## Deployment guide:

Configuring a highly available Microsoft<sup>®</sup> Lync Server<sup>®</sup> 2013 environment on Dell<sup>™</sup> architecture





A Principled Technologies deployment guide commissioned by Dell Inc.

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## **INTRODUCTION**

When considering a highly available solution for your business' communications needs, choosing a Dell architecture solution over a traditional hardware combination of servers, networking, and storage can save your IT administrator lots of configuration and management time. A Dell converged infrastructure solution can offer small businesses and remote offices performance, scalability, and streamlined management. These features keep important communications workloads running for your business.

In this guide, we take you through the simple, straightforward process of setting up a highly available Microsoft Lync Server 2013 environment on a Dell solution consisting of the following hardware:

- 1 Dell PowerEdge<sup>™</sup> M1000e blade enclosure
- 2 Dell PowerEdge M620 blade servers
- 1 Dell EqualLogic<sup>™</sup> PS-M4110 blade storage array
- 4 Dell PowerConnect<sup>™</sup> M8024-k 10GbE switch modules

We set up this environment in our labs, and we provide each step we took along with any best practices we recommend. First, read more about the components of the Dell solution. Then, continue on for an overview of how to configure a Microsoft Lync Server 2013 environment (for detailed steps, see the corresponding appendices).

## ABOUT THE COMPONENTS About the Dell PowerEdge M1000e blade enclosure

The Dell PowerEdge M1000e blade chassis and its supported fabric interconnects are designed for dense computing situations. Features of the PowerEdge M1000e include:

- Management. Reduces administrative demand by providing a secure centralized management interface for the chassis and blades within, using proven Web (SSL-encrypted) and CLI (SSH/Telnet) technologies.
- Simplified configuration. The Chassis Management Controller allows administrators to control up to nine enclosures and 144 server blades, including BIOS/firmware change management and updates, thermal monitoring, and power threshold configuration.
- Flexible I/O. Six interconnect sockets with the capability to support three fully redundant fabrics, a passive midplane with more than 8 Tbps in I/O bandwidth capacity, and FlexIO support provide a number of connectivity options for your servers.
- **Reliability and efficiency.** Six power supplies and nine fans, all hotswappable, allowing for no-downtime maintenance of key chassis

components. All components are tuned for maximum power efficiency to reduce datacenter power consumption.

For more information about the Dell PowerEdge M1000e Blade Enclosure, visit www.dell.com/us/enterprise/p/poweredge-m1000e/pd.

#### About the Dell PowerEdge M620 server nodes

The Dell PowerEdge M620 has features optimized for performance, density, and energy efficiency.

- Processors. The Dell PowerEdge M620 is powered by two Intel<sup>®</sup> Xeon<sup>®</sup> E5-2600-series processors, which incorporate the very latest in processor technology from Intel. The powerful processors provide the performance you need for your essential mainstream tasks. The Intel Xeon E5-2600-series processor gives you up to eight cores per processor or up to 16 cores per server.
- **Memory.** The Dell PowerEdge M620 holds up to 768GB DDR3 RAM (up to 1600 MHz) across 24 DIMM slots per server node.
- **Management.** The Dell PowerEdge M620, like all late-model Dell servers, comes with the Dell Lifecycle Controller. This tool simplifies server management by providing a single interface for management functions and by storing critical system information in the system itself. There are no CDs or USB keys to monitor for drivers or firmware.

#### About the Intel Xeon processor E5 family

The new Intel Xeon processor E5 family, which comes standard in new Dell PowerEdge servers, incorporates innovative technology and features to meet the computing demands of the present and future. The Intel Xeon processor E5 family delivers intelligent and adaptive performance using such features as Intel Turbo Boost Technology 2.0, Intel Advanced Vector Extension, Intel Integrated I/O, and Intel Data Direct I/O Technology. These new processors also feature Intel Trusted Execution Technology (Intel TXT) and utilize Intel Advance Encryption Standard New Instructions (Intel AES-NI) to help keep your data safe.

For more information about the Intel Xeon processor E5 family, visit <u>www.intel.com.</u>

#### About the Dell EqualLogic PS-M4110 blade array

The Dell EqualLogic PS-M4110 is an enterprise-class storage array designed to install directly into a blade chassis. Simple integration with Dell PowerEdge M-series servers and switches in the PowerEdge M1000e chassis allows for a full-featured, single-chassis solution without external dependencies. The PS-M4410 features a full suite of

enterprise-class management tools and features, including EqualLogic array firmware, SAN Headquarters, and Host Integration Tools.

#### **About Microsoft Windows Server 2012**

Windows Server<sup>®</sup> 2012, the latest release of this server OS from Microsoft<sup>®</sup>, includes many new features and enhancements. According to Microsoft, Windows Server 2012 focuses on four core areas:

- **Beyond virtualization.** Windows Server 2012 provides a robust and dynamic virtualization platform through Hyper-V<sup>®</sup>, and includes new features that provide flexible options for delivering cloud services.
- The power of many servers, the simplicity of one. Windows Server 2012 offers features that allow for high availability and ease of management for multiple-server infrastructures.
- Every app, any cloud. Windows Server 2012 delivers a scalable and flexible Web and application platform by providing a consistent and open set of tools and frameworks that apply to applications on premises, in the cloud, or in a hybrid environment.
- Modern work style, enabled. Microsoft Windows Server 2012 empowers users and IT staff with remote access to data, applications, and simpler management tools while strengthening security and compliance.

#### **About Microsoft Lync Server 2013**

Microsoft Lync Server 2013 is a unified communications platform that lets users communicate securely and stay connected with colleagues and customers, from virtually wherever they chose to work.

Lync connects people on Windows 8 and other operating systems including mobile devices, as part of their everyday productivity experience. Lync provides a consistent, single-client experience for presence, instant messaging, voice, video, and meetings. Users can switch among devices as they choose based on their needs. Lync offers familiar and consistent user experience across PC, phone, browser, and tablets.

To learn more about Microsoft Lync Server 2013, visit <u>office.microsoft.com/en-</u>us/lync/.

## WE SHOW YOU HOW – INSTALLING LYNC SERVER 2013 ON DELL ARCHITECTURE

This guide walks you through deploying virtualized instances of Microsoft Lync Server 2013 onto a Windows Server 2012 Hyper-V® Failover Cluster. We recommend this configuration as it takes advantage of both guest-level and application-level high availability features. This guide is intended for a business with approximately 500-1000 users that uses Lync Server 2013 Standard Edition. For more information on sizing and capacity planning, see <u>http://technet.microsoft.com/en-us/library/gg615015.aspx</u>.

We first show you how to create a Hyper-V<sup>®</sup> Failover Cluster on two Dell PowerEdge M620 nodes running Windows Server 2012, using the Dell EqualLogic PS-M4110 blade storage to host the shared data. We then detail how to configure a highly available Lync Server 2013 Standard Edition environment consisting of three virtual machines: a pair of Lync Server 2013 Standard Edition Front End VMs, and a file server to handle quorum witness and topology information. Under this configuration, in the event that the server node hosting the primary Lync Server 2013 Front End VM goes offline, the secondary Front End VM will provide automatic failover of voice features without interruption to any participants, and any non-voice features can either be failed over manually on the application level, or will resume function as soon as the downed VM reboots on the other server node via Windows Server 2012 and Hyper-V failover clustering.

#### **Existing infrastructure**

This guide assumes a pre-existing infrastructure that contains an Active Directory<sup>®</sup> Domain Controller, DNS server, and an Active Directory Certificate Authority. Further information can be found at the following links:

- Active Directory Domain Services: <u>technet.microsoft.com/en-us/library/hh831484.aspx</u>
- Active Directory Certificate Services: <u>technet.microsoft.com/en-us/library/hh831740.aspx</u>
- Certificate requirements: <u>technet.microsoft.com/en-</u> us/library/gg398066.aspx

#### Installing the hardware

Before beginning this section, install the blade enclosure into a rack near sufficient 240V power outlets. Additionally, each Dell PowerEdge M620 will need a mezzanine NIC card (an Intel X520 10GbE in our tests). For detailed steps, see <u>Appendix</u> <u>A</u>.

Provide a DHCP-enabled network connection to both Chassis Management Controller (CMC) modules on the back of the enclosure. If not using DHCP, provide the CMC with a static IP address using the front control panel.

- Ensure that the mezzanine cards to be used for iSCSI traffic are installed into Slot B on each Dell PowerEdge M620 blade server, and insert the blades into the front of the enclosure. We placed the blade servers into slots 1 and 2.
- 2. Insert the Dell EqualLogic PS-M4110 blade storage into slots 3 and 4 on the front of the enclosure.
- **3.** Insert two of the Dell PowerConnect M8024-k 10Gb Ethernet switch modules into slots A1 and A2 on the back of the enclosure.
- 4. Insert the remaining two Dell PowerConnect M8024-k 10Gb Ethernet switch modules into slots B1 and B2 on the back of the enclosure.
- Provide domain-connected 10Gb network connections to port 20 (or an available port other than ports 17 and 18) on the M8024-k modules in slots A1 and A2.
- 6. Provide two 10Gb connections between the M8024-k modules in A1 and A2, using ports 17 and 18 on each. It is a best practice to cross the cables, i.e., connect port 17 in slot A1 to port 18 in slot A2, and vice versa.
- 7. Repeat step 6 for the M8024-k modules in slots B1 and B2.
- 8. Power on the enclosure.

#### **Networking overview**

This deployment requires three networks. The first is a domain-connected network, which connects to the external Active Directory domain controller and other existing infrastructure. The second is a Live Migration network, which comprises only the two clustered servers and allows VMs to move from one node to another with no downtime. The third is an iSCSI network, which connects to the PS-M4110 storage array and allows the storage to be shared across the servers. It is a best practice to isolate traffic from these networks. In our setup, we had two dual-port NICs in each blade: one of these is integrated and corresponds with fabric A, and the other is a mezzanine card configured to correspond with fabric B. We assigned a port from the integrated NIC for the domain-connected network, and the other port for Live Migration traffic. We isolated these networks by using different subnets and configuring tagged VLAN traffic for the Live Migration network. We used the mezzanine cards and fabric B for a dedicated iSCSI network. Figure 1 shows the sample IP scheme we used.

Server	NIC	IP Address	Traffic type	VLAN ID
ServerNode1	1	192.168.1.51	Domain	0 (untagged)
ConverNede1	2	192.168.20.51	Live Migration	20
Servernodel	3	192.168.10.51	iSCSI	0
	4	192.168.10.53	iSCSI	0
	1	192.168.1.52	Domain	0
ServerNode2	2	192.168.20.52	Live Migration	20
	3	192.168.10.52	iSCSI	0
	4	192.168.10.54	iSCSI	0
ADServer	1	192.168.1.1	Domain	0
Cluster1	1	192.168.1.70	Domain	0
PS-M4110 Group	1	192.168.10.60	iSCSI	0
PS-M4110 Member	1	192.168.10.61	iSCSI	0
First Front End VM	1	192.168.1.11	Domain	0
Second Front End VM	1	192.168.1.12	Domain	0
File Server VM	1	192.168.1.15	Domain	0

Figure 1: Network configuration for failover clustering.

