Lab: Installing and Configuring System Center 2012 R2 Virtual Machine Manager

Exercise 1: Installing and Configuring System Center 2012 R2 VMM

▶ **Task 1: Review the email from Ed Meadows, CIO, A. Datum, Inc.**

Email

From: Ed Meadows, CIO, A. Datum Corp.

To: IT department

Subject: Ready to add System Center 2012 R2 Virtual Machine Manager!

I really appreciate the way you have set up our Hyper-V environment! Everything looks great. Now that we have our virtualization infrastructure in place, I would like you create a test implementation of System Center 2012 R2 Virtual Machine Manager. To do this, we need to:

1. Load the software on one of our servers in the London Site. We need at least two physical hosts, but have plenty of virtual machines on them. Do you recommend putting this on a virtual machine or physical computer? Please let me know what computers you'll be using. Remember that the test data that you gather will be used to further deploy a much more robust solution that we will use to build our private clouds.
2. Make sure that all the prerequisites Microsoft has recommended are met. If there are any shortfalls, let me know as soon as possible. Create a list of the prerequisites that you will need to verify.
3. After you have created the VMM management server and installed a Virtual Machine Manager console on a desktop client in the Developer department, finish testing the console and ensure everything works.
4. Finally, create the local host group and assign at least two physical hosts.

Ed

To create the test implementation, answer the following questions:

- How many Microsoft System Center 2012 R2 Virtual Machine Manager (VMM) servers do you need to deploy in the Adatum environment?

  Answer: You only need to deploy one server.

- What are the VMM prerequisites that need to be met? **Answer:** The following software prerequisites need to be met:
  - Operating System – Windows Server 2012 or newer ○ Microsoft SQL Server - SQL Server 2008 R2 Service Pack 2 (SP2) Standard or newer ○ Windows Remote Management service – enabled and started ○ Microsoft .NET Framework 4.5
  - Windows deployment and installation kit – Windows Assessment and Deployment Kit (Windows ADK) for Windows Server 2012 R2

- The following hardware prerequisites need to be met:

○ CPU - Pentium 4, 2 gigahertz (GHz) (x64) ○ Memory - 2 gigabytes (GB) ○ Disk space - 80 GB

Will you deploy VMM on a single server, or will you separate components onto dedicated servers?

Answer: You should deploy the VMM management server on one computer, and then deploy the VMM console on both a server and a client computer.

- Will you install the VMM server inside a virtual machine or on a physical machine?

  Answer: A virtual machine will allow you to use both physical servers as hosts.

- What computers will you use, and what will be their roles?

  Answer: ○ Answer: VMM management server - LON-VMM1 ○ Physical hosts – LON-HOST1 and LON-HOST2 ○ Client VMM console – LON-CL1

▶ Task 2: Check for VMM prerequisites, and install VMM

1. On LON-VMM1, on the taskbar, click **Server Manager**.
2. In Server Manager, click the **Local Server** link.
3. In the Properties for LON-VMM1 details pane, ensure that **LON-VMM1** is in the **Adatum.com** domain. Verify that the **Operating system version** is at least the Standard or Datacenter version of **Windows Server 2012 R2**. Confirm that it has at least a **2 GHz Pentium** processor, **4 GB** of random access memory (RAM) and **80 GB** of disk space available.
4. Close Server Manager.
5. On the taskbar, click the **Start Screen** icon.
6. On the Start screen, move the mouse pointer directly under the **Desktop** tile. Click the round white circle with a white down arrow in it.
7. In the Apps by name screen, scroll to the right, and then click the **SQL Server Management Studio** tile.
8. In the Microsoft SQL Server Management Studio (Administrator) console, in the **Connect to Server** dialog box, click **Connect**.
9. In the Object Explorer console, on the left side, note the top tree element labeled **LON-VMM1 (SQL Server 11.0.3000 – ADATUM\administrator)**. This version number, 11.0.3000, corresponds to SQL Server 2012 SP1.
10. Click the **File** drop-down list box, and then click **Exit**.
11. On the taskbar, click the **Windows PowerShell** icon.
12. In Windows PowerShell, type the following command, and then press Enter:

```
regedit.exe
```

13. In the Registry Editor window, click the **HKEY_LOCAL_MACHINE** subkey. Expand **SOFTWARE**, expand **Microsoft**, expand **Net Framework Setup**, expand **NDP**, expand **v4**, and then expand **Client**, and then click 1033.
14. In the **Version** item, verify that the value in the **Data** column is **4.5.51641** or higher.
15. Close the Registry Editor window.
16. In Windows PowerShell, type the following command, and then press Enter:

```
services.msc
```

17. In the Services console, in the **Name** column, scroll down to **Windows Remote Management (WS–Management)**. If necessary, expand the size of the Name column to see the object name. Verify that the service has the status of **Running**, and that the **Startup Type** is set to **Automatic**.
18. Close the Services console, and then close Windows PowerShell.
19. On the taskbar, click the **File Explorer** icon.
20. In the This PC window, double-click the **DVD Drive** icon.
21. In the VMM folder, verify that installation files display.

