Module 1: Planning for the Cloud
Lab: Preparing the Private Cloud Infrastructure

Exercise 1: Deploying the Virtual Machine Manager agent

► Task 1: Open the VMM console
1. On LON-VM1, from the desktop, double-click Virtual Machine Manager Console.
2. Confirm the Virtual Machine Manager Console opens as expected.

► Task 2: Deploy the Virtual Machine Manager agent to the hosts
1. In the VMM console, click the VMs and Services workspace, in the navigation pane right-click All Hosts, and then click Add Hyper-V Hosts and Clusters.
2. In the Add Resource Wizard, on the Resource location page, click the Windows Server computers in a trusted Active Directory domain option, and then click Next.
3. On the Credentials page, click Manually enter the credentials, in the User name text box, type Contoso\administrator, in the Password text box, type Pa$$w0rd, and then click Next.
4. On the Discovery scope page, click Specify an Active Directory query to search for Windows Server computers, and then click Generate an AD query.
5. In the Find Computers window, next to Computer name, type *host*, and then click OK.
6. On the Discovery scope page, click Next.
7. On the Target resources page, in the Discovered computers pane, select lon-host1.contoso.com and Lon-host2.contoso.com, and then click Next.
8. If a Virtual Machine Manager window opens, click OK.
11. In the Jobs window, wait until the Add virtual machine host jobs display a status of Completed w/Info, and then close the Jobs window.
12. Wait for all Virtual Machines to be displayed in the All Hosts view.

Results: After this exercise, you should have deployed the Virtual Machine Manager agent to the host machines LON-HOST1 and LON-HOST2.
Exercise 2: Confirming the Hyper-V Hosts and Virtual Machines are being managed by VMM

Task 1: Check Hyper-V Host status
1. On LON-VM1 open the Virtual Machine Manager Console.
2. Click the Fabric pane and then click All Hosts.
3. From the details pane right-click LON-HOST1.contoso.com and then click Properties.
4. In the lon-host1.contoso.com Properties window that opens click the Status tab.
5. In the details pane under Health status check that each Category and sub-category display a Status of OK.
6. Click the Refresh button and then click OK.
7. Click the Jobs pane and then click the Running tab, wait for the Refresh host job to start and then disappear.
8. Click the History tab and confirm the Refresh host job completed successfully.
9. Click the Fabric pane and then click All Hosts.
10. From the details pane right-click LON-HOST2.contoso.com and then click Properties.
11. In the lon-host2.contoso.com Properties window that opens click the Status tab.
12. In the details pane under Health status check that each Category and sub-category display a Status of OK.
13. Click the Refresh button and then click OK.
14. Click the Jobs pane and then click the Running tab, wait for the Refresh host job to start and then disappear.
15. Click the History tab and confirm the Refresh host job completed successfully.
16. Click the Fabric pane and then click All Hosts.
17. From the details pane confirm both hosts are displayed with a Host Status of OK.

Task 2: Check Virtual Machine status
1. On LON-VM1, in the Virtual Machine Manager Console, click the VMs and Services pane.
2. Click All Hosts.
3. From the ribbon, in the Show tab, click VMs.
4. For each virtual machine review the Status column.
5. The Status column for each virtual machine should show either Running or Stopped.
6. If any Virtual Machine has a Status of Incomplete VM Configuration perform the following steps.
   a) From the Hyper-V Console start the Virtual Machine.
   b) Wait until it is at the logon prompt.
   c) Right-click the Virtual Machine in VMM and then click Refresh. The Status of the Virtual Machine will change to Running.
   d) Right-click the Virtual Machine and then click Shut Down and then click Yes.
   e) Repeat steps a through d for each Virtual Machine that has a Status of Incomplete VM Configuration.
Note: Leave 20247D-LON-DC1, 20247D-LON-SQ1 and 20247D-LON-VM1 running in preparation for Lab 2.

Results: After this exercise you should have confirm the Hyper-V hosts are being managed by VMM and that each Virtual Machine on both hosts is displayed in VMM in a healthy state.
Module 2: Configuring and Deploying the Private Cloud with Microsoft System Center 2012 R2 Virtual Machine Manager

Lab: Configuring and Deploying the Private Cloud Infrastructure

Exercise 1: Configuring Host Groups

► Task 1: Create and configure a host group named Production
1. On LON-VM1 open the Virtual Machine Manager Console.
2. Click the VMs and Services pane.
3. Right-click the All Hosts, and then select Create Host Group.
4. Rename the Host Group to Production, and then press Enter.
5. Right-click the Production host group, and then click Properties.
6. In the Production Properties dialog box, on the General page, select Allow unencrypted BITS file transfers (offers improved performance but is less secure).
7. Click the Host Reserves tab.
8. Clear the Use the host reserves settings from the parent host group check box.
9. Configure settings on this page as follows:
   • CPU: 10%
   • Memory: 512 MB
   • Disk I/O: 0
   • Disk Space: 10%
   • Network I/O: 5%
10. Click Dynamic Optimization then clear the Use dynamic optimization settings from the parent host group check box.
11. Click the Automatically migrate virtual machines to balance load at this frequency (minutes) check box, and then in the text box, type 15.
12. Click the Enable power optimization check box, and then click the Settings button.
13. In the Power Optimization Settings window, configure values as follows:
   • CPU: 40%
   • Memory: 4096
   • Disk I/O: 15
   • Network I/O: 10%
14. In the Schedule section, schedule power optimization to run only during night hours (from 7:00 P.M. until 6:00 A.M., 7 days a week), and then click OK.
15. Clear the check boxes for Enable power optimization and Automatically migrate virtual machines to balance load at this frequency.
Note: You are disabling these options, as we will not utilize these settings in the lab.

16. Click **OK** to close the **Production Properties** dialog box.
17. Right-click **LON-HOST1**, and then select **Move to Host Group**.
18. In the **Move Host Group** window, under **Parent host group**, select **Production**, and then click **OK**.
19. Right-click **LON-HOST2**, and then select **Move to host group**.
20. In the **Move host group** window, under **Parent host group**, select **Production**, and then click **OK**.

**Results:** After completing this exercise you should have created a Host Group named Production, configured some of the Host Group settings and then added both LON-HOST1 and LON-HOST2 to the Production Host Group.
Exercise 2: Configuring User Roles and Run As Accounts

▲ Task 1: Configure a run as account
1. On LON-VM1, in the VMM console, click the Settings workspace.
2. Expand Security, and then click Run As Accounts.
3. In the ribbon, click Create Run As Account.
4. In the Create Run As Account dialog box, type the following, and then click OK:
   • Name: Administrator account
   • Description: For administrative tasks
   • User name: Contoso\Administrator
   • Password: Pa$$w0rd
5. Confirm password: Pa$$w0rd

▲ Task 2: Create a user role for StockTrader administrators
1. On LON-VM1, expand the Security node, and then click User Roles.
2. In the ribbon, click Create User Role.
3. In the Create User Role Wizard, on the Name and description page, in the Name text box, type StockTrader Administrators, and then click Next.
4. On the Profile page, click Application Administrator (Self-Service User), and then click Next.
5. On the Members page, click the Add button.
6. In Select Users, Computers or Groups, type StockTrader_Admins, click OK, and then click Next.
7. On the Scope page, click Next.
8. On the Networking page click Add, click External Network and then click OK and then click Next.
10. On the Permissions page, click the following check boxes, and then click Next:
    • Author
    • Checkpoint
    • Deploy
    • Local Administrator
    • Remote connection
    • Shut down
    • Start
11. On the Run As accounts page, click Next.
13. Close the Jobs window.

Results: After this exercise you should have created a User Role and Run As Account for the StockTrader Administrators.
Exercise 3: Configuring the Library

- Task 1: Add a library share
  2. Right-click LON-VM1.Contoso.com, and then click Add Library Shares.
  3. On the Add Library Shares page, click the VHDs share, click the Add Default Resources check box, and then click Next.
  4. On the Summary page, click Add Library Shares.
  5. After the job completes, close the Jobs window.

**Results:** After this exercise you should have added a new Library Share to VMM that uses the VHDs share on LON-VM1.
Exercise 4: Preparing the Private Cloud Infrastructure

► Task 1: Create a logical and VM network
1. On LON-VM1, in the Virtual Machine Manager console, click the Fabric pane and then expand Networking and then click Logical Networks.
2. Right-click Logical Networks and then click Create Logical Network.
3. In the Create Logical Network Wizard, on the Name page type StockTrader Production Network in the Name box.
4. Ensure the One connected network option is selected and then select both checkboxes underneath and then click Next.
5. On the Network Site page click Next.
7. Close the Jobs window.
8. From the details pane right-click StockTrader Production Network and then click Create IP Pool.
9. In the Create Static IP Address Pool Wizard dialog box, on the Name page, in the Name field, type StockTrader IP Pool, and then next to Logical network, select StockTrader Production Network. Click Next.
10. On the Network Site page, in the Network site field, type Contoso HQ.
11. In the IP Subnet field, type 172.16.0.0/16, in the Host groups that can use this network site section, click the Production check box, and then click Next.
12. On the IP Address Range page, in the IP addresses to be reserved for other uses text box, type 172.16.0.100, and then click Next.
13. On the Gateway page, click Insert, double-click Enter gateway address then type 172.16.0.200, and then click Next.
14. On the DNS page, next to DNS Server Address, click Insert, and then type 172.16.0.10. In the Connection specific DNS suffix box, type Contoso.com, and then click Next.
15. On the WINS page, click Next, and then click Finish.

► Task 2: Create a static IP address pool for the external network
1. On LON-VM1, in the Virtual Machine Manager console, click the Fabric workspace.
2. In the navigation pane, expand the Networking node, and then click Logical Networks.
3. On the ribbon, click Create, then click IP Pool.
4. In the Create Static IP Address Pool Wizard dialog box, on the Name page, in the Name field, type External. Next to Logical network, select External Network, and then click Next.
5. On the Network Site page, in the Network site field, type External.
6. In the IP Subnet field, type 10.10.0.0/16, in the Host groups that can use this network site section, click the Production check box, and then click Next.
7. On the IP Address Range page, in the Starting IP address text box, type 10.10.0.130.
8. In the Ending IP address text box, type 10.10.0.150, and then click Next.
9. On the **Gateway** page, click **Insert**, double-click **Enter gateway address** then type **10.10.0.1**, and then click **Next**.

10. On the **DNS** page, next to **DNS Server Address**, click **Insert**, and then type **10.10.0.10**. In the **Connection specific DNS suffix** box, type **Contoso.com**, and then click **Next**.

11. On the **WINS** page, click **Next**, and then click **Finish**.

12. Close the **Jobs** window.

**Task 3: Create a MAC address pool and VIP template**

1. On LON-VM1, in the **Virtual Machine Manager console**, click the **Fabric** pane and then expand **Networking**, then click **MAC Address Pools**.

2. On the ribbon, click **Create**, then click **MAC Pool**.

3. In the **Create MAC Address Pool Wizard**, on the **Name and Host Group** page, for the **MAC address pool name**, type **StockTrader MAC Pool**, select the **Production** host group, and then click **Next**.

4. On the **MAC Address Range** page, in the **Starting MAC address** field, type **00:27:B4:BF:A7:4F**, and in the **Ending MAC address** field, type **00:27:B4:BF:A7:7F**.

5. Click **Next**, and then click **Finish**.

6. Close the **Jobs** window.

7. In the ribbon, click **Create**, then click **VIP template**.

8. In the **Load balancer VIP template Wizard**, on the **Name** page, in the **Template name** field, type **Web load balancer**, in the **Virtual IP port** field, type **80**, and then click **Next**.

9. On the **Type** page, click **Specific**. From the **Manufacturer** drop-down list box, click **Microsoft**. From the **Model** drop-down list box, click **Network Load Balancing (NLB)**, and then click **Next**.

10. On **Protocol** page, click **TCP**, and then click **Next**.

11. On the **Persistence** page, click **Next**, and then click **Finish**.

12. Close the **Jobs** window.

**Results:** After this exercise you should have created a new Logical Network, VM Network and a Static IP Address Pool named StockTrader and associated the Default Gateway, DNS Server and Gateway Server IP addresses.
Exercise 5: Deploying a New Virtual Machine

Task 1: Create and deploy a new virtual machine
1. On LON-VM1, in the Virtual Machine Manager console, click the VMs and Services pane.
2. On the ribbon, click the Create Virtual Machine button, and then click Create Virtual Machine.
3. In the Create Virtual Machine Wizard, on the Select Source page, click Browse.
4. In the Select Virtual Machine Source window, select Base14A-WS12R2.vhd, click OK, and then click Next.
5. On the Specify Virtual Machine Identity page, type TestVM in the Virtual machine name box and then click Next.
6. On the Configure Hardware page, click Memory, set it to Static – 256 MB.
7. On the Configure Hardware page, click Network Adapter 1 then click Connected to a VM network.
8. Click Browse and then click External Network and then click OK and then click Next.
9. On the Select Destination page, click Place the virtual machine on a host, and then click Next.
10. On the Select Host page, review Rating details and explanations, select lon-host1.Contoso.com, and then click Next.
11. On the Configure Settings page, click Next.
12. On the Add Properties page, under Operating system, select Windows Server 2012 R2 Datacenter, and then click Next.
13. On the Summary page, click Create. Monitor the Jobs window to verify that the Create virtual machine job completes successfully.
15. Click LON-HOST1 and then confirm the TestVM virtual machine is displayed in the details pane.

Note: If the Create Virtual Machine job fails with Error (2912) then perform the following steps:

a. In the VMM Console click the VMs and Services pane, expand All Hosts, expand Production.
b. Click lon-host1 and from the details pane right-click TestVM and then click Delete and then click Yes. Wait until the TestVM virtual machine has been removed,
c. Right-click lon-host1 and then click Remove.
d. In the Remove lon-host1.contoso.com window that opens click Browse.
e. Click Administrator account and then click OK.
f. Click OK on the Remove lon-host1.contoso.com window to remove the host.
g. Repeat steps b – e for lon-host2.
h. Close the VMM Console.
i. On LON-VM1, right-click Start, then click Run.
j. In the Open box type MMC and then click OK.
k. In the MMC console that opens click **File**, then click **Add/Remove Snap-in**.

l. In the **Add or Remove Snap-ins** window that opens, under **Available snap-ins** click **Certificates** and then click **Add** and then click **Finish**.

m. Click **Certificates** again and then click **Add**, then select **Computer account** and then click **Next**, then click **Finish**.

n. Click **OK** on the **Add or Remove Snap-ins** window.

o. Expand **Certificates – Current User\Trusted Root Certificate Authorities\Certificates**.

p. Right-click any certificate that begins with LON-VM1 and then click **Delete**, then click **Yes** on the **Certificate** window.

q. Expand **Certificates – Current User\Trusted People\Certificates**.

r. Right-click any certificate that begins with LON-VM1 and then click **Delete**, then click **Yes** on the **Certificate** window.

s. Expand **Certificates (Local Computer)\Personal\Certificates**.

r. Right-click any certificate that begins with LON-VM1 and then click **Delete**, then click **Yes** on the **Certificate** window.

u. Expand **Certificates (Local Computer)\Trusted Root Certification Authorities\Certificates**.

v. Right-click any certificate that begins with LON-VM1 and then click **Delete**, then click **Yes** on the **Certificate** window.

w. Expand **Certificates (Local Computer)\Trusted People\Certificates** (if it exists).

x. Right-click any certificate that begins with LON-VM1 and then click **Delete**, then click **Yes** on the **Certificate** window.

y. Close the MMC Console without saving it.

z. Restart LON-VM1 and then login using **Contoso\Administrator**.

aa. In the **Administrator: Virtual Machine Manager Command Shell window** that opens type the following command and then press enter on the keyboard:

$credential = get-credential

bb. In the **Windows PowerShell** window that opens type **Contoso\Administrator** in the **User name** box, type **Pa$$w0rd** in the **Password** box and then click **OK**.

c. In the **Administrator: Virtual Machine Manager Command Shell window** that opens type the following command and then press enter on the keyboard:

Get-VMMManagedComputer -ComputerName "lon-vm1.contoso.com" | Register-SCVMMManagedComputer -Credential $credential

dd. Close the **Administrator: Virtual Machine Manager Command Shell window**.

ee. Open the VMM Console and then from the **VMs and Services** pane expand **All Hosts** and then right-click **Production**.

ff. Click **Add Hyper-V Hosts and Clusters**.

gg. In the **Add Resource Wizard**, on the **Resource Location** page click **Next**.
hh. On the **Credentials** page click **Browse**, click **Administrator account** and then click **OK** and then click **Next**.

ii. On the **Discovery Scope** page, in the **Computer names** box, type **LON-HOST1** on one line and then type **LON-HOST2** on another line and then click **Next**.

jj. On the **Target resources** page select **lon-host1.contoso.com** and **lon-host2.contoso.com** and then click **Next**.

kk. On the **Host Settings** page select **Reassociate this host with this VMM environment** and then click **Next**.

ll. On the **Summary** page click **Finish**.

mm. Wait until the **Add virtual machine host** jobs complete with a status of **Completed w/info**.

  o. Browse to \LON-VM1\VHDs and then right-click **Base14A-WS12R2.vhd** and then click **Properties**.

nn. In the **Base14A-WS12R2 Properties** window that opens, next to **Attributes**, clear the **Read-only** attribute and then click **OK**.

oo. In the VMM Console, click the **Library** pane, expand **Library Servers** and then right-click **LON-VM1.CONTOSO.COM** and then click **Refresh**.

pp. Click the **Jobs** pane and wait until the **Refresh library share** job completes.

qq. Click **Start**, then click **Administrative Tools**, then double-click **Internet Information Services (IIS) Manager**.

rr. Expand **LON-VM1 (Contoso\Administrator)**, expand **Sites** and then click **AppController**.

ss. From the **Actions** pane click **Bindings**.

tt. In the **Site Bindings** window that opens, click **https** and then click **Edit**.

uu. In the **Edit Site Binding** window that opens, under **SSL certificate**, select **SCVMM_CERTIFICATE_KEY_CONTAINERLON-VM1.CONTOSO.COM** and then click **OK**.

vv. Click **Close** on the **Site Bindings** window.

ww. Close **Internet Information Services (IIS) Manager**.

xx. Close the **Administrative Tools** window.

yy. Restart the **Create and deploy a new virtual machine** Task.