#### **Configuring the PowerConnect modules**

- 1. Use Internet Explorer to access the CMC. The default username is root and the default password is calvin. Note that you may want to modify the default credentials for security reasons.
- 2. Access the I/O Module GUI for the M8024-k module in A1 and log in with the same credentials.
- Under System→Stack Management→Stack Port Summary, edit ports 0/17 and 0/18 so that they are used for stacking instead of Ethernet (Figure 2).

ystem owerConnect M8024-k lol, r/w	Stack Port Su						
iot, r/w		minary					
	Detail						
Home			-				
System	Stack Po	rt Summary:	Detail			8	C ?
+ General							
+ Time Synchronization	Unit 🔺	Interface •	Configured	Running	Link Status	Link Speed	Edit
± P Addressing	onix =		Stack-mode	Stack-mode	Link Oldido	(Gb/s) 👻	Curt
+ Diagnostics	1	0/17	Stack 🗸	Stack	Link Up	10	
<ul> <li>Management Security</li> </ul>	1	0/18	Stack 🗸	Stack	Link Up	10	
SNMP     File Management	1	0/19	Ethernet V	Ethernet	Link Down	10	
Stack Management	1	0/20	Ethernet	Ethernet	Link Down	Unknown	
Unit Configuration	· ·	0/20	Euromet +	Eulemen	Link Down	Onkiown	
Stack Summary Stack Firmware Synchronization	1	1/1	Ethernet 🗸	Ethernet	Link Down	10	
Supported Switches	1	1/2	Ethernet 🗸	Ethernet	Link Down	10	
Stack Port Summary	1	1/3	Ethernet 🗸	Ethernet	Link Down	10	
Stack Port Counters	4	1/4	Ethernet V	Ethorpot	Link Down	10	
	1	1/4	Luiemer	Ethemet	LINK DOWN	10	
Checkpoint Statistics	2	0/17	Stack 🗸	Stack	Link Up	10	
sFlow	2	0/18	Stack 🗸	Stack	Link Up	10	
= ISDP	2	0/19	Ethernet 🗸	Ethernet	Link Down	Unknown	
+ iscsi	2	0/20	Ethernet M	Ethornat	Link Down	Unknown	_
Operational Mode	2	0/20	Eulemet	Eulemet		Unknown	
Switching	2	1/1	Ethernet 🗸	Ethernet	Link Down	10	
Routing	2	1/2	Ethernet 🗸	Ethernet	Link Down	10	
Statistics/RMON		10					

Figure 2: Configuring the M8024-k stacking ports.

- **4.** After clicking Apply, click Save. This will allow these settings to persist in the event of a switch reboot.
- 5. Repeat steps 2 through 4 for the M8024-k module in A2. The switches will now be stacked and will function as one unit.
- 6. Repeat steps 2 through 5 for the M8024-k modules in B1 and B2.

#### **Isolating the Live Migration network**

- Access the I/O Module GUI for the M8024-k in slot A1, and navigate to Switching→VLAN→Port Settings.
- For Unit 1, Port Te1/0/1, use the Port VLAN Mode drop-down menu to select Trunk (see Figure 3). Click Apply.

	ell_loç 🔎 👻 🖄 📷 Tech-Mkt-2: I/O Modul 🤞	§ System : Port Settin ×			- C	ı ★	× ¢
	E™ SWITCH ADMINISTRATOR		Supj	oort   A	bout   1	Log Oul	1
System PowerConnect M8024-k root, r/w	Port Settings Detail Show All						
mo Home ⊒ - System = - Switching ≣ - Network Security ≣ - Stots ■ - Ports	Port Settings: Detail		Ð	۲	C	?	^
Address Tables     GARP     Spanning Tree     VLAN	Ports Port VLAN Mode PVID	Unit 1 2 Port 1 2 10/1 2 Trunk 2 1 (1 to 4093)					
Port Settings LAG Settings Bind MAC to VLAN Bind IP Subnet to VLAN GVRP Parameters	Frame Type Ingress Filtering Port Priority	Admit All					
Protocol Group     Doube VLAN     Voice VLAN     Voice VLAN     Voice VLAN     Unit Aggregation     Multicast Support     Unity Aggregation     If Yes August     If Yes August     If Yes Multicast     If Yes Multicast				Α	pply		×

Figure 3: Configuring the M8024-k ports for VLAN traffic.

- 3. Click Save.
- **4.** For Unit 1, Port Te1/0/2, use the Port VLAN Mode drop-down menu to select Trunk. Click Apply.
- 5. Click Save.

#### **Configuring the PS-M4110 networking**

- **1.** From the CMC, select SLOT-03, and click Configure Array.
- Enter member and group networking information and credentials (Figure 4). Use Fabric B.

Tech-Mkt-2 PowerEdge M1000e	Properties Setup Power	
	Status	
Chassis Overview Chassis Controller	Configure Array	■ C ?
Server Overview	Array Configuration	
2 SLOT-02	Attribute	Value
4 Extension of 3	Member Name	PSM4110-1
5 SLOT-05	Member IP	192.168.10.61
7 SLOT-07	Member Netmask	255.255.255.0
9 SLOT-09	Member Gateway	0.0.0.0
10 SLOT-10	Use Existing Group	
12 SLOT-12	Group Name	PSGRP-1
13 SLOT-13	Group IP Address	192 168 10 60
15 SLOT-15	Group Membership Management Password	
I6 SLOT-16	Confirm Group Membership Management	
A1 Gigabit Ethernet	Password	•••••
B1 10 GbE KR	Group Administration (grpadmin) Password	•••••
B2 10 GbE KR C1 Not Installed	Confirm Group Administration (grpadmin) Password	•••••
C2 Not Installed		
- iKVM	Storage Network Settings	
Power Supplies		Maha

Figure 4: Configuring the PS-M4110 networking.

Note: With this configuration, the iSCSI subnet will also be used for management of the PS-M4110. To separate management and iSCSI network traffic, it is possible to set up management access through the CMC to Ethernet port 1 on the PS-M4110. Further information can be found in Setting up a Dedicated Management Port (page 46) in the Dell EqualLogic PS-M4110 Blade Storage Arrays Installation Guide.<sup>1</sup>

3. Click Apply.

#### Configuring the PowerEdge M620 blade servers

For more detailed steps, see <u>Appendix B</u>.

- 1. Connect a monitor, mouse, and keyboard to the KVM module on the back or the front of the M1000e.
- 2. Press the Ctrl key twice rapidly to access the KVM menu and select the desired blade.

<sup>&</sup>lt;sup>1</sup> Access to the guide requires an EqualLogic support account (this comes included with your Dell EqualLogic array). The direct link to this page is <u>https://eqlsupport.dell.com/support/download\_file.aspx?id=1648&langtype=1033</u>

- **3.** Attach an external DVD drive with the Windows Server 2012 installation media to the desired blade.
- **4.** Power on the blade server, and install Windows Server 2012 Datacenter Edition with a GUI. Repeat for the other blade server.
- 5. Assign static IP addresses to the blade server NICs. In our setup, we used the first port on the onboard NIC for domain-connected network traffic and the second port for Live Migration. Ensure that the ports used for Live Migration have a VLAN ID and are on a separate subnet from the domain. We used both ports on the mezzanine card for iSCSI.
- 6. Join the M620 blades to the domain.
- 7. Add the MPIO feature to both blades.

#### Configuring the PS-M4110 storage

For more detailed steps, see <u>Appendix C</u>.

- **1.** From one of the M620 blades, use Internet Explorer<sup>®</sup> to navigate to the group IP address. Log in with the credentials supplied earlier.
- 2. Under Members, right-click the PS-M4110 to access the initial configuration wizard.
- **3.** Configure the PS-M4110 with a RAID policy and initial RAID capacity appropriate to your organization (Figure 5).

	0/ 🍳 - 🗟 🗘 🔁 PSGRF	P-1 - EqualLogic PS Se ×			Ŀ	- □ × ☆☆
EQUALLOGIC			🔔 a	rpadmin_Logged in 6/	17/2013 7:17:29	PM 📶 Loqout
🚽 Group 🛛 🔳 🗸	🖋 Group PSGRP-1			6 🕤	<b>e</b>	
Group PSGRP-1	Activities		Group In	formation		
Storage Pools     Members     Members	Group PSGRP-1	General Settings Group name: PSGRP-1 IP address: 192.168.10.6	Volumes: 0 Online: 0 0 In use: 0	Snapsho Online: 0 In use: 0	ots: 0	Collection Volume c Snapshol
		Configure	member	x	I	Custom s
Ste	ep 2 - RAID Configuration			0		
		policy     Action     Action	ter selecting a RAD policy, you can ange 6 only in certain cases as follows: AD 10 to RAD 50, RAD 6 AD 50 AD 6 AD 50 to RAD 6 AD 50 to RAD 6 AD 50 to RAD 6 converted. See information on choosing a RAD policy pacity : initialization completes Live Current New S21 TB 0 MB S21 TB 0 AD 521 TD	Change 5.21 TB 5.21 TB	pribed space	
Group			Sack Next >	sh 🔀 Cancel		
Volumes	-					
Keplication						
💻 💂 🖉 ?			A.V.			Þ
Tools	Alarms 🛞 0 <u> 1</u> 1	🖗 0 🕴 Operation	is 🔅 0 👰 0			ý ( <b>î</b>



- 4. Create volumes based on your organizational needs (Figure 6). For this guide, you will require at least two volumes: one for Quorum and one for storing the VMs' virtual hard drives. In our setup, we created these volumes with the following sizes:
  - Quorum, 10 GB
  - VHDs, 2 TB



Figure 6: Creating a volume on the PS-M4110.

 Provide access to each volume for both host server (Dell PowerEdge M620) IQNs (Figures 7 and 8).

Targets   Discovery   Favorite Targets   Volumes and Devices	RADIUS Configuratio
Configuration settings here are global and will affect any future the initiator.	connections made with
Any existing connections may continue to work, but can fail if the initiator otherwise tries to reconnect to a target.	e system restarts or
When connecting to a target, advanced connection features all particular connection.	ow specific control of a
Initiator Name:	
iqn. 1991-05.com.microsoft:node1.test.local	
To modify the initiator name, dick Change.	C <u>h</u> ange
To set the initiator CHAP secret for use with mutual CHAP, dick CHAP.	CHA <u>P</u>
To set up the IPsec tunnel mode addresses for the initiator, dick IPsec.	IPsec
To generate a report of all connected targets and devices on the system, click Report.	<u>R</u> eport
More about Configuration	







#### Configuring the volumes in the OS

- **1.** Use iSCSI Initiator to connect each M620 to the volumes. Ensure that multipathing is enabled.
- 2. Use Disk Management to bring the disks online and initialize them to create MBR partitions.
- 3. Create volumes on the disks but do not assign drive letters (Figure 9).

