



iLink
Microsoft Lync
ShoreTel CSTA Server
Configuration Guide

Release 1.5

While the information in this publication is believed to be accurate, ShoreTel and ilink make no warranty of any kind with regard to this material including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose. Neither ShoreTel nor ilink shall be liable for errors contained herein, or for incidental or consequential damages in connection with the furnishing, performance, or use of this material. Information in this publication is subject to change without notice.

COPYRIGHT NOTICE

No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, photocopying, recording or otherwise, without prior written consent of ShoreTel and ilink. No third party intellectual property right liability is assumed with respect to the use of the information contained herein. ShoreTel and ilink assume no responsibility for errors or omissions contained in this book. This publication and all features described herein are subject to change without notice.

Copyright © 2008, 2014-2015 by ilink Kommunikationssysteme GmbH. All rights reserved.
Copyright © 2008, 2012, 2014 by ShoreTel Inc. All rights reserved.

All products or services mentioned in this manual are covered by the trademarks, service marks, or product names as designated by the companies who market those products.

ilink Kommunikationssysteme GmbH
Charlottenstrasse 4
10969 Berlin, Germany
+49 (30) 285 26-0

www.ilink.de/en

September 2015
Software release 1.5, document revision 8

Table of Contents

Overview	4
Requirements	5
Deployment Steps	7
1. Installation Preparation.....	8
Multiple Servers?	8
Server specification	8
ShoreTel Communicator for IBM Sametime	8
2. CSTA Server Software Installation and Configuration.....	9
The DialPlan.conf Configuration File	10
The Extension Translation Table	11
The External Translation Table	13
Configuring for Multiple DID Ranges	14
Configuring for Extensions in one DID Range with Different Leading Digits	15
Configuring for Extensions with Arbitrary DID Numbers	16
Configuring for Multiple Trunk Access Codes (for Outbound Calls)	17
Highly Complex Dial Plans	17
3. Update Existing CSTA Server Installations	18
3.1: Required step after a Java upgrade.....	18
3.2: Update from a release sold by ilink (release 1.5.x).....	18
3.3: Update from a release sold by ShoreTel (release 1.0.x)	18
Step 1: Save the existing configuration files.....	18
Step 2: Uninstall the existing software	19
Step 3: Clean the installation folders.....	19
Step 4: Install the new software version.....	19
Step 5: Reapply the old configuration	19
Step 6: Adapt the old configuration to the new software	19
Step 7: Microsoft Lync 2010/2013 Configuration for Remote Call Control	20
4. Microsoft Lync 2010 Configuration for Remote Call Control	22
Step 1: Set up TCP Route and Trusted Application Pool using PowerShell.....	22
Step 2: Download and Publish Topology Builder configuration	24
Step 3: Configure Lync 2010 User Properties for Telephony	28
Step 4: Lync 2010 Telephony Integration	32
5. Microsoft Lync 2013 Configuration for Remote Call Control	34
Step 1: Set up TCP Route and Trusted Application Pool using PowerShell.....	34
Step 2: Download and Publish Topology Builder configuration	36
Step 3: Configure Lync 2013 User Properties for Telephony	40

Step 4: Lync 2013 Telephony Integration.....45
 Configuring the User’s Phone Numbers on the Active Directory Server (optional).....47
 Appendix 1: Advanced Dial Plan Configurations.....50
 Default.conf Configuration File50
 Configuring On-Net Dialing in DialPlan.Conf51
 Configuring for Mapping ANI Digits (for Inbound Calls).....52
 Appendix 2: Translating Numbers for Lync Clients53
 Translating Numbers Received from Lync Clients53
 Translating Numbers Delivered to Lync Clients54
 Appendix 3: Understanding Caller ID for Inbound and Outbound Dialing.....56
 Appendix 4: Parallel installation of ShoreTel CSTA Server and ShoreTel Communicator for Sametime57
 Appendix 5: Configuration File Details58
 Appendix 6: Troubleshooting62
 Appendix 7: ShoreTel CSTA Server Planning Worksheet64

Overview

ShoreTel CSTA Server is a software solution that connects a ShoreTel phone system to a Lync server.

Featurewise, this offers CSTA based ShoreTel call control from within the Lync client (Lync call this remote call control or RCC). So users can place ShoreTel calls from Microsoft Lync, Microsoft Outlook and Microsoft Sharepoint, and reach out to contacts by IM, email or ShoreTel phone in just one click. Microsoft Office applications recognize phone numbers and contact names using Microsoft smart tags, and offer the option to dial (via the ShoreTel phone) directly from within the current application.

Incoming ShoreTel calls will open a Lync slide in window with caller information.

ShoreTel CSTA Server also offers a full integration of ShoreTel's true telephony presence capabilities into Microsoft Lync Server, so that the Lync client will display the local users' phone presence (i.e. when the user is on his or her ShoreTel phone). The Lync client then allows to “pin” a contact and receive an instant notification when that user's presence status changes from “in a call” to available.

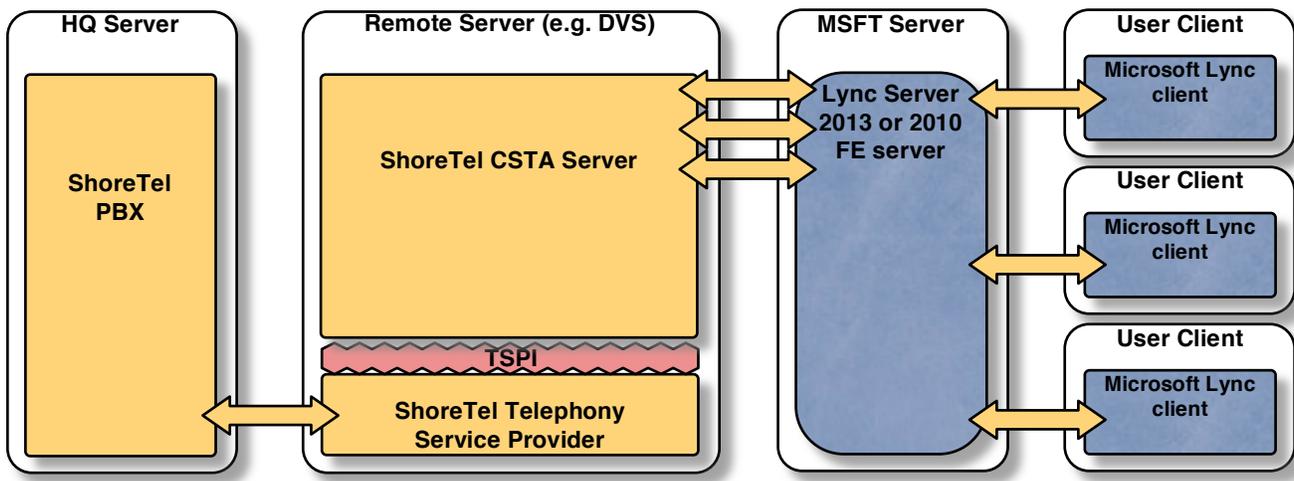
ShoreTel CSTA Server is not about connecting the Lync client’s voice channel to a ShoreTel phone system. For this, a SIP gateway needs to be set up between ShoreTel and Lync.

ShoreTel CSTA Server is independent of the core ShoreTel IP PBX release and is compatible with ShoreTel releases since version 12. It runs on either a ShoreTel HQ or DVS server or on a dedicated ShoreTel TAPI application server.

ShoreTel CSTA Server supports Lync releases since Lync 2010.

Lync Online / Office 365 is not supported.

This is an illustration of a typical setup:



Requirements

The following is required for a ShoreTel CSTA Server setup for up to 1,000 Lync RCC users:

1. A properly installed and configured ShoreTel IP PBX system, version 12 or later
2. At least one available HQ, DVS or TAPI application server
3. A valid ShoreTel CSTA Server user license for each Lync RCC user
4. A properly installed, configured and licensed Lync system using either Standard Edition or Enterprise Edition topology
5. A Lync client installed on each RCC user's PC
This can be a Lync 2010 client or the full Lync 2013 client (Lync 2013 Basic clients are not supported).
For Lync 2013 clients, the Lync 2013 update 15.0.4551.1005: November 7, 2013 must be installed.

Note that multiple CSTA Servers may be required to support more than 1,000 RCC users.

Requirements for the server that will run the CSTA Server software include:

- Windows Server (any version supported by ShoreTel for the DVS server, 32 or 64 bit)
- Java Runtime (JRE 8, 7, or 6)
- ShoreTel Telephony Service Provider (RpcTspX.tsp)
- This does not need to be a physical server, virtual server images are supported

Network communication requirements between the various servers:

The following communication channels are required and may not be blocked by firewalls or be prevented by the network settings of the various hosts:

CSTA Server requirements

- The Microsoft Lync server needs to be able to connect to the iolink TeamCall CSTA Server. CSTA Server's default TCP/IP port number for this access is 26535 (an alternative port number can be configured after installation).

- So the Lync server host must allow outgoing connections to port 26535 of the CSTA Server host and the CSTA Server host must allow incoming connections on this port from the Lync server.

ShoreTel requirements

- ShoreTel TAPI on the CSTA Server host needs to be able to connect to the ShoreTel HQ server. See ShoreTel documentation for further details on the required network ports.

Lync requirements

- The Lync clients on the user's desktops need to be able to connect to the Lync server. See Lync documentation for further details on the required network ports.

Note: If your ShoreTel system uses On-Net dialing or complex dial plans, we strongly recommend you contact ilink Implementation Services at sales@ilink.de.

Tip

Fill out the ShoreTel CSTA Server Planning Worksheet in Appendix 7 before starting the installation. Not only will this worksheet be helpful during the installation, its contents may also be required if calling into ilink for support.

Deployment Steps

- 1.** Prepare the installation
(see chapter 1)
- 2.** Install and configure ShoreTel CSTA Server software
(see chapter 2)
- 3.** Configure Microsoft Lync Server for Remote Call Control
(see chapter 5, steps 1 and 2 for **Lync 2013 server**
or chapter 4, steps 1 and 2 for Lync 2010 server)
- 4.** Configure Lync User Properties for Telephony
(see chapter 5, step 3 for **Lync 2013 server**
or chapter 4, step 3 for Lync 2010 server)
- 5.** Configuration of the Lync client's phone integration
(see chapter 5, step 4 for **Lync 2013 clients**
or chapter 4, step 4 for Lync 2010 clients)

1. Installation Preparation

Multiple Servers?

In the overwhelming majority of all cases, you'll only need to install a single ShoreTel CSTA Server. The exception is if you want to have different ShoreTel users dial out with different trunk access codes.

Since ShoreTel CSTA Server only allows to configure the same trunk access code usage rules for all of its users, you would have to set up multiple servers in order to configure different trunk access code usage rules and then associate individual users with the CSTA Server with the trunk access code usage rule that shall be used for that specific user.

Server specification

First, you'll need to select a (physical or virtualized) server for installation. ShoreTel CSTA Server can be installed on either a ShoreTel HQ or DVS server or on a dedicated ShoreTel TAPI application server.

These are the requirements for this server:

- Windows Server (any version that is also supported by ShoreTel for the DVS server, 64 or 32 bit)
- Java Runtime (JRE 8, 7, or 6) 32 bit
- ShoreTel Telephony Service Provider (RpcTspX.tsp)
- Firewall rules on this host as well as network settings must allow the Microsoft Lync server to connect to the ShoreTel CSTA Server service. ShoreTel CSTA Server's default TCP/IP port number for this access is 26535 (an alternative port number can be configured after installation).

It is possible to install ShoreTel CSTA Server on a host that provides other services as well, but it is best to use a server that does not run any heavy duty services. For example, you should not use this server for any of the following: Windows Domain controller, Terminal Server, Database Server (with MySQL), Web server.

Tip

Fill out the ShoreTel CSTA Server Planning Worksheet in Appendix 7 before starting the installation. Not only will this worksheet be helpful during the installation, its contents may also be required if calling into iLink for support.

You will need remote access to the Lync server with administrative rights in order to perform the following steps:

- a) Set up a TCP Route and Trusted Application Pool for our server within Lync via the Lync Server Management Shell and the Lync Server Topology Builder,
- b) Configure telephony settings of the individual Lync users via the Lync Server Control Panel.

ShoreTel Communicator for IBM Sametime

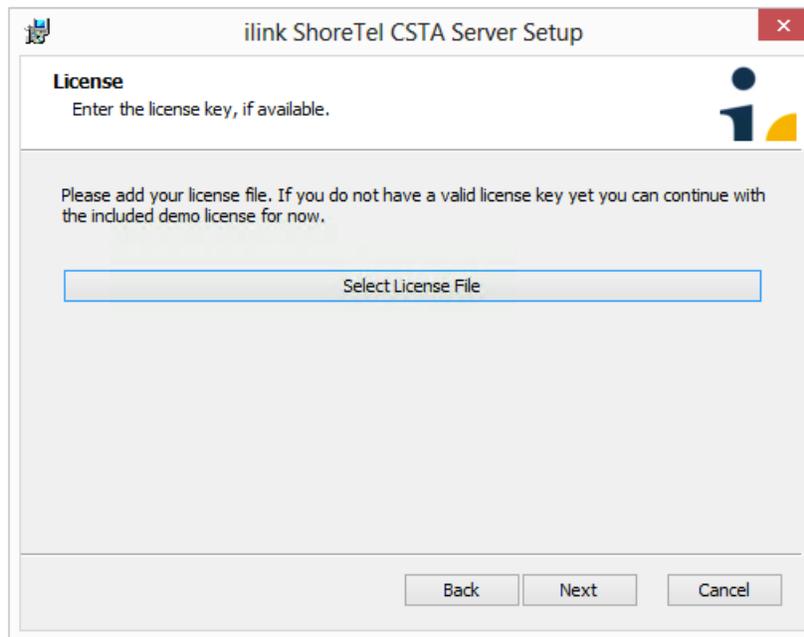
If you want to install both ShoreTel CSTA Server and ShoreTel Communicator for IBM Sametime on the same Windows server, please see *Appendix 4* for information about such a setup.

2. CSTA Server Software Installation and Configuration

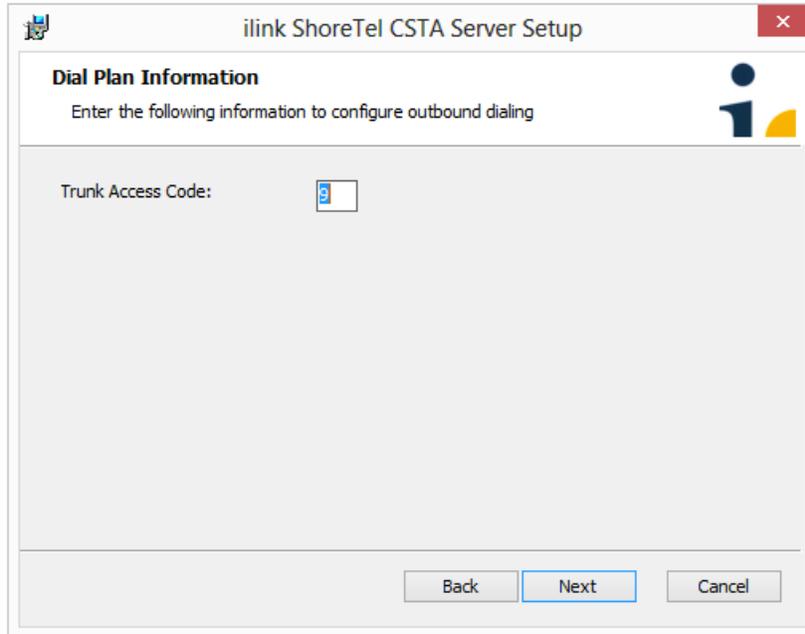
Note: See chapter 3 for information on how to upgrade an existing installation.

Copy the *ShoreTel CSTA Server.msi* installer file to the DVS or App Server where the CSTA Server is to be installed. Double click on this file and follow the instructions presented.

During the installation you'll be asked for your license file. If you do not have a license file, you may proceed without a license. The ShoreTel CSTA Server package would then be set to demo mode though – which means that your CSTA Server will be limited to supporting just one device.



A few steps later you will be prompted to enter a Trunk Access Code:



A trunk access code is the digit or digit sequence that is used to direct an outbound call to a desired trunk or trunk group.

The CSTA Server will use the trunk access code specified during installation as the default value to prefix calls placed to external numbers. Examples:

Geographical Area	Typical Trunk Access Code
North America	9
Europe	0

If your ShoreTel system has multiple trunk access codes, enter the one that should be used by default for calls placed by users who will be configured for the CSTA Server you are installing. See the following sections for information on manually configuring additional trunk access codes.

The DialPlan.conf Configuration File

ShoreTel CSTA Server’s *DialPlan.conf* configuration file is used for various configuration purposes like mapping ShoreTel extension numbers to the users’ phone numbers, or for support of multiple trunk access codes or multiple DID ranges.

