting objects for Lync Server.
RTCUniversalUserReadOnlyGroup	Grants read-only access to Lync Server user settings.
RTCUniversalServerReadOnlyGroup	Grants read-only access to Lync Server settings. This group does not have access to pool level settings, only to settings specific to an individual server.



RTCHSUniversalServices	Includes service accounts used to run Front End Server and Standard Edition servers. This group allows servers read/write access to Lync Server global settings and Active Directory user objects.
RTCComponentUniversalServices	Includes service accounts used to run A/V Conferencing Servers, Web Services, Mediation Server, Archiving Server, and Monitoring Server.
RTCProxyUniversalServices	Includes service accounts used to run Lync Server Edge Servers.

13 Role-Based Access Control

To enable you to delegate administrative tasks while maintaining high standards for security, Microsoft Lync Server 2010 communications software introduces role-based access control (RBAC). With RBAC, administrative privilege is granted by assigning users to predefined administrative roles. Lync Server 2010 includes a rich set of built-in administrative roles, and you can assign user groups to these roles.

In RBAC, a role is a list of cmdlets defined by Lync Server, designed to be useful for a certain type of administrator or technician. A scope is the set of objects which the cmdlets defined in a role can operate on. The objects that scope affects can be either user accounts (grouped by organizational unit) or servers (grouped by site).

The following table lists the predefined roles in Lync Server 2010, and gives a general overview of the types of tasks each can do. The fourth column shows the similar Microsoft Exchange Server role for each Lync Server role, if there is one.

Table 6 – Predefined Rules

Role	Comments
CsAdministrator	Can perform all administrative tasks and modify all settings, including creating roles and assigning users to roles. Can expand a deployment by adding new sites, pools, and services.
CsUserAdministrator	Can enable and disable users for Lync Server, move users and assign existing policies to users. Cannot modify policies.
CsVoiceAdministrator	Can create, configure, and manage voice-related settings and policies.
CsServerAdministrator	Can manage, monitor, and troubleshoot servers and services. Can prevent new connections to servers, stop and start services, and apply software updates. Cannot make changes with global configuration impact.
CsViewOnlyAdministrator	Can view the deployment, including user and server information, in order to monitor deployment health.

CsHelpDesk	Can view the deployment, including user's properties and policies. Can run specific troubleshooting tasks. Cannot change user properties or policies, server configuration, or services.
CsArchivingAdministrator	Can modify archiving configuration and policies.
CsResponseGroupAdministrator	Can manage the configuration of the Response Group application within a site.
CsLocationAdministrator	Lowest level of rights for Enhanced 9-1-1 (E9-1-1) management, including creating E9-1-1 locations and network identifiers, and associating these with each other. This role is always assigned with a global scope.

14 Lync Server Storage Information

Lync server 2010 stores the data corresponding to its functions at various locations; the following table lists this information.

Table 7 – Lync Server Storage Information

Type of Data	Database Name/UNC	Location
Persistent user data (for example, access control lists (ACLs), contacts, Standard Edition server or Enterprise Edition Front End pool, scheduled conferences)	RTC	Enterprise Edition, back-end database
Transient user data (for example, endpoints and subscriptions, and transient conferencing state)	RTCDyn	Enterprise Edition, back-end database
Real-time communications (RTC) address book database is the SQL Server repository where Address Book service information is stored.	RTCab	Enterprise Edition, back-end database

<p>Real-time communications address book database is the SQL Server repository where Address Book service information is stored. (Secondary copy for performance).</p>	<p>RTCab1</p>	<p>Enterprise Edition, back-end database</p>
<p>Maintains the configuration of the current Lync Server 2010 topology, as defined and published by Topology Builder.</p>	<p>XDS</p>	<p>Enterprise Edition, back-end database. Replicated to FE, GC and Edge server.</p>
<p>Location Information service regarding databases. Used for E911 services.</p>	<p>LIS</p>	<p>Enterprise Edition, back-end database.</p>
<p>Dynamic information database for the Call Park application.</p>	<p>CPSDyn</p>	<p>Enterprise Edition, back-end database.</p>
<p>Lync Server Response Group service for the configuration of the services.</p>	<p>RGSConfig</p>	<p>Enterprise Edition, back-end database.</p>
<p>Response Group Service data for runtime operations.</p>	<p>RGSDyn</p>	<p>Enterprise Edition, back-end database.</p>

Address Book download files created by Address Book Server and downloaded by Lync 2010, Lync Phone Edition, and Lync Attendant clients	User-specified path	UNC	\\a05ocsfems01\LyncShare\1-WebServices-1\ABFiles\00000000-0000-0000-0000-000000000000\00000000-0000-0000-0000-000000000000
Meeting content (for example, Microsoft Office PowerPoint presentations, question and answer logs, polling, chat, and uploaded content)	User-specified path	UNC	\\a05ocsfems01\LyncShare\1-WebServices-1\MeetingContent
Meeting content metadata (XML data that describes the meeting content, such as date and time a PowerPoint presentation is uploaded)	User-specified path	UNC	\\a05ocsfems01\LyncShare\1-WebServices-1\MeetingMetaData
Meeting content compliance log (XML data that records content upload activities, along with the uploaded meeting content)	User-specified path	UNC	\\a05ocsfems01\LyncShare\1-WebServices-1\MeetingComplianceData
Application data files that are used internally by the application server component for the pool	User-specified path	UNC	\\a05ocsfems01\LyncShare\1-WebServices-1\CollabContent
Update files used by the client version control mechanism to update Lync clients and by the Device Update Service to update unified communications (UC) devices	User-specified path on Enterprise Edition.	UNC	\\a05ocsfems01\LyncShare\1-WebServices-1\DeviceUpdateStore



15 Lync Server 2010 Ports

Lync Server 2010 requires that specific ports on the firewall be open. Additionally, if Internet Protocol security (IPsec) is deployed in your organization, IPsec must be disabled over the range of ports used for the delivery of audio, video, and panorama video. The following table summarizes the ports and protocols used by Lync Servers and clients.

Table 8 – Lync Server 2010 Port Assignments

Server Role/Client	Default Port	Protocol	Comments
Lync Server Front-End service	5060	TCP	Optionally used by Standard Edition servers and Front End Servers for static routes to trusted services, such as remote call control servers.
Front-End service	5061	TCP(TLS)	Used by Standard Edition servers and Front End pools for all internal SIP communications between servers (MTLS), for SIP communications between Server and Client (TLS) and for SIP communications between Front End Servers and Mediation Servers (MTLS). Also used for communications with Monitoring Server.
Front-End service	444	HTTPS	Used for communication between the Focus (the Lync Server component that manages conference state) and the individual servers.
Lync Server Front-End service	135	DCOM and remote procedure call (RPC)	Used for DCOM based operations such as Moving Users, User Replicator Synchronization, and Address Book Synchronization.
Lync Server IM Conferencing service	5062	TCP	Used for incoming SIP requests for instant messaging (IM) conferencing.
Lync Server Web Conferencing service	8057	TCP (TLS)	Used to listen for Persistent Shared Object Model (PSOM) connections from client.
Web Conferencing Compatibility Service	8058	TCP (TLS)	Used to listen for Persistent Shared Object Model (PSOM) connections from the Live Meeting client and previous versions of Communicator.
Lync Server Audio/Video Conferencing service	5063	TCP	Used for incoming SIP requests for audio/video (A/V) conferencing.
Lync Server Audio/Video Conferencing service	57501-65335	TCP/UDP	Media port range used for video conferencing.

Web Compatibility service	80	HTTP	Used for communication from Front End Servers to the web farm FQDNs (the URLs used by IIS web components) when HTTPS is not used.
Lync Server Web Compatibility service	443	HTTPS	Used for communication from Front End Servers to the web farm FQDNs (the URLs used by IIS web components).
Lync Server Conferencing Attendant service (dial-in conferencing)	5064	TCP	Used for incoming SIP requests for dial-in conferencing.
Lync Server Conferencing Attendant service (dial-in conferencing)	5072	TCP	Used for incoming SIP requests for Microsoft Lync 2010 Attendant (dial in conferencing).
Lync Server Mediation service	5070	TCP	Used by the Mediation Server for incoming requests from the Front End Server to the Mediation Server.
Lync Server Mediation service	5067	TCP (TLS)	Used for incoming SIP requests from the PSTN gateway to the Mediation Server.
Lync Server Mediation service	5068	TCP	Used for incoming SIP requests from the PSTN gateway to the Mediation Server.
Lync Server Mediation service	5081	TCP	Used for outgoing SIP requests from the Mediation Server to the PSTN gateway.
Lync Server Mediation service	5082	TCP (TLS)	Used for outgoing SIP requests from the Mediation Server to the PSTN gateway.
Lync Server Application Sharing service	5065	TCP	Used for incoming SIP listening requests for application sharing.
Lync Server Application Sharing service	49152-65335	TCP	Media port range used for application sharing.
Lync Server Conferencing Announcement service	5073	TCP	Used for incoming SIP requests for the Lync Server Conferencing Announcement service (that is, for dial-in conferencing).
Lync Server Call Park service	5075	TCP	Used for incoming SIP requests for the Call Park application.

Audio Test service	5076	TCP	Used for incoming SIP requests for the Audio Test service.
Location Service	5066	TCP	Used for outbound Enhanced 9-1-1 (E9-1-1) gateway.
Lync Server Response Group service	5071	TCP	Used for incoming SIP requests for the Response Group application.
Lync Server Response Group service	8404	TCP (MTLS)	Used for incoming SIP requests for the Response Group application.
Lync Server Bandwidth Policy Service	5080	TCP	Used for call admission control by the Bandwidth Policy service for A/V Edge TURN traffic.
Lync Server Bandwidth Policy Service	448	TCP	Used for call admission control by the Lync Server Bandwidth Policy Service.
CMS Replication service	445	TCP	Used to push configuration data from the Central Management store to servers running Lync Server.
Various	49152-57500	TCP/UDP	Media port range used for audio conferencing on all internal servers. Used by all servers that terminate audio: Front End Servers (for Lync Server Conferencing Attendant service, Lync Server Conferencing Announcement service, and Lync Server Audio/Video Conferencing service), and Mediation Server.
Lync Server Front-End service	5060	TCP	Optionally used for static routes to trusted services, such as remote call control servers.
Lync Server Front-End service	5061	TCP	Used for internal communications between servers and for client connections.
Lync Server Mediation service	5070	TCP	Used by the Mediation Server for incoming requests from the Front End Server.
Lync Server Mediation service	5067	TCP (TLS)	Used for incoming SIP requests from the PSTN gateway.

Lync Server Mediation service	5068	TCP	Used for incoming SIP requests from the PSTN gateway.
Lync Server Mediation service	5070	TCP (MTLS)	Used for SIP requests from the Front End Servers.
Clients	67/68	DHCP	Used by Lync Server 2010 to find the Registrar FQDN (that is, if DNS SRV fails and manual settings are not configured).
Clients	443	TCP (TLS)	Used for client-to-server SIP traffic for external user access.
Clients	443	TCP (PSOM/TLS)	Used for external user access to web conferencing sessions.
Clients	443	TCP (STUN/MS TURN)	Used for external user access to A/V sessions and media (TCP)
Clients	3478	UDP (STUN/MS TURN)	Used for external user access to A/V sessions and media (TCP)
Clients	5061	TCP (MTLS)	Used for client-to-server SIP traffic for external user access.
Clients	6891-6901	TCP	Used for file transfer between Lync 2010 clients and previous clients (clients of Microsoft Office Communications Server 2007 R2, Microsoft Office Communications Server 2007, and Live Communications Server 2005).
Clients	1024-65535 *	TCP/UDP	Audio port range (minimum of 20 ports required)
Clients	1024-65535 *	TCP/UDP	Video port range (minimum of 20 ports required).
Clients	1024-65535 *	TCP	Peer-to-peer file transfer (for conferencing file transfer, clients use PSOM).
Clients	1024-65535 *	TCP	Application sharing.



16 Lync Server 2010 Pool Settings

LyncStd.coxocs.lab: Standard pool doesn't provide a mechanism for implementing high availability solution. Meeting state is preserved because a meeting is hosted by the pool, not by any single server. Multiple Front End Servers when deployed will also make it possible to take any given server offline for hardware or software updates with minimal service interruption. When the server goes down due to hardware or network failure, there will be an interruption in the experience of the clients that are using that server for IM, presence, and conferencing. Those clients will reconnect to resume the service.

Additionally, one Front End pool in the deployment also runs the Central Management Server, which manages and deploys basic configuration data to all servers running Lync Server 2010. The Central Management Server also provides Lync Server Management Shell and file transfer capabilities.

To install Lync Server pool:

1. Log on to the server with an account that is a member of the local administrators group.
2. Locate the installation media on your computer, and then double-click \Setup\amd64\Setup.exe.
 - If you are prompted to install the Microsoft Visual C++ 2008 distributable, click Yes.
3. On the Microsoft Lync Server 2010 Installation Location page, click OK. Change this path to another location or drive if you need to have the files installed to another location.(D:\)
4. On the End User License Agreement page, review the license terms, click I accept, and then click OK. This step is required before you can continue.
5. On the Microsoft Lync Server 2010 – Deployment Wizard page, click Install Topology Builder.
6. When the installation successfully completes, click Exit.
7. Start Topology Builder: Click Start, click All Programs, click Microsoft Lync Server 2010, and then click Lync Server Topology Builder.
8. In Topology Builder, select New Topology. You are prompted for a location and file name for saving the topology. Give the topology file a meaningful name and accept the default extension of .tbxml. Click OK.
9. Navigate to the location where you want to save the new topology XML file, enter a name for the file, and then click Save.
10. On the Define the primary domain page, enter the name of the primary SIP domain (COXOCS.LAB) for your organization, and then click Next.
11. On the Define the first site page, enter a name (ATLANTA-COX) and a description for the first site, and then click Next.
12. On the Specify site details page, enter the location information for the site, and then click Next.
13. On the New topology was successfully defined page, ensure the Open the New Front End Wizard when this wizard closes check box is selected, and then click Finish
14. In the Define New Front End Pool Wizard, on the Define the New Front End pool page, click Next.
15. On the Define the Front End pool FQDN page, enter a fully qualified domain name (FQDN) for the pool you are creating, click Enterprise Edition Front End Pool, and then click Next.
16. On the Define the computers in this pool page, enter a computer FQDN (Lyncstd.coxocs.lab) for the first Front End Server in the pool, and then click Add.
17. On the Select features page, select the check boxes for the features that you want on this Front End pool. Select all the check boxes, such as instant messaging (IM) and presence features, you would select the Conferencing check box to allow multiparty IM, but would not select the Dial-in (PSTN) conferencing, Enterprise Voice, or Call

- Admission Control check boxes, because they represent voice, video, and collaborative conferencing features.
- a. Conferencing – This selection enables a rich set of features including:
 - b. Instant messaging (IM) with more than two parties in an IM session
 - c. Conferencing, which includes document collaboration, application sharing, and desktop sharing
 - d. A/V conferencing, which enables users to have real-time audio/video (A/V) conferences without the need for external services such as the Live Meeting service or a third-party audio bridge
 - e. Dial-in (PSTN) conferencing - Allows users to join the audio portion of a Lync Server 2010 conference by using a public switched telephone network (PSTN) phone without requiring an audio conferencing provider.
 - f. Enterprise Voice - Enterprise Voice is the Voice over IP (VoIP) solution in Lync Server 2010 that allows users to make and receive phone calls. You would deploy this feature if you plan to use Lync Server 2010 for voice calls, voice mail, and other functions that use a hardware device or a software client.
 - g. Call admission control (CAC) – CAC determines, based on available network bandwidth, whether to allow real-time communications sessions such as voice or video calls to be established. If you have deployed only IM and presence, CAC is not needed because neither of these two features uses CAC.
18. On the Select collocated server roles page, you can choose between collocating the A/V Conferencing service and the Mediation Server on the Front End Server or to deploy one or both as stand-alone servers.
 19. Click Next. If you defined other role servers on the Associate server roles with this Front End pool page, separate role configuration wizard pages will open to allow you to configure the server roles.
 20. If you did not select additional server roles to configure and deploy, or when you have finished the configuration of the additional role servers, click Finish.
 21. Right-click the Lync Server 2010 node, and then click Publish Topology.
 22. On the Publish the topology page, click Next.
 23. On the Create databases page, select the databases you want to publish.
 24. On the Select Central Management Server page, select a Front End pool.
 25. Click Next to complete the publishing process.
 26. When the publish process has completed, click Finish.
 27. When the topology has been published successfully, you can begin installing a local replica of the Central Management store on each server running Lync Server 2010 in your topology
 28. On the Deployment Wizard page, click Install or Update Lync Server System.
 29. On the Lync Server 2010 page, next to Step1: Install Local Configuration Store, click Run.
 30. On the Local Server Configuration page, ensure that the Retrieve configuration automatically from the Central Management Store option is selected, and then click Next.
 31. When the local server configuration installation is complete, click Finish.
 32. To install the Lync Server 2010 components for the Front End Server, click Run next to Step 2: Setup or Remove Lync Server Components.
 33. On the Setup Lync Server Components page, click Next to set up components as defined in the published topology.
 34. The Executing Commands page displays a summary of commands and installation information as it proceeds. When finished, you can use the list to select a log to view, and then click View Log.
 35. When Lync Server components setup completes, click Finish.
 36. Log on to a server as a member of the Domain Admins group for the domain on which the delegated user will run Enable-CsTopology.