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**Results:** After this exercise you should have deployed a new Virtual Machine using the Windows Server 2012 R2 base image.
Module 3: Extending and Maintaining Cloud Infrastructure
Lab: Maintaining Cloud Infrastructure

Exercise 1: Configuring a PXE Server in VMM

► Task 1: Install the WDS server role
1. On LON-VM1, click Start, then click Server Manager.
2. In the Server Manager console, in the navigation pane, click Add roles and features.
3. In the Add Roles and Features Wizard, on the Before You Begin page, click Next.
4. On the Installation Type page click Next
5. On the Server Selection page click Next
6. On the Server Roles page, select the Windows Deployment Services check box, click Add features and then click Next.
7. On the Features page click Next.
8. On the WDS page, click Next.
9. On the Role Services page, ensure that both the Deployment Server and Transport Server check boxes are selected, and then click Next.
10. On the Confirmation page, click Install.
11. On the Results page, verify that the installation has succeeded, and then click Close.
12. Close Server Manager.

► Task 2: Configure WDS
1. On LON-VM1, click Start, click to Administrative Tools, and then double-click Windows Deployment Services. The Windows Deployment Services console opens.
2. In the Windows Deployment Services console, expand the Servers node.
4. On the Before You Begin page, click Next.
5. On the Install Options page click Next.
6. On the Remote Installation Folder Location page, verify that the path displays C:\Remotelnstall, and then click Next. When the System Volume Warning message displays, click Yes.
7. On the PXE Server Initial Settings page, click Respond to all client computers (known and unknown), and then click Next. A Task Progress bar starts.
8. On the Operation Complete page, clear the check box next to Add images to the server now, and then click Finish.

► Task 3: Configure the PXE server role in VMM
1. On LON-VM1, on the desktop, double-click Virtual Machine Manage Console.
2. Click the Fabric workspace, expand the Servers node, and then click PXE Servers.
3. Right-click **PXE Servers**, and then click **Add PXE Server**. The **Add PXE Server** dialog box opens.

4. In the **Add PXE Server** dialog box, in the **Computer name** field, type **LON-VM1**.

5. In the **Add PXE Server** dialog box, select the **Enter a user name and password** option, in the **User name** field, type **Contoso\Administrator**, in the **Password** field, type **Pa$$w0rd**, and then click **Add**. The **Jobs** window opens.

6. In the **Jobs** window, click the **Setup a new PXE Server** job. On the **Summary** and **Details** tabs, monitor the status of the job.

7. When the job displays **Completed**, close the **Jobs** window.

8. With the **PXE Servers** node selected, verify that **LON-VM1.Contoso.com** displays in the results pane, and the **Agent Status** column displays **Responding**.

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**Results:** After this exercise you should have installed the Windows Deployment Services server role on LON-VM1 and then added the PXE server to Virtual Machine Manager.
Exercise 2: Configuring a Physical Computer Profile

Task 1: Configure a new physical computer profile

1. In the Virtual Machine Manage Console, click the Library workspace, expand the Profiles node, and then click Physical Computer Profiles.

2. Right-click Physical Computer Profiles, and then click Create Physical Computer Profile. The New Physical Computer Profile Wizard dialog box opens.

3. On the Profile Description page, in the Name field, type Hyper-V Host Profile, and then click Next.

4. On the OS Image page, click Browse in the Choose a VHD dialog box, select Base14A-WS12R2.vhd, and then click OK.

5. On the OS Image page, click Next.

6. On the Hardware Configuration page, under Management NIC, click IP Configuration then select the Allocate a static IP from the following logical network option. Verify that External Network is selected, and then click Next.


8. Next to Run As account, click Browse. In the Select a Run As Account dialog box, select Administrator account, and then click OK.

9. Under General Settings, click Admin Password. In the details pane, in both the Password and Confirm boxes, type Pa$$w0rd, and then click Next.

10. On the Host settings page, under Add the following path, type C:\VmStorage. Click Add, and then click Next.


12. After the physical computer profile is created, close the Jobs window.

Results: After this exercise you should have created a new Physical Computer Profile named Hyper-V Host Profile.
Exercise 3: Configuring an Update Server Role in VMM

- **Task 1: Add an update server to VMM**

1. On LON-VM1, in the Virtual Machine Manage Console, click the Fabric workspace.
2. In the navigation pane, expand the Servers node, and then click Update Server.
4. In the Add Windows Server Update Services Server dialog box, in the Computer name field, type LON-VM1, and then in the TCP/IP port field, type 8530.
5. Click Browse and then click Administrator account and then click OK.
6. Click Add. The Jobs window opens.
7. In the Jobs window, select the Add Update Server job. On the Summary and Details tabs, monitor the status of the job.
8. When the job displays as Completed w/info, close the Jobs window.
9. With the Update Server node selected, verify that LON-VM1.Contoso.com displays in the results pane and the Agent Status column displays Responding.

**Results:** After this exercise you should have added an Update Server to Virtual Machine Manager.
Exercise 4: Configuring a Software Update Baseline in VMM

► Task 1: Create a software update baseline
1. On LON-VM1, in the Virtual Machine Manage Console, click the Library workspace.
2. In the navigation pane, expand Update Catalog and Baselines, and then click Update Catalog.
3. In the results pane, verify that various software updates display. These updates have been synchronized from the Windows Server® Update Services (WSUS) server role.
4. In the ribbon, click Create, and then click Baseline. The Update Baseline Wizard starts.
5. In the Update Baseline Wizard, on the General page, in the Name field, type Server Baseline, and then click Next.
6. On the Updates page, click Add.
7. In the Add Updates to Baseline dialog box, press and hold the Ctrl key on your keyboard, and then click the following updates:
   • Update for Windows Server 2012 R2 (KB2956575)
   • Update for Windows Server 2012 R2 (KB2965065)
8. Click Add, and then click Next.
9. On the Assignment Scope page, select the check boxes for the following items, and then click Next:
   • Library Servers: LON-VM1.Contoso.com
   • PXE Servers: LON-VM1.Contoso.com
   • Update Server: LON-VM1.Contoso.com
   • VMM Server: LON-VM1.Contoso.com
11. In the Jobs window, verify that Create new baseline job has completed successfully.
12. Close the Jobs window.

► Task 2: Verify baseline compliance
1. In the Virtual Machine Manage Console, click the Fabric workspace.
2. In the navigation pane, expand Servers, and then click Library Servers.
3. In the ribbon, click the Compliance button.
4. In the results pane, note the compliance and operational status of lon-vm1.contoso.com. Compliance Status should display as Unknown, and Operational Status should display as Pending Compliance Scan.
5. Select lon-vm1.contoso.com, and then in the ribbon click the Home tab and then click Scan.
6. The Operational Status column changes to Scanning. After a minute or so, Compliance Status should report as Compliant. This indicates that lon-vm1.contoso.com is compliant with the baseline that you configured in the previous task.
7. Close the Virtual Machine Manage Console.
Results: After this exercise you should have created a new Update Baseline in VMM and then run a compliance scan against the Infrastructure Servers in VMM.
Module 4: Configuring Application Delivery
Lab: Configuring Virtual Application Delivery

Exercise 1: Configuring the Server App-V Sequencer

► Task 1: Install the Server App-V Sequencer on LON-AP2
1. Log on to LON-AP2.
2. Browse to \LON-VM1\C$\SAV.
3. In the details pane, double-click SeqSetup.exe.
4. On the Welcome to The Setup Wizard for Microsoft Server Application Virtualization Sequencer page, click Next.
5. On the License Agreement page, select I accept the license terms, and then click Next.
6. On the Customer Experience Improvement Program page, leave the default settings, and then click Next.
7. On the Destination Folder page, leave the default settings, and then click Next.
8. On the Ready to Install page, note that the installer will also install the prerequisites for the Sequencer, and then click Next.
9. On the Setup had finished installing Microsoft Server Application Virtualization Sequencer page, click Finish, and then close the explorer window.

Results: After this exercise you should have installed the Server App-V Sequencer on LON-AP2.
Exercise 2: Configuring the Server App-V Agent

► Task 1: Install the Server App-V agent on LON-AP1
1. Log on to LON-AP1 and browse to \LON-VM1\C$\SAV.
2. In the details pane, double-click AgentSetup.exe.
3. On the Welcome to The Setup Wizard for Microsoft Server Application Virtualization Agent page, click Next.
4. On the License Agreement page, select I accept the license terms, and then click Next.
5. On the Microsoft Update Opt-in page, select I do not want to use Microsoft Update, and then click Next.
6. On the Destination Folder page, leave the default settings, and then click Next.
7. On the Ready to Install page, note that the installer will also install the prerequisites for the Server App-V agent, and then click Next.
8. On the Setup has finished installing Microsoft Server Application Virtualization Agent page, click Finish, and then close the explorer window.

Results: After this exercise you should have installed the Server App-V agent on LON-AP1.
Exercise 3: Sequencing an Application

**Task 1: Sequence the Pet Shop application**

1. On LON-AP2, click **Start**, click **All Programs**, click **Microsoft Server Application Virtualization**, and then click **Microsoft Server Application Virtualization Sequencer**.
2. In the **Microsoft Server Application Virtualization Sequencer**, click **Create a New Virtual Application Package**.
3. In the **Server Application Virtualization - Create New Package** wizard, on the **Prepare Computer** page, click **Next**.
4. On the **Select A Packaging Option** page, click **Select the installer for the application**, and then click **Browse**.
5. In the **Browse navigation pane**, expand **Computer**, click **Local Disk (C:)**, and then click **Microsoft .NET Pet Shop 4.0.msi**, click **Open**, and then click **Next**.
6. On the **Package Name** page, in the **Virtual Application Package Name** field, type **PetShop4.0**, and then click **Next**.
7. If an **Open File – Security Warning** window opens click **Run**.
8. The **.NET Pet Shop 4.0 installation** wizard opens. On the **Welcome to the .NET Pet Shop 4.0 Setup Wizard** page, click **Next**.
9. On the **License Agreement** page, click **I Agree**, and then click **Next**.
10. On the **.NET Pet Shop 4.0 Information** page, click **Next**.
11. On the **Installation Options** page, click **Source Code Only**, and then click **Next**.
12. On the **Select Installation Folder** page, in the **Folder** field, type **Q:\PetShop4.0\**, and then click **Next**.
13. On the **Confirm Installation** page, click **Next**.
14. On the **Installation Complete** page, click **Close**.
15. Close the **Windows® Internet Explorer®** window that opens.
16. Click **Start**, and then click **Run**.
17. In the **Run** dialog box, in the **Open** field, type **cmd**, and then click **OK**.
18. At the command prompt, type **Q:;** and then press Enter.
19. At the command prompt, type **cd \Petshop4.0**, and then press Enter.
20. At the command prompt, type **build.bat**, and then press Enter. When prompted to press any key to continue, press a key.
21. At the command prompt, type **DecryptWebConfig.bat**, and then press Enter. When prompted to press any key to continue, press a key.
22. Close the command prompt.
23. Click **Start**, click **Administrative Tools**, and then click **Internet Information Services (IIS) Manager**.
24. In the connections pane, expand **LON-AP2**, and then click **Sites**.
25. In the **Actions** pane, click **Add Web Site**.
26. In the **Add Web Site** dialog box, in the **Site Name** field, type **PetShop4**, in the **Physical path** field, type **Q:\PetShop4.0\Web\**, in the **Port** field, type **8089**, and then click **OK**.
27. Close Internet Information Services (IIS) Manager.

28. In the Server Application Virtualization - Create New Package wizard, on the Installation page, select the I am finished installing check box and then click Next. The sequencer collects the system changes that were made.

29. On the Configure Software page, click Next.

30. On the Create Package page, click Close.

31. Click File, and then click Save.

32. In the Save As dialog box, in the File name box type `\\LON-AP1\c$\SequencedApps\PetShop4.0.sprj`, and then click Save.

33. Close the PetShop4.0 - Microsoft Server Application Virtualization Sequencer.

**Results:** After this exercise you should have used the Server App-V Sequencer on LON-AP2 to sequence the Pet Shop Application.
Exercise 4: Testing the Server App-V Package Deployment

► Task 1: Install the Server App-V agent cmdlets on LON-AP1
1. On LON-AP1, browse to \LON-VM1\C$\SAV.
2. In the details pane, double-click AgentCmdletsSetup.exe.
3. On the Welcome to the Setup Wizard for Microsoft Server Application Virtualization Agent PowerShell Cmdlets page, click Next.
4. On the License Agreement page, select I accept the license terms, and then click Next.
5. On the Microsoft Update Opt-In page, select I do not want to use Microsoft Update, and then click Next.
6. On the Ready to Install page, click Next.
7. On the Setup has finished installing Microsoft Server Application Virtualization Agent PowerShell Cmdlets page, click Finish.
8. Close the explorer window.

► Task 2: Import the Server App-V package
1. On LON-AP1, open Windows Explorer, and then browse to C:\SequencedApps
2. Right-click deploymentconfig.xml, and then click Edit with XML Notepad.
3. In XML Notepad, click Edit, and then click Replace.
4. Replace all instances of localhost with LON-DM1.
5. Replace all instances of (local) with LON-DM1.

Note: Important, for the next step, do not use the Replace All option. Use Replace and replace each instance manually until the password=pass@word1 is found and then stop.

6. Replace all instances of password= with password=pass@word1.
7. Save and close XML Notepad, and then close the SequencedApps window.
8. Click Start, All Programs, Accessories, Windows PowerShell and then right-click Windows PowerShell and then click Run as Administrator.
9. At the Administrator: Windows PowerShell prompt, type the following cmdlet, and then press Enter. This changes the Windows PowerShell execution policy.


10. Type Import-Module ServerAppVAgent, and then press Enter.
11. Type the following cmdlet, on a single line and then press Enter:

Add-ServerAppvpackage Petshop -Manifest C:\SequencedApps\petshop4.0_manifest.xml -sft C:\SequencedApps\petshop4.0.sft -configuration C:\SequencedApps\deploymentconfig.xml

12. Type Start-ServerAppVPackage Petshop, and then press Enter.
13. Click **Start**, click **All Programs**, and then click **Internet Explorer**.

14. In the **Internet Explorer** address bar, type **http://localhost:8089**, and then press Enter to test the site. The .NET Pet Shop web site displays.

    **Note:** If the Pet Shop web site fails to load perform the following steps:

    a) Close **Internet Explorer**.

    b) On **LON-AP1** open **Internet Information Services (IIS) Manager**.

    c) Click **Application Pools** then click **PetShop4**, and then from the **Actions** pane click **Advanced Settings**.

    d) Click **ApplicationPoolIdentity** then click the ellipsis button.

    e) Click **Custom account** and then click **Set**.

    f) Type **Contoso\Administrator** in the **User name** box, type **Pa$$w0rd** in the **Password** and **Confirm password** boxes and then click **OK**.

    g) Click **OK** on the **Application Pool Identity** dialog box then click **OK** on the **Advanced Settings** dialog box.

    h) Close **Internet Information Services (IIS) Manager**.

    i) Return to Step 13 above.

15. Close **Internet Explorer**.

16. Close the **Windows PowerShell** window.

17. Shut down **LON-AP1**.

    **Results:** After this exercise you should have installed the Server App-V Agent Cmdlets on LON-AP1 and then imported the virtualized application.
Module 5: Creating the Private Cloud Building Blocks
Lab: Creating the Private Cloud Building Blocks

Exercise 1: Configuring Profiles

► Task 1: Configure a guest OS profile named LON-DB OS Profile
1. On LON-VM1, on the desktop, double-click Virtual Machine Manager Console.
2. In the Virtual Machine Manager Console, click the Library workspace, expand Profiles, and then click Guest OS Profiles.
3. In the ribbon, click Create, and then click Guest OS Profile.
4. In the New Guest OS Profile dialog box, on the General page, configure the following settings:
   • Name: LON-DB OS Profile
   • Description: Guest OS Profile for new SQL Server
5. Click the Guest OS Profile page.
6. On the Guest OS Profile page, under General Settings, click Identity Information.
7. In the Computer name text box, type LON-DB#.
8. Click Admin Password, and then click Specify the password of the local administrator account. In the Password and Confirm text boxes, type Pa$$w0rd.
9. Click Operating System, and then select Windows Server 2012 R2 Datacenter.
10. Under Networking, click Domain/Workgroup.
11. Click Domain, and then in the Domain text box, type Contoso.com.
12. Under Domain credentials, select Specify credentials to use for joining the domain.
13. In the Domain user text box, type Contoso\Administrator. In the Password and Confirm text boxes, type Pa$$w0rd.
14. Click OK to close the New Guest OS Profile dialog box. The new profile displays in the results pane.

► Task 2: Configure a hardware profile named WinServer2012R2
1. In the Virtual Machine Manager Console, click the Library workspace, expand Profiles, and then click Hardware Profiles.
2. In the ribbon, click Create, and then click Hardware Profile.
3. In the New Hardware Profile dialog box, on the General page, configure the following settings:
   • Name: WinServer2012R2
   • Description: Hardware Profile for new Windows Server 2012 R2 Servers
4. Click the Hardware Profile page.
5. On the Hardware Profile page, under Compatibility, click Cloud Capability Profile.
6. Select the Hyper-V check box.
7. In the General section, click Processor, and then select the Allow migration to a virtual machine host with a different processor version check box.
8. Click Memory, verify that Static is selected, and then change the Virtual machine memory option to 1024 MB.
10. Under Connectivity, select the Connected to a VM network radio button, and confirm External Network is selected.
11. Click the Static IP (from a static IP pool) radio button, and then in the drop-down list box, select IPv4 only.
12. Click OK to close the New Hardware Profile dialog box. The new profile displays in the results pane.

