Alex Lewis
Andrew Abbate
Tom Pacyk

Microsoft® Lync Server 2010

UNLEASHED

SAMS

Microsoft® Lync Server 2010 Unleashed

ISBN-13: 978-0-672-33034-6
ISBN-10: 0-672-33034-2

The Library of Congress Cataloging-in-Publication data is on file.

Printed in the United States of America

First Printing April 2011

Trademarks

All terms mentioned in this book that are known to be trademarks or service marks have been appropriately capitalized. Sams Publishing cannot attest to the accuracy of this information. Use of a term in this book should not be regarded as affecting the validity of any trademark or service mark.

Warning and Disclaimer

Every effort has been made to make this book as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an "as is" basis. The authors and the publisher shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this book.

Bulk Sales

Sams Publishing offers excellent discounts on this book when ordered in quantity for bulk purchases or special sales. For more information, please contact

U.S. Corporate and Government Sales
1-800-382-3419
corpsales@pearsontechgroup.com

For sales outside of the U.S., please contact

International Sales
international@pearsoned.com

Associate Publisher
Greg Wiegand

Acquisitions Editor
Loretta Yates

Development Editor
Sondra Scott

Managing Editor
Kristy Hart

Project Editor
Jovana San Nicolas-Shirley

Copy Editor
Ginny Munroe

Indexer
Lisa Stumpf

Proofreader
Mike Henry

Technical Editor
Jeff Guillet

Publishing Coordinator
Cindy Teeters

Cover Designer
Gary Adair

Compositor
Nonie Ratcliff

Contributing Writers
Chris Amaris
Mitch Steiner
Marshall Harrison

Contents at a Glance

Table of Contents

About the Authors

Alex Lewis has a mixed background in telecommunications, IT, and consulting with more than 15 years experience. Alex has worked with a wide range of environments from small organizations to large enterprises requiring complex or custom communications solutions. Alex is a strong believer in the power of business and technology alignment using technological solutions to reduce costs and drive revenue. Including titles on Active Directory and Exchange, this is the seventh book that Alex has participated in writing. He currently is a principal consultant at Convergent Computing in Oakland, California and leads its Unified Communications practice. He loves a challenge and brings a wealth of experience to each new engagement.

Andrew Abbate is a 17-year veteran of consulting and IT and has a wealth of practical knowledge about communications, collaboration, and security. Andrew has helped some of the largest and most complex environments in North America improve their capability to quickly and securely communicate and collaborate with internal and external resources. In addition to his Lync and OCS background, Andrew has written several other books covering topics such as Exchange, Active Directory, and information security. Andrew currently enjoys the position of principal consultant and partner at Convergent Computing where he continues to consult with both large and small clients to help improve their IT practices.

Tom Pacyk, MCITP, MCSE, is a senior systems engineer specializing in Lync, OCS, and Exchange projects while working at ExtraTeam in the Bay Area, CA. Tom began his career as a systems administrator and has moved into working as a consultant for the last five years where he designs and implements collaboration solutions for large and small customers. His work began with the original Exchange 2000 instant messaging service and he has been involved with implementations of every version of the product since then and now with Lync Server 2010. Outside of work, Tom runs a blog related to Microsoft Lync and Exchange topics.

Dedication

This book is dedicated to my best friend who kept me company through all the late nights, my pug, Pugsley. Thank you for the companionship and warm nuzzles encouraging me to keep writing way too late into the night. If only I could teach you to write for me, that would be a trick!
—Alex Lewis

I dedicate this book to my niece Nora. Seeing the joy you've brought to your family reminds me that I need to keep life in perspective and focus on the truly important things.
—Andrew Abbate

I dedicate this book to my fiancée, Elizabeth, for putting up with the endless late nights and lost weekends of writing with an incredible amount of patience. Thank you so much for your support the entire time.
—Tom Pacyk

Acknowledgments

Alex Lewis: First, thank you to the Lync team at Microsoft, including Miru Gunarajah and the whole Dr. Rez team. You've done a great job with the product and thanks for giving us an opportunity to play with it a bit earlier than everyone else! Next, of course, thank you to the team at Sams including Loretta Yates, Jovana Shirley, and development editor extraordinaire Sondra Scott. Without them, the book wouldn't exist or likely be readable. To my coauthors Andrew and Tom, thank you for joining me in this endeavor and thank you for all the troubleshooting help and guidance you give me on a regular basis.

To all my friends, thank you for putting up with the late nights and all the times I couldn't join you for a night out. The next round's on me. And to Kate, you've been a great friend and brought me take-out or pizza more times than I can count so that I could continue working uninterrupted. I owe you big time!

Andrew Abbate: As always, it's a real trick to try to make sure one thanks all the people that make these books possible. I'll start off with thanking the great folks at Sams who make these books possible and who perform the impressive task of taking the materials we produce and turning it into an impressively polished book. I'd like to thank my coauthors Alex and Tom, for helping to keep me on track and making this book as painless as possible.

Last and certainly not least, I'd like to thanks my friends for being supportive and accepting of the fact that I disappear for months on end when I start one of these projects. Thanks for always being there.

Tom Pacyk: Writing a book for the first time seemed like such a great idea when the opportunity presented itself, but once the writing began I found myself beginning to think otherwise. The process had its ups and downs, but it's a great feeling now that it's been completed, and I'm very proud of the work we've compiled here.

Thanks so much to the Sams team for putting it all together, and to my co-authors, Alex and Andrew, for their assistance and tremendous efforts on this book.

I'd also like to thank John Weber for giving me a kick in the right direction when I started my consulting career. I don't know if I would have reached this point without his mentoring and advice back when I started out Portland, OR. His infamous line, "Let's not confuse the issue with facts," continues to be one of my all-time favorite quotes.

Lastly, I'd like to thank my parents, family, and friends for all their support over the years and all their assistance in my career. I couldn't have done this without their help.

We Want to Hear from You!

As the reader of this book, *you* are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

You can email or write me directly to let me know what you did or didn't like about this book—as well as what we can do to make our books stronger.

Please note that I cannot help you with technical problems related to the topic of this book, and that due to the high volume of mail I receive, I might not be able to reply to every message.

When you write, please be sure to include this book's title and author as well as your name and phone or email address. I will carefully review your comments and share them with the author and editors who worked on the book.

Email: feedback@samspublishing.com

Mail: Greg Wiegand
Associate Publisher
Sams Publishing
800 East 96th Street
Indianapolis, IN 46240 USA

Reader Services

Visit our website and register this book at informit.com/register for convenient access to any updates, downloads, or errata that might be available for this book.

Introduction

The authors of this book have been working with Communications Server since the Live Communications Server 2003 days. I remember when it launched on December 29, 2003. Back then, Windows Messenger 5.0 was the main client used and the terminology was completely different. However, even then, TLS communication was supported, although most IT departments went with the more familiar TCP option instead. Needless to say, a lot has changed through the years. Most people I work with don't realize that Lync Server is a fifth-generation product! It is even older if you count the Exchange Instant Messenger Service that was included in Exchange Server 2000, which was pulled out to build the first version of Live Communications Server.

In the beginning, Live Communications Server 2003 was only an IM server. With Lync Server, it has evolved into many more things, including

- Web and audio conferencing server
- Unified Communications (UC) integration across many other platforms, such as Office, SharePoint, and Exchange
- Soft phone
- Video conferencing system
- PBX replacement

Back in 2003, IM was perceived as a novelty. No one used it to conduct business or even imagined it as a gateway to multimodal communications. Starting with Office Communications Server 2007 R2 and continuing with Lync Server, Microsoft introduced the concept of Communications Enabled Business Processes (CEBP).

NOTE

It seems every vendor and analyst defines CEBP in a different way. However, for this book, we stick with a more generic definition. CEBP adds a communications medium to a business process with the intent of streamlining and automating the process or with the intent of reducing human latency through real-time communications.

Chronology of Lync Server

Let's go through some history and chronology to better understand why and how Communication Server 2010 came to be.

- **Microsoft Exchange Server 2000 Instant Messenger Service**—It's hard to believe so few people, even Exchange administrators, have heard of the Exchange 2000 IM service. However, it is not hard to believe that even fewer deployed it. It was a

rudimentary service with little integration to Exchange or other Microsoft Server products. Later versions utilized special engines, whereas the Exchange 2000 IM service leveraged an in-house middleware platform called Exchange Interprocess Communication (EXIPC) to translate between IIS 5 and Exchange. The solution was essentially composed of two types of servers: home servers and routing servers.

Home servers handled IM communications similarly to a front end in Lync Server. However, there was little Active Directory integration. That's where routing servers came in. If two users were homed to different home servers, they would need to jump through a bunch of hoops to talk with each other. The routing server acted as a bridge connecting any two home servers. It was a basic solution, especially at a time when public IM providers such as Yahoo! and AOL offered significantly more in terms of functionality.

- **Live Communications Server 2003**—Instant messaging functions were taken out of Exchange and given their own platforms with the 2003 wave of Microsoft Server products. It was code named Greenwich and initially called Office Real-Time Communications Server 2003 before being renamed Live Communications Server 2003 just prior to release. It wasn't long before it was better known by its three-letter acronym LCS 2003. LCS 2003 was the first version to support certificates and offer TLS-encrypted communications as the recommended method. LCS 2003 was also the first version to support enterprise archival of IM communications, although it was rarely implemented because the compliance regulations in effect today simply didn't exist or include IM conversations in 2003.
- **Live Communications Server 2005**—Live Communications Server 2005, or LCS 2005 as it's more commonly known, was the first widely deployed version of the Microsoft real-time communications platform. It was code named Vienna. Although one might argue that LCS 2005 was Microsoft's first attempt at a unified communications platform, few organizations deployed functions beyond IM and presence. LCS 2005 added new functions including a more advanced presence engine that would change a user's presence status based on information from a user's Exchange calendar and remote access through the access proxy role. LCS 2005 SP1 added the capability to communicate with Office Communications Server 2007 users and a number of other features. In today's Microsoft nomenclature, it would likely be called Live Communications Server 2005 R2.
- **Office Communications Server 2007**—Code named RTC12, this is when the creative codenames went the way of the dodo bird. Commonly known as OCS 2007, the platform made huge jump in terms of functionality and acceptance. OCS 2007 added the following functions:
  - **On-Premise Web Conferencing**—The ROI from bringing web conferencing in-house almost always justified the cost of implementing OCS, and thus, it became an important feature. However, voice conferencing was PC-only or needed to be hosted through a third-party provider.

- **Multiparty IM**—It might seem insignificant to add more than one person to an IM conversation, but it became an important market differentiator compared to products such as IBM SameTime and Cisco CUPS.
- **Enhanced presence**—Also known as "rich presence," it enabled users to expose additional information beyond the red, green, and yellow gumdrop that was standard at the time. This information included name, title, and detailed calendar information. It also included a multitiered access mechanism called levels of access to display different amounts of personal information to different tiers of users.
- **Improved federation**—Open federation and widespread adoption of OCS 2007 changed the landscape of intercompany communication. E-mail became secondary for partner communication as users could see real time availability data and collaborate immediately removing the latency inherent to asynchronous methods of communication.
- **Enterprise Voice**—It's simply not possible to call your solution a Unified Communications solution without the inclusion of a voice platform. Although it was basic, it was a proactive step in the right direction because almost every other UC vendor would also roll out a combined IM, meeting, and voice platform around the same time or soon after.

- **Office Communications Server 2007 R2**—When combined with Exchange Unified Messaging, this was the first version that could realistically be considered a PBX replacement, although it still lacked many traditional PBX features. Code named Wave 13 or W13, OCS 2007 R2 added a bunch of collaboration and voice features as noted in the following:
  - **Call Delegation**—Also known as the boss-secretary function, this enabled delegates to answer a call for another user. The primary user also notified the delegate answered the call. This function was designed to be used with the Communicator Attendant Console. Much like with delegates in Exchange, the assistant could be given the rights to do almost everything for the manager yet make it appear that the manager was doing the work. A full call delegation feature list includes call screening for audio, video, or IM; joining a voice conference on behalf of the manager; checking voicemail for the manager; initiating a person-to-person call on behalf of the manager; initiating conference calls on behalf of the manager; and transferring calls to the manager.
  - **Team Call**—A simple workflow that enabled call forwarding to multiple people. The call could be forwarded to specific people in sequence or in parallel. This was often used for out-of-office or out-to-lunch functions.
  - **Group Chat**—A separate server role that also required a separate client from Communicator. It allowed persistent chat similar to IRC.

- **Desktop sharing**—This included desktop sharing from the Communicator client and with anonymous users through the Communicator Web Access service.
- **Audio conferencing**—Much like web conferencing in OCS 2007, this is another great ROI story. Third-party audio conferencing services can be expensive; tens of thousands of dollars per month can be saved by bringing it in-house. Many companies deployed OCS 2007 R2 strictly for this functionality; everything else was just a bonus.
- **Response Group Service**—This is Microsoft's version of a simple IVR workflow. It's often used for small call centers or IT help desks.
- **SIP trunking**—SIP trunking is still new but seeing a growth in adoption. Essentially, it enables OCS 2007 R2 to connect to a SIP trunking provider that handles all outbound call routing. Although the process can be a little complex to set up initially, it greatly eases call routing topology because everything goes to the cloud service provider.
- **Improved codecs**—Improved codecs for voice and video enable better voice quality and more tolerance for nonideal networks. They also enable HD-quality video between clients over reasonable network links.

How This Book Is Organized

Everything you'll want to know about new features for Lync Server is included in Chapters 1–4. These chapters describe new features and benefits.

You will find that the improvements Microsoft has made to Lync Server are not only evolutionary, but they represent a major step forward for UC. Lync Server solidifies Microsoft's role as market leader in the UC field.

CAUTION

This book covers all aspects of Lync Server. However, the book does assume you have at least a cursory knowledge of the basics of Active Directory, DNS, and the associated infrastructures of each.

This book is organized into nine parts, each one made up of several chapters focusing on a different core area of Lync Server.

- **Part I, "Overview"**—This part provides an introduction to Lync Server not only from the perspective of a general technology overview, but also to note what is truly new in Lync Server and what has compelled organizations we've worked with to implement it during the beta phase.