37. In the Lync Server Deployment Wizard, click Run next to Step 3: Request, Install or Assign Certificates.
38. On the Certificate Request page, click Next.
39. On the Delayed or Immediate Requests page, you can accept the default Send the request immediately to an online certification authority option by clicking Next. The internal CA with automatic online enrollment must be available if you select this option. If you choose the option to delay the request, you will be prompted for a name and location to save the certificate request file. The certificate request must be presented and processed by a CA either inside your organization, or by a public CA. You will then need to import the certificate response and assign it to the proper certificate role.
40. On the Certificate Request Summary page, review the information in the summary. If the information is correct, click Next. If you need to correct or modify a setting, click Back to the proper page to make the correction or modification.
41. On the Online Certificate Request Status page, review the information returned. You should note that the certificate was issued and installed into the local certificate store. If it is reported as having been issued and installed, but is not valid, ensure that the CA root certificate has been installed in the server's Trusted Root CA store. Refer to your CA documentation on how to retrieve a Trusted Root CA certificate. If you need to view the retrieved certificate, click View Certificate Details. By default, the check box for Assign the certificate to Lync Server certificate usages is checked. If you want to manually assign the certificate, clear the check box, and then click Finish.
42. On the Certificate Wizard page, verify that the Status of the certificate is "Assigned," and then click Close.
43. In the Lync Server Deployment Wizard, on the Lync Server 2010 page, click Run next to Step 4: Start Services.
44. On the Start Services page, click Next to start the Lync Server services on the server.
45. On the Executing Commands page, after all services have started successfully, click Finish.
46. Use the administrative account to log on to the computer where Lync Server Control Panel is installed.
47. Start Lync Server Control Panel, and then provide credentials, if prompted. Lync Server Control Panel displays deployment information.
48. In the left navigation bar, click Topology, and then confirm that the service status shows a computer with a green arrow and that a green check mark for replication status is next to each Lync Server server role that has been deployed and brought online.
49. In the left navigation bar, click Users, and then click Enable users.
50. On the New Lync Server User page, click Add.
51. To define search parameters for the objects you want to find, on the Select from Active Directory page, you can select Search, and then optionally click Add Filter. You can also select LDAP search and enter an LDAP expression to filter or limit the objects that will be returned. After you have decided on your Search options, click Find.
52. In the Search results pane, select all the objects for this search session, and then click OK.
53. On the New Lync Server User page, the object or objects you selected are in the Users display. In the Assign users to a pool list, select the server where the objects should be homed.
54. Following are a number of options for configuring the objects.
 - a. Generate user's SIP URI
 - b. Telephony
 - c. Line URI
 - d. Conferencing policy
 - e. Client version policy
 - f. PIN policy



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- g. External access policy
 - h. Archiving policy
 - i. Location policy
 - j. Client policy
55. For the purposes of testing the basic functionality, select the option you prefer for the Generate user's SIP URI setting (the other options in the configuration will use default settings), and then click Enable.
 56. A summary page is displayed that shows a check mark in the Enabled column to indicate that the objects are now ready for use. The SIP address column displays the address you need for the user sign-in configuration.
 57. Log one user on to a computer that is joined to the domain, and another user on to another computer in the domain.
 58. Install Microsoft Lync 2010 on each of the two client computers, and then verify that both users can sign in to Lync Server 2010 and can send instant messages to each other.

16.1 Standard Server Settings

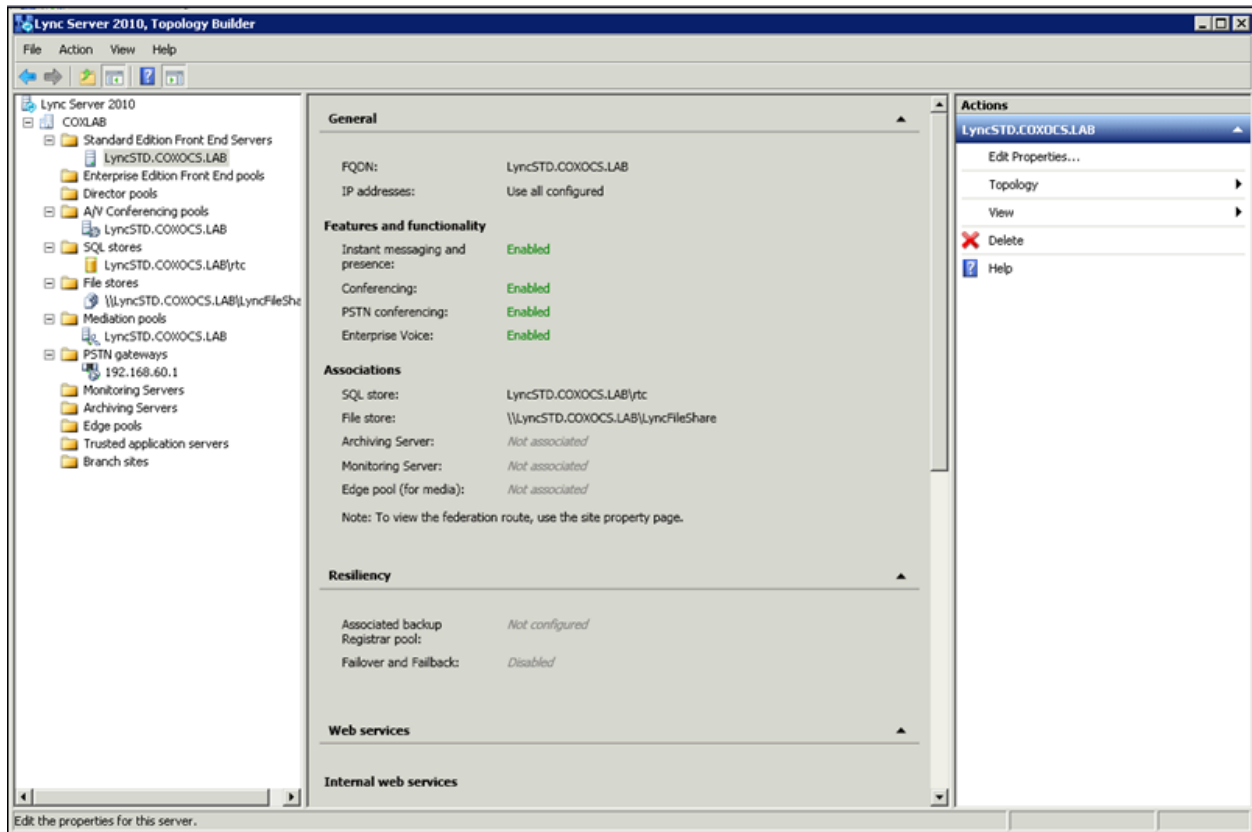


Figure 5 – Standard Server Settings (1 of 2)

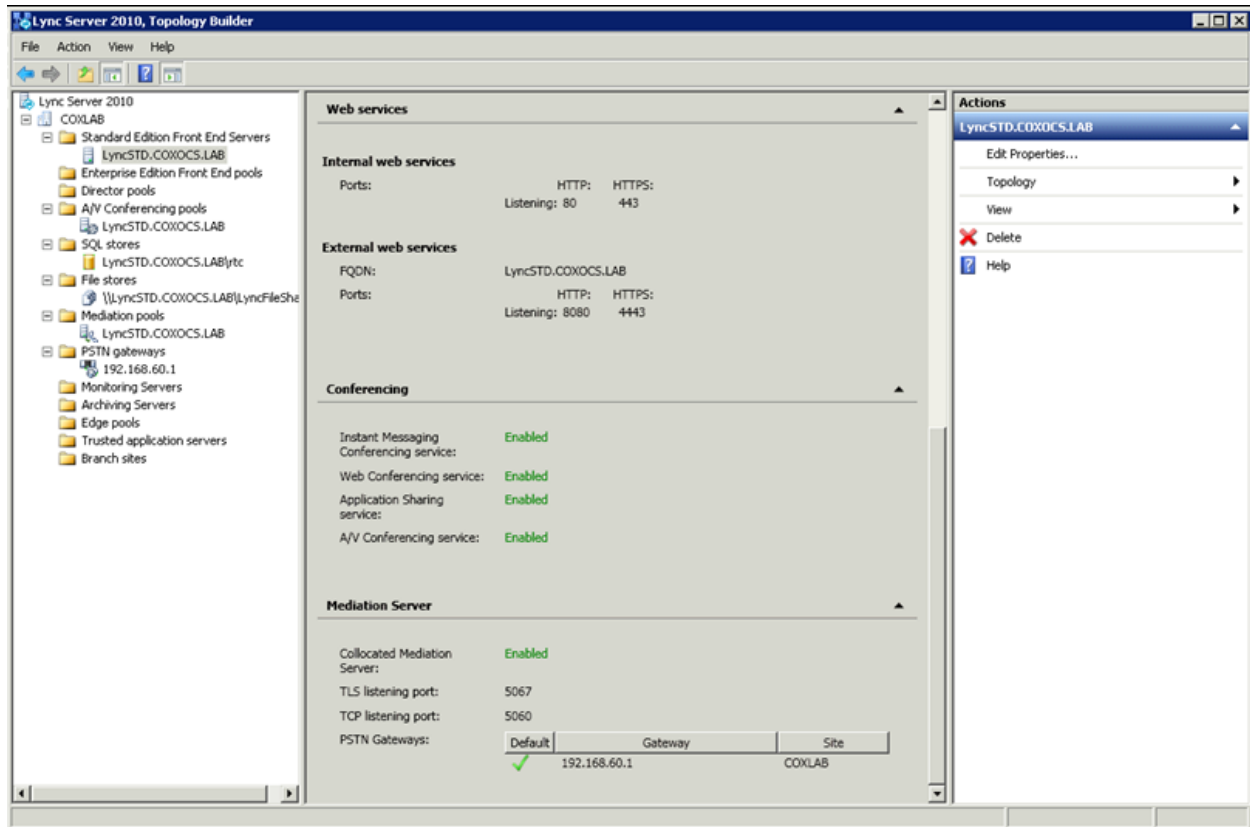


Figure 6 – Standard Server Settings (2 of 2)

Using Topology Builder you can modify the server configuration settings such as following:

Instant messaging (IM): This allows conference between two parties in an IM session.

Web Conferencing: This includes document collaboration, application sharing, and desktop sharing.

A/V conferencing: This enables users to have real-time audio/video (A/V) conferences without the need for external services such as the Live Meeting service or a third-party audio bridge

Dial-in (PSTN) conferencing: This allows users to join the audio portion of a Lync Server 2010 conference by using a public switched telephone network (PSTN) phone without requiring an audio conferencing provider.

Enterprise Voice: Enterprise Voice is the voice over IP (VoIP) solution in Lync Server 2010 that allows users to make and receive phone calls. You would deploy this feature if you plan to use Lync Server 2010 for voice calls, voice mail, and other functions that use a hardware device or a software client.

16.2 Lync Server Topology

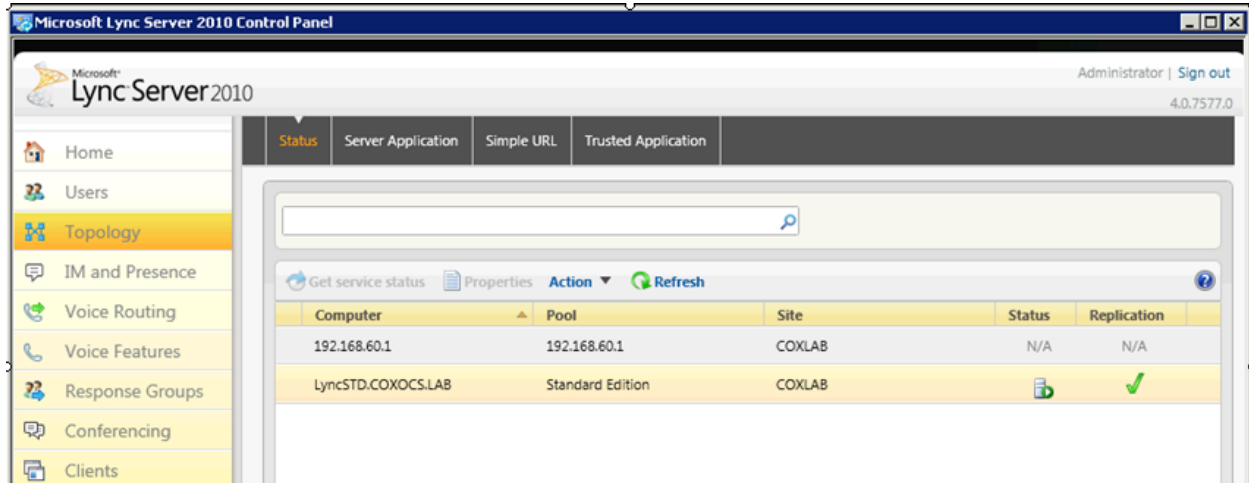


Figure 7 – Lync Server Topology

16.3 Mediation Server Settings

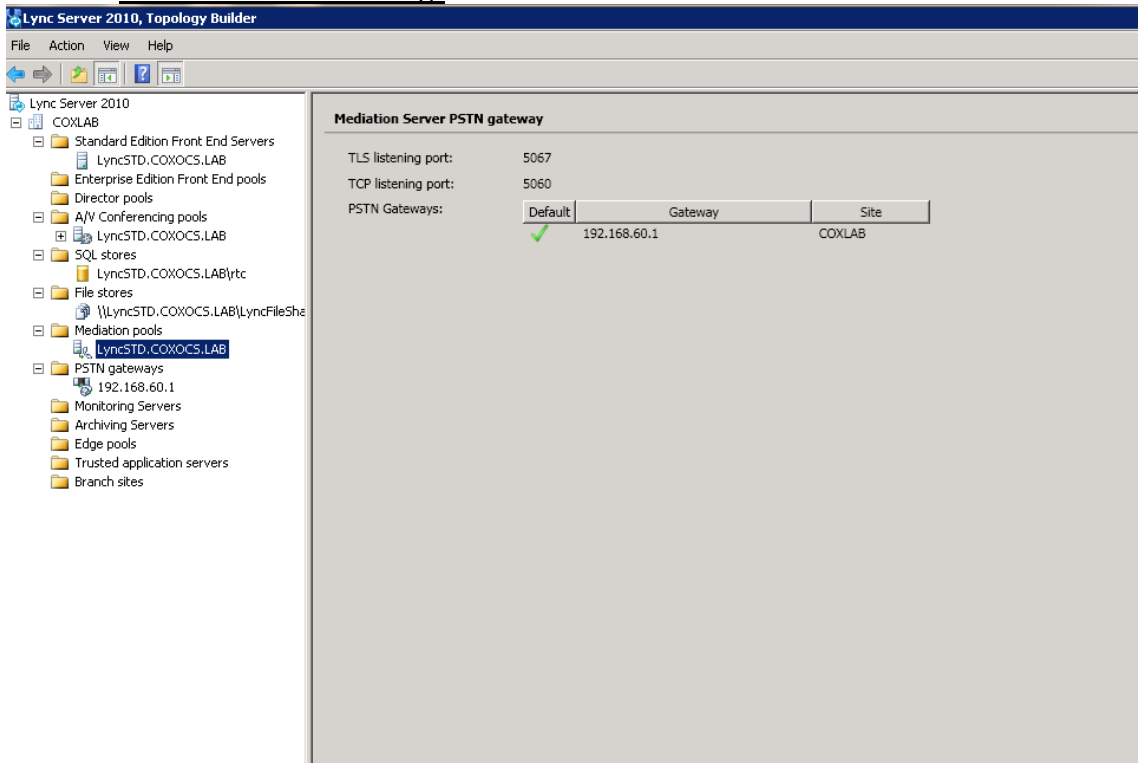


Figure 8 – Mediation Server Settings



Specify PSTN gateway: After selecting the option for collocation of Mediation Server option on the server roles page, you can define your planned PSTN gateways 192.168.60.1. In our case this is the IP Address of the EdgeMarc E-SBC.