Task 3: Configure a SQL Server profile named SQLServer1
1. In the Virtual Machine Manager Console, click the Library workspace, expand Profiles, and then click SQL Server Profiles.
2. In the ribbon, click Create, and then click SQL Server Profile.
3. In the New SQL Server Profile dialog box, on the General page, configure the following settings:
   • Name: SQLServer1
   • Description: Template for New SQL Servers
4. Click the SQL Server Configuration page.
5. On the SQL Server Configuration page, next to Add, click SQL Server Deployment. A new SQL Server deployment is added to the template.
6. Configure the following settings:
   • Name: SQLServer1
   • Instance name: MSSQLSERVER
   • Instance ID: DefaultInstance
7. Under Installation Run As account, click Browse.
8. In the Browse Run As Accounts dialog box, select Administrator account, and then click OK.
9. Click Configuration.
10. In the Media source text box, type C:\SQLInstall.
11. In the SQL Server administrators box type Contoso\Administrator and then click Add.
12. Next to Security mode, verify that Windows Authentication is selected.
13. Select the Use TCP\IP for remote connections check box.
14. Click Service Accounts.
15. Under SQL Server service Run As Account, click Browse.
16. In the Browse Run As Accounts dialog box, select Administrator account, and then click OK.
17. Repeat steps 15 and 16 for both the SQL Server Agent service Run As Account and the Reporting Services Run As Account.
18. Click OK to close the New SQL Server Profile dialog box. The new SQL Server profile displays in the results pane.
Task 4: Configure an application profile named StockTrader Web Application

1. In the Virtual Machine Manager Console, click the Library workspace, expand Library Servers and then click LON-VM1.contoso.com.

2. From the ribbon, click Import Physical Resource.

3. In the Import Library Resource wizard, click Add resource and then from the C drive click st5-tradeweb.zip and then click Open.

4. Click Browse and then click MSSCVMMLibrary and then click OK.

5. Click Import.

6. Close the Jobs window that opens.

7. In the Virtual Machine Manager Console, click the Library workspace, expand Profiles, and then click Application Profiles.

8. In the ribbon, click Create, and then click Application Profile.

9. In the New Application Profile dialog box, on the General page, configure the following settings:
   - Name: StockTrader Web Application
   - Description: Template for StockTrader web application
   - Compatibility: General

10. Click the Application Configuration page.

11. On the Application Configuration page, click OS Compatibility, and then select the Windows Server 2012 R2 Datacenter check box.

12. Click Add, and then click Web application.

13. With Web Application selected, in the Name text box, type StockTrader Web.

14. Click Browse, in the Browse Application Packages dialog box, select st5-tradeweb.zip, and then click OK.

15. Click OK to close the New Application Profile dialog box. The new application profile displays in the results pane.

Results: After this exercise you should have created a Guest OS Profile, a Hardware Profile, a SQL Server Profile and an Application Profile.
Exercise 2: Configuring Virtual Machine Templates

Task 1: Create a VM template for the StockTrader web server

1. In the Virtual Machine Manager Console, click the Library workspace, expand Templates, and then click VM Templates.
2. In the ribbon, click Create VM Template.
3. In the Create VM Template Wizard, on the Select Source page, select Use an existing VM template or a virtual hard disk stored in the library, and then click Browse.
4. In the Select VM Template Source dialog box, select Base14A-WS12R2.vhd, and then click OK.
5. On the Select Source page, click Next.
6. In the VM Template Identity page, configure the following options, and then click Next:
   - VM Template name: StockTrader Web Application Server
   - Description: Web Server hosting the StockTrader Web Application
7. On the Configure Hardware page, in the Hardware profile drop-down list box, select WinServer2012R2. Notice that the settings from the hardware profile import into the template.
8. Click Next.
9. On the Configure Operating System page, in the Guest OS profile drop-down list box, select LON-DB OS Profile.
10. Under General Settings, select Identity Information, and then under Computer name, change the name to LON-WEB1#.
11. Under Roles and Features, select Roles.
12. Select the Web Server (IIS) check box, and then click Next.
13. On the Application Configuration page, in the Application profile drop-down list box, select StockTrader Web Application. Notice that the settings from the application profile are imported into the template.
14. Click Next.
15. On the SQL Server Configuration page, in the SQL Server profile drop-down list box, select None-no SQL Server configuration settings, and then click Next.
17. Close the Jobs window.

Task 2: Create a VM template for deployment for deploying SQL Server

1. In the Virtual Machine Manager Console, click the Library workspace, expand Templates, and then click VM Templates.
2. In the ribbon, click Create VM Template.
3. In the Create VM Template Wizard, on the Select Source page, select Use an existing VM template or a virtual hard disk stored in the library, and then click Browse.
4. In the Select VM Template Source dialog box, select Base14A-WS12R2.vhd, and then click OK.
5. On the Select Source page, click Next.
6. On the VM Template Identity page, configure the following, and then click Next:
   - VM Template name: StockTrader SQL Server
- Description: SQL Server to support the StockTrader application

7. On the Configure Hardware page, in the Hardware profile drop-down list box, select WinServer2012R2. Notice that the settings from the hardware profile are imported into the template.

8. Click Next.

9. On the Configure Operating System page, in the Guest OS profile drop-down list box, select LON-DB OS Profile, and then click Roles.

10. In the results pane select Web Server (IIS) and then click Next.

11. On the Application Configuration page, in the Application profile drop-down list box, select None – do not install any applications, and then click Next.

12. On the SQL Server Configuration page, in the SQL Server profile drop-down list box, select SQLServer1, and then click Next.


**Results:** After this exercise you should have created a VM template for the StockTrader Web Server and a VM Template for the SQL Server.
Exercise 3: Configuring a Service Template

► Task 1: Create a service template to deploy the StockTrader application

1. In the Virtual Machine Manager Console, click the Library workspace, expand Templates, and then click Service Templates.

2. In the ribbon, click Create Service Template.

3. In the Virtual Machine Manager Service Template Designer, in the New Service Template dialog box, in the Name text box, type StockTrader Application.

4. Under Patterns, select Single Machine (v1.0), and then click OK. The StockTrader Application loads into the Template Designer.

5. Under VM Templates, click and drag the StockTrader SQL Server template to the Add applications section of the Single Tier.

6. On the ribbon, click Save and Validate.


Results: After this exercise you should have created a new Service Template and configured it with the relevant VM Templates for the StockTrader application.
Exercise 4: Configuring User Roles

► Task 1: Create a Delegated Administrator user role
1. On LON-VM1, in the Virtual Machine Manager Console, click the Settings workspace, expand Security, and then click User Roles.
2. In the ribbon, click Create User Role.
3. In the Create User Role Wizard, on the Name and description page, configure the following, and then click Next:
   • Name: StockTrader Admins
   • Description: User Role for StockTrader Administrators
4. On the Profile page, select Fabric Administrator (Delegated Administrator), and then click Next.
5. On the Members page, click Add.
6. In the Select Users, Computers, or Groups dialog box, type StockTrader_Admins, click OK, and then click Next.
7. On the Scope page, select the Production check box, and then click Next.
9. In the Select a Library server dialog box, click LON-VM1.Contoso.com, click OK, and then click Next.
10. On the Run As accounts page, click Add.
11. In the Select a Run As Account dialog box, select Administrator account, click OK, and then click Next.
12. On the Summary page, click Finish. After a few seconds, the Jobs window opens.
13. After the user role is created, close the Jobs window.

► Task 2: Create a Tenant administrator user role
1. On LON-VM1, in the Virtual Machine Manager Console, click the Settings workspace, expand Security, and then click User Roles.
2. In the ribbon, click Create User Role.
3. In the Create User Role Wizard, on the Name and description page, configure the following, and then click Next:
   • Name: StockTrader Tenant Admins
   • Description: User Role for StockTrader Tenant Administrators
4. On the Profile page, select Tenant Administrator, and then click Next.
5. On the Members page, click Add.
6. In the Select Users, Computers, or Groups dialog box, type StockTrader_Admins, click OK, and then click Next.
7. On the Networking page, click Add, click StockTrader Production Network and then click OK and then click Next.
8. On the Resources page click Add, then multi-select all resources and then click OK and then click Next.
10. On the Permissions page select Author, Local Administrator, Deploy, Start and Shut down and then click Next.

11. On the Run As Accounts page click Add, click Administrator account and then click OK, then click Next.


13. After the user role is created, close the Jobs window.

► Task 3: Create an Application Administrator User Role

1. On LON-VM1, in the Virtual Machine Manager Console, click the Settings workspace, expand Security, and then click User Roles.

2. In the ribbon, click Create User Role.

3. In the Create User Role Wizard, on the Name and description page, configure the following, and then click Next:
   • Name: StockTrader App Admins
   • Description: User Role for StockTrader Application Administrators

4. On the Profile page, select Application Administrator (Self-Service User), and then click Next.

5. On the Members page, click Add.

6. In the Select Users, Computers, or Groups dialog box, type StockTrader_User, click OK, and then click Next.

7. On the Scope page, click Next.

8. On the Networking page click Add, click StockTrader Production Network and then click OK and then click Next.

9. On the Resources page click Add, then multi-select all resources and then click OK and then click Next.

10. On the Permissions page select Author, Local Administrator, Deploy, Start and Shut down and then click Next.

11. On the Run As accounts page, click Next.


13. After the user role is created, close the Jobs window.

Results: After this exercise you should have created a Delegated Administrator User Role, a Tenant Administrator User Role and an Application Administrator User Role.
Module 6: Deploying and Configuring Access to a Private Cloud

Lab: Deploying and Configuring Accessing to a Hybrid Cloud

Exercise 1: Creating and Configuring a Private Cloud

► Task 1: Create a private cloud
1. Log on to LON-VM1 open the Virtual Machine Manager Console.
2. Click the VMs and Services workspace, and then in the navigation pane, click the Clouds node.
3. In the ribbon, click Create Cloud. The Create Cloud Wizard opens.
4. On the General page, in the Name text box, type StockTrader Cloud, and then click Next.
5. On the Resources page, ensure that the Host groups option is selected, click Production host group, and then click Next.
6. On the Logical Networks page, click External Network, and then click Next.
7. On the Load Balancers page, click Microsoft Network Load Balancing (NLB), and then click Next.
8. On the VIP Templates page, click Web load balancer, and then click Next.
9. On the Port Classifications page click Next.
10. On the Storage page, select Local Storage and then click Next.
11. On the Library page, next to Stored VM path, click Browse. Select the MSSCVMMLibrary folder, and then click OK.
12. Next to Read-only library shares, click Add. Select VHDs click OK, and then click Next.
15. On the Summary page, click Finish.
16. After the job is finished, close the Jobs window.

► Task 2: Configure pooled resources for the private cloud
1. In the Virtual Machine Manager console, expand Clouds, right-click StockTrader Cloud, and then click Properties.
2. In the Properties dialog box, click the Capacity tab.
3. In the right pane of the Capacity tab, clear all check boxes.
4. Configure values for Cloud capacity as follows, and then click OK:
   - Virtual CPUs – Assigned Capacity: 3
   - Memory (GB) – Assigned Capacity: 10
   - Storage (GB) – Assigned Capacity: 500
   - Custom quota (points) – Assigned Capacity: 10
   - Virtual machines – Assigned Capacity: 5
5. In the Virtual Machine Manager console, click the Library workspace. In navigation pane, expand Profiles, and then select Capability Profiles. Right-click Capability Profiles and then select Create Capability Profile.

6. In the Create Capability Profile Wizard, on the General page, in the Name text box, type StockTrader, and then click Next.

7. On the Capabilities page, configure the following values, and then click Next:
   - Fabric Compatibility: Hyper-V virtualization host
   - Processor Range: Minimum: 1, Maximum: 3
   - Memory Range: Minimum: 8 MB, Maximum: 6 GB
   - Hard Disk Count: Minimum: 0, Maximum: 4
   - Disk Size Range: Minimum: 0, Maximum: 500 GB
   - Fixed disks: Allowed
   - Differencing Disks: Allowed
   - Dynamic Disks: Allowed

8. On the Summary page, click Finish. If the Jobs window appears, close the window.

9. In the Virtual Machine Manager Console, click VMs and Services, right-click StockTrader Cloud, and then click Properties.

10. Click the Capability Profiles tab.

11. Select StockTrader, and then click OK.

**Results:** After this exercise you should have created a private cloud named StockTrader Cloud. You should have also created and configured Capability Profile named StockTrader and applied it to the StockTrader Cloud.
Exercise 2: Configuring App Controller

► Task 1: Configure App Controller

1. On LON-VM1, from the desktop double-click App Controller.
2. On the App Controller page, sign in as Contoso\Administrator with the password Pa$$w0rd.
3. On the Overview page, in the Private Clouds section, click Connect a Virtual Machine manager server and clouds.
4. In the Add a new VMM connection window, type the following, and then click OK:
   - Connection name: Contoso VMM
   - Server name: LON-VM1.contoso.com
   - Port: 8100
   - Automatically import SSL certificates: selected
5. When the job finishes, click Clouds.
6. In the navigation pane. Verify that you can now view StockTrader Cloud in the central pane.
7. Close the App Controller portal.

Results: After this exercise you should have configured App Controller integration with Virtual Machine Manager.
Exercise 3: Creating, Deploying and Managing Services

**Task 1: Create a virtual machine template**

1. On LON-VM1, in the Virtual Machine Manager Console, click the Library workspace, and then in the navigation pane, expand Templates.

2. Right-click VM Templates and then click Create VM Template.

3. In the Create VM Template Wizard, on the Select Source page, click Use an existing template or a virtual hard disk stored in library, and then click Browse.

4. In the Select VM Template Source window, click Base14A-WS12R2.vhd, click OK, and then click Next.

5. On the VM Template Identity page, in the VM template name text box, type Windows Server 2012 R2, and then click Next.

6. On the Configure Hardware page, configure following values, and then click Next:
   - Cloud Capability Profiles: StockTrader
   - Virtual machine memory: 1024 MB
   - Network Adapter1: Connected to a VM Network: External Network
   - IP Address: Static IP (from a static IP Pool)

7. On the Configure Operating System page, next to Guest OS profile, select Create new Windows operating system customization settings, then configure following values, and then click Next:
   - Admin Password: Select a Run As account for the local administrator account. Click Browse, and then select Administrator account and then click OK.
   - Operating System: Windows Server 2012 R2 Datacenter
   - Domain/Workgroup: Select Domain and then in the Domain box type Contoso.com, click Select the Run As account to use for joining the domain, click Browse, and then select Administrator account.

8. On the Application Configuration page, select Windows Server 2012 R2 Datacenter and then click Next.

9. On the SQL Server Configuration page, next to SQL Server Profile select None – no SQL Server configuration settings and then click Next.

10. On the Summary page, click Create.

11. Close the Jobs window.

**Task 2: Create a service template**

1. On LON-VM1, in the Virtual Machine Manager Console, click the Library workspace, and then in the navigation pane, expand Templates.

2. Right-click Service Templates and then select Create Service Template.

3. In the New Service Template window, for the Name, type Web Server, and for Release, type 1.0.

4. In Patterns, select Single Machine (v1.0) and then click OK.

5. In the VM Templates window, click and drag the Windows Server 2012 R2 virtual machine template and release it on the Single Tier text.

6. Right-click on the same place where you released the virtual machine template, and then select Properties.
7. In the **Windows Server 2012 R2 - Machine Tier 1 Properties** window, click the **Hardware Configuration** tab. In the central pane, select **Cloud Capability Profiles**, and verify that in the right pane, **StockTrader** is selected.

8. In the central pane, in the **Network Adapters** section, click **Network Adapter 1**. In the right page, ensure it is connected to **External Network**. Click **Static IP (from a static IP pool)**, and then from the drop-down box, select **IPv4 only**.

9. Click the **OS Configuration** tab.

10. In the **Roles and Features** section of the central pane, click **Roles**.

11. In the right pane, select following:
   - Web Server (IIS)
   - Management Tools
   - IIS Management Console

12. Click **Identity Information** then in the **Computer name** box type **WebServer#**.

13. In the left pane, click the **Validation Errors** tab, ensure that no error appears in right pane, and then click **OK**.

14. Ensure that no errors or exclamation marks appear on the schema. If any errors or exclamation marks appear, double-click the tier to open the **Properties** dialog box again, and then without making any changes, click **OK**.

15. Ensure that on the schema **NIC 1** is connected to **External Network**.

16. Right-click on the rectangle, where the text **Web Server Release 1.0** displays (it should be on top), and then select **Properties**.

17. In the **Web Server Properties** window that opens, click the **Access** tab, and in the right pane, click the **Add...** button.

18. In the Select Users window, select **StockTrader Administrators** and then click **OK** twice.

19. In the **Virtual Machine Manager Service Template Designer – Web Server 1.0** window, click the **Save and Validate** button in the ribbon.

20. Close the **Virtual Machine Manager Service Template Designer – Web Server 1.0** window.

21. Right-click the **Web Server** service template, and then click **Publish**.

22. Click the **VMs and Services** pane, then expand **Clouds**, right-click **StockTrader Cloud** and then click **Assign Cloud**.

23. In the **Assign Cloud** dialog box click **Use an existing user role** and then select **StockTrader Administrators – Self-Service user** and then click **OK**.

24. Click **OK** on the **StockTrader Administrators Properties** window that opens.

**Task 3: Deploy and verify a service**

1. On LON-VM1, in the **Virtual Machine Manager console**, click the arrow in the top left corner, and then select **Open New Connection**.

2. In the **Connect to Server** window, select the **Specify credentials** option, for the user name, type **Contoso\StockTrader_Admins**, and for the password, type **Pa$$w0rd**.

3. Clear the option to **Automatically connect with these settings**, and then click **Connect**.

4. In the **Select User Role** dialog box, click the **StockTrader Administrators** profile, and then click **OK**.
5. In the newly opened **Virtual Machine Manager console**, verify that the console name begins with **StockTrader Administrators**.

6. Click the **Library** workspace.

7. In the navigation pane, expand **Templates**, and then click **Service Templates**.

8. In the results pane, right-click the **Web Server** template, and then select **Configure Deployment**.

9. In the **Select name and destination** window, in the **Name** field, type **WebServer1**, in the **Destination** drop-down menu, select **StockTrader Cloud**, and then click **OK**.

10. In the **Deploy Service – WebServer1** window, click **Refresh Preview** then verify that there are no errors or exclamation marks on service schema, and then in the ribbon, click **Deploy Service**.

11. In the **Deploy Service** window, click **Deploy**.

12. The **Jobs** window will open, and you will be able to observe progress. The deployment will take approximately 10 minutes.