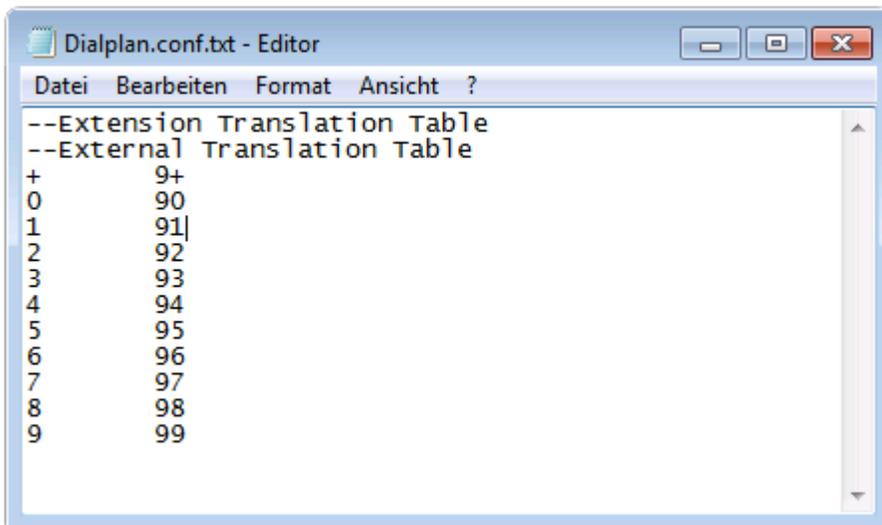
This file is located in the ShoreTel CSTA Server configuration folder at:

%ProgramFiles%\ilink\ShoreTel CSTA Server\Config

To make configuration changes, the *DialPlan.conf* file needs to be edited manually. You can open and edit this file using a standard text editor such as Notepad or WordPad.

Be sure to plan your configuration using *Appendix 7: ShoreTel CSTA Server Planning Worksheet* before modifying any configuration files. After modifying the configuration, the ShoreTel CSTA Server services must be restarted before the changed configuration becomes active.

Here is an example of a simple *DialPlan.conf* file:



```
Dialplan.conf.txt - Editor
Datei Bearbeiten Format Ansicht ?
--Extension Translation Table
--External Translation Table
+ 9+
0 90
1 91
2 92
3 93
4 94
5 95
6 96
7 97
8 98
9 99
```

The *DialPlan.conf* file contains two sections, each consisting of zero or more rows with two columns of values each. The first column of both sections starts in the first character position of each line and the second column starts after a run of tabs and/or spaces.

The Extension Translation Table

The first section is known as the “Extension Translation Table”. It starts with this line:

```
--Extension Translation Table
```

This section is used to map the ShoreTel extension numbers to the phone numbers that the Lync client uses for caller ID lookup (e.g. the users’ phone numbers stored in Active Directory).

Most sites have one of the following four cases:

1. The users have DIDs, i.e. they can be directly called from the outside. The users’ DIDs are stored in Active Directory (e.g. as ten digit numbers in North America).
2. The users have DIDs, but the users’ extension numbers are stored in Active Directory.
3. There are no DIDs. The users’ extension numbers are stored in Active Directory.
4. No phone numbers are stored in Active Directory for the users – Lync’s caller ID lookup will not find a name for incoming calls from other users.

In case 1 the phone numbers used by ShoreTel (extensions) differ from what is stored in Active Directory (DIDs). So a mapping between both is needed for successful caller ID lookup.

In cases 2 and 3 the phone numbers used by ShoreTel and those stored in Active Directory match, so no mapping is needed.

In case 4 there will be no successful caller ID lookup anyway, so there is no need to do a number mapping.

If a number mapping between extensions and DIDs is desired (case 1), appropriate configuration lines need to be added to the extension translation table.

The first column contains characters to match the start of an external number (including country code). The second column contains digits to match the start of the corresponding extension number.

So when mapping from DID to extension, the left column is used. When a DID starts with one of the left column values, this part of the DID is replaced with the corresponding right column value.

When mapping from extension to DID, the process is reversed. The right column is used. When an extension starts with one of the right column values, this part of the extension is replaced with the corresponding left column value.

Depending on whether there is a pattern to the mapping between DIDs and extensions, you will either have to add one line per extension or you may utilize the pattern (or use both options for different numbers).

```
--Extension Translation Table
+14083312010      5731
+14083312011      6846
+14083312012      2392
+140833130        1
+140833145        45
+14083315         8
```

This example would map DIDs to extensions as follows:

- The numbers specified in the initial lines would be mapped as is (...2010 ↔ 5731 etc.)
- The numbers ...30xx would be mapped to 1xx (three digit extensions)
- The numbers ...45xx would be mapped to 45xx (four digit extensions)
- The numbers ...5xxx would be mapped to 8xxx (four digit extensions)

If there are multiple configuration lines, they are evaluated in the order they appear in the *DialPlan.conf* file. For a correct mapping make sure that the entries are in correct order: from most specific to least specific.

Note: Every line must have an entry in both columns; adding an entry in just one column without the corresponding entry in the second column will cause an error in the parser and unpredictable behavior of the system.

The sections *Configuring for Multiple DID Ranges*, *Configuring for Extensions in one DID Range with Different Leading Digits*, and *Configuring for Extensions with Arbitrary DID Numbers* below describe specific cases in which the extension translation table can be used to adapt to more complex setups.

The External Translation Table

The second section is known as the “External Translation Table”. It starts with this line:

```
--External Translation Table
```

This section is used to map external phone numbers used in the Lync client to numbers that can be dialed by the ShoreTel system. This involves selecting the trunk to be used for outbound dialing. In standard sites with a single outbound trunk, an appropriate configuration line has already been added by the installer.

If other trunks shall be used for certain outbound call destinations, appropriate configuration lines need to be added to the external translation table.

The first column contains characters to match the start of an external number as used by Lync. The second column contains digits to match the start of the corresponding dialable number as used by ShoreTel.

So when mapping from “Lync number” to “ShoreTel number”, the left column is used. When a Lync number starts with one of the left column values, this part of the Lync number is replaced with the corresponding right column value.

When mapping from ShoreTel number to Lync number, the process is reversed. The right column is used. When an ShoreTel number starts with one of the right column values, this part of the ShoreTel number is replaced with the corresponding left column value.

Depending on whether there is a pattern to the mapping between Lync numbers and ShoreTel numbers, you will either have to add one line per ShoreTel number or you may utilize the pattern (or use both options for different numbers).

```
--External Translation Table  
+      9+
```

In the example above (which is what the installer automatically configures), the trunk access code **9** is prepended to every dialed number that starts with **+**. When using Lync to dial the number +12024561414, ShoreTel would actually dial 9+12024561414 (which –strange as the 9+1 part might look– is a valid number for ShoreTel).

To support outbound calls made in non-international format (e.g. ten or eleven digit numbers), add the following lines to the external translation table:

```
--External Translation Table  
+      9+  
0      90  
1      91  
2      92  
3      93  
4      94  
5      95  
6      96  
7      97  
8      98  
9      99
```

With these rules, using Lync to dial the number 12026331000 would cause ShoreTel to actually dial 912026331000.

Note: The external translation table is only consulted for outbound numbers that appear to be external numbers. Numbers whose length does not exceed the configured maximum extension length (see *Appendix 1: Advanced Dial Plan Configurations*), the external translation table does not apply.

If there are multiple configuration lines, they are evaluated in the order they appear in the *DialPlan.conf* file. For a correct mapping make sure that the entries are in correct order: from most specific to least specific.

Note: Every line must have an entry in both columns; adding an entry in just one column without the corresponding entry in the second column will cause an error in the parser and unpredictable behavior of the system.

The section *Configuring for Multiple Trunk Access Codes* below describes a specific case in which the external translation table can be used to adapt to more complex setups.

Configuring for Multiple DID Ranges

If the ShoreTel system has multiple DID ranges, use *Appendix 7: ShoreTel CSTA Server Planning Worksheet* to document each DID range and the corresponding extension ranges. Next determine the appropriate entries of the extension translation table's first and second columns.

For example, a ShoreTel system configured to use three DID ranges with corresponding three digit extensions would appear as follows in the worksheet:

DID Range Start	DID Range End	Extension Range Start	Extension Range End
+14085551100	+14085551199	100	199
+14085559900	+14085559909	200	209
+14085551234	+14085551234	900	900

The resulting entries in the Extension Translation Table of the *Dialplan.conf* file are:

```
--Extension Translation Table
+140855511      1
+1408555990    20
+14085551234   900
```

Configuring for Extensions in one DID Range with Different Leading Digits

If the ShoreTel system has extension numbers in the same DID range that start with different leading digits, use *Appendix 7: ShoreTel CSTA Server Planning Worksheet* to document each range of consecutive extension numbers and the corresponding DID ranges. Next determine the appropriate entries of the extension translation table's first and second columns.

For example, a ShoreTel system configured to use three groups of four digit extensions in one DID range would appear as follows in the worksheet:

DID Range Start	DID Range End	Extension Range Start	Extension Range End
+14085552220	+14085552249	4120	4149
+14085552250	+14085552259	4450	4459
+14085552260	+14085552269	4560	4569

The resulting entries in the Extension Translation Table of the *Dialplan.conf* file are:

```
--Extension Translation Table
+1408555222      412
+1408555223      413
+1408555224      414
+1408555225      44
+1408555226      45
```

Configuring for Extensions with Arbitrary DID Numbers

If the ShoreTel system has extension numbers that don't match the final digits of the corresponding DID numbers, use *Appendix 7: ShoreTel CSTA Server Planning Worksheet* to list each individual DID number and its corresponding extension number. You'll enter the DID numbers in the first column and the extensions in the second.

For example, a ShoreTel system configured with three DIDs that have arbitrary corresponding extensions would appear as follows in the worksheet:

DID Range Start	DID Range End	Extension Range Start	Extension Range End
+14085551834	+14085551834	612	612
+14085551348	+14085551348	613	613
+14085551483	+14085551483	614	614

The resulting entries in the Extension Translation Table of the *Dialplan.conf* file are:

```
--Extension Translation Table
+14085551834      612
+14085551348      613
+14085551483      614
```

Configuring for Multiple Trunk Access Codes (for Outbound Calls)

If the ShoreTel system has multiple trunk access codes that are to be used for different ranges of PSTN numbers, use *Appendix 7: ShoreTel CSTA Server Planning Worksheet* to document each range of PSTN numbers and their associated trunk access codes. Next determine the appropriate entries of the external translation table's first and second columns.

For example, a ShoreTel system configured to use a main trunk access code (9) plus three special trunk access codes (6, 7, 8) that correspond to trunk lines for placing local, 7-digit dialed calls to three specific areas codes would appear as follows in the worksheet:

PSTN Range Start	PSTN Range End	Trunk Access Code	Country Code	Area Code
+14080000000	+14089999999	6	1	408
+12120000000	+12129999999	7	1	212
+16130000000	+16139999999	8	1	613
everything	else	9		

The resulting entries in the External Translation Table of the *Dialplan.conf* file are:

```
--External Translation Table
+1408      6
+1212      7
+1613      8
+          9
```

Highly Complex Dial Plans

If you have On-Net dialing and/or highly complex dial plans, please consult Appendix 1. Or engage iLink Professional Services at sales@ilink.de. The professional services team is available to assist with any implementation.

3. Update Existing CSTA Server Installations

3.1: Required step after a Java upgrade

The **ilink TeamCall CA ShoreTel** service requires a Java runtime. During installation, the path of the Java runtime is written to the Windows registry and will be used when the service is started.

If the path of the installed Java runtime has changed due to a Java upgrade (which it normally does), the service will no longer start because it still tries to start using the old Java runtime location.

The configured runtime path can be found at this location in the Windows registry:

```
HKLM\SYSTEM\CurrentControlSet\Services\ilink TeamCall CA ShoreTel\Parameters\
JVM Library
```

Typically the value looks similar to one of these examples:

```
C:\Program Files (x86)\Java\jre6\bin\client\jvm.dll
C:\Program Files\Java\jre7\bin\client\jvm.dll
C:\Program Files (x86)\Java\jre1.8.0_45\bin\client\jvm.dll
```

If the currently configured value no longer points to an existing jvm.dll after a Java upgrade, please adapt the registry value accordingly and restart the **ilink TeamCall CA ShoreTel** service.

3.2: Update from a release sold by ilink (release 1.5.x)

If you want to upgrade from a specific 1.5.x release to a newer 1.5.x release, just double click the new MSI package and proceed with the installation.

The installation package supports updates of existing installations, so you do not need to remove the existing installation.

A new configuration is also not necessary because the existing configuration files (and log files) will not be replaced by the update.

3.3: Update from a release sold by ShoreTel (release 1.0.x)

If you perform an upgrade **from a 1.0 release sold by ShoreTel** to a current release, you should make sure that:

- The existing configuration will survive the upgrade
- The configuration will be adapted to the new software
- Any installation folder inconsistencies that may have been introduced as a result of past upgrades between older versions are removed

To do so, follow the following seven steps:

Step 1: Save the existing configuration files

Save the CSTA Server configuration files to a safe location, e.g. the Windows desktop. You will need them later in order to reapply the existing configuration to the new software.

The CSTA Server configuration files are located in the CSTA\Config folder within ShoreTel's ShoreWare Server folder. In a typical installation this is located in:

%ProgramFiles%\Shoreline Communications\ShoreWare Server\CSTA\Config

Save all files from this folder (or even better: the whole folder).

If you also have this second folder, please save it as well:

%ProgramFiles%\Shoreline Communications\ShoreWare Server\CSTAAccess\Config

Step 2: Uninstall the existing software

Go to the Windows Programs and Features list and uninstall ShoreTel CSTA Server (e.g. release 1.0.31).

Step 3: Clean the installation folders

In some existing installations with a long history of applying various CSTA Server upgrades, there may be two installation folders (*CSTA* and *CSTAAccess*), one or both of which may not be fully removed during the uninstallation of the software:

%ProgramFiles%\Shoreline Communications\ShoreWare Server\CSTA

%ProgramFiles%\Shoreline Communications\ShoreWare Server\CSTAAccess

If one or both of these folders have not been removed, please do so manually.

Step 4: Install the new software version

Copy the new *ShoreTel CSTA Server.msi* installer file to the DVS or App Server where the CSTA Server is to be installed. Double click on this file and follow the instructions presented.

Step 5: Reapply the old configuration

Make a backup copy of the new configuration folder before you reapply the old configuration. This will allow you to detect new configuration settings that may have been introduced since you last upgraded the software.

Now, if you had just one saved configuration folder, copy the files from this folder to the new configuration folder at the following location (but do not copy the log4j configuration as its format has changed):

%ProgramFiles%\iLink\ShoreTel CSTA Server

If you had two saved configuration folders (*CSTA* and *CSTAAccess*), you'll have to compare them file by file. In each case, copy the file that's more recent to the new configuration folder at the following location (but do not copy the log4j configuration as its format has changed):

%ProgramFiles%\iLink\ShoreTel CSTA Server

Step 6: Adapt the old configuration to the new software

Please change the following settings to adapt your old configuration to the new software:

Default.conf

Replace the license string by the license string you've received with the upgrade licenses. Please make sure to keep the license string and the word "license=" on a single (long) line without introducing any line breaks:

```
license=3ac6d7af928aeda3601a8a73c358301bab3e0657f7a3e5a...
```

Set the value of rfc2806PrivateContext as follows:

```
rfc2806PrivateContext=enterprise
```

DialPlan.conf

Previous recommendations had been to specify the Lync users' phone numbers in Lync User Management in international format. This required to specify the extension mapping in the DialPlan.conf "--Extension Translation Table" section.

This approach will continue to work just fine and you do not have to modify it.

If you prefer to use the new recommendations for simplicity's sake, please remove all entries from the "--Extension Translation Table" section (leaving the section header in place) **and** change the phone numbers of all Lync users in Lync User Management from international format to just the extensions.

Depending on the number of existing Lync users this may require a certain effort, but it will make adding additional users easier in the future, because you'll no longer have to edit DialPlan.conf for each new users.

Comparison with new configuration files

Now compare your configuration files with the copy of the new configuration files that you made in step 5. The goal here is to identify any configuration settings that may have been introduced since you last upgraded the software. Please copy each such new setting into your configuration and assign a suitable value.

Step 7: Microsoft Lync 2010/2013 Configuration for Remote Call Control

Step 7.1: Set up TCP Route and Trusted Application Pool

See chapter 5, step 1 (Lync 2013) or chapter 4, step 1 (Lync 2010).

This step can be done ahead of time.

Step 7.2: Download and Publish Topology Builder configuration

See chapter 5, step 2 (Lync 2013) or chapter 4, step 2 (Lync 2010).

This step can be done ahead of time.

Step 7.3: Configure Lync 2010/2013 User Properties for Telephony

See chapter 5, step 3 (Lync 2013) or chapter 4, step 3 (Lync 2010)..

This step should not be required during a Lync server upgrade.

This is a per user configuration within the Lync user management which should remain unchanged during your user migration from Lync 2010 to Lync 2013.

Step 7.4: Lync 2013 Telephony Integration

See chapter 5, step 4 (Lync 2013) or chapter 4, step 4 (Lync 2010)..

This step should not be required during a Lync server upgrade.

First of all, it does not pertain to the Lync server upgrade and is only applicable when the users switch from Lync 2010 client to Lync 2013 client, which we would advise to do in a separate step after the server migration has been successfully completed.

