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**.
9. On the **Host Settings** page, click **Next**.
10. On the **Summary** page, click **Finish**.
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**.
9. On the **Resources** page 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.**
12. On the **Summary** page, click **Finish**.
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

1. On LON-VM1, in the **Virtual Machine Manager console**, in the **Library** workspace, in the **Library Servers** node, select **LON-VM1.contoso.com**.
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**.
6. On the **Summary** page click **Finish**.
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.**
16. Close the **Jobs** window.

▶ 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.
14. Close the **Jobs** window.
15. Click **LON-HOST1** and then confirm the **TestVM** virtual machine is displayed in the details pane.
16. Close the **Virtual Machine Manager console**.

 **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**.

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

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

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

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

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

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

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

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

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

x. Close the MMC Console without saving it.

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

z. Click **Start** then type **Shell** and then click **Virtual Machine Manager Command Shell**.

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**.

cc. 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**.

- 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.

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.
3. Right-click **LON-VM1.Contoso.com**, and then click **Configure Server**. The Windows Deployment Services Configuration Wizard starts.
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:\RemoteInstall**, 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**.
9. Close the **Windows Deployment Services** console.

▶ 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**.

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**.
7. On the **OS Configuration** page, under **General Settings**, select **Domain**. In the details pane, in the **Domain** field, type **Contoso.com**.
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**.
11. On the **Summary** page click **Finish**.
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.**
3. Right-click **Update Server**, and then click **Add Update Server**. The **Add Windows Server Update Services Server** dialog box opens**.**
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**
10. On the **Summary** page, click **Finish**.
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**.
8. Shut down LON-VM1.

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 **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.

```
Set-ExecutionPolicy RemoteSigned –Scope Process –Force
```

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**.
9. Under **Network Adapters**, click **Network Adapter 1**.
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**.
16. On the **Summary** page, click **Create**.
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**.
13. On the **Summary** page, click **Create**.
14. Close the **Jobs** window.

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**.
7. Close the **Virtual Machine Manager Service Template Designer – StockTrader Application new** window.

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**.
8. On the **Library servers** page, click **Add**.
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 **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 **Add**, click **Administrator account** and then click **OK**, then click **Next**.
12. On the **Summary** page, click **Finish**.
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**.
12. On the **Summary** page, click **Finish**.
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**.
13. On the **Capacity** page, click **Next.**
14. On the **Capability Profiles** page, 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 – WebServerver1** 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.
22. Close the Virtual Machine Viewer.
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.
6. Double-click the Windows Server 2012 R2 – Machine Tier 1 box.
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**.
10. On the **Discovery Method** page, click **Next**.
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

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

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

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: **LON-OM1.Contoso.com**

- 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**.
12. Close the Windows Explorer window.
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
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**.
13. Close the **Operations console**.

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 Mo**bile 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**
6. On the **Summary** page, click **Finish**.
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**.
11. Close the **Operations console**.

▶ 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**.
9. On the **Installation Settings** page, 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**.
12. On the **Installation** page, click **Close**.
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.
5. Close Windows Explorer.

▶ 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.

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**.
9. On the **Export File Format 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**.
13. Click **OK** on the **Certificate Export Wizard** popup window.
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**.
21. Click **Next** on the **Certificate Store** page then on the **Completing the Certificate Import Wizard** page click **Finish**.
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

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 **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**.
7. On the Choose Watcher Nodes page, select the **LON-OM1.Contoso.com** check box.
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 A**dd 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**.
11. On the **Summary** page, click **Finish**.
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 Detai**l report.

Note: If the report is displayed in red, this normal and shows that the service level goals are not being met.

8. Close the Service Level Tracking Summary Report.
9. Close the **Operations console**.

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

```
.\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/**
6. Close Windows® Internet Explorer®.

▶ 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**.
4. Open Internet Explorer and browse to **http://LON-OM1/OperationsManager.**
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**.
9. In the **Operations Manager Dashboard Viewer Web Part** pane, in the **Operations Manager web console environments** box, select **LON-OM1**.
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.

	Impact: Low	**Impact:** Medium	**Impact:** High
Urgency: **Low**	9	8	7
Urgency: **Medium**	6	5	4
Urgency: **High**	3	2	1

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**.

	Impact: Low	**Impact:** Medium	**Impact:** High
Urgency: **Low**	9	8	7
Urgency: **Medium**	6	5	4
Urgency: **High**	3	2	1

▶ 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**.
16. On the **Completion** page, click **Close**.

▶ 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**.
25. On the **Dynamic Members** page, click **Next**.

26. On the **Subgroups** page, click **Next**.
27. On the **Excluded Members** page, click **Next**.
28. On the **Summary** page, click **Create**.
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**.
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, 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**.
10. On the **Alert Routing Rules** page, click **Add**.
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 **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**.
14. On the **Summary** page, click **Create**.
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**.
5. On the **Connection** page, in the **Server Name** text box, type **LON-VM1.contoso.com**.
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**.
9. On the **Summary** page, click **Create**.
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

1. On LON-SM1, open Windows® Internet Explorer®, and then type **http://lon-ap1:8083/SMPortal**. Press Enter.
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.
14. On LON-SM1, in the **Self-Service Portal**, in the navigation pane, click **My Requests**.
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**.
9. On **Completion** page, click **Close**.

▶ 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**.
9. On the **Template** page, click **Select**.
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.
4. Double-click **Setup**.
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**.
9. Log off of **LON-SQ1**.

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.
3. Right-click **Runbook Servers**, and then click **Deploy new Runbook Server**. The Runbook Server Deployment Wizard starts.
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 Co**mpleting 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. 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**.
6. Leave the default settings on the **Installation Configuration** page, and click **Next**.
7. On the **Completing the Integration Pack Deployment Wizard** page, click **Finish**.
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\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.
36. Close the **System Center 2012 Orchestrator Runbook Designer**.

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 **DASHBOAD** 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.

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