▶ Task 3: Install the VMM management server and Virtual Machine Manager console on LON-VMM1

1. In File Explorer, in the VMM window, double-click **setup.exe**.
2. On the Microsoft System Center 2012 R2 Installation splash screen, click the **Install** hyperlink.
3. On the **What would you like to do** page, click **Add features**.
4. In the Microsoft System Center 2012 Virtual Machine Setup Wizard, on the **Getting started** page, under the **Select features to** add section, select the **VMM management server** check box, and then click **Next**.
5. On the **Product registration information** page, in the **Name** text box, type, **Administrator**, and in the **Organization** text box, type **A.Datum, Corp.** Leave the **Product key** text box blank, and then click **Next**.
6. Read the **Please read this license agreement** disclaimer, select the **I have read, understood, and agree with the terms of the license agreement** check box, and then click **Next**.
7. On the **Customer Experience Improvement Program (CEIP)** page, click **No, I am not willing to participate**, and then click **Next**.
8. When the **Database configuration** page displays, verify that since SQL Server 2012 SP1 is running on the server, the server name will already display. Leave the **Port number** box empty, in the **Instance name** drop-down list, click **MSSQLSERVER**. In the **Select an existing database or create a new database** area, use the default new database **VirtualManagerDB**, and then click **Next**.
9. On the **Configure service account and distributed key management** page, in the **User name and domain** text box, type **ADATUM\SCService**, and in the **Password:** text box, type **Pa$$w0rd**. Leave the **Distributed Key Management** section blank, and then click **Next**.
10. On the **Port configuration** page, do not make any changes, and then click **Next**.
11. On the **Library configuration** page, select the **Create a new library share** radio button, and then click **Next**.
12. On the **Installation summary** page, review the text, and then click **Install**. The Installing features will now run for several minutes.
13. On the **Set up completed successfully** page, click **Close**.
14. On the Microsoft System Center 2012 R2 Installation splash screen, click **Close**.
15. Close File Explorer.
16. If the **Connect to Server** page for the VMM console displays, skip forward to step 26. If it does not, then perform the following steps.
17. On the taskbar, click the **Start Screen** icon.

18. On the Start screen, move the mouse pointer directly under the **Desktop** tile, and click the round white circle with a white down arrow in it.
19. In the Apps by name screen, scroll to the right, right-click the **Virtual Machine Manager Console** item, and in the bar at the bottom of the Apps by name screen, click **Pin to taskbar**.
20. Click any empty area of the Apps by name screen, and when you see a white circle with a white up arrow in it, click the arrow.
21. On the Start screen, click the **Desktop** tile.
22. On the desktop, on the taskbar, click the **Virtual Machine Manager Console** icon.
23. On the **Connect to Server** page, verify that the **Server name** text box is set to **localhost: 8100**. Verify that the **Use current Microsoft Windows session identity** check box is selected, and then click **Connect**. The default selection, **Use current Microsoft Windows session identity**, is adequate as you are signed on as the domain administrator.
24. Wait for the Virtual Machine Manager console to load.
25. Close the Virtual Machine Manager console.

▶ Task 4: Install the Virtual Machine Manager console on LON-CL1

Note: Perform these steps from LON-HOST2. In Hyper-V Manager on LON-HOST2, rightclick **Hyper-V Manager** in the console tree and select **Connect to server**. Select **Another computer**, and type **LON-HOST1** and then click **OK**. Select and connect to **LON-CL1**.

1. On LON-CL1, on the Start screen, click the **Desktop** tile.
2. On the desktop, on the taskbar, click the **File Explorer** icon.
3. In File Explorer, navigate to **\\lon-vmm1.adatum.com\c$\Program Files\Microsoft System Center 2012 R2\Virtual Machine Manager\setup\msi\Client**.
4. In the Client folder, double-click the **AdminConsole.msi** file. The MSI file opens a pop-up window stating it is installing, and displaying a progress bar. If it does not encounter an error, then after installing the Virtual Machine Manager console successfully, it will close itself. If a **Security Warning** popup displays, click **Run**.
5. After the install pop-up window closes, close File Explorer.
6. On the taskbar, click the **Start Screen** icon.
7. On the Start screen, move the mouse pointer directly under the **Desktop** tile, and click the round white circle with a white down arrow icon.
8. In the Apps by name start screen, scroll to the right until you see the **Microsoft System Center 2012** tile area, and then right-click the **Virtual Machine Manager Console NEW** tile.
9. In the Command bar at the bottom of the page, click **Pin to Taskbar**.
10. On your keyboard, press the Windows key.
11. On the **Start screen** page, click the **Desktop** tile.
12. On the desktop, on the taskbar, click the **Virtual Machine Manager Console** icon.

13. On the **Connect to Server** page, in the **Server name** text box, type **LON-VMM1.adatum.com:8100**, and then click **Connect**.
14. When the console displays, navigate around to observe that is the same Virtual Machine Manager console as is installed on LON-VMM1.
15. Close the Virtual Machine Manager console and sign out of LON-CL1.

Results: After completing this exercise, you should have installed System Center 2012 R2 VMM.