13. After the **Create Service Instance** job completes, close the **Jobs** window.

14. In the Virtual Machine Manager console, click the **VMs and Services** workspace.

15. Expand **Clouds**, and then click **StockTrader Cloud**.

16. In the ribbon, click the **VMs** button, and then verify that a machine named **WebServer1.Contoso.com** is visible and running.

17. Right-click **WebServer1.Contoso.com**, select **Connect or View**, and then click **Connect via Console**.

18. In the **Virtual Machine Viewer – WebServer1.CONTOSO.COM on server lon-hostX.contoso.com** window, click the Ctrl-Alt-Del button.

19. Log on to the machine as **Contoso\Administrator** with the password of **Pa$$w0rd**.

20. Open **Server Manager**, click **Local Server** and from the details pane confirm that **CONTOSO.COM** is displayed next to **Domain**.

21. Scroll down and in the **ROLES AND FEATURES** section, confirm that **Web Server (IIS)** is displayed.


23. Close the Virtual Machine Manager console that is named StockTrader Administrators.

**Task 4: Deploy a service by using App Controller**

1. On LON-VM1, from the desktop double-click **App Controller**.

2. On the **App Controller** page, enter the User name **Contoso\StockTrader_Admins** using the password **Pa$$w0rd**, and then click **Sign In**.

3. When prompted to select a user role, click **StockTrader Administrators** and then click **OK**.

4. On the **Overview** page, in the **Common Task** section, click **Deploy a new service or virtual machine**.

5. On the **New Deployment** page, click **Configure**.

6. In the select a cloud for this deployment window, click **StockTrader Cloud**, and then click **OK**.

7. On the **New Deployment** page, click **Select a template**.

8. In the Choose a template window, select **Web Server Service 1.0** and then click **OK**.

9. On the **New Deployment** page, in the **INSTANCE** section, click **Configure**.
10. In the Properties of new Virtual Machine window, in the **Description** text box, type *Deployed with AppController*, and then click **OK**.

11. On the **New Deployment** page, in the **Service** section, click **Configure**.

12. In the Service name box type Web Server – App Controller and then click **OK**.

13. On the **New Deployment** page, click **Deploy**.

14. In the **App Controller** window, click **Jobs**.

15. Verify that the **Create service deployment** job has an **In Progress** status.

16. Refresh the console and verify that it completes successfully. Optional: If you do not have enough time to deploy a service once more, you can cancel this job in the VMM console Jobs workspace. It may need approximately 15 minutes to complete.

17. Close the **App Controller** portal.

**Task 5: Perform and verify a service upgrade**

1. Switch back to the **Virtual Machine Manager console** on LON-VM1, which is running under the administrator account.

2. Click the **Library** workspace.

3. Expand **Templates**, and then click **Service Templates**.

4. In the right pane, right-click the **Web Server** template, and then select **Open Designer**.

5. In **Virtual Machine Manager Service Template Designer – Web Server 1.0 (Read-Only)**, click the **Web Server Release 1.0** box then in the bottom pane, in the **Release** box replace 1.0 with 1.1.


7. In the **Warning** window that opens click **OK**.

8. In the **Windows Server 2012 R2 - Machine Tier 1 Properties** window, click the **OS Configuration** tab.

9. In the central pane, click **Roles** under **Roles and Features**.

10. Select the **DNS Server** role, and then click **OK**.

11. Click **Save and Validate** in the ribbon.

12. Close the Virtual Machine Manager Service Template Designer window.

13. Click **Web Server (version 1.0)**. In the lower pane, click the **WebServer1** hyperlink.

14. In the results pane, in the **Name** column, right-click **WebServer1**, and then select **Set Template**.

15. In the Change Service Template for WebServer1 Wizard, click **Replace the current template with an updated template for this service**, and then click **Browse**.

16. Select **Web Server version 1.1**, and then click **OK**.

17. Click **Next** twice.

18. On the **Update Method** page, ensure that **Update method** is set to **Apply updates to existing virtual machines in-place**, and then click **Next**.

19. On the **Updates Review** page, read the warning, click **Apply the updates to the service immediately after this wizard completes**, and then click **Next**.

20. On the **Summary** page, click **Finish**.
21. The Jobs window will open, and you will be able to observe progress of the **Perform servicing on a Service** job. To update the service will take 1-2 minutes. (The job with most likely complete with a status of **Completed w/ Info** – that is normal).

22. After the job completes, close the Jobs window.

23. Expand, **WebServer1**, expand **Windows Server 2012 R2 – Machine Tier 1**, right-click virtual machine **WebServer1.CONTOSO.COM**, select **Connect or View** and then click **Connect via Console**.

24. If necessary, in the **Virtual Machine Viewer** window, click the **Ctrl-Alt-Del** button. Log on as **Contoso\Administrator** with the password of **Pa$$w0rd**.

25. Open **Server Manager**, and then click **Add roles and features**.

26. In the **Add Roles and Features Wizard**, on the **Before you begin** page click **Next**.

27. On the **Select installation type** page click **Next**.

28. On the **Select destination server** page click **Next**.

29. On the **Select server roles** page notice that the **DNS Server** role has been installed and then click **Cancel**.

30. Close Server Manager.

31. Close the **Virtual Machine Viewer** window.

32. Right-click **WebServer1**, and then click **Shut Down**.

33. In the **Virtual Machine Manager** window that opens, click **Yes**.

34. In the **Shut Down WebServer1.CONTOSO.COM** window that opens, click **Yes**.

35. Close the **Virtual Machine Manager console**.

**Results**: After this exercise you should have created a virtual machine template, a service template and then used them to deploy a service in VMM. You should then have used App Controller to deploy a service. Finally you should have performed a service upgrade in VMM.
Module 7: Monitoring Cloud Infrastructure

Lab: Monitoring the Private Cloud Infrastructure

Exercise 1: Deploying Agents

► Task 1: View currently monitored computers
1. On LON-OM1, from the desktop, double-click Operations Console.
2. In the Operations console, in the Monitoring workspace, under Monitoring, click Discovered Inventory.
1. Read the list of computers, and notice that only LON-OM1.Contoso.com displays. If the state does not show Healthy, right-click the LON-OM1.Contoso.com object, and then click Refresh.

► Task 2: Identify the management action account
1. In the Operations console, in the Administration workspace, under Run As Configuration, click Accounts.
2. Under Type: Action Account, read the description for Contoso\SCOM_MSAA. This user account is used on agent-managed computers to run tasks. This account is not configured as a domain administrator.

► Task 3: Install the agent on systems by using the Discovery Wizard
1. In the Operations console, in the Administration workspace, click Administration.
2. On the Administration Overview page, click Required: Configure computers and devices to manage.
3. In the Computer and Device Management Wizard, on the What would you like to manage page, click Windows computers, and then click Next.
4. On the Auto or Advanced page, click Advanced discovery.
5. In the Computer and Device Classes dialog box, select Servers Only.
6. Verify that the Management Server is LON-OM1.Contoso.com, and then click Next.
7. On the Discovery Method page, click Scan Active Directory.
8. In the Domain box, select Contoso, and then click Configure.
9. In the Find Computers window, verify that the Role box is set to Any, and then click OK.
11. On the Administrator Account page, click Other user account, type Administrator in the User name box, type Pa$$w0rd in the Password box then click Discover.
12. On the Select Objects to Manage page, select the check boxes for the following servers:
   • LON-DM1.Contoso.com
   • LON-VM1.Contoso.com
   • LON-SQ1.Contoso.com
   • LON-HOST2.contoso.com
13. In the Management mode box, select Agent, and then click Next.
14. On the **Summary** page, read the default agent installation directory. Notice that the Agent Action Account is **Local System**, and then click **Finish**.

15. In the **Agent Management Task Status** window that opens, wait for agent installation to complete for all four targets, and then click **Close**.

![Task 4: Configure agentless monitoring by using the Discovery Wizard](image)

1. In the **Operations console**, on the **Administration Overview** page, under **Actions**, click **Configure computers and devices to manage**.

2. In the **Computer and Device Management Wizard**, on the **What would you like to manage** page, click **Windows computers**, and then click **Next**.

3. On the **Auto or Advanced** page, click **Advanced discovery**.

4. In the **Computer and Device Classes** box, select **Servers Only**.

5. Verify that the Management Server is **LON-OM1.Contoso.com**, and then click **Next**.

6. On the **Discovery Method** page, click **Scan Active Directory**.

7. In the **Domain** box, select **Contoso**, and then click **Configure**.

8. In the Find Computers window, verify that the **Role** box is set to **Any**, and then click **OK**.

9. On the **Discovery Method** page, click **Next**.

10. On the **Administrator Account** page, click **Other user account**, type **Administrator** in the **User name** box, type **Pa$$w0rd** in the **Password** box then click **Discover**.

11. On the **Select Objects to Manage** page, select the check box for **LON-AP1.Contoso.com**

12. In the **Management mode** box, select **Agentless**, and then click **Next**.

13. On the **Summary** page, click **Finish**.

![Task 5: Prepare security for manual agent installation](image)

1. In the **Operations console**, in the **Administration** workspace, click **Settings**, and then double-click **Security**.

2. In the **Global Management Server Settings – Security** window, click **Review new manual agent installations in pending management view**, and then click **OK**.

![Task 6: Manually install the agent](image)

1. On **LON-HOST1**, click **Start**, and then click **This PC**.

2. In a Windows Explorer window, browse to `\lon-om1\c$\Program Files\Microsoft System Center 2012 R2\Operations Manager\Server\AgentManagement\amd64` and then double-click **MOMAgent.msi**.

3. In the **Welcome to the Microsoft Monitoring Agent Setup Wizard** window, click **Next**.

4. On the **Important Notice** page click **I agree**.

5. On the **Destination Folder** page, read the default installation location, and then click **Next**.

6. On the **Agent Setup Options** page click **Next**.

7. On the **Management Group Configuration** page, enter the following information, and then click **Next**:
   - Management Group Name: **SCOM2012**
• Management Server Port: **5723**

8. On the **Agent Action Account** page, click **Local System**, and then click **Next**.

9. On the **Microsoft Update** page click **Next**.

10. On the **Ready to Install** page, click **Install**.

11. On the **Microsoft Monitoring Agent configuration completed successfully** page, click **Finish**.


13. On LON-OM1, in the **Operations console**, in the **Administration** workspace, under **Device Management**, click **Pending Management**.

14. Click **LON-Host1.Contoso.com**, and then from the **Tasks** pane click **Approve**.

15. In the **Manual Agent Install** window, read the information, and then click **Approve**.

▶ **Task 7: Verify that monitored computers are healthy**

1. In the **Operations console**, in the **Administration** workspace, under **Device Management**, click **Agent Managed**, and then review the list of computers.

2. Click **Agentless Managed**, and then review the list of computers including their **Health State**.

3. Click **Management Servers**, and then review the list of computers.

4. In the **Monitoring** workspace under **Monitoring**, click **Discovered Inventory**.

5. Right-click in the details pane and then click **Refresh** to update the view.

6. Close the **Operations console**.

**Results:** After this exercise you should have installed the Operations Manager agent on the cloud infrastructure servers. This included both a manual installation and a Console (or push) installation.
Exercise 2: Deploying and Configuring Management Packs

Task 1: Import management packs

1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Authoring workspace, on the Authoring Overview page, click Required: Import management packs.
3. In the Import Management Packs window, click Add, and then click Add from disk.
4. In the Online Catalog Connection window, click No to prevent searching the online catalog for dependencies. The virtual machine does not have access to the Internet to search for the dependencies.
5. In the Select Management Packs to import window, browse to C:\ManagementPacks\WindowsServer.
6. Select all files, and then click Open.
7. In the Select Management Packs window, notice that all management packs have a green check mark icon except Windows Server Operating System Library.
8. Click Windows Server Operating System Library, read the status details, and then click Install.
9. When the import completes, click Close.
10. In the Operations console, in the Authoring workspace, on the Authoring Overview page, click Required: Import management packs.
11. In the Import Management Packs window, click Add, and then click Add from disk.
12. In the Online Catalog Connection window, click No to prevent searching the online catalog.
13. In the Select Management Packs to import window, browse to C:\ManagementPacks\IIS8.
14. Select all files, and then click Open.
15. In the Select Management Packs window, notice that now all management packs have a green check mark.
16. Click Install.
17. When the import completes, click Close.
18. In the Operations console, in the Authoring workspace, on the Authoring Overview page, click Required: Import management packs.
19. In the Import Management Packs window, click Add, and then click Add from disk.
20. In the Online Catalog Connection window, click No to prevent searching the online catalog for dependencies.
21. In the Select Management Packs to import window, browse to C:\ManagementPacks\IIS7.
22. Select all files, and then click Open.
23. In the Select Management Packs window, notice that all management packs have a green check mark.
24. Click Install.
25. When the import completes, click Close.
26. In the Operations console, in the Authoring workspace, on the Authoring Overview page, click Required: Import management packs.
27. In the **Import Management Packs** window, click **Add**, and then click **Add from disk**.

28. In the **Online Catalog Connection** window, click **No** to prevent searching the online catalog for dependencies.

29. In the **Select Management Packs to import** window, browse to 
   `C:\ManagementPacks\SQL\6.4.1.0`

30. Select all files, and then click **Open**.

31. In the **Select Management Packs** window, notice that all management packs have a green check mark.

32. Click **Install**.

33. When the import completes, click **Close**.

**Task 2: Verify management pack functionality**

1. On LON-OM1, in the **Operations console**, in the Authoring workspace, expand **Management Pack Objects**, and then click **Object Discoveries**.

2. Scroll down to **Discovered Type: Computer (26)**, and verify that **Populate All Windows Server 2012 R2 Full Computer Group** exists.

3. Scroll down and verify that **Discovered Type: IIS 7 Server Role (7)** exists.

4. In the **Monitoring** workspace, expand **Microsoft Windows Internet Information Services**, and then click **IIS Role State** and confirm in the result pane that **LON-OM1.CONTOSO.COM** is visible.

5. Expand **Microsoft Windows Server**, and then click **Windows Server State** and confirm in the result pane that **LON-OM1.CONTOSO.COM** is visible.

**Task 3: Create a management pack for overrides**

1. On LON-OM1, in the **Operations console**, in the Administration workspace, click **Management Packs**.

2. In the **Tasks** pane, click **Create Management Pack**.

3. In the **Create a Management Pack** wizard, on the **General Properties** page, enter the following information, and then click **Next**:
   - Name: **Windows 2012 Overrides**
   - Version: **1.0.0.0**
   - Description: **Overrides for computers running Windows Server 2012**

4. On the **Knowledge** page, click **Create**.

**Task 4: Create an override for the Windows Server 2012 disk space monitor**

1. On LON-OM1, in the **Operations console**, in the **Authoring** workspace, expand **Management Pack Objects**, and then click **Monitors**.

2. Scroll down and expand **Windows Server 2012 Logical Disk**, expand **Entity Health**, expand **Availability**, and then double-click **Logical Disk Free Space**.

3. In the **Logical Disk Free Space Properties** window, on the **Health** tab, review the health states that are available.

**Note**: The **Health State column** shows the health state that will be reflected in the Operations Console for the associated **Monitor Condition**.
4. On the System Drive % tab, read the default configuration. When less than 10 percent of the disk space is available, a warning state generates.

5. On the System Drive Mbytes tab, read the default configuration. When less than 500 megabytes (MB) of disk space are available, a warning state generates.

6. On the Alerting tab, read the default configuration. An alert generates when a warning state is generated.

7. On the Overrides tab, click Override, and then click for all objects of class: Windows Server 2012 Logical Disk.

8. In the Override Properties window, select the Override check box for Warning %Threshold for System Drives, and then in the Override Value column, type 5.

9. In the Select destination management pack box, select Windows 2012 Overrides, and then click OK.

10. In the Logical Disk Free Space Properties window, click Close.

11. In the Authoring workspace, right-click Logical Disk Free Space, and then click Overrides Summary.

12. Verify that the Warning %Threshold for System Drives is now 5, and then click Close.


Results: After this exercise you should have imported Management Packs for the Windows operating system, IIS and SQL. You should have also created a Management Pack to store Overrides for Windows Server 2012. Finally, you should have created an Override for the Logical Disk Free Space monitor and stored it in the Windows 2012 Overrides Management Pack.
Exercise 3: Configuring Roles and Notifications

▲ Task 1: Create a new role
1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Administration workspace, under Security right-click User Roles and then click New User Role and then click Operator.
3. In the Create User Role Wizard – Operator Profile window that open, on the General Properties page type Contoso Windows Server Operators in the User role name box and then click Add.
4. In the Select Users or Groups window that opens type Contoso_IR in the Enter the object names to select box and then click Check Names then click OK then click Next.
5. On the Group Scope page clear the SCOM2012 checkbox and then select the Windows Server 2012 R2 Full Computer Group checkbox and then click Next.
6. On the Approved Tasks page click Next.
7. On the Dashboards and Views page click Only the dashboards and views selected in each tab are approved.
8. In the Monitoring Tree tab select Windows Computers and then click Next.
9. On the Summary page review the Summary information and then click Create.
10. From the details pane confirm the Contoso Windows Server Operators User Role is displayed.

▲ Task 2: Create a notification channel
1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Administration workspace, under Notifications, click Channels.
3. In the Tasks pane, click New, and then click Email (SMTP).
4. In the E-mail Notification Channel window, on the Description page, click Next to accept the default channel name and description.
5. On the Settings page, click Add.
6. In the Add SMTP Server window, enter the following information, and then click OK:
   - SMTP server (FQDN): lon-ap1.contoso.com
   - Port number: 25
   - Authentication method: Anonymous
7. On the Settings page, in the Return address box, type administrator@contoso.com, and then click Next.
8. On the Format page, click Finish to accept the default message format.
9. After the channel saves, click Close.

▲ Task 3: Create a notification subscriber
1. In the Operations console, in the Administration workspace, click Subscribers.
2. In the Tasks pane, click New.
3. In the Notification Subscriber Wizard, on the Description page, in the Subscriber Name box, type Administrator, and then click Next.
4. On the Schedule page, click Always send notifications, and then click Next.
5. On the **Addresses** page, click **Add** to create a new subscriber address.