- **Part II, "Microsoft Lync Server 2010 Server Roles"**—This part provides an in-depth discussion of all the Lync Server roles including a general overview, the installation process, configuration, administration, troubleshooting, and best practices. Each role is examined in detail with step-by-step installation instructions and valuable screenshots.
- **Part III, "External Dependencies"**—Lync Server leverages many other technologies including Active Directory, DNS, certificates, and SQL Server. It also has specific prerequisites and requirements around network latency, bandwidth, and firewall and reverse proxies for external access and federation. Lync Server relies heavily on Active Directory for integration to other Microsoft Server components such as Microsoft Exchange and Microsoft SharePoint.
- **Part IV, "Administration and Management"**—This part covers common administration tasks and the Communications Server Management Shell, which is the heart of all administration tasks. It moves on to discuss monitoring Lync Server through Microsoft Systems Center Operations Manager and the backup and restore processes for all the Communications Server roles.
- **Part V, "Migrating from Older Versions"**—This part reviews the process of upgrading from Office Communications Server 2007 and 2007 R2. It also explains how to upgrade from Live Communications Server. A green field deployment is easy; migrating users, response groups, and dial plans from previous versions of Communications Server can cause headaches. A solid, tested migration strategy is important for minimizing downtime and ensuring a successful migration. The bad news is there is only one way to do it. The good news is that it is explained in great detail in Part V.
- **Part VI, "Voice"**—Microsoft has heavily invested in making Lync Server a voice-focused platform. There are huge improvements from previous platforms. Lync Server now supports branch office survivability, e911, and improved conferencing. This part covers PBX integration, enterprise voice, and audio conferencing. With these improvements, Communications Server is ready to be a full PBX replacement. It can even work as a call center solution integrated with solutions from Aspect for larger deployments, Altigen for smaller deployments, and a host of other partners.
- **Part VII, "Integration with Other Applications"**—Lync Server has unique communications and collaboration features when integrated with other applications. Presence can be brought into a SharePoint page or Exchange Outlook Web Application. The Exchange Unified Messaging server completes the Microsoft UC solution. However, Microsoft didn't stop there. There is also an open API called Unified Communications Managed API (UCMA) for developers to create their applications and extensions that plug into the UC ecosystem.
- **Part VIII, "Clients"**—From a user's perspective, the solution *is* the client. That's all a user sees. The Communicator 2010 client is designed to be easier to use with more information in the main page and not hidden in menus and submenus. For example, the dial pad is front and center for all Communicator conversations.

In addition to soft clients, this part also has a chapter on UC endpoints including headsets, webcams, and handset phones. Due to popular demand, many new types of endpoints are available for Lync Server, including a true conference room phone, which fills a major gap for previous versions.

- **Part IX, "Planning for Deployment"**—Every good deployment starts with a good plan. This part can help you build a plan for your organization. It covers the new virtualization policy that enables all roles to be virtualized, designing a nonvoice deployment, designing edge architecture, and planning for a voice deployment. Although Communications Server expertise is required, many other skill sets are also important to plan a successful deployment. Communications Server touches many other areas including PBX/telecommunications, Active Directory, Exchange, and the enterprise network. Although bringing in an expert is always a good strategy, this part educates you with the basics for planning your deployment.

The real-world experience we have working with Lync Server, our combined experience with the platform since its beginnings, and our field experience deploying Communications Server enable us to present this information to you. We made the mistakes, found the workarounds, and simply know what works and how to make things work. We know you will find this book valuable with the planning and deployment of your Lync Server infrastructure.

CHAPTER 5

Microsoft Lync Server 2010 Front End

IN THIS CHAPTER

Overview

Microsoft Lync Server has a number of different server roles. These can be combined different ways to produce a myriad of architectural options. Even the collocation of services for a given role can be split for added flexibility.

The Front End role in Lync Server is significantly changed from previous versions. Three significant architectural changes are related to the Front End Server role.

- The Office Communications Server 2007 R2 Mediation Server role is now collocated on the front end as a best practice for all architectures. The exception is a direct SIP connectivity to a PBX or a SIP trunking provider.
- The A/V Conferencing role can now be broken into a dedicated pool. This is recommended for large deployments with more than 10,000 users.
- The Director role is no longer simply a front end pool with no users assigned to it. It has been separated out to a unique role and is discussed further in Chapter 9, "Director."

As in previous versions of Communications Server, a single Front End or multiple Front End Servers are organized into logical pools. A Standard Edition server exists as the only server in a pool, whereas multiple Enterprise Edition servers can exist in a pool to provide redundancy and scalability. HTTP traffic should still be load balanced by a hardware load balancer; however, other OCS services are now load balanced via DNS. This architecture moves complex traffic,

SIP, and media off of hardware load balancers traditionally designed solely for HTTP traffic, and it simplifies the overall design.

This chapter highlights the full lifecycle of the Front End Server role. Because the Front End Server is deployed first, this chapter also reviews the steps necessary to prepare Active Directory. Then it moves on to the installation of the Standard and Enterprise Editions of the Front End Server role, followed by configuration and administration. Finally, the chapter concludes with troubleshooting and best practices.

Active Directory Preparation

Lync Server leverages Active Directory more than any previous version of Communications Server. This results in tight integration across the Microsoft stack, including Microsoft Exchange and Microsoft SharePoint Server. However, first Active Directory must be prepared before installation can begin. All the Active Directory preparation steps can be performed either in the Deployment Wizard GUI or the Lync Server Management Shell, a customized version of PowerShell. This chapter reviews both methods.

The first step is to ensure that your Active Directory environment meets the minimum requirements for Lync Server. The requirements are outlined here:

- All domain controllers in the forest where Lync Server is deployed must be Windows Server 2003 SP2 or higher.
- All domains where you deploy Lync Server must have a functional level of Windows 2003 native or higher.
- The functional level for the forest must be Windows 2003 native or higher.

After the Active Directory prerequisites have been met, the next step is to extend the Active Directory schema to support Lync Server. The schema preparation process adds new classes and attributes to Active Directory that are required for Lync Server. This process must be run as a user that is a member of the Domain Admins and Schema Admins groups.

NOTE

To run the preparation steps from another domain member server other than the Schema Master, ensure that the remote registry service runs and the appropriate registry key is set on the Schema Master. In addition, the Active Directory Remote Server Administration Tools (AD DS) feature must be installed on the server where the preparation steps will run.

Figure 5.1 displays the Lync Server preparation steps main page.

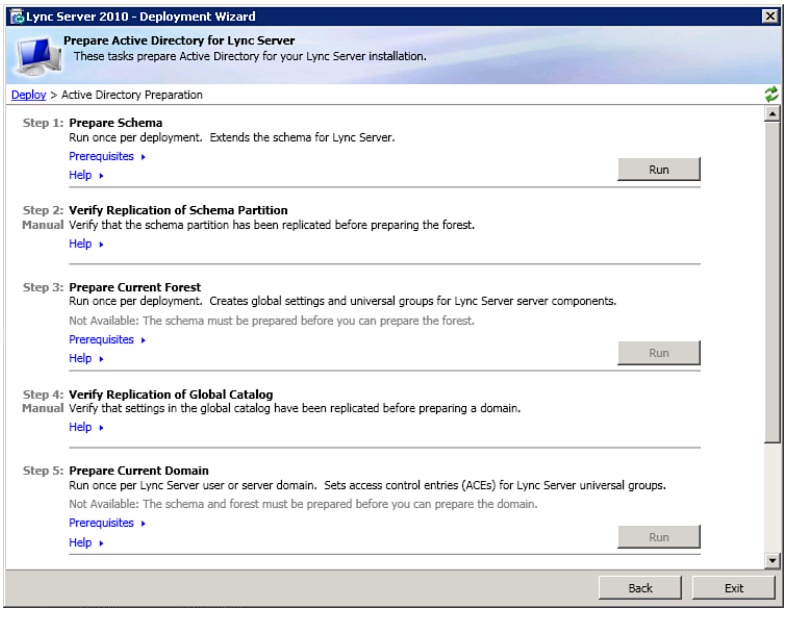

FIGURE 5.1 Lync Server Deployment Wizard

To extend the Active Directory schema using the Lync Server Deployment Wizard, follow the steps that follow:

1. From the Lync Server installation media, run Setup.exe.
2. For **Step 1: Prep Schema**, click **Run.**
3. At the Prepare Schema screen, click **Next**. You can see the Management Shell command that is executed, as shown in Figure 5.2.

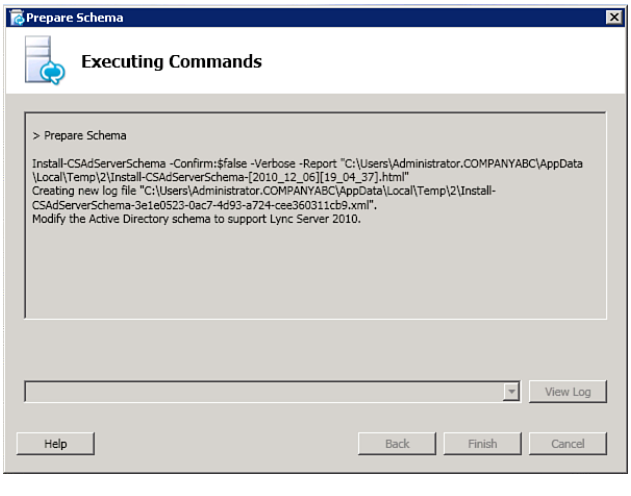

FIGURE 5.2 Schema Prep Command

4. Ensure the process is successful, and then click **Finish** to close the window.
5. Ensure the information replicated to all domain controllers before continuing to the next step.

To prepare the Active Directory schema using the Lync Server Management Shell, open the shell and run the Install-CSADServerSchema cmdlet. The proper syntax for the command is Install-CsAdServerSchema –LDF <full directory path where the LDF files are located>. For example:

```
Install-CsAdServerSchema -LDF "C:\Program Files\Microsoft Lync Server\
➥Deployment\Setup"
```

Prepare the Active Directory Forest

The next step is to prepare the Active Directory forest. A user of the Enterprise Admins group for the root domain must run this process. Forest preparation creates global objects and sets the appropriate permissions and groups to complete the installation process.

NOTE

In a new deployment, the global settings are automatically stored in the Configuration partition. If you are upgrading from an older version of Communications Server, you might still store the settings in the System container as was standard during previous versions of the installation. However, although it is not a requirement, it is recommended that the global settings container be moved from the System partition to the Configuration partition as part of the Lync Server installation process.

The Deployment Wizard should still be open from the last step. If not, run setup.exe and it picks up where you left off. Follow the steps that follow to prepare the forest:

1. For **Step 3: Prepare Current Forest**, click **Run**.
2. At the **Prepare Forest** screen, click **Next**.
3. Specify the location where the OCS universal security groups are created. By default, this is the local domain, but you can also select the FQDN for the domain where you want the groups to be created. Then click **Next**. You can see the management shell command that is executed, as shown in Figure 5.3.
4. Ensure the process is successful and then click **Finish** to close the window.
5. Ensure the information replicates to all domain controllers before continuing to the next step.

To prepare the Active Directory forest using the Lync Server management shell, open the shell and run the Enable-CsAdForest cmdlet. The proper syntax for the command is Enable-CsAdForest –GroupDomain <FQDN of the domain to create the universal groups>. For example:

```
Enable-CsAdForest –GroupDomain companyabc.com
```

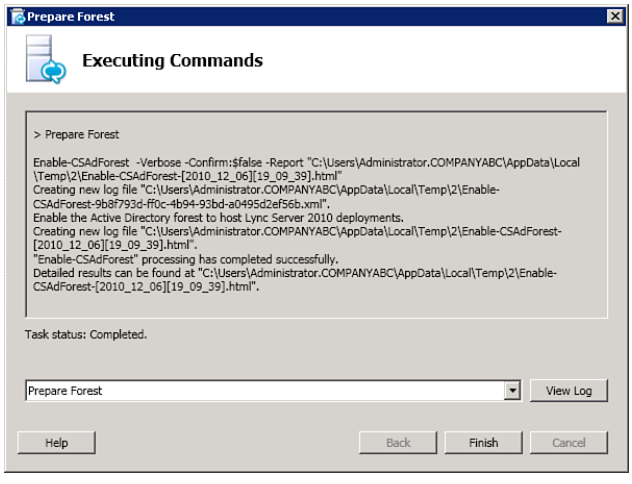

FIGURE 5.3 Prepare Forest Command

The final step is to prepare the Active Directory domain or domains. You need to run this in every domain where you plan to deploy Lync Server. This step adds the necessary ACEs (access control entries) to universal groups. Like the two previous steps, this can be done through the Lync Server Deployment Wizard or the Lync Server management shell.

Using the Deployment Wizard, perform the following steps.

NOTE

If you closed the Deployment Wizard, you need to run setup.exe again.

1. For **Step 5: Prepare Current Domain**, click **Run**.
2. At the **Prepare Domain** screen, click **Next**. You can see the management shell command that is executed, as shown in Figure 5.4.
3. Ensure the process is successful, and then click **Finish** to close the window.
4. Ensure the information replicates to all domain controllers before continuing to the next step.

To prepare an Active Directory domain using the Lync Server management shell, open the shell and run the Enable-CsAdDomain cmdlet. The proper syntax for the command is Enable-CsAdDomain –Domain <current domain FQDN> -GroupDomain <FQDN of the domain where the Universal groups were created>. For example:

```
Enable-CsAdDomain –Domain companyabc.com –GroupDomain companyabc.com
```

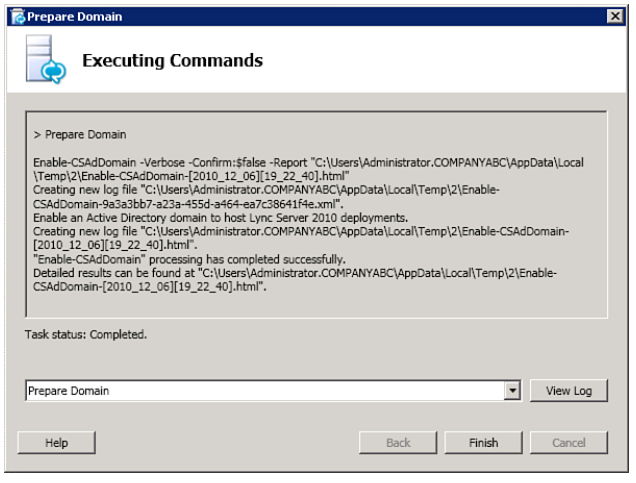

FIGURE 5.4 Prepare Domain Command

Active Directory Administration Groups

Following is a list of Active Directory Administration groups created by the preparation processes. They are referenced throughout the book and it is good to be familiar with them.

The service groups are

- **RTCHSUniversalServices**—Includes service accounts used to run the Front End Server and allows servers read/write access to Lync Server global settings and Active Directory user objects
- **RTCComponentUniversalServices**—Includes service accounts used to run conferencing servers, web services, the Mediation Server, the Archiving Server, and the Monitoring Server
- **RTCProxyUniversalServices**—Includes service accounts used to run Lync Server Edge Servers

The administration groups are

- **RTCUniversalServerAdmins**—Allows members to manage server and pool settings
- **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

Infrastructure groups include

- **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; it can access only settings specific to an individual server.

Forest preparation then adds service and administration groups to the appropriate infrastructure groups, as follows:

- RTCUniversalServerAdmins is added to RTCUniversalGlobalReadOnlyGroup, RTCUniversalGlobalWriteGroup, RTCUniversalServerReadOnlyGroup, and RTCUniversalUserReadOnlyGroup.
- RTCUniversalUserAdmins is added as a member of RTCUniversalGlobalReadOnlyGroup, RTCUniversalServerReadOnlyGroup, and RTCUniversalUserReadOnlyGroup.
- RTCHSUniversalServices, RTCComponentUniversalServices, and RTCUniversalReadOnlyAdmins are added as members of RTCUniversalGlobalReadOnlyGroup, RTCUniversalServerReadOnlyGroup, and RTCUniversalUserReadOnlyGroup.