Exercise 2: Managing Hosts and Host Groups

▶ Task 1: Set the default domain group policy to allow domain members to become hosts

1. On LON-DC1, in Server Manager, click **Tools**, and then click **Group Policy Management**.
2. In the Group Policy Management Console, in the console tree, expand **Forest: Adatum.com**, expand **Domains**, and then expand **Adatum.com**. Under **Adatum.com**, right-click **Default Domain Policy**, and then click **Edit**.
3. In the Group Policy Management Editor, maximize the window.
4. In the console tree, under **Computer Configuration**, expand **Policies**. Navigate to the following location: **Administrative Templates\Network\Network Connections\Windows Firewall \Domain Profile**.
5. In the Domain Profile details pane, double-click **Windows Firewall: Allow inbound file and printer sharing exception**.
6. In the **Windows Firewall: Allow inbound file and printer sharing exception** pop-up dialog box, click **Enabled**, in the **Options** box, type an asterisk (*****), and then click **OK**.
7. In the Domain Profile details pane, double-click **Windows Firewall: Allow ICMP exceptions**.
8. In the **Windows Firewall: Allow ICMP exceptions** pop-up dialog box, select the **Enabled** radio button, in the **Options** area, select the **Allow inbound echo request** check box, and then click **OK**.
9. In the Domain Profile details pane, double-click **Windows Firewall**: **Define inbound port exceptions**.
10. In the **Windows Firewall: Define inbound port exceptions** pop-up dialog box, select **Enabled**. In the **Options** area, by **Define port exceptions**, click **Show**.
11. In the **Show Contents** pop-up dialog box, under **Value**, type **5985**, and then click **OK** twice.
12. In the Group Policy Management Editor console tree, under **Administrative Templates**, expand **Windows Components**, select and expand **Windows Remote Management (WinRM)**, and then click **WinRM Service**.
13. In the WinRM Service details pane, double-click the **Allow remote server management through WinRM** setting.
14. In the pop-up dialog box, click the **Enabled** radio button, in the **Options** area, in both the **IPv4** and **IPv6** text boxes, type an asterisk (*****), and then click **OK**.
15. Close the Group Policy Management Editor, and then close the Group Policy Management Console.
16. On LON-HOST1, on the desktop, on the taskbar click the **Windows PowerShell** icon.

17. In the Windows PowerShell window, type the following command, and then press Enter:

```
gpupdate /force
```

18. When both computer and user policies update successfully, close the Windows PowerShell window.
19. Repeat steps 16-17 on **LON-HOST2**.

▶ Task 2: Add LON-HOST1 and LON-HOST2 to VMM

1. On LON-VMM1, from the desktop, on the taskbar, click the **Virtual Machine Manager Console** icon.
2. On the **Connect to Server** page, click **Connect**.
3. In the Virtual Machine Manager console, click the **VMs and Services** workspace.
4. In the console tree, right-click **All Hosts**, and then click **Add Hyper-V Hosts and Clusters**.
5. In the Add Resource Wizard, on the **Resource Location** page, click the **Windows Server computers in a trusted Active Directory domain** option (it should be the default), and then click **Next**.
6. On the **Credentials** page, select the **Manually enter the credentials** radio button. While the default is **Use an existing Run As account**, which has a **Browse** button to find the account, the **Run As account** has to have local administrator permissions on the host machine being assigned. In the **User name** text box, type **ADATUM\Administrator**, in the **Password** text box, type **Pa$$w0rd**, and then click **Next**.
7. On the **Discovery Scope** page, note the two radio buttons, **Specify Windows Server computers by names**, and **Specify and Active Directory query to search for Windows Server computers**. In the **Computer names** text box, type **lon-host1.adatum.com**, and then click **Next**.
8. On the **Target resources** page, in the **Discovered computers** section, select the **lon-host1.adatum.com** check box, and then click **Next**.
9. When the **Virtual Machine Manager** pop-up window displays warning you that if Hyper-V is not enabled on the selected server, the VMM will do so, click **OK**.
10. On the **Host Settings** page, note that the **Host group** drop-down list box has only one option, **All Hosts**. Note the check box that says **Reassociate this host with this VMM environment**. Selecting this check box moves hosts that have been assigned to a different VMM management server and assigns them to this one. Make no changes, and click **Next**.
11. On the **Summary** page, in the upper left, click the **View Script** button.
12. In Notepad, review the Windows PowerShell cmdlets that display. These are the cmdlets necessary to run a script in Windows PowerShell to add the LON-HOST1 host to this VMM management server. This script can be very useful for documenting your work or to create another host, perhaps at a later time.
13. In Notepad, click **File**, and then click **Save As**.
14. In the Save As window, under **This PC**, click **Documents**. In the **File name** text box, type **AddHost.ps1**, in the **Save as type** drop-down list box, click **All Files (*.*)**, and then click **Save**.
15. Close Notepad.
16. On the **Summary** page, click **Finish**.
17. A Jobs pop-up window displays, which shows all the individual steps being taken to add the host. The final step entitled, **Add virtual machine host** takes the longest. It will spend a few moments at several percentages of job completion.

18. When the job finishes, close the Jobs window. In the Jobs pop-up window, a yellow triangle might display, with the text **Add virtual machine host Completed w/ info**. This occurs because **Multipath I/O** is not enabled for known storage arrays. This is expected.
19. In the VMs and Services console tree, under **All Hosts**, verify that **Lon-host1** now displays.
20. To add **LON-HOST2,** on the taskbar, click the **Windows PowerShell** icon.
21. In Windows PowerShell, type the following command, and then press Enter:

```
cd documents
```

22. In Windows PowerShell, type the following command, and then press Enter:

```
notepad AddHost.ps1
```

23. In the Notepad window, click **Format**, and then click **Word Wrap**.
24. Examine the script, and note the two variables that are created and the cmdlets they are based on.
25. Review the **Add-SCVMHost** cmdlets and the various parameters that it calls.
26. Modify the **ComputerName** parameter to identify **lon-host2** rather than **lon-host1**.
27. On the **File** menu, click **Save**, and then close **Notepad**.
28. In Windows PowerShell, type the following command, and then press Enter:

```
./addhost.ps1
```

29. In the **Windows PowerShell credential required** pop-up, in the **User name** text box, type **ADATUM\administrator**, in the **Password** text box, type **Pa$$w0rd**, and then click **OK**.
30. Wait for Windows PowerShell to display a number of parameters and values in columnar form, and then close Windows PowerShell.
31. In the Virtual Machine Manager console, in the VMs and Services console tree, under **All Hosts**, verify that you now see **LON-HOST2**. Select **LON-HOST2**, on the ribbon, click the **Folder** tab, and then click **Properties**. Review each of the pages in the **lon-host2.adatum.com Properties** dialog box.
32. Close the **lon-host2.adatum.com Properties** dialog box, and then close the Virtual Machine Manager console.