6. In the **Subscriber Address Wizard**, on the **General** page, in the **Address name** box, type **Mobile E-mail**, and then click **Next**.

7. On the **Channel** page, in the **Channel Type** box, select **E-mail (SMTP)**.

8. In the **Delivery address for the selected channel** box, type **administrator@contoso.com**, and then click **Next**.

9. On the **Schedule** page, click **Always send notifications**, and then click **Finish**.

10. In the **Notification Subscriber Wizard**, click **Finish**.

11. Click **Close**.

**Task 4: Create a notification subscription**

1. In the **Operations console**, in the Administration workspace, under **Notifications**, click **Subscriptions**.

2. In the **Tasks** pane, click **New**.

3. In the **Notification Subscription Wizard**, on the **Description** page, in the **Subscription name** box, type **Windows Server 2012 notifications**, and then click **Next**.

4. On the **Criteria** page, in the **Conditions** box, select the **raised by any instance in a specific group** check box.

5. In the **Criteria description** box, click **specific**.

6. In the **Group Search** window, in the **Filter by** box, type **2012**, and then click **Search**.

7. Click **Windows Server 2012 Computer Group**, click **Add**, and then click **OK**.

8. On the **Criteria** page, click **Next**.

9. On the **Subscribers** page, click **Add**.

10. In the ** Subscriber Search** window, click **Search**, click **Administrator**, click **Add**, and then click **OK**.

11. On the **Subscribers** page, click **Next**.

12. On the **Channels** page, click **Add**.

13. In the **Channel Search** window, click **Search**, click **SMTP Channel**, click **Add**, and then click **OK**.

14. On the **Channels** page, click **Delay sending notifications if conditions remain unchanged for longer than (in minutes)**, type **10**, and then click **Next**.

15. On the **Summary** page, click **Finish**.

16. Click **Close**.

17. Close the **Operations console**.

**Results:** After this exercise you should have configured Notification Subscriptions in Operations Manager by creating a Notification Channel, a Notification Subscriber and a Notification Subscription.
Exercise 4: Configuring VMM Integration

▶ Task 1: Enable VMM integration with Operations Manager

1. On LON-VM1, open the Virtual Machine Manager Console. If the Connect to Server dialog box opens, select to use the current Microsoft Windows session identity, and then click Connect.

2. In the Settings workspace, click System Center Settings, and then double-click Operations Manager Server.

3. In the Add Operations Manager wizard, on the Introduction page, read the requirements for integration, and then click Next.

4. On the Connection to Operations Manager page, use the following settings, and then click Next.
   - Server name: LON-OM1.Contoso.com
   - Use the VMM server service account: Selected
   - Enable Performance and Resource Optimization (PRO): Selected
   - Enable maintenance mode integration with Operations Manager: Selected

5. On the Connection to VMM page, enter the following, and then click Next.
   - User name: Contoso\Administrator
   - Password: Pa$$w0rd


7. In the Jobs window, click New Operations Manager connection, and wait for the job to complete. This takes approximately five minutes.

8. Close the Jobs window.

▶ Task 2: Verify VMM integration with Operations Manager

1. On LON-OM1, open the Operations Console.

2. Click the Monitoring workspace and then expand Microsoft System Center Virtual Machine Manager, expand Agents and then click Health State.

3. From the details pane, in the AgentWatcher State section, confirm LON-VM1, LON-HOST1 and LON-HOST2 are displayed in a healthy state.

4. Expand Microsoft System Center Virtual Machine Manager Views and then click Diagram view for LON2DVM1 and confirm the diagram view displays the VMM components in a healthy state.

5. Close the Operations console.

Results: After this exercise you should have configured integration between Operations Manager and Virtual Machine Manager.
Exercise 5: Configuring DPM Integration

► Task 1: Import the DPM management packs
1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Administration workspace click Management Packs.
3. From the Tasks pane click Import Management Packs.
4. In the Import Management Packs window, click Add, and then click Add from disk.
5. In the Online Catalog Connection window, click No to prevent searching the online catalog for dependencies.
6. In the Select Management Packs to import window, browse to \lon-DM1\C$\DPM\ManagementPacks\en-us.
7. Select all files, and then click Open.

Note: One of the Management Packs will appear with a Warning next to it, this can be ignored.
8. Click Install.
9. On the Operations Manager window that opens click Yes.
10. When the import completes, click Close.

► Task 2: Install the DPM central console
1. On LON-OM1, right-click Start, and then click Run.
2. In the Open box, type \LON-DM1\C$\DPM and then press Enter.
3. Double-click setup.exe.
4. In the Microsoft System Center 2012 R2 window, under Install, click DPM Central Console.
5. In the Microsoft Software License Terms window, select the I accept the license terms and conditions check box, and then click OK.
6. In the Data Protection Manager Central Console Setup Wizard, on the Welcome page, click Next.
7. On the Central Console Opt-in page, click Install Central Console server-side and client-side Components, and then click Next.
8. On the Prerequisites Check page, when the prerequisite check completes, click Next.
10. On the Microsoft Update Opt-in page, click I do not want to use Microsoft Update, and then click Install.
11. On the Data Protection Manager message box, click OK.
13. Close all open windows.

► Task 3: Install DPM security roles
1. On LON-OM1, click Start, and then click This PC.
2. Browse to C:\Program Files\Microsoft DPM\bin.
3. Double-click DefaultRoleConfigurator.exe.
4. When the Hit Return to Exit message appears press Enter.

**Task 4: Verify installation of the DPM central console**

1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Monitoring workspace, expand System Center 2012 R2 Data Protection Manager, expand State views, and then click DPM servers. Note that LON-DM1 will be listed here.

   ![Note: It can take up to 5 minutes for LON-DM1 to appear.](image)

3. In the Administration workspace, under Security click User Roles.
4. Notice that DPM roles display under Profile: Operator.
5. Close the Operations console.

**Results:** After this exercise you should have configured integration between Operations Manager and Data Protection Manager.
Module 8: Extending and Customizing Monitoring of the Cloud Infrastructure

Lab: Extending and Customizing Monitoring

Exercise 1: Creating Custom Monitoring

▶ Task 1: Import the App Controller certificate

1. On LON-VM1, right-click Start, click Run and then in the Open box type MMC and then press Enter.
2. In the Console 1 – [Console Root] window that opens click File and then click Add/Remove Snap-in.
3. In the Add or Remove Snap-ins window that opens click Certificates and then click Add.
4. In the Certificate snap-in window that opens click Computer account and then click Next and then click Finish and then click OK.
5. Expand Certificates (Local Computer), expand Personal and then click Certificates.
6. From the results pane right-click the certificate that has an Expiration date of 1/1/2019 and then click All Tasks and then click Export.
7. In the Certificate Export Wizard that opens, on the Welcome to the Certificate Export Wizard page, click Next.
8. On the Export Private Key page click Next.
10. On the File to Export page click Browse.
11. Navigate to Local Disk (C:), type AppControllerCert in the File name box and then click Save.
12. Click Next on the File to Export page and then on the Completing the Certificate Export Wizard page click Finish.
14. Close the MMC console, in the Microsoft Management Console window that opens click No.
15. On LON-OM1 right-click Start then click Run, in the Open box type \LON-VM1\C$ and then press enter.
16. In the C$ window that opens, double-click AppControllerCert.
17. In the Certificate window that opens click Install Certificate.
18. In the Certificate Import Wizard that opens, on the Welcome to the Certificate Import Wizard page, click Next.
19. On the Certificate Store page click Place all certificates in the following store and then click Browse.
20. In the Select Certificate Store window that opens click Trusted Root Certification Authorities and then click OK.
22. Wait for the Security Warning window to open and then click Yes then click OK on the Certificate Import Wizard window.
23. In the Certificate window click Install Certificate again.
24. In the **Certificate Import Wizard** that opens, on the **Welcome to the Certificate Import Wizard** page, click **Local Machine** and then click **Next**.

25. On the **Certificate Store** page click **Place all certificates in the following store** and then click **Browse**.

26. In the **Select Certificate Store** window that opens click **Trusted Root Certification Authorities** and then click **OK**.

27. Click **Next** on the **Certificate Store** page then on the **Completing the Certificate Import Wizard** page click **Finish**.

28. Click **OK** on the **Certificate Import Wizard** window and then click **OK** on the **Certificate** window.

**Task 2: Creating a Management Pack for custom monitoring**

1. On LON-OM1, open the **Operations Console**.

2. In the **Operations console**, in the **Administration** workspace, click **Management Packs**.

3. In the **Tasks** pane, click **Create Management Pack**.

4. In the **Create a Management Pack** window, in the **Name** box, type **Infrastructure Monitoring**, and then click **Next**.

5. On the **Knowledge** page, click **Create**.

**Task 3: Create a group for VMM servers**

1. On LON-OM1, in the **Operations console**, in the **Authoring** workspace, click **Groups**.

2. In the **Task** pane, click **Create a New Group**.

3. On the **General Properties** page, enter the following information, and then click **Next**:
   - **Name**: **VMM Servers**
   - Select destination management pack: **Infrastructure Monitoring**

4. On the **Explicit Members** page, click **Next**.

5. On the **Dynamic Members** page, click **Create/Edit rules**.

6. In the **Create a Group Wizard – Query Builder** window, select **VMM Server**, click **Add**, and then click **OK**.

7. On the **Dynamic Members** page, read the query formula, and then click **Next**.

8. On the **Subgroups** page, click **Next**.

9. On the **Excluded Members** page, click **Create**.

10. From the details pane right-click the **VMM Servers** group that has been created and then click **View Group Members**.

11. In the **Managed Objects – SCOM2012 – Operations Manager** window that opens confirm LON-VM1.CONTOSO.COM is displayed and then close the **Managed Objects – SCOM2012 – Operations Manager** window.

**Task 4: Monitor the VMM service**

1. On LON-OM1, in the **Operations console**, in the **Authoring** workspace, click **Management Pack Templates**.

2. In the **Tasks** pane, click **Add Monitoring Wizard**.
3. In the Add Monitoring Wizard window, on the Select Monitoring Type page, click Windows Service, and then click Next.

4. On the General page, enter the following information, and then click Next:
   - Name: VMM Service
   - Select destination management pack: Infrastructure Monitoring

5. On the Service Details page, next to Service name, click the ellipsis button.

6. In the Select Windows Service window, in the Computer name box, type LON-VM1, and then press Enter.

7. In the Select service area, scroll down, click System Center Virtual Machine Manager, and then click OK.

8. On the Service Details page, next to Targeted group, click the ellipsis button.

9. In the Group Search window, click Search, click VMM Servers, and then click OK.

10. On the Service Details page, verify that the Monitor only automatic services check box is selected, and then click Next.

11. On the Set Performance Data Collection Settings page, enter the following information, and then click Next:
   - Generate an alert if CPU usage exceeds the specified threshold: selected
   - CPU Usage: 50
   - Number of samples: 3
   - Sampling interval: 5 minutes

12. On the Summary page, click Create.

Task 5: Monitor the VMM service process

2. In the Tasks pane, click Add Monitoring Wizard.

3. In the Add Monitoring Wizard window, on the Select Monitoring Type page, click Process Monitoring, and then click Next.

4. On the General Properties page, enter the following information, and then click Next:
   - Name: VMM Process
   - Select destination management pack: Infrastructure Monitoring

5. On the Process to Monitor page, click Monitor whether and how a process is running (for processes you want).

6. In the Process name box, type vmmservice.exe.

7. On the Process to Monitor page, next to Targeted group click the ellipsis button.

8. In the Group Search window, click Search, click VMM Servers, and then click OK.
9. On the **Process to Monitor** page, click **Next**.

10. On the **Running process** page, enter the following information, and then click **Next**:
   - Generate an alert if the number of processes is below the minimum value or above the maximum value for longer than the specified duration: selected
   - Minimum number of processes: 1
   - Maximum number of processes: 1
   - Duration: 2 minutes

11. On the **Performance Data Collection Settings** page, read the available options, and then click **Next**.

12. On the **Summary** page, click **Create**.

   ► **Task 6: Configure monitoring for the SQL TCP port**
   1. On LON-OM1, in the **Operations console**, in the Authoring workspace, click **Management Pack Templates**.
   2. In the **Tasks** pane, click **Add Monitoring Wizard**.
   3. In the **Add Monitoring Wizard** window, on the **Select Monitoring Type** page, click **TCP Port**, and then click **Next**.
   4. On the **General Properties** page, enter the following information, and then click **Next**:
      - Name: **VMM SQL Server Port**
      - Select destination management pack: **Infrastructure Monitoring**
   5. On the **Test Port Settings** page, enter the following information, and then click **Test**:
      - Computer or device name: **LON-SQ1.Contoso.com**
      - Port: **1433**
   6. When the test completes, read the results, and then click **Next**.
   8. In the **Run this query every** box, enter **1 minute**, and then click **Next**.
   9. On the Port Monitoring Settings Summary page, click **Create**.

   ► **Task 7: Configure monitoring for the App Controller .NET application**
   1. On LON-OM1, in the **Operations console**, in the Administration workspace, on the Administration Overview page, click **Import management packs**.
   2. In the **Import Management Packs** window, click **Add**, and then click **Add from disk**.
   3. In the **Online Catalog Connection** window, click **No** to prevent searching the online catalog for dependencies.
   4. In the **Select Management Packs to import** window, browse to **C:\ManagementPacks\APM**.
   5. Select all files and then click **Open**.
   6. In the **Select Management Packs** window, notice the green check mark icon.
   7. Click **Install**. When the import completes, click **Close**.
   8. From the Authoring workspace, click **Management Pack Templates**.
   9. In the Tasks pane, click **Add Monitoring Wizard**.
10. In the **Add Monitoring Wizard** window, on the **Select Monitoring Type** page, click **.NET Application Performance Monitoring**, and then click **Next**.

11. On the **General Properties** page, enter the following information, and then click **Next**:
   - Name: **AppController .NET Application**
   - Select destination management pack: **Infrastructure Monitoring**

12. On the **What to Monitor** page, click **Add**.

13. In the **Object Search** window, click **Search**.

14. In the **Available items** area, scroll down, click **AppController**, click **Add**, and then click **OK**.

15. On the **What to Monitor** page, click **Next**.

16. On the **Server-Side Configuration** page, select the following options:
   - **Turn on performance event alerts**
   - **Turn on exception event alerts**

17. In the **Performance event threshold (ms)** box remove the existing value and then type **10000** and then click **Next**.

18. On the **Summary** page, read the information, and then click **Create**. Note that **Microsoft Internet Information Services (IIS)** may need to be restarted.

19. Close the **Operations console**.

20. On **LON-VM1** click **Start**, type **cmd**, and then press Enter.

21. In the command prompt window, type **iisreset**, and then press Enter.

22. Close the command prompt.

**Task 8: Configure a web application availability monitor**

1. On **LON-OM1**, open the Operations console then in the Authoring workspace, click **Management Pack Templates**.

2. In the **Tasks** pane, click **Add Monitoring Wizard**.

3. In the Add Monitoring Wizard window, on the **Select Monitoring Type** page, click **Web Application Availability Monitoring**, and then click **Next**.

4. On the General page type **App Controller Web Site** in the Name box and under Management pack select **Infrastructure Monitoring** and then click **Next**.

5. On the **What to Monitor** page type **Home Page** in the Name box, type **https://lon-vm1.contoso.com:444** in the URL box and then click **Next**.

6. On the **Where to Monitor From** page click **Add** then click **Search**.

7. Click **LON-OM1.CONTOSO.COM** then click **Add** and then click **OK** then click **Next**.

8. On the **View and Validate Tests** page click **Run Test**.

9. Review the information in the **Test Results** page and then click **Close**, then click **Next**.

**Note:** If the **Test Results** display **The request succeeded, but the error criteria evaluation failed** message. Click the **Run Test** button again.

10. On the **Summary** page click **Create**.
11. Click the Monitoring pane, expand Application Monitoring, expand Web Application Availability Monitoring and then click Web Application Status.

12. Wait for the App Controller Web Site monitor to appear before continuing with the next exercise. This can take up to five minutes.

Results: After this exercise you should have used some of the key Management Pack templates in Operation Manager to create custom monitors for the cloud infrastructure components.
Exercise 2: Creating a Distributed Application

▶ Task 1: Create a distributed application diagram for the App Controller portal
1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Authoring workspace, click Distributed Applications.
3. In the Tasks pane, click Create a New Distributed Application.
4. In the Distributed Application Designer window, enter the following information, and then click OK:
   - Name: App Controller Portal
   - Template: .NET 3-Tier Application
   - Management pack: Infrastructure Monitoring
5. Review the component groups that have been configured by the template and leave the Distributed Application Designer open.

▶ Task 2: Configure the component groups for the App Controller portal
1. On LON-OM1, in the Distributed Application Designer, click the Database pane.
2. Under the Database pane right-click the AppController database and then click Add To and then click App Controller Portal Data Tier.
3. Click the Perspective pane and then under the Perspective pane right-click Home Page and then click Add To and then click App Controller Portal Client Perspective.
4. Click the NET Application Component pane, then under the NET Application Component pane right-click AppController and then click Add To, then click App Controller Portal Business Tier.
5. Click the ASP .NET Application pane, then under the ASP .NET Application pane right-click AppController and then click Add To, then click App Controller Portal Presentation Tier.
6. Under the File menu, click Save.
7. After the Distributed Application Designer – App Controller Portal has been saved close the window.

▶ Task 3: View the distributed application
1. On LON-OM1, in the Operations console, in the Monitoring workspace, click Distributed Applications.
2. Notice the state for the App Controller Portal is Healthy.

Note: If the App Controller Portal does not display a healthy state, right-click Distributed Applications and then click Refresh.