1			
Recycle Bin	Disk Management		
Els Action View Hele	Disk Management		
	er 19		
	A Tas Electure States Courses	English R.I.	
putty Garrie Cayo	le Basic NTFS Healthy (5 232.37 GE	8 186.39 GB 80	
		New Simple Volume Wizard	×
		Assian Drive Letter or Path	
		For easier access, you can assign a drive letter or drive path to your partition.	
AP			
Lync screens		O factors the following datas latter	
		Mount in the following enrols NTES folder	
		Browne.	
¢	88	Do not assign a drive letter or drive path	
C=Disk 0		- Annound -	
Basic (C)	1000		
Online Healthy (	system, Boot, Page File, Active, Crash Dump, Primary Pa		
Disk 1			
Basic 10.00 GB 10.00 GB		< Back Next > Cancel	
Online Unallocat	ed 🔰 🖿		
Gibisk 2			
2048.01 GB 2048.01 G	8		
Offline Unallocat	ed 📕		
Unallocated Primary pa	rtition		
		Windows Server 201	2
		<b>I</b> Go	
			Windows Server 2012 Datacenter
			Build 9200
			- 😼 🔁 👍 906 PM 6/17/2013



4. Once the volumes are configured on one M620, bringing them online on the second M620 will carry the settings over.

#### **Creating the failover cluster**

For more detailed steps, see <u>Appendix D</u>.

- Use Server Manager to install the Failover Cluster feature on both M620s, and restart them.
- From one of the M620s, which we will refer to as a node, open Failover Cluster Manager and validate the configuration (Figure 10). In the report, ensure that the iSCSI volumes show up under List Potential Cluster Disks.

	Users\administrator.TEST\Appl 🔎 👻 🧔	Failover Cluster Validation ×		- □ × ☆ ☆
Microso	oft			^
	Failov	ver Cluster Val	idation Report	
Node: Node: Started Completed	Node1.test.local Node2.test.local 6/17/2013 10:10:36 PM 6/17/2013 10:16:52 PM		Validated Validated	
The Validate a Cor http://go.microsoft	figuration Wizard must be run after any c com/fwlink/p/?LinkId=226879.	hange is made to the configuration	n of the cluster or hardware. For more information, see	
	<b>a</b> .			
Results by	Category			
Name		Result Summary	Description	
Inventory		<b>1</b>	Success	
Network			Success	
Storage			Success	
System Configura	ation		Success	
_				
Inven	tory			
Name		Result	Description	
List BIOS Informa	ition		Success	
List Environment	Variables		Success	
List Fibre Channel	Host Bus Adapters		Success	
List iSCSI Host Bu	us Adapters		Success	
List Memory Infor	mation		Success	~
<				>

Figure 10: Successful cluster validation check.

- 3. Create the cluster, adding all available storage.
- Download and install Update for Windows Server 2012 (KB2803748), a hotfix to prevent Microsoft Management Console crashes in Failover Cluster Manager from <u>http://www.microsoft.com/en-us/download/details.aspx?id=36468</u>.
- 5. Restart both nodes.

#### **Configuring the failover cluster**

- 1. Verify the network properties for each network in Failover Cluster Manager, and ensure that the iSCSI network is not used for cluster traffic.
- 2. Use the Live Migration settings to assign the appropriate network you will use for this purpose.
- 3. Set the Quorum disk to be used as the disk witness for quorum. This may have been set automatically. If not, use the following steps:
  - a. Click More Actions→Configure Cluster Quorum Settings.
  - b. Click Next.

- c. Select Advanced quorum configuration and witness selection, and click Next.
- d. Select All nodes, and click Next.
- e. Leave the Allow cluster to dynamically manage the assignment of node votes checkbox checked, and click Next.
- f. Select Configure a disk witness, and click Next.
- g. Select the disk to be used for quorum, and click Next.
- h. Click Next.
- i. Click Finish.
- 4. Make the disk designated for VHDs into a Cluster Shared Volume.
- **5.** Install Dell Host Integration Tools 4.5.0 onto both blades. Enable all features during installation.
- 6. Adjust the MPIO settings in Auto-Snapshot Manager to remove any subnets not being used for iSCSI (Figure 11).





#### **Creating the VMs**

- Install the Hyper-V role on both nodes. Do not configure a virtual switch or live migration. Set the default stores to use the VHDs' cluster shared volume. The default path for shared cluster storage is C:\ClusterStorage.
- 2. Create an external virtual switch on each node using a domain-connected NIC adapter (Figure 12). These switches must have exactly the same name between nodes.

Xirtual Switches	Virtual Switch Properties
🙀 New virtual network switch	
🗄 📩 Domain	Name:
Global Network Settings	Domain
MAC Address Range	Notes:
00-15-5D-0A-34-00 to 00-15-5D	-0
	Connection type
	What do you want to connect this virtual switch to?
	External network:
	Broadcom BCM57810 NetXtreme II 10 GigE (NDIS VBD Client) #129 V
	Allow management operating system to share this network adapter
	Enable single-root I/O virtualization (SR-IOV)
	Briveta petwork
	VLAN ID
	Enable virtual LAN identification for management operating system
	The VLAN identifier specifies the virtual LAN that the management operating system will use for all network communications through this network adapter. This setting does not affect virtual machine networking.
	<u>R</u> emove
	SR-IOV can only be configured when the virtual switch is created. An external virtual switch with SR-IOV enabled cannot be converted to an internal or private switch.



- Use Failover Cluster Manager to create three VMs (Figure 13; you can find further information on Lync Server 2013 hardware requirements at technet.microsoft.com/en-us/library/gg398438.aspx):
  - LSFE01 on Node 1. This will be the primary Front End.
  - LSFE02 on Node 2. This will be the backup Front End.
  - LSFS on any node. This will be the file server and quorum witness.

			Failover Cluster N	anager			
le Action View Help							
Failover Cluster Manager	Balaa (0)					Actions	
Cluster1.test.local	Koles (0)					Roles	
Roles	Search			P Queries ▼ [		Ronging Role	
Nodes	Name	Status	Туре	Owner Node	Priority	Virtual Machines	
Networks			New Virtual Machin	e	×	Create Empty Bole	
Cluster Events					-	View	
		Select the target clu	ster node for Virtual Ma	thine creation.		View Default	
		Look for:				Q Kerresh	
		> Search		Clear		Help	
		Cluster nodes:	<b>C</b> 1				
		Name	Status				
		Node?	Op Up				
		- NOUEZ	<b>O</b> OP				
	~						
			OK	Cancel			

Figure 13: Creating a VM in Failover Cluster Manager.

- 4. Install Windows Server 2012 Datacenter Edition with a GUI on each VM.
- 5. Connect the virtual switch to each VM.
- 6. Connect the VMs to the domain.

#### **Creating the Lync Server file shares**

On the file server VM, create two directories (one for each Front End) on the C:\ drive and allow read and write access to the following groups (Figure 14):

- RTCComponentUniversalServices
- RTCHSUniversalServices
- RTCUniversalConfigReplicator
- RTCUniversalServerAdmins

📕   💽 🕼 = I		Local Disk (C:)	
File Home Shar	e View		• O 1 = 1 = 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +
€ ⊚ - ↑ ♣• 0	Computer 🕨 Local Disk (C:)		LyncShare1 Properties
<ul> <li>★ Favorites</li> <li>Desktop</li> <li>Downloads</li> <li>Recent places</li> <li>Libraries</li> <li>Documents</li> <li>Music</li> <li>Pictures</li> <li>Videos</li> </ul>	Name PerfLogs Program Files Program Files (x86) Users Windows LyncShare1	Date modified           7/26/2012 12-4           7/26/2012 12-4           7/26/2012 12-4           7/26/2012 10-6           6/18/2013 4:05           6/19/2013 12-3           28           File Sharing           Choose people on yo	General Sharing Security Previous Versions Customize           General Sharing Security Previous Versions Customize           Network File and Folder Sharing           LincShare1           Shared           Network Path:
Retwork		Type a name and then click Name Administrator Administrator RTCComponentUnivers RTCCNviersalService RTCUniversalConfigReg RTCUniversalServerAdn	¢ Add, or click the arrow to find someone.
6 items 1 item selected		I'm having trouble sharing	
			Share Cancel
			Build 9200
			2:14 PM 6/19/2013

Figure 14: Creating the first file share. Repeat for LyncShare2.

#### **Preparing the Active Directory for Lync**

For more detailed steps, see <u>Appendix E</u>.

1. Use the Lync Server 2013 setup GUI to prepare the schema, forest, and domain (Figure 15).





- Use Active Directory Users and Computers to make the user account you plan to use for managing Lync a member of the CSAdministrator and RTCUniversalServerAdmins groups.
- **3.** Using DNS Manager, create a new Service Location record with the following properties (Figure 16; Use your own Front End FQDN):
  - Service: sipinternaltls
  - Protocol: tcp
  - Port Number: 5061
  - Host offering this service: LSFE01.test.local

File Action View Help ← ← ♪ ♪ ☆ ☆ ☆ ☆ ☆ DNS △ ↓ ADDC ▷ ⓓ Global Logs △ ☆ ADDC ▷ ⓓ Global Logs △ ☆ Forward Lookup Zones ▷ ⓓ rest.local △ ☆ test.local ▷ ↓ ⓓ rmsdcs.test.local △ ☆ test.local ▷ ☆ msdcs.test.local ▷ ☆ test.local ▷ ☆ msdcs.test.local	Name	Tyr Re	pe	Data		Timestam
<ul> <li>← ⇒ 2 III × II @ II</li> <li>DNS</li> <li>▲ ADDC</li> <li>▷ III Global Logs</li> <li>▲ Forward Lookup Zones</li> <li>▷ IIImsdcs.test.local</li> <li>△ III test.local</li> <li>▷ IIImsdcs</li> <li>▷ IIImsdcs</li></ul>	Name msdcs sites tcp udp Domain ForestDi (same a	Tyr Re	De	Data		Timestam
<ul> <li>DNS         <ul> <li>ADDC</li> <li>Construction</li> <li>Global Logs</li> <li>Forward Lookup Zones</li> <li>Construction</li> <li>Construction</li></ul></li></ul>	Name msdcs sites tcp Domain ForestDi (same a	Tyr	e 	Data		Timestam
▲ State in the set of the set	Domain ForestDi (same a	Re				
▲		Resource Record Type Select a resource record type:		e X	ost	static
	(same a (same a addc	Route Through (RT) Service Location (SRV) Signature (SIG) Text (TXT)			ocord	static 6/14/2013
	es Cluster1 es LSFE01 ers LSFE02 LSFS Node1 Node2	Cluster1 LSFE01	Well Known Services (W X.25	Service Location (SR	v)	ecord
Conditional Forwarders		Description: Service (SRV) record. A for a single DNS domain	Domain:	test.local		
		Node2 host to another host to another host service provider hosts as backups	host to another host wit service provider hosts a hosts as backups, DNS ( specific TCP/IP service a	service: Protocol:	_sipinternaltls _tcp	
		domain and receive the	n Priority:	5061		
< <u> </u>	<		Port number:			
			Host offering this s LSFE01.test.local	ervice:		
			Allow any authen name. This sett	enticated user to update a ing applies only to DNS rec	I DNS rec cords for	cords with the same a new name.
				ОК	Cano	cel Help

Figure 16: Creating a Service Location Record for the primary Front End VM.