▶ Task 3: Create a LocalGroup host group, and then add LON-HOST1 and LON-HOST2 to the LocalGroup host group

1. On LON-VMM1, on the desktop, on the taskbar, click the **Virtual Machine Manager Console** icon.
2. In the Virtual Machine Manager console, on the **Connect to Server** page, click **Connect**.
3. In the Virtual Machine Manager console, click the **VMs and Services** workspace.
4. In the VMs and Services console tree, click **All Hosts**.
5. On the ribbon, on the **Home** tab, click **Create Host Group**. Verify that in the console tree, under **All Hosts**, a new folder named **New host group** displays. Highlight this folder, type **LocalGroup**, and then press Enter.
6. In the VMs and Services console tree, click **lon-host1,** and then on the ribbon, click the **Host** tab.
7. On the ribbon, click **Move to Host Group**.

8. In the **Move Host Group** pop-up dialog box, in the **Parent host group:** drop-down list box, click **LocalGroup**, and then click **OK**.
9. In the VMs and Services console tree, right-click **lon-host2**, and then click **Move to Host Group**.
10. In the **Move Host Group** pop-up dialog box, in the **Parent host group** drop-down list box, click **LocalGroup**, and then click **OK**.

▶ Task 4: Configure LocalGroup properties

1. Right-click **LocalGroup**, and then click **Properties**.
2. In the **LocalGroup Properties** dialog box, in the **Properties** pages, configure the following:
    a. On the **General** page, in the **Description** text box, add the description **The local group of virtualization hosts the A. Datum IT department is using**.
    b. On the **Host Reserves** page, clear the **Use the host reserves settings from the parent host group** check box. In the **Disk space**, **amount** text box, change the values from **1%** to **2%**.
    c. On the **LocalGroup Properties** page, click **OK**.
3. Close the VMM Console, and sign out of LON-VMM1.

Results: After completing this exercise, you should have created and configured hosts and host groups.

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Poslovna banka: Zagrebačka banka d.d. Trg bana Josipa Jelačića 10, 10000 Zagreb, Hrvatska
OIB: 14575159920 I matični broj: 2412926 I IBAN: HR7523600001102036972
tel. +385 (0)1 2222 182 I fax. +385 (0)1 2305 004 I info@racunarstvo.hr I www.racunarstvo.hr

Module 8: Managing the Network and Storage Infrastructure in Microsoft System Center 2012 R2 Virtual Machine Manager

Lab A: Network Infrastructure Management

Exercise 1: Implementing a Network Infrastructure

▶ Task 1: Configure logical networks

1. On LON-VMM1, in Microsoft System Center 2012 R2 Virtual Machine Manager (VMM), launch the Virtual Machine Manager console.
2. In the Virtual Machine Manager console, click the **Fabric** workspace, in the Navigation pane, click **Networking**, and then on the on the ribbon, click **Create Logical Network**.
3. In the Create Logical Network Wizard, on the **Name** page, in the **Name** text box, type **Adatum UK**, and then in the **Description** text box, type **Adatum (London) logical network**.
4. Click **One connected network**, click **Allow new VM networks created on this logical network to use network virtualization**, and then click **Next**.
5. On the **Network Site** page, click **Add**, and then in the **Host groups that can use this network site** section, click **All Hosts**.
6. In the **Associated VLANs and IP subnets** area, click **Insert row**, in the **VLAN** text box, type **0**, and then in the **IP subnet** text box, type **192.168.1.0/24**.
7. Click the **Network Site Name** text box, select and delete the automatically generated site name, and then type **Docklands**.
8. Repeat step 5, 6 and 7, using the following details: ○ VLAN: **0** ○ IP Subnet: **192.168.2.0/24** ○ Network Site Name: **Gatwick**
9. Click **Next**, and then click **Finish**.
10. Close the Jobs window.
11. On the ribbon, click **Create IP Pool**.
12. In the Create Static IP Address Pool Wizard, on the **Name** page, in the **Name** text box, type **Docklands IP Pool**, select the logical network **Adatum UK**, and then click **Next**.
13. On the **Network site** page, click **Use an existing network site**, ensure that **Docklands** is selected, and then click **Next**.
14. On the **IP address range** page, review the options, and then click **Next**.
15. On the **Gateway** page, review the options, and then click **Next**.
16. On the **DNS** page, review the options, and then click **Next**.
17. On the **WINS** page, review the options, and then click **Next**.
18. On the **Summary** page, click **Finish**.
19. Close the Jobs window.
20. Create another IP pool called **Gatwick IP Pool**. Use the **Adatum UK** logical network, and use the **Gatwick** Network site.
21. On the ribbon, click **Create**, and then click **Hyper-V Port Profile**.
22. In the Create Hyper-V Port Profile Wizard, on the **General** page, in the **Name** text box, type **Adatum UK Uplink**.