Forest preparation also creates the following role-based access control (RBAC) groups:

- CSAdministrator
- CSArchivingAdministrator
- CSBranchOfficeTechnician
- CSHelpDesk
- CSLocationAdministrator
- CSResponseGroupAdministrator
- CSRoleAdministrator
- CSServerAdministrator
- CSUserAdministrator
- CSViewOnlyAdministrator
- CSVoiceAdministrator

Installation

This section outlines the steps for installing the Standard and Enterprise Editions of Lync Server. The Standard Edition is generally used for small deployments, whereas the

Enterprise Edition offers significant benefits for redundancy and a scalability. The largest difference between the Standard Edition and Enterprise Edition of Lync Server is that the Standard Edition uses SQL Server Express, previously known as MSDE, whereas the Enterprise Edition uses a full version of SQL Server 2005 or 2008.

Lync Server Topology Builder

After preparing Active Directory, the next step is to install the Lync Server Topology Builder. This tool is new and powerful. With a single tool it enables an administrator to design and validate a Lync Server topology, and then publish it to Active Directory. This process greatly simplifies deployments compared to previous versions of Communications Server.

Installation of the Topology Builder comes with some prerequisites and requirements. First, the administrator must be a member of the Domain Admins account in Active Directory. The right to install the Topology Builder can be delegated, but only by a user who is a member of both the Domain Admins and RTCUniversalServerAdmin groups. The other requirements and prerequisites are outlined in the following list:

- 64-bit edition of the following:
  - Windows Server 2008 R2
  - Windows Server 2008 SP2 or later
  - Windows 7
  - Windows Vista SP2 or later
- Net Framework 3.5 SP1 or a later service pack.
- Microsoft Visual C++ 2008 Redistributable x64 9.0.30729.4148. The Deployment Wizard automatically installs this package if it is not already installed.
- Windows PowerShell 2.0. This is already installed for Windows 7 and Windows Server 2008 R2. For Windows Server 2008, it must be downloaded separately (Microsoft KB968930).

CAUTION

Note that the previous versions of PowerShell must be uninstalled prior to installing PowerShell 2.0.

- Message Queueing (MSMQ) services. Be sure to also install Directory Services integration during the "Features" Installation Wizard.
- Backward Compatibility Pack for SQL Server 2005 v. 8.05.2312. Although this is not technically required to install Topology Builder, it is required to run the Install-CsDatabase cmdlets. These cmdlets are sometimes called by Topology Builder, depending on the chosen topology, and this should also be considered a

prerequisite. This installation package can be found on the installation media in the \Setup\amd64 directory as SQLServer2005_BC.msi.

After the prerequisites are installed, the actual installation of the Topology Builder tool can begin. To install Topology Builder, follow these steps:

1. Run **setup.exe** from the installation media. It is located at \setup\amd64\setup.exe.
2. If the installer prompts you to install the Microsoft Visual C++ 2008 Redistributable, click **yes** and follow the Installation Wizard.
3. Click **Install Topology Builder** in the right column menu of the Deployment Wizard.
4. After installation is complete, there is a check mark next to the Install Topology Builder link, which is grayed out, as shown in Figure 5.5.

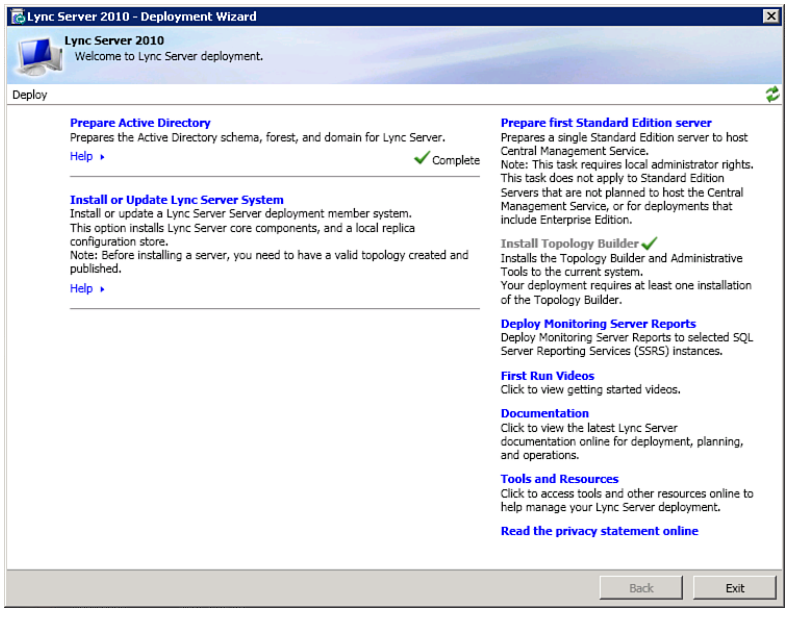

FIGURE 5.5 Completed Topology Builder Installation

The Topology Builder tool functions differ depending on your choice of Standard Edition or Enterprise Edition deployment. The process is outlined in each respective section that follows.

Standard Edition Installation

As noted previously, Lync Server Standard Edition is designed for smaller deployments. Standard Edition deployments can have only one server per pool and use SQL Server 2008 Express on the same server as the front end. This results in limited scalability and no redundancy. For this reason, Standard Edition is recommended only for small deployments or where high availability is not a requirement.

The first step for any Standard Edition deployment is to prepare the server as a Central Management Store and prepare the database.

1. From the main Deployment Wizard screen, in the right pane, click **Prepare the first Standard Edition Server**.
2. Click **Next** at the first screen.
3. The window displays the actions performed to prepare the server as the first Standard Edition server, including the setup of the Central Management Store. This process takes a few minutes to complete.
4. When it's done, ensure it completed successfully and then click **Finish**.

The next step is to define the topology with Topology Builder.

Topology Builder for Standard Edition Deployments

Lync Server uses the published topology to process traffic and maintain overall topology information. To ensure the topology is valid, it is recommended you run Topology Builder before your initial deployment and publish an updated topology after each topological change. This example shows a Standard Edition topology. Remember, if you change the topology later, it should be republished to ensure consistency.

When you first launch Lync Server Topology Builder, you see a partially blank MMC screen, as shown in Figure 5.6. Compare that to the detailed result at the end of this example.

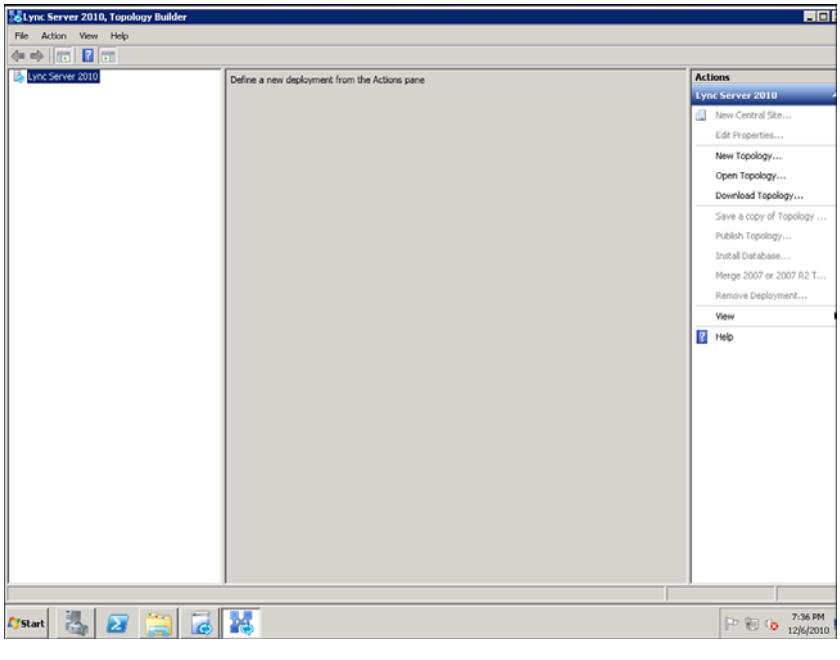

FIGURE 5.6 Topology Builder without a Defined Topology

To begin using Topology Builder, follow the steps that follow:

1. In the right side of the Action pane, click **New.**
2. Define the default SIP domain. In many deployments, this is simply your domain name, as shown in Figure 5.7. In more complex deployments, additional SIP domains might be added by clicking the **Add** button. When you are done defining SIP domains, click **OK**.

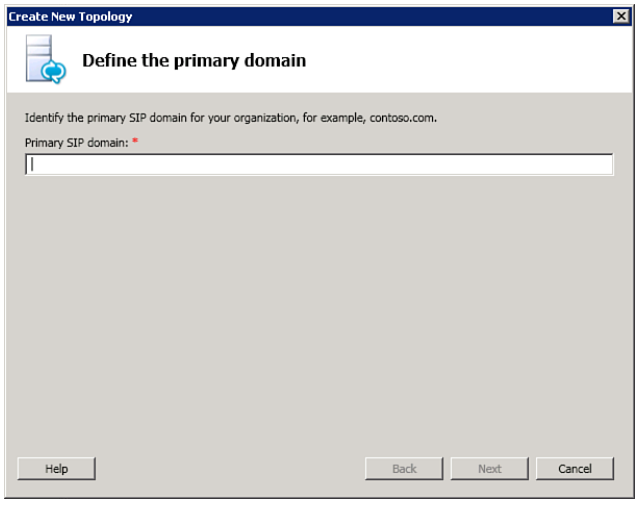

FIGURE 5.7 Define Default SIP Domain

3. The Next window will ask you to define the first site name as shown in Figure 5.8.

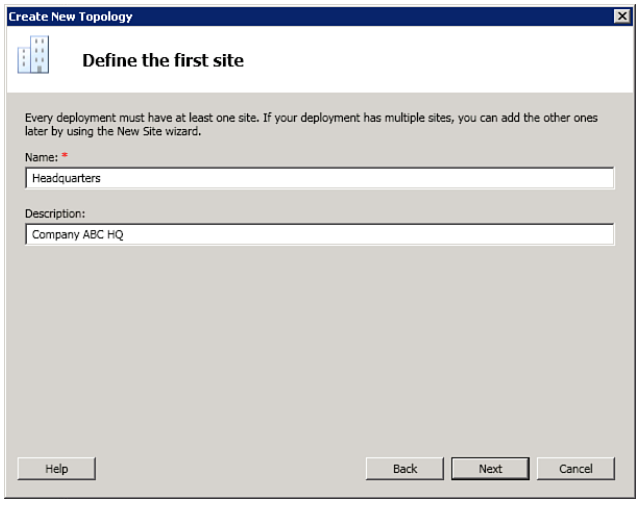

FIGURE 5.8 Define Site

NOTE

Note that Lync Server sites have no relationship to Active Directory sites. They are completely separate and unique to Lync Server.

4. The next window prompts the Administrator for the geographic location of the first site. Click **Finish** to complete the wizard.
5. This brings up the Define Front End Pool wizard.
6. Define the pool FQDN and select the radio button for Standard Edition, and then click **Next** as shown in Figure 5.9.

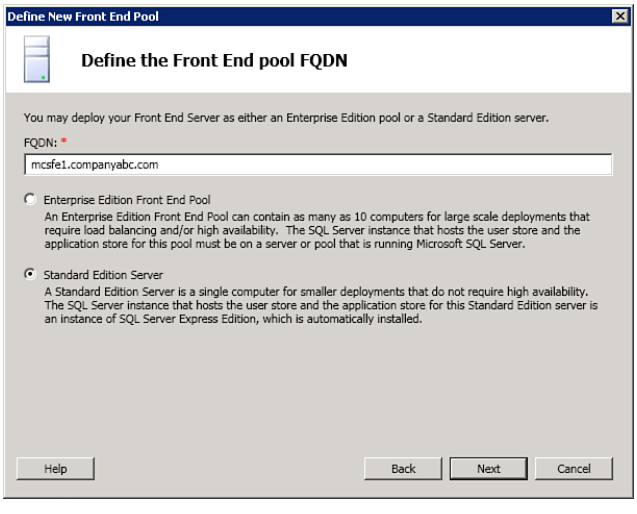

FIGURE 5.9 Define Front End Pool

7. Choose the appropriate workloads for your deployment, and then click **Next**. Choose the proper collocation options and click **Next**. Choose whether other server roles such as Archiving and Monitoring should be associated with this pool and click **Next**.
8. Define the database to be used by the pool, as shown in Figure 5.10. For a Standard Edition deployment, the SQL box is grayed out because a local instance of SQL Express is always used. Click **Next**. Then define the file share to be used by the pool and click **Next**.

NOTE

Note that you need to manually create the share on the front end before progressing past step 8. After the share is created, Lync Server assigns the appropriate permissions.

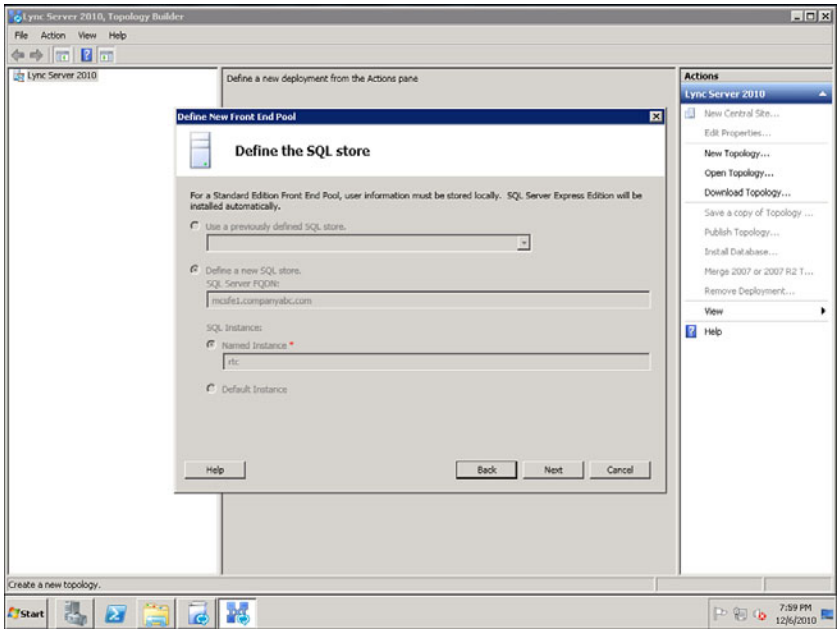

FIGURE 5.10 Define SQL Instance and File Share for Front End Pool

9. When you are ready, click **Next**.
10. Specify the Web Services URL and click **Next**. Specify the PSTN Gateway as shown in Figure 5.11 and click **Finish**.

This completes the initial topology definition. However, there are additional steps to complete a fully functional topology. The next step is to define easy-to-remember URLs for common Lync Server functions.

1. From the main Topology Builder page where Lync Server 2010 is highlighted, expand **Simple URLs** in the main pane, as shown in Figure 5.12, and then click **Properties** in the right pane.
2. Enter easy-to-remember URLs, as shown in Figure 5.13.

