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# 20414B

## Implementing an Advanced Server Infrastructure

*Companion Content*

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# Module 1

## Overview of Management in an Enterprise Data Center

### Contents:

Lesson 1

# Overview of the Enterprise Data Center

## Contents:

## Resources

## Providing Secure Services in the Data Center

**Additional Reading:** All of these additional Active Directory services are covered in this course except for AD LDS. For more information about AD LDS, see the Active Directory Lightweight Directory Services Overview page at http://go.microsoft.com/fwlink/?LinkID=286067.

Lesson 2

# Overview of the Microsoft System Center 2012 Components

## Contents:

# Resources

## Overview of Configuration Manager

**Reference Links:** For more information about System Center 2012 Configuration Manager capabilities, go to http://go.microsoft.com/fwlink/?LinkID=286070.

## Overview of Virtual Machine Manager

**Reference Links:** For more information about new features in VMM 2012 and VMM 2012 SP1, go to:
What's New in System Center 2012 - Virtual Machine Manager at http://go.microsoft.com/fwlink/?LinkId=253224.

## Overview of Service Manager

**Additional Reading:** For more information, go to:
System Center 2012 - Service Manager Parts at http://go.microsoft.com/fwlink/?LinkId=253994.

## Overview of Operations Manager

**Reference Links:** To search for and to download Management packs for System Center, go to: http://go.microsoft.com/fwlink/?LinkID=286068

**Reference Links:** For more information, go to How to connect VMM with Operations Manager - http://go.microsoft.com/fwlink/?LinkID=286069

## Additional System Center Services and Tools

**Reference Links:** For more information, go to:

- System Center 2012 – Virtual Machine Manager Component Add-ons and Extensions - http://go.microsoft.com/fwlink/?LinkID=285266.
- Microsoft Baseline Configuration Analyzer 2.0 - http://go.microsoft.com/fwlink/?LinkID=286071.

# Module Review and Takeaways

## Review Question(s)

**Question:** Explain how System Center components are integrated, and list the benefits of integration.

**Answer:** System Center integrates the various components by using:

- Operations Manager Monitoring Management Packs
- Orchestrator Integration Packs
- System Center Cloud Services Process Pack
- Connectors

Integration provides the monitoring of the System Center environment and automation of several data center–related tasks that are involved with managing and maintaining the enterprise data center. This includes provisioning virtual machines and automatically creating incidents in Service Manager by using alerts within Operations Manager. Additionally, you can use the Operations Console to perform many of the tasks that you perform within individual consoles.

**Question:** What additional high availability option do you get when you deploy virtual machines that you do not have with physical machines?

**Answer:** You can make the virtual machine highly available so that you can support applications that do not provide any other type of high availability.

# Lab Review Questions and Answers

## Lab: Considerations for Implementing an Enterprise Data Center

## Question and Answers

**Question:** How do the requirements at A. Datum compare to your organization's requirements? What requirements are similar? What additional requirements do you have?

> **Answer:** Answers will vary significantly. Probably none of the students will have the same requirements, but there should be some overlap between the student requirements and the A. Datum requirements.

**Question:** What services and tools are you using to manage your data center? How well integrated are the tools?

> **Answer:** Answers will vary. Most organizations have some tools that they use, but they tend not to be well integrated.

# Module 2

## Planning and Implementing a Server Virtualization Strategy

### Contents:

Lesson 1

# Planning a VMM Deployment

## Contents:

## Question and Answers

**Question:** After reading the scenario, answer the following questions:

1. How can you determine the number of virtualization hosts that are necessary for the deployment? What factors must you consider?
2. What can you do to ensure developers can create resources on premises, and then transfer them to Windows Azure™?
3. What should you consider when planning to deploy the App Controller and the VMM Management Server on the same server?

**Answer:**

1. You can review the amount of physical memory and the physical, logical processor cores that are assigned to all of the systems that you must virtualize. You can use the Microsoft Assessment and Planning Toolkit (MAP) to analyze requirements more thoroughly, so that you can determine how much memory and processor utilization you currently are using. This would provide valuable sizing data.
2. For the developers, you can provide and delegate access to System Center 2012 -- App Controller.
3. When planning to deploy the App Controller and VMM Management Server on the same server, you should change the port that the VMM server uses to deploy files. This is because only one service can listen on a single port.

Lesson 2

# Planning a VMM Deployment

## Contents:

## Question and Answers

**Question:**

1. Why would you want to create an equivalent object?
2. What are five types of objects that a library might store?
3. How could you prevent two web servers from running on the same host server?

**Answer:**

1. Equivalent objects help ensure that you can use a single template across multiple sites.
2. Five types of objects that a library may store include SQL s, scripts, Web Deployment packages, Microsoft Application Virtualization (Server App-V) packages, driver files, answer files, customer resources, and virtual disk drives.
3. You can prevent web servers from running on the same hosts by configuring custom properties on the virtual machines and host, and then creating a placement rule.

## Resources

## Adding Virtualization Hosts to VMM

**Best Practice:** You should consider security requirements before you add other vendor hosts to your network. For example, you must decide how to implement certificates for virtualization hosts, and you may want to determine how to use a Run As account.

**Reference Links:** For more information, go to:

- System Requirements: VMware ESX Hosts at http://go.microsoft.com/fwlink/p/?linkId=285337
- System Requirements Citrix XenServer Hosts at http://go.microsoft.com/fwlink/p/?linkId=285261

## Deploying Hyper-V Hosts

**Best Practices:** Some considerations for bare-metal deployment:

- You should ensure that your baseboard firmware is current, and consider updating all firmware before deployment.
- Make sure that you have enough space for the VHD on the physical server partition, because VMM will cache drivers during deployment.
- When creating the VHD or VHDX file, consider the size of the host page file. The host's RAM will determine this. After you deploy the server, remote administration will not be enabled. Consider creating a Group Policy that enables remote administration.