- 4. Create DNS hosts on the Front End IP address for the following (Figure 17; Use your Front End IP address):
  - meet
  - dialin
  - admin

File Action View Help						
<ul> <li>DNS</li> <li>ADDC</li> <li>Global Logs</li> <li>Forward Lookup Zones</li> <li>Forward Lookup Zones</li> <li>Testlocal</li> <li>Testlocal</li></ul>	Name msdcs msdcs sites s	Type       Start of Authority (SOA)       Name Server (NS)       Host (A)       Host (A)	[35], addc.test.local., hos addc.test.local.           192.168.1.1           192.168.1.1           192.168.1.1           192.168.1.12           192.168.1.15           192.168.1.51           192.168.1.51           192.168.1.11           192.168.1.11	Timestam it static static 6/14/2012 Name (uses parent di admin tully qualified domain admin.test.local. P address: 192.168.1.11	New Host omain name if blank): name (FQDN):	
< m >	K	III		Create associated Allow any authent same owner name	pointer (PTR) record sicated user to update DNS records wit Add Host Can	h the

Figure 17: Creating the meet, dialin, and admin DNS entries.

#### **Preparing the primary Front End VM**

1. Attach the Windows Server 2012 installation media to the VM and run the following PowerShell command:

Install-WindowsFeature RSAT-ADDS, Web-Server, Web-Static-Content, Web-Default-Doc, Web-Http-Errors, Web-Asp-Net, Web-Net-Ext, Web-ISAPI-Ext, Web-ISAPI-Filter, Web-Http-Logging, Web-Log-Libraries, Web-Request-Monitor, Web-Http-Tracing, Web-Basic-Auth, Web-Windows-Auth, Web-Client-Auth, Web-Filtering, Web-Stat-Compression, Web-Dyn-Compression, NET-WCF-HTTP-Activation45, Web-Asp-Net45, Web-Mgmt-Tools, Web-Scripting-Tools, Web-Mgmt-Compat, Windows-Identity-Foundation, Desktop-Experience, Telnet-Client, BITS -Source D:\sources\sxs -Restart

2. After the VM has restarted, attach the Lync Server 2013 installation media and use the setup GUI to run Prepare First Standard Edition Server (Figure 18).

ø	Lync Server 2013 - Deployment Wizard			× _	
Lync S	erver 2013				
	Prepare single Standard Edition Server	x			
Deploy F	Executing Commands		, ver to		
+                   	Checking prerequisite VMIEnabledprerequisite satisfied. Checking prerequisite NOTHerVersionInstalledprerequisite satisfied. Checking prerequisite NotherVersionInstalledprerequisite satisfied. Checking prerequisite WindowsldentityFoundationprerequisite satisfied. Checking prerequisite WindowsldentityFoundationprerequisite satisfied. Checking prerequisite SupportedSqlRtcprerequisite satisfied. Checking prerequisite SqlNativeClientinstallingsuccess Checking prerequisite SqlNativeClientinstallingsuccess		ator dard host r dition.		
	Checking prerequitite SqlSharedManagementObjectsinstallingsuccess Checking prerequisite UcmaRedistinstallingsuccess Checking prerequisite SqlInstanceRtcinstalling	View Log	l SQL nces.		
[	Help Back Finish Tools and Resource	Cancel		2	
	Click to access tool	s and other reso	urces Evit		

Figure 18: Preparing the primary Front End.

#### **Building the topology**

For more detailed steps, see <u>Appendix F</u>.

- 1. Use the Lync Server 2013 setup GUI to install the Lync administrative tools.
- 2. Use the Lync Server Topology Builder to create a new topology.
- Add a new Standard Edition Front End Server to the topology with the desired features and one of the shared directories as the Lync file store (Figures 19 and 20).
  - a. For our setup, we chose a basic deployment with the following features:
    - Conferencing with Dial-in
    - Call Admission Control
    - Collocate Mediation Server

For more information on deploying other features such as Enterprise Voice, Archiving, Monitoring, and external user access, see <u>http://technet.microsoft.com/en-us/library/gg398664.aspx</u>.



Figure 19: Defining the primary Front End pool FQDN.

Recycle Bin	26	Lync Server 2013, Topology Builder	
	File Action	Help	
	b Lync Ser	22 Define New Front End Pool	
		Define the SQL Server store	
		For a Standard Edition Front End pool, user information must be stored locally. SQL Server Express Edition will be installed automatically. SQL Server store:	
		LSFE01.test.local\rtc Vew	
		Enable SQL Server store mirroring	
		Mirroring SQL Server store:	
		Use SQL Server mirroring witness to enable automatic failover	
		▼ New	
		Unite Dark Next Count	
		neip back ivext Cancei	
			Windows Server 2012 Datacenter Build 9200
	3		P3 😳 🕼 2:55 PM 6/19/2013

Figure 20: Defining the SQL Server store.

4. Edit the topology properties to set the Administrative access URL (We used https://admin.test.local) and the server to host the Central

Management Store. For our setup, we used the primary Front End VM (Figure 21).

		Edit Properties	5	_ <b>_ ×</b>	
s s	IP domain imple URLs	✓ https://dialin.test.local		Add ^	
C S	entral Management erver		Make Active Edit URL		
		Meeting URLs:			
		Simple URL	SIP domain		
		<ul> <li>https://neettestilocal</li> </ul>	testiocal	Remove	
			Make Active Edit URL		
		Administrative access URL:			
		https://admin.test.local		2	
		Central Management Server		<b>^</b>	
		Front End Server to install Central Management S	erver on:	≡	
		LSFE01.test.local Site1		▼	
		Note: If you want to reassign the Central Manage the procedure described in the Operations sectio	ment Server after initial deployment, y n of the product documentation.	ou must follow	
				· ·	
	Help		C	OK Cancel	1.
				P	



5. Publish the topology (Figure 22).

ycle Bin 📲	3	Lync	Server 2013, Topol	logy Builder		- <b>D</b> X	
F	ile Action He	elp					
	🗟 Lync Ser		Publish Topolo	gy	×		
		Publishing wizard complet	e				
		Your topology was successfully publ	ished.				
		Ste	p	Status	^		
		<ul> <li>Creating Central Management</li> </ul>	store	Success	Uiew Logs		
		<ul> <li>Setting Central Management s</li> <li>Dublishing tensolarity</li> </ul>	tore location	Success			
		Publishing topology		Success			
		<ul> <li>Updating clobal simple URL se</li> </ul>	attings	Success			
		opduting global simple one se		Success	$\sim$	SIP doma	
		Next stores				test.local	
		<ul> <li>Click here to open to-do list</li> </ul>					
		In order for Lync Server 2013 to	correctly route traffic, ye	our deployment must i	match the published		
1. S.		topology. The linked text file cor	ntains a list of any server	s that need to be upd	ated, as well as any		
		databases that need to be create	ed.				
		To close the wizard, click Finish.					
						Site	
		Help		Back Fin	nish Cancel	Site1	
						_	
			( )				
- 1 - <b>-</b> -							
						WC 1 C 200	

Figure 22: Publishing the topology.

#### Installing the configuration to the primary Front End VM

- **1.** Log into the primary Front End VM with Domain Admin credentials.
- 2. In the Lync Server 2013 setup GUI, navigate to the section titled Install or Update Lync Server System, which takes you to the installation components page (Figure 23). As a general note, steps 2 (Setup or Remove Lync Server Components) and 4 (Start Services) will need to be run on each Front End after each time the topology is published.





- **3.** Run Step 1: Install Local Configuration Store. Retrieve the configuration directly from the Central Management store.
- 4. Run Step 2: Setup or Remove Lync Server Components.
- 5. Run Step 3: Request, Install or Assign Certificates. Request and assign the Default and OAuthTokenIssuer certificates (Figures 24 and 25).

	6	Lync Server 2013 - Deployment Wizard		×	
F	Vel Vel	Server 2013 come to Lvnc Server deployment. 2 Certificate Request X			
	Select a L	Executing Commands	tasks.	x	
	✓ De ✓ OA	> Request Certificate Request-CSCertificate -New -Type Default.WebServicesInternal WebServicesExternal -CA	equest Assign		
		**ADDC testJocaltest-ADDC-CA <sup>+</sup> -FriendlyName 'LS Internal Cert <sup>+</sup> -KeySize 2048 -PrivateKeyExportable SFalse -DomainName 'sip.testJocal' -AllSipDomain -Verbose -Report 'CAUSersNadministrator.TEST VAppDataLocal/SempRequest-CSCertificate-12013 G6.191(6-24.18).html Creating new log file 'C.USersNadministrator.TESTVAppDataLocalTempRequest- CSCertificate-904/d66-add-404-080-061-4280007048xml <sup>-1</sup> . Create a certificate request based on Lync Server configuration for this computer.	View	12	
	< Help	Help     Back     Next     Cancel	Close		
	f <b>l</b> Help	Run Back	Exit	~ ,	
			Vindows	Server 2	012 Datacen



		Lync Server 2013 - De	eployment Wizard			
	Lync Server 2013 Welcome to Lync Se	rver deployment.				
	5	Certificate	Wizard		×	
	Select a Lync Server Certificat	e Type and then select a task. Expand th	e Certificate Type to perform ad	vanced certificate	usage tasks.	
	Certificate	Friendly Name	Expiration Date	Location	Request	
	<ul> <li>Default certificate</li> </ul>	LS Internal Cert	6/19/2015 5:15:27 PM	Local		
	<ul> <li>OAuthTokenIssuer</li> </ul>	<ul> <li>IS Internal Cert</li> </ul>	6/19/2015 5:16:54 PM	Global	Assign	
	• Onderrotenissier	V contenter cere	0,10,2010 01100 1100	ciobai	Remove	
					View	
	<			>		
	Help Refresh	Import Certificate Process Pending C	ertificates		Close	
1. A.						
	Prerequisites >					
	Halo N			Run	2	
	neib. A					
				Back	Exit	

Figure 25: Certificates successfully assigned.

6. Run Step 4: Start Services. Ensure that all Lync services are running.

#### Adding the secondary Front End VM to the topology

1. In Lync Server Topology Builder, right-click Standard Edition Front End Servers, and click New Front End Pool (Figure 26).

	10	Lync Server 2013, Topology Builder
	File Action Help	
	4 🛃 Lync Server	The properties for this item are not available for editing.
	⊿ 🖞 Site1	
	Lync Server 2010	
	▲ Lync Server 2013	
1997 - A.	Standard Edition Front End Se Standard Edition Front End Se	
	ESFEUT.test.local	Define New Front End Pool
	Director pools	
	Mediation pools	Define the Front End pool FQDN
· · ·	Persistent Chat pools	
	Edge pools	You may deploy your Front End Server as either an Enterprise Edition pool or a Standard Edition server.
	Trusted application servers	FODN: *
	Shared Components	I SEF02 test local
	🚞 Branch sites	
		Help Back Next Cancel

Figure 26: Adding the secondary Front End VM to the topology.

 Follow the wizard to select features for the secondary Front End VM. In general, these should match the features selected for the primary Front End (Figure 27). Use the second shared directory for the file store.



Figure 27: Selecting features for the secondary Front End VM.