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OIB: 14575159920 I matični broj: 2412926 I IBAN: HR7523600001102036972
tel. +385 (0)1 2222 182 I fax. +385 (0)1 2305 004 I info@racunarstvo.hr I www.racunarstvo.hr

23. Click **Uplink port profile**, in the **Load balancing algorithm** drop-down list box, click **Hyper-V port**, and then click **Next**.
24. On the **Network configuration** page, under **Network sites**, click **Docklands**, click **Gatwick**, click **Enable Hyper-V Network-Virtualization**, and then click **Next**.
25. On the **Summary** page, click **Finish**.
26. Close the Jobs window.
27. On the ribbon, click **Create Logical Switch**.
28. In the Create Logical Switch Wizard, on the **Getting Started** page, click **Next**.
29. On the **General** page, in the **Name** text box, type **Adatum UK**, in the **Description** text box, type **Adatum production hosts logical switch**, and then click **Next**.
30. On the **Extensions** page, leave the default extensions, and then click **Next**.
31. On the **Uplink** page, click **Add**, ensure that the **Adatum UK uplink** is selected, click **OK**, and then click **Next**.
32. On the **Virtual Port** page, click **Add**.
33. On the **Add Virtual Port** page, click **Browse**.
34. On the **Select a Port Profile Classification** page, click **Medium Bandwidth**, and then click **OK**.
35. Click **Include a virtual network adapter port profile in this virtual port**, click the **Native virtual network adapter port profile**, click **Medium Bandwidth Adapter**, click **OK**, and then click **Next**.
36. On the **Summary** page, click **Finish**.
37. Close the Jobs window.

▶ Task 2: Connect a host server with a logical network

1. In the Fabric workspace click to expand **Servers**, click **All Hosts**, and then click **lon-host1.adatum.com**.
2. On the ribbon, click **Properties**.
3. In the **Properties** dialog box, click **Hardware**, and then locate and click the logical network associated with your network card (this will be connected to **External Network**.) On the right, click the **Adatum UK** logical network, read the warning about VLANs, click **OK**, and then click **OK** again.
4. In the **Fabric** workspace, expand **Servers**, click **All Hosts**, click **lon-host1.adatum.com**, and then on the ribbon, click **Properties**. Click **Virtual Switches**, click **New Virtual Switch**, and then click **New Logical Switch**.
5. An error message displays stating that VMM cannot create a virtual switch without any physical network adapters. At this point, if you have another network card, you can assign the logical switch to a physical adapter.
6. In the error message pop-up window, click **OK**.
7. In the **Properties** dialog box, click **Hardware**, and then scroll down and expand **Network adapters**. Click your physical network adapter, and note that you can select or clear the adapter for virtual machine placement and management use. Click the Logical network, and on the right, under **Logical network connectivity**, you can assign the logical networks and IP subnets,
8. Click **Cancel**, and then click **Yes** to close the warning.

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Task 3: Configure network virtualization

1. In the Virtual Machine Manager console, click the **VMs and Services** workspace, and then on the ribbon, click **Create VM Network**.
2. On the **Name** page, in the **Name** text box, type **Adatum North**, ensure that **Adatum UK** is selected as the logical network, and then click **Next**.
3. On the **Isolation** page, click **Isolate using Hyper-V network-virtualization**, and then click **Next**.
4. On the **VM Subnets** page, click **Add**, in the **Name** text box, type **Adatum Finance**, and then in the **Subnet** text box, type **192.168.4.0/24**.
5. On the **VM Subnets** page, click **Add**, in the **Name** text box, type **Adatum Engineering**, in the **Subnet** text box, type **192.168.5.0/24**, and then click **Next**.
6. On the **Connectivity** page, review the message, and then click **Next**.
7. On the **Summary** page review the summary, and then click **Finish**.
8. Close the Jobs window.
9. In the Virtual Machine Manager console, click the **VMs and Services** workspace, and then on the ribbon, click **Create VM Network**.
10. On the **Name** page, in the **Name** text box, type **Adatum South**, ensure that **Adatum UK** is selected as the logical network, and then click **Next**.
11. On the **Isolation** page, click **Isolate using Hyper-V network-virtualization**, and then click **Next**.
12. On the **VM Subnets** page, click **Add**, in the **Name** text box, type **Adatum Warehouse**, and then in the **Subnet** text box, type **192.168.4.0/24**.
13. On the **VM Subnets** page, click **Add**, in the **Name** text box, type **Adatum Logistics**, in the **Subnet** text box, type **192.168.5.0/24**, and then click **Next**.
14. On the **Connectivity** page, review the message, and then click **Next**.
15. On the **Summary** page, review the summary, and then click **Finish**.
16. Close the Jobs window.
17. In the VMs and Services workspace, click **VM Networks**, click **Adatum North**, and then right-click and click **Create IP Pool**.
18. On the **Name** page, in the **Name** text box, type **Adatum Finance VM Network IP Pool**. Ensure that the VM Network is set to **Adatum North**, and that the VM subnet is set to **Adatum Finance (192.168.4.0/24)**, and then click **Next**.
19. On the **IP address range** page, note that the first IP address in the range is reserved. Leave the default settings, and then click **Next**.
20. On the **Gateway** page, click **Next**.
21. On the **DNS** page, click **Next**.
22. On the **WINS** page, click **Next**.
23. On the **Summary** page, click **Finish**.
24. Close the Jobs window.
25. In the **VMs and Services** workspace, click **VM Networks**, click **Adatum South**, and then right-click and click **Create IP Pool**.