Also, this is a local configuration of the Lync client. The Lync 2013 should access the same local configuration data as the Lync 2010 client, so these settings should remain unchanged when the clients are upgraded.

4. Microsoft Lync 2010 Configuration for Remote Call Control

The reference document from Microsoft is the *RCC Deployment Guide*, downloadable at <http://www.microsoft.com/download/en/confirmation.aspx?id=16598>.

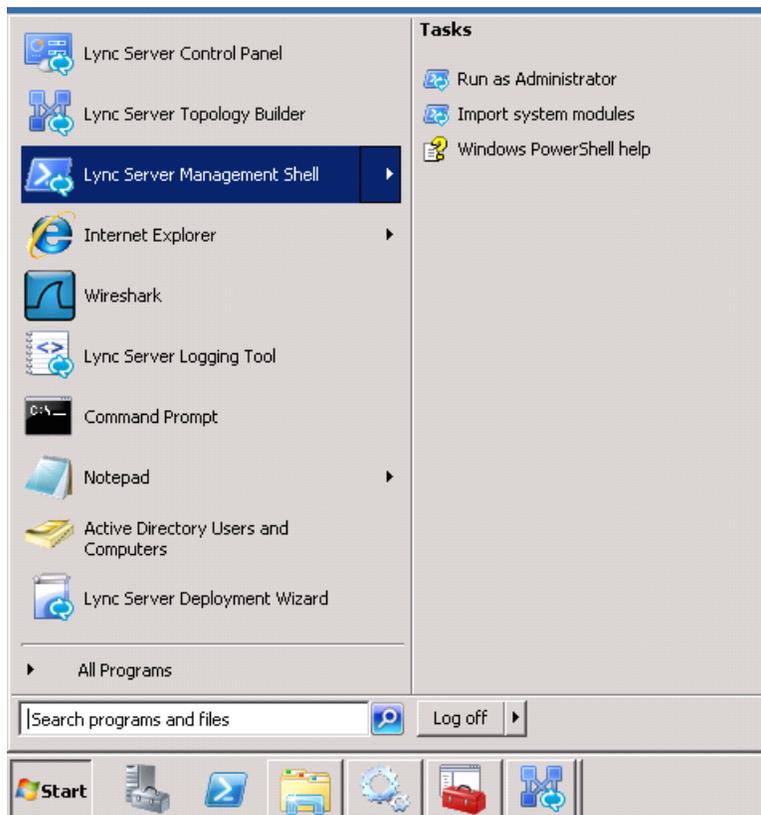
Step 1: Set up TCP Route and Trusted Application Pool using PowerShell

In this example the ShoreTel CSTA Server IP is *10.4.2.18* and its host name is *cstaservername.yourdomain.com*. You will enter these PowerShell commands using the actual CSTA Server name and domain name for your environment.

Note: Some of these commands may throw warnings about replication or UCMA considerations. Simply press "Y" to acknowledge those and proceed.

Log in with the proper credentials for the Administrator account on your Lync Server system.

Select Lync Server Management Shell from the Start menu, then choose Run as Administrator:



On the Lync Server Management Shell command line, enter the following configuration commands (**enter each command on a single line**, even if printed here on multiple lines due to formatting).

When doing so, please **make sure to replace** the placeholder `<DESTINATION-IP>` by the IP address of ShoreTel CSTA Server's host (e.g. 10.40.1.3) – **three times!**

Also replace the placeholder `<DESTINATION-HOST>` by a name for the ShoreTel CSTA Server's host (e.g. shoreteldvs.yourdomain.com). This does not need to be a host name that is known to your company's DNS – it will only be used in the Lync user configuration to refer to the host configured here.

Replace the placeholder `<REGISTRAR-NAME>` by the name of your Lync registrar (use the Lync Server Management Shell command `Get-CsService -Registrar` to query for this name. It is listed in the response under the key `Identity`).

Finally, if you have modified the CSTA Server's listening port number, please use the new number instead of `26535` (in two commands).

```
$TCPRoute = New-CsStaticRoute -TCPRoute -Destination <DESTINATION-IP>
-Port 26535 -MatchUri <DESTINATION-HOST> -ReplaceHostInRequestUri $True
-MatchOnlyPhoneUri $False
```

```
Set-CsStaticRoutingConfiguration -Route @{Add=$TCPRoute}
```

```
New-CsTrustedApplicationPool -Identity <DESTINATION-IP> -Registrar
<REGISTRAR_NAME> -Site 1 -TreatAsAuthenticated $true -ThrottleAsServer $true
-OutboundOnly $false -RequiresReplication $false
```

(ignore any warning that may appear here and answer 'Y' if prompted to do so)

```
New-CsTrustedApplication -ApplicationID ShoreTelCSTA
-TrustedApplicationPoolFqdn <DESTINATION-IP> -Port 26535 -EnableTCP
```

(ignore any warning that may appear here and answer 'Y' if prompted to do so)

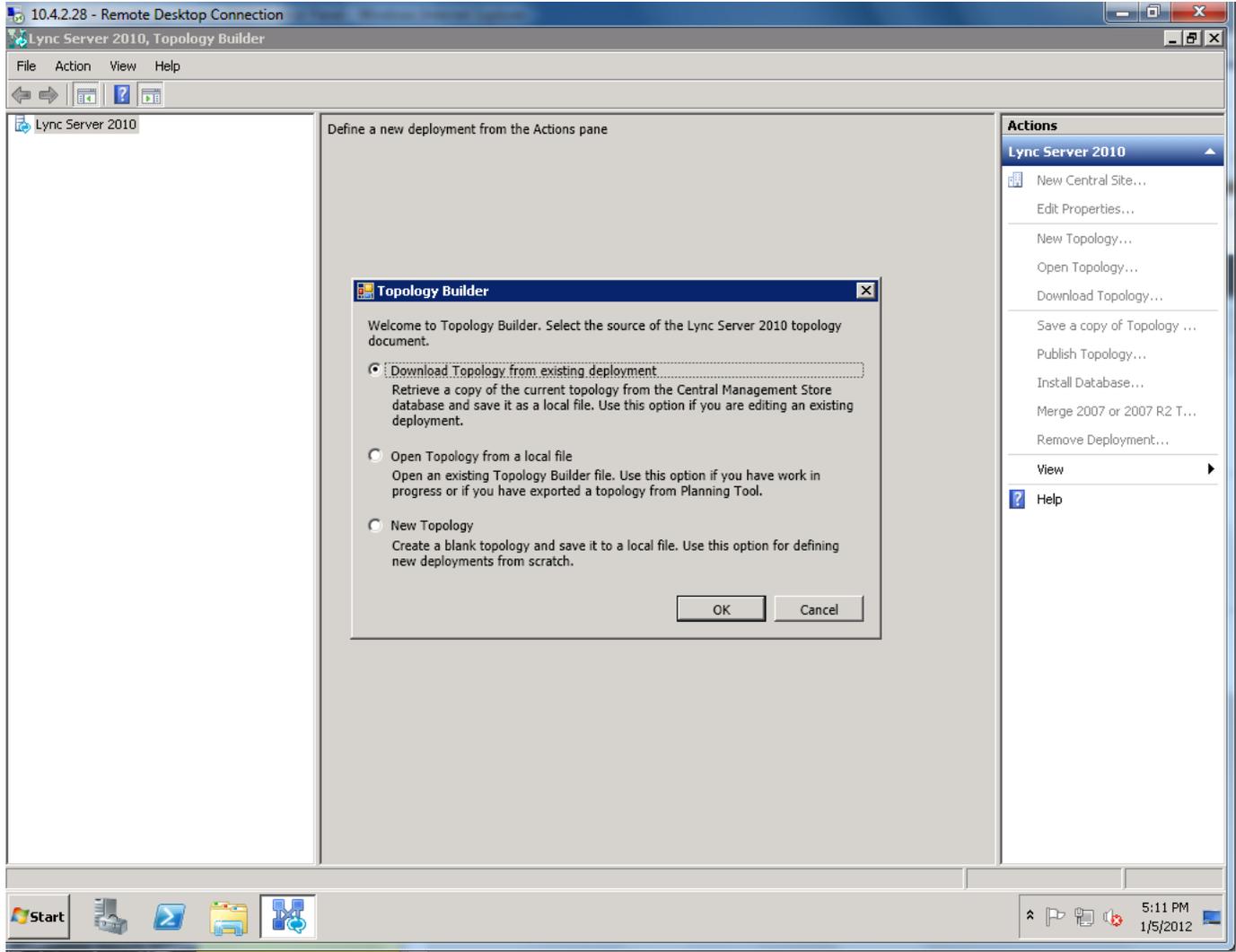
```
Enable-CsTopology
```

If you have a complex setup with multiple CSTA Servers, please repeat these commands for each additional CSTA Server.

See the ShoreTel CSTA Server Advanced Troubleshooting Guide for information on how to review or remove the settings you have made above.

Step 2: Download and Publish Topology Builder configuration

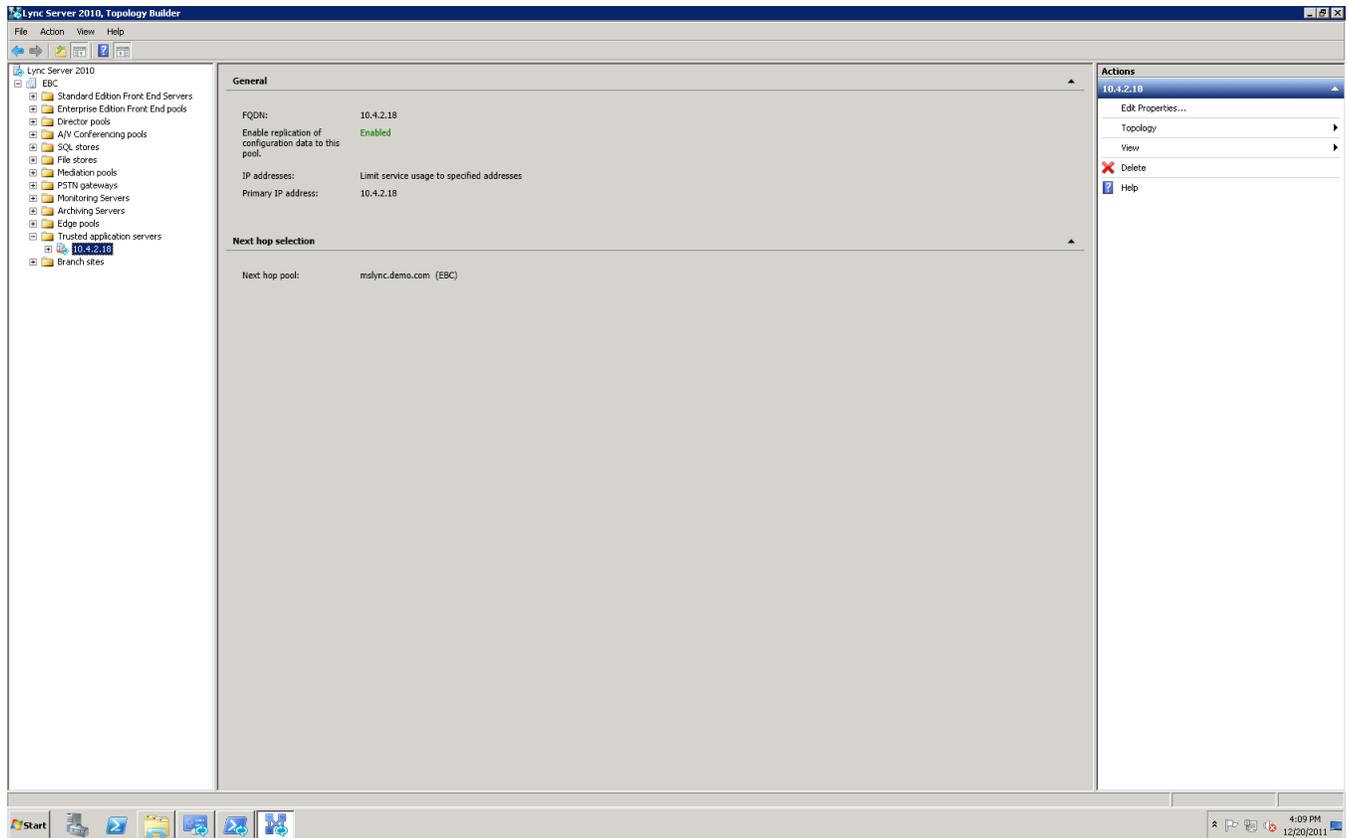
Launch the Lync Server 2010 Topology Builder from the Start menu and the following screen will display:



Click the button **Download Topology from existing deployment** and the current active topology file will be opened.

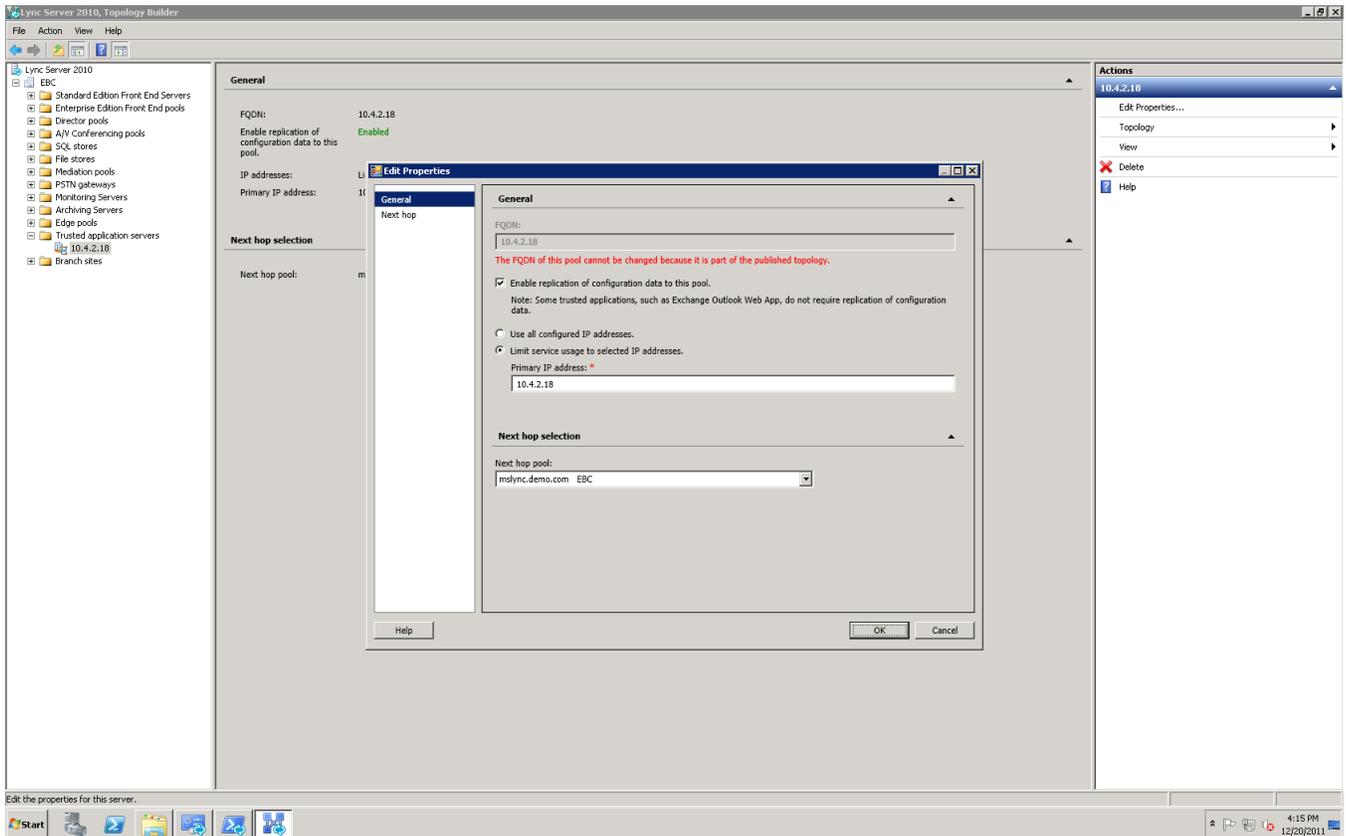
Next, Topology Builder will want to save the file so that there is a backup of the current configuration in case something goes wrong later on. Unless you want to archive the previous configuration, you'll typically only need this file temporarily until you know that the new configuration is OK. So just save it to the desktop or some other place where you'll remember to delete it at the end.

Expand the hierarchy in the left hand pane, open the **Trusted Application Servers** folder and click on the application that you just created via PowerShell:



In this example both the CSTA Server's identity and FQDN entries were entered as the IP address **10.4.2.18**.