3. Right-click App Controller Portal, point to Open, and then click Diagram View.
4. Expand the component groups to review the components of the App Controller .NET application that are being monitored.
5. Close the Operations console.
Results: After this exercise you should have created a Distributed Application Diagram for the App Controller Portal.
Exercise 3: Configuring Service Level Tracking

► Task 1: Create a service level objective
1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Authoring workspace, expand Management Pack Objects, and then click Service Level Tracking.
3. In the Tasks pane, click Create.
4. On the General page, in the Name box, type App Controller Portal Tracking, and then click Next.
5. On the Objects to Track page, under Targeted class, click Select.
6. In the list, click App Controller Portal, and then click OK.
7. On the Objects to Track page, click Next.
8. On the Service Level Objectives page, click Add, and then click Monitor state SLO.
9. In the Service Level Objective (Monitor State) window, enter the following information, and then click OK:
   • Service level objective name: App Controller Portal Availability
   • Monitor: Availability
   • Service level objective goal: 99.000
   • Specify the states you want to be counted as downtime in this objective: Critical
10. On the Service Level Objectives page, click Next.
12. On the Completion page, click Close.

► Task 2: View a service level report
1. On LON-OM1, in the Operations console, in the Reporting workspace, click Microsoft Service Level Report Library, and then click Service Level Tracking Summary Report.
2. In the Tasks pane, click Open.
3. In the Service Level Tracking Summary Report window, click Add.
4. In the Add Service Levels window, click Search.
5. In the Available Items area, click App Controller Portal Tracking, click Add, and then click OK.

Note: It can take up to 15 minutes for the App Controller Portal Tracking, component to become available.

6. In the Service Level Tracking Summary Report window, enter the following information, and then click Run:
   • Data Aggregation: Hourly
   • From: Today Set the time to be minus two hours from the current time
   • To: Today The current time
7. When the report generates, under App Controller Portal Tracking, expand SCOM2012 and then click App Controller Portal Availability, then review the Service Level Objective Detail report.
Note: If the report is displayed in red, this normal and shows that the service level goals are not being met.


Results: After this exercise you should have created a Service Level Tracking Object in Operations Manager for the App Controller portal and then used the Service Level Tracking Summary Report to view its availability.
Exercise 4: Creating Views for Private Cloud Infrastructure

► Task 1: Create a group for infrastructure servers
1. On LON-OM1, open the Operations Console.
2. In the Operations console, in the Authoring workspace, click Groups, then from the Tasks pane click Create a New Group.
3. On the General Properties page, enter the following information, and then click Next:
   - Name: Infrastructure Servers
   - Select destination management pack: Infrastructure Monitoring
4. On the Explicit Members page, click Next.
6. In the Create Group Wizard – Query Builder window, select VMM Server, and then click Add.
7. Select DPM server, click Add, and then click OK.
8. On the Dynamic Members page, read the query formula, and then click Next.
10. On the Excluded Members page, click Create.
11. In the navigation pane, click Groups. In the list of groups, right-click Infrastructure Servers, and then click View Group Members.
12. In the Managed Objects window, note that LON-VM1 and LON-DM1 are listed, and then close the window.

► Task 2: Create an alert view for infrastructure servers
1. In the Operations console, in the Monitoring workspace, scroll down and click Infrastructure Monitoring.
2. Right-click Infrastructure Monitoring, point to New, and then click Alert View.
3. In the Properties window, in the Name box, type Infrastructure Alerts.
4. Next to Show data related to, click the ellipsis button.
5. In the Select Items to Target window, click View all targets.
6. In the list of targets, click Infrastructure Servers, and then click OK.
7. In the Properties window, click OK.
8. Under Infrastructure Monitoring, click Infrastructure Alerts.

Note: In the Infrastructure Alerts view there may be a number of critical alerts displayed, this is expected.

► Task 3: Create a dashboard view for the App Controller portal
1. On LON-OM1, in the Operations console, in the Monitoring workspace, click Infrastructure Monitoring.
2. Right-click Infrastructure Monitoring, point to New, and then click Dashboard View.
3. In the New Dashboard and Widget Wizard window, on the Template page, in the right column, click Service Level Dashboard, and then click Next.

4. On the General Properties page type App Controller Availability in the Name box and then click Next.

5. On the Scope page click Add.

6. Click App Controller Portal Tracking, click Add then click OK and then click Next.

7. On the Summary page click Create, then on the Completion page click Close.

**Results**: After this exercise you should have created a new group and alert view for the infrastructure servers. You should have also created a new dashboard view for the App Controller Portal.
Exercise 5: Configuring SharePoint Integration

**Task 1: Install the Operations Manager SharePoint web part**

1. On LON-AP1, click **Start**, point to **All Programs**, click **Microsoft SharePoint 2010 Products**, and then click **SharePoint 2010 Management Shell**.

2. In the **Administrator: SharePoint 2010 Management Shell**, type `CD C:\SharePoint`, and then press Enter.

3. Type the following command, and then press Enter:

   ```powershell
   \install-OperationsManager-DashboardViewer.ps1 C:\SharePoint
   ```

4. When prompted, press **Enter** to install for all sites.

5. Close the **Administrator: SharePoint 2010 Management Shell**.

**Task 2: Confirm the web part is enabled**

1. On LON-AP1, click **Start**, point to **All Programs**, click **Microsoft SharePoint 2010 Products**, and then click **SharePoint 2010 Central Administration**.

2. In the **SharePoint 2010 Central Administration** page that opens click **Site Actions**, then click **Site Settings**.

3. In the **Site Collection Administration** section click **Site collection features**.

4. Scroll down until you see **Operations Manager Dashboard Web Part**.

5. If there is an **Activate** button next to **Operations Manager Dashboard Web Part**, click **Activate** and wait for the page to automatically refresh.

6. Scroll down and confirm the **Activate** button for **Operations Manager Dashboard Web Part** has now changed to **Deactivate**.

7. Close the **SharePoint 2010 Site Collection Administration Features** page.

**Task 3: Configure a web console for the web part**

1. On LON-AP1, click **Start**, point to **All Programs**, click **Microsoft SharePoint 2010 Products**, and then click **SharePoint 2010 Central Administration**.

2. In the upper left corner, click **Site Actions**, and then click **View All Site Content**.

3. Under **Lists**, click **Operations Manager Web Console Environments**.

4. Click **Add new item**.

5. In the **Operations Manager Web Console Environments – New Item** window, enter the following information, and then click **Save**:
   - **Title**: LON-OM1
   - **HostUri**: http://LON-OM1/OperationsManager/


**Task 4: Identify the URI for the dashboard**

1. On LON-AP1, click **Start**, point to **All Programs**, and then click **Internet Explorer**.

2. In Internet Explorer, in the address bar, type `http://LON-OM1/OperationsManager`, and then press Enter.
Note: If a Windows Security window opens prompting you for logon credentials, click Cancel and then restart LON-OM1 then return to the beginning of this task.

3. If a Web Console Configuration Required page opens click Configure, then click Run and then after the configuration has completed click Close on the Web Console Configuration Tool dialog box then close Internet Explorer.


5. If a Web Console Configuration Required page opens click Skip.

6. In the Monitoring workspace, expand Infrastructure Monitoring, and then click App Controller Availability.

7. Click the address bar, and copy the URL for the dashboard.

8. Close Internet Explorer.

Task 5: Create a new SharePoint page for the App Controller availability dashboard

1. On LON-AP1, click Start, point to All Programs, and then click Internet Explorer.

2. In Internet Explorer, in the address bar, type http://LON-AP1:8081, and then press Enter.

3. In the upper left corner, click Site Actions, and then click New Page.

4. In the New Page window, in the New page name box, type App Controller Dashboard, and then click Create.

5. Under Editing Tools, click Insert, and then click Web Part.

6. In the Categories box, click Microsoft System Center.

7. In the Web Parts box, click Operations Manager Dashboard Viewer Web Part, and then click Add.

8. In the upper right corner of the Operations Manager Dashboard Viewer Web Part, click the down arrow, and then click Edit Web Part.


10. In the Dashboard link box, paste the dashboard URL.

11. In the Title box, type App Controller Availability.

12. Scroll down, and then click OK.

13. Notice that the dashboard now displays the same data that you saw in the web console.

14. Click the Page tab, and then click the Save & Close button.

15. Close all open windows.

Results: After this exercise you should have installed and configured the Operations Manager SharePoint Web Part and then created a new SharePoint page. Then, using the web part you should have added the App Controller Availability dashboard to the SharePoint page.
Module 9: Implementing Service Management for the Cloud
Lab: Implementing Service Management for a Cloud

Exercise 1: Configuring Service Manager Basic Settings

▶ Task 1: Configure service request settings
1. On LON-SM1, from the desktop double-click Service Manager Console.
2. In the Service Manager console, click the Administration workspace, expand Administration, and then click Settings.
3. In the results pane, double-click Service Request Settings.
4. In the Service Request Settings window, in the Service Request ID prefix text box, type SRT.
   1. In the Maximum size (KB) text box, type 1024, and then click OK.

▶ Task 2: Configure incident settings
1. In the results pane, double-click Incident Settings.
2. In the Incident Settings window, click the General tab, and then in the Maximum number of attached files text box, type 5.
3. In the Maximum size (KB) text box, type 3072.
4. In the Default support group drop-down list box, select Tier 2.
5. In the navigation pane, click the Parent Incident tab, and then select the Automatically resolve child incidents when parent incident is resolved option.
6. In the navigation pane, click the Priority Calculation tab, and then configure the values in the matrix consistent with the following table.

<table>
<thead>
<tr>
<th>Impact: Low</th>
<th>Impact: Medium</th>
<th>Impact: High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgency: Low</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Urgency: Medium</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Urgency: High</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

7. In the navigation pane, click the Resolution Time tab.
8. In the Priority 1 row, for Target Resolution Time, select 30 minutes.
9. In Priority 2 row, for Target Resolution Time, select 60 minutes, and then click OK.

▶ Task 3: Configure problem settings
1. In the results pane, double-click Problem Settings.
2. In the **Problem Settings** window, click the **General** tab, and then in the **Maximum number of attached files** text box, type **5**.

3. For **Priority**, configure the values in the matrix consistent with the following table, and then click **OK**.

<table>
<thead>
<tr>
<th>Urgency:</th>
<th>Impact: Low</th>
<th>Impact: Medium</th>
<th>Impact: High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>9</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Medium</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Task 4: Configure data retention settings**

1. In the results pane, double-click **Data Retention Settings**.

2. In the **Incident retention time** text box, type **120**.

3. In the **Change request retention time** text box, type **240**.

4. In the navigation pane, click **History**.

5. In the **History retention time** text box, type **720**, and then click **OK**.

**Task 5: Create a new user role for incidents**

1. In the **Administration** workspace, in the navigation pane, expand **Security**, and then click **User Roles**.

2. In the Tasks pane, click **Create User Role**, and then select **Incident Resolver**.

3. In the Create User Role wizard, on the **Before You Begin** page, click **Next**.

4. On the **General** page, in **Name** text box, type **Contoso Incident Resolvers**, and then click **Next**.

5. On the **Management Packs** page, select the following management packs, and then click **Next**:
   - Service Manager Incident Management Configuration Library
   - Service Manager Incident Management Library

6. On the **Queues** page, click **Next**.

7. On the **Configuration item Groups** page, click **Next**.

8. On the **Catalog item Group** page, click **Next**.

9. On the **Tasks** page, select **Provide access to only the selected tasks**, select the following tasks, and then click **Next**:
   - Properties (View or edit the general settings for incident management)
   - Link or Unlink to Parent
   - Resolve
   - Change Incident Status
   - Assign to Me
- Escalate or Transfer
- Create Related Incident
- Request User Input
- Activate
- Unlink
- Create Incident
- Assign to Analyst
- Apply Template
- Close

10. On the Views page, click Next.
11. On the Form Templates page, click Next.
12. On the Users page, click Add.
13. In the Select Users or Groups window, type Contoso_IR, click Check Names, and then click OK.
14. Verify that Contoso\Contoso_IR displays in the Selected users text box, and then click Next.
15. On the Summary page, click Create.

▶ Task 6: Confirm the data warehouse has been registered
1. In the Administration workspace, click the Administration node.
2. From the Administration Overview page click Register with Service Manager Data Warehouse.
3. In the Confirm Removal of Existing Registration window that opens, review the message confirming that Service Manager is already registered with a data warehouse and then click No.
4. Click the Reporting workspace, expand Reports and then click Configuration Management.
5. From the details pane click Computer Inventory then from the Tasks pane click Run Report.
6. In the Computer Inventory report that opens click the hyper-link for LON-SM1, review the Computer Details section and then close the Computer Inventory report.

**Results:** After this exercise you should have configured the Service Manager default settings for the Contoso environment.
Exercise 2: Configuring Service Manager Connectors

Task 1: Create an Active Directory connector, and create a group

1. In the Service Manager console, click the Administration workspace, expand Administration, and then click Connectors.
2. Right-click Connectors, select Create connector, and then click Active Directory connector.
3. In the Active Directory connector wizard, on the Before You Begin page, click Next.
4. On the General page, in the Name text box, type Contoso AD, and then click Next.
5. On the Domain or organizational unit page, click Use the domain: CONTOSO.COM, and then in the Credentials section, click New.
6. In the Run As Account window, fill in the text boxes as follows, and then click OK:
   - Display name: Administrator account
   - Account: Windows Account
   - User name: Administrator
   - Password: Pa$$w0rd
   - Domain: CONTOSO
7. Click Test Connection. Verify that that connection was successful.
8. Click OK on the Test Connection window and then click Next.
9. On the Select objects page, click All computers, printers, users and user groups, select Automatically add users of AD Groups imported by this connector, and then click Next.
10. On the Summary page, click Create.
11. On the Completion page, click Close.
12. In the results pane, click Contoso AD, in the Tasks pane, click Synchronize Now, and then click OK.
13. Review the Status column, and wait for a status of Finished Success to display. In the Tasks pane, click Refresh to view the refreshed status. It might take 4 to 5 minutes for the task to complete.
14. In the Service Manager console, click the Configuration Items workspace.
15. In the navigation pane, click Users, and verify that all of the Active Directory users and groups were imported.
16. Click the Library workspace, and then in the navigation pane, click Groups.
17. In the Tasks pane, click Create Group.
18. In the Create Configuration items Group Wizard, on the Before You Begin page, click Next.
19. On the General page, in the Group name text box, type Contoso Computers, and then click Next.
20. On the Included Members page, click Add.
21. In the Select objects window, in the Type to filter text box, type Contoso, and then press Enter.
22. In the Available objects list, select Contoso\Domain Computers, and then click Add.
23. Click Contoso\Domain Controllers, and then click Add.
24. Click OK, and then click Next.
27. On the Excluded Members page, click Next.
29. On the Completion page, click Close.

**Task 2: Create an Operations Manager alert connector**

1. In the Service Manager console, click the Administration workspace, expand Administration, and then click Connectors.
2. Right-click Connectors, select Create connector, and then click Operations Manager Alert connector.
3. In the Operations Manager Alert connector wizard, on the Before You Begin page, click Next.
4. On the General page, in Name text box, type Contoso SCOM, and then click Next.
6. In the Credentials section, in the Run As account drop-down list box, select Administrator account, and then click Test Connection.
7. In the Credentials window, in the Password text box, type Pa$$w0rd, and then click OK.
8. Verify that connection is successful.
9. Click OK on the Test Connection window and then click Next.
11. In the Add Alert Routing Rule window, in Rule Name text box, type Contoso Computers Alert.
12. In the Template drop-down list box, select Operations Manager Incident Template.
13. In the Select Criteria Type section, select Computer for which the alert was raised, and then in the Computer is a member of group drop-down list box, select Contoso Computers.
14. In the Select alert severity and priority section, select the Priority check box, and in the Priority drop-down list box, select Medium, and then click OK.
15. In the Alert Routing Rules window, in the template drop-down list box, select Default Incident Template, and then click Next.
16. On the Schedule page, click Close alerts in Operations Manager when incidents are resolved or closed, and then click Next.
17. On the Summary page, click Create.
18. On the Completion page, click Close.
19. Logon to LON-OM1 and open the Operations Console from the desktop.
20. Click the Administration workspace and then under Product Connectors click Internal Connectors.
21. From the results pane double-click Alert Sync: Contoso SCOM.

- **Note:** Depending on the performance of the environment, it can take up to 10 minutes for the Alert Sync: Contoso SCOM connector to appear.
22. Click **Add** then in the **Product Connector Subscription Wizard** type **Contoso Alerts** in the **Subscription name** box and then click **Next**.

23. On the **Groups** page click **Next**.

24. On the **Targets** page click **Next**.

25. On the **Criteria** page click **Create**.

26. Click **OK** on the **Alert Sync: Contoso SCOM – Product Connector Properties** window.

27. Close the **Operations console**.

**Task 3: Create an Operations Manager configuration item connector**

1. On LON-SM1, in the **Service Manager console**, click **Connectors**.

2. Right-click **Connectors**, select **Create connector**, and then click **Operations Manager CI connector**.

3. In the Operations Manager CI connector wizard, on the **Before You Begin** page, click **Next**.

4. On the **General** page, in the **Name** text box, type **Contoso SCOM CI**, and then click **Next**.

5. On the **Server Details** page, in the Server name text box type **LON-OM1.contoso.com**.

6. In the **Credentials** section, in the **Run As account** drop-down list box, choose **Administrator account**, and then click **Test Connection**.

7. In the **Credentials** window, in the **Password** text box, type **Pa$$w0rd**, and then click **OK**.

8. Verify that the connection is successful.

9. Click **OK** on the **Test Connection** window and then click **Next**.

10. On the **Management Packs** page, click **Select all**, and then click **Next**.

11. On the **Schedule** page, in the second drop-down list box, select **7:00 PM**, and then click **Next**.

12. On the **Summary** page, click **Create**.

13. On the **Completion** page, click **Close**.

**Task 4: Create an Orchestrator connector**

1. In the **Service Manager console**, click **Connectors**.

2. Right-click **Connectors**, select **Create connector**, and then click **Orchestrator connector**.

3. In the **Orchestrator connector wizard**, on the **Before You Begin** page, click **Next**.

4. On the **General** page, in the **Name** text box, type **Contoso Orchestrator**, and then click **Next**.

5. On the **Connection** page, in the **Orchestrator Web Service URL** text box, type **http://lon-or1:81/Orchestrator2012/Orchestrator.svc**.