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26. On the **Name** page, in the **Name** text box, type **Adatum Logistics VM Network IP Pool**. Ensure that the VM Network is set to **Adatum South**, and that the VM subnet is set to **Adatum Logistics (192.168.5.0/24)**, and then click **Next**.
27. On the **IP address range** page, note that the first IP address in the range is reserved. Leave the default settings, and then click **Next**.
28. On the **Gateway** page, click **Next**.
29. On the **DNS** page, click **Next**.
30. On the **WINS** page, click **Next**.
31. On the **Summary** page, click **Finish**.
32. Close the Jobs window.

▶ Task 4: Connect virtual machines to a virtual machine network

1. In the Virtual Machine Manager console, click the **VMs and Services** workspace.
2. Click **All Hosts**, right-click **20409B-LON-TEST1**, and then click **Properties**.
3. In the **Properties** dialog box, click **Hardware Configuration** and then click **Network Adapter 1**.
4. Click **Connected to a VM network** and then click **Browse**.
5. In the **Select a VM Network** dialog box, select **Adatum North** and click **OK**. In **VM Subnet** field, select **Adatum Finance** and then click **OK**.
6. Right-click **20409B-LON-PROD1**, and then click **Properties**.
7. In the **Properties** dialog box, click **Hardware Configuration** and then click **Network Adapter 1**.
8. Click **Connected to a VM network**, and then click **Browse**.
9. Click **Adatum South**, and then click **OK**.
10. Ensure that the VM Subnet is set to **Adatum Logistics**, and then click **OK**.
11. Click **20409B-LON-TEST1**, and then on the ribbon, click **Power On**.
12. Click **20409B-LON-PROD1**, and then on the ribbon, click **Power On**.
13. Click **20409B-LON-TEST1**, on the ribbon, click **Connect or View**, and then click **Connect Via Console**.
14. In the Virtual Machine Viewer window, click **Ctrl-Alt-Del**.
15. On the sign-on screen, type **Pa$$w0rd**, and then press Enter.
16. In the Server Manager console, click **Local Server**, and then click **192.168.10.15,IPv6 enabled**.
17. In the Network Connections window, right-click **Ethernet**, and then click **Properties**.
18. In the **Ethernet Properties** dialog box, click **Internet Protocol Version 4**, and then click **Properties**.
19. In the **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog box, click **Obtain an IP address automatically**, click **Obtain DNS server address automatically**, click **OK**, and then click **Close**.

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20. In the **Networks** dialog box, click **Yes**.
21. Right-click **Ethernet**, and then click **Status**.
22. In the **Ethernet Status** dialog box, click **Details**.
23. Verify that the IPv4 Address is set to an address from the **Adatum Finance VM Network IP Pool** that you configured earlier, and that it is in the **192.168.4.0/24** range.
24. In the VMM console, ensure that in the **VMs and Services** workspace, **All Hosts** is selected,, and then click **20409B-LON-PROD1**. On the ribbon, click **Connect or View**, and then click **Connect Via Console**.
25. In the Virtual Machine Viewer window, click **Ctrl-Alt-Del**.
26. On the sign-in screen, type **Pa$$w0rd**, and then press Enter.
27. In the Server Manager console, click **Local Server**, and then click **10.0.0.15, IPv6 Enabled**.
28. In the Network Connections window, right-click **Ethernet**, and then click **Properties**.
29. In the **Ethernet Properties** dialog box, click **Internet Protocol Version 4**, and then click **Properties**.
30. In the **Internet Protocol Version 4 (TCP/IPv4) Properties** dialog box, click **Obtain an IP address automatically**, click **Obtain DNS server address automatically**, click **OK**, and then click **Close**.
31. In the **Networks** dialog box, click **Yes**.
32. Right-click **Ethernet**, and then click **Status**.
33. In the **Ethernet Status** dialog box, click **Details**.
34. Verify that the IPv4 Address is set to an address from the **Adatum Logistics VM Network IP Pool** that you configured earlier, and is in the **192.168.5.0/24** range.
35. In the Server Manager console, in the **Tools** menu, click **Windows PowerShell**.
36. In the Windows PowerShell window, use the **ping** command to verify the IP address of **20409B-LON-TEST1** that you learned in step 23. This should not be possible because networks are virtualized.
37. In the VMM console, ensure that the **All Hosts** node in the **VMs and Services** workspace is selected.
38. Click **20409B-LON-TEST1**, and then on the ribbon, click **Shut Down**.
39. In the Virtual Machine Manager console, click **Yes**.
40. Click **20409B-LON-PROD1** and then on the ribbon, click **Shut Down**.
41. In the Virtual Machine Manager console, click **Yes**.

Results: After completing this exercise, you should have created and configured a new virtual network, configured network virtualization, and connected virtual machines to a virtual machine network.