NOTE

The following three examples are all valid for Lync Server simple URLs:

- https://<function>.<domain _fqdn>: https://dialin.companyabc.com
- https://<sip_domain>/<function>: https://companyabc.com/dialin
- https://<External_WebPool_FQDN>/<function>: https://cs2010.companyabc.com/dialin

Note that these are the only allowed syntaxes.

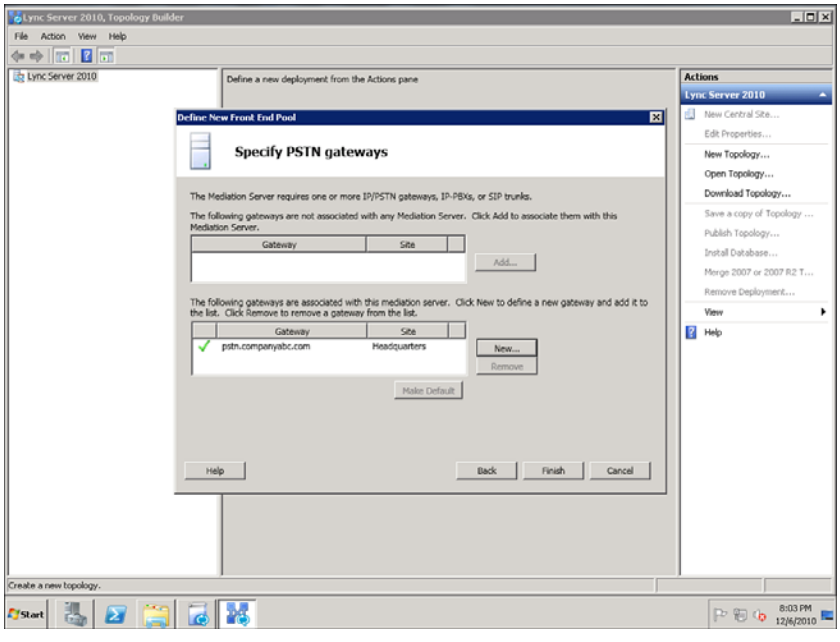

FIGURE 5.11 Enterprise Voice Topology

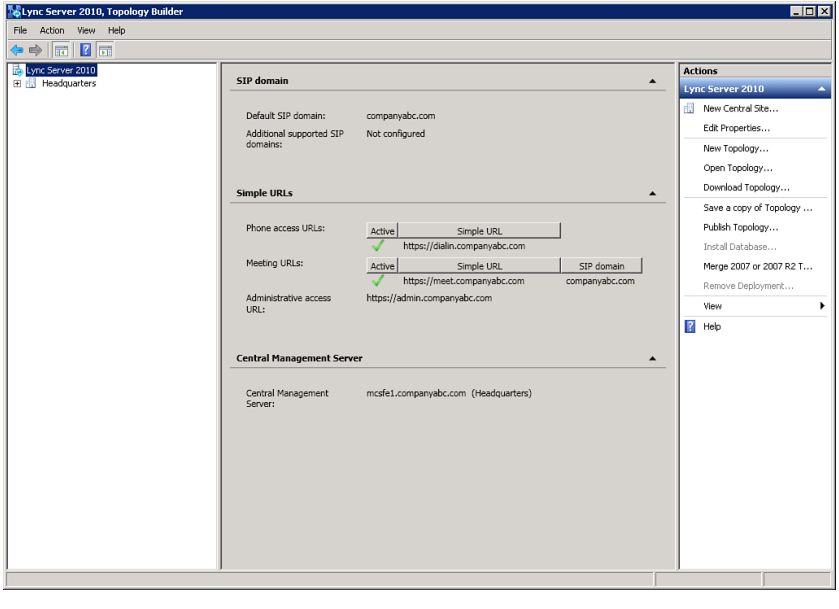

FIGURE 5.12 Expand the Simple URLs

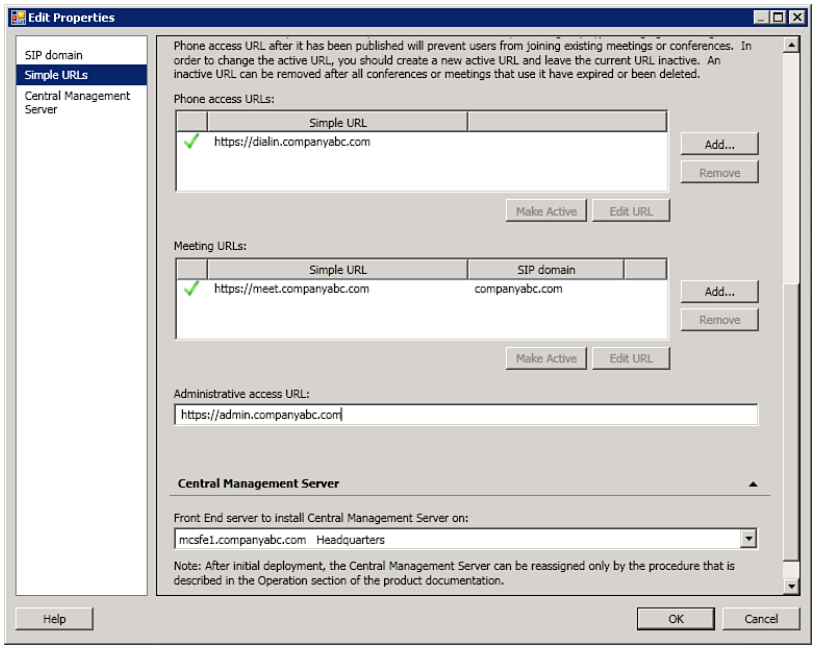

FIGURE 5.13 Configured Simple URLs

Port information, such as https://dialin.companyabc.com:443, is invalid. If you choose the first option, the FQDNs need to be included as SANs on your certificates. If you choose the second or third option, note that the following virtual directory names are reserved and cannot be used as part of a simple URL:

- ABS
- Conf
- LocationInformation
- RequestHandler
- AutoUpdate
- cscp
- OCSPowerShell
- RGSClients
- CertProv
- GetHealth
- ReachWeb
- RGSConfig

- CollabContent
- GroupExpansion
- RequestHandlerExt
- WebTicket

Publish the Topology

The final step is to publish the topology to the Central Management Store. In a Standard Edition deployment, this is the first front end you define. Perform the following steps to publish your topology:

1. In the Topology Builder tool, in the top-level menu item in the left pane, select Lync Server, as shown in Figure 5.14.

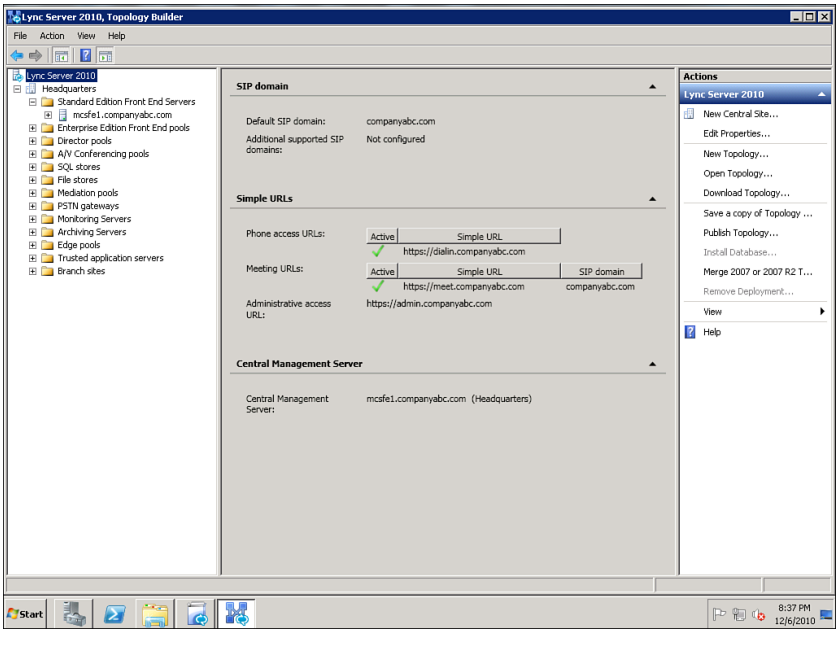

FIGURE 5.14 Top Level of Topology Builder

2. In the right pane, select **Publish Topology**.
3. At the opening screen, click **Next.**
4. Ensure that correct Central Management Store is selected, and then click **Next**. This starts the publishing process and overwrites any existing topologies.
5. The **Publish Topology** window displays the actions being performed. Ensure it says "Succeeded" at the bottom when it is finished, as shown in Figure 5.15, and then click **Finish**.

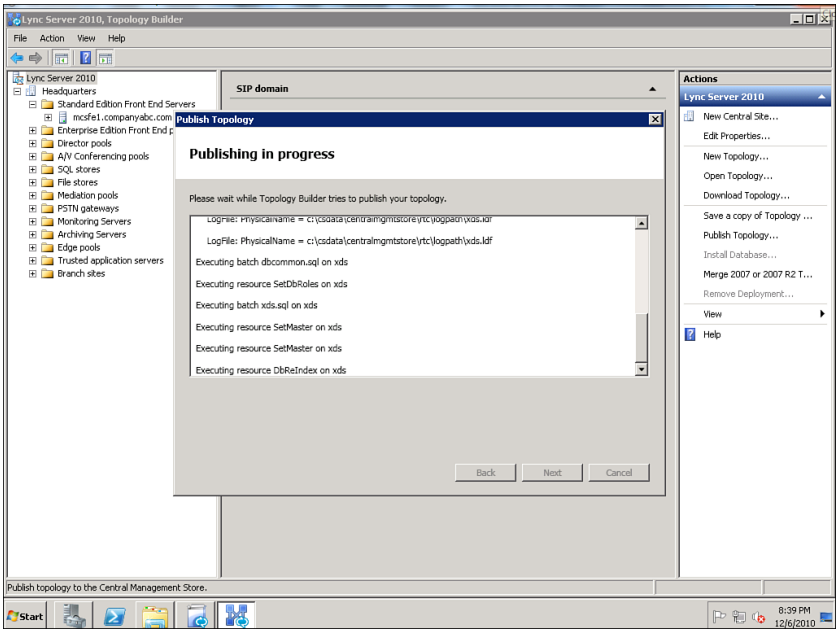

FIGURE 5.15 Successfully Published Topology

Installing the Front End Role

It is important to note that if you jumped to this section before completing the previous steps, you need to go back. Preparing the server for the first Standard Edition server and building a valid topology in the Topology Builder tool are both prerequisites to installing the Front End role. This is a different process from Office Communications Server 2007 and 2007 R2, and it involves more steps.

TIP

Administrators new to Lync Server are advised to review the new features, requirements, and prequisites before beginning the installation process.

The following prerequisites are required to install the Standard Edition Front End role:

- IIS with the following options:
  - Static Content
  - Default Document
  - Directory Browsing
  - HTTP Errors

- HTTP Redirection
- ASP.NET
- .NET Extensibility
- Internet Server API (ISAPI) Extensions
- ISAPI Filters
- HTTP Logging
- Logging Tools
- Request Monitor
- Tracing
- Basic Authentication
- Windows Authentication
- Request Filtering
- Static Content Compression
- IIS Management Console
- IIS Management Scripts and Tools

- Message Queueing with Directory Service Integration

After you've completed the steps outlined previously, the server is ready to install the Front End role. In the main Lync Server Deployment Wizard screen, click **Install or Update Lync Server System** from the main pane. Follow the steps that follow to complete the installation process:

1. Click **Run** to Install the local configuration store and follow the wizard.
2. For **Step 2: Setup or Remove Lync Server Components**, click **Run**.
3. The next screen shows the actions being performed, as shown in Figure 5.16. This process takes a few minutes to complete.
4. After the task completes, click **Finish**, and you are brought back to the Deployment Wizard.
5. Review **Step 3: Request, Install or Assign Certificates** and click **Run**. This deployment requires a total of four certificates, so you need to run this step eight times: four times to request certificates and four times to assign them.
6. Because this is a new deployment, choose **Create a new certificate.**
7. At the next screen, choose **Default** as shown in Figure 5.17, and then click **Request.**
8. Assuming you are using an internal CA, choose **Send the request immediately to an online certificate authority** and click **Next**. This is the default option.

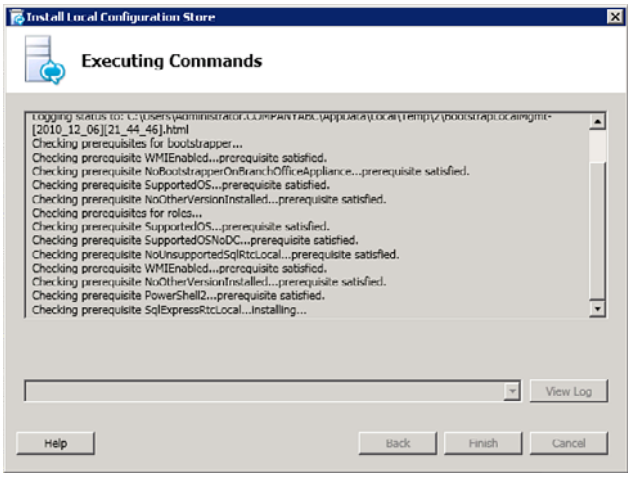

FIGURE 5.16 Installing the Front End Role

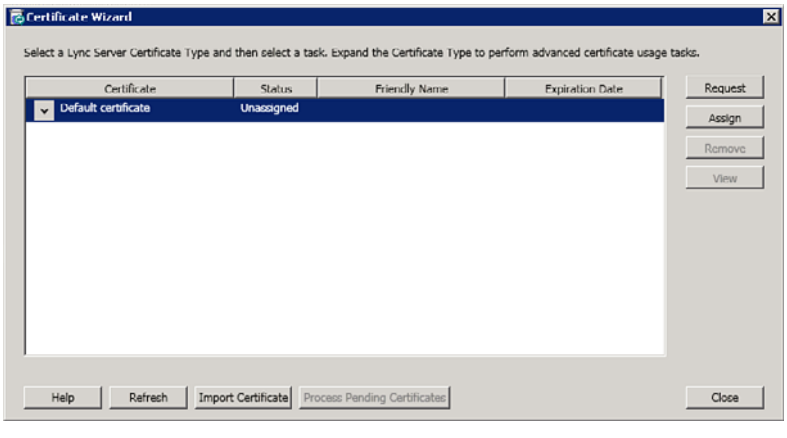

FIGURE 5.17 Request the Default Certificate

9. Select the appropriate CA for your environment from the drop-down list, choose a friendly name and key length, enable **Mark the certificate's private key as exportable** as shown in Figure 5.18, and then click **Next**.
10. Enter your Organization Name and Organizational Unit, and then click **Next**.
11. Select your country from the drop-down menu, and then enter your state/province and city/locality. Remember that full names must be entered, and abbreviations are not considered valid for certificate requests. When complete, click **Next**.
12. The Deployment Wizard automatically adds the SANs required based on the published topology. Unless you have special requirements, select the option to **Skip** and then click **Next**.
13. Review the information to ensure it is correct, and then click **Next**.
14. This screen shows the commands executed, as shown in Figure 5.19.