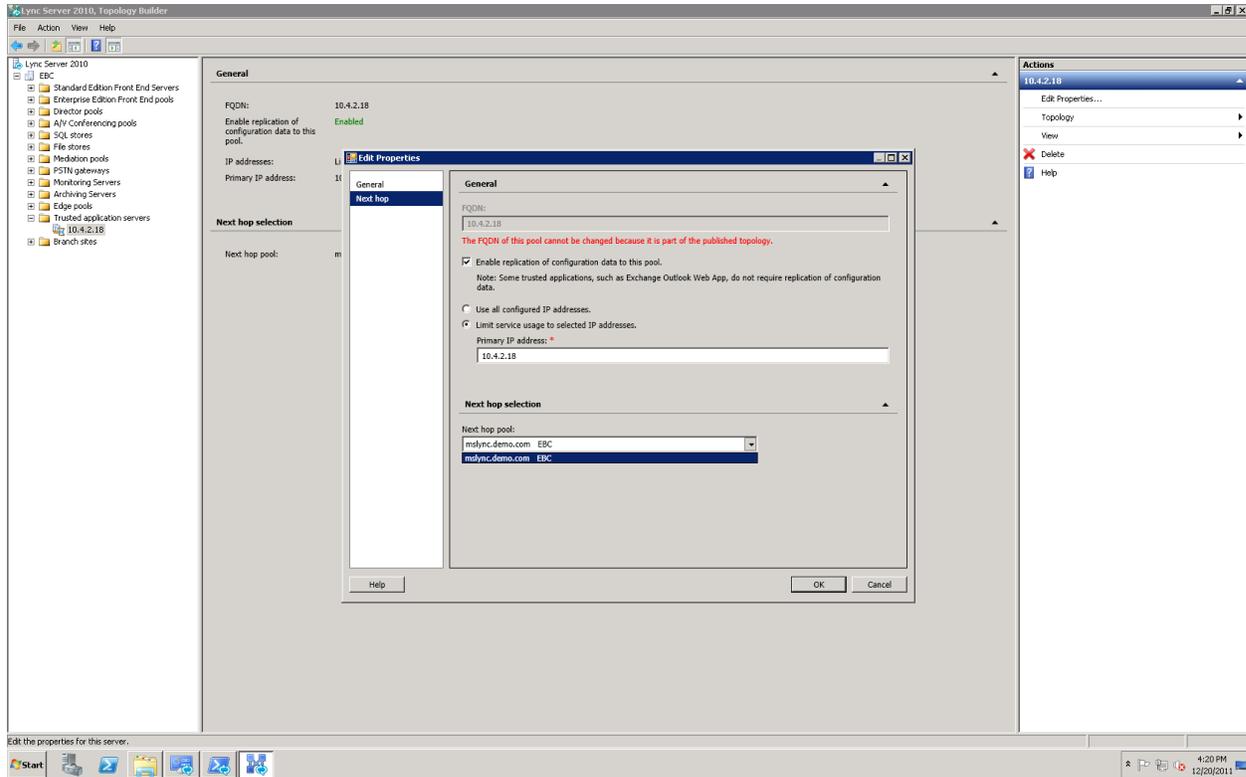
In the Actions pane to the right, click **Edit Properties...** and select the **General** configuration panel.



Uncheck the check box **Enable replication of configuration data to this pool** (different from what is being displayed in the screenshot above).

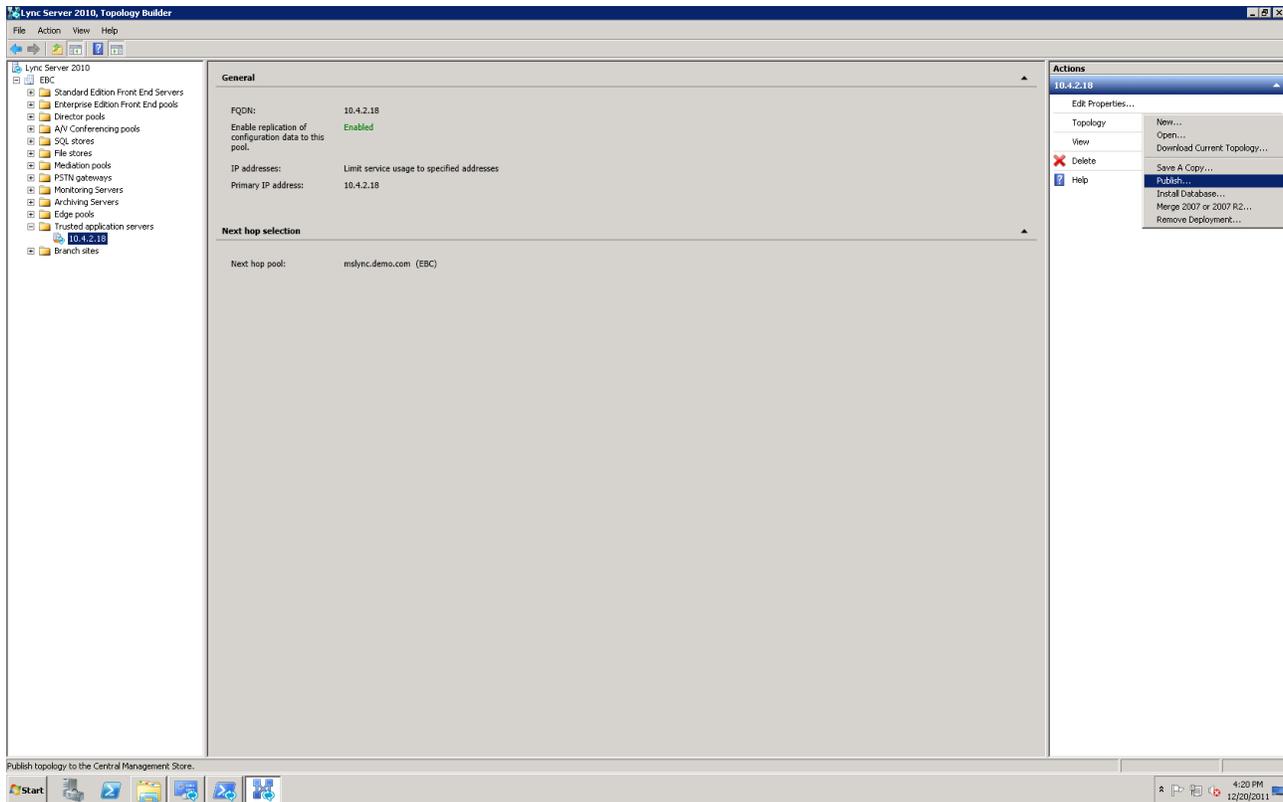
Click the radio button **Limit Server usage to selected IP addresses** and specify the IP address of the ShoreTel CSTA server in the **Primary IP Address** field.

Select the appropriate Next Hop pool for your Lync 2010 deployment from the **Next Hop Pool** drop down menu. In this example there is only one pool, named *mslync.demo.com*:



When all the fields are set correctly, click **OK** to save the entries.

Finally, right click on **Topology** and then select **Publish...** from the drop down menu to publish the topology:



Repeat these steps to add any additional CSTA Servers that you defined using the PowerShell commands in Step 1.

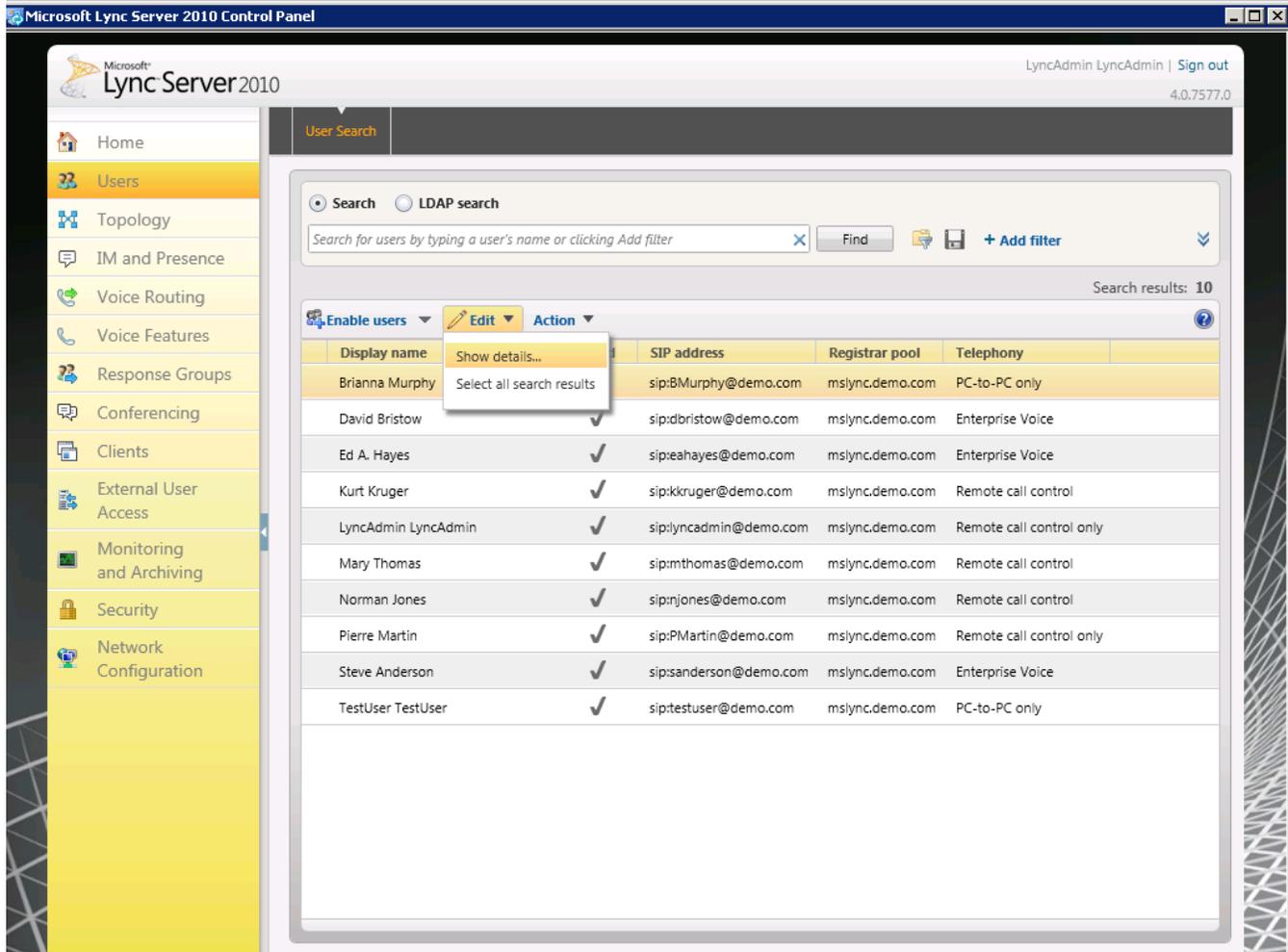
Step 3: Configure Lync 2010 User Properties for Telephony

Open the Lync Server 2010 Control Panel.

Log in with the proper credentials for the Administrator account on your system.

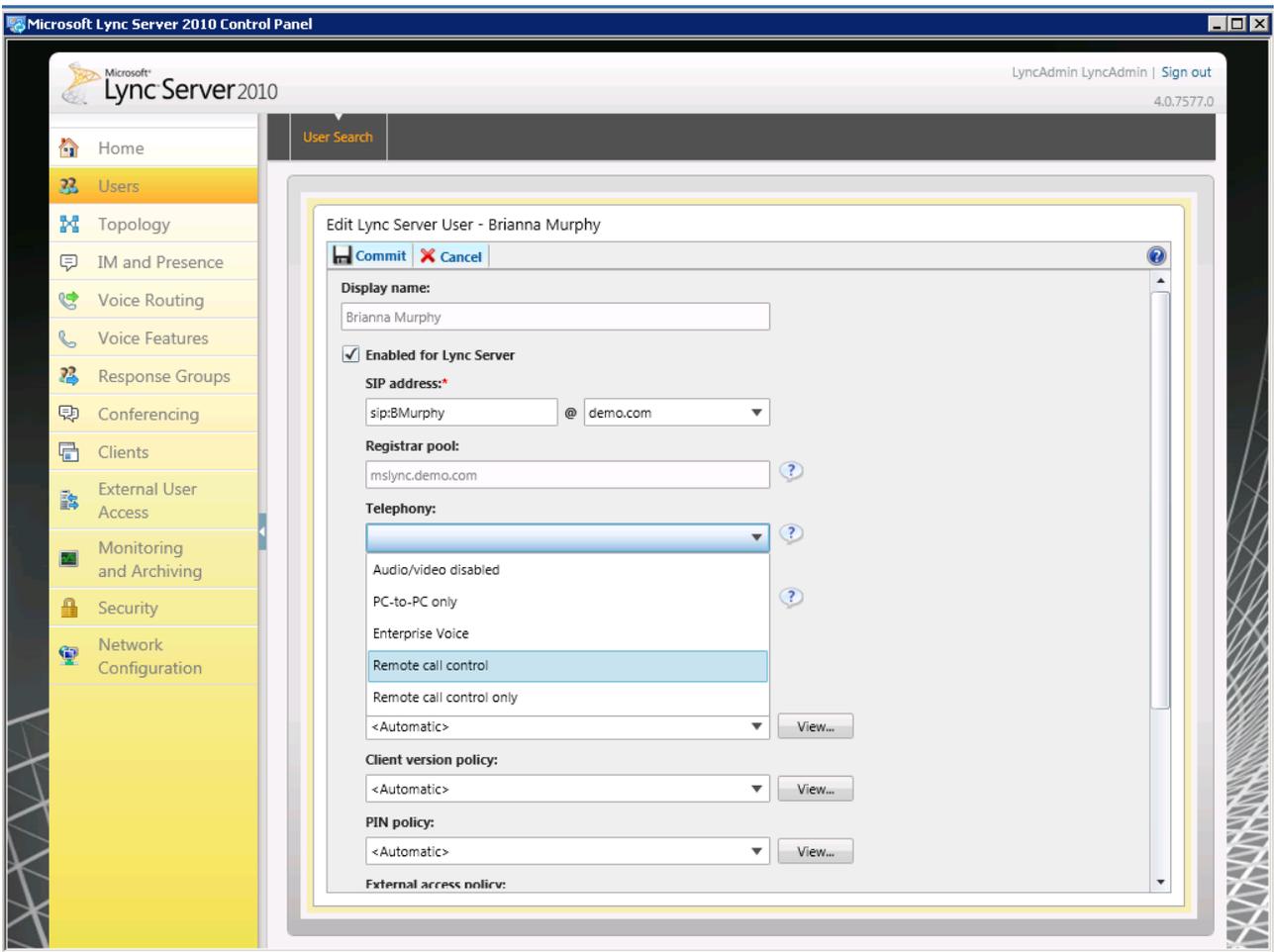
On the lefthand pane, click **Users** and use the Search radio buttons and Find button to populate the list of Lync users to be configured on your system.

In this example, the user being configured is Brianna Murphy. Select her user name and click **Edit** > **Show details...** Initially she's not enabled and Telephony is set as *PC-to-PC only*.



Select the check box **Enabled for Lync Server** and note that the **SIP address** and **Registrar pool** fields are filled in by default.

From the **Telephony**: drop down menu, select **Remote call control**.



For **Line URI**: specify this user’s phone number starting with “tel:” in lower case. You should use the user’s phone number in the form in which it is known in Active Directory, so that the Lync client of other users will display the name when a call comes in from this user.

Typically, this either looks like this (extension number):

tel:212

or like this (DID in international format):

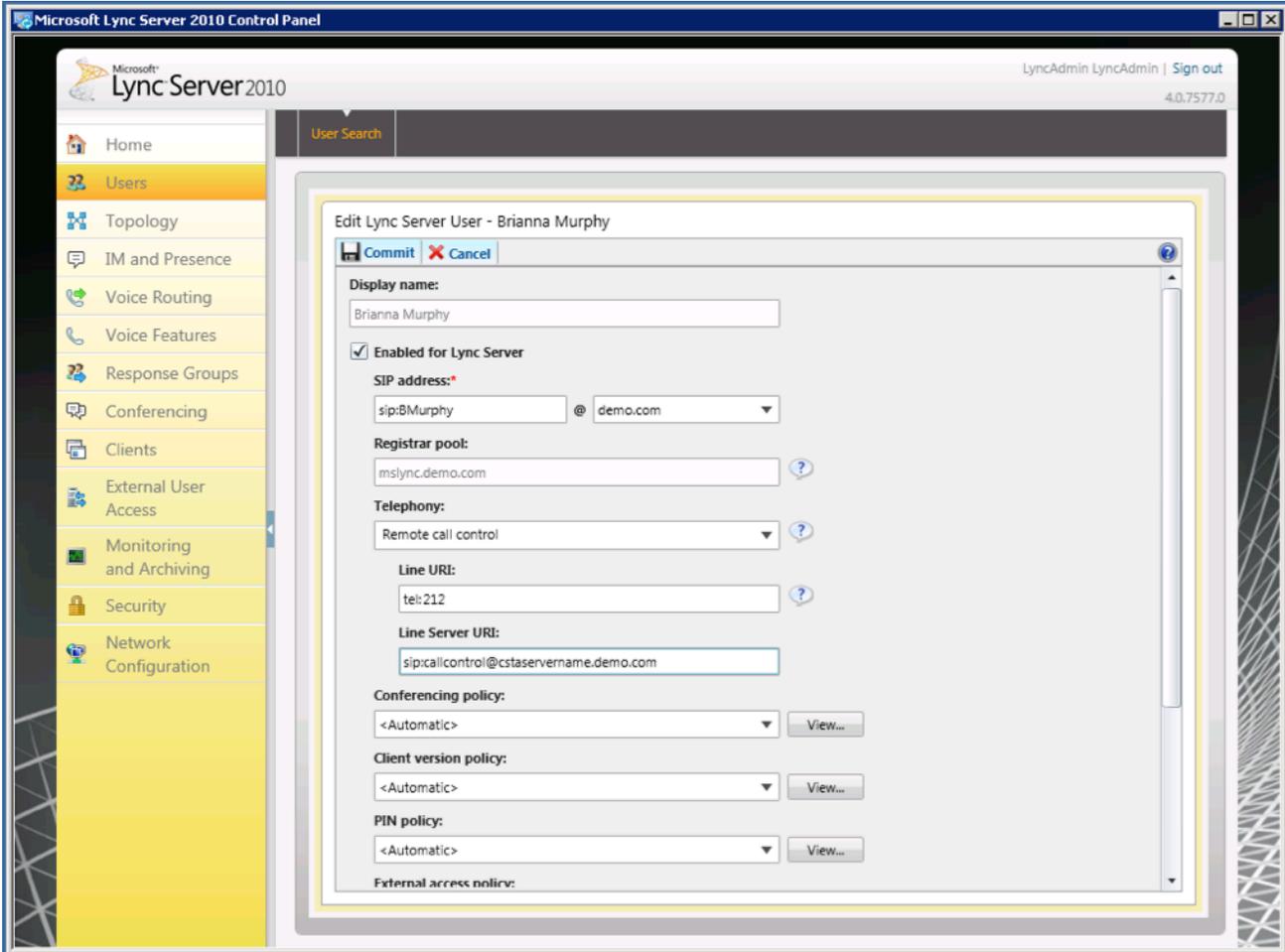
tel:+1408555212

You may also have to configure CSTA Server’s extension translation table, depending on your setup. See The Extension Translation Table on page 11 for details.