## Working with VMM Libraries

**Additional Reading:** For more information, go to Configuring the Library Overview at http://go.microsoft.com/fwlink/p/?linkId=285262

# Demonstration: Configuring Host Groups

## Demonstration Steps

### Reviewing Virtual Machine Manager Host Groups

1. On LON-VMM1, on the task bar, click Virtual Machine Manager Console.
2. On the **Connect to Server** dialog box, ensure that the **Use current Microsoft Windows session identity** check box is selected, and then click **Connect**. The Virtual Machine Manager Console opens.
3. Click **VMs and Services**, and then in the navigation pane, click **All Hosts**.
4. On the ribbon, click **Create Host Group.**
5. Type **Classroom** for the host group name.
6. Right-click the host group that you created, and then click **Properties**. Discuss the options on the **General** properties page**.**
7. Click **Placement Rules**, and then discuss the options.
8. Click **Host Reserves**, and then discuss the options.
9. Click **Dynamic Optimization**, and then discuss the options.
10. Click **Settings** in the **Power optimization** area, and then discuss these options. Click **Cancel** to close the dialog box.
11. Click **Network**, and then discuss the options.
12. Click **Storage**, and then discuss the options.
13. Click **Customer Properties**, and then discuss the options.
14. Click **Cancel** to close the **Classroom Properties** dialog box.
15. Keep **LON-DC1** and **LON-VMM1** running, they are required for the next demonstration in this lesson.

# Demonstration: Managing VMM Libraries

## Demonstration Steps

**Configure a Library and Library share**

1. On **TOR-SVR1,** on the Server Manager Dashboard, click **File and Storage Services**, and then click **Shares**. In the Shares workspace click **Tasks**, click **New Share**, click **SMB Share – Quick,** click **Next**, click **Next,** type **TORVMMLibrary**, click **Next**, click **Next**, click **Next**, and then click **Create**.
2. Click **Close**.
3. On **LON-VMM1**, open the Virtual Machine Manager Console, click **Library** in the bottom left of the screen. From the ribbon, click **Add Library Server**. On the **Enter Credentials** page, click **Enter a user name and password**, and then enter the following credentials:
    - User name: **Adatum\Administrator**
    - Password: **Pa$$w0rd**
4. Click **Next**, and then click **Search**.
5. In the **Computer name** field, type **TOR-SVR1**, and then click **Search**.

6. On the **Computer Search** page, click **tor-svr1.adatum.com**, click **Add**, click **OK**, and then click **Next**.
7. Click the box next to **TORVMMLibrary**, and then click the box next to **Add Default Resources.**
8. Click **Next**, and then click **Add Library Servers.**
9. Review the job status, and then close the Jobs window.
10. Keep all virtual machines running, they are required for demonstrations in the next Module.

# Module Review and Takeaways

## Common Issues and Troubleshooting Tips

| Common Issue | Common Issues and Troubleshooting Tips |
|---|---|
| Unable to add ESX or XenServer hosts | Check name resolution, check any firewalls, and verify certificates.<br><br>Check that adequate permissions have been granted on the hosts. Ensure you use the correct RunAs account. |

# Module 3

## Planning and Implementing Networks and Storage for Virtualization

### Contents:

Lesson 1

# Planning a Storage Infrastructure for Virtualization

## Contents:

## Question and Answers

**Question:** Review the scenario above. How would you plan an alternative design that will lower the amount of the Fibre Channel switching infrastructure and keep storage administration with the SAN team?

> **Answer**: One solution could be to build a scale-out file-server cluster with four nodes. Each node would have two Fibre Channel HBAs, which totals eight HBAs. Optionally, you can fit the file-server cluster nodes with a pair of 10 GB Ethernet network cards, and the Hyper-V hosts can use multiple 1 GB network cards. The cost of the 10 GB switches may be less than that of the Fibre Channel switches.

## Resources

## Configuring High-Availability Options for Hyper-V Storage

 **Reference Links:** For more information, go to The Microsoft Storage Team Blog at http://go.microsoft.com/fwlink/?LinkID=285270.

Lesson 2

# Implementing a Storage Infrastructure for Virtualization

## Contents:

## Resources

## Managing Storage in VMM

**Reference Links:** For a List of Supported Storage Arrays, go to http://go.microsoft.com/fwlink/?LinkID=285283.

## Demonstration: Configuring iSCSI Storage for Virtualization

### Demonstration Steps

**Add the iSCSI target server role service**

1. On **LON-SVR1**, in Server Manager, click **Add roles and features**.
2. In the Add Roles and Features Wizard, on the **Before you begin** page, click **Next**.
3. On the **Select installation type** page, click **Next**.
4. On the **Select destination server** page, ensure that **Select a server from the server pool** is selected, and then click **Next**.
5. On the **Select server roles** page, expand **File And Storage Services (Installed)**, expand **File and iSCSI Services**, select the **iSCSI Target Server** check box, and then click **Next**.
6. On the **Select features** page, click **Next**.
7. On the **Confirm installation selections** page, click **Install**.
8. When installation completes, click **Close**.

**Create a storage pool**

1. On **LON-SVR1**, move the mouse pointer to the bottom left-hand side of the task bar, and then right-click, and click **Disk Management**.
2. On the **Disk Management** page, click **Action**, and then click **Create VHD**. In the **Location** field, type **E:\iSCSI1.vhdx**.
3. In the **Virtual hard disk size** field, type **50**, click **MB**, and then select **GB**. Click **VHDX**, and then click **OK**.
4. Repeat step 2 and 3 to create two more VHDX files named **iSCSI2** and **iSCSI3**.
5. Right-click **Disk2**, and then click **Initialize Disk**. All three disks should be selected. Click **OK**.
6. Close the **Disk Management** page.
7. In Server Manager, in the navigation pane, click **File and Storage Services**, and then click **Storage Pools**.
8. In the Storage Pool section, click **TASKS**, click **Refresh**, and then click **New Storage Pool**.
9. On the **Before You Begin** page, click **Next**.
10. In the **Storage Pool Name** field, type **VMPool**, and then click **Next.**
11. On the **Physical Disks** page, select all three disks, and then click **Automatic**. Note that you can assign a host spare. Leave the selection as **Automatic**, and then click **Next**.
12. On the **Confirmation Page**, click **Create**.
13. On the **Results** page, click **Create a virtual disk when this wizard closes**, and then click **Close**. The New Virtual Disk Wizard launches.