To define a new PSTN gateway, click new next to the following gateways are associated with this mediation server.

In the Gateway FQDN or IP Address, type the FQDN or the IP address of the new gateway.

Confirm or modify the Listening port for IP/PSTN Gateway setting. The default is Port 5067.

For SIP Transport Protocol, select TCP or TLS, based on what your infrastructure and PSTN gateway requirements are. Not all PSTN gateways support Transport Layer Security (TLS). Check your gateway's documentation or contact the vendor to confirm what is supported. Transmission Control Protocol (TCP) is available, but TLS is the default setting, and is recommended for its ability to encrypt the traffic from gateway to Mediation Server.

If you have previously defined PSTN gateways, they will be listed in; the following gateways are not associated with any Mediation Server box. Click Add to associate them with this Mediation Server.

16.4 PSTN Gateway Settings

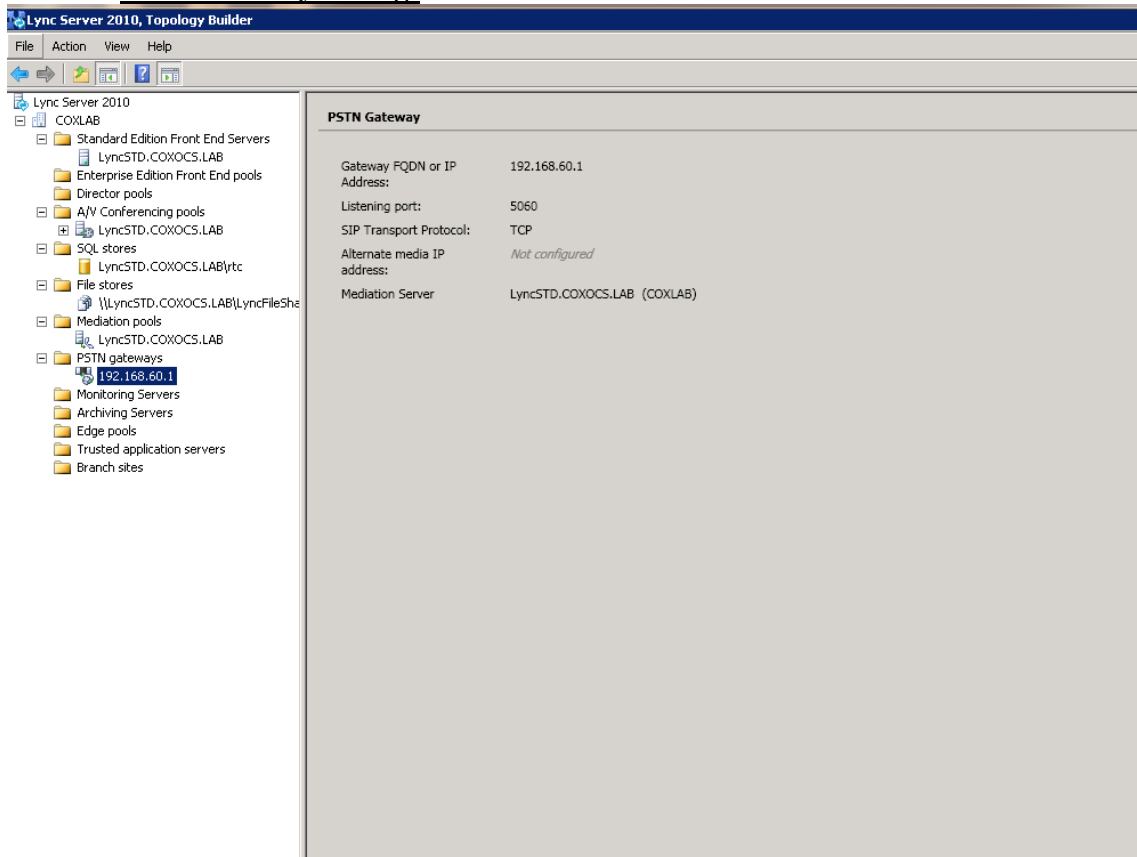


Figure 9 – PSTN Gateway Settings

16.5 Voice Routing - Trunk Configuration

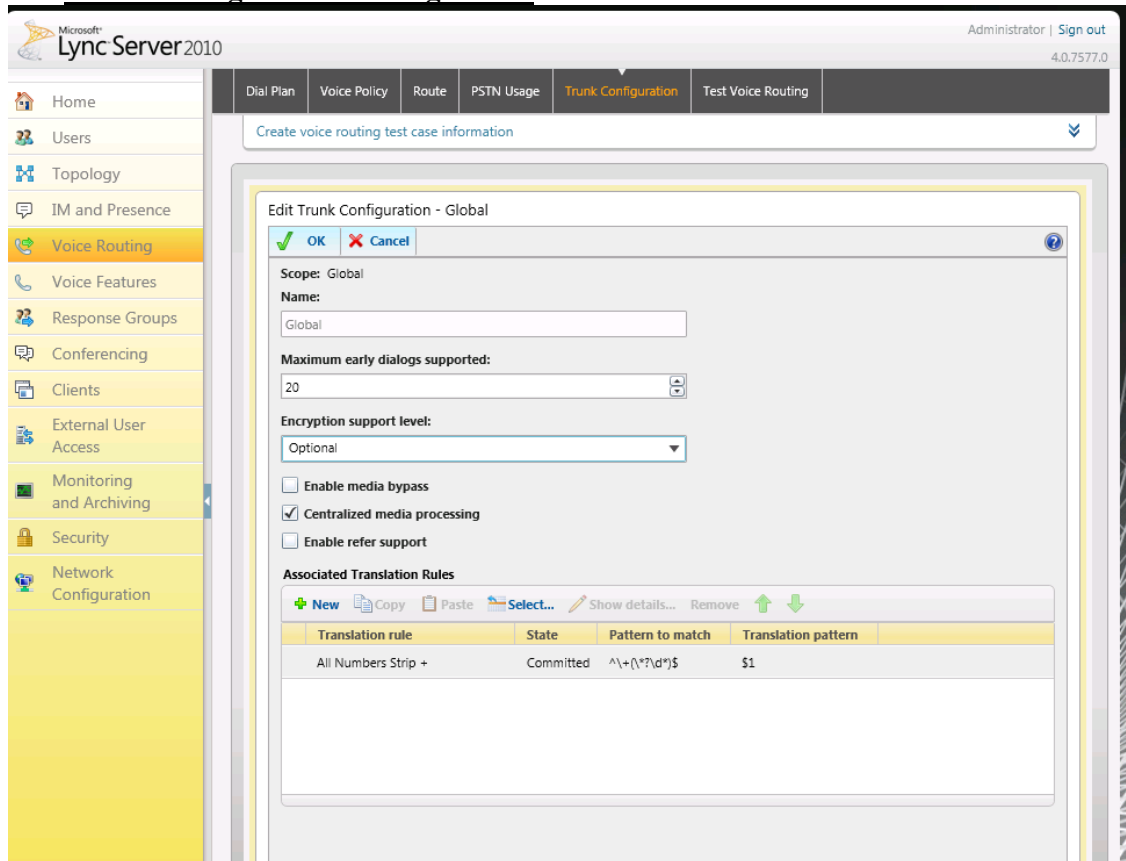


Figure 10 – Trunk Configuration

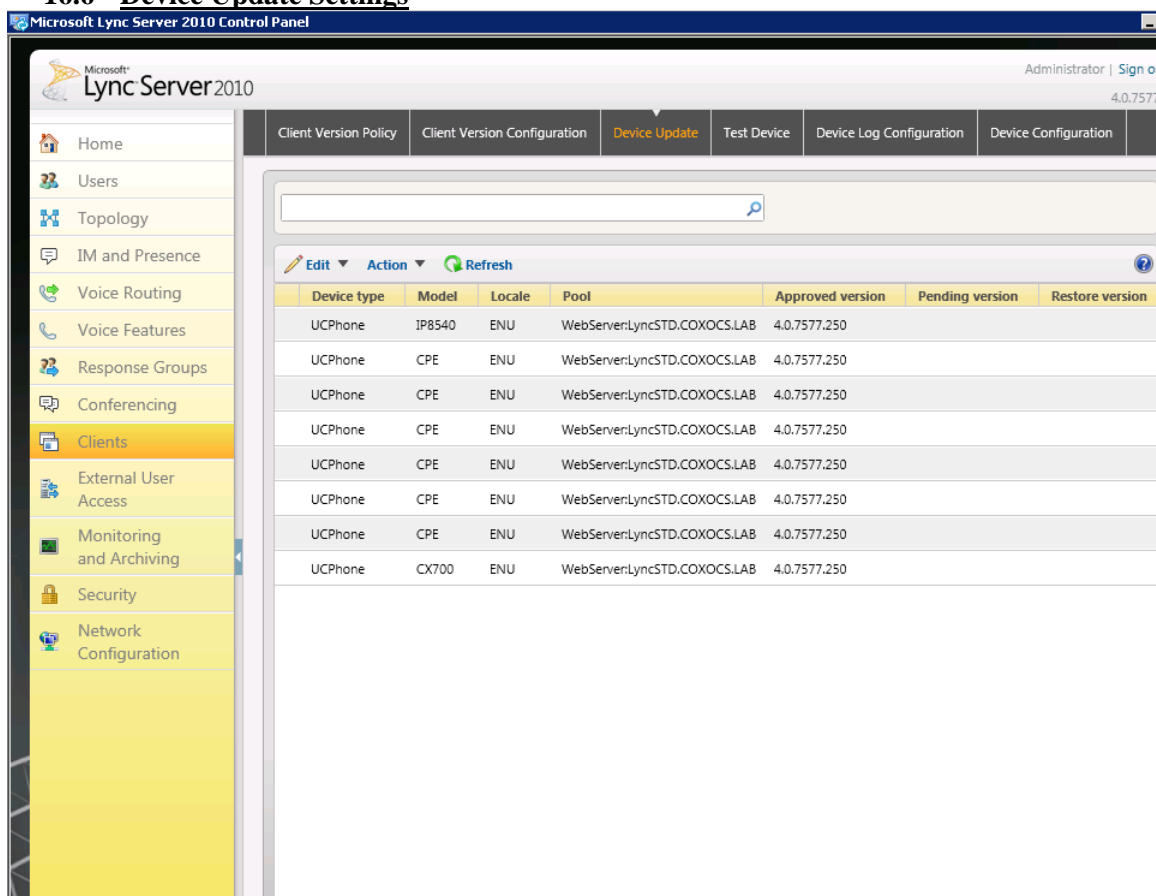
On the Trunk Configuration page, you can use one of the following methods to configure a trunk: Double-click an existing trunk (for example, the Global trunk) to display the Edit Trunk Configuration dialog box.

For creating new Trunk: Click new, and then select a scope for the new trunk:

- **Site trunk:** Choose the site for this trunk configuration from the Select a Site dialog box, and then click OK. Note that if a trunk has already been created for a site, the site does not appear in the Select a Site dialog box.
- **Pool trunk:** Choose the service for this trunk configuration (for example, a PSTN gateway at a specified site) from the Select a Service dialog box, and then click OK. Note that if a trunk has already been created for a service, the service does not appear in the Select a Service dialog box. Select one of the following Encryption support level options:
 - **Optional:** SRTP encryption will be used if the service provider or equipment manufacturer supports it.
 - **Not Supported:** SRTP encryption is not supported by the service provider or equipment manufacturer and therefore will not be used.
- Ensure the Enable media bypass check box is cleared.

- Select the Centralized media processing check box if there is a well-known media termination point (for example, a PSTN gateway where the media termination has the same IP as the signaling termination). Clear this check box if the trunk does not have a well-known media termination point.
- If the trunk peer supports receiving SIP REFER requests from the Mediation Server, select the **Enable refer support** check box. Clear the check box if the trunk peer does not support receiving SIP REFER requests from the Mediation Server.
- Ensure the trunk’s translation rules are arranged in the correct order. To change a rule’s position in the list, highlight the rule name and then click the up or down arrow. Here we have rule to remove + sign for the called numbers.

16.6 Device Update Settings



The screenshot shows the Microsoft Lync Server 2010 Control Panel. The 'Device Update' tab is active. The main content area displays a table with the following data:

Device type	Model	Locale	Pool	Approved version	Pending version	Restore version
UCPhone	IP8540	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CPE	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CPE	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CPE	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CPE	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CPE	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CPE	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		
UCPhone	CX700	ENU	WebServer:LyncSTD.COXOCS.LAB	4.0.7577.250		

Figure 11 – Device Update Settings

Microsoft Lync Server 2010 includes the Device Update Web service, which is automatically installed with Web Services. You can use this service to download updates from Microsoft, test them, and then deploy the updates to all the IP phones in your organization. You can also use Device Update Web service to roll back devices to previous software versions. We recommend that you check for updates every three months.

Testing and deploying updates Retrieve updates from Microsoft and upload them to Device Update Web service. Test, and then approve or reject, specific updates for deployment to your organization’s IP phones to make sure that all updates are valid and functional, instead of having to troubleshoot after deployment.

Rolling back an update Roll back a defective update and retain a tested prior update as the latest update. The device goes back to the backup tested update, which is always stored on the device as a backup.

Introducing new device models Make available all software updates relevant to a new model of an IP phone that is being introduced to the market.

Inventory management for devices in organizations Use the log files and audit information stored in the Device Updates folder to view the IP phones in your organization and information about them, such as the current firmware version.