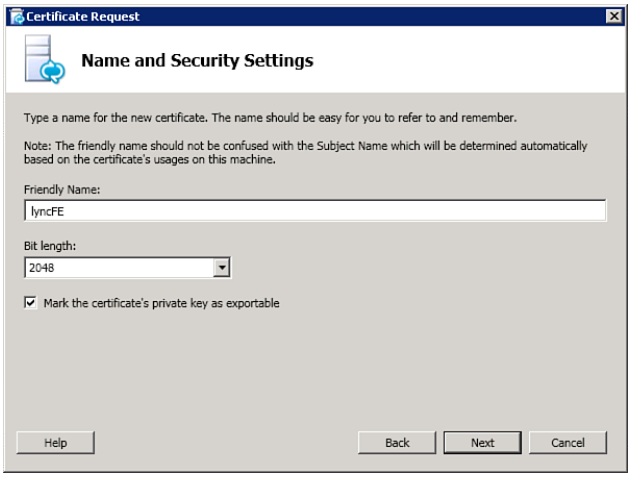

FIGURE 5.18 Certificate Request Settings

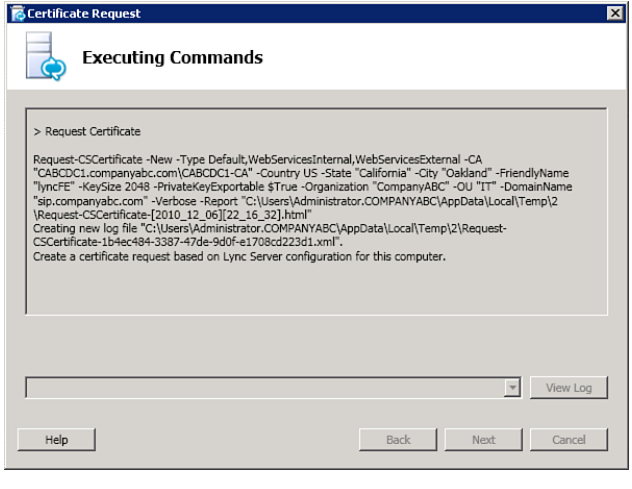

FIGURE 5.19 Certificate Request Process

15. Click **Next.**
16. Ensure the **Assign this certificate to Lync Server usages** box is checked and click **Finish**. Click **Next** through the wizard to assign the certificate. Figure 5.20 shows the actions taking place.
17. Ensure the process completes successfully, and then click **Finish**.
18. Click **Close** to close the wizard.
19. After the certificates have been assigned, there is a check mark by step 3 as shown in Figure 5.21. If there is not a check mark, check your process because you might have skipped a step.

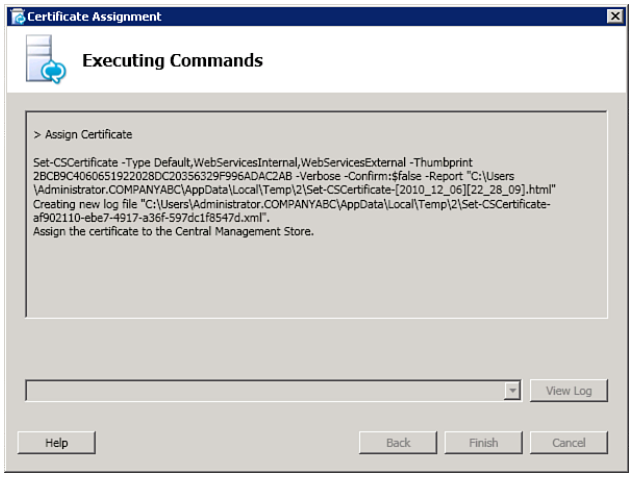

FIGURE 5.20 Choose the Default Certificate

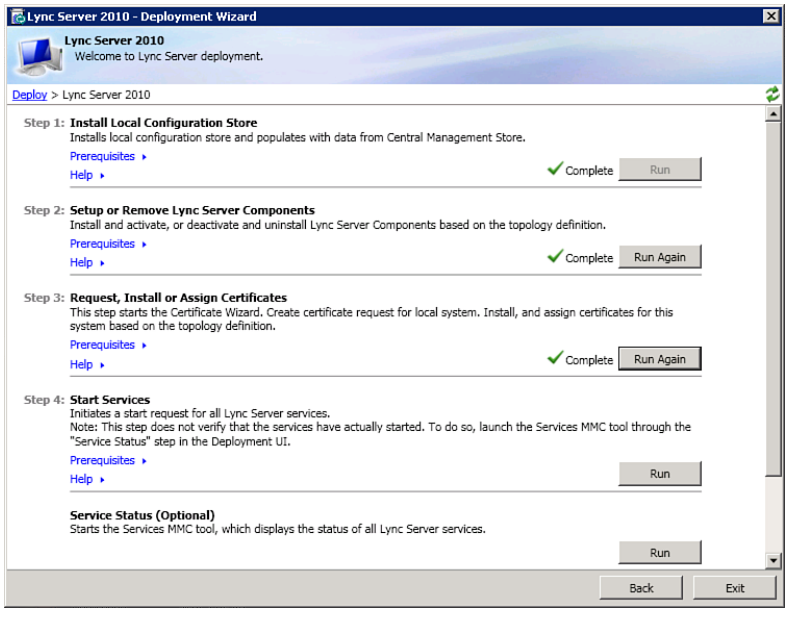

FIGURE 5.21 Certificate Process Completed

20. If the file store for the pool is located on this system, you need to reboot before continuing. After the reboot, restart the Deployment Wizard by launching Setup.exe.
21. Click **Install or Update Lync Server System**, and then click **Run** for Step 4: Start Services.

22. Click **Next**.
23. Ensure all services start, as shown in Figure 5.22.

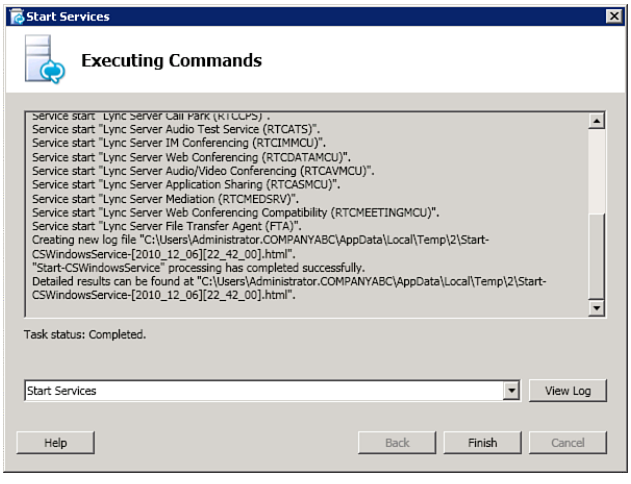

FIGURE 5.22 All Services Started

24. Click **Exit** to leave the Deployment Wizard.

The Standard Edition front end is now installed and ready for further configuration using the Lync Server Control Panel.

NOTE

Note that the client autoconfiguration requirements are still the same.

The following DNS records are required for client autoconfiguration:

- SRV record of _sipinternaltls._tcp.<sip_Domain> for port 5061 pointing to the FQDN of your front end pool or Director
- Host (A) record of sipinternal.<sip_Domain> pointing to the IP address assigned to your front end pool or Director
- Host (A) record of sip.<sip_Domain> pointing to the IP address assigned to your front end pool or Director

Enterprise Edition Installation

Lync Server Enterprise Edition is designed for larger deployments or those that require high availability or redundancy. Enterprise Edition enables you to have multiple front end servers in a pool, and it scales to support larger user counts with an outboard SQL database.

Topology Builder for Enterprise Edition Deployments

Lync Server uses the published topology to process traffic and maintain overall topology information. It is especially important to ensure all information included in the Topology Builder is correct because it sets the initial configuration information for deployed server roles. To ensure the topology is valid, it is recommended you run the Topology Builder before your initial deployment and publish an updated topology after each topological change. This example shows a Enterprise Edition topology. Remember, if you change the topology later, republish it to ensure consistency.

When you first launch Lync Server Topology Builder, you see a partially blank MMC screen, as shown in Figure 5.23. Compare this to the detailed result at the end of this example.

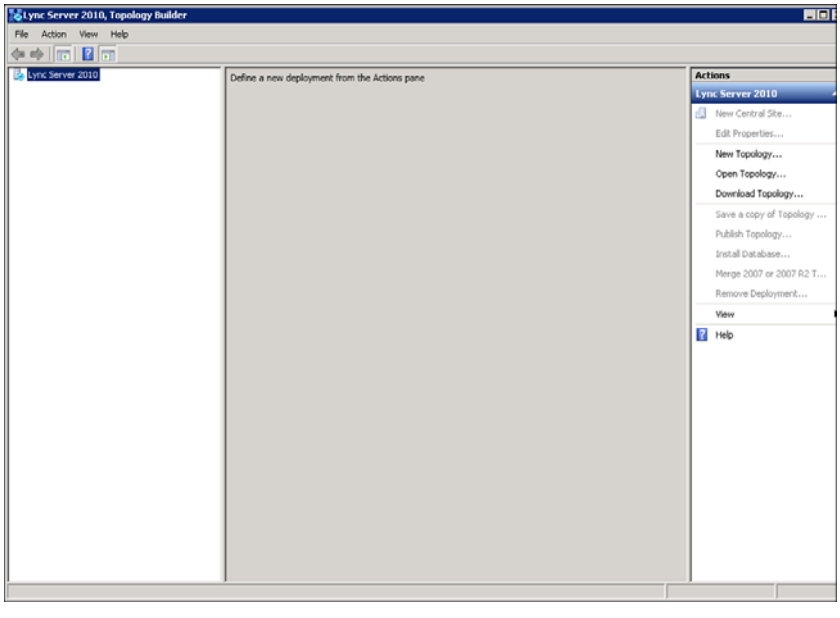

FIGURE 5.23 Topology Builder without a Defined Topology

To begin using Topology Builder, follow these steps:

1. On the right side of the Action pane, click **New.**
2. Define the default SIP domain. In many deployments, this is simply your domain name, as shown in Figure 5.24. In more complex deployments, additional SIP domains might be added by clicking the **Add** button. When you are done defining SIP domains, click **OK**.
3. On the right side of the Action pane, click **Define Site**. Enter the appropriate information, as shown in Figure 5.25, and then click **OK**.

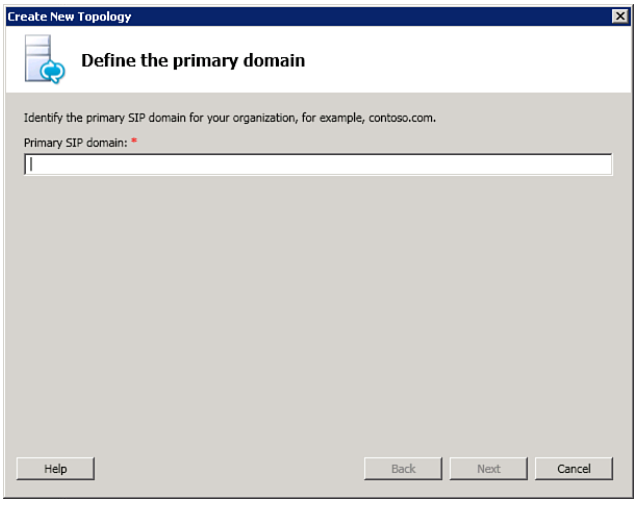

FIGURE 5.24 Define the Default SIP Domain

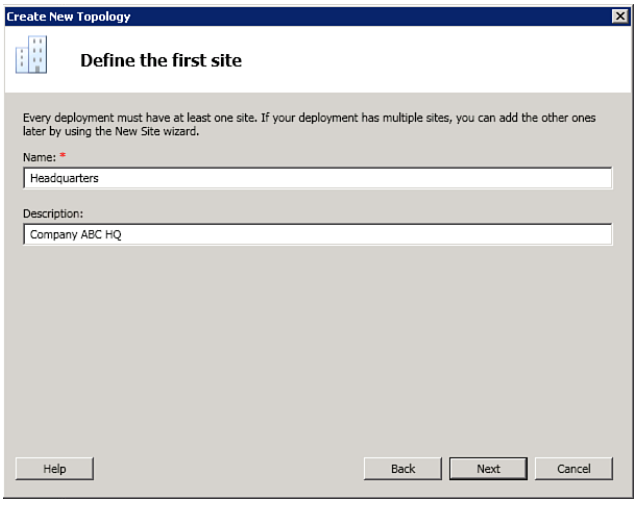

FIGURE 5.25 Define the Site

NOTE

Note that Lync Server sites have no relationship to Active Directory sites. They are completely separate and unique to Lync Server.

4. On the right side of the Action pane, click **Define Front End Pool**, and choose the radio button for the Enterprise Edition, and then click **Next**.
5. Define the pool FQDN, as shown in Figure 5.26. When you are done, click **Next**.

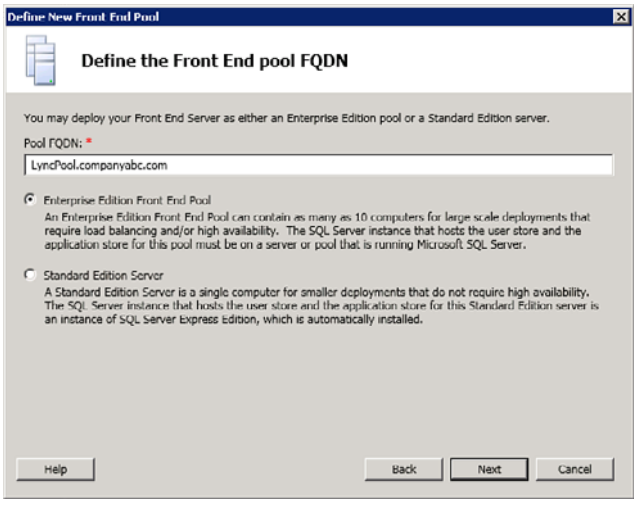

FIGURE 5.26 Define the Front End Pool

6. Define the Front End Server FQDNs and click **Next**.
7. Choose the appropriate workloads for your deployment, and then click **Next**. Associate the appropriate Archiving or Monitoring Servers for your pool and click **Next**.
8. Define the database and file share to be used by the pool, as shown in Figure 5.27. For an Enterprise deployment, SQL cannot be collocated on one of the front end servers. Also, you need to manually create the share on a server other than the front end before progressing past this step. After the share is created, Lync Server assigns the appropriate permissions. When you are ready, click **Next**.