6. Next to **Run As account** click **New**.

7. In the **Run As Account** window that opens configure the settings as follows:
   - Display name: **Orchestrator**
   - User name: **Orchestrator_svc**
   - Password: **P@ssw0rd**

8. Click **OK** on the **Run As Account** window.

9. Click **Test Connection**.

10. Verify that the connection is successful.
11. Click OK on the Test Connection window and then click Next.
12. On the Sync Folder page, click Next.
13. On the Web Console URL page, type http://lon-or1:82, and then click Next.
15. On the Completion page, click Close.

**Task 5: Create a VMM connector**

1. In the Service Manager console, click on the Administration workspace, expand Administration, and then click Connectors.
2. Right-click Connectors, select Create connector, and then click Virtual Machine Manager connector.
3. In the Virtual Machine Manager connector wizard, on the Before You Begin page, click Next.
4. On the General page, in Name text box, type Contoso VMM, and then click Next.
6. In the Credentials section, in the Run As account drop-down list, select Administrator account, and then click Test Connection. If prompted for a password, type Pa$$w0rd, and then click OK.
7. Verify that the connection was successful,
8. Click OK on the Test Connection window and then click Next.
10. On the Completion page, click Close.
11. In the results pane, click Contoso VMM, in the Tasks pane, click Synchronize Now, and then click OK.
12. Review the Status column and wait for a status of Finished Success to display. In the Tasks pane, click Refresh to view the refreshed status. It might take 4 to 5 minutes for the task to complete.
13. In the Service Manager console, click the Configuration Items workspace.
14. In the Tasks pane, click Create Folder.
15. In the Create new folder window, in the Folder name text box, type VMM Objects.
16. In the Management pack section, select Service Catalog Generic Incident Request, and then click OK.
17. In the navigation pane, click the VMM Objects folder that you just created.
18. In the Tasks pane, click Create View.
19. In the Create View window, configure the following:
   - On the General page, in the Name area, type VMM Templates.
   - In the Management pack area, select Service Catalog Generic Incident Request.
20. In the navigation pane, click Criteria.
21. In the Advanced Search area, click Browse.
22. In the Frequently used basic classes drop-down list box, select All basic classes.
23. In the Type to filter text box, type virtual machine template, click Virtual Machine Template, and then click OK two times.
24. In the **Configuration Items** results pane, click the **VMM Templates** view that you created.

25. In the **VMM Templates** pane, you will see the **VMM Templates** that have been created.

26. Close the **Service Manager console**.

**Results:** After this exercise you should have configured integration between Service Manager and other System Center 2012 R2 components by creating the relevant connectors in Service Manager.
Exercise 3: Configuring the Self-Service Portal

Task 1: Verify the self-service portal functionality

2. Wait for 40 to 50 seconds for the SMPortal site to open.
3. On the Home page, scroll down, and then click Create a request.
4. On the Service Request page, beside Generic Incident Request (EN), click Go to request.
5. Fill in the Generic Incident Request form as follows:
   - Issue title: Test Incident
   - Symptoms: Mouse does not work
   - Category of the issue: Hardware Problems
   - How urgent is issue: Medium
   - Alternate contact: administrator@contoso.com
6. Scroll down, click Next, and then click Submit.
7. Verify that you receive a message that says that your request was submitted.
8. Leave the Self-Service Portal open.
9. On LON-SM1, open the Service Manager console, click the Work Items workspace, expand Incident Management, and then click All Incidents.
10. Verify that Test Incident appears in the results pane. Double-click the Test Incident.
11. In the Incident form, click the Resolution tab, from the Tasks pane, click Refresh, click Yes, then in the Time Worked value box, select 1 hour, and then click Add.
12. In the Tasks pane, click Change Incident Status, and then click Resolve.
13. In the Resolve window, in the Resolution Category drop-down box, select Fixed by analyst, in the Comments text box, type fixed by installing new driver, and then click OK twice.
15. In the central pane, click Test Incident.
16. In the right pane, review the incident details, and verify that the status displays as Resolved.
17. Close the Self-Service Portal.

Results: After this exercise you should have used the Service Manager Self-Service Portal to raise an Incident in Service Manager and then confirm that Incident is visible in the Service Manager Console.
Exercise 4: Configuring Notifications

**Task 1: Configuring notification channels**
1. On LON-SM1, open the Service Manager console, click the Administration workspace, expand Administration, and then expand Notifications.
2. Click Channels, and then in the results pane, double-click E-mail Notification Channel.
3. In the Configure E-mail Notification Channel window, select the Enable e-mail notifications checkbox, and then click Add.
4. In the Add SMTP Server window, in the SMTP server (FQDN) text box, type lon-ap1.contoso.com.
5. Leave Port number and Authentication method values unchanged, and then click OK.
6. In the Return e-mail address text box, type administrator@contoso.com, and then click OK.

**Task 2: Create an email notification template**
1. In the Administration workspace, under Notifications click Templates.
2. In the Tasks pane, click Create E-mail Template.
3. In the Create E-Mail Notification Template Wizard, on the General page, in the Notification template name text box, type Incident Notification e-mail, and then click Browse.
4. In the Select a Class window, select Incident, click OK, and then click Next.
5. On the Template Design page, in the Message subject text box, type Incident has been created.
6. Click in Message body text box, type The incident has been created in Service Manager, press Enter, and then click Insert.
7. In the Select Property window, in the left pane, select Affected User, in the right pane, click User Name, click Add, and then click Next.
8. On the Summary page, click Create.

**Task 3: Configure notification subscriptions**
1. In the Administration workspace under Notifications, click Subscriptions.
2. In the Tasks pane, click Create Subscription.
3. In the Create E-Mail Notification Subscription Wizard, on the Before You Begin page, click Next.
4. On the General page, in Notification subscription name text box, type Incident Subscription, and then click Browse.
5. In the Select a Class window, select Incident, and then click OK.
6. Verify that in the When to notify drop-down box When an object of the selected class is created, is selected, and then click Next.
7. On the Additional Criteria page, in Available properties section, select Priority, and then click Add.
8. Under Criteria, click on the less-than arrow, select is less than or equal to, type 4, and then click Next.
10. In the Select E-Mail Notification Template window, select Incident Notification e-mail, click OK, and then click Next.
11. On the **Recipient** page, click **Add**.

12. In the **Select objects** dialog box, select **CONTOSO\Administrator**, click **Add**, click **OK**, and then click **Next**.

13. On the **Related Recipients** page, click **Add**, select **Affected User**, click **Add**, and then click **Next**.

14. On the **Summary** page, click **Create**.

15. On **Completion** page, click **Close**.

16. Close the **Service Manager console**.

**Results:** After this exercise you should have configured a Notification Channel, Notification Template and A Notification Subscription in Service Manager.
Module 10: Configuring High Availability, Disaster Recovery and Protection for a Cloud

Lab: Protecting the Private Cloud Infrastructure

Exercise 1: Configuring the Storage Pool

▶ Task 1: Add the disk to the storage pool

1. On LON-DM1 from the desktop, double-click Microsoft System Center 2012 R2 Data Protection Manager.

2. In the System Center 2012 R2 DPM Administrator Console, click the Management workspace, in the navigation pane, click Disks, on the ribbon, click Rescan, and then click Add.

3. In the Add Disks to Storage Pool window, in the Available disks list, click Disk 1, click Add, and then click OK.

4. Verify that Disk 1 appears in the details pane under DPM Storage Pool Disks.

Results: After this exercise, you should have added a disk to the DPM storage pool.
Exercise 2: Deploying DPM Protection Agents

▶ Task 1: Automatically deploy a DPM protection agent on LON-SQ1
1. On LON-DM1, in the System Center 2012 R2 DPM Administrator Console, click the Management workspace.
2. In the navigation pane, click Agents, and then on the ribbon, click Install.
3. In the Protection Agent Installation Wizard, on the Select agent deployment method page, click Install agents and then click Next.
4. On the Select computers page, select LON-HOST2, LON-OR1 and LON-SQ1, click Add, and then click Next.
5. On the Enter credentials page, fill in the following information, and then click Next:
   • User name: Administrator
   • Password: Pa$$w0rd
   • Domain: Contoso.com
6. On the Choose restart method page, select No. I will restart the selected computers later, and then click Next.
7. On the Summary page, click Install.
8. After the installation results display Success, click Close.

▶ Task 2: Manually deploy and configure a protection agent on LON-AP2
1. Log on to LON-AP2 and browse to \LON-DM1\C$\DPM\Agents
2. Double-click DPMAgentInstaller_x64.exe,
3. In the Microsoft Software License Terms window that opens select I accept the license terms and conditions and then click OK.
4. After command prompt window displays and reports that the Agent installation completed successfully, press Enter.
5. Click Start, and then click Run.
6. In the Open text box, type cmd, and then click OK.
7. At the command prompt, type the following, and then press Enter:
   ```
   cd “C:\Program Files\Microsoft Data Protection Manager\DPM\Bin”
   ```
8. At the command prompt, type the following, and then press Enter:
   ```
   SetDpmServer.exe -dpmServerName LON-DM1 -isNonDomainServer -userName DpmAgentAcct
   ```
9. At the Enter the password for ‘DpmAgentAcct’ to connect to LON-DM1 prompt, type Pa$$w0rd, and then press Enter.
10. At the Retype the password to confirm prompt, type Pa$$w0rd, and then press Enter.
11. When the Configuration completed successfully!!! message displays, log off of LON-AP2.

▶ Task 3: Attach LON-AP2 to the DPM server
1. On LON-DM1, in the System Center 2012 R2 DPM Administrator Console click the Management workspace.
2. In the navigation pane, click **Agents**, and then on the ribbon, click **Install**.

3. In the Protection Agent Installation Wizard, on the **Select agent deployment method** page, select **Attach agents**, select **Computer in a workgroup or untrusted domain**, and then click **Next**.

4. On the **Select computers** page, fill in the following information:
   - Computer name: **LON-AP2**
   - Username: **DpmAgentAcct**
   - Password: **Pa$$w0rd**

5. Click **Add**, and then click **Next**.

6. On the **Summary** page, click **Attach**.

7. After the installation completes, click **Close**.

**Results:** After this exercise, you should have automatically deployed a DPM protection agent to a domain-joined computer, and then manually installed and configured the DPM protection agent on a workgroup computer.
Exercise 3: Creating and Configuring Protection Groups

► Task 1: Create a Hyper-V protection group for virtual machines
1. On LON-DM1, in the System Center 2012 R2 DPM Administrator Console, click the Protection workspace.
2. On the ribbon, click New.
3. In the Create New Protection Group Wizard, on the Welcome page, click Next.
4. On the Select protection group type page, leave Servers selected, and then click Next.
5. On the Select group members page, in the Available members pane, expand Contoso.com, expand LON-HOST2, expand HyperV, select the Online\20247D-LON-OR1 check box, and then click Next.
6. On the Select data protection method page, in the Protection group name field, type Hyper-V VMs, and then click Next.
7. On the Select short-term goals page, leave the default Retention range of 5 days, and then click Next.
8. On the Review disk allocation page, accept the default settings, and then click Next.
9. On the Choose replica creation method page, accept the default settings, and then click Next.
10. On the Choose consistency check options page, accept the default settings, and then click Next.
11. On the Summary page, review the settings, and then click Create Group.
12. When the group has been created successfully, click Close.

► Task 2: Create a SQL Server protection group
1. On LON-DM1, in the System Center 2012 R2 DPM Administrator Console, click the Protection workspace.
2. On the ribbon, click New.
3. In the Create New Protection Group Wizard, on the Welcome page, click Next.
4. On the Select protection group type page, leave Servers selected, and then click Next.
5. On the Select group members page, in the Available members pane, expand Contoso.com, expand LON-SQ1, expand All SQL Servers, expand LON-SQ1, select the AppController check box, and then click Next.
6. On the Select data protection method page, in the Protection group name text box, type App Controller Database, and then click Next.
7. On the Select short-term goals page, leave the default Retention range of 5 days, and then click Next.
8. On the Review disk allocation page, accept the default settings, and then click Next.
9. On the Choose replica creation method page, accept the default settings, and then click Next.
10. On the Choose consistency check options page, accept the default settings, and then click Next.
11. On the Summary page, review the settings, and then click Create Group.
12. When the group has been created successfully, click Close.
**Results:** After this exercise, you should have created a Hyper-V protection group and a SQL Server protection group.
Exercise 4: Configuring SQL Server Self-Service Recovery

► Task 1: Configure the SQL administrator recovery role
1. On LON-DM1, in the System Center 2012 R2 DPM Administrator Console, click the Protection workspace.
2. On the ribbon, click Self service recovery.
3. In the **DPM Self Service Recovery Configuration Tool for SQL Server** window, click Create Role.
4. On the Getting started page, click Next.
5. On the Specify security groups page, in the **Role Name** text box, type SQL Admins, in the Description text box, type SQL Self Service Recovery Role, and then click Add.
6. In the <domain\group> text box, type Contoso\SQL_Admins, and then click Next.
7. On the Specify recovery items page, click Add.
8. In the **Specify SQL Server Instance** text box, type LON-SQ1, in the Database name text box, type AppController, and then click Next.
9. On the Specify recovery targets page, accept the default settings, and then click Next.
10. Click Finish, and then click OK.
11. In the **DPM Self Service Recovery Configuration Tool for SQL Server** window, click Close.

► Task 2: Install the DPM self-service recovery tool on LON-SQ1
1. Log on to LON-SQ1 as Contoso\Administrator with the password Pa$$w0rd.
2. Right-click Start, and then click Run.
3. In the **Open** text box, type \lon-DM1\C$\DPM\ and then press enter.
5. In the **Microsoft System Center 2012 R2** window that opens click **DPM Self-Service Recovery**.
6. In the Microsoft Software License Terms window that opens click I accept the license terms and conditions and then click OK.
7. On the **Microsoft System Center 2012 R2 DPM Self Service Recovery Tool** window that opens click Install.
8. When setup completes, click Finish.

**Results:** After this exercise, you should have configured SQL Server self-service recovery and installed the DPM Self Service Recovery Tool.
Exercise 5: Restoring Data from a SQL Server Protection Group

Task 1: Recover data from LON-SQ1

1. On LON-DM1, open the System Center 2012 R2 DPM Administrator Console and then click the Recovery workspace.

2. In the navigation pane, expand Recoverable data, expand Contoso.com, expand LON-SQ1, expand All Protected SQL Instances, expand LON-SQ1, and then click AppController.

3. In the ribbon, click Recover.

4. In the Recovery Wizard, on the Review recovery selection page, click Next.

5. On the Select recovery type page, click Recover to original instance of SQL Server (Overwrite database), and then click Next.

6. On the Specify recovery options page, click Next.

7. On the Summary page, click Recover.

8. When the recovery completes, click Close.

Results: After this exercise, you should have recovered the latest recovery point of a SQL Server database to its original location.
Exercise 6: Performing Self-Service Recovery of SQL Server Data

**Task 1: Use self-service recovery to recover data from LON-SQ1**

1. Log on to LON-SQ1 as Contoso\SQL_Admin with the password Pa$$w0rd.
2. On LON-SQ1, on the desktop, double-click Microsoft System Center 2012 R2 DPM Self Service Recovery Tool.
3. In the DPM Self Service Recovery Tool, click Connect to Server.
4. In the Connect to DPM Server dialog box, in the DPM Server Name text box, type LON-DM1.contoso.com, and then click Connect.
5. Click New Recovery Job.
6. In the Recovery Wizard, on the Welcome page, click Next.
7. On the Specify database details page, in the SQL Server Instance Name or Availability Group drop-down list box, select LON-SQ1, in the Database Name drop-down list box, select AppController, and then click Next.
8. On the Specify Recovery Point page, leave the default recovery point selected, and then click Next.
9. On the Select recovery type page, leave the default selection, and then click Next.
10. If a Change Recovery Point page appears, select the Recovery Point and then click Next.
11. On the Specify destination page, in the Destination server (FQDN) text box, type LON-SQ1.contoso.com, in the Destination Folder text box, type C:\DatabaseRecovery\AppController, and then click Next.
12. On the Specify recovery options page, select Apply security settings of destination computer, and then click Next.
13. On the Summary page, click Recover, and then click OK.
14. When the recovery completes, click Close.
15. Confirm the AppController database has been recovered to the C:\DatabaseRecovery\AppController folder.
16. Log off of LON-SQ1.

**Results:** After this exercise, you should have recovered the latest recovery point of a SQL Server database to a folder on your computer so that you can copy it to your development server.
Module 11: Automating and Standardizing a Cloud
Lab: Automating a Private Cloud

Exercise 1: Deploying a Runbook Server and Configuring Integration Packs

- **Task 1: Deploy a runbook server on LON-AP2**
  1. On LON-OR1, from the desktop, double-click **Deployment Manager**.
  2. In the left pane, expand the **Runbook Servers** node.
  4. On the **Welcome** page, click **Next**.
  5. On the **Service Information** page, enter the following information, and then click **Next**:
     - **Computer**: LON-AP2
     - **Account Information – User name**: Contoso\Administrator
     - **Account Information- Password**: Pa$$w0rd
  6. On the **Integration Pack or Hotfix Deployment** page, click **Next**.
  7. On the **Completing the Runbook Server Deployment Wizard** page, click **Finish**.
  8. Wait for deployment to complete. This can take up to 15 minutes.