16.7 Conference settings

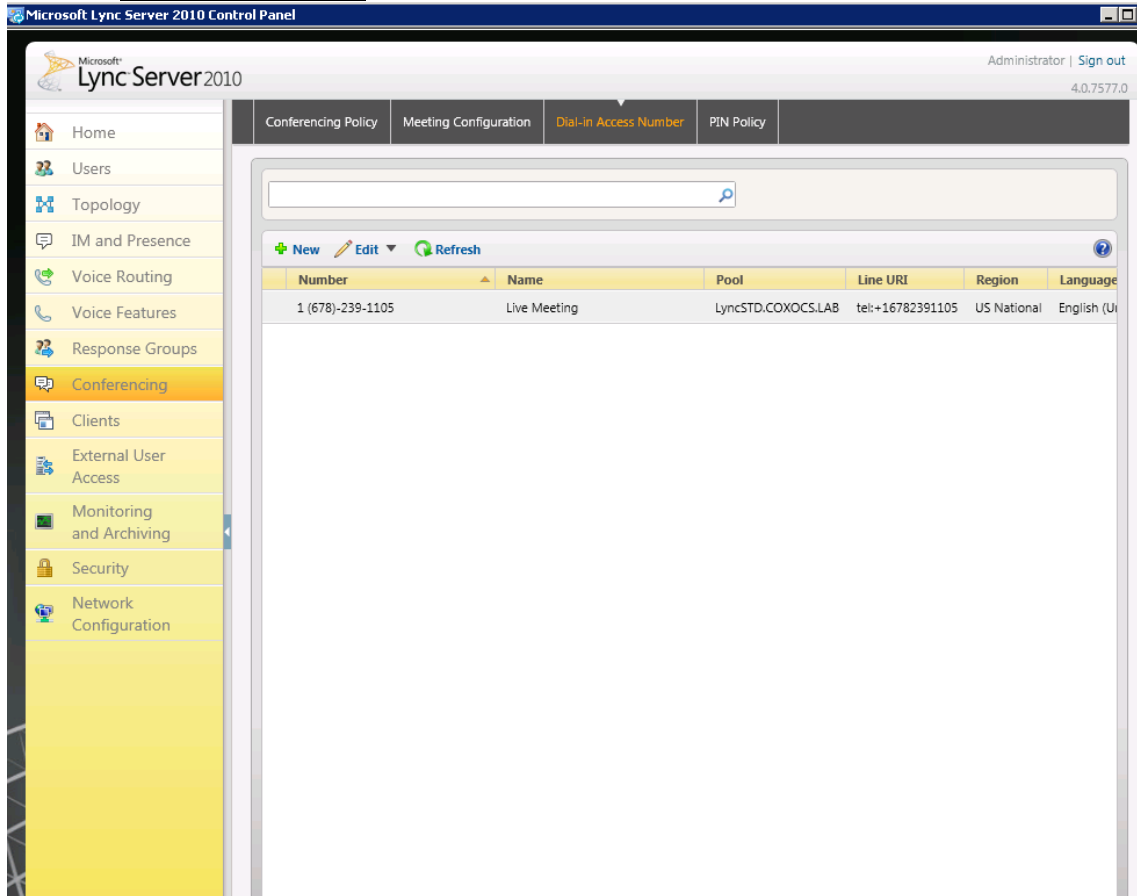


Figure 12 – Conference Settings

On the Dial-in Access Number page, you can do one of the following:

- **Click New** to open New Dial-in Access Number.
- Click one of the dial-in access numbers in the list, **click Edit**, and then click Show details.



- In Display number, type the phone number that public switched telephone network (PSTN) phone users dial to join a conference. In Display name, type a description for the dial-in access number. This is the name that is associated with the dial-in access number in Lync 2010 search results.
- In Line URI, type the E.164 number of the dial-in access number in TEL URI format, including the + symbol before the number and excluding spaces. For example, tel:+16782391105.
- In SIP URI, do the following:
 - In the text box, type a unique SIP URI for this dial-in conferencing access number. This SIP URI is displayed in various locations including, but not limited to, call notification messages and previous versions of Communicator clients.
 - In the drop-down list box, click the domain of the Conferencing Attendant application that supports this dial-in access number. In Pool, click the pool that is running the instance of Conferencing Attendant that supports this dial-in access number.
- In Primary language, click the language in which prompts are played for this dial-in access number.
- (Optional) In Secondary languages (maximum of four), click Add, select one or more additional languages that you want to support for callers to this dial-in access number, and then click OK.

16.8 Response Service Group

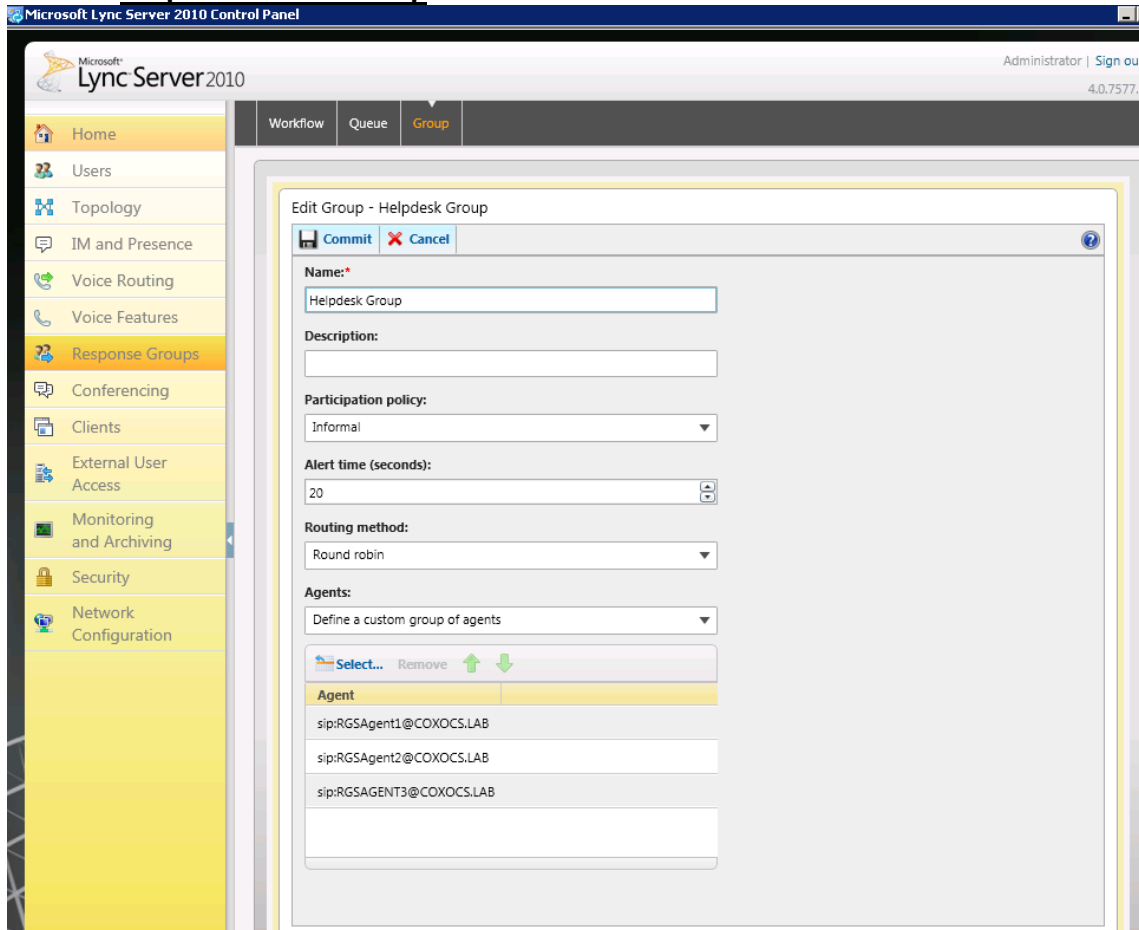


Figure 13 – Response Service Group Settings

If your organization has groups of people who answer and manage certain types of calls, such as for customer service, an internal help desk, or general telephone support for a department, you can deploy Response Group to manage these types of calls. So there for The Response Group application routes and queues incoming calls to designated persons, who are known as agents. You can increase the use of telephone support services and reduce the overhead of running these services by using Response Group.

When a caller calls a response group, the call is routed to an agent based on a hunt group or the caller's answers to interactive voice response (IVR) questions. The Response Group application uses standard response group routing methods to route the call to the next available agent. Call routing methods include serial, longest-idle, parallel, round robin, and the new Attendant routing, in which all agents are called at the same time for every incoming call, regardless of their current presence. If no agents are available, the call is held in a queue until an agent is available. While in the queue, the caller hears music until an available agent accepts the call. If the queue is full, or if the call times out while in the queue, the caller might hear a message and then is either disconnected or transferred to a different destination. When an agent accepts the call, the caller might or might not be able to see the agent's identity, depending on how the administrator configures the response group. Agents can either be formal, which means that they must sign in to the group before they can accept calls routed to the group, or informal, which means that they do not sign into and out of the group to accept calls.



When you assign users as response group agents, inform them that, if they have Privacy mode enabled, they need to search for "RGS Presence Watcher" contacts and add them to their Contacts list. Agents who have Privacy mode enabled but who do not have "RGS Presence Watcher" in their Contacts list cannot receive calls to the response group. Agents who do not have Privacy mode enabled are not affected.

- On the New or Edit Group page, in the Name field, type a descriptive name for the group.
- In Description, type a description for the group. In the Participation policy, select one of the following to set up the sign-in behavior for the group:
 - Select Informal** to specify that agents in the group do not need to sign in and out of the group. Agents are automatically signed in to the group when they sign in to Lync Server 2010.
 - Select Formal** to specify that agents in the group must sign in and out of the group. When you select this option, agents click a menu item in Lync 2010 to open Internet Explorer and display a webpage console for signing in and out of the group.

- **In Alert time** (seconds), specify the number of seconds to ring an agent before offering the call to the next available agent (the default is 20 seconds).

- In Routing method, select the method for routing calls to agents in the group as follows:

To offer a new call first to the agent who has been idle the longest (has had a presence of Available or Inactive in Lync Server the longest), click Longest idle.

To offer a new call to all available agents at the same time, click Parallel. The call is sent to the first agent who accepts it.

To offer a new call to each agent in turn, click Round robin.

To always offer a new call to the agents in the order in which they are listed in the Agent list, click Serial.

To offer a new call to all agents who are signed into Lync Server 2010 and the Response Group application at the same time, regardless of their current presence, click Attendant. Lync 2010 Attendant users who are configured as agents can see all the calls that are waiting and answer waiting calls in any order. The call is sent to the first agent who accepts it, and the other Lync 2010 Attendant users no longer see the call.

- In Agents, specify how you want to create your agents list:

To use a Microsoft Exchange Server distribution list, click Use an existing email distribution list, and then in Distribution list address, type the email address of the distribution list (for example, HelpDesk@CoxOcs.LAB).

If a distribution list was configured so that the membership is hidden and the Response Group administrator assigns the distribution list to the agent list, users can call the group to find out who the members are.

If a distribution list was configured so that it is hidden in the Exchange Global Address List, the Response Group administrator might be able to see the distribution list and assign it to the agent list if the Response Group process has the appropriate user rights and permissions, even if the administrator does not have the appropriate user rights and permissions.

To use a custom list of agents, click Define a custom group of agents. Click Select, and then in the Select Agents search field, type all or part of the name of the user you want to assign as an agent to this group, and then click Find. In the list of agents, select the user, and then click OK.

16.9 Call Park Settings

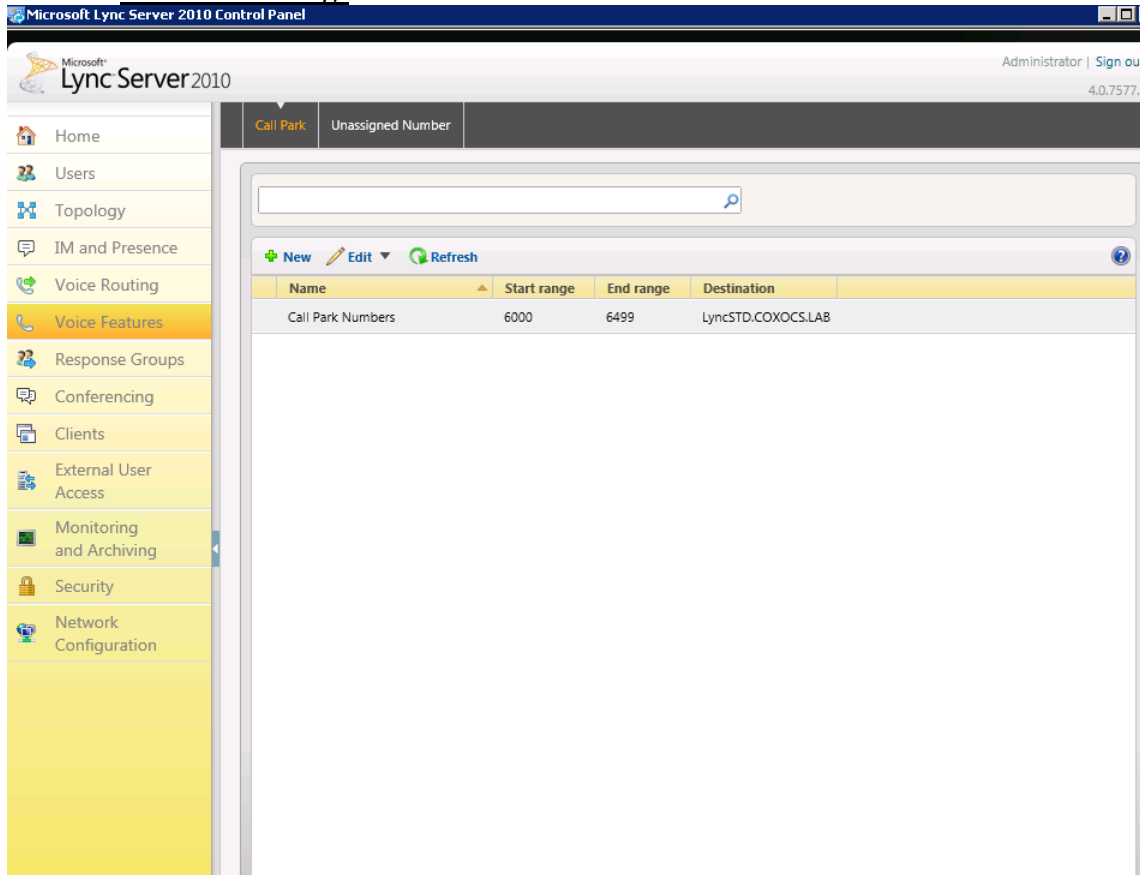


Figure 14 – Call Parking Settings

Call Park can be deployed if you want Enterprise Voice users to be able to do any of the following:

- Put a call on hold and then retrieve the call from the same or another phone.
- Put a call on hold to transfer it to a department or general area, for example, to a sales department or a warehouse where there is a common area phone.
- Put a call on hold and keep the original answering phone free for other calls.

When a user parks a call, Lync Server 2010 transfers the call to a temporary number, called an orbit, where the call is held until it is retrieved or it times out. Lync Server sends the orbit to the user who parked the call. To retrieve the parked call, the user can dial the orbit number or click the orbit link or button in the Conversation window.