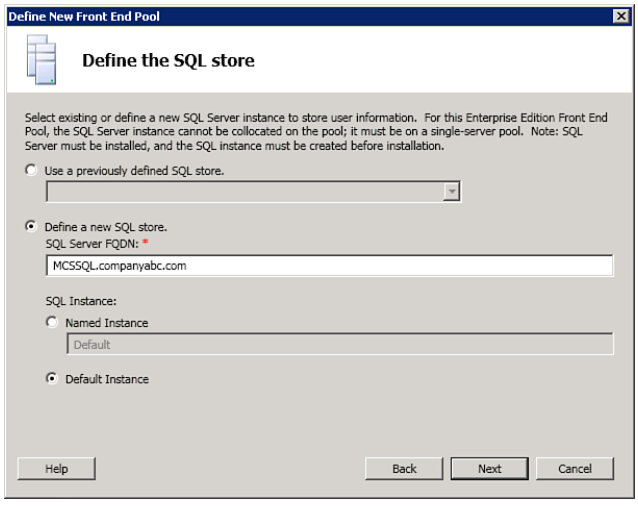

FIGURE 5.27 Define SQL Instance for Front End Pool

9. Specify the Web Services URL for the pool and click **Next**.
10. Define an A/V Conferencing pool as shown in Figure 5.28.

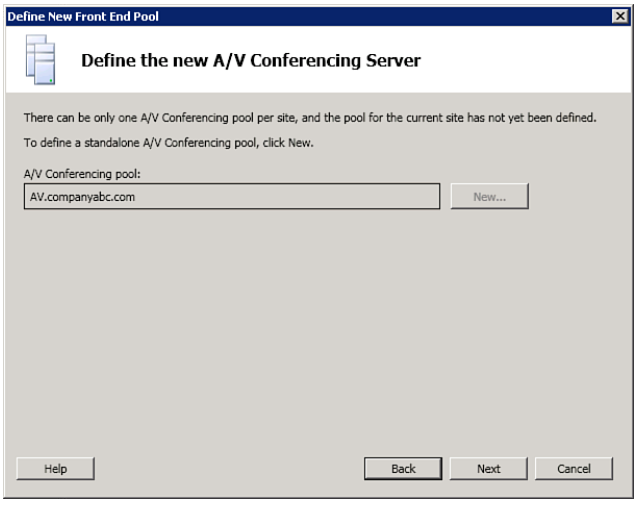

FIGURE 5.28 Conferencing Settings

11. If you deploy Enterprise Voice, define a PSTN gateway if required, as shown in Figure 5.29. Then click **Next**.

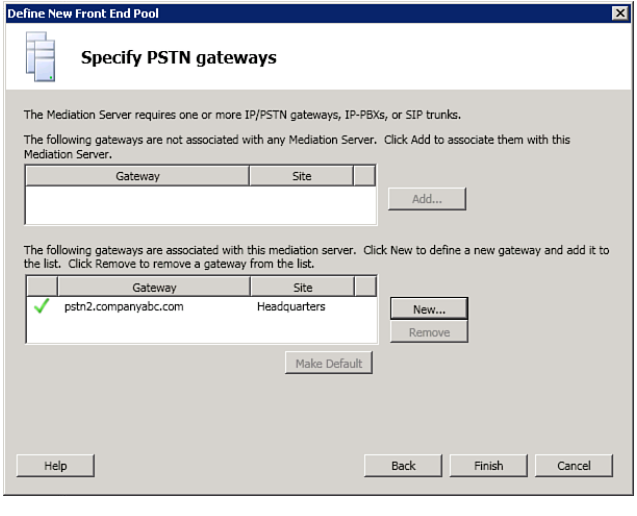

FIGURE 5.29 Specify Voice Gateway

12. If you plan to allow external access or add any edge services, enable the **Associate Edge Pool** box and select an Edge Server. When complete, click **Finish**.

This completes the initial topology definition. However, there are additional steps to complete a fully functional topology.

Configure Simple URLs

The next step is to define easy-to-remember URLs for common Lync Server functions.

1. From the main Topology Builder page where your site name is highlighted, expand **Simple URLs** in the main pane, as shown in Figure 5.30, and then click **Edit**.

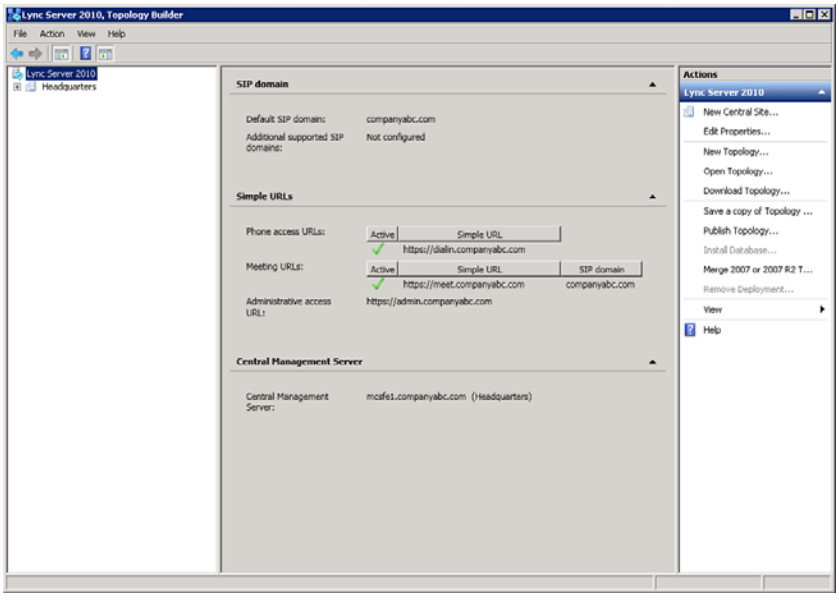

FIGURE 5.30 Expand the Simple URLs Item

2. Enter easy-to-remember URLs as shown in Figure 5.31.

NOTE

The following three examples are all valid for Lync Server simple URLs:

- https://<function>.<domain _fqdn>: *https://dialin.companyabc.com*
- https://<sip_domain>/<function>: https://companyabc.com/dialin
- https://<External_WebPool_FQDN>/<function>: https://cs2010.companyabc.com/dialin

Note that these are the only allowed syntaxes.

Port information, such as https://dialin.companyabc.com:443 is invalid. If you choose the first option, all the FQDNs need to be included as SANs on your certificates. If you choose the second or third option, note that the following virtual directory names are reserved and cannot be used as part of a simple URL:

- ABS
- Conf
- LocationInformation
- RequestHandler
- AutoUpdate
- cscp
- OCSPowerShell
- RGSClients
- CertProv
- GetHealth
- ReachWeb
- RGSConfig
- CollabContent
- GroupExpansion
- RequestHandlerExt
- WebTicket

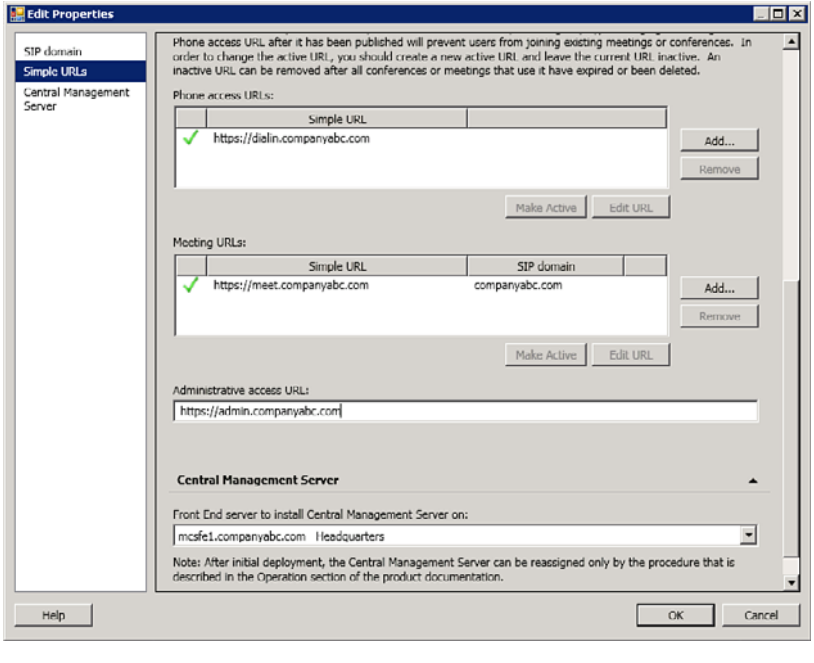

FIGURE 5.31 Configured Simple URLs

Publish the Topology

The final step is to publish the topology to the Central Management Store. Perform the following steps to publish your topology:

1. In the Topology Builder Tool, in the top-level menu item in the left pane, select Lync Server, as shown in Figure 5.32.

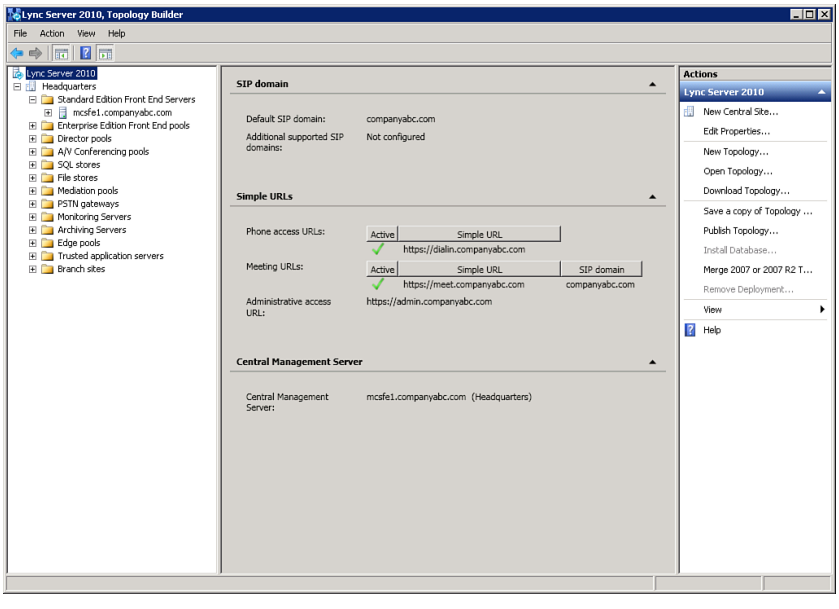

FIGURE 5.32 The Top Level of Topology Builder

2. Click **Publish Topology**.
3. In the opening screen, click **Next.**
4. Ensure that correct Central Management Store is selected, and then click **Next**. This starts the publishing process and overwrites any existing topologies.
5. Enable the **Create Other Databases** box. Ensure the account used for installation has permission to perform this function. Click **Next**.
6. The **Publish Topology** window displays the actions being performed as shown in Figure 5.33. Click **Finish**.

Installing the Front End Role

It is important to note that if you jumped to this section before completing the previous steps, you need to go back. Preparing the server for the first Enterprise Edition server and building a valid topology in the Topology Builder tool are prerequisites to installing the Front End role. This is a different process from Office Communications Server 2007 and 2007 R2, and it involves more steps. Administrators new to Lync Server are advised to review the new features, requirements, and prequisites before beginning the installation process.

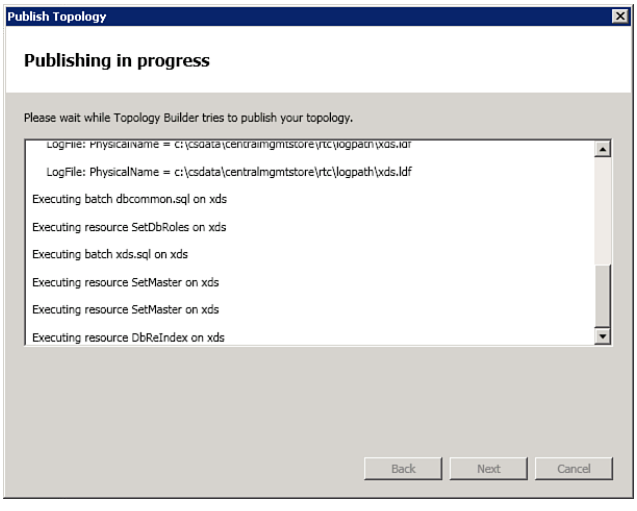

FIGURE 5.33 Publishing the Topology

The following prerequisites are required to install the Enterprise Edition Front End role:

- IIS with the following options:
  - Static Content
  - Default Document
  - Directory Browsing
  - HTTP Errors
  - HTTP Redirection
  - ASP.NET
  - .NET Extensibility
  - Internet Server API (ISAPI) Extensions
  - ISAPI Filters
  - HTTP Logging
  - Logging Tools
  - Request Monitor
  - Tracing
  - Basic Authentication
  - Windows Authentication
  - Request Filtering
  - Static Content Compression

- IIS Management Console
- IIS Management Scripts and Tools

- Message Queueing with Directory Service Integration

After you've completed the steps outlined previously, the server is ready to install the Front End role. From the main Lync Server Deployment Wizard screen, click **Install or Update Lync Server System** from the main pane, and then click **Run** for Step 1: Install Local Configuration Store. Follow the steps that follow to complete the installation process:

1. For **Step 2: Setup or Remove Lync Server Components**, click **Run**.
2. As the screen that pops up, click **Next.**
3. The next screen shows the actions being performed, as shown in Figure 5.34. This process takes a few minutes to complete.

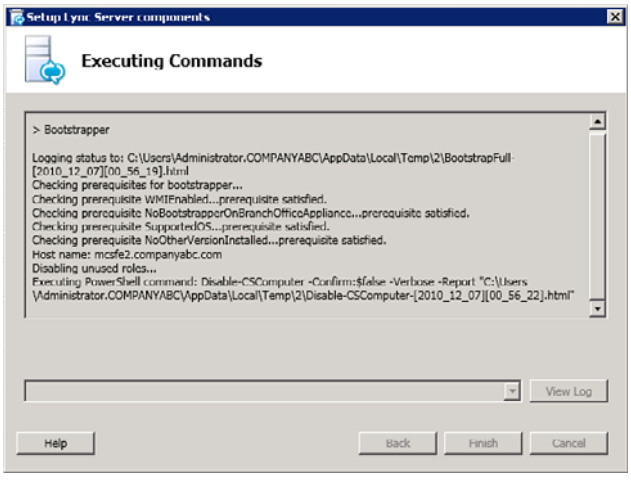

FIGURE 5.34 Installing the Front End Role

4. After the task completes, click **Finish** and you are brought back to the Deployment Wizard.
5. Review **Step 3: Request, Install or Assign Certificates** and click **Run**.
6. At the next screen, choose **Default**, as shown in Figure 5.35, and then click **Request.**
7. Assuming you are using an internal CA, choose **Send the request immediately to an online certificate authority**, and then click **Next**. This is the default option.
8. Select the appropriate CA for your environment from the drop-down list, choose a friendly name and key length, and enable the **Mark the certificate's private key as exportable** box as shown in Figure 5.36, and then click **Next**.
9. Enter your organization name and organizational unit, and then click **Next**.