14. On the **Before you begin** page, click **Next**, and then on the **Storage Pool** page, click **Next**. On the **Virtual Disk Name** page, in the **Name** field, type **VMStorage**, and then click **Next**.
15. On the **Storage Layout** page, click **Parity**, **and** then click **Next**. On the **Provision** page, click **Thin**, and then click **Next**.
16. On the **Size** page, in the **Virtual disk size field**, type **100**, and then click **Next**.
17. On the **Confirmation** page, review the settings, and then click **Create**.
18. On the **View results** page, click **Close**. The New Volume Wizards launches.
19. On the **Before You Begin** page, click **Next**. On the **Server and Disk** page, in the **Disk** area, click the **VMStorage** virtual disk, and then click **Next**. On the **Size** page, leave the default (99.9) GB, and then click **Next**.
20. On the **Drive Letter or Folder** page, leave the driver letter **F**, and then click **Next**. On the **File System Settings** page, click on the **Volume Label** field, type **VMStorage**, and then click **Next**. Review the settings, and then click **Create**. On the **Results** page, click **Close**.
21. In the File and Storage Services pane, click **iSCSI**.
22. In the iSCSI VIRTUAL DISKS pane, click **TASKS**, and then in the **TASKS** drop-down list box, click **New iSCSI Virtual Disk**.
23. In the New iSCSI Virtual Disk Wizard, on the **Select iSCSI virtual disk location** page, under **Storage location**, click F, and then click **Next**.
24. On the **Specify iSCSI virtual disk name** page, type **iSCSIDisk1**, and then click **Next**.
25. On the **Specify iSCSI virtual disk size** page, in the **Size** box, type **99**, and in the drop-down list box, ensure **GB** is selected, and then click **Next**.
26. On the **Assign iSCSI target** page, click **New iSCSI target**, and then click **Next**.
27. On the **Specify target name** page, in the **Name** box, type **LON-SVR1**, and then click **Next**.
28. On the **Specify access servers** page, click **Add**.
29. In the **Select a method to identify the initiator** dialog box, click **Enter a value for the selected type**, and in the **Type** drop-down list box, select **IP Address**. In the **Value** field, type **172.16.0.31**, and then click **OK**.
30. On the **Specify access servers** page, click **Next**.
31. On the **Enable Authentication** page, click **Next**.
32. On the **Confirm selections** page, click **Create**.
33. On the **View results** page, wait until creation completes, and then click **Close**.

**Configure iSCSI initiators**

1. On **LON-HOST1**, in server manager click **Tools**, and then select **iSCSI Initiator**. If prompted to start the Microsoft iSCSI service, click **Yes**.
2. On the **Targets** page, in the **Target** field, type **172.16.0.12**, and then click **Quick connect**. Note that there is one item listed under Discovered targets with its status connected. Click **Done**, and then click **OK** to close the page.
3. On **LON-HOST1**, move the mouse pointer to the bottom left-hand side of the task bar then right-click. Click **Disk Management**.
4. Find the new 99 GB disk, right-click the disk, and then click **Online**. Right-click again, and then click **Initialize Disk**. On the **Initialize disk** page, click **OK**.

5. Right-click the unallocated space, and then click **New Simple Volume**.
6. On the **Welcome** page, click **Next**, and on the **Specify Volume Size** page, leave the default value, and then click **Next**.
7. On the **Assign Driver letter or Path** page, click the drop-down list box, and then then select the letter **V**. Click **Next**.
8. On the **Format Partition** page, in the **Volume label** field, type **VMStorage**, and then click **Next**. Review the settings, and then click **Finish**.
9. Close **Disk Management**.
10. Keep all virtual machines running, they will be used for a second demonstration in this lesson.

# Demonstration: Configuring Storage in VMM

## Demonstration Steps

### Update the LON-HOST1 virtual machine placement path in VMM

1. On **LON-VMM1**, on the task bar, click the **Virtual Machine Manager console** button. In the **Connect to Server** dialog box, click **Connect**.
2. Click the **Fabric** workspace, expand **Servers**, right-click **LON-HOST1**, and then click **Refresh.**
3. On the ribbon, click the **Jobs** button, wait for Refresh host job to complete, and then close the Jobs window.
4. Right-click **LON-HOST1**, and then click **Properties**.
5. Click **Placement**, click **Add**, click **VMStorage**, and then click **OK**. Click **OK** again to close the **Properties** page.

### Create storage classifications

1. In the Virtual Machine Manager console, click the **Fabric** workspace, and then click **Storage**.
2. On the ribbon, click **Create Classification**, and in the **Name** field, type **Gold**. In the **Description** field type **15K SAS Drives**, and then click **Add**.
3. On the ribbon, click **Create Classification**, and in the **Name** field, type **Silver**. In the **description** field, type **7K SATA Drives**, and then click **Add**.
4. Click the **Classification and Pools** node, and then note that there is no capacity available.

### Add storage providers

1. On **LON-VMM1**, in the Virtual Machine Manager console, click **Fabric**, right-click **Storage**, and then click **Add Storage Devices**.
2. On the **Select Provider Type** page, click **Add a Windows-based file server as managed storage device**, and then click **Next**.
3. Click in the **Provider IP address or FQDN:** field, type **lon-svr1.adatum.com**, and then click **Browse**.
4. On the **Select a Run As account** page, click **Administrator**, and then click **OK**.
5. On the **Specify Discovery Scope** page, click **Next**.
6. On the **Gather Information** page, review the discovery result, and then click **Next**.
7. On the **Select Storage Devices** page, click **Next**.
8. On the **Summary** page, click **Finish**, and then close the Jobs window.

### Create File Shares from VMM

1. On **LON-VMM1**, click **Fabric**, and on the ribbon, click **Create File Share**.
2. On the **Create File Share** page, in the **Name** field, type **GoldDisks**. In the **Local path** field, type **F:**, and then click **Add**.
3. Keep all virtual machines running, they are required for a demonstration in the next lesson.

Lesson 3

# Planning and Implementing a Network Infrastructure for Virtualization

## Contents:

# Resources

## What Is Network-Virtualization?

 **Reference Links:** For a complete overview of network-virtualization, go to http://go.microsoft.com/fwlink/?LinkID=285279

## Demonstration: Configuring Virtual Networks

### Demonstration Steps

**Create a virtual network**

1. On **LON-HOST1**, in Hyper-V Manager, in the left pane, right-click **LON-HOST1**, and then click **Virtual Switch Manager**.
2. In the left pane, click **New virtual network switch**, in the Create virtual switch section click **External**, and then click **Create Virtual Switch**.
3. In the **Virtual Switch Properties**, in the **Name** field type **Classroom demo**, and then select the check box next to **Allow Management Operating System to share this network adapter**.
4. Select the check box next to **Enable single-root I/O virtualization (SR-IOV)**.
5. Change the virtual switch type to **Internal network**, and then click **OK**.

**Create a virtual network adapter**

1. In the left hand pane, right-click **LON-HOST1**, click **New**, and then click **Virtual Machine**.
2. On the **Before You Begin** page, click **Next**, and on the **Specify Name and Location** page, in the **Name** field, type **demo1**, and then click **Next**.
3. On the **Assign Memory** page, click **Next**.
4. On the **Configure Networking** page, click the arrow in the **Connection** field, click **Classroom Demo**, and then then click **Finish**.