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Lab B: Managing Infrastructure Storage

Exercise 1: Implementing a Storage Infrastructure

▶ Task 1: Install the SMI-S storage provider

1. On LON-VMM1, in the Virtual Machine Manager console, on the ribbon, click **PowerShell**.
2. When the Windows PowerShell prompt displays, type the following Windows PowerShell command set the iSCSI Target Server local administrator credentials:

```
$Cred = Get-Credential
```

3. In the **Windows PowerShell credential request** dialog box, in the **User name** text box, type **adatum\administrator**, in the **Password** text box, type **Pa$$w0rd**, and then click **OK**.
4. In the Windows PowerShell window, type the following script:

```
$Runas = New-SCRunAsAccount –Name “iSCSIRunas” –Credential $Cred
```

5. In the Windows PowerShell window, add the Internet small computer system interface (iSCSI) storage provider by typing the following script:

```
Add-SCStorageProvider -Name "Microsoft iSCSI Target Provider" -RunAsAccount $Runas
ComputerName "LON-SS1.adatum.com" -AddSmisWmiProvider
```

▶ Task 2: Deploy block storage

1. On LON-VMM1, in the Virtual Machine Manager console, click **Fabric**, right-click **Storage**, and then click **Add Storage Devices**.
2. On the **Select Provider Type** page, click **SAN and NAS devices discovered and managed by a SMI-S provider**, and then click **Next**.
3. Click the **Protocol** drop-down list box, and then click **SMI-S WMI**. In the **Provider IP address or FQDN** text box, type **lon-ss1.adatum.com**, and then click **Browse**.
4. On the **Select a Run As account** page, click **iSCSIRunas**, and then click **OK**.
5. On the **Specify Discovery Scope** page, click **Next**.
6. On the **Gather Information** page, review the discovery result, and then click **Next**.
7. On the **Select Storage Devices** page, click **Create Classification**, and in the **Name** text box, type **Gold**. In the **Description** text box, type **15K SAS Drives**, and then click **Add**.
8. Click **Create Classification**, and in the **Name** text box, type **Silver**. In the **description** text box, type **7K SATA Drives**, and then click **Add**.
9. Select the **iSCSITarget: LON-SS1:C** check box, and then in the **Classification** drop-down list box, click **Silver**.
10. Select the **iSCSITarget: LON-SS1:E:** check box, in the **Classification** drop-down list box, click **Gold**, and then click **Next**.
11. On the **Summary** page, click **Finish**, and wait for the job to finish.
12. When the job finishes, close the Jobs window.
13. On LON-VMM1, in the Virtual Machine Manager console, click **Fabric**.
14. In the Fabric navigation pane, click **Storage**, and then on the ribbon, click **Create Logical Unit**.

15. In the **storage pool** drop-down list box, click **iSCSITarget: LON-SS1:E**, in the **Name field**, type **LON-APP1_C**, in the **Size (GB):** text box, clear the existing value, type **20**, and then click **OK**.
16. In the Fabric navigation pane, click **Classifications and Pools**. Verify that you can see the new logical unit number (LUN) listed.

▶ Task 3: Add file storage to VMM

1. On LON-VMM1, in the Virtual Machine Manager console, click **Fabric**, right-click **Storage**, and then click **Add Storage Devices**.
2. On the **Select Provider Type** page, click **Windows-based file server**, and then click **Next**.
3. In the **Provider IP address or FQDN:** field, type **lon-svr1.adatum.com**, and then click **Browse**.
4. On the **Select a Run As account** page, click **Create Run As Account**.
5. In the **Name** box, type **Administrator**. In the **User name** box, type **Adatum\Administrator** in the **Password** and **Confirm password** text boxes, type **Pa$$w0rd**, and then click **OK**.
6. In the **Select a Run As Account** box, click **Administrator**, and then click **OK**.
7. On the **Specify Discovery Scope** page, click **Next**.
8. On the **Gather Information** page, review the discovery result, and then click **Next**.
9. On the **Select Storage Devices** page, click **Next**.
10. On the **Summary** page, click **Finish**.
11. Close the Jobs window.
12. On LON-VMM1, click **Fabric**, and on the ribbon, click **Create File Share**.
13. On the **Create File Share** page, in the **Name** text box, type **SVR1_Gold**.
14. In the **Classification** drop-down list box, click **Gold**.
15. In the **Local path** text box, type **C:\SVR1_GOLD**, and then click **Create**.

▶ Task 4: Assign and allocate storage

1. On LON-VMM1, click **Fabric**, click **All Hosts**, click **lon-host1.adatum.com**, and then on the ribbon, click **Properties**.
2. Click **Host Access**, and then click **Browse**. Click **Administrator**, and then click **OK**.
3. Click **OK** again to accept the changes.
4. Click **lon-host1.adatum.com**, and then, on the ribbon, click **Properties**.
5. Click **Storage**.
6. On the **Storage** page, click **Add**, and then click **Add File Share**.
7. Click the **File share path** drop-down list box, click **\\lon-svr1.adatum.com\SVR1_Gold**, and then click **OK**.
8. On LON-VMM1, click **Fabric**, and then click **Storage**.
9. On the ribbon, click **Allocate Capacity**, and then click **Allocate Storage Pools**.
10. In the **Available storage pools** section, click **iSCSITarget LON-SS1:E**, click **Add**, click **OK**, and then click **Close**.
11. In the Virtual Machine Manager console, click the **VMs and Services** workspace.