For **Line Server**: given the example *cstaservername.yourdomain.com* specified in the PowerShell commands in Step 1, enter

sip:callcontrol@cstaservername.yourdomain.com

using the actual CSTA Server name and domain name for your environment. In this example the Line Server is *cstaservername.demo.com*. Note that this value is the same for all users who will be served by this instance of the CSTA Server.



Save changes with the **Commit** button at top.

Repeat these steps for all users who will be using the Lync 2010 client to control their ShoreTel IP phone via this instance of the CSTA Server.

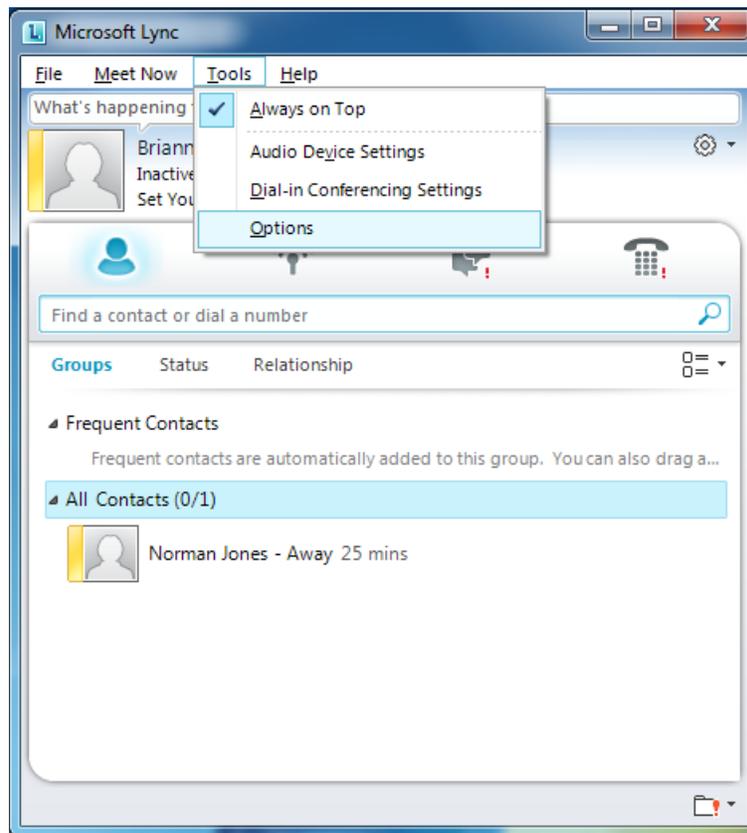
Repeat these steps for users of any additional CSTA Servers that you have added to your ShoreTel system and configured for use with Lync Server 2010. Note that from the user perspective, the difference would be in the Line and Line Server URIs configured for them.

Step 4: Lync 2010 Telephony Integration

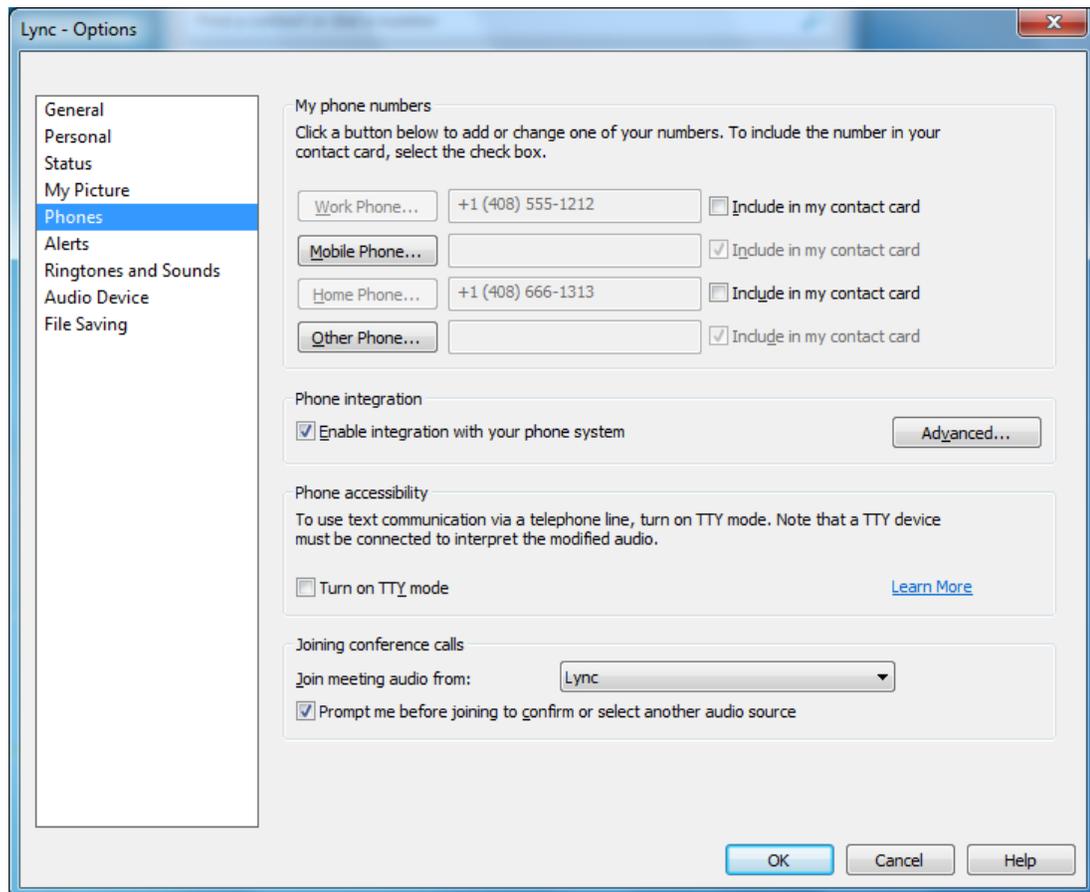
Note: It is strongly recommended that the latest version of Microsoft Lync 2010 be deployed to all user workstations that will be configured for telephony integration. Check the Microsoft website to download the latest version.

To verify and complete the telephony configuration of the user’s Lync client, launch and sign in to the Lync client as a configured user. In this example we’re using Brianna Murphy’s account.

Open the **Options** window from the **Tools** menu:



Select the **Phones** tab in the **Options** window:



Verify that the **Enable integration with your phone system** checkbox is checked, which it should be by default.

The four phone numbers (Work, Mobile, Home, Other) are intended to allow others to call this user at these numbers. The numbers can be configured on the Active Directory server (described in step 4 of the Lync 2013 telephony integration below). If not configured there, they can be set here.

Typically, the work phone number should match the line number configured for this user on the Lync Server 2013 (see step 3 above).

Check the **Include in my contact card** checkbox so other users have access to the phone number associated with this user.

Repeat these steps for all users who will be using the Lync client to control their ShoreTel IP phone via the CSTA Server.

5. Microsoft Lync 2013 Configuration for Remote Call Control

The reference documentation from Microsoft is *Deploying Remote Call Control* at <http://technet.microsoft.com/en-us/library/gg558664.aspx>

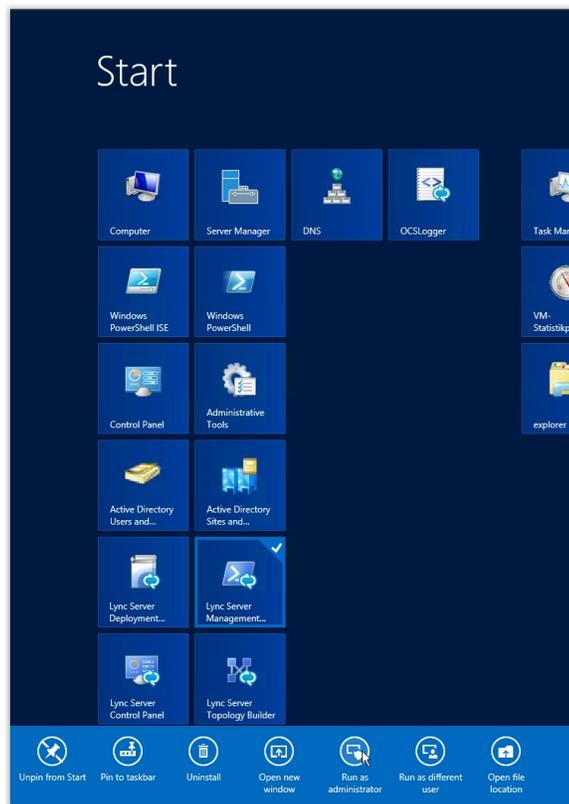
Step 1: Set up TCP Route and Trusted Application Pool using PowerShell

In this example the ShoreTel CSTA Server IP is *10.40.1.3* and its host name is *cstaservername.yourdomain.com*. You will enter these PowerShell commands using the actual CSTA Server name and domain name for your environment.

Note: Some of these commands may throw Warnings about replication or UCMA considerations. Simply press "Y" to acknowledge those and proceed.

Log in with the proper credentials for the Administrator account on your Lync Server system.

Select Lync Server Management Shell from the Start menu, then choose Run as Administrator:



On the Lync Server Management Shell command line, enter the following configuration (**enter each command on a single line**, even if printed here on multiple lines due to formatting).

When doing so, please **make sure to replace** the placeholder `<DESTINATION-IP>` by the IP address of ShoreTel CSTA Server's host (e.g. 10.40.1.3) – **three times!**

Also replace the placeholder `<DESTINATION-HOST>` by a name for the ShoreTel CSTA Server's host (e.g. shoretel dvs.yourdomain.com). This does not need to be a host name that is known to your company's DNS – it will only be used in the Lync user configuration to refer to the host configured here.

Replace the placeholder `<REGISTRAR-NAME>` by the name of your Lync registrar (use the Lync Server Management Shell command `Get-CsService -Registrar` to query for this name. It is listed in the response under the key `Identity`).

Finally, if you have modified the CSTA Server's listening port number, please use the new number instead of `26535` (in two commands).

```
$TCPRoute = New-CsStaticRoute -TCPRoute -Destination <DESTINATION-IP>
-Port 26535 -MatchUri <DESTINATION-HOST> -ReplaceHostInRequestUri $True
-MatchOnlyPhoneUri $False
```

```
Set-CsStaticRoutingConfiguration -Route @{Add=$TCPRoute}
```

```
New-CsTrustedApplicationPool -Identity <DESTINATION-IP> -Registrar
<REGISTRAR_NAME> -Site 1 -TreatAsAuthenticated $true -ThrottleAsServer $true
-OutboundOnly $false -RequiresReplication $false
```

(ignore any warning that may appear here and answer 'Y' if prompted to do so)

```
New-CsTrustedApplication -ApplicationID ShoreTelCSTA
-TrustedApplicationPoolFqdn <DESTINATION-IP> -Port 26535 -EnableTCP
```

(ignore any warning that may appear here and answer 'Y' if prompted to do so)

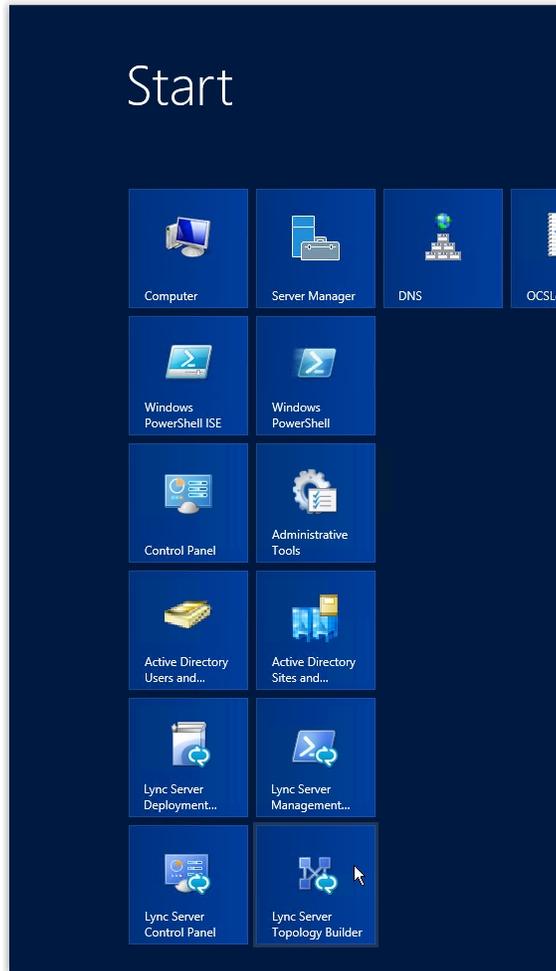
```
Enable-CsTopology
```

If you have a complex setup with multiple CSTA Servers, please repeat these commands for each additional CSTA Server.

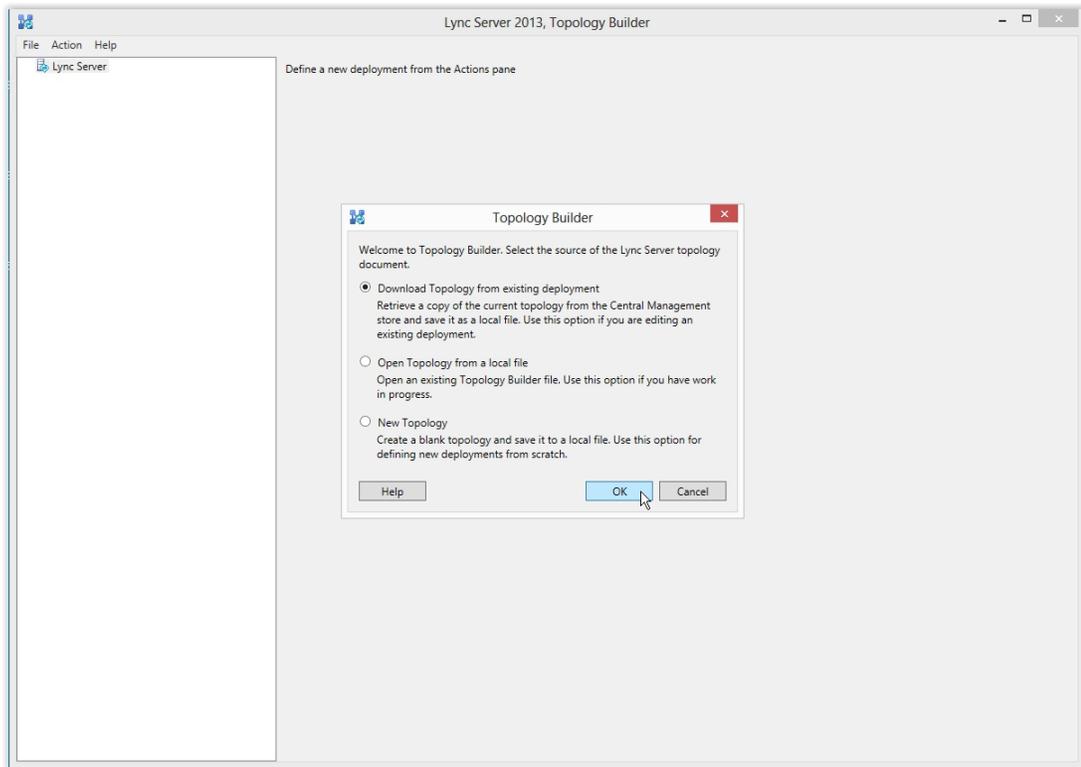
See the ShoreTel CSTA Server Advanced Troubleshooting Guide for information on how to review or remove the settings you have made above.