3. Publish the topology.

#### **Updating the primary Front End VM**

**1.** On the primary Front End VM, re-run steps 2 and 4 under Install or Update Lync Server System (Figure 28).

Recycle Bin	Lync Server 2013 - Deployment Wiz	vard X
	Lync Server 2013	
ō	Set Up Lync Server Components	
Exe	cuting Commands	ent Store.
Checking pre Checking pre Checking pre	equisite MSSpeech_SR_zh-HK_TELEprerequisite satisfied.	✓ Complete Run Again
Checking pre Installing any	equisite UcmaWorkflowRuntimeprerequisite satisfied. collocated databases	the topology definition.
Report "C:\Us [17_37_28].ht	ver:Nell command: Install-CSUDatabase - Contirm:Stalse - Verbose - LocalUatabases - ers/administrator.TEST\AppData\Local\Temp\Install-CSDatabase-[2013_06_19] ml*	···· In Progress Run Again
This step will Executing Por \administrate	configure services, apply permissions, create firewall rules, etc. verShell command: fnable-CSComputer -Confirmé/Salse -Verbose -Report "C-\Users TEST\AppDatALocalTemp\/fable-CSComputer-[2013.06]19[117.37_36].html"	nstall, and assign certificates for
Task status: Co	mpleted.	✓ Complete Run Again
Bootstrap loca	machine View Log	unch the Services MMC tool
Help	Back Finish Cancel	Run
		Back Exit
		Windows Server 2012 Datacenter
- 2		5:37 PM 6/19/2013

Figure 28: Updating the primary Front End VM.

#### Installing the configuration to the secondary Front End VM

 On the secondary Front End VM, run the following Windows PowerShell command:

Install-WindowsFeature RSAT-ADDS, Web-Server, Web-Static-Content, Web-Default-Doc, Web-Http-Errors, Web-Asp-Net, Web-Net-Ext, Web-ISAPI-Ext, Web-ISAPI-Filter, Web-Http-Logging, Web-Log-Libraries, Web-Request-Monitor, Web-Http-Tracing, Web-Basic-Auth, Web-Windows-Auth, Web-Client-Auth, Web-Filtering, Web-Stat-Compression, Web-Dyn-Compression, NET-WCF-HTTP-Activation45, Web-Asp-Net45, Web-Mgmt-Tools, Web-Scripting-Tools, Web-Mgmt-Compat, Windows-Identity-Foundation, Desktop-Experience, Telnet-Client, BITS -Source D:\sources\sxs -Restart

 After the VM restarts, run all four steps under Install or Update Lync Server System (Figure 29). The OAuthTokenIssuer certificate should already be assigned.

ecycle Bin					
	Lync Server 20	13 - Deployment Wi	lizard	<b>x</b>	
	Lync Server 2013 Welcome to Lync Server deployment.				
5	Set Up Lync Server Components	×		2	
Exe	cuting Commands		nent Store.	<u>^</u>	
Checking pre-	requisite ASPNetprerequisite satisfied.	^	✓ Complete Run Again		
Checking prei Checking prei Checking prei	requisite Kb2040680installedprerequisite satisfied. requisite BranchCacheBlockprerequisite satisfied. requisite WCFprerequisite satisfied. requisite WindowstMediScondationprerequisite ratisfied		on the topology definition.		
Checking pre Checking pre	requisite vinitowsiwediar oundationprerequisite satisfied. requisite SqlInstanceRtcLocalprerequisite satisfied. requisite VCredistprerequisite satisfied.		····· In Progress Run		
Checking pre Checking pre Checking pre Checking pre	requisite SqlNativeClientprerequisite satisfied. requisite SqlClrTypesprerequisite satisfied. requisite SqlSharedManagementObjectsprerequisite satisfied. requisite UcmaRedistprerequisite satisfied.	=	. Install, and assign certificates for		
Checking pre	requisite WinFabinstalling	~	Run		
		▼ View Log	launch the Services MMC tool		
Help	Back Fini	View Log	launch the Services MMC tool		
Help	Back Fini	View Log	launch the Services MMC tool	2	
Help	Back Fini	View Log	launch the Services MMC tool Run Back A- Lives	2	
Help	Back Fini	View Log	Run	2 at with dows tion Center to activate	
Help	Back Fini Help ►	View Log	Run Back A Go to Ac Win Win Win Win Win Win Win Win Win Win	2 Exit And dows tion Center to activate lows Server 2012 Data	cent

Figure 29: Installing the configuration to the secondary Front End VM.

#### Designating the secondary Front End pool as a backup

- 1. In Lync Server Topology Builder, open the primary Front End VM properties.
- 2. Under Resiliency, add the secondary Front End VM as a backup. Check the box for Automatic failover and failback for Voice and adjust the intervals to values appropriate for your organization (Figure 30).



Figure 30: Designating the secondary Front End VM as the backup.

- **3.** Publish the topology.
- 4. On each Front End VM, re-run steps 2 and 4 under Install or Update Lync Server System in the Lync Server setup GUI.
- 5. From the primary Front End VM, run the following Windows PowerShell commands (Figure 31; Use your Front End FQDNs):

Invoke-CSBackupServiceSync -PoolFqdn LSFE01.test.local Invoke-CSBackupServiceSync -PoolFqdn LSFE02.test.local



Figure 31: Syncing the backup service.

#### Adding the backup SRV

- Using DNS Manager, create a new Service Location record with the following properties (Figure 32; Use your own backup Front End FQDN and take note that the priority and weight are different from the SRV created earlier):
  - Service: \_sipinternaltls
  - Protocol: \_tcp
  - Priority: 10
  - Weight: 10
  - Port Number: 5061
  - Host offering this service: LSFE02.test.local

🗢 🛋 🐹 🗶 💷 🖄					New Resource Record	
<ul> <li>DNS</li> <li>ADDC</li> <li>Global Logs</li> <li>Global Logs</li> <li>Forward Lookup Zones</li> <li>Testlocal</li> <li>Testlocal</li> <li>Trust Points</li> <li>Conditional Forwarders</li> </ul>	Name	Type         Data           Resource Resource Resource Route Through (RT) Serve Location (SRV) Signature (SIG) Text (TX) Well Known Services (WKS) X.2 Description: Service (SRV) record. Allows administication (SRV) Service (SRV) record. Allows administication (SRV)	Data urce Ret e: s administr easily mov	Service Location (SRV) Domain: Service: Protocol: Priority: Weight: Port number: LSFE02.test.local	test-localsipinternaltstcp 10 10 5061 vice:	
	meet dialin admin	hos to anothe hos with a service provider hosts as participations of the specific TCPI service and domain and receive the nan	imary serv its that use protocol m nes of any	Allow any authent name. This setting	icated user to update all DNS records with applies only to DNS records for a new nam	Help

Figure 32: Adding the backup SRV.

#### **Commands for manual failover**

Lync Server Standard Edition will fail over Voice features automatically, but other features can be failed over manually. Use these commands to perform this operation. Please note that you must replace the FQDN in the sample commands below with the appropriate FQDN of your Front End VMs. In this example, LSFE01.test.local is the FDQN of the primary Front End VM, and LSFE02.test.local is the FDQN of the secondary Front End VM.

- To obtain the location of the Active Central Management Database: Get-CsService -CentralManagement
- To find the backup server (use your primary Front End FQDN):
- Get-CsPoolBackupRelationship -PoolFqdn LSFE01.test.local To check on the availability of the Central Management Store:

Get-CsManagementStoreReplicationStatus - CentralManagementStoreStatus

- To manually fail over the Central Management Store to the backup server (replace the FQDN):
- Invoke-CsManagementServerFailover -BackupSqlerverFqdn LSFE02.test.local -

BackupSqlInstanceName RTC -ForceTo manually fail over the Front End pool to the backup server:

Invoke-CsPoolFailOver -PoolFqdn LSFE01.test.local
-Disastermode -Verbose

• To fail back to the primary server:

```
Invoke-CsPoolFailback -PoolFqdn LSFE01.test.local
-Verbose
```

Invoke-CsManagementServerFailover -BackupSqlServerFqdn LSFE01.test.local -BackupSqlInstanceName RTC -Force

### **SUMMING IT ALL UP**

As this guide has shown, setting up a highly available Microsoft Lync Server 2013 environment on Dell architecture is a straightforward process. In little time, you can deploy two Dell PowerEdge M620 M-series servers, switches, and Dell EqualLogic storage using Microsoft Windows Server 2012, and set up your Lync Server 2013 infrastructure. By setting up a highly available Lync Server 2013 environment on your Dell architecture solution, you can ensure your office communications stay running with little to no downtime to keep your business moving.

## APPENDIX A – INSTALLING THE HARDWARE AND CONFIGURING THE NETWORKING

#### Installing the hardware

- Provide a DHCP-enabled network connection to both Chassis Management Controller (CMC) modules on the back of the M1000e blade enclosure. This will provide the CMCs and the blade server iDRACs with IP addresses. If you are not using DHCP, you will need to specify a static IP address and subnet mask for the CMC using the front control panel. Specifying IP addresses for the iDRACs is optional for this guide.
- Inside each blade server, there are two mezzanine slots: fabric B and fabric C (fabric A corresponds to the embedded NICs). Choose a slot in which to place the mezzanine NIC card. The chosen slot must match the fabric that will be used for the Dell PowerConnect M8028-k 10Gb Ethernet switches. In our setup, we used fabric B.
- **3.** Insert the Dell PowerEdge M620 blade servers into slots 1 and 2 on the front of the enclosure and ensure that they are locked into place.
- 4. Insert the Dell EqualLogic PS-M4110 blade storage into slots 3 and 4 on the front of the enclosure and ensure that it is locked into place.
- Insert the first pair of Dell PowerConnect M8024-k 10Gb Ethernet switches into slots A1 and A2 on the back of the enclosure and ensure that they are locked into place.
- Insert the remaining Dell PowerConnect M8024-k 10Gb Ethernet switches into slot B1 and B2 on the back of the enclosure and ensure that they are locked into place.
- Provide domain-connected network connection to one port on each of the M8024-k modules in slots A1 and A2. Any port can be used except 17 and 18, because these will be used for stacking.
- Provide two 10Gb connections between the M8024-k modules in fabric A: Connect slot A1, port 17 to slot A2, port 18. Connect slot A1, port 18 to slot A2, port 17.
- Provide two 10Gb connections between the M8024-k modules in fabric B: Connect slot B1, port 17 to slot B2, port 18. Connect slot B1, port 18 to slot B2, port 17.
- **10.** Power on the enclosure.