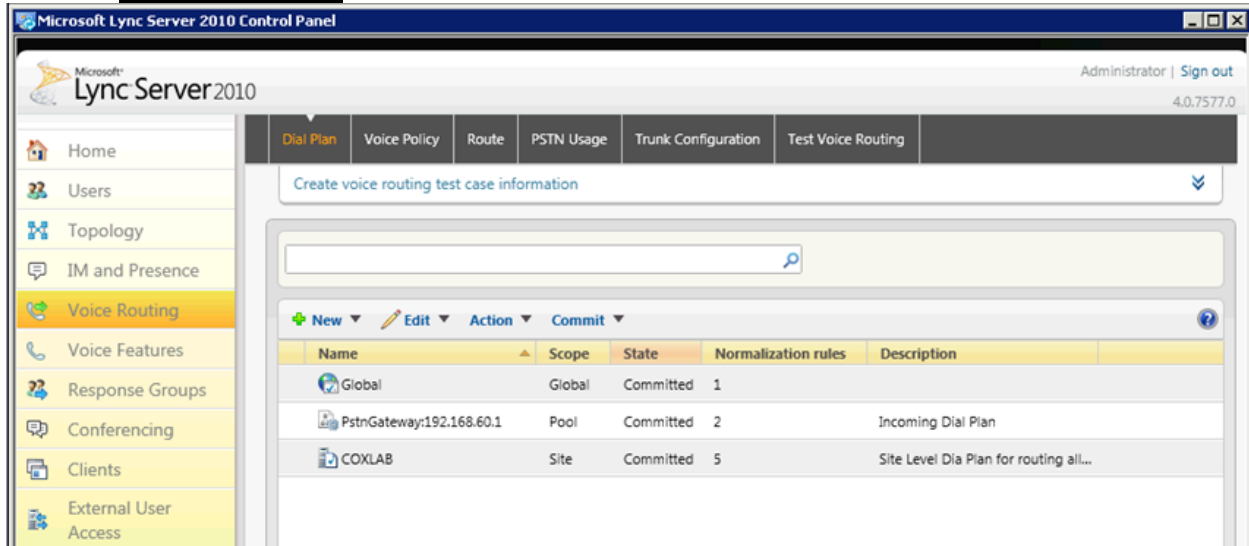
The user who parked a call can notify someone to retrieve the call by using an external mechanism, such as instant messaging (IM) or a paging system, to communicate the orbit number to someone else. The user who parked the call can leave the Conversation window open to receive notification when the call is retrieved.



Because orbit ranges are globally unique, it is possible to retrieve calls from any Lync Server site or PBX phone if routing is configured appropriately. If no one retrieves the call within a configurable amount of time, the call rings back to the person who parked it. If that person does not answer the ring-back, the call is transferred to a fallback destination, such as to an operator, if so configured. You can configure the number of times the call rings back before being transferred from one to ten times. If no one answers a transferred call, the call is disconnected. The orbit is freed when the call is retrieved or disconnected.

When you deploy Call Park, you need to reserve ranges of extension numbers (orbits) for parking calls. These extensions need to be virtual extensions: extensions that have no user or phone assigned to them. You then configure the call park orbit table with the orbit ranges and specify which Application service hosts the Call Park application that handles each range. Each Front End pool has a Call Park table on the corresponding Back End Server that is used to manage calls that are parked on the pool. The list of orbit ranges is stored in Central Management store and is used to route orbits to the destination pool. Each Lync Server 2010 pool where the Call Park application is deployed and configured can have one or more orbit ranges. Orbit ranges must be globally unique across the Lync Server 2010 deployment.

16.10 Dial Plan Settings



Microsoft Lync Server 2010 Control Panel

Administrator | Sign out
4.0.7577.0

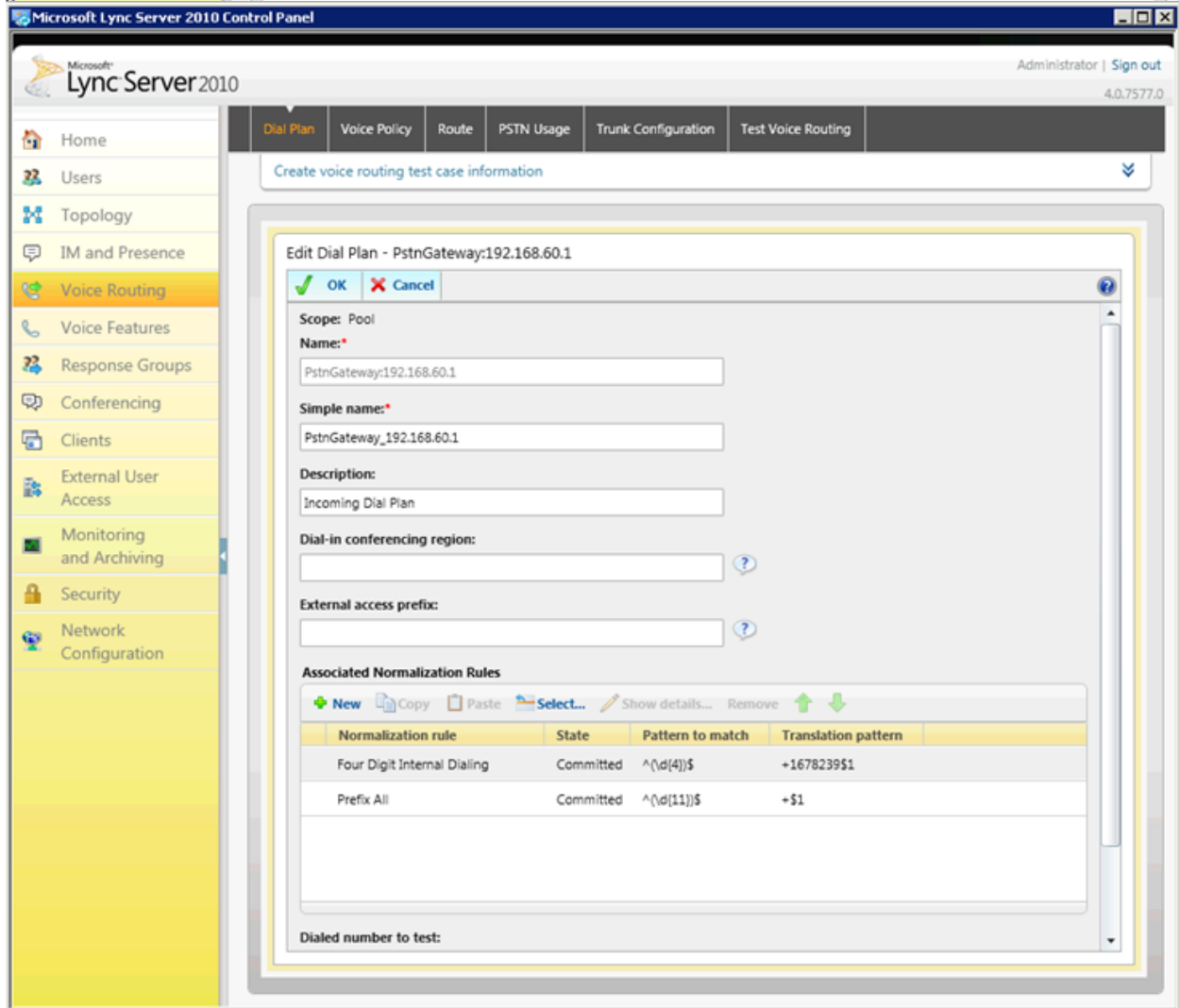
Home Users Topology IM and Presence **Voice Routing** Voice Features Response Groups Conferencing Clients External User Access

Dial Plan Voice Policy Route PSTN Usage Trunk Configuration Test Voice Routing

Create voice routing test case information

+ New Edit Action Commit

Name	Scope	State	Normalization rules	Description
Global	Global	Committed	1	
PstnGateway:192.168.60.1	Pool	Committed	2	Incoming Dial Plan
COXLAB	Site	Committed	5	Site Level Dia Plan for routing all...



Microsoft Lync Server 2010 Control Panel

Administrator | Sign out
4.0.7577.0

Home Users Topology IM and Presence **Voice Routing** Voice Features Response Groups Conferencing Clients External User Access Monitoring and Archiving Security Network Configuration

Dial Plan Voice Policy Route PSTN Usage Trunk Configuration Test Voice Routing

Create voice routing test case information

Edit Dial Plan - PstnGateway:192.168.60.1

OK Cancel

Scope: Pool

Name: PstnGateway:192.168.60.1

Simple name: PstnGateway_192.168.60.1

Description: Incoming Dial Plan

Dial-in conferencing region:

External access prefix:

Associated Normalization Rules

+ New Copy Paste Select... Show details... Remove

Normalization rule	State	Pattern to match	Translation pattern
Four Digit Internal Dialing	Committed	^\d{4}\$	+1678239\$1
Prefix All	Committed	^\d{11}\$	+\$1

Dialed number to test:

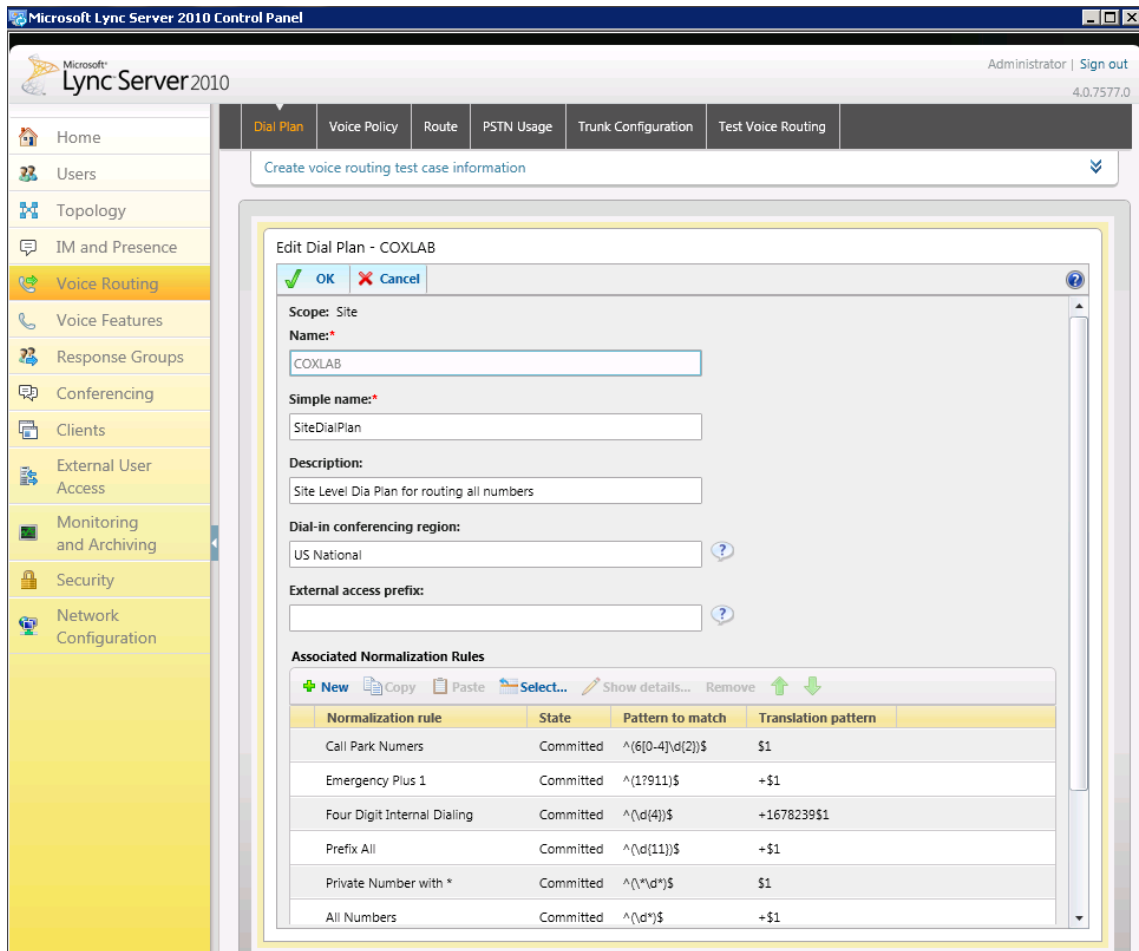


Figure 15 – Dial Plan Settings

A dial plan is a named set of normalization rules that translates phone numbers for a named location, individual user, or contact object into a single standard (E.164) format for purposes of phone authorization and call routing.

Normalization rules define how phone numbers expressed in various formats are to be routed for each specified location, user, or contact object. The same dial string may be interpreted and translated differently depending on the location from which it is dialed and the person or Contact object making the call.

On the Dial Plan page, click New and select a scope for the dial plan:

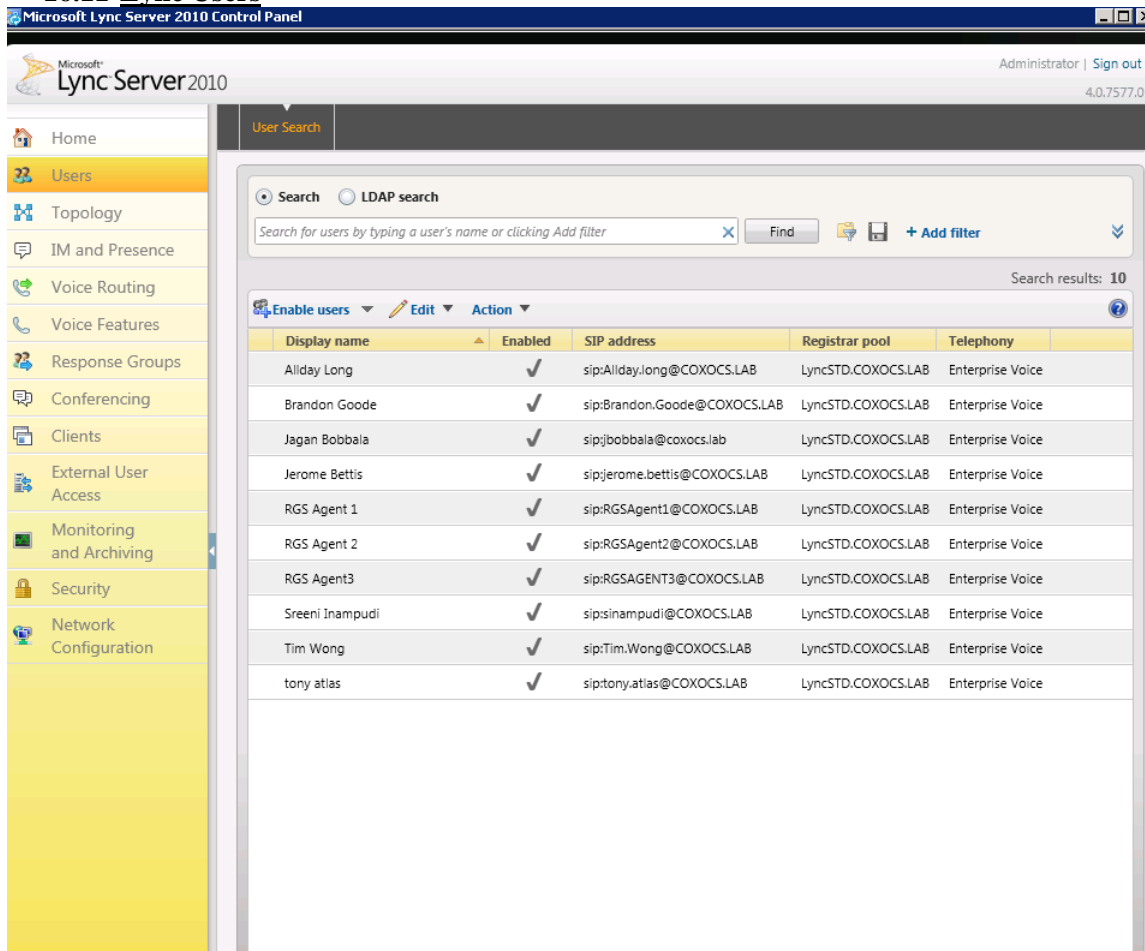
- **Site dial plan** applies to an entire site, except any users or groups that are assigned to a user dial plan. If you select Site for a dial plan’s scope, you must choose the site from the Select a Site dialog box. If a dial plan has already been created for a site, the site does not appear in the Select a Site dialog box.
- **Pool dial plan** can apply to a public switched telephone network (PSTN) gateway or a Registrar. If you select Pool for a dial plan’s scope, choose the PSTN gateway or Registrar from the Select a



Service dialog box. If a dial plan has already been created for a service (PSTN gateway or Registrar), the service does not appear in the list.