Step 2: Download and Publish Topology Builder configuration

Launch the Lync Server Topology Builder from the Start menu:



The following screen will display:

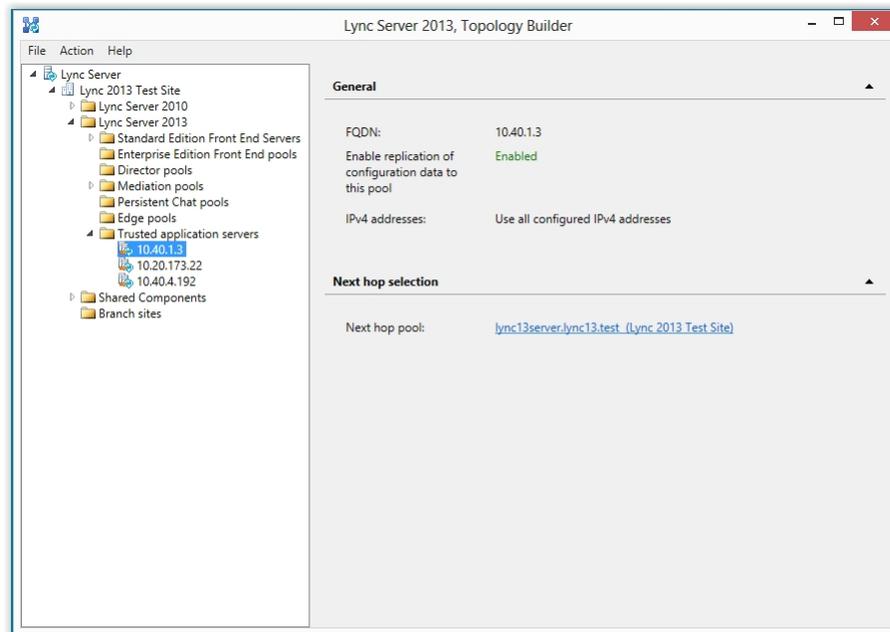


Click the radio button for **Download Topology from existing deployment** and the current active topology file will be opened.

Next, Topology Builder will want to save the file so that there is a backup of the current configuration in case something goes wrong later on. Unless you want to archive the previous configuration, you'll typically only need this file temporarily until you know that the new configuration is OK. So just save it to the desktop or some other place where you'll remember to delete it at the end.

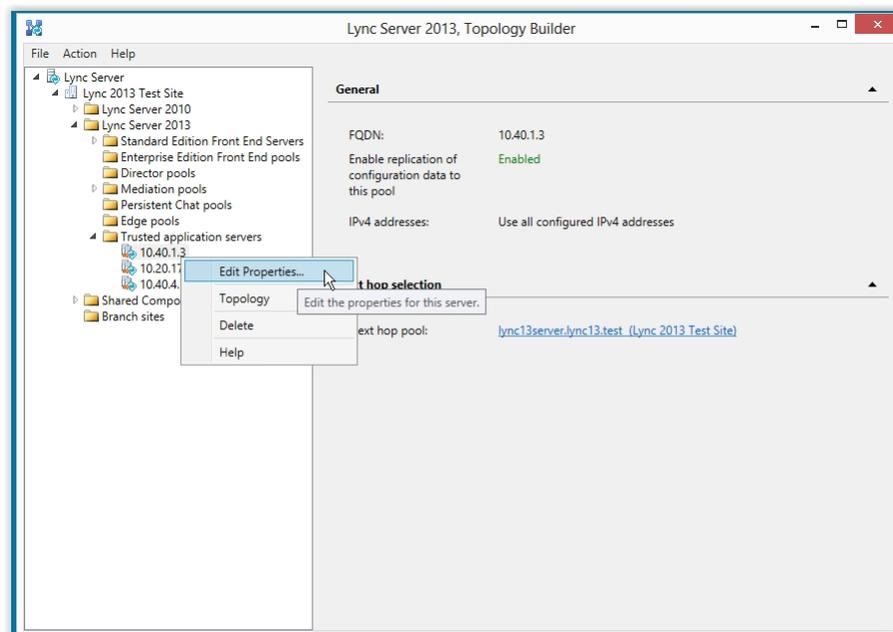
iolink ShoreTel CSTA Server Configuration Guide

Now expand the hierarchy in the left hand pane, open the **Trusted Application Servers** folder and click on the application that you just created via PowerShell:

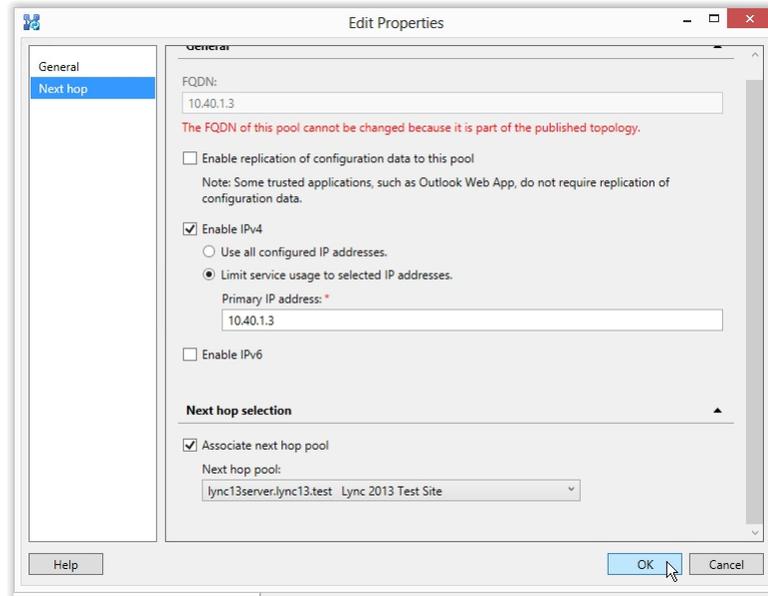


In this example both the CSTA Server's identity and FQDN entries were entered as the IP address **10.40.1.3**.

Right click the server and select **Edit Properties...**



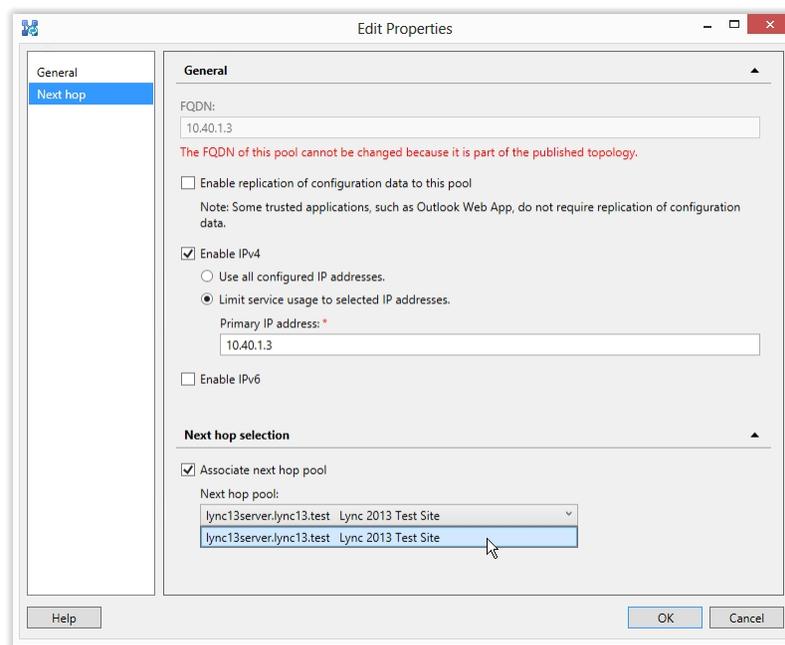
Select the **General** configuration panel:



Uncheck the check box **Enable replication of configuration data to this pool**

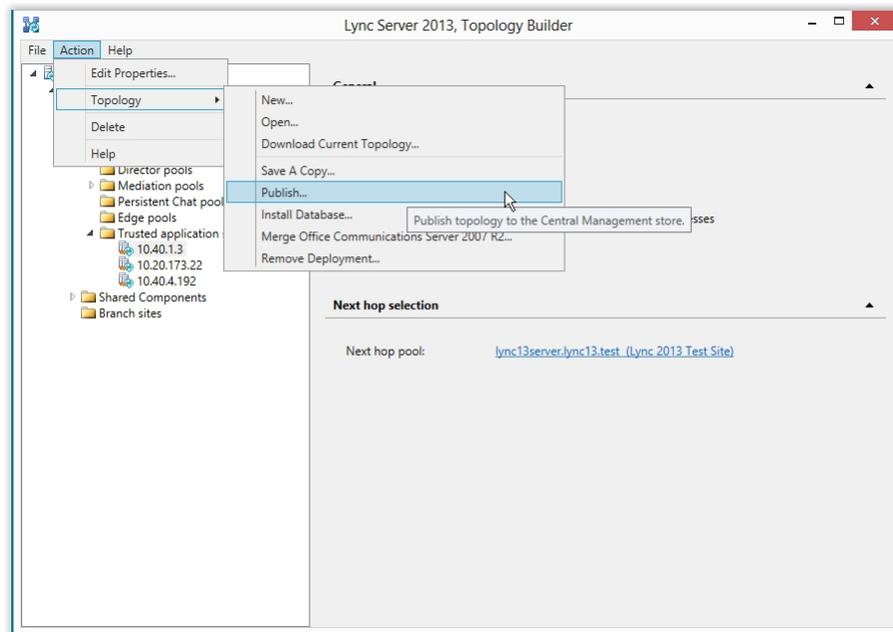
Click the radio button **Limit Server usage to selected IP addresses** and specify the IP address of the ShoreTel CSTA server in the **Primary IP Address** field.

Select the appropriate Next Hop pool for your Lync 2013 deployment from the **Next Hop Pool** drop down menu. In this example there is only one pool, named *lync13server.lync13.test*.



When all the fields are set correctly, click **OK** to save the entries.

Finally, use the menu entry **Action / Topology / Publish...** to publish the topology:



Repeat these steps to add any additional CSTA Servers that you defined using the PowerShell commands in Step 1.

If you have not yet done so, you may delete the temporary topology file that was saved at the beginning of this step.

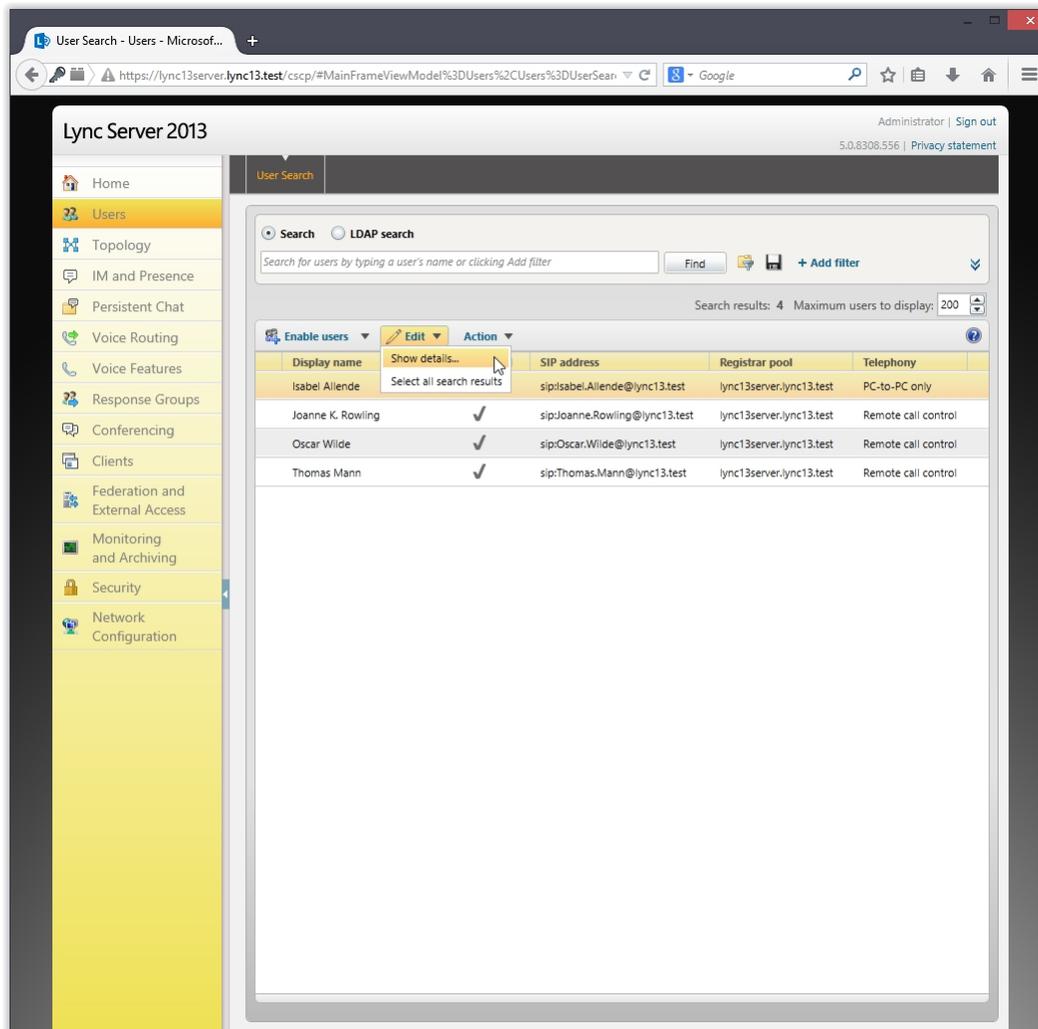
Step 3: Configure Lync 2013 User Properties for Telephony

Open a web browser and navigate to **<https://Lyncservername.yourdomain.com/cscp>** using the actual Lync Server 2013 name and domain name for your environment.

Log in with the proper credentials for the Administrator account on your system.

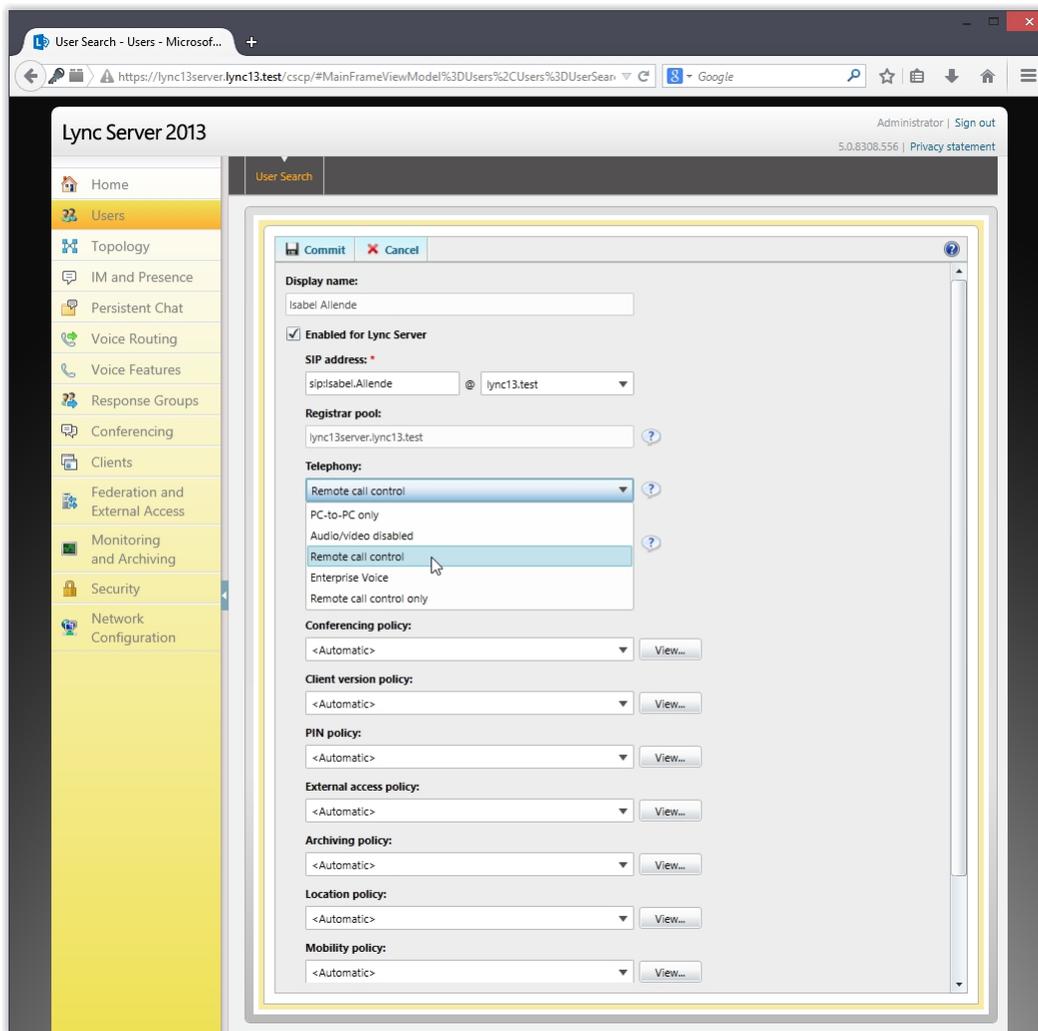
On the lefthand pane, click **Users** and use the Search radio buttons and Find button to populate the list of Lync users to be configured on your system.