#### Configuring the PowerConnect M8024-k 10GbE modules

- 1. Use the enclosure front control panel to find the CMC IP address.
- 2. From a computer on the network, use Internet Explorer to navigate to the CMC.
- Log in with the default credentials. The default Username is root and the Password is calvin
- 4. Click Slot A1 under Chassis Overview $\rightarrow$ I/O Module Overview $\rightarrow$ 10 GbE KR.
- 5. Click Launch I/O Module GUI.
- 6. Log in with the same root credentials.
- 7. Click System→Stack Management→Stack Port Summary.
- 8. Check the Edit checkboxes next to ports 0/17 and 0/18.
- **9.** Under Configured Stack-mode, change the mode from Ethernet to Stack on both ports.
- 10. Click Apply.
- **11.** Click the Save icon in the top right. Your changes will not persist after a reboot unless saved in this manner.
- **12.** Repeat steps 4 through 11 for the remaining three M8024-k modules. The switches are now stacked and each fabric will function as one unit.
- Return to the I/O Module GUI for the M8024-k in slot A1, and navigate to Switching→VLAN→Port Settings.
- **14.** For Unit 1, Port Te1/0/1, use the Port VLAN Mode drop-down menu to select Trunk.
- 15. Click Apply.
- 16. Click Save.
- **17.** For Unit 1, Port Te1/0/2, use the Port VLAN Mode drop-down menu to select Trunk.
- 18. Click Apply.
- 19. Click Save.

#### **Configuring the PS-M4110 networking**

- From the CMC, select SLOT-03 under Chassis Overview→Server Overview→SLOT-03.
- 2. Under Array Properties, click Configure Array.
- 3. Enter the following information in the appropriate fields:
  - Member Name. We used PSM4110-1.

- Member IP. This needs to be on the subnet to be used for iSCSI. We used 192.168.10.61.
- Member Netmask. We used 255.255.25.0.
- Member Gateway. We left this blank.
- Use Existing Group. Check this if you are adding the PS-M4110 to an existing PS-series group. In our setup, we created a new group instead.
- Group Name. We used PSGRP-1.
- Group IP Address. This needs to be on the subnet used for iSCSI. We used 192.168.10.60.
- Group Membership Management Password. This is the password that new members will use to gain membership.
- Group Administration (grpadmin) Password. This is the password for the top-level management account (grpadmin).
- Selected Fabric. The PS-M4110 defaults to Fabric B, but can use Fabric A if the enclosure has midplane version 1.1 or higher. The fabric must have 10GbE modules installed to be used for the PS-M4110. In our setup, we used Fabric B.
- 4. Click Apply.
- 5. Click SLOT-03 again to confirm that the settings are in place.

## **APPENDIX B – CONFIGURING THE M620 BLADES**

Complete the steps in this section on both Dell PowerEdge M620 blades.

#### Installing Windows Server 2012 Datacenter Edition on the M620s

- 1. Attach a monitor and keyboard to the VGA and USB outputs on the front or back of the M1000e blade enclosure.
- 2. Press the Ctrl key twice quickly to bring up the KVM menu and select Slot 1.
- **3.** Attach an external DVD drive with the installation media inside to the front of the first M620 and power the blade on.
- **4.** Follow the on-screen instructions to install Windows Server 2012 Datacenter with a GUI.

#### **Creating a network for Live Migration**

- 1. Click Start, and type ncpa.cpl. Press Enter.
- 2. Right-click the adapter to be used for Live Migration, and click Properties.
- 3. Click Configure.
- 4. Click Advanced.
- 5. Select VLAN ID, and enter a value (for our testing purposes, we used 20).
- 6. Click OK.
- 7. Right-click the Live Migration adapter, and click Properties.
- 8. Select IPv4, and click Properties.
- **9.** Select the Use the following IP address and Use the following DNS server addresses radio buttons.
- Enter an IP address, subnet mask, default gateway, and preferred DNS server. Click OK.

#### Joining the M620s to the domain

- 1. Click Start, and type ncpa.cpl. Press Enter.
- 2. Right-click the adapter, and click Properties.
- **3.** Select IPv4, and click Properties.
- Select the Use the following IP address and Use the following DNS server addresses radio buttons.
- Enter an IP address, subnet mask, default gateway, and preferred DNS server. Click OK.
- 6. In Server Manager, in the left pane, select Local Server.

- 7. Click the computer name.
- 8. Click Change.
- **9.** Enter an appropriate hostname for the node, and select the Domain radio button.
- **10.** Enter the name of your domain, and click OK.
- **11.** Enter the administrative credentials to connect to the domain, and click OK.
- **12.** At the welcome screen, click OK.
- **13.** Restart the blade, and use the domain credentials to log in again.

#### Adding the MPIO feature

- 1. In Server Manager, click Manage→Add Roles and Features.
- 2. At the Before you begin screen, click Next.
- **3.** At the Select installation type screen, leave the default selection of Role-based or feature-based installation, and click Next.
- At the Select destination server screen, leave the default selection, and click Next.
- 5. At the Select server roles screen, click Next.
- 6. When the Add Roles and Features Wizard window pops up, click Add Features.
- 7. Click Next.
- 8. At the Select features screen, check the box for Multipath I/O, and click Next.
- 9. At the Confirm installation selections screen, click Install.
- **10.** When the installation completes, click Close.

## APPENDIX C – CONFIGURING THE STORAGE Configuring the PS-M4110 RAID policy

- From one of the M620s, use Internet Explorer to navigate to the PS group IP address (alternatively, use the PS-M4110 member IP address). Click OK at the warning.
- 2. If necessary, install the Java SE Runtime Environment.
- **3.** Log in with the grpadmin credentials you specified during networking configuration.
- 4. Expand Members, and right-click PSM4110-1 (unconfigured). Click Configure member.
- 5. At the General Settings screen, click Next.
- At the RAID Configuration screen, select a RAID policy and initial RAID capacity appropriate for your needs. In our setup, we chose RAID 10 and Immediately expand group capacity.
- 7. At the Summary screen, click Finish.

#### Finding the initiator IQN

These are generic steps for finding the iSCSI Qualified Name (IQN) for an initiator (a server that will access an iSCSI target). Refer to this section whenever an initiator IQN is needed.

- 1. Press the Windows key, and type iscsi initiator. Press Enter.
- 2. If prompted, start the Microsoft iSCSI Initiator service.
- **3.** Click the Configuration tab.
- 4. Copy the Initiator Name.

#### **Creating volumes on the PS-M4110**

The volumes created in this section will appear as physical disks to Windows Server 2012 Datacenter. Use these steps to create volumes as needed for your organization. In our setup, we created two full provisioned volumes:

- Quorum (10 GB)
- VHDs (2 TB)
- 1. In the EqualLogic PS Series Group Manager, click Storage Pools→Default.
- 2. Click Create volume.
- 3. At the Volume Settings screen, enter a name for the volume, and click Next.

- 4. At the Space screen, enter a size for the volume. Choose full or thin provisioning. Choose a snapshot reserve percentage. Click Next.
- 5. At the iSCSI Access screen, select the Restricted access radio button and check the Limit access to iSCSI initiator name checkbox. Enter the IQN of the first M620. Ensure that the Set read-write radio button is selected and check the Allow simultaneous connections from initiators with different IQNs checkbox. Click Next.
- 6. At the Summary screen, click Finish.

#### Providing multiple IQNs access to a volume

Complete these steps to provide volume access to the second M620 server using the IQN.

- 1. In the Group Manager left pane, expand Volumes, and select the volume to be modified.
- 2. Select the Access tab.
- 3. Click Add.
- 4. Check the Limit access to iSCSI initiator name checkbox.
- 5. Enter the IQN of the desired initiator.
- 6. Click OK.

#### Connecting the M620s to the volumes

Complete these steps on both M620s.

- 1. Open iSCSI Initiator.
- 2. Click the Discovery tab.
- 3. Click Discover Portal.
- 4. Enter the PS Group IP address, and click OK.
- 5. Click the Targets tab.
- 6. Select the first volume IQN, and click Connect.
- 7. Check the Enable multi-path checkbox, and click OK.
- 8. Repeat steps 6 and 7 for the remaining volumes.

#### Preparing the volumes for cluster shared storage

Repeat these steps for all volumes to be added to the cluster.

- On the first M620, open Disk Management by clicking Tools→Disk Management in Server Manager.
- 2. Right-click the name of the first offline volume, and click Online.

- 3. Right-click the name of the same volume, and click Initialize Disk.
- 4. Leave MBR selected, and click OK.
- 5. Right-click the white space of the volume, and click New Simple Volume.
- 6. Click Next.
- 7. Specify a size, and click Next. We used the maximum disk space.
- 8. Select the Do not assign a drive letter or drive path radio button, and click Next.
- 9. Enter a label for the volume, and click Next.
- 10. Click Finish.
- **11.** On the second node, open Disk Management and bring the volume online. The volume properties will transfer over. The management console may need to be refreshed to complete this operation.

# APPENDIX D – CREATING THE FAILOVER CLUSTER AND BUILDING THE VMS

#### **Creating the failover cluster**

On both M620s, use Server Manager to install the Failover Clustering feature and prerequisites.

- 1. Restart both nodes.
- From the first M620, open the Failover Cluster Manager by clicking Tools→Failover Cluster Manager.
- 3. Click Validate Configuration.
- 4. Click Next.
- 5. Enter the hostname of the first node, and click Add.
- 6. Enter the hostname of the second node, and click Add.
- 7. Click Next.
- 8. Select Run all tests, and click Next.
- 9. Confirm the settings, and click Next.
- When the validation completes, click View Report and verify that there are no errors. Check that the iSCSI volumes are shown under both nodes in List Potential Cluster Disks.
- **11.** In the validation wizard, leave the Create the cluster now using the validated nodes checkbox checked, and click Finish.
- **12.** At the Before You Begin screen, click Next.
- 13. Enter a name and IP address for the cluster, and click Next. We used Cluster1 and 192.168.1.70.
- **14.** Check the Add all eligible storage to the cluster checkbox, and click Next.
- 15. Click Finish.
- 16. Download and install Update for Windows Server 2012 (KB2803748) from <u>http://www.microsoft.com/en-us/download/details.aspx?id=36468</u>, a hotfix to prevent Microsoft Management Console crashes in Failover Cluster Manager, and restart.

#### Configuring the failover cluster

- 1. In Failover Cluster Manager, select the cluster, and click Networks.
- 2. For any networks unrelated to the cluster, right-click the network, and click Properties.

- Select the radio button for Do not allow cluster network communication on this network. Note: The iSCSI network will be disabled by default and is a correct setting.
- 4. Click Live Migration Settings.
- 5. Select the network to be used for live migration, and click Up until it is at the top of the list.
- 6. Click OK.
- 7. In the left pane, click Storage  $\rightarrow$  Disks.
- 8. The disk to be used for quorum may be automatically assigned. If not, select the cluster, and click More Actions→Configure Cluster Quorum Settings.
  - a. Click Next.
  - Select Advanced quorum configuration and witness selection, and click Next.
  - c. Select All nodes, and click Next.
  - **d.** Leave the Allow cluster to dynamically manage the assignment of node votes checkbox checked, and click Next.
  - e. Select Configure a disk witness, and click Next.
  - f. Select the disk to be used for quorum, and click Next.
  - g. Click Next.
  - h. Click Finish.
- **9.** Right-click the Cluster Disk to be used for VHDs, and click Add to Cluster Shared Volumes.