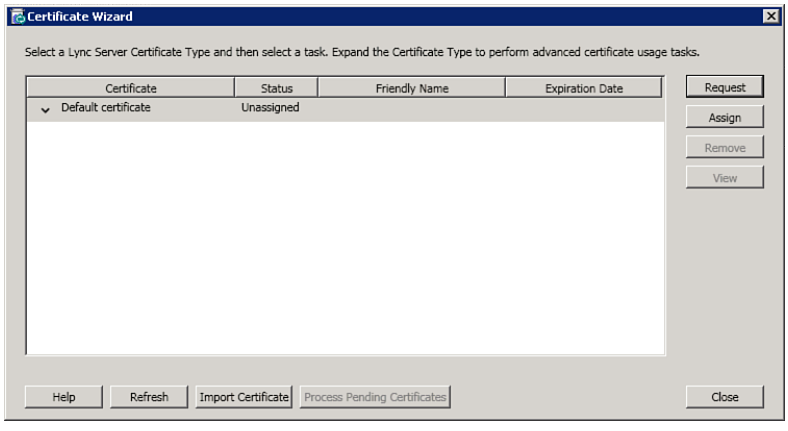

FIGURE 5.35 Request the Default Certificate

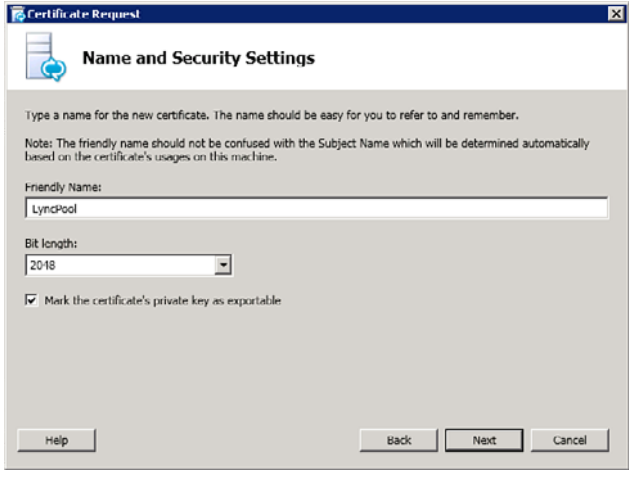

FIGURE 5.36 Certificate Request Settings

10. Select your country from the drop-down menu, and then enter your state/province and city/locality. Remember that full names must be entered, abbreviations are not considered valid for certificate requests. When complete, click **Next**.
11. The Deployment Wizard automatically adds the SANs required based on the published topology. Unless you have special requirements, select the option to **Skip**, and then click **Next**.
12. Review the information to ensure it is correct, and then click **Next**.
13. This screen shows the commands executed, as shown in Figure 5.37.
14. Click **Next**.

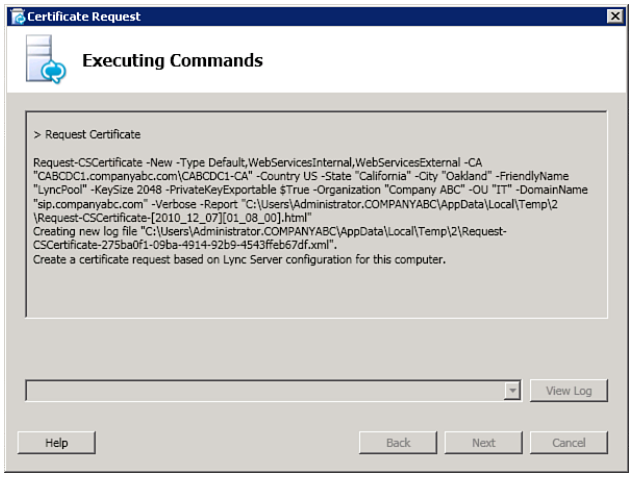

FIGURE 5.37 Certificate Request Process

15. Ensure **Assign this certificate for Lync Server certificate usages** is checked and click **Finish**.
16. On the first screen, click **Next**.
17. Review the certificate information and then click **Next.**
18. Figure 5.38 shows the actions to assign the certificate. When the actions are complete, click **Finish**.

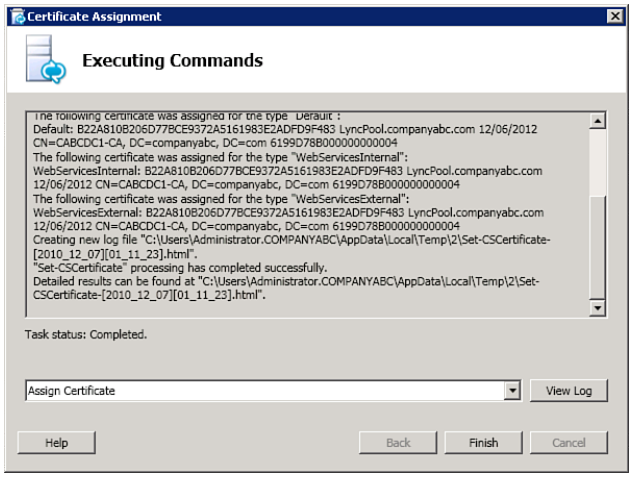

FIGURE 5.38 Assigning the Certificate

19. After all the certificates have been assigned, a check mark by Step 3 displays, as shown in Figure 5.39. If there is not a check mark, check the process because you likely skipped a step.

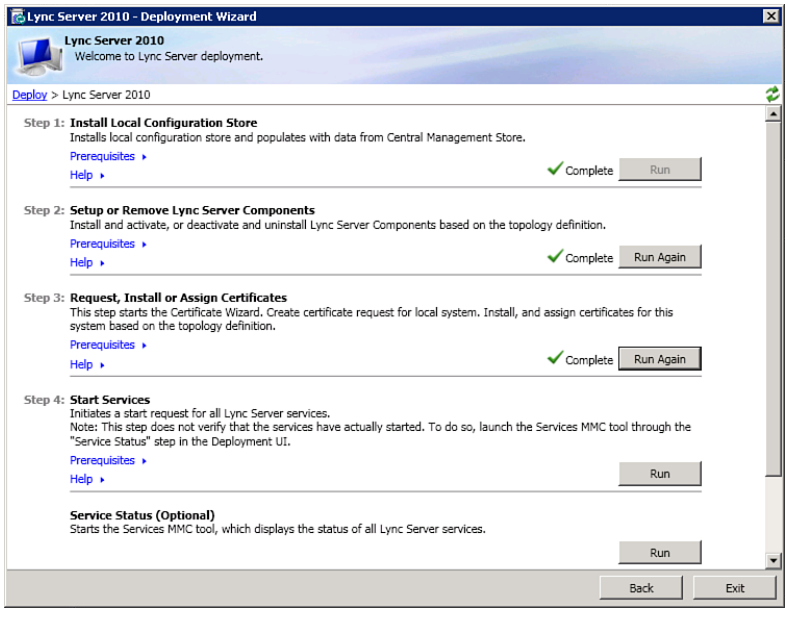

FIGURE 5.39 Certificate Process Completed

20. If the file store for the pool is located on this system, you need to reboot before continuing. After the reboot, restart the Deployment Wizard by launching Setup.exe.
21. Click Install or Update Lync Server System, and then click **Run** for Step 4: Start Services.
22. Click **Next**.
23. Ensure all services start, as shown in Figure 5.40.
24. Click **Exit** to leave the Deployment Wizard.

Configure Front End

The Standard Edition front end is now installed and ready for further configuration using the Lync Server Control Panel, as shown in Figure 5.41. The Lync Server Control Panel is the only GUI available to Lync administrators. It is assumed that most configuration will be done via the Lync Server Management Shell.

For Enterprise Edition deployments, you need to manually add an A record in DNS for the pool name of your front end pool. This is the FQDN that is used when you select **Lync Server Control Panel** from the Start menu.

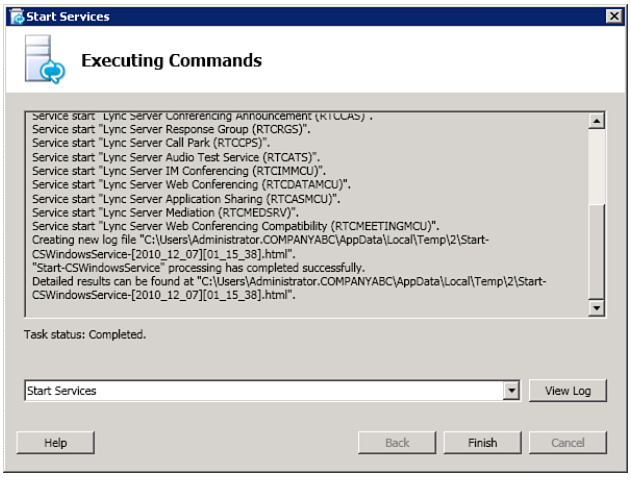

FIGURE 5.40 All Services Started

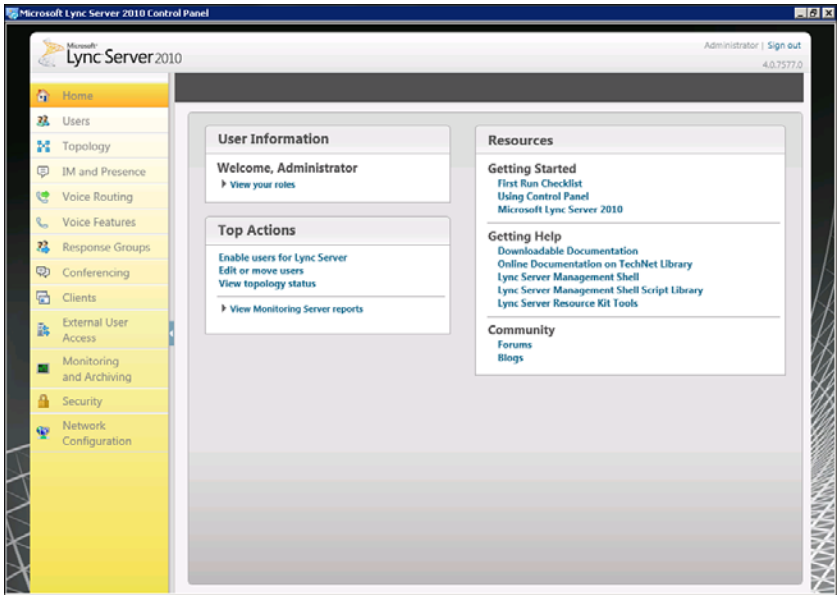

FIGURE 5.41 Lync Server Control Panel

NOTE

Note that the client autoconfiguration requirements are still the same.

The following DNS records are required for client autoconfiguration:

- SRV record of _sipinternaltls._tcp.<sip_Domain> for port 5061 pointing to the FQDN of your front end pool or Director
- Host (A) record of sipinternal.<sip_Domain> pointing to the IP address assigned to your front end pool or Director
- Host (A) record of sip.<sip_Domain> pointing to the IP address assigned to your front end pool or Director

Configuration

The good news about Lync Server is that with the Topology Builder tool, much of the configuration is done automatically. Although both configuration and administration can be done from the Silverlight web GUI or the Lync Server management shell, the configuration section focuses on the former, whereas the administration section focuses on the latter to avoid duplication of concepts.

First, an introduction to the Lync Server Control Panel. This section reviews each of the tabs and options in the Silverlight Control Panel web application and cites management shell commands for functions that do not appear in the Control Panel.

CAUTION

Before opening the Control Panel for the first time, ensure the server is included in the list of trusted sites on the server or your client. Without this setting, the Control Panel fails to launch.

To launch the Control Panel on a Lync Server, select the Lync Server Control Panel link from the Start menu under the Microsoft Lync Server program group. To launch the Control Panel from another system, enter the Admin simple URL you entered during the initial installation or https://<poolFQDN>/cscp. In the sample environment, this is either https://admin.companyabc.com/ or https://Lyncpool.companyabc.com/cscp/. Either URL brings you to the Control Panel.

When you first log in, you're brought to the Control Panel home page. The navigation bar is on the left and includes options for Home, Users, Topology, IM and Presence, Voice Routing, Voice Features, Response Groups, Conferencing, Clients, External User Access, Monitoring and Archiving, and Security.

On the Home page, you can see a link to a quick start guide and other informational links in the center pane and shortcuts to common tasks in the right pane. This is certainly easier than hunting for them in the various other menus. The shortcuts include

- Add New User
- Configure Voice Routing Dial Plans
- Configure Voice Policy
- Configure Voice Routes
- Configure PIN Policy

As you can see, Microsoft has a strong focus on the voice functions of Lync Server.

The Users tab opens with a search bar. To find all users, simply leave the field blank and click the Search icon. All Communications Server–enabled users are returned, as shown in Figure 5.42. To enable a new user for Lync Server, click the **New** button and a wizard displays. Click **Add** under the **Select Domain Users** menu, and then type the name or names of users to be enabled. Choose a Front End pool and SIP URI generation method, and then assign telephony rules and user policies. Be sure to click the **Add** button at the top to save the user; otherwise, your changes are lost.

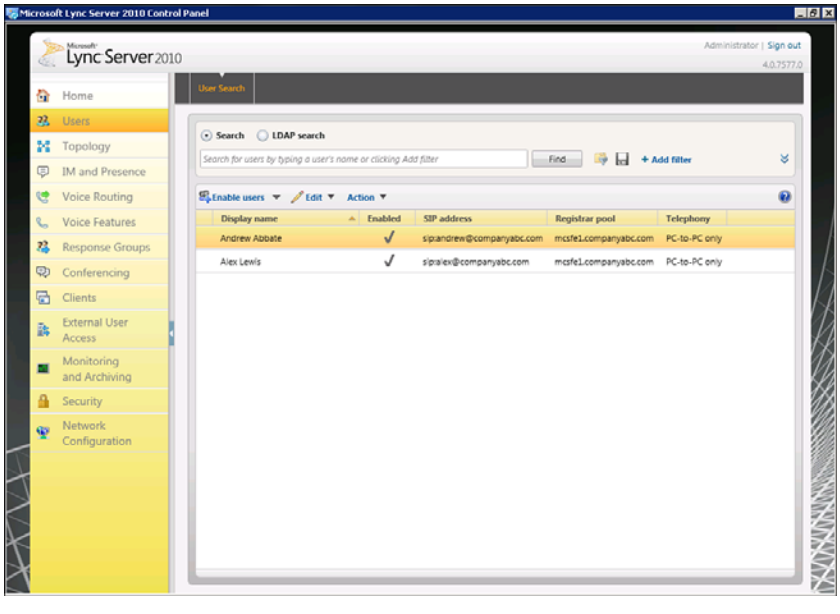

FIGURE 5.42 All Lync Server–Enabled Users

An administrator can also use the get-CsUser management shell cmdlet. With no arguments, the cmdlet returns all users. However, when run with the argument of a user's SIP address, the cmdlet returns detailed information about the account and configuration as shown in the following:

```
PS C:\Users\Administrator.COMPANYABC> get-CsUser alex@companyabc.com
Identity                          : CN=Alex Lewis,OU=CS Users,DC=companyabc,DC=
                                    com
OriginatorSid                     :
VoicePolicy                       :
ConferencingPolicy                :
DialPlan                          :
LocationPolicy                    :
ClientPolicy                      :
ClientVersionPolicy               :
ArchivingPolicy                   :
PinPolicy                         :
ExternalAccessPolicy              :
HostedVoiceMail                   :
HostedVoicemailPolicy             :
HostingProvider                   : SRV:
RegistrarPool                     : lyncpool.companyabc.com
TargetRegistrarPool               :
CSEnabled                         : True
SipAddress                        : sip:alex@companyabc.com
LineURI                           :
LineServerURI                     :
EnterpriseVoiceEnabled            : False
TenantId                          : 00000000-0000-0000-0000-000000000000
HomeServer                        : CN=Lc Services,CN=Microsoft,CN=Headquarters
                                    :1,CN=Pools,CN=RTC Service,CN=Services,CN=C
                                    onfiguration,DC=companyabc,DC=com
TargetHomeServer                  :
PrivateLine                       :
IPPBXSoftPhoneRoutingEnabled      : False
RemoteCallControlTelephonyEnabled : False
EnabledForRichPresence            : True
AudioVideoDisabled                : False
DisplayName                       : Alex Lewis
SamAccountName                    : alex
UserPrincipalName                 : alex@companyabc.com
OriginatingServer                 : CABCDC1.companyabc.com
```

From the User Search menu, administrators can also save common searches for easy access later. This saves the search as a User Search Query file or .usf. The file can be loaded later by clicking the Open button and selecting the file. This can be especially helpful in multidomain environments.