In this example, the user being configured is Isabel Allende. Select her user name and click **Edit > Show details...** Initially she's not enabled and Telephony is set as *PC-to-PC only*:



Select the check box **Enabled for Lync Server** and note that the **SIP address** and **Registrar pool** fields are filled in by default.

From the **Telephony**: drop down menu, select **Remote call control**.



For **Line URI**: specify this user’s phone number starting with “tel:” in lower case. You should use the user’s phone number in the form in which it is known in Active Directory, so that the Lync client of other users will display the name when a call comes in from this user.

Typically, this either looks like this (extension number):

tel:212

or like this (DID in international format):

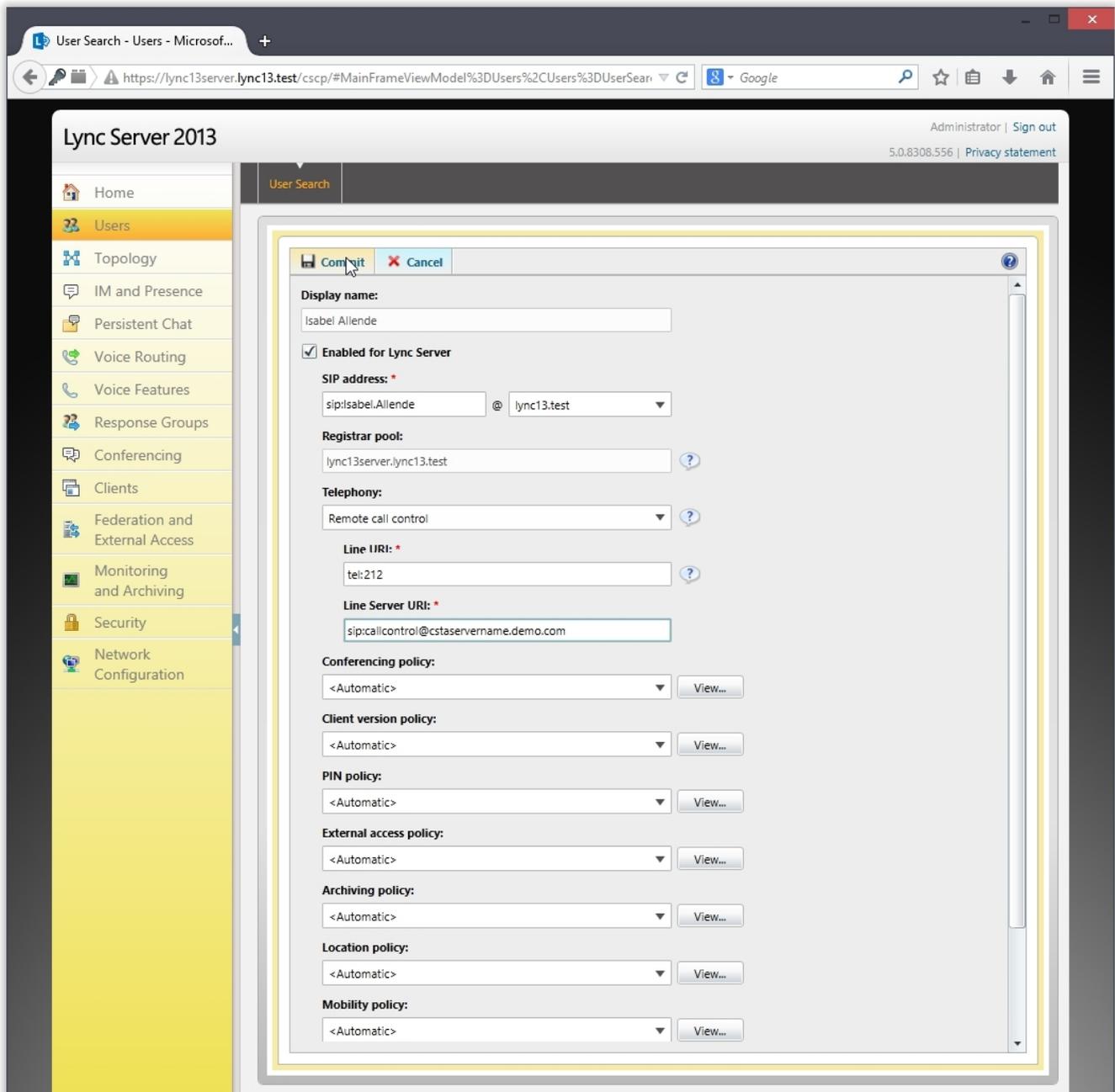
tel:+1408555212

You may also have to configure CSTA Server’s extension translation table, depending on your setup. See The Extension Translation Table on page 11 for details.

For **Line Server**: given the example *cstaservername.yourdomain.com* specified in the PowerShell commands in Step 1, enter

sip:callcontrol@cstaservername.yourdomain.com

using the actual CSTA Server name and domain name for your environment. In this example the Line Server is *cstaservername.demo.com*. Note that this value is the same for all users who will be served by this instance of the CSTA Server.



Save changes with the **Commit** button at top.

Repeat these steps for all users who will be using the Lync 2013 client to control their ShoreTel IP phone via this instance of the CSTA Server.

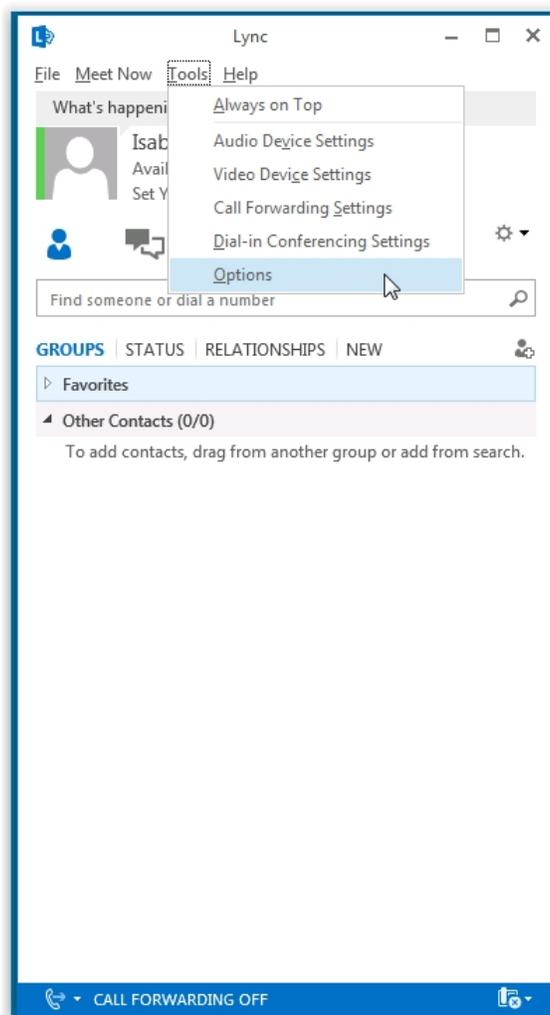
Repeat these steps for users of any additional CSTA Servers that you have added to your ShoreTel system and configured for use with Lync Server 2013. Note that from the user perspective, the difference would be in the Line and Line Server URIs configured for them.

Step 4: Lync 2013 Telephony Integration

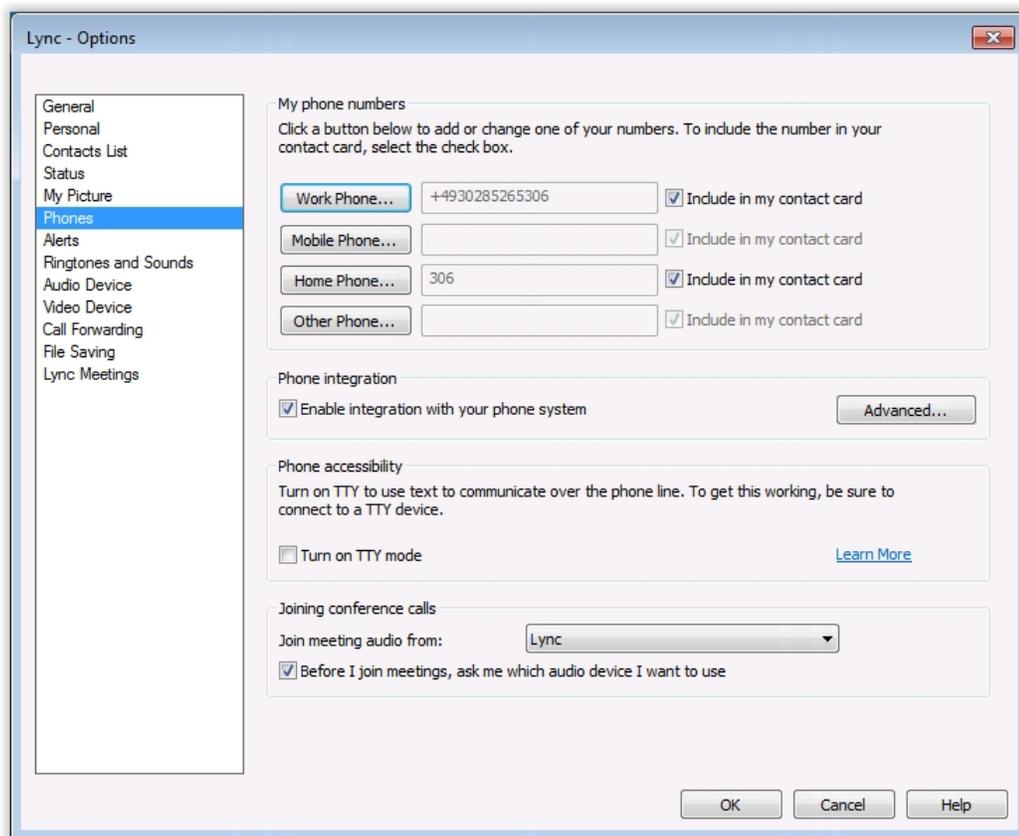
Note: It is strongly recommended that the latest version of Microsoft Lync 2013 be deployed to all user workstations that will be configured for telephony integration. Check the Microsoft website to download the latest version.

To verify and complete the telephony configuration of the user's Lync client, launch and sign in to the Lync client as a configured user. In this example we're using Isabel Allende's account.

Open the **Options** window from the **Tools** menu:



Select the **Phones** tab in the **Options** window:



Verify that the **Enable integration with your phone system** checkbox is checked, which it should be by default.

The four phone numbers (Work, Mobile, Home, Other) are intended to allow others to call this user at these numbers. The numbers can be configured on the Active Directory server (see below). If not configured there, they can be set here.

Typically, the work phone number should match the line number configured for this user on the Lync Server 2013 (see step 3 above).

Check the **Include in my contact card** checkboxes so other users have access to these phone numbers.

Repeat these steps for all users who will be using the Lync client to control their ShoreTel IP phone via the CSTA Server.

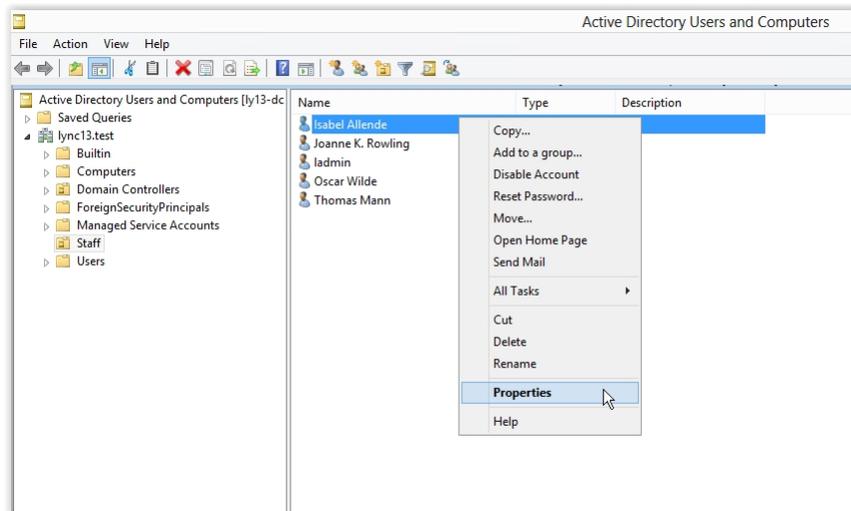
Configuring the User's Phone Numbers on the Active Directory Server (optional)

To configure the users' phone numbers in Active Directory, proceed as follows:

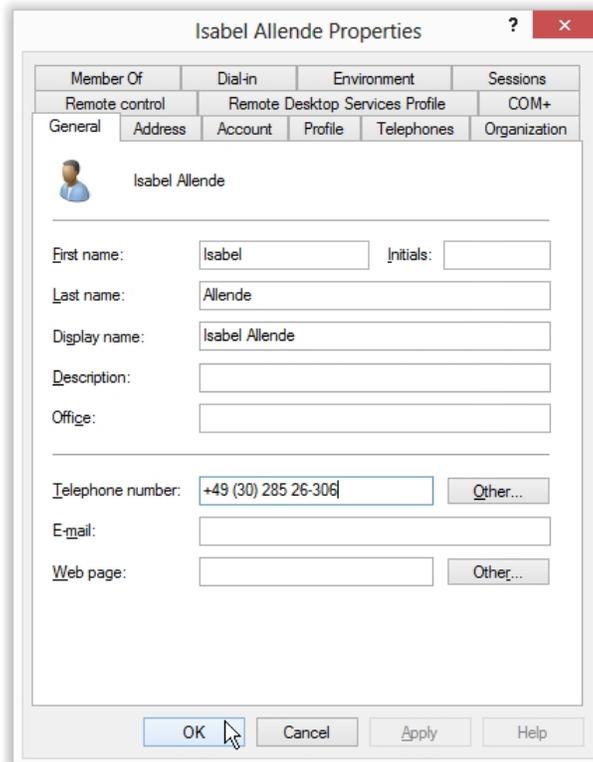
Start **Active Directory Users and Computers**:



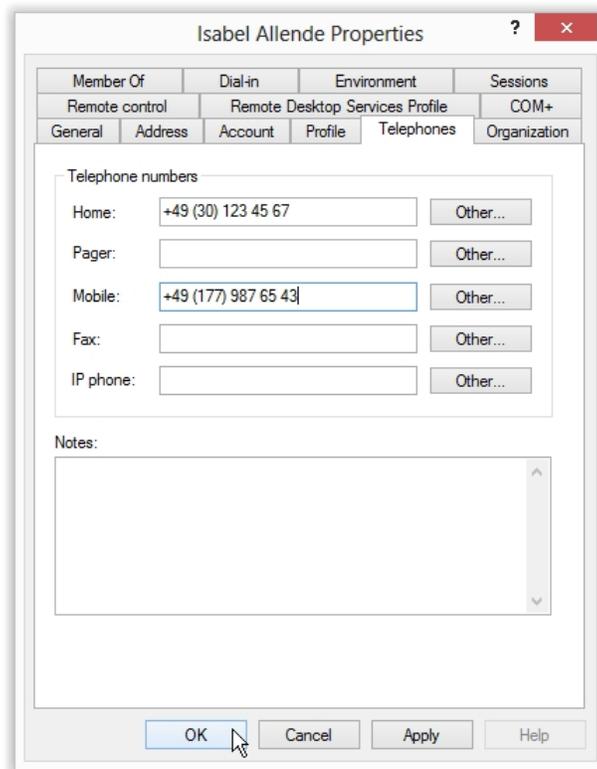
Select the user, right click and open **Properties** from the context menu:



Use the **General** tab to set the work phone number:



Use the **Telephones** tab to set the home and mobile number.



The "Other Phone" number cannot be set in Active Directory, it can only be set by the user in the Lync client's phone options.

Appendix 1: Advanced Dial Plan Configurations

The ShoreTel CSTA Server provides a telephone number mapping function for Lync client software. The installer supports complete configuration of this functionality for a new CSTA Server with a basic configuration. This consists of a ShoreTel system with a single DID range where every PSTN number in the range corresponds to an extension such that the extension number appears as the final digits of the PSTN number. For example if the DID range is +1(408)555-9400 through +1(408)555-9499 then the extension corresponding to the DID number +1(408)555-9432 is 432.

If one of the following circumstances applies to your ShoreTel system, it is considered an advanced configuration:

1. Configured to for On-Net Dialing
2. Configured for Mapping ANI Digits on Inbound Calls

Any advanced configuration requires that the configuration file be manually edited in order for the number mapping function for Lync clients to operate correctly.