- User dial plan can be applied to specified users or groups. After you select the dial plan scope, it cannot be changed.
- If you are creating a user dial plan, enter a descriptive name in the Name field on the New Dial Plan dialog box. After this name is saved, it cannot be changed.
- The Simple name field is pre-populated with the same name that appears in the Name field. You can optionally edit this field to specify a more descriptive name that reflects the site, service, or user to which the dial plan applies.
- (Optional) In the Description field, you can type additional descriptive information about the dial plan.
- (Optional) If you want to use this dial plan as a region for dial-in access numbers, specify a Dial-in conferencing region. If you do not want to use this dial plan for dial-in access numbers, leave this field empty.
- Verify that the dial plan's normalization rules are arranged in the correct order. To change a rule's position in the list, highlight the rule name and then click the up or down arrow.
- Lync Server traverses the normalization rule list from the top down and uses the first rule that matches the dialed number. If you configure a dial plan so that a dialed number can match more than one normalization rule, make sure the more restrictive rules are sorted above the less restrictive ones.
- The default Prefix All normalization rule $^{\backslash d\{11\}}\$$ matches any 11-digit number. For example, if you add a normalization rule that matches 11-digit numbers that start with 1678, make sure that Prefix All is sorted below the more restrictive $^{\{1678\}d\{7\}}\$$ rule.
- (Optional) Enter a number to test the dial plan and then click Go. The test results are displayed under Enter a number to test.
- Click OK. On the Dial Plan page, click Commit, and then click Commit all.

16.11 Lync Users



The screenshot shows the Microsoft Lync Server 2010 Control Panel. The left navigation pane includes: Home, Users, Topology, IM and Presence, Voice Routing, Voice Features, Response Groups, Conferencing, Clients, External User Access, Monitoring and Archiving, Security, and Network Configuration. The main area is titled 'User Search' and shows search results for 10 users. The search criteria are: Search, LDAP search, Search for users by typing a user's name or clicking Add filter, Find, Add filter. The search results table is as follows:

Display name	Enabled	SIP address	Registrar pool	Telephony
Allday Long	✓	sip:Allday.long@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
Brandon Goode	✓	sip:Brandon.Goode@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
Jagan Bobbala	✓	sip:jagobballa@coxocs.lab	LyncSTD.COXOCS.LAB	Enterprise Voice
Jerome Bettis	✓	sip:jerome.bettis@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
RGS Agent 1	✓	sip:RGSAGENT1@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
RGS Agent 2	✓	sip:RGSAGENT2@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
RGS Agent3	✓	sip:RGSAGENT3@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
Sreeni Inampudi	✓	sip:sinampudi@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
Tim Wong	✓	sip:Tim.Wong@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice
tony atlas	✓	sip:tony.atlas@COXOCS.LAB	LyncSTD.COXOCS.LAB	Enterprise Voice

Figure 16 – Lync Server Users

You can use the results of a search query to configure users for Microsoft Lync Server 2010. You can search for users by display name, first name, last name, Security Accounts Manager (SAM) account name, SIP address, or line Uniform Resource Identifier (URI).

You can search for users by using the Lync Server Control Panel or the Active Directory Users and Computers snap-in. The following procedure describes how to use Lync Server Control Panel.

Open a browser window, and then enter the Admin URL (<https://admin.coxocs.lab>) to open the Lync Server Control Panel. In the left navigation bar, click Users.

In the Search users box, type all or the first portion of the display name, first name, last name, SAM account name, SIP address, or line URI of the user account that you want to search for, and then click Find. Click the expand arrow button in the upper-right corner of the screen above Search results, and then click Add Filter. Enter the user property by typing it or clicking the arrow in the drop-down list to select a user property. In the Equal to list, click Equal to or Not equal to.

In the text box, type the search criteria you want to use to filter search results, and then click Find.

The search results appear under Search Results. You can select any or all of the users in the list and perform configuration tasks on the users you select.

16.12 Lync Welcome Screen

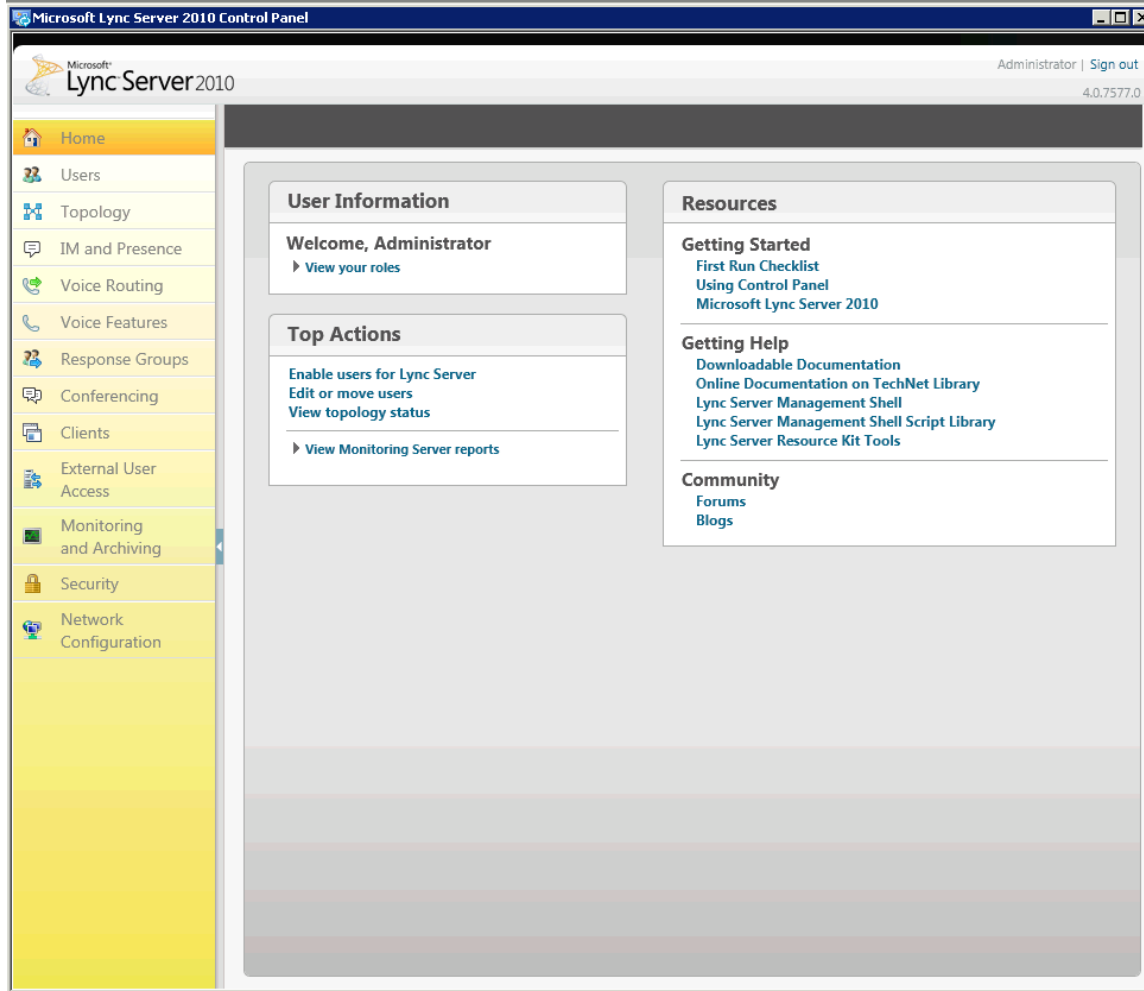


Figure 17 – Lync Welcome Screen

In Microsoft Lync Server 2010, the web-based Microsoft Lync Server 2010 Control Panel replaces the Microsoft Management Console (MMC) interface from previous versions. Lync Server 2010 Control Panel provides you with a graphical user interface (GUI) to manage the configuration of the servers running Lync Server 2010, in addition to the users, clients, and devices in your organization. Lync Server 2010 Control Panel uses Lync Server Management Shell as the underlying mechanism to perform Lync Server configuration.

Lync Server 2010 Control Panel is automatically installed on every Lync Server 2010 Front End Server or Standard Edition server. You can also install Lync Server 2010 Control Panel on another computer, such as a management console from which you want to centrally manage Lync Server. To configure settings using Lync Server 2010 Control Panel, you must be logged in using an account that is assigned to the CsAdministrator role

16.13 Lync New User

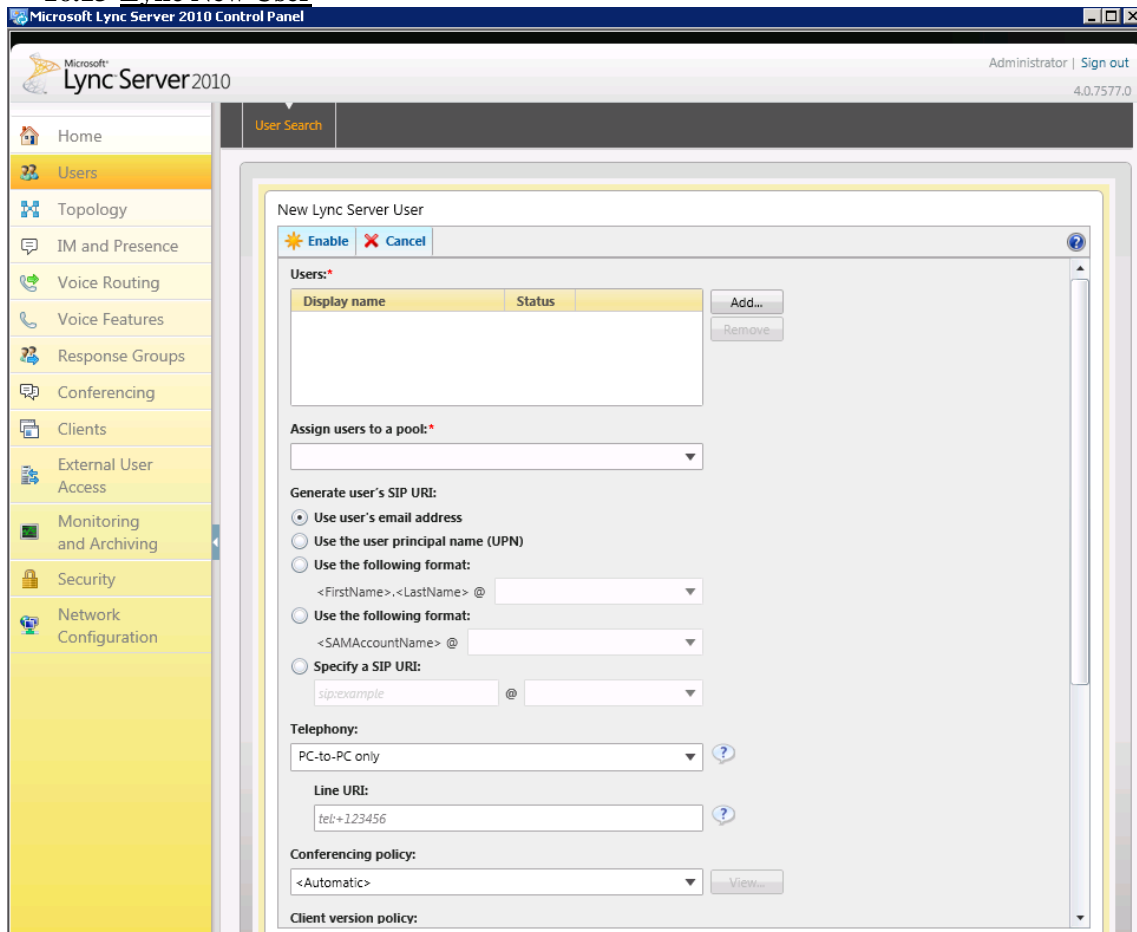


Figure 18 – Lync New User

From a user account that is assigned to the CsUserAdministrator role or the CsAdministrator role, log on to any computer in your internal deployment.

Open a browser window, and then enter the Admin URL (<https://admin.coxocs.lab>) to open the Lync Server Control Panel. For details about the different methods you can use to start Lync Server Control Panel, see Open Lync Server Administrative Tools.

In the left navigation bar, click Users.

- Click Enable users.
- On the New Lync Server User dialog, click Add.
- In the Search users box, type all or the first portion of the name, display name, first name, last name, Security Accounts Manager (SAM) account name, or phone number of the Active Directory user account that you want, and then click Find.
- In the table, select the account you want to add to Lync Server 2010, and then click OK.

- Assign the user to a pool, specify any additional details, and assign the policies to the user you want, and then click Enable.

16.14 Lync Services

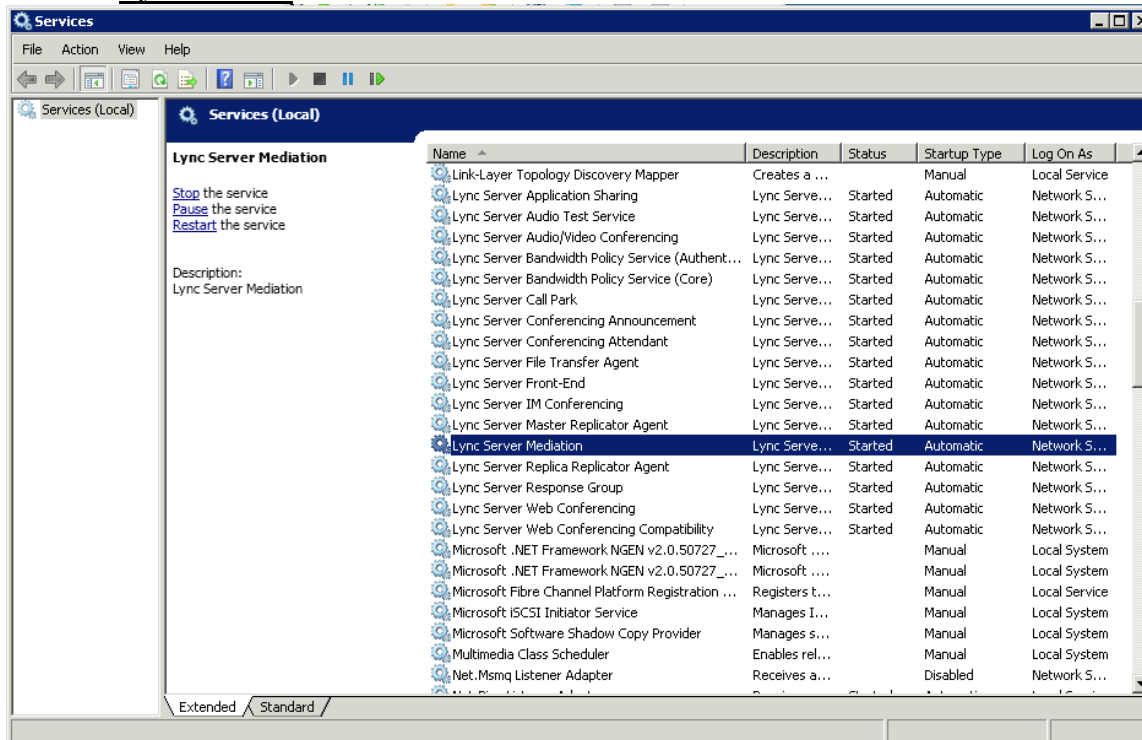


Figure 19 – Lync Server Services

By opening the services MMC console you can monitor the functioning of the Lync server's services.