**Review virtual network adapter settings**

1. In the right-hand pane, right-click the virtual machine named **demo1**, and then click **Settings**.
2. From the list of hardware that appears, click the **Network adapter**. On the right, you can see the switch currently in use, as well as the VLAN and Bandwidth Management settings.
3. Under **Network adapter** settings, click **Hardware Acceleration**, and on the right, notice that you can see the Virtual Machine Queue, IPsec task offloading, and the single-root I/O virtualization (SR-IOV) settings.
4. Under **Network adapter** settings, click **Advanced Features**, and on the right, review the futures you can assign.
5. When finished reviewing the options, click **Cancel**.
6. In **Hyper-V Manager**, under Virtual Machines right-click the **demo1** virtual machine, and then click **Delete**.
7. On the **Delete Selected Virtual Machines** page, click **Delete** to confirm.
8. Right-click **LON-HOST1**, and then click **Virtual Switch Manager**.
9. Click the **Classroom demo** virtual switch, and on the bottom, right-click **Remove**, and then click **OK**.
10. Keep all virtual machines running, they are required for the next demonstration in this lesson.

# Demonstration: Configuring Virtual Network Components in VMM

## Demonstration Steps

### Create a logical network

1. On **LON-VMM1**, launch the Virtual Machine Manager console.
2. Click the **Fabric** workspace, on the ribbon, click **Create**, and then click **Logical Network**.
3. On the **Name** page, in the **Name** field, type **Classroom1**, and then click **Allow new VM networks created on this logical network to use network virtualization**. Click **Next**.
4. On the **Network Site** page, click **Add**, and then in the **Host groups that can use this network site** section, select **All Hosts**.
5. In the **Associated VLANs and IP subnets area**, click **Insert row**, then click the **VLAN** field, and type **3**. Click the **IP subnet** field, and then type **192.168.3.0/24**, click **Next**, and then click **Finish**.
6. Close the Jobs window.

### Create a logical network IP Pool

1. Click the **Fabric** workspace, then on the ribbon, click **Create**, and then click **IP Pool**. On the **Name** page, in the **Name** field, type **Classroom1 IP Pool**, click the **Logical network** drop-down list box, click **Classroom1**, and then click **Next**.
2. On the **Network site** page, click **Use an existing network site**, and then ensure **Classroom1_0** is selected. Click the **IP subnet** drop-down list box, select **192.168.3.0/24**, and then click **Next**.
3. On the **IP address range** page, review the options, and then click **Next**.
4. On the **Gateway** page, review the options, and then click **Next**.
5. On the **DNS** page, review the options, and then click **Next**. On the **WINS** page, review the options, click **Next**, and then on **Summary** page, click **Finish**, and then close the Jobs window.

### Create an uplink native port profile

1. On the ribbon, click **Create**, and then click **Native Port Profile**
2. On the **General** page, click in the **Name** field, and then type **Classroom1 Uplink**. Click **Uplink port profile**, and then click **Next**.
3. On the **Network configuration** page, under **Network sites**, click **Classroom 1_0**, click **Enable Windows Network-Virtualization**, and then click **Next**.
4. On the **Summary** page click **Finish** and then close the Jobs window.

### Create a logical switch

1. On the ribbon, click **Create**, and then click **Logical Switch**.
2. On the **Getting Started** page, click **Next**, and on the **General** page, in the **Name** field, type **Classroom switch1**, and then click **Next**.
3. On the **Extensions** page, leave the default extensions, and then click **Next**.
4. On the **Uplink** page, click **Add**, click the **Port profile** drop-down list box, select **Classroom1 Uplink**, click **OK**, and then click **Next**.
5. On the **Virtual Port** page, click **Add**, and then on the **Add Virtual Port** page, click **Browse**.
6. On the **Select a Port Profile Classification** page, click **High Bandwidth**, and then click **OK**. Click **Include a virtual network adapter port profile in this virtual port**, click the **Native virtual network adapter port profile**, select **High Bandwidth Adapter**, click **OK**, and then click **Next**.

7. On the **Finish** page, click **Finish**.
8. Close the Jobs window.

**Add a logical switch to a host server**

1. From the Fabric workspace, right-click **LON-HOST1**, click **Properties**, click **Virtual Switches**, click **New Virtual Switch**, and then click **New Logical Switch**.
2. At this point, if you have another network card, you can assign the logical switch to a physical adapter.
3. On the Properties page, click **Hardware**, and then scroll down and expand **Network adapters**. Click your physical network adapter, and note that you can select or clear the adapter for virtual machine placement and management use. Click the Logical network, and on the right, under **Logical network connectivity**, you can assign the logical networks and IP subnets,
4. Click **Cancel**.
5. Keep all virtual machines running, they are required for the next demonstration in this lesson.

## Demonstration: Configuring Network-Virtualization

### Demonstration Steps

**Enable the Windows Network-Virtualization Filter driver**

1. On **LON-HOST1**, open the **network adapters** page, and then on the physical adapter that the hosts use, enable **Windows Network-Virtualization Filter Driver**, and select **OK**.

**Refresh LON-HOST1**

1. On **LON-VMM1**, open the Virtual Machine Manager console, and then refresh the host**.**

**Create the Red VM network**

1. On **LON-VMM1**, open the Virtual Machine Manager console, and click the **VMs and Services** workspace. Create a VM network named **Classroom1_Red**, and then select network isolation, create a subnet named **Red Network**, and then assign the subnet **192.168.3.0/24.**

**Create the Blue VM network**

1. In the **VMs and Service** workspace create another VM Network **Classroom1_Blue**, and select network isolation, create a subnet named **Blue Network**, and then assign the subnet **192.168.3.0/24.**

**Create the VM IP pools**

1. Create an IP pool for the Blue VM network, named **Blue VM Network IP Pool**, and then accept the defaults and note that the first address in the pool is reserved.
2. Create an IP pool for the Red VM network, named **Red VM Network IP Pool**.

# Module Review and Takeaways

## Best Practice

Storage and networking bandwidth is crucial when you are planning. Always look for bottlenecks, and calculate the amount of data that will transfer point-to-point. For example, if you host 500 servers on a SAN, and schedule an antivirus sweep, what is the impact?

## Review Question(s)

**Question:** What is a benefit of logical switches?

> **Answer:** You can define logical switches in VMM, and then use them across multiple Hyper-V hosts. This will help with consistency across your virtualization environment.