#### Installing Dell EqualLogic Host Integration Tools 4.5.0

Complete these steps on each failover cluster node:

- 1. Insert the installation media, and click Setup64.exe.
- 2. At the Welcome screen, click Next.
- 3. At the License Agreement screen, review and accept the terms of the license agreement, and click Next.
- 4. At the Destination Folder screen, click Next.
- 5. At the Select Type screen, select Complete, and click Next.
- 6. At the Ready to Install the Program screen, click Install.
- 7. At the Installation Complete screen, click Finish.
- 8. In the pop-up window that follows to restart the system, click Yes.

#### **Configuring MPIO settings**

Complete these steps on each failover cluster node:

- 1. Press the Windows key, and open Auto-Snapshot Manager.
- 2. In the left pane, click Settings  $\rightarrow$  MPIO Settings.
- **3.** In the Included section, click Exclude next to any subnets not to be used for iSCSI traffic.
- 4. Click Save.

#### **Installing the Hyper-V roles**

Complete these steps on each failover cluster node using the same shared storage for the Default Stores:

- **1.** Open Server Manager, and click Manage  $\rightarrow$  Add Roles and Features.
- 2. At the Before You Begin screen, click Next.
- 3. At the Installation Type screen, click Next.
- 4. At the Server Selection screen, select one of the servers in the failover cluster.
- 5. At the Server Roles screen, check the Hyper-V checkbox. At the prerequisite pop-up, click Add Features. Click Next.
- 6. At the Features screen, click Next.
- 7. At the Hyper-V screen, click Next.
- 8. At the Virtual Switches screen, click Next.
- 9. At the Migration screen, click Next.
- 10. At the Default Stores screen, enter locations on the shared cluster storage. The default path is C:\ClusterStorage. For our setup, we used C:\ClusterStorage\VHDs for both paths. Click Next.
- **11.** At the Confirmation screen, check the box to automatically restart the server after installation, and click Install.

#### **Creating a virtual switch**

Complete these steps on each failover cluster node:

- **1.** In Hyper-V Manager, click Virtual Switch Manager.
- In the left pane, select New virtual network switch. Leave External highlighted, and click Create Virtual Switch.
- Enter a name for the virtual switch. This name must be identical between both nodes. Use the drop-down menu to select an adapter that can communicate with the external Active Directory. Click OK.

- **4.** At the connectivity warning, click Yes.
- If you didn't use a NIC team for the first switch, add a second virtual switch using a different domain-connected adapter.

#### **Creating the VMs**

Lync 2013 Standard Edition requires at least three VMs: two Front End VMs and one File Server VM to act as a quorum witness. Repeat these steps for each VM to be created.

- **1.** In Failover Cluster Manager, click Roles.
- 2. In the right pane, click Virtual Machines $\rightarrow$ New Virtual Machine.
- 3. Select a node to install the VM on, and click OK.
- 4. At the Before You Begin screen, click Next.
- 5. At the Specify Name and Location screen, verify that the location is on cluster shared storage. Give the VM a name, and click Next. We used the following names for our VMs:
  - LSFE01
  - LSFE02
  - LSFS
- 6. At the Assign Memory screen, enter an amount appropriate for the server role, and click Next. You can find further information about Lync hardware requirements at <u>technet.microsoft.com/en-us/library/gg398438.aspx</u>.
- 7. At the Configure Networking screen, use the drop-down menu to select the domain-connected virtual switch, and click Next.
- At the Connect Virtual Hard Disk screen, create a new disk, enter a size appropriate for the server role, and click Finish. We sized every VHD at 50 GB.
- 9. At the Summary screen, click Finish.
- **10.** Right-click the VM, and click Settings.
- **11.** Select Add New Hardware→Network Adapter, and click Add.
- **12.** Select the redundant domain-connected switch from the drop-down menu, and click OK.

#### Installing Windows Server 2012 Datacenter Edition on the VMs

Repeat these steps for each VM.

- 1. In Failover Manager, right-click the VM, and click Settings.
- 2. In the left pane, click DVD Drive.

- **3.** Select the image file or the DVD drive containing the Windows Server installation media radio button. Click OK.
- 4. Right-click the VM, and click Start.
- 5. Right-click the VM, and click Connect.
- 6. Follow the on-screen instructions to install Windows Server 2012.

#### Joining the VMs to the domain

Repeat these steps for each VM.

- 1. Click Start, and type ncpa.cpl. Press Enter.
- 2. Right-click the adapter, and click Properties.
- **3.** Select IPv4, and click Properties.
- 4. Select the Use the following IP address and Use the following DNS server addresses radio buttons.
- Enter an IP address, subnet mask, default gateway, and preferred DNS server. Click OK.
- 6. In Server Manager, in the left pane, select Local Server.
- 7. Click the computer name.
- 8. Click Change.
- 9. Enter an appropriate hostname for the VM, and select the Domain radio button.
- **10.** Enter the name of your domain, and click OK.
- **11.** Enter the administrative credentials to connect to the domain, and click OK.
- **12.** At the welcome screen, click OK.
- **13.** Restart the VM, and use the domain credentials to log in again.

## APPENDIX E – PREPARING THE ACTIVE DIRECTORY AND VMS FOR LYNC SERVER 2013

#### **Preparing the Active Directory**

This step must be completed from the Active Directory Domain Controller, or a server with Active Directory Remote Server Administrative tools installed.

- 1. Insert the Lync Server 2013 installation DVD into the optical drive.
- 2. Run setup.exe. If the Microsoft C++ Runtime warning appears, click Yes.
- 3. At the Lync Server 2013 splash screen, choose an appropriate installation location, and click Install. For our setup, we chose the default location.
- 4. At the License Agreement screen, accept the license terms, and click OK.
- 5. After unpacking, the Lync Server Deployment Wizard should open. If not, use the Start menu to locate and open the wizard.
- 6. At the welcome screen, click Prepare Active Directory.
- 7. Next to Prepare Schema, click Run.
  - a. Click Next.
  - **b.** Once the command completes, click Finish.
  - c. Optionally, verify the replication by using the instructions found at <u>technet.microsoft.com/en-</u>us/library(OCS.15)/ms.lync.dep.DeployMainVerifySchemaPrep.aspx.
- 8. Next to Prepare Current Forest, click Run.
  - a. Select the radio button for Domain FQDN and enter the name of your FQDN. For our setup, this was test.local.
  - **b.** Once the command completes, click Finish.
  - C. Optionally, verify the replication by using the instructions found at <u>technet.microsoft.com/en-</u>us/library(OCS.15)/ms.lync.dep.DeployMainVerifyForestPrep.aspx.
- 9. Next to Prepare Current Domain, click Run.
  - a. Click Next.
  - **b.** Once the command completes, click Finish.
  - Optionally, verify the replication by using the instructions found at <u>technet.microsoft.com/en-</u> <u>us/library(OCS.15)/ms.lync.dep.DeployMainVerifyDomainPrep.aspx</u>

#### Providing Lync permissions to the Domain Admin

- 1. Log into the Active Directory machine with Domain Admin credentials.
- 2. In Server Manager, click Tools→Active Directory Users and Computers.
- **3.** Expand the domain, and click Users.
- 4. Right-click CSAdministrator, and click Properties.
- 5. In the Members tab, click Add.
- 6. Type the name of the user you wish to give Lync Server access and press Enter. For our test purposes we used test\Administrator. For more information on Lync Server permissions, see <u>technet.microsoft.com/en-</u> <u>us/library(OCS.15)/ms.lync.dep.DeployMainCreateCSCPAdmin.aspx</u>
- 7. Click OK.
- 8. Right-click RTCUniversalServerAdmins, and click Properties.
- 9. In the Members tab, click Add.
- **10.** Type the name of the user given in step 6 and press Enter.
- 11. Click OK.

#### **Configuring the DNS**

- 1. Log into the Active Directory with Domain Admin credentials.
- 2. Open the DNS Manager.
- Under Forward Lookup Zones, right-click the domain, and click Other New Records.
- 4. Select Service Location, and click Create Record.
- 5. Enter the following information, replacing the last line with the Front End VM FQDN for your environment:
  - Service: \_sipinternaltls
  - Protocol: \_tcp
  - Port Number: 5061
  - Host offering this service: LSFE01.test.local
- 6. Click OK.
- 7. Click Done.
- 8. Right-click the domain again, and click New Host (A or AAAA).
- **9.** Enter the following information, replacing the IP address with the IP address of your Front End VM:
  - Name: meet

- IP address: 192.168.1.11
- **10.** Check the Create associated pointer (PTR) record checkbox, and click Add Host.
- 11. Click OK at the PTR warning.
- 12. Repeat steps 8 through 11 for the DNS entries dialin and admin. Use the Front End IP address for both.

#### **Creating the Lync Server file shares**

- 1. Log into the file server VM with Domain Admin credentials.
- Create a new folder with an appropriate name for the share. We used LyncShare1.
- 3. Right-click the folder, and click Properties.
- 4. In the Sharing tab, click Share.
- 5. Using the drop-down menu, click Find People.
- 6. Type RTC in the box, and click Check Names.
- Hold down the Ctrl key and select the following users: RTCComponentUniversalServices, RTCHSUniversalServices, RTCUniversalConfigReplicator, and RTCUniversalServerAdmins. Click OK.
- 8. Click OK.
- From the drop-down menu next to a newly added user, select Read/Write. Repeat for all newly added users.
- 10. Click Share.
- 11. Click Done.
- **12.** Repeat steps 2 through 11 for a second folder title LyncShare2.

#### **Preparing the primary Front End VM**

- Log in with Domain Admin credentials to the VM to be used as the primary Lync Standard Edition Front End VM.
- Attach the Windows Server 2012 Datacenter Edition installation media to the VM.
- **3.** Open Windows PowerShell.
- 4. Type the following command and press Enter:

```
Install-WindowsFeature RSAT-ADDS, Web-Server, Web-
Static-Content, Web-Default-Doc, Web-Http-Errors, Web-
Asp-Net, Web-Net-Ext, Web-ISAPI-Ext, Web-ISAPI-Filter,
Web-Http-Logging, Web-Log-Libraries, Web-Request-
Monitor, Web-Http-Tracing, Web-Basic-Auth, Web-
```

Windows-Auth, Web-Client-Auth, Web-Filtering, Web-Stat-Compression, Web-Dyn-Compression, NET-WCF-HTTP-Activation45, Web-Asp-Net45, Web-Mgmt-Tools, Web-Scripting-Tools, Web-Mgmt-Compat, Windows-Identity-Foundation, Desktop-Experience, Telnet-Client, BITS -Source D:\sources\sxs -Restart

- 5. After the VM has restarted, attach the Lync Server 2013 installation media to the VM and run Setup.exe.
- 6. If this is the first time that setup.exe has been run, install the C++ Runtime and core components as prompted and accept the license agreement.
- 7. At the welcome screen, click Prepare First Standard Edition Server.
- 8. Click Next.
- 9. Once all commands are completed without errors, click Finish.