17 Microsoft Lync Server 2010 Patches installed

Updates that are released for Lync Server 2010

- Update for Administrative Tools
[2467771](#) Description of the update package for Lync Server 2010, Administrative Tools: January 2011
- Update for Core Components
[2500444](#) Description of the cumulative update for Lync Server 2010, Core Components: April 2011
- Update for Conferencing Server
[2514975](#) Description of the cumulative update for Lync Server 2010, Conferencing Server: April 2011
- Update for Web Components Server
[2500441](#) Description of the update package for Lync Server 2010, Web Components Server: April 2011
- Update for Standard/Enterprise edition Server
[2500442](#) Description of the update for Lync Server 2010: April 2011
- Update for Web Conferencing Server

[2530592](#) Description of the cumulative update for Lync Server 2010, Web Conferencing Server: April 2011

- Update for Mediation Server
[2502810](#) Description of the cumulative update for Lync Server 2010, Mediation Server: April 2011

Note Do not apply this update to your Mediation Servers if you use Interoute as your SIP trunk provider. There is an issue with Options handling by Interoute that will lead to voice call failure. If you have installed this hotfix and you use Interoute as your SIP trunk provider, you must uninstall this update from your Mediation Servers.

- Update for Unified Communications Managed API 3.0 Runtime
[2500448](#) Description of the cumulative update for Lync Server 2010, Unified Communications Managed API 3.0 Runtime: April 2011

18 Logging Tools for Troubleshooting

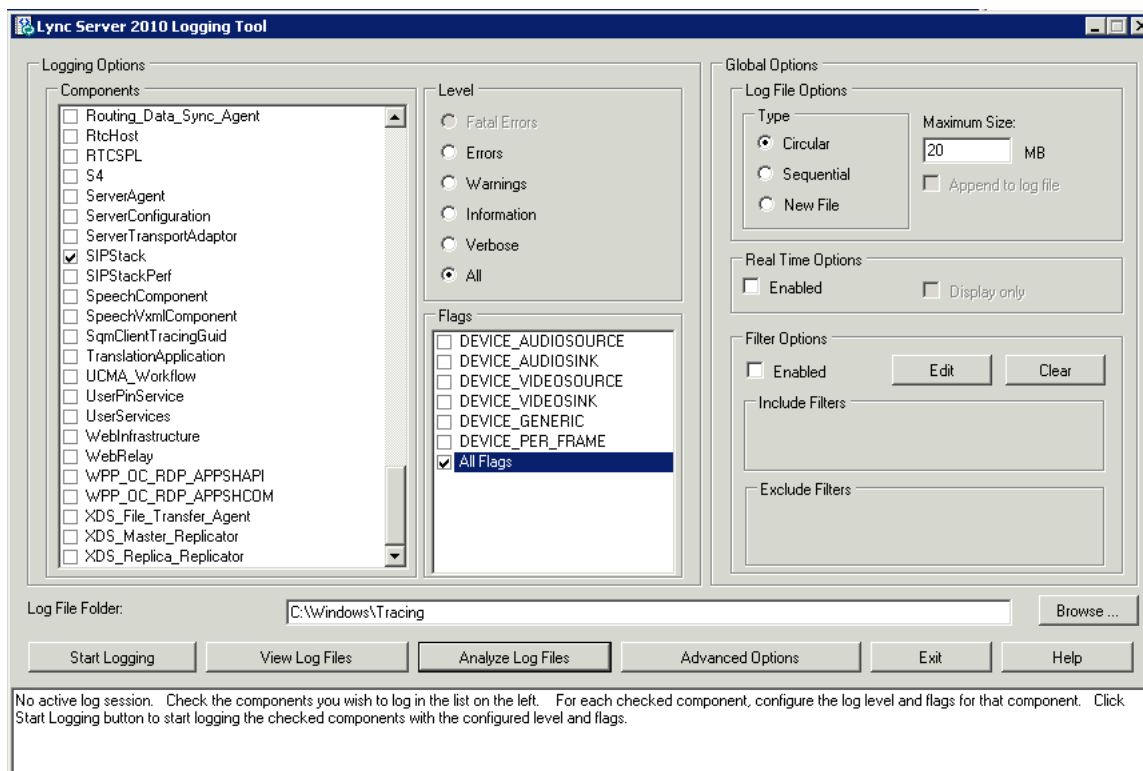


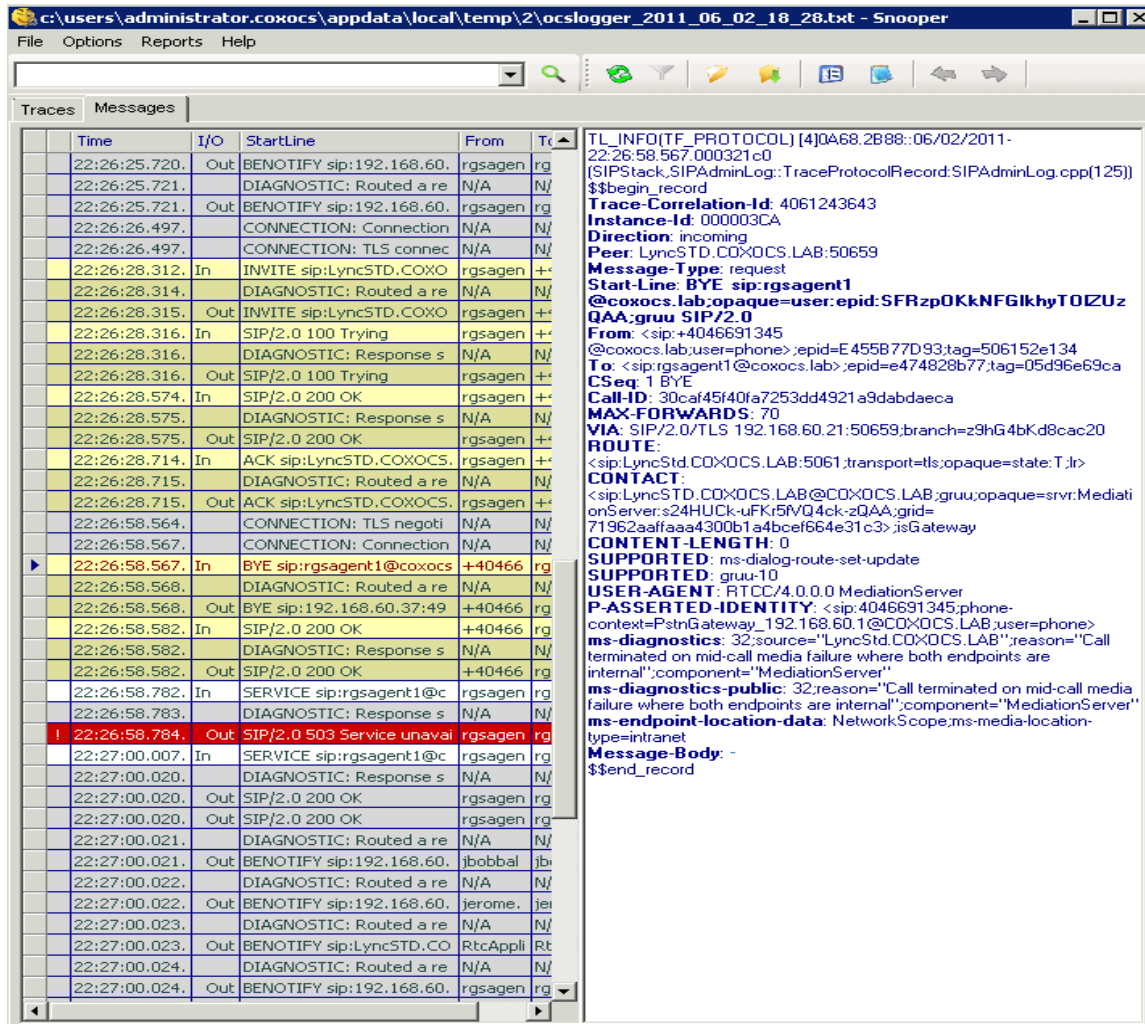
Figure 20 – Logging Tools for Troubleshooting

Microsoft Lync Server 2010 Logging Tool integrates a range of logging and tracing functionality. It facilitates troubleshooting by capturing logging and tracing information from the product while the product is running. Logging Tool is installed with the Lync Server administrative tools. You can use Logging Tool to run debug sessions on any Lync Server server role.

Lync Server 2010 Logging Tool generates log files on a per-server basis, so it must be actively running and tracing on each computer for which you want to generate a log.

To start the logging, do one of the following:

- Open a command prompt, navigate to the folder where OCSLogger.exe is installed (by default, %ProgramFiles%\Common Files\Microsoft Lync Server 2010\Tracing), type OCSLogger.exe, and then press Enter.
- On the Start menu, open the Run dialog box. Type the full path and file name, by default %ProgramFiles%\Common Files\Microsoft Lync Server 2010\Tracing\OCSLogger.exe) and then click OK. On the Start menu, click inside the Search box. Type OCSLogger.exe and then press Enter.



Time	I/O	StartLine	From	To
22:26:25.720	Out	BENOTIFY sip:192.168.60.	rgsagen	rg
22:26:25.721	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:26:25.721	Out	BENOTIFY sip:192.168.60.	rgsagen	rg
22:26:26.497	Out	CONNECTION: Connection	N/A	N/A
22:26:26.497	Out	CONNECTION: TLS connec	N/A	N/A
22:26:28.312	In	INVITE sip:LyncSTD,COXO	rgsagen	++
22:26:28.314	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:26:28.315	Out	INVITE sip:LyncSTD,COXO	rgsagen	++
22:26:28.316	In	SIP/2.0 100 Trying	rgsagen	++
22:26:28.316	Out	DIAGNOSTIC: Response s	N/A	N/A
22:26:28.316	Out	SIP/2.0 100 Trying	rgsagen	++
22:26:28.574	In	SIP/2.0 200 OK	rgsagen	++
22:26:28.575	Out	DIAGNOSTIC: Response s	N/A	N/A
22:26:28.575	Out	SIP/2.0 200 OK	rgsagen	++
22:26:28.714	In	ACK sip:LyncSTD,COXOCS.	rgsagen	++
22:26:28.715	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:26:28.715	Out	ACK sip:LyncSTD,COXOCS.	rgsagen	++
22:26:58.564	Out	CONNECTION: TLS negoti	N/A	N/A
22:26:58.567	Out	CONNECTION: Connection	N/A	N/A
22:26:58.567	In	BYE sip:rgsagent1@coxocs	+40466	rg
22:26:58.568	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:26:58.568	Out	BYE sip:192.168.60.37:49	+40466	rg
22:26:58.582	In	SIP/2.0 200 OK	+40466	rg
22:26:58.582	Out	DIAGNOSTIC: Response s	N/A	N/A
22:26:58.582	Out	SIP/2.0 200 OK	+40466	rg
22:26:58.782	In	SERVICE sip:rgsagent1@c	rgsagen	rg
22:26:58.783	Out	DIAGNOSTIC: Response s	N/A	N/A
22:26:58.784	Out	SIP/2.0 503 Service unavail	rgsagen	rg
22:27:00.007	In	SERVICE sip:rgsagent1@c	rgsagen	rg
22:27:00.020	Out	DIAGNOSTIC: Response s	N/A	N/A
22:27:00.020	Out	SIP/2.0 200 OK	rgsagen	rg
22:27:00.020	Out	SIP/2.0 200 OK	rgsagen	rg
22:27:00.021	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:27:00.021	Out	BENOTIFY sip:192.168.60.	jbobbal	jb
22:27:00.022	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:27:00.022	Out	BENOTIFY sip:192.168.60.	jerome.	je
22:27:00.023	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:27:00.023	Out	BENOTIFY sip:LyncSTD,CO	RtcAppli	Rt
22:27:00.024	Out	DIAGNOSTIC: Routed a re	N/A	N/A
22:27:00.024	Out	BENOTIFY sip:192.168.60.	rgsagen	rg

Figure 21 – Debugging trace screen

To view and analyze log files on a computer other than the one on which the logs were captured, you can run the Lync Server 2010 Logging Tool on the other computer by installing the Lync Server administrative tools on that computer. OCSLogger.exe is the file that runs Logging Tool, which by default is installed to:

%ProgramFiles%\Common Files\Microsoft Lync Server 2010\Tracing.

You can run OCSLogger.exe on computers running the Windows XP, Windows Vista, or Windows 7 operating systems, as well as on Windows Server 2003, Windows Server 2008 SP1, and Windows Server



2008 R2. To run OCSLogger.exe on Windows Vista or Windows 7, you must run the application in the Run as Administrator mode.

19 Enabling/Moving User for Lync Server 2010

- 1) From a user account that is assigned to the CsUserAdministrator role or the CsAdministrator role, log on to A05OCSFEMS01.COX.COM.
- 2) From the start menu, Select All Programs->Microsoft Lync Server-> Lync Server Control Panel.
- 3) In the left navigation bar, click Users.
- 4) Select LDAP Search and in the Search users box, type all or the first portion of the display name, first name, last name, Security Accounts Manager (SAM) account name, SIP address, or line Uniform Resource Identifier (URI) of the user account that you want, and then click Find.
- 5) In the results list, select a specific user or users in the list.
- 6) On the Action menu, click Move selected users to pool.
- 7) In Move Users, select the pool that you want to move the users to in Destination registrar pool.
- 8) Or Click Enable users.
- 9) On the New Lync Server User dialog, click Add.
- 10) In the Search users box, type all or the first portion of the name, display name, first name, last name, Security Accounts Manager (SAM) account name, or phone number of the Active Directory user account that you want, and then click Find.
- 11) In the table, select the account you want to add to Lync Server 2010, and then click OK.
- 12) Assign the user to a pool, specify any additional details, and assign the policies to the user you want, and then click Enable.

19.1 Using Lync Management Shell for moving the users:

- 1) If you are running the commands on the local machine (for example, you log on directly to a Front End Server): Log on to the computer where Lync Server Management Shell is installed as a member of the RTCUniversalServerAdmins group or with the necessary user rights as described in Delegate Setup Permissions.
- 2) If you are running the commands remotely on another machine (for example, you log on to your computer and run the commands remotely on a Front End Server): From a user account that is assigned to the CsUserAdministrator role or the CsAdministrator role, log on to LyncStd.COXOCS.LAB
- 3) Start the Lync Server Management Shell: Click Start, click All Programs, click Microsoft Lync Server 2010, and then click Lync Server Management Shell.
- 4) To move single users, use the Move-CsUser cmdlet as follows:
PS C:\Users\ > Get-help Move-CsLegacyUser
NAME: Move-CsLegacyUser

SYNOPSIS: Migrates one or more user accounts from Microsoft Office Communications Server 2007 R2 or Microsoft Office Communications Server 2007 to Microsoft Lync Server 2010.