12. On the ribbon, on the **Home** tab, click **Create Virtual Machine** and then in the list click **Create Virtual Machine**.
13. On the **Select Source** page, click **Create the new virtual machine with a blank virtual hard disk**, and then click **Next**.
14. On the **Identity** page, in the **Virtual machine name** text box, type **LON-APP1**, and then click **Next**.
15. On the **Configure Hardware** page, scroll down, under **Network Adapters**, click **Network Adapter 1**, on the right, and then click **Connected to a VM network**.
16. Ensure that the VM network is **Adatum North**, click the **VM Subnet** drop-down list box, click **Adatum Finance**, and then click **Next**.
17. On the **Select Destination** page, click **Next**.
18. On the **Select Host** page, ensure that **lon-host1.adatum.com** is selected, and then click **Next**.
19. On the **Configure Settings** page, in the **Virtual machine path** text box, type **C:\Program Files \Microsoft Learning\20409\Drives**, and then click **Next**. (Note: this path may differ on your host.)
20. On the **Add Properties** page, click **Next**.
21. On the **Summary** page, review the settings, and then click **Create**.
22. Confirm that the Create Virtual Machine job completed successfully.
23. Close the Jobs window.
24. On LON-VMM1, click **VMs and Services**, click **All Hosts**, right-click **LON-APP1**, and then click **Migrate Virtual Machine**.
25. In the Migrate VM Wizard, on the **Select Host** page, ensure that **lon-host1.adatum.com** is selected, and then click **Next**.
26. On the **Select Path** page, in the **Storage location for VM configuration** text box, type **\\lon-svr1.adatum.com\SVR1_Gold**, click **Automatically place all VHDs with the configuration**, and then click **Next**.
27. On the **Select Network** page, leave the default settings, click **Next**, and then click **Move**.
28. Check the job status.
29. Close the Jobs window.

Results: After completing this exercise, you should have implemented a storage infrastructure.

Lab C: Infrastructure Updates Management

Exercise 1: Managing Infrastructure Updates

▶ Task 1: Integrate Windows Server Update Services (WSUS) with VMM

1. In the Virtual Machine Manager console, click the **Fabric** workspace.
2. In the navigation pane, expand the **Servers** node, expand the **Infrastructure** node, and then click **Update Server**.

3. Right-click **Update Server**, and then click **Add Update Server**.
4. In the **Add Windows Server Update Services Server** dialog box, in the **Computer name** text box, type **LON-WSUS**, and then in the **TCP/IP port** text box, type **8530**.
5. Select the **Enter a user name and password** option. In the **User name** text box, type **Adatum\Administrator**, in the **Password** text box, type **Pa$$w0rd**, and then click **Add**.
6. In the Jobs window, click the **Add Update Server** job. On the **Summary** and **Details** tabs, monitor the status of the configuration job.
7. When the job displays as **Completed w/info**, close the Jobs window.

Note: Status is expected to be Completed w/ Info.

8. With the **Update Server** node selected, verify that **LON-WSUS.adatum.com** displays in the results pane, and that the **Agent Status** column displays **Responding**.

▶ Task 2: Perform a manual synchronization with WSUS from VMM

1. In the Virtual Machine Manager console, click the **Fabric** workspace.
2. In the navigation pane, expand the **Servers** node, expand **Infrastructure**, and then click **Update Server**.
3. In the Update Servers pane, right-click **LON-WSUS.Adatum.com**, and then click **Synchronize**.
4. In the Jobs window, when the job displays an error message, close the Jobs window.

Note: An error is expected because there is no Internet connection. However, this will not affect the rest of the lab exercise.

▶ Task 3: Create the update baseline in VMM

1. In the Virtual Machine Manager console, click the **Library** workspace.
2. In the navigation pane, expand the **Update Catalog and Baselines** node, and then click **Update Baselines**.
3. On the **Home** page, in **Create** group, click **Create** and then click **Baseline**.
4. In the Update Baseline Wizard, in the **Name** text box, type **LON Base1**, click **Next**, and then click **Add**.
5. In the Add Updates to Baseline window, select all of the **Updates**, and then click **Add**.
6. In the wizard click **Next**. Select the **All Hosts** and **LON-VMM1.Adatum.com** check boxes, and then click **Next**.
7. View the **Summary**, and then click **Finish**.
8. In the Jobs window, select the **Change properties of a baseline** job.
9. On the **Summary** and **Details** tabs, monitor the status of the configuration job.
10. When the job displays as **Completed**, close the Jobs window.
11. With the **Update Baselines** node selected, verify that **LON Base1** displays in the **Baselines** pane, with **Assignments** set to **2**.

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▶ Task 4: Assign an existing baseline in VMM

1. In the Virtual Machine Manager console, click the **Library** workspace.
2. In the navigation pane, expand the **Update Catalog and Baselines** node, and then click **Update Baselines**.
3. On the Baselines pane, right-click **LON Base1**, and then click **Properties**.
4. In the **LON Base1 Properties** dialog box, on the left side bar, click the **Assignment Scope** tab, select the **LON-WSUS.Adatum.com** check box, and then click **OK**.
5. On the **Home** page, click **Jobs**, click **History**, and verify that the status of job **Change properties of a baseline** lists as **Completed**.
6. Click back to the **Library** workspace.
7. In the **Library** workspace, with the **Update Baselines** node selected, verify that **LON Base1** displays in the Baselines pane with **Assignments** set to **3**.

▶ Task 5: Scan for update compliance in VMM

1. In the Virtual Machine Manager console, click the **Fabric** workspace.
2. In the navigation pane, click the **Servers** node, and then on the **Home** page, click **Compliance**.
3. In the Results pane, select **LON-WSUS.Adatum.com**, and then on the **Home** page, click **Scan**.
4. In the Results pane, verify that the **Operational Status** changes to **Scanning**.
5. When the status changes again, verify that the **Compliance Status** changes to **Compliant**.

Results: After completing this exercise, you should have added and configured an Update Server to manage infrastructure updates.