## Real-world Issues and Scenarios

- After creating various logical networks and VM Networks, you are unable to remove a VMM object due to an error with a dependency on a temporary template. If this happens, you can remove the template by using Windows PowerShell.
- In the VMM console, on the ribbon, click **Windows PowerShell**, and then at the command prompt, type the following command, and then press Enter:
  **Get-SCVMTemplate | where {$_.Name -like "Temporary*"}**
- Review the output, and confirm the only listed item is the suspicious temporary template, and that you do not have valid templates with the name "Temporary" in them.
- Remove the problematic template by typing the following command at the command prompt, and then pressing Enter:
  **Get-SCVMTemplate | where {$_.Name -like "Temporary*"} | Remove-SCVMTemplate**
- This should clear the dependent template, which will allow you to delete objects, such as a VM Network.

## Tools

Microsoft Assessment and planning toolkit (MAP) : http://go.microsoft.com/fwlink/?LinkID=285277

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| Virtual machines are all paused. | Could have run out of disk space. Look for unneeded snapshots, and then calculate how much disks space will be required to ensure that you do not run out again. |
| Random iSCSI connectivity issues. | Check that the network switches and network cards are configured correctly, and that all support the same feature sets that you are using. |
| Live migrations fail, poor connectivity to virtual machines. | Confirm that sufficient bandwidth is available and that live migration is not flooding a network that is used by other traffic that hosts and virtual machines require. |

# Lab Review Questions and Answers

## Lab: Planning and Implementing Virtualization Networks and Storage

## Question and Answers

**Question:** What type of business would benefit from network-virtualization?

**Answer**: Hosting companies and service providers are most likely to benefit, as they generally need to onboard existing customer systems or allow customers to create their own networks.

**Question:** Which two workloads could you consolidate into a single cluster?

**Answer:** You can consolidate the SQL Server and Hyper-V workloads into a single SMB 3.0 failover cluster.

**Question:** What are the new SAN types available to Hyper-V and its virtual machines?

**Answer**: Hyper-V version 3.0 introduces virtual Fibre Channel.

# Module 4

## Planning and Deploying Virtual Machines

### Contents:

Lesson 1

# Planning Virtual Machine Configuration

## Contents:

# Resources

## Planning Virtual Machines for SQL Server

**Reference Links:**

- For more information on running SQL Server with Hyper-V Dynamic Memory (SQL Server 2008 R2), go to http://go.microsoft.com/fwlink/?LinkID=285284.
- For more information on the support policy for Microsoft SQL Server products that are running in a hardware virtualization environment, go to http://go.microsoft.com/fwlink/?LinkID=285286.

## Planning Virtual Machines for Exchange Server

**Reference Links:**

- For more information about Exchange Server 2010 virtualization, go to http://go.microsoft.com/fwlink/?LinkID=285290.
- For more information about Exchange Server 2013 virtualization, go to http://technet.microsoft.com/en-us/library/jj619301(v=exchg.150).aspx

## Planning Virtual Machines for SharePoint Server

**Reference Links:**

- For the SharePoint Server 2010 resource center, go to http://go.microsoft.com/fwlink/?LinkID=285291.
- For the SharePoint Server 2013 resource center, go to http://go.microsoft.com/fwlink/?LinkID=285292.

## Planning Virtual Machines for AD DS

**Additional Reading:** For more information about the VM Generation ID identifier, go to http://go.microsoft.com/fwlink/?LinkID=260709.

**Additional Reading:** For an introduction to AD DS virtualization, go to http://go.microsoft.com/fwlink/?LinkID=285289.

Lesson 3

# Deploying Virtual Machines

## Contents:

# Resources

## P2V Machine Conversion

**Additional Reading:** For an updated list of P2V supported operating systems, go to http://go.microsoft.com/fwlink/?LinkID=285288.

**Additional Reading:** For more information and to download Disk2vhd, go to http://go.microsoft.com/fwlink/?LinkID=285293.

**Reference Links:** For more information about VMM P2V prerequisites and supported operating systems, go to http://go.microsoft.com/fwlink/?LinkID=285288.

## V2V Machine Conversions

**Reference Links:** For more information about the Microsoft Virtual Machine Converter, go to http://go.microsoft.com/fwlink/?LinkID=285296.

# Module Review and Takeaways

## Best Practice

Just as with most IT projects, good planning and change control will help with overall success during virtualization. Performance and resource monitoring are an essential part of maintaining the virtualization infrastructure. Therefore, part of your implementation and conversion strategy should include these to maintain performance levels and avoid scenarios where you run out of.

## Tools

For more information and to download the Virtual Machine Servicing Tool 2012, go to http://go.microsoft.com/fwlink/?LinkID=285295.

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| Unable to perform a P2V to CSV on VMM if there is insufficient disk space on the local drive | Use a Windows PowerShell script to perform the conversion, or choose an alternative work around at http://go.microsoft.com/fwlink/?LinkID=285285. |

# Module 5

## Planning and Implementing a Virtualization Administration Solution

### Contents:

Lesson 1

# Planning and Implementing Automation with System Center 2012

## Contents:

# Resources

## Designing Automation in System Center 2012

**Reference Links:**

- For more information on getting started with Orchestrator, go to http://go.microsoft.com/fwlink/?LinkID=285301.
- For runbook examples for System Center 2012 Components, go to http://go.microsoft.com/fwlink/?LinkID=285297.