## APPENDIX F – INSTALLING LYNC SERVER 2013 STANDARD EDITION Building the topology

- At the Lync Server 2013 installation welcome screen, click Install Administrative Tools.
- 2. Once the installation finishes, click Start $\rightarrow$ Lync Server Topology Builder.
- 3. Select the radio button for New Topology, and click OK.
- 4. Enter a name for the topology, and click Save. For our setup, we used testtopol.tbxml.
- 5. Enter your Primary SIP domain, and click Next. For our setup, we used test.local.
- Enter any additional SIP domains, and click Next. For our setup, we did not add any.
- 7. Enter a name for the first site, and click Next. For our setup, we used Site1.
- 8. Enter location details if desired, and click Next.
- 9. Leave the Open the New Front End Wizard when this wizard closes checkbox checked, and click Finish.
- **10.** At the Define New Front End Pool wizard welcome screen, click Next.
- 11. In the Pool FQDN field, enter the FQDN of the current server. These must match exactly. For our setup, we used LSFE01.test.local. Select the radio button for Standard Edition Server, and click Next.
- 12. Select all features required for your organization. The Archiving and Monitoring features each require a dedicated SQL instance. We selected Conferencing with Dial-in, Call Admission Control, and Collocate Mediation Server. Click Next.
- **13.** Leave the Collocate Mediation Server checkbox checked, and click Next.
- **14.** Leave the Enable an Edge pool to be used by the media component of this Front End pool checkbox unchecked, and click Next.
- 15. At the Define the SQL Server store screen, click Next.
- 16. Select the radio button for Define a new file store and enter the appropriate information. For our setup, this was LSFS.test.local and LyncShare1. Click Next.
- 17. At the Specify the Web Services URL screen, click Next.
- 18. If your organization employs an Office Web Apps server, then check the Associate pool with an Office Web Apps Server checkbox, and click New. Enter the FQDN and Discover URL, and click OK. We did not use an Office Web Apps

server and did not check the checkbox. You can find further information on deploying an Office Web Apps server at <a href="https://www.technet.microsoft.com/en-us/library/jj219458.aspx">www.technet.microsoft.com/en-us/library/jj219458.aspx</a>.

- 19. If installing the Archiving and/or Monitoring roles, click Next to continue the wizard. On the following screens, enter the appropriate SQL instances to be used for these roles. If the Archiving and Monitoring roles are not to be configured at this time, click Finish to close the wizard.
- **20.** In the Topology Builder, right-click Lync Server, and click Edit Properties.
- **21.** Click Central Management Server.
- 22. In the Administrative access URL field, enter the admin URL. For our setup, this was https://admin.test.local.
- 23. Under Central Management Server, use the drop-down menu to select the Front End server.
- 24. Click OK.
- **25.** Right-click Lync Server, and click Publish Topology.
- 26. Confirm that the listed tasks have been completed, and click Next.
- 27. Ensure that the Front End server is selected in the drop-down menu, and click Next.
- **28.** After the process completes, click Finish.

#### Installing the configuration to the primary Front End VM

- 1. Log into the primary Front End VM with Domain Admin credentials. Navigate to the Lync Server 2013 installation media and run setup.exe.
- At the Lync Server 2013 installation welcome screen, click Install or Update Lync Server System.
- 3. Next to Install Local Configuration Store, click Run.
  - Select the radio button for Retrieve directly from the Central Management store (requires read access to the Central Management store), and click Next.
  - b. Click Finish.
- 4. Next to Setup or Remove Lync Server Components, click Run.
  - a. Click Next.
  - b. Click Finish.
- 5. Next to Request, Install or Assign Certificates, click Run.
  - a. Select Default certificate, and click Request.

- **b.** When the wizard pops up, click Next.
- c. Leave the Send the request immediately to an online certification authority radio button, and click Next.
- d. Select your CA from the drop-down menu, and click Next.
- e. Specify alternate credentials for the CA if needed, and click Next.
- f. Leave the Use alternate certificate template for the selected certification authority checkbox unchecked, and click Next.
- g. Enter a name for the certificate in the Friendly name field, select a Bit length of 2048, and check the Mark the certificate's private key as exportable checkbox. Click Next. We named our certificate LS Internal Cert.
- h. Enter your organization name and unit if desired, and click Next.
- i. Enter your geographical information if desired, and click Next.
- j. Review the Subject and Subject Alternative Names, and click Next.
- Under Configured SIP domains, check the checkbox next to your domain, and click Next.
- I. Add any additional subject alternative names if desired. For our setup, we did not require any more. Click Next.
- m. Review the settings, and click Next.
- n. After the operation completes, click Next.
- o. Click Finish.
- p. When the Certificate Assignment window pops up, click Next.
- q. Click Next.
- r. Click Finish.
- s. Click Close.
- t. Repeat step 5 for the OAuthTokenIssuer certificate.
- 6. Next to Start Services, click Run.
  - a. Click Next.
  - b. Click Finish.

#### Adding the secondary Front End pool

 Open the current topology in Topology Builder. This can be done by importing the active configuration or simply opening the .tbxml file that was previously saved.

- Click Lync Server→Site1→Lync Server 2013 and right-click Standard Edition Front End Servers. Click New Front End Pool.
- 3. Click Next.
- 4. Enter the FQDN of the secondary Front End VM, and click Next. For our setup, we used LSFE02.test.local.
- 5. Select the appropriate options for your environment. Call Admission Control will not be available if already installed on the primary Front End server. This feature can only have one instance per site. For our setup, we chose everything except for Archiving and Monitoring. Call Admission Control was already installed.
- 6. Leave the Collocate Mediation Server checkbox checked, and click Next.
- Leave the Enable an Edge pool to be used by the media component of this Front End pool checkbox unchecked, and click Next.
- 8. At the Define the SQL Server store screen, click Next.
- 9. Select the radio button for Define a new file store and enter the appropriate information. For our setup, this was LSFS.test.local and LyncShare2. Click Next.
- **10.** At the Specify the Web Services URL screen, click Next.
- 11. If your organization employs an Office Web Apps server, then check the Associate pool with an OWA Server checkbox, and click New. Enter the FQDN and Discover URL, and click OK. If not using an OWA server, click Finish. We did not use an OWA Server and did not check the checkbox.
- 12. If installing the Archiving and/or Monitoring roles, click Next to continue the wizard. On the following screens, enter the appropriate SQL instances to be used for these roles. If the Archiving and Monitoring roles are not to be configured at this time, click Finish to close the wizard.
- **13.** In the Topology Builder, click Action  $\rightarrow$  Publish Topology.
- 14. Click Next.
- **15.** Once the commands complete, click Finish.

#### **Updating the primary Front End VM**

- Log into the primary Front End VM with administrative credentials. Navigate to the Lync Server 2013 installation media and run setup.exe.
- 2. Click Install or Update Lync Server System.
- 3. Next to Setup or Remove Lync Server Components, click Run Again.
  - a. Click Next.

b. Click Finish.

#### Installing the configuration to the secondary Front End VM

- 1. Log into the secondary Front End VM with Domain Admin credentials.
- 2. Attach the Windows Server 2012 installation media to the VM.
- 3. Open Windows PowerShell and run the following command:

Install-WindowsFeature RSAT-ADDS, Web-Server, Web-Static-Content, Web-Default-Doc, Web-Http-Errors, Web-Asp-Net, Web-Net-Ext, Web-ISAPI-Ext, Web-ISAPI-Filter, Web-Http-Logging, Web-Log-Libraries, Web-Request-Monitor, Web-Http-Tracing, Web-Basic-Auth, Web-Windows-Auth, Web-Client-Auth, Web-Filtering, Web-Stat-Compression, Web-Dyn-Compression, NET-WCF-HTTP-Activation45, Web-Asp-Net45, Web-Mgmt-Tools, Web-Scripting-Tools, Web-Mgmt-Compat, Windows-Identity-Foundation, Desktop-Experience, Telnet-Client, BITS -Source D:\sources\sxs -Restart

- 4. Attach the Lync Server 2013 installation media to the VM and run Setup.exe.
- 5. If this is the first time that setup.exe has been run, install the C++ Runtime and core components as prompted and accept the license agreement.
- 6. At the welcome screen, click Install or Update Lync Server System.
- 7. Next to Install Local Configuration Store, click Run.
  - Select the radio button for Retrieve directly from the Central Management store (requires read access to the Central Management store), and click Next.
  - **b.** Click Finish.
- 8. Next to Setup or Remove Lync Server Components, click Run.
  - a. Click Next.
  - b. Click Finish.
- 9. Next to Request, Install or Assign Certificates, click Run.
  - a. Select Default certificate, and click Request.
  - **b.** When the wizard pops up, click Next.
  - c. Leave the Send the request immediately to an online certification authority radio button, and click Next.
  - d. Select your CA from the drop-down menu, and click Next.
  - e. Specify alternate credentials for the CA if needed, and click Next.

- **f.** Leave the Use alternate certificate template for the selected certification authority checkbox unchecked, and click Next.
- g. Enter a name for the certificate in the Friendly name field, select a Bit length of 2048, and check the Mark the certificate's private key as exportable checkbox. Click Next. We named our certificate LS Internal Cert.
- **h.** Enter your organization name and unit if desired, and click Next.
- i. Enter your geographical information if desired, and click Next.
- j. Review the Subject and Subject Alternative Names, and click Next.
- Under Configured SIP domains, check the checkbox next to your domain, and click Next.
- I. Add any additional subject alternative names if desired. For our setup, we did not require any more. Click Next.
- m. Review the settings, and click Next.
- n. After the operation completes, click Next.
- o. Click Finish.
- p. When the Certificate Assignment window pops up, click Next.
- q. Click Next.
- r. Click Finish.
- s. Click Close.
- **10.** Next to Start Services, click Run.
  - a. Click Next.
  - b. Click Finish.

#### Designating the secondary Front End pool as a backup

- Open the current topology in Topology Builder. This can be done by importing the active configuration or simply opening the .tbxml file that was previously saved.
- Click Lync Server→Site1→Lync Server 2013→Standard Edition Front End Servers and right-click the primary Front End server. Click Edit Properties.
- Under Resiliency, check the Associated backup pool checkbox. Use the dropdown menu to select the secondary Front End server. Check the box for Automatic failover and failback for Voice and adjust the intervals to values appropriate for your organization. Click OK.
- 4. Click OK.
- 5. In the Topology Builder, click Action $\rightarrow$ Publish Topology.

- 6. Click Next.
- 7. Once the commands complete, click Finish.

#### **Updating the Front End VMs**

- On both Front End servers, run steps 2 (Setup or Remove Lync Server Components) and 4 (Start Services) from the Install or Update Lync Server System category in the setup GUI.
- 2. From the primary Front End server, run the following PowerShell commands. Replace the FQDNs with your own:

```
Invoke-CSBackupServiceSync -PoolFqdn LSFE01.test.local
Invoke-CSBackupServiceSync -PoolFqdn LSFE02.test.local
```

#### Adding the backup SRV

- 1. Log into the Active Directory with Domain Admin credentials.
- 2. Open the DNS Manager.
- Under Forward Lookup Zones, right-click the domain, and click Other New Records.
- 4. Select Service Location, and click Create Record.
- 5. Enter the following information, replacing the last line with the secondary Front End FQDN for your environment:
  - Service: \_sipinternaltls
  - Protocol: \_tcp
  - Priority: 10
  - Weight: 10
  - Port Number: 5061
  - Host offering this service: LSFE02.test.local
- 6. Click OK.
- 7. Click Done.

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