SYNTAX:

```
Move-CsLegacyUser -Identity <UserIdParameter> -Target <Fqdn> [-Confirm  
[<SwitchParameter>]] [-DomainController <Fqdn>] [-ExcludeArchivingPolicy  
<SwitchParameter>] [-ExcludeConferencingPolicy <SwitchParameter>] [-  
ExcludeDialPlan <SwitchParameter>] [-ExcludeExternalAccessPolicy  
<SwitchParameter>] [-ExcludePresencePolicy <SwitchParameter>] [-  
ExcludeVoicePolicy <SwitchParameter>] [-Force <SwitchParameter>] [-  
PassThru <SwitchParameter>] [-ProxyPool <Fqdn>] [-WhatIf  
[<SwitchParameter>]] [<CommonParameters>]
```

Example:

```
Move-CsLegacyUser -Identity "Display Name" -Target "Lyncstd.coxocs.lab"
```



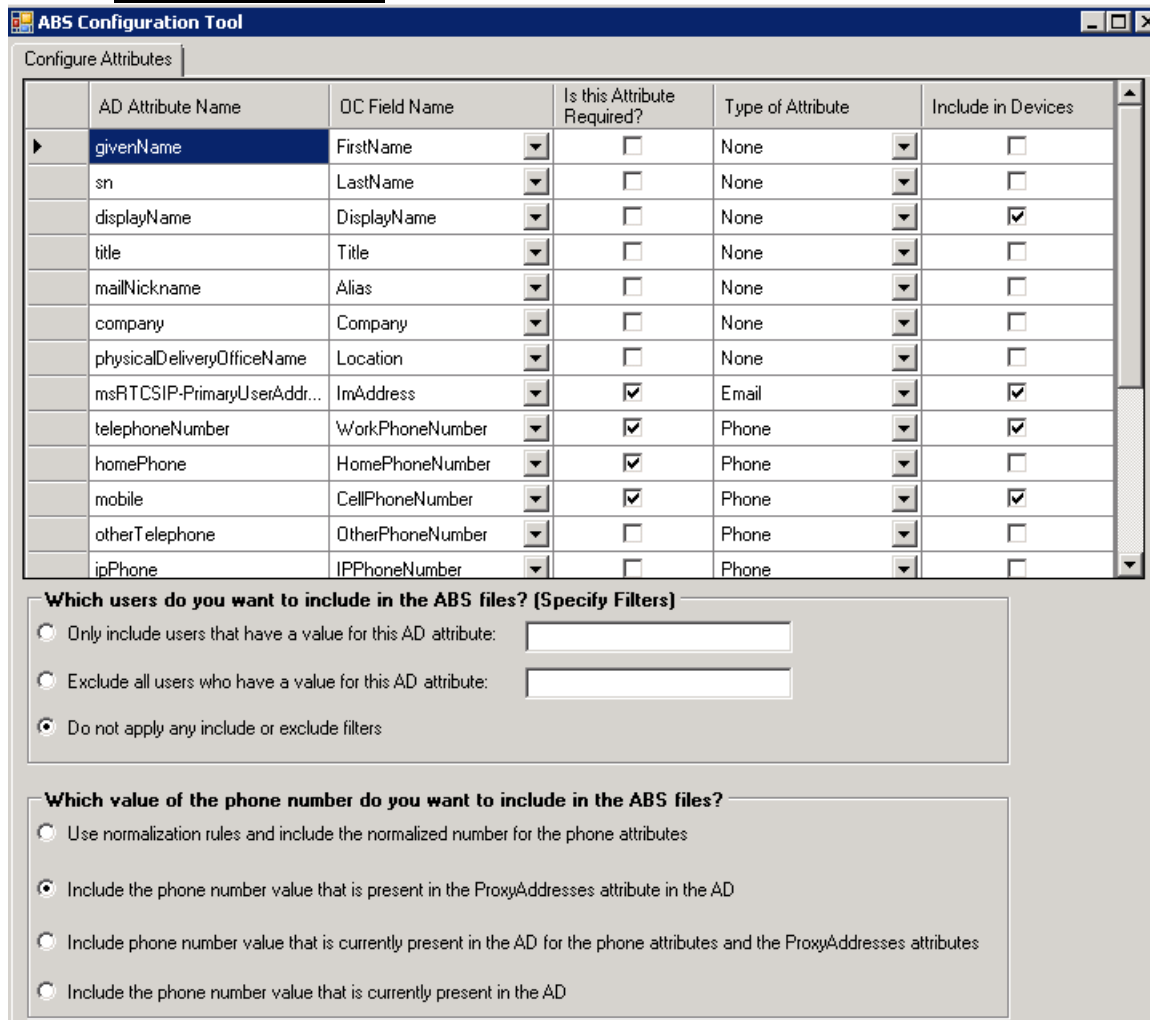

20 Address Book Settings

The Address Book Service is an integral component of the Microsoft Lync Server 2010 and is installed along with other server components. One of the Address Book Server's primary tasks is to update search results for Lync clients by writing global address list information from the RTC database. As a part of the deployment of Microsoft Lync Server 2010, the **Address Book** Service is installed by default. The databases used by the **Address Book** Service – RTCab and RTCab1 – are created on the SQL Server. Another function of ABS is to perform phone number normalization for Lync telephony integration.

The Address Book Server uses data provided by User Replicator to update the information that it initially obtains from the global address list (GAL). User Replicator writes the Active Directory Domain Services (AD DS) attributes for each user, contact, and group into the AbUserEntry table in the database and the Address Book Server syncs the user data from the database into files in the Address Book Server file store and into the Address Book database RTCab or RTCab1. The schema for the AbUserEntry table uses two columns, UserGuid and UserData. UserGuid is the index column and contains the 16-byte GUID of the Active Directory object. UserData is an image column which contains all of the previously mentioned Active Directory Domain Services (AD DS) attributes for that contact.

User Replicator determines which Active Directory attributes to write by reading a configuration table located in the same SQL Server-based instance as the AbUserEntry table. The AbAttribute table contains three columns, ID, Name and Flags. The table is created during database setup. If the AbAttribute table is empty, User Replicator skips its AbUserEntry table processing logic. Address Book Server attributes are dynamic and are retrieved from the AbAttribute table, which is initially written by the Address Book Server when the Address Book Server is activated.

20.1 Address Book Setting



AD Attribute Name	OC Field Name	Is this Attribute Required?	Type of Attribute	Include in Devices
givenName	FirstName	<input type="checkbox"/>	None	<input type="checkbox"/>
sn	LastName	<input type="checkbox"/>	None	<input type="checkbox"/>
displayName	DisplayName	<input type="checkbox"/>	None	<input checked="" type="checkbox"/>
title	Title	<input type="checkbox"/>	None	<input type="checkbox"/>
mailNickname	Alias	<input type="checkbox"/>	None	<input type="checkbox"/>
company	Company	<input type="checkbox"/>	None	<input type="checkbox"/>
physicalDeliveryOfficeName	Location	<input type="checkbox"/>	None	<input type="checkbox"/>
msRTCSIP-PrimaryUserAddr...	ImAddress	<input checked="" type="checkbox"/>	Email	<input checked="" type="checkbox"/>
telephoneNumber	WorkPhoneNumber	<input checked="" type="checkbox"/>	Phone	<input checked="" type="checkbox"/>
homePhone	HomePhoneNumber	<input checked="" type="checkbox"/>	Phone	<input type="checkbox"/>
mobile	CellPhoneNumber	<input checked="" type="checkbox"/>	Phone	<input checked="" type="checkbox"/>
otherTelephone	OtherPhoneNumber	<input type="checkbox"/>	Phone	<input type="checkbox"/>
ipPhone	IPPhoneNumber	<input type="checkbox"/>	Phone	<input type="checkbox"/>

Which users do you want to include in the ABS files? (Specify Filters)

Only include users that have a value for this AD attribute:
 Exclude all users who have a value for this AD attribute:
 Do not apply any include or exclude filters

Which value of the phone number do you want to include in the ABS files?

Use normalization rules and include the normalized number for the phone attributes
 Include the phone number value that is present in the ProxyAddresses attribute in the AD
 Include phone number value that is currently present in the AD for the phone attributes and the ProxyAddresses attributes
 Include the phone number value that is currently present in the AD

Figure 22 – Address Book Settings

To generate address book files manually you can run the following the command in the Management Shell

- 1) Update-CsUserDatabase
- 2) Update-CsAddressBook

For troubleshooting the AddressBook Issues you can export the file to a text format:

```
D:\Server\Core>abserver -dumpfile " D:\LyncShare\1-WebServices-1\ABFiles\00000000-0000-0000-0000-000000000000\00000000-0000-0000-0000-000000000000\F-0ebd.1sabs"
```



21 Lync Server Backup and Restoration

Microsoft Lync Server 2010 simplifies backup and restoration compared to previous versions of Office Communications Server. In Lync Server 2010, much of the settings and configuration data that were stored in Active Directory Domain Services (AD DS) and the settings and configuration data that were stored on individual servers are now stored in the Central Management store. Global-level, site-level, pool-level, and server-level settings and configuration data are backed up and restored when you backup and restore the Central Management store. In addition, Lync Server 2010 provides Lync Server Management Shell cmdlets for backing up and restoring many of the components in your Lync Server deployment.

Microsoft Lync Server 2010 uses settings and configuration information that is stored in databases, and data that is stored in databases and file stores. This section describes the data that you need to back up to be able to restore service if your organization experiences a failure or outage, and also identifies the data and components used by Lync Server 2010 that you need to back up separately.

The following table identifies the settings and configuration information you need to back up and restore.

Table 9 – Backup and Restore

Type of data	Location	Description / When to back up
Topology configuration information	Central Management store (database:xds.mdf)	Topology, policy, and configuration settings. Back up with your regular backups and after you use Lync Server 2010 Control Panel or cmdlets to modify your configuration or policies.
Response Group configuration information	Back End Server or Standard Edition server (database: RgsConfig.mdf)	Response Group agent groups, queues, and workflows. Back up with your regular backups and after you add or change agent groups, queues, or workflows.
Location information	Central Management store (database: Lis.mdf)	Enterprise Voice Enhanced 9-1-1 (E9-1-1) configuration information. This information is generally static. Back up with your regular backups.
Persistent user data.	Standard Edition server (database: Rtc.mdf)	Back up with your regular backups. This information is dynamic, but the loss of updates is not catastrophic to Lync Server if you need to restore to your last regular backup. If Contacts lists are critical to your organization, you can back up this data more frequently.
Lync Server file store	Typically on a file server, file cluster, or a Standard Edition server	Meeting content; meeting content metadata; meeting compliance logs; application data files; update files for device updates; audio files for Response Group, Call Park, and Announcement applications. Back up with your regular backups.



21.1 Additional Backup Requirements

Lync Server uses or depends on some data and components that you need to back up separately from the above procedures in this document. The following components are not backed up or restored as part of the Lync Server backup and restoration process described in this document:

Active Directory Domain Services (AD DS): You need to back up AD DS by using Active Directory tools at the same time that you back up Lync Server. Although many Lync Server settings are now stored in Central Management store instead of in AD DS as in previous versions, AD DS still stores the following:

- User SIP Uniform Resource Identifier (URI) and other user settings
- Contact objects for applications such as Response Group and Conferencing Attendant
- A pointer to the Central Management store
- Kerberos Authentication Account (an optional computer object) and Lync Server security groups

Certification authority and certificates: Use your organization's policy for backing up your certification authority (CA) and certificates. If you use exportable private keys, you can back up the certificate and the private key, and then export them if you use the procedures in this document to restore Lync Server. If you use an internal CA, you can re-enroll if you need to restore Lync Server. It is important that you retain the private key in a secure location where it will be available if a computer fails

Public switched telephone network (PSTN) gateway configuration If you use Enterprise Voice or Survivable Branch Appliances, you need to back up the PSTN gateway configuration. See your vendor for details about backing up and restoring PSTN gateway configurations.

Infrastructure information Backup information about your infrastructure, such as your firewall configuration, load balancing configuration, Internet Information Services (IIS) configuration, Domain Name System (DNS) records and IP addresses, and Dynamic Host Configuration Protocol (DHCP) configuration.

To back up core data and settings

- 1) From a user account that is a member of the RTCUniversalServerAdmins group, log on to any computer in your internal deployment.
- 2) To store the backups you create in the following steps, create a new shared folder and update the path referenced by \$Backup to the new shared folder.
- 3) Start the Lync Server Management Shell: Click Start, click All Programs, click Microsoft Lync Server 2010, and then click Lync Server Management Shell.
- 4) Back up the Central Management store configuration file. At the command line, type the following:
: Export-CsConfiguration -FileName "C:\Config.zip"
- 5) Copy the backed up Central Management store configuration file to \$Backup\.
- 6) Back up Location Information service data. At the command line, type the following: Export-CsLisConfiguration -FileName "C:\E911Config.zip"
- 7) Copy the backed up Location Information service configuration file to \$Backup\.
- 8) Back up user data on every back-end database of a Front End pool and every Standard Edition server. At the command line, type the following:
Dbimpexp.exe /hrxmlfile:D:\BackupUser.xml /sqlserver:lyncstd.coxocs.lab\rtc



- 9) Copy the backed up user file to \$Backup\.
- 10) Back up the Response Group configuration with the following command:
 - `Import-Module .\RgsImportExport.ps1`
 - `Export-CsRgsConfiguration ApplicationServer:lyncstd.coxocs.lab - FileName C:\RgsConfig.zip`
- 11) Copy the backed up Response Group configuration file to \$Backup\.

21.2 Restoring a Standard Edition Server

Microsoft recommends that you take an image copy of the system before you start restoration so that you can use this image as a rollback point in case something goes wrong during restoration. You might want to take the image copy after you install the operating system and SQL Server, and restore or re-enroll the certificates.

To restore a Standard Edition server

- 1) Start with a clean or new server that has the same fully qualified domain name (FQDN) as the failed computer, install the operating system, and then restore or re-enroll the certificates.
- 2) From a user account that is a member of the RTCUniversalServerAdmins group, log on to the server you are restoring.
- 3) Restore the File Store by copying the appropriate File Store from \$Backup to the File Store location on the server and share the folder.
- 4) Run Topology Builder:
 - a. Start Topology Builder: Click Start, click All Programs, click Microsoft Lync Server 2010, and then click Lync Server Topology Builder.
 - b. Click Download Topology from existing deployment, and then click OK.
 - c. Select the topology, and then click Save. Click Yes to confirm your selection.
 - d. Right-click the Lync Server 2010 node, and then click Publish Topology.
 - e. Follow the Publish the Topology wizard. On the Create databases page, select the databases you want to recreate.
 - f. Follow the rest of the wizard, and then click Finish.
- 5) Browse to the Lync Server 2010 installation folder or media, start the Lync Server Deployment Wizard located at \setup\amd64\Setup.exe. Use the Lync Server Deployment Wizard to do the following:
 - a. Run Step 1: Install Local Configuration Store to install the local configuration files.
 - b. Run Step 2: Setup or Remove Lync Server Components to install the Lync Server server roles.
 - c. Run Step 3: Request, Install or Assign Certificates to assign the certificates.
 - d. Run Step 4: Start Services to start services on the server.
- 6) Restore user data by performing the following:
 - a. Copy BackupUsers.xml from \$Backup\ to a local directory.
 - b. Start the Lync Server Management Shell: Click Start, click All Programs, click Microsoft Lync Server 2010, and then click Lync Server Management Shell.
 - c. To restore the user data, at the command line, type:

```
Dbimpexp.exe /hrxmlfile:C:\BackupUsers.xml  
/sqlserver:LyncStd.CoxOCS.LAB\rtc /import /restype:all
```



7) If you deployed Response Group on this Standard Edition server, restore the Response Group configuration data using following command:

- `Import-Module .\RgsImportExport.ps1`
- `Import-CsRgsConfiguration ApplicationServer:lyncstd.coxocs.lab -FileName C:\RgsConfig.zip -Verbose`