## Demonstration: Creating a Basic Runbook

### Demonstration Steps

**Create a basic runbook**

1. On **LON-OR1**, move the mouse to the bottom left corner until the Start icon appears, click the **Start** icon, and then when the Windows user interface appears. Click **Runbook Designer**.
2. On the left, in the Connections pane, right-click **Runbooks**, click **New**, click **Folder**, and on your keyboard, press the **Delete key**, type **20414 Runbooks**, and then press Enter.
3. Right-click the **20414 Runbooks** folder, click **New**, click **Runbook**, and at the top of the central pane, right-click **New Runbook**, click **Rename**, click **Yes** to confirm that you are checking out this runbook, type **VMM Library Monitor**, and then press Enter.
4. On the right-hand pane, under Activities, click to expand **File Management**, and then click and drag the **Monitor Folder** activity to the center of the central pane.
5. Right-click the **Monitor Folder** activity, click **Rename**, and then type **VMM Library Monitor**.
6. Right-click **VMM Library Monitor**, click **Properties**, and on the left, click **General**. On the **General Information** page, in the **Description** field, type **This Runbook monitors the VMM library for new virtual hard disks**.
7. On the left, click **Details**, on the folder to monitor section, in the **Path** field, type **\\LON-VMM1\MSSCVMMLibrary**, and then click **Include sub-folders**.
8. In the File Filter section, click **Add**, and on the **Filter Setting** page, click the **Name** drop-down list box, click **File Name**, and then in the **Value** field, type ***.vhd**, and then click **OK**.
9. On the left, click **Triggers**, and in the Trigger if section, click the check box next to **Number of files is:**. Click the drop-down list box underneath Number of files is, and then select **greater than**, and type **0**.
10. On the left, click **Authentication**, and in the **User name** field, type **Adatum\Administrator**, and in the **Password** field, type **Pa$$w0rd**, and then click **Finish**.
11. On the right, under Activities, click **Notification**, and then click and drag the **Send Event Log Message** activity to the central pane and to the right of the **VMM Library Monitor** activity.
12. Place the mouse pointer over the VMM Library Monitor activity, and a small arrow appears to the right. Place the mouse pointer over the arrow, and then the mouse pointer should change to a cross, click the **arrow** and drag it to the **Send Event Log Message**. A link with an arrow should now appear between the two activities.
13. Right-click the link between the two activities, click **Properties**, and then when the **Link Properties** page appears, review the filter, and then click **Finish**.
14. Right-click the **Send Event Log Message**, click **Properties**, and on the **Details** page, in the Properties section, click in the **Computer** field, and then type **LON-OR1**. In the **Message** field, type **A**

**virtual hard disk file was created or updated in the LON-VMM1 library**. In the Severity section, click **Warning**, and then click **Finish**.

15. On the ribbon, click **Check In**, and on the ribbon, click **Run**. On the Windows task bar, click the **File Explorer** icon, click in the **address bar** field, and then type **\\lon-vmm1\MSSCVMMLibrary\VHDs**.
16. In the ribbon of VHDs window, click **View**, select the checkbox next to **File name extensions.**
17. In the VHDs window, right-click the file **Blank Disk – Large.vhd**, click **Copy**, right-click an empty space in the File Explorer window, and then click **Paste**. A new file is created called Blank Disk – Large – Copy.vhd.
18. Move the mouse to the bottom left corner until Start icon appears, click the **Start icon**, the Windows user interface appears, type **Event**, and then click **Event Viewer**.
19. In the center Summary of Administrative Events pane, click the expand (**+**) button next to **Warning**, and you should see that there is an Event ID with the ID of 1 and a Source of Orchestrator Runbook. Double-click the **Orchestrator event**, and then review the event.
20. Close the **Event Viewer**, and then close the File Explorer window. On the ribbon, click **Stop**, and then on the ribbon, click **Orchestration Console**. Review the Orchestration Console, and in the Summary under Instance Statistics, you should see a Success.
21. Close the Orchestration Console.
22. Leave the virtual machines running, they are required in the next demo.

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## Demonstration: Integrating Orchestrator and VMM

### Demonstration Steps

#### Install the System Center Integration Pack for VMM

1. On **LON-OR1**, move the mouse to the bottom left corner until the **Start** icon appears, right-click the **Start** icon, and then click **Run**. On the Run page, click in the Open field and type **\\lon-dc1\labfiles\module5\system_center_2012_orchestrator_integration_packs.exe**, and then click **OK**. On the Choose Directory For Extracted File page, leave the default directory, and then click **OK**. On the Extraction Complete page, click **OK**.
2. On **LON-OR1**, move the mouse to the bottom left corner until the **Start** icon appears, click the **Start** icon, and when the Windows user interface appears, click **Deployment Manager**.
3. In the Deployment Manager Console, right-click **Integration Packs**, and then click **Register IP with the Orchestrator Management Server**.
4. On the **Welcome** page, click **Next**, and then on the **Select Integration Packs or Hotfixes** page, click **Add**.
5. On the **Open** page, in the File name **field**, type **\\lon-dc1\Labfiles\Module5\SC2012_Virtual_Machine_Manager_Integration_Pack.oip**. Click **Open**, the integration pack is now listed, click **Next**, and then on the **Completing Integration Pack Registration Wizard** page, click **Finish**. On the **End-User License Agreement** page, click **Accept**.
6. Wait until the registration is complete, and click and expand **Orchestration Management Server**, and then click **Integration Packs**.
7. Right-click **System Center Integration Pack for System Center 2012 Virtual Machine Manager**, and then click **Deploy IP to Runbook Server or Runbook Designer**.

8. On the **Welcome** page, click **Next**, and on the **Deploy Integration Packs or Hotfixes** page, select the check box next to **System Center Integration Pack for System Center 2012 Virtual Machine Manager**, and then click **Next**.
9. On the **Computer Selection** page, in the **Computer** field, type **LON-OR1**, click **Add**, and then click **Next**.
10. On the **Installation Options** page, click **Next**, and then on the **Completion** page click **Finish**.
11. Review the log entries, and then close the Orchestrator Deployment Manager.

**Set the Windows PowerShell execution policy**

1. On **LON-OR1**, on the task bar, right-click **Windows PowerShell**, and then under Tasks, click **Run as Administrator**.
2. At the Windows PowerShell prompt, type **set-executionpolicy remotesigned**, press Enter, type **Y**, and then press Enter.
3. Close the Windows PowerShell window.
4. On **LON-VMM1**, on the task bar, right-click **Windows PowerShell**, and then under Tasks, click **Run as Administrator**.
5. At the Windows PowerShell prompt, type **set-executionpolicy remotesigned**, press Enter, type **Y**, and then press Enter.
6. Close the Windows PowerShell window.

**Enable Remote Management Trusted Hosts**

1. On **LON-OR1**, move the mouse to the bottom left of the screen, the Start icon appears. Right-click the **Start** icon and then click **Run**. On the **Run** page, in the **Open** field, type **gpedit.msc**, and then click **OK**. The Local Group Policy Editor Management Console appears.
2. On the left hand side, under Local Computer Policy, click to expand **Administrative Templates**, scroll down then double-click **Windows Components**, and then double-click **Windows Remote Management (WinRM)**.
3. On the left, click **WinRM Client**, and then on the right, under WinRM Client, double-click **Trusted Hosts**.
4. On the **Trusted Hosts** page, click **Enabled**, and in the **TrustedHostList** field, type **LON-VMM1**, and then click **OK**.
5. Close the Group Policy editor.