If On-Net Dialing is being used, both the *DialPlan.conf* and *Default.conf* configuration files must be manually edited. As noted previously, both these configuration files are found in the configuration directory, which by default is **%ProgramFiles%\iLink\ShoreTel CSTA Server**.

Be sure to plan such configurations using *Appendix 7: ShoreTel CSTA Server Planning Worksheet* before modifying any files. After modifying these configuration files, the ShoreTel CSTA Server components must be restarted.

Default.conf Configuration File

The *Default.conf* configuration file is a text file containing a list of key value pairs. It can be edited using a text editor. The two keys that are used in configuring the software for mapping, or translation, of telephone numbers are `onNetPrefixList` and `maxExtensionLength`.

Key	Default	Comment
<code>onNetPrefixList</code>		List of prefixes used if ShoreTel On-Net Dialing feature is activated. All prefixes are listed on a single line separated by semicolons (“;”)
<code>maxExtensionLength</code>	5	Maximum number of digits in an extension number. Should be set to 3, 4, or 5.

Unless the On-Net Dialing feature is active, leave the value for `onNetPrefixList` blank. To configure support for On-Net Dialing, enter the list of all On-Net Dialing prefixes separated by semicolons.

For example if you are using the On-Net Dialing prefixes 241, 242, and 243, then the value for the `onNetPrefixList` key is **241;242;243**.

Note: If you enable On-Net Dialing you must also make appropriate entries for each On-Net Dialing prefix in the *DialPlan.conf* file (see below).

For more information about the contents of the *Default.conf* configuration file and other ShoreTel CSTA Server configuration files, see Appendix 5.

Configuring On-Net Dialing in DialPlan.Conf

If the On-Net Dialing feature is enabled, additional information is needed in the Extension Translation Table section of *DialPlan.conf*. As described above, the CSTA Server determines if a number is an extension number or an external number based on its length. Telephone numbers too long to be extension numbers are considered external numbers unless they start with one of the On-Net Dialing prefixes configured in the *Default.conf* configuration file (see above).

If On-Net Dialing is configured then the extension numbers used in the mapping process will consist of the On-Net Dialing prefix followed by an extension number of the standard length. The Extension Translation Table must contain appropriate entries.

For example, a ShoreTel system is configured to use 3 digit extensions and an On-Net Dialing prefix of 589. All extensions associated with that prefix are associated with the DID range (408)555-1xxx. In this case the On-Net Dialing prefix 589 would be added to the list of On-Net Dialing prefixes configured in the *Default.conf* file:

```
onNetPrefixList = 589
```

and there would be an entry in the Extension Translation Table of the *DialPlan.conf* file with +14085551 in the first column and 589 in the second column:

```
--Extension Translation Table  
+14085551      589
```

Configuring for Mapping ANI Digits (for Inbound Calls)

If the ShoreTel system is configured with a trunk such that ANI data must be mapped before delivery to Lync clients, use *Appendix 7: ShoreTel CSTA Server Planning Worksheet* to list the range of PSTN numbers that will not be correctly reported if not mapped and the corresponding leading digits that will be used to identify them. Next determine what the appropriate entries should be in the first and second columns based on the mapping substitution rules described above.

For example, a ShoreTel system configured with trunks that only deliver 7-digit ANI which is prefixed by special leading digits that indicates which trunk is delivering the call would appear as follows:

PSTN Range Start	PSTN Range End	Leading Digits
+14080000000	+14089999999	06
+12120000000	+12129999999	07
+16130000000	+16139999999	08

The resulting entries at the end of the Extension Translation Table of the *DialPlan.conf* file are:

```
+1408      06
+1212      07
+1613      08
```

Appendix 2: Translating Numbers for Lync Clients

Translating Numbers Received from Lync Clients

Telephone numbers received from a desktop client are first examined to determine if they are already dialable extension numbers (based on their length) or On-Net Dialing extensions (based on their prefix). If so, no translation is required.

Otherwise, these numbers are processed by matching the leading characters of the telephone number provided with an entry in the first column of the Extension Translation Table. If a match is found, the matching portion of the provided telephone number is replaced with the digits found in the corresponding entry in the second column.

The examples below illustrate the substitution process for mapping to extension numbers:

First Column	Second Column	Number Provided	Resulting Extension
+14085551	11	+14085551234	11234
+14085551	589	+14085551234	589234
+140828512	7	+14085551234	734
+14085551234	456	+14085551234	456

If no match is found in the Extension Translation Table, then the matching process is repeated using the External Translation Table. The leading characters of the provided telephone number are matched with an entry in the first column of the External Translation Table. If a match is found the matching portion of the provided telephone number is replaced with the digits found in the corresponding entry in the second column.

These examples illustrate the substitution process for mapping to a dialing sequence for an external number:

First Column	Second Column	Number Provided	Resulting External Dialing Sequence
+	9+	+14085551234	9+14085551234
+1	91	+14085551234	914085551234
+1408	9	+14085551234	95551234
+1212	81212	+12125551234	812125551234

Translating Numbers Delivered to Lync Clients

Telephone numbers received from the ShoreTel system are first examined to determine if they are extension numbers (based on their length) or On-Net Dialing extensions (based on their prefix). If so, numbers are converted from extension numbers to numbers in E.164 “international format” by matching the leading digits of the extension number with an entry in the second column of the Extension Translation Table. If a match is found the matching portion of the extension number is replaced with the digits found in the corresponding entry in the first column. If no match is found no translation is performed. If all the digits in the second column match the number in question, then all the digits are replaced with the entry found in the corresponding first column.

These examples illustrate the substitution process:

First Column	Second Column	Extension Number	Resulting Number
+14085551	11	11987	+14085551987
+14085551	589	589123	+14085551123
+140828512	7	789	+14082851289
+14085551234	456	456	+14085551234

Telephone numbers received from the ShoreTel system that correspond to external numbers are converted to DID numbers by matching the leading digits of the external number with an entry in the second column of the External Translation Table. If a match is found the matching portion of the number is replaced with the digits found in the corresponding entry in the first column. If no match is found then no

translation is performed. If all the digits in the second column match the external number, then all the digits are replaced with the entry found in the corresponding first column.

These examples illustrate the substitution process:

First Column	Second Column	External Number	Resulting Number
+1	1	14085551987	+14085551987
+1		4085551987	+14085551987

Appendix 3: Understanding Caller ID for Inbound and Outbound Dialing

The ShoreTel system supports International Caller ID, Caller ID Name, Caller ID Number, ANI, and DNIS. The Caller ID and trunk group or DNIS information is provided to the user to assist in answering the call. This information will be displayed on the ShoreTel phone and in the Lync client user interface. When the Lync client starts, it retrieves its Server and Line URI settings, as well as the RCC-enabled settings automatically from the server. This in-band provisioning transmits configuration settings to the Lync client, even when it has no access to Group Policies stored in Active Directory.

On an incoming call, the ShoreTel system rings the user's ShoreTel IP phone and also sends out an incoming call notification to the Lync client by using a SIP INFO message sent from the CSTA Server. The user can either answer the incoming call on the ShoreTel IP phone or click to accept the incoming call on Lync client, which activates the speaker phone on the ShoreTel IP phone.

To resolve the Calling Party Number to a name, the Lync client first applies the number normalization Regular Expression configured in the Address Book Service on the Lync server for the Calling Party Number. After that, the Lync client matches the current E.164 format normalized Calling Party Number with the phone numbers stored in Active Directory or Outlook contacts. This functionality is called reverse number lookup. If the Lync client successfully applies reverse number lookup and finds a name that matches a Calling Party Number, the name is presented to the user in the pop-up window and the Conversation window, instead of the Calling Party Number.

If the Calling Party Number string does not contain a number on an incoming call, the Lync client will not apply reverse number look up. On an outgoing call initiated by the Lync client, it first applies the Number Normalization regular expression rules (the same rules that were configured for reverse number lookup on incoming calls, which convert a number string to E.164 format) on the number string entered as Calling Party Number in the Lync client before sending the request to the CSTA Server.

Appendix 4: Parallel installation of ShoreTel CSTA Server and ShoreTel Communicator for Sametime

If you want to run both ShoreTel CSTA Server and ShoreTel Communicator for Sametime on the same server, you will have to perform manual configuration steps as described below.

Installation of both products on the same server poses no problems.

ShoreTel CSTA Server installs into **%ProgramFiles%\iLink\ShoreTel CSTA Server** and ShoreTel Communicator for Sametime installs into **%ProgramFiles%\iLink\ShoreTel Communicator for Sametime**.

However, the components of both products use the same port numbers, so there will be port conflicts when both sets of services are started.

You'll need to change the port configuration of one of the two products in order to resolve the conflicts.

As an example, you may do so by changing the port number assignments of the ShoreTel CSTA Server components as follows, followed by a restart of the ShoreTel CSTA Server services:

%ProgramFiles%\iLink\ShoreTel CSTA Server\Config\Default.conf

```
loginPort = 26535      --> 26536  (Listening port)
cstaLinkPort = 26001  --> 26002  (CA ShoreTel port)
```

%ProgramFiles%\iLink\ShoreTel CSTA Server\Config\ca_config.properties

```
server_port=26001      --> 26002  (Listening port)
nettspi_port=20000     --> 20001  (Client port)
csis_port=2800         --> 2801   (Client port)
```

%ProgramFiles%\iLink\ShoreTel CSTA Server\Config\LINKTSP.INI

```
loginPort=20000       --> 20001  (Listening port)
```

%ProgramFiles%\iLink\ShoreTel CSTA Server\Bin\CSIS-CA\PluginTelephony\PLUGINTELEPHONYTCE.INI

```
Port=2800             --> 2801   (Listening port)
```

Appendix 5: Configuration File Details

By default, the configuration files for the CSTA Server components are stored in the folder
%ProgramFiles%\iLink\ShoreTel CSTA Server

Note: You do not usually need to modify these files as the CSTA Server installer already properly configures them for a typical situation.

Note: As a best practice, you should always create a backup copy of a configuration file before modifying it.

TeamCall CSTA Server Settings

The configuration file of TeamCall CSTA Server is named *Default.conf*. It contains the following keys:

Key	Default	Comment
loginPort	26535	Listener Port. This port is to be used in the Lync RCC routing settings
license		Default is empty: demo mode with 1 monitor, Otherwise: a hexdump on a single line with encrypted licensing data
logFileMaxSize	100	Maximum size of a log file in KB. This size is limited only by file system constraints. A recommended value is 10240 (= 10 MB).
logFileMaxBackups	2	Number of log files to keep during log rotation. This number is limited only by file system constraints. The recommended range is 0 to 30.
debugLevel	0	0 = debug logging switched off 9 = for logging during debug sessions
cstaLogEnabled	0	Write csta.log (0 or 1)
interfaceLogEnabled	0	Write Interface.log (0 or 1)
cstaLinkAddress	127.0.0.1	The IP address of the host where TeamCall CA ShoreTel service is running. By default this is the loopback address because it is on the same host as the TeamCall CSTA Server service.
cstaLinkPort	26001	The listener port of the TeamCall CA ShoreTel. Note: this port is explicitly set to 26001 during the installation

onNetPrefixList		List of prefixes used if ShoreTel On-Net Dialing feature is activated. All prefixes are listed on a single line separated by semicolons (“;”) By default this is empty. Note: Configuring the CSTA server for On-Net Dialing also requires making corresponding entries in the <i>Dialplan.conf</i> file.
maxExtensionLength	5	Maximum number of digits in an extension number. Should be set to 3, 4, or 5.
rfc2806PrivateContext	enterprise	“Private Context” string used to construct RFC2806 telURIs for extension numbers that have no corresponding DID number. The DID Prefix entered during installation is unique to the ShoreTel system and is used for this purpose. The default value (enterprise) is used when extension numbers are used as Line URI numbers of the Lync users.
setSignalHandler	1	For debugging only in the case a crash occurs: 0 : don’t create a core dump 1 : create a core dump

TeamCall CA ShoreTel Settings

The configuration file of TeamCall CA ShoreTel is named *ca_config.properties*. It contains the following keys:

Key	Default	Comment
server_port	26001	The listener port.

nettspi_hostname	127.0.0.1	The IP address of the host where the TeamCall LinkTSP service is running. By default this is the loopback address because it is on the same host as the TeamCall CA ShoreTel service.
nettspi_port	20000	The port of the TeamCall LinkTSP service.

TeamCall LinkTSP Settings

The configuration file of TeamCall LinkTSP is named *LINKTSP.INI*. It contains the following keys:

Key	Default	Comment
loginPort	20000	The listener port.
Driver	RpcTspX.tsp	The TAPI TSP driver DLL

TeamCall CA ShoreTel and TeamCall LinkTSP Logging Settings

TeamCall CA ShoreTel and TeamCall LinkTSP share a common configuration file that controls logging behavior named *log4j-config.xml*. This is an XML file that contains key value pairs using XML tags.

The root logger at the top of the configuration file contains a “Level” key. To change the level of detail in the log files produced, change the value of this key.

Key	Default	Comment
Level	INFO	Logging level. The default, “INFO”, will log general information, warnings, and errors. To capture all debugging information, change this value to “DEBUG”. To stop all logging change the value to “OFF”.

Appendix 6: Troubleshooting

This appendix covers common problem situation and gives suggested approaches for these situations. For additional troubleshooting information, see the *ShoreTel CSTA Server Advanced Troubleshooting Guide*.

Problem: The Lync 2013 client crashes upon login.

Solution: Please install the Lync 2013 update 15.0.4551.1005: November 7, 2013

See <http://support.microsoft.com/kb/2825630/en-us> and <http://support.microsoft.com/kb/2898888/en-us>

Problem: Only a single device can be controlled from client software.

Solution: Obtain and install a valid license for the CSTA Server using the **License Tool** application.

Problem: An external number cannot be dialed in international format

Solution: Check if the value `uaCSTATrunkAccessCode` is configured correctly (typically `uaCSTATrunkAccessCode` is set to 9 in North America) in the *Default.conf* file of the CSTA Server.

Problem: The configuration is correct but telephony is still not available.

Solution: Check the firewall configuration of your system. Make sure that the CSTA Server TCP/IP port is not blocked by a firewall or used by another software process.

Problem: Users are not able to sign-in to the Lync client

Solution: There is something wrong with Lync system which is far beyond the scope of phone integration. Please contact your system administrator. A fully functional Lync deployment is a prerequisite for phone integration.

Problem: The Lync client shows telephony as not supported.

Solution: Check if the static TCP route for CSTA port (default 26535) setting in Lync is configured correctly. Is the IP address to the CSTA Server correct? Is trusted application pool relationship set correctly?

Problem: Telephony is enabled for some users but not for all.

Solution: Check the Lync server and Lync client configuration for each user where telephony is not available. Also check the existence of a valid phone device for each affected user.

Problem: An internal user cannot call another internal user.

Solution: Please check if the called user's phone number is configured correctly in Lync server as well as in the Lync client.

Problem: The tray icon of the Lync client shows "telephony not available" although telephony is working.

Solution: This is a known issue with the Microsoft clients. After some period of time the tray icon changes to reflect the correct state automatically.

Problem: A change to a user's Call Handling Mode (CHM) made on the ShoreTel phone is not reflected within the Lync client's call forwarding setting.

Solution: This is a known issue with the Microsoft client. The workaround is to sign-out and sign-in again.

Problem: A change to forwarding settings made with the Lync client results in the user's CHM set to "Custom" on the ShoreTel phone.

Solution: This is a known issue with the ShoreTel CSTA Server. The workaround is to change the CHM using the Mode button on the ShoreTel phone.

Appendix 7: ShoreTel CSTA Server Planning Worksheet

Information needed by ilink if remote deployment by ilink has been ordered

The customer's technician that ilink would do the installation with:

Name: _____

Email address: _____

Phone number: _____

Up to three initial Lync users for testing after setup:

Lync user name: _____ ShoreTel extension: _____

Lync user name: _____ ShoreTel extension: _____

Lync user name: _____ ShoreTel extension: _____

Licensing

Path and filename of license file: _____

Number of Lync RCC users: _____

Maximum device count of license: _____

The server on which ShoreTel CSTA Server shall be installed

IP Address: _____ . _____ . _____ . _____

Fully qualified domain name (FQDN): _____

Symbolic name for call control URI (e.g. callcontrol): _____

Information about other hosts

ShoreTel HQ server: IP address: _____ . _____ . _____ . _____

Lync FE server: IP address: _____ . _____ . _____ . _____

Lync 2013 Lync 2010

Lync registrar: FQDN: _____

Software Configuration

TeamCall CSTA Server Port Number: Default (26535) Other: _____

TeamCall CA ShoreTel Service Port Number: Default (26001) Other: _____

TeamCall LinkTSP Service Port Number: Default (26000) Other: _____

Log File Directory: Default Other: _____

Telephony setup

Default trunk access code: _____

Local area code: _____

Extension number length: 3 digits 4 digits 5 digits (default)

Primary DID range: +_____ through +_____

Corresponding extension range: _____ through _____

Primary DID range prefix: +_____

On Net Dialing prefixes: _____

RFC2806 private context: Default (same as DID prefix) Other: _____

Internal-Only Extension Ranges (No PSTN DID number)	
Start	End
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Multiple Trunk Access Codes	
Trunk Access Code	Use
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