- **Task 2: Register System Center 2012 R2 integration packs**
  1. In the left pane, expand **Orchestrator Management Server**, right-click **Integration Packs**, and then click **Register IP with the Orchestrator Management Server**. The Integration Pack Registration Wizard starts.
  2. On the **Welcome to the Integration Pack Registration Wizard** page, click **Next**.
  3. On the **Select Integration Packs or Hotfixes** page, click the **Add** button. In the Open navigation pane, click **This PC**, double-click **Local Disk (C:)**, double-click OR2012, double-click **IntegrationPacks**, in the details pane, click **SC2012R2_Integration_Pack_for_Data_Protection_Manager.oip**, and then click **Open**.
  4. Click the **Add** button.
  5. In the Open navigation pane, click **Computer**, double-click **Local Disk (C:)**, double-click OR2012, double-click **IntegrationPacks** in the details pane, click **SC2012R2_Integration_Pack_for_Operations_Manager.oip**, and then click **Open**.
  6. Click the **Add** button.
  7. In the Open navigation pane, click **Computer**, double-click **Local Disk (C:)**, double-click OR2012, double-click **IntegrationPacks**, in the details pane, click **SC2012R2_Integration_Pack_for__Virtual_Machine_Manager.oip**, and then click **Open**.
  8. After adding all three integration packs, click **Next**.
  9. On the **Completing the Integration Pack Wizard** page, click **Finish**.
  10. In each Microsoft License Agreement dialog box, click **Accept**.
  11. Wait for each integration pack to finish registering.
Task 3: Deploy System Center 2012 R2 integration packs to LON-OR1 and LON-AP2
1. In the Management Server pane, expand Orchestrator Management Server, right-click Integration Packs, and then click Deploy IP to Runbook Server or Runbook Designer. The Integration Pack Deployment Wizard starts.
2. On the Welcome to the Integration Pack Registration Wizard page, click Next.
3. On the Deploy Integration Packs or Hotfixes page, select the check box next to the following, and then click Next:
   • System Center Integration pack for System Center 2012 Data Protection Manager
   • System Center Integration pack for System Center 2012 Virtual Machine Manager
   • System Center Integration pack for System Center 2012 Operations Manager
4. On the Computer Selection Details page, in the Computer field, type LON-OR1, and then click Add.
5. To add the second Runbook server, in the Computer field, type LON-AP2, click Add, and then click Next.
8. Wait for each integration pack to deploy.
9. Close the System Center 2012 R2 Orchestrator Deployment Manager.

Task 4: Configure the System Center Integration Pack for System Center 2012 R2 Virtual Machine Manager
1. On LON-OR1, from the desktop double-click Runbook Designer.
2. Click the Options menu, and then click SC 2012 Virtual Machine Manager.
3. On the Prerequisite Configuration page, click Add.
4. In the Add Configuration dialog box, in the Name field, type LON-VM1, and then next to the Type field, click the ellipsis.
5. In the Item Selection box, click System Center Virtual Machine Manager, and then click OK.
6. In the Add Configuration dialog box, type the following information:
   • VMM Administrator Console: LON-VM1
   • VMM Server: LON-VM1
   • User: Administrator
   • Domain: CONTOSO
   • Password: Pa$$w0rd
7. Leave the remaining fields with the default settings, and then click OK.
8. On the Prerequisite Configuration page, click Finish.

Task 5: Configure the System Center Integration Pack for System Center 2012 R2 Data Protection Manager
1. From the Options menu, click SC 2012 Data Protection Manager.
2. On the Prerequisite Configuration page, click Add.
3. In the **Add Configuration** dialog box, in the **Name** field, type **LON-DM1**, and then next to the **Type** field, click the ellipsis.

4. In the **Item Selection** box, click **PowerShell Remoting**, and then click **OK**.

5. In the **Add Configuration** dialog box, type the following information:
   - DPM Administrator Console: **LON-DM1**
   - DPM Server: **LON-DM1**
   - User: **Administrator**
   - Domain: **CONTOSO**
   - Password: **Pa$$w0rd**

6. Leave the remaining fields with the default settings, and then click **OK**.

7. On the **Prerequisite Configuration** page, click **Finish**.

**Task 6: Configure the System Center Integration Pack for System Center 2012 R2 Operations Manager**

1. From the **Options** menu, click **SC 2012 Operations Manager**.

2. On the **Microsoft System Center Operations Manager Connections** page, click **Add**.

3. In the **Connection** dialog box, type the following information:
   - Name: **LON-OM1**
   - Server: **LON-OM1**
   - Domain: **CONTOSO**
   - User name: **Administrator**
   - Password: **Pa$$w0rd**

4. Click **OK** to close the connection settings.

5. On the **Microsoft System Center Operations Manager Connections** page, click **Finish**.

**Results:** After this exercise, you should have deployed a runbook server, and registered, deployed, and configured the System Center 2012 R2 integration packs.
Exercise 2: Configure a Template to Deploy Agents on a New Virtual Machine

- **Task 1: Configure the Virtual machine template**

1. On LON-VM1, open the Virtual Machine Manager Console. If necessary, select **Use current Microsoft Windows session identity**, and then click **Connect**.
2. In the Virtual Machine Manager console, click the **Library** workspace.
3. In the navigation pane, click **VM Templates**, in the details pane, right-click **StockTrader Web Application Server**, and then click **Properties**.
4. In the Properties dialog box, click the **OS Configuration** tab, and then click **[GUIRunOnce] Commands**.
5. From the details pane, in the Command to add field type: `\lon-dm1\C$\DPM\Agents\amd64\DPMAgentInstaller_x64.exe /q LON-DM1`, and then click **Add**.
6. Click **OK** to close the Properties dialog box.
7. Close the Virtual Machine Manager console and log off LON-VM1.

**Results:** After this exercise, you should have configured the StockTrader Web Application Server virtual machine template so that it will install the DPM protection agent automatically after the template has deployed.
Exercise 3: Creating a Runbook to Protect All Resources on a Virtual Machine Scenario

▶ Task 1: Create variables for DPMServer, DPMUser, and DPMPassword

1. On LON-OR1, open the Runbook Designer.

2. In the Connections pane, expand LON-OR1, expand Global Settings, right-click Variables, point to New, and then click Folder.

3. Type AutomateDeploy, and then press Enter.

4. Right-click AutomateDeploy, point to New, and then click Folder.

5. Type 1. ProtectVM, and then press Enter.

6. Right-click 1. ProtectVM, point to New, and then click Variable.

7. In the General Information dialog box, type the following information:
   • Name: DPMServer
   • Value: LON-DM1

8. Click Finish.

9. Right-click 1. ProtectVM, point to New, and then click Variable.

10. In the General Information dialog box, type the following information:
    • Name: DPMUser
    • Value: Administrator

11. Click Finish.

12. Right-click 1. ProtectVM, point to New, and then click Variable.

13. In the General Information dialog box, type the following information:
    • Name: DPMPassword
    • Value: Pa$$w0rd
    • Select the Encrypted Variable check box.

14. Click Finish.

▶ Task 2: Create a new runbook named ProtectVM

1. On LON-OR1, open the Runbook Designer.

2. In the Connections pane, expand LON-OR1, right-click Runbooks, point to New, and then click Folder.

3. Type AutomateDeploy, and then press Enter.

4. In the Connections pane, expand LON-OR1, expand Runbooks, right-click AutomateDeploy, point to New, and then click Folder.

5. Type 1. ProtectVM, and then press Enter.

6. In the Connections pane, expand LON-OR1, expand Runbooks, expand AutomateDeploy, right-click on 1. ProtectVM, point to New, and then click Runbook.

7. On the toolbar, click Check Out.

8. Right-click the New Runbook tab, click Rename, type ProtectVM, and then press Enter.
9. In the **Activities** pane, click the **Runbook Control** workspace, and then drag **Initialize Data** onto the **Runbook Designer** workspace.

10. Right-click **Initialize Data**, and then click **Properties**.

11. In the **Initialize Data Properties** dialog box, click the **Details** tab, and then click **Add**.

12. Click **Parameter 1**. The **Data** dialog box opens.

13. In the **Activity data** field, type **VMName**, and then click **OK**.

14. Click **Finish** to close the **Initialize Data Properties** dialog box.

15. In the **Activities** pane, click the **SC 2012 Data Protection Manager** workspace, and then drag **Run DPM PowerShell Script** onto the **Runbook Designer** workspace.

16. Click the arrow to the right of **Initialize Data**, and drag the smart link to **Run DPM PowerShell Script**.

17. Right-click **Run DPM PowerShell Script**, and then click **Properties**. The **Run DPM PowerShell Script Properties** dialog box opens.

18. On the **Properties** tab, click the button next to **Name**, select **LON-DM1**, and then click **OK**.

19. Right-click inside the **PowerShell Script** box and then click **Expand**.

20. Type the following and then click **OK**:

    ```
    'C:\Program Files\Microsoft System Center 2012 R2\DPM\bin\Attach-ProductionServer.ps1' -DPMServerName (DPMServer) -PSName (VMName from "Initialize Data") -Username (DPMUser) -password (DPMPassword) -domain Contoso
    ```

21. In **Output Variable 01**, type **$results**, and then click **Finish**.

22. In the **Activities** pane, click the **SC 2012 Data Protection Manager** workspace, and then drag **Get Data Source** onto the **Runbook Designer** workspace.

23. Click the arrow to the right of **Run DPM PowerShell Script**, and then drag the smart link to **Get Data Source**.

24. Right-click **Get Data Source**, and then click **Properties**. The **Get Data Source Properties** dialog box opens.

25. On the **Properties** tab click the ellipsis next to the **Name** field. In the **Item Selection** dialog box, click **LON-DM1**, and then click **OK**.

26. In the **Production Server** box, remove **Production Server**, right-click and point to **Subscribe**, and then click **Published Data**.

27. In the **Published Data** dialog box, click the drop-down arrow and select **Initialize Data**, click **VMName**, and then click **OK**.

28. Click Finish to close the **Get Data Source Properties** dialog box.

29. In the **Activities** pane, click the **SC 2012 Data Protection Manager** workspace, and then drag **Protect Data Source** onto the **Runbook Designer** workspace.

30. Click the arrow to the right of **Get Data Source**, and then drag the smart link to **Protect Data Source**.

31. Right-click **Protect Data Source**, and then click **Properties**. The **Protect Data Source Properties** dialog box opens.
32. On the Properties tab, click the ellipsis next to the Name field. In the Item Selection dialog box, click LON-DM1, and then click OK.

33. In the Data Source ID field, right-click and point to Subscribe, and then click Published Data. On the Published Data dialog box, click DataSourceID, and then click OK.

34. In the Protection Group field, type PG1.

35. Click Finish to close the Protect Data Source Properties dialog box.


**Results:** After this exercise, you should have created a runbook to attach the virtual machine to Microsoft System Center 2012 R2 Data Protection Manager, and to protect all of the specified virtual machines data sources.
Module 12: Configuring a Self-Service Multi-Tenant Cloud with the Windows Azure Pack

Lab: Configuring the Windows Azure Pack

Exercise 1: Configuring the Windows Azure Pack

► Task 1: Configuring a VM cloud
1. Logon to LON-WAP and from the desktop double-click WAP - Admin.
2. In the Internet Explorer window that opens click Continue to this website (not recommended).
3. In the Windows Security dialog box that opens type Contoso\Administrator in the User name box.
4. Type Pa$$w0rd in the Password box and then click OK.
5. In the Service Management Portal click the VM CLOUDS tab and then in the details pane click First you must register your System Center Service Provider Foundation.
6. In the Register System Center Service Provider Foundation dialog box that opens type https://lon-vm1.contoso.com:8090 in the SERVICE URL box.
7. Type Contoso\Administrator in the USERNAME box.
8. Type Pa$$w0rd in the PASSWORD box and then click the tick box.
9. From the details pane click the CLOUDS tab and then click USE AN EXISTING MACHINE CLOUD PROVIDER TO PROVISION VIRTUAL MACHINES.
10. In the CONNECT TO dialog box that opens type lon-vm1.contoso.com in the VIRTUAL MACHINE MANAGER SERVER FQDN box and then click REGISTER.
11. Wait for approximately 1 minute and then in the details pane, on the CLOUDS tab expand lon-vm1.contoso.com.
12. Click StockTrader Cloud.
13. Review the stocktrader cloud properties that are displayed including the CORES, RAM, STORAGE and VIRTUAL MACHINES.
14. In the top-left of the Internet Explorer window click Service Management Portal to return to the All ITEMS page.

► Task 2: Configuring a website cloud
1. In the Service Management Portal click the WEB SITE CLOUDS tab.
2. From the details pane click Register your existing Web Site Cloud REST Endpoint.
3. In the CONNECT TO dialog box that opens type StockTrader Web Site Cloud in the DISPLAY NAME box.
4. Type https://lon-vm1.contoso.com in the WEB SITE CLOUD REST ENDPOINT box.
5. Type CloudAdmin in the USERNAME box.
6. Type Pa$$w0rd in the PASSWORD box and then click CONNECT.
7. Click the Clouds tab then click StockTrader Web Site Cloud.
8. In the stocktrader web site cloud page that opens click the DASHBOARD tab and review the information displayed.
9. Click the ROLES tab and review the information displayed.
10. Click the WEB SITES page and review the information displayed.
11. Click the CONFIGURE tab and review the information displayed.
12. Click the CREDENTIALS tab and review the information displayed.
13. In the top-left of the Internet Explorer window click Service Management Portal to return to the All ITEMS page.

► Task 3: Configuring SQL Server resources
1. In the Service Management Portal click the SQL SERVERS tab.
2. From the details pane click Add an existing server to the hosting server group.
3. In the CONNECT TO dialog box that opens type LON-WAP in the SQL SERVER NAME box.
4. Type sa in the USERNAME box.
5. Type Pa$$w0rd in the PASSWORD box.
6. Type 50 in the SIZE OF HOSTING SERVER IN GB box and then click CONNECT.
7. From the details pane click LON-WAP.
8. In the lon-wap page that opens click the DASHBOARD tab and review the information provided.
9. In the top-left of the Internet Explorer window click Service Management Portal to return to the All ITEMS page.

► Task 4: Configuring automation
1. In the Service Management Portal click the AUTOMATION tab.
2. From the details pane click Register the Service Management Automation endpoint.
3. In the REGSITER SERVICE MANAGEMENT AUTOMATION dialog box that opens type https://lon-or1.contoso.com:9090 in the SERVICE URL box.
4. Type Contoso\Administrator in the USER NAME box.
5. Type Pa$$w0rd in the PASSWORD box and then click the tick box.
6. From the details pane click the DASHBOARD tab and review the information provided.
7. Click the RUNBOOKS tab and review the information provided.
8. Click the ASSETS tab and review the information provided.
9. In the top-left of the Internet Explorer window click Service Management Portal to return to the All ITEMS page.
10. From the ALL ITEMS page review the information in the details pane and confirm the StockTrader Cloud and StockTrader Web Site Cloud are displayed.

► Task 5: Configuring a hosting plan
1. In the Service Management Portal click the PLANS tab.
2. From the details pane click CREATE A NEW HOSTING PLAN.
3. In the AUTHOR A HOTING PLAN wizard that opens, on the Lets Create a Hosting Plan page, type StockTrader Hosting Plan in the PLEASE SELECT A FRIENDLY NAME FOR YOUR PLAN box and then click the right-arrow.
4. On the **Select services for a Hosting Plan** page select **WEB SITE CLOUD, VIRTUAL MACHINE CLOUD** and **SQL SERVERS** and then click the right-arrow.

5. On the **Select add-ons for the plan** page click the tick box.

6. From the details pane wait until the **STATUS** column for the **StockTrader Hosting Plan** displayed **Not Configured** and then click **StockTrader Hosting Plan**.

7. In the **stocktrader hosting plan** page that opens, under **plan services** click **Virtual Machine Clouds**.

8. In the **virtual machine clouds** page click the drop-down list next to **VMM MANAGEMENT SERVER** and then click **lon-vm1.contoso.com**.

9. Click the drop-down list next to **VIRTUAL MACHINE CLOUDS** and then click **StockTrader Cloud**.

10. Scroll down and under the **networks** section click **Add networks**.

11. In the **Select networks to add to this plan** window select **External Network** and then click the tick box.

12. Under the **hardware profiles** section click **Add hardware profiles**.

13. In the **Select hardware profiles to add to this plan** window select **WinServer2012R2** and then click the tick box.

14. Under **templates** click **Add templates**.

15. In the **Select templates to add to this plan** window select **Windows Server 2012 R2** and then click the tick box.

16. Under the **additional settings** section select **Connect to the console of virtual machines** and then click **SAVE**.

17. In the top-left of the **Internet Explorer** window click **Service Management Portal** to return to the **All ITEMS** page.

18. Click the **PLANS** tab and from the bottom of the **Internet Explorer** page click **CHANGE ACCESS** and then click **Public**.

19. In the **Make StockTrader Hosting Plan public? The plan will be viewable and subscribers can start signing up with the plan** message box that opens click **Yes**.

20. Notice from the details pane that the **STATUS** column for the **StockTrader Hosting Plan** now displays **Public**.

21. In the top-left of the **Internet Explorer** window click **Service Management Portal** to return to the **All ITEMS** page.

**Task 6: Creating a user account for StockTrader**

1. In the **Service Management Portal** click the **USER ACCOUNTS** tab.

2. From the details pane click **CREATE A NEW USER**.

3. In the **QUICK CREATE** dialog box that opens type **StockTrader_User@contoso.com** in the **ENTER EMAIL ADDRESS** box.

4. Type **Pa$$w0rd** in the **PASSWORD** and **CONFIRM PASSWORD** boxes.

5. Under **CHOOSE PLAN** click **StockTrader Hosting Plan (public)** and then click **Create**.

6. From the details pane wait until the **stocktrader_user@contoso.com** user account is displayed.
7. In the top-left of the Internet Explorer window click Service Management Portal to return to the All ITEMS page.

8. Close Internet Explorer.

Task 7: Confirming tenant access for StockTrader

1. From the desktop on LON-WAP double-click WAP-Tenant.

2. In the Internet Explorer window that opens click Continue to this website (not recommended).

3. In the Service Management Portal that opens type StockTrader_User@contoso.com in the Email Address box.

4. Type Pa$$w0rd in the Password box and then click Submit.

5. In the MANAGEMENT PORTAL TOUR wizard that opens, on the Welcome page, click the right-arrow and review the information provided.

6. On the Main Menu page, click the right-arrow and review the information provided.

7. On the Create New page, click the right-arrow and review the information provided.

8. On the Commands page, click the right-arrow and review the information provided.

9. On the Notifications page click the tick box.

10. In the NEW page that opens click the X button to close the page.

11. Click the My ACCOUNT tab and then from the details page click the SUBSCRIPTIONS tab.

12. From the details pane confirm the StockTrader Hosting Plan is displayed.

13. Close Internet Explorer.

Results: After this exercise you should have used the Windows Azure Pack to create a VM Cloud, a Website Cloud and an SQL Server Database resource. You should have then created a hosting plan that includes these resources. You should have also configured Automation in Windows Azure Pack and also created a new User Account. Finally you should have used logged into the Tenant Portal using the new User Account and confirmed that the Windows Azure Pack resources are available.