**Configure the System Center Integration Pack for VMM**

1. On **LON-OR1**, move the mouse to the bottom left corner until the Start icon appears, click the **Start** icon, and then click **Runbook Designer**.
2. On the menu at the top, click **Options**, and then click **SC 2012 Virtual Machine Manager**.
3. On the **Configurations** page, click **Add**, and on the **Add Configuration** page, in the **Name** field, type **LON-VMM1**, and then click the browse **(…)** button.
4. On the **Item Selection** page, click **System Center Virtual Machine Manager**, and then click **OK**.
5. On the **Add Configuration** page, under **Properties**, in the **VMM Administrator Console** field, type **LON-VMM1**, and in the **VMM Server** field, type **LON-VMM1**. In the **User** field, type **Adatum\Administrator**, remove the text in the **Domain** field, and then in the **Password** field, type **Pa$$w0rd**.

6. In the **Authentication Type (remote only)** field, click the **Browse** button, click **Negotiate**, and then click **OK**.

**7.** Click **OK**, and then on the **Configurations** page, click **Finish**.

**8.** In the Runbook Designer Console, in the Activities section on the right, click **SC 2012 Virtual Machine Manager**, and then review the activities.

9. Leave the **LON-DC1** and **LON-VMM1** running, they are required in the next demo.

Lesson 2

# Planning and Implementing System Center 2012 Administration

## Contents:

# Resources

## Delegating Administration Options in Orchestrator

 **Reference Links:** For more information on Orchestrator Security Planning, go to http://go.microsoft.com/fwlink/?LinkID=285302.

## Demonstration: Create a Delegated Administrator in VMM

### Demonstration Steps

#### Configure delegated administration in VMM

1. On LON-VMM1, on the taskbar, click **Virtual Machine Manager Console**.
2. In the **Connect to Server** dialog box, ensure that the **Use current Microsoft Windows session identity** check box is selected, and then click **Connect**. The Virtual Machine Manager (VMM) Console opens.
3. In the VMM Console, click the **Settings** workspace, and then on the ribbon, click **Create User Role**.
4. On the **Name and description** page, in the **Name** field, type **DevAdmin**, and in the **Description** field, type **Development team administrators**, and then click **Next**.
5. On the **Profile** page, click **Fabric Administrator (Delegated Administrator)**, and then click **Next**.
6. On the **Members** page, click **Add**, and in the **Select Users**, **Computers**, **or Groups** dialog box, in the **Enter the object names to select** field, type **Rob Cason**, click **OK**, and then click **Next**.
7. On the **Scope** page, click **All Hosts**, and then click **Next**.
8. On the **Library servers** page, click **Add**, select **LON-VMM1.Adatum.com**, click **OK**, and then click **Next**.
9. On the **Run As** page, click **Add**, select **Administrator**, click **OK**, and then click **Next**.
10. Review the summary, and then click **Finish**.
11. Close the Jobs window.

Lesson 3

# Planning and Implementing Self-Service Options in System Center 2012

## Contents:

# Demonstration: Creating VMM Private Clouds

## Demonstration Steps

### Create a private cloud

1. On LON-VMM1, on the taskbar, click **Virtual Machine Manager Console**.
2. In the **Connect to Server** dialog box, ensure that the **Use current Microsoft Windows session identity** check box is selected, and then click **Connect**. The VMM Console opens.
3. Click the **VMs and Services** workspace.
4. On the ribbon, click **Create Cloud**.
5. On the **General** page, in the **Name** field, type **London Development**, and in the **Description** field, type **London Development Cloud**, and then click **Next**.
6. On the **Resources** page, select **All Hosts**, and then click **Next**.
7. On the **Logical Networks** page, select **External Network**, and then click **Next**.
8. On the **Load Balancers** page, select **Microsoft Network Load Balancing (NLB)**, and then click **Next**.
9. On the **VIP Templates** page, click **Next**.
10. On the **Port Classifications** page, click **Network load balancing**, click **Medium bandwidth**, click **Low bandwidth**, and then click **Next**.
11. On the **Storage** page click **Next**.
12. On the **Library** page, in the **Read-only library shares** section, click **Add**. Select **MSSCVMMLibrary**, click **OK**, and then click **Next**.
13. On the **Capacity** page, review the capacity options. Remove the check mark next to each selected resource and then assign the following:

- 8 virtual central processing units (CPUs)
- 12 gigabytes(GB) memory
- 250 GB storage
- 15 quota points
- 8 virtual machines

14. Click **Next**.
15. On the **Capability Profiles** page, select **Hyper-V**, and then click **Next**.
16. Review the **Summary** page, and then click **Finish**.
17. Close the Jobs window.

### Assign access to the London Development cloud

1. Click the **VMs and Services** workspace, right-click **Tenants**, and then click **Create User Role**.
2. On the **Name and description** page, in the **Name** field, type **DevSS**. In the **Description** field, type **London Development Team Self Service Role**, and then click **Next**.
3. On the **Profile** page, click **Application Administrator (Self-Service User)**, and then click **Next**.
4. On the **Members** page, click **Add**, and on the **Select Users** page, type **anat**, click **OK**, and then click **Next**.

5. On the **Scope** page, click **London Development**, and then click **Next**.
6. On the **Quotas** page, review the Role and Member level quotas, and then click **Next**.
7. On the **Networking** page, click **Add**, and on the **Select VM Networks** page, click **External Network**, click **OK**, and then click **Next**.
8. On the **Resources** page, click **Next**.
9. On the **Actions** page, click **Select All**, and then click **Next**.
10. On the **Run As accounts** page, click **Add**, click **Administrator**, click **OK**, and then click **Next**.
11. On the **Summary** page, review the settings, and then click **Finish**.

**Connect App Controller to VMM**

1. On **LON-VMM1**, move the mouse to the bottom left corner until the **Start** icon appears, click the **Start** icon, and when the Windows user interface appears, click **App Controller**.
2. On the **App Controller Credentials** page, in the **User name** field, type **Adatum\Administrator**, and in the **Password** field, type **Pa$$w0rd**, and then click **Sign In**.
3. On the **Overview** page, under Status, click **Connect a Virtual Machine Manager server and clouds**. In the **Add a new VMM connection** page, click the **Connection name** field, and then type **LON-VMM1.adatum.com**. In the Description field, type **London VMM Server access**. In the **Server name** field, type **LON-VMM1.adatum.com**, and then click **OK**.
4. On the **Overview** page, in the top right corner of the browser, click **Sign Out**.