The default Topology menu shows all servers in the Lync Server topology and their statuses. If there is an error, it shows to the right of the server name and the administrator can drill down by double-clicking the server name. There are also two other tabs at the

top of the screen: Server Application and Trusted Application. The Server Application tab shows the services for each pool and their statuses. Under the Action menu, the administrator can choose to enable or disable services as required. The Trusted Application tab shows all trusted applications. This is the same as the get-CsTrustedApplication management shell cmdlet. By default, there are no trusted applications.

The IM and Presence tab can be a bit confusing. It actually controls the client file transfer filter and URL filter policies. These are similar to Office Communications Server 2007 R2 and function in a predictable manner. The file filter allows administrators to set file types that are blocked by file extension. Note that the tool doesn't do any deep inspection beyond file type suffix, so renaming a file to change the suffix works to circumvent it. The URL filter has three options: Allow URLs, Block URLs, and Send Warning. The warning option allows the administrator to configure a custom warning message.

Configure Voice Policy

The next four tabs—Voice Routing, Voice Features, Response Groups, and Conferencing—are covered in detail in the voice chapters included in Section 6, "Voice," later in this book. For this reason, this section offers only an overview of these tabs.

The Voice Routing tab has many options. The first one is Dial Plan. This is roughly equivalent to the location profile in Office Communications Server 2007 R2. It has options to configure normalization rules per dial plan. The Normalization Wizard successfully blends the best parts of the previous tools. It has the power and flexibility of raw regular expressions and the intuitive and logical interface of the Office Communications Server 2007 R2 Enterprise Voice Route Helper. This should go a long way toward helping administrators without traditional telephony backgrounds to create complex dial plans.

The Voice Policy option is something completely new. Although it has an associated usage policy, it also has a number of check boxes to enable or disable various calling features. The choices are

- Enable call forwarding
- Enable delegation
- Enable call transfer
- Enable call park
- Enable simultaneous ringing of phones
- Enable team call
- Enable PSTN reroute
- Enable bandwidth policy override
- Enable malicious call tracing

Many of these features require additional configuration that doesn't just involve simply checking a box. For example, orbits must be defined for call park to function correctly. This simply creates a policy to allow the functionality for users assigned to a specific voice policy.

The Route option focuses on policy-based routing. This allows logical call routing based on number patterns. This can be especially helpful in mixed Enterprise Voice and PBX scenarios or where Lync Server is used for conferencing but a PBX maintains enterprise call control. Note that a call follows the first applicable path, not all paths that match.

PSTN Usage, the next tab from the top bar, is essentially the combination of a route and a voice policy. When a usage is assigned only actions that fit, the voice policy is allowed, and then calls follow the appropriate route.

The next tab, Trunk Configuration, can apply to internal or external SIP trunk configuration. Proper configuration of the Trunk Configuration options allow interoperability with a wider scope of SIP trunks and SIP trunking providers.

The last tab under Voice Routing is Test Voice Routing. This allows an administrator to define and save test cases. This is especially helpful in rapidly changing or complex environments.

The Voice Features item on the left bar has two sections: Call Park and Unassigned Number. The Call Park section allows an administrator to define Call Park number ranges and assign them to a pool. The Unassigned Number section allows an administrator to define number ranges and an action where to redirect the call. In previous versions, the call simply disconnected, but in Lync Server, the call can be routed to Exchange UM or to the Announcement service for a front end pool. Multiple rules can be defined for different number ranges. This is helpful for multiple site deployments where using a local pool or one with a different language is valuable.

Response Groups have the same familiar pieces: Workflow, Queue, and Group definition fields. Existing Response Group workflows can also be imported from Office Communications Server 2007 R2.

Configure Conferencing Policy

The next tab in the left column is Conferencing. The Conferencing Policy Section allows configuration for data collaboration, application sharing, audio, video, PSTN, and recording options. Select the default global policy and click Edit to examine the options and default settings. The Meeting Configuration section allows administrators to define meeting settings such as PSTN caller bypass and who can be enabled as a presenter. The Dial-In Access Number section is much improved. It acts as a single screen for all dial-in conferencing numbers enterprisewide. Multiple numbers can be defined for different sites or pools. The final section is PIN Policy, which defines settings for PIN length, PIN expiration, and the maximum number of retries.

Configure Clients Tab

The Clients tab covers both Communicator clients and Communicator Phone Edition devices. This covers the following sections, client version policy, client version configuration, device update, test device, device log configuration, and device configuration. The client version filter allows explicit deny and allow for all types of clients. The client version configuration allows an administrator to define what happens for a client that doesn't fit one of the client version filters. The device update section allows administrators to upload .cab files to be deployed to Communication Phone Edition devices. The next section allows an administrator to define one or more test devices to test Communicator Phone Edition updates before they are widely deployed. The device log configuration is self-explanatory with options for defining log size and duration. The device configuration section allows administrators to define SIP security level, logging level, QoS settings, and device-locking settings.

Configure External Access Policy

The next tab is External User Access. The first section, External Access Policy, defines the access edge policy for communication with external users. The access edge configuration section controls settings for federation and remote user access. Next is the Federated Domains section. Administrators can explicitly allow or deny federated partners. If open federation is not enabled, all partners need to be defined in the allow list. The last section is for public IM providers. An administrator can enable each of the public IM providers separately. Note that a special client access license is required for some public IM federation.

The Monitoring and Archiving tab contains policy-based settings for CDR (Call Detail Recording) and QoE (Quality of Experience) information. It also contains global and policy-based archiving settings. These are explained in great detail in Chapters 7, "Microsoft Lync Server 2010 Monitoring," and 8, "Microsoft Lync Server 2010 Archiving."

The second-to-last tab in the Lync Server Control Panel is Security. The registrar section has options for Kerberos, NTLM, or certificate authentication. By default, all three are enabled. The web service section covers web service authentication methods. The options are PIN authentication, certificate authentication, and enabling certificate chain download. All are enabled by default.

The final tab is Network Configuration. This section includes various policy settings for voice configuration as related to the network. Specifically, this is the area where an administrator can configure Call Admission Control (CAC) and Media Bypass policies. Additionally, administrators can configure E911 and location-specific settings for users in the location policy.

Lync Server supports DNS load balancing for multiple server pools. This is a huge benefit because hardware load-balancing configuration for SIP traffic can be difficult and requires significant troubleshooting. Many load-balancer administrators don't understand the concept beyond balancing web traffic. Although DNS load balancing is used for SIP traffic in Lync Server, a hardware load balancer is still required for web services traffic, such as the address book service. DNS load balancing isn't exactly round robin DNS. A proper

configuration using the Company ABC environment and assuming mcsfe1 and mcsfe2 are both Enterprise Edition servers in the same pool would be configured in DNS as shown in Table 5.1.

TABLE 5.1 Configuration of DNS Load Balancing

_sip._tls.companyabc.com	Cspool.companyabc.com
Mcsfe1.companyabc.com	192.168.1.172
Mcsfe2.companyabc.com	192.168.1.173
Cspool.companyabc.com	192.168.1.172 192.168.1.173

When the client does an SRV record lookup as part of the automatic configuration process, the cspool.companyabc.com record is returned. From that, the DNS server returns the list of IPs assigned to cspool.companyabc.com (192.168.1.172 & 192.168.1.173). The client is programmed to choose an IP at random and register to that front end server. If the connection fails, the client tries the next random IP address in the list until it successfully registers or exhausts all the IP addresses returned by the DNS server.

Administration

This section reviews common administration tasks for Lync Server. As mentioned previously, the focus is primarily on the use of the PowerShell-based Management Shell. The most common administrative function is enabling a user for Lync Server. For example, to enable the user Rand Morimoto with the SIP address of rand@companyabc.com, you use the following command:

```
Enable-csUser –Identity "Rand Morimoto" –RegistrarPool
"cspool.companyabc.com" –SIPAddress "sip:rand@companyabc.com"
```

This example explicitly specifies the SIP address to be used. Lync Server can also automatically generate the address using the SIPAddressType parameter based on a number of options including first.last name (firstLastName), email address (emailaddress), UPN (userPrincipalName), and SAM account name (SAMAccountName). This is helpful when enabling a large number of users and when specifying the actual SIP address isn't practical. To enable a user with a SIP address that is his email address, use the following cmdlet syntax:

```
Enable-csuser –Identity <user Identity> -RegistrarPool <front end
pool FQDN> -SIPAddressType EmailAddress
```

Obviously, enabling a user can also be done in the Lync Server Control Panel. However, it's often faster to simply use the management shell.

Let's look at a more traditional PowerShell concept applied to Lync Server: the Get-CsUser and Get-CsAdUser cmdlets. On the surface, you might think these cmdlets are almost identical; however, that is not the case. They are actually different. The biggest difference is that Get-CsUser returns results only for Lync Server–enabled users. So, if users are currently enabled or the Identity parameter is specified to be a nonenabled user, the cmdlet won't return any data. Get-CsAdUser returns data for both enabled and nonenabled users.

That leads to the question, "Why not use Get-CsAdUser all the time?" The answer is the cmdlets return different information when used appropriately. Table 5.2 displays the attributes returned by each. As you can see, Get-CsAdUser returns general Active Directory information, whereas Get-CsUser returns Lync Server-specific information. There is a small bit of overlap, but only where Lync Server references a generic Active Directory field.

TABLE 5.2 Information Returned by Get-CsUser and Get-CsAdUser Cmdlets

Get-CsUser	Get-CsAdUser
	AddressListMembership
	AltSecurityIdentities
ArchivingPolicy	
	Assistant
AudioVideoDisabled	
	City
ClientPolicy	
ClientVersionPolicy	
	Company
ConferencingPolicy	
	CountryAbbreviation
	CountryCode
	CountryOrRegionDisplayName
CSEnabled	CSEnabled
	Department
	Description
DialPlan	
DisplayName	DisplayName
	DistinguishedName

TABLE 5.2 Information Returned by Get-CsUser and Get-CsAdUser Cmdlets

Get-CsUser	Get-CsAdUser
	EmployeeId
EnabledForRichPresence	
EnterpriseVoiceEnabled	
ExternalAccessPolicy	
	Fax
	FirstName
	Guid
	HomePhone
HomeServer	
HostedVoiceMail	
HostedVoicemailPolicy	
HostingProvider	
	Id
Identity	Identity
	Info
	Initials
IPPBXSoftPhoneRoutingEnabled	
	IPPhone
	IsValid
	LastName
LineServerURI	
LineURI	
LocationPolicy	
	Manager
	MiddleName
	MobilePhone
	Name
	ObjectCategory

TABLE 5.2 Information Returned by Get-CsUser and Get-CsAdUser Cmdlets

Get-CsUser	Get-CsAdUser
	ObjectCategoryCN
	ObjectClass
	ObjectState
	Office
	OriginatingServer
OriginatorSid	
	OtherFax
	OtherHomePhone
	OtherIPPhone
	OtherMobile
	OtherPager
	OtherTelephone
	Pager
	PasswordLastSet
	Phone
PinPolicy	
	PostalCode
	PostOfficeBox
	PreferredLanguage
PresencePolicy	
	PrimaryGroupId
PrivateLine	
	ProxyAddresses
RegistrarPool	
RemoteCallControlTelephonyEnabled	
SamAccountName	SamAccountName
	Sid
	SidHistory

TABLE 5.2 Information Returned by Get-CsUser and Get-CsAdUser Cmdlets

Get-CsUser	Get-CsAdUser
SipAddress	SipAddress
	StateOrProvince
	Street
	StreetAddress
TargetHomeServer	
TargetRegistrarPool	
TenantId	TenantId
	Title
	Url
	UserAccountControl
UserPrincipalName	UserPrincipalName
VoicePolicy	
	WebPage
	WhenChanged
	WhenCreated
	WindowsEmailAddress

There are many similar cmdlet relationships in the Management Shell. In fact, you can write a book to explain the various cmdlets, their syntaxes, and how to link them together to accomplish different tasks.

Troubleshooting

As with previous versions of Communications Server, there are two major gremlins with the Front End role: certificates and DNS. The new Deployment Wizard takes most of the guesswork out of certificate generation by automatically filling the SAN fields with the appropriate FQDNs for a given deployment. However, in more complex environments manual configuration might be necessary.

The added convenience of the Deployment Wizard doesn't lessen the importance of certificates. They are still core to all server and server-client communications. DNS, on the other hand, is not automated. For each pool created, the administrator needs to create an A record for each pool pointing to the load-balanced VIP for multiple-server pools or to the front end IP address for single-server pools.

The Lync Server event log is also a good place to check for errors. From the Start menu, select Administrative Tools, and then select Event Viewer. Expand the Applications and Services Logs item and select Lync Server. All events related to Lync Server functions reside here. Often, the error description is enough to identify the problem and make clear the resolution.

Best Practices

Following are the best practices from this chapter:

- Use DNS load balancing for SIP traffic. A hardware load balancer is still required for web services such as the address book service.
- Although the Lync Server Control Panel might seem more familiar at first, there are many functions that can only be accomplished in the Management Shell.
- Always install the SQL backward compatibility pack to ensure all cmdlets run correctly.
- For larger deployments, separate out conferencing services to a dedicated pool.
- Use the RBAC controls to delegate administration rights.
- Always publish a new topology before making changes or installing a new server role.
- Use the Get-CsUser cmdlet for Lync Server-specific information and the Get-CsAdUser cmdlet for general Active Directory information.

This page intentionally left blank

Index

Numbers

A

B

C

D

E

F

G

H

I

J–K

L

M

N

O

P

Q

R

S

T

U

V

W

X–Z