# Module Review and Takeaways

## Review Question(s)

**Question:** What are some of the benefits of automation and self-service?

**Answer**: Automation can help reduce human error by systematically undertaking a task or series of tasks, and automation can reduce the time that it takes for IT staff to complete tasks Additionally, you can use automation to allow the assignment of privileges to a runbook rather than to a user. For example, you can have a runbook that will add user accounts to a group, and then you allow self-service users to call this runbook.

Self-service can provide users and administrators with rapid access to resources in a controlled environment, without the need to log calls or wait for an administrator.

# Lab Review Questions and Answers

## Lab: Planning and Implementing an Administration Solution for Virtualization

## Question and Answers

**Question:** If you received a call from the Toronto developers stating there are no resources left, where can you see, quickly, who is consuming all of the resources?

**Answer:** In the VMM Console, click the **VMs and Services** workspace, expand **clouds**, and then click the **Toronto Cloud**. Click the **Overview** button in the ribbon, and then you then can see the **Quotas**, and drill down to individual assignments.

**Question:** Can Adam deploy a virtual machine?

**Answer:** Adam should be able to deploy a virtual machine, but only from an assigned template.

# Module 6

## Planning and Implementing a Server Monitoring Strategy

### Contents:

Lesson 1

# Planning Monitoring in Windows Server 2012

## Contents:

## Resources

## Considerations for Monitoring Server Roles

**Additional Reading:** For more information about Windows Server 2012 performance tuning, see

Performance Tuning Guidelines for Windows Server 2012 on the Microsoft web site at http://go.microsoft.com/fwlink/?LinkID=285313

Reference the Performance Tuning Guidelines for Windows Server 2012 document from http://go.microsoft.com/fwlink/?LinkID=285314

## Options for Monitoring a Server Virtualized Environment

**Reference Links:** You can reference the Performance Tuning Guidelines for Windows Server 2012 document at http://go.microsoft.com/fwlink/?LinkID=285313.

## Demonstration: Enabling and Viewing Resource Metering Data

### Demonstration Steps

1. On LON-HOST1, open Server Manager, click **Tools**, and then from the **Tools** drop-down list box, click **Windows PowerShell ISE**.
2. In the Windows PowerShell ISE window, type the following commands, pressing Enter at the end of each line:

```
$vms = Get-VM | ?{$_.State –eq “Running”}
$vms
```

3. In the Windows PowerShell ISE window, type the following command to view the properties of the running virtual machines, and then press Enter:

```
$vms | Select Name, state, ResourceMeteringEnable
```

4. In the Windows PowerShell ISE window, type the following command to enable Resource Metering, and then press Enter:

```
$vms | Enable-VMResourceMetering
```

5. In the Windows PowerShell ISE window, type the following command to view Resource Metering data, and then press Enter:

```
$vms | Measure-VM
```

6. In the Windows PowerShell ISE window, type the following command to view all Resource Metering data for the 20414B-LON-DC1 virtual machine:

```
Get-VM –Name 20414B-LON-DC1 | Measure-VM
```

7. In the Windows PowerShell ISE window, type the following command to disable Resource Metering, and then press Enter:

```
$vms | Disable-VMResourceMetering
```

Lesson 2

# Overview of System Center Operations Manager

## Contents:

## Resources

## Operations Manager Components

**Reference Links:** For more information about distributed deployment of Operations Manager, see http://go.microsoft.com/fwlink/?LinkID=285319.

## Options for Operations Manager Agent Installation

**Reference Links:** For more information on the supported operating systems for the Operations Manager agent, see http://go.microsoft.com/fwlink/?LinkID=285321 and search for "Operations Manager Agent – Windows-Based Computers" in the browser.

## What Is ACS?

**Reference Links:**

- For information on how to filter ACS events for UNIX and Linux, see http://go.microsoft.com/fwlink/?LinkID=290803
- For more information on the use of Dynamic Access Control with ACS, see http://go.microsoft.com/fwlink/?LinkID=285318

## Deploying Audit Collection Services

**Reference Links:**

- For more information on how to configure certificates for ACS Collector and Forwarder, see http://go.microsoft.com/fwlink/?LinkID=285320
- For more information on the ACS administration and the AdtAdmin.exe tool, see http://go.microsoft.com/fwlink/?LinkID=285317

## Considerations for Deploying Operations Manager

**Reference Links:** System Requirements: System Center 2012 SP1 - Operations Manager

http://go.microsoft.com/fwlink/?LinkID=285321

## Demonstration: Using the Operations Manager Console

### Demonstration Steps

1. On LON-OM1, from the Start screen, click **Operations Console**.
2. Click the Monitoring workspace, expand the **Operations Manager** node, and then click **Active Alerts**. Explain that any alerts from servers in the Operations Manager infrastructure would display here.
3. In the Operations Manager node, click **Management Group Diagram**. Explain that the green check marks indicated that the component is healthy.
4. In the Management Group Diagram, expand the **Data Access Service** group. Explain that shows all servers running that service.
5. Under the Data Access Services in the **Management Group Diagram**, click on the **Data Access Services** child node. Notice that the **Detail View** is populated.

6. In the Management Group Diagram, expand the **Audit Collection Services** node. Explain that nothing displays because ACS has not been deployed.
7. In the Operations Manager node, click **Management Group Health**. Explain that this is a dashboard view that contains information from three different views.
8. In the Operations console, in the bottom left pane, click **Authoring** to open the Authoring workspace.
9. In the Authoring pane, click **Groups**. Explain that groups are created when management packs are imported and populated based on the management packs' discovery rules.
10. In the Operations console, in the middle pane, right-click **Windows Server Computer Group**, and then click **View Group Members**. Explain that only one server displays because Operations Manager is currently monitoring only one server.
11. Close the Managed Objects – Adatum – Operations Manager window.
12. In the Operations console, in the middle pane, right-click **Windows Server Computer Group**, and then click **View Diagram**.
13. In the Diagram View – Adatum – Operations Manager window, expand **LON-OM1.Adatum.com**, and then expand the **Healthy** node. Explain that Operations Manager monitors these components currently, and are reporting as healthy. Expand the **Not monitored** node, and explain that Operations Manager is not monitoring these components currently.
14. Close the Diagram View – Adatum – Operations Manager window.
15. In the Authoring pane, expand **Management Pack Objects**. Explain for what each type of management pack object is used.
16. In the Operations console, in the bottom left pane, click **Reporting** to open the Reporting workspace. Explain that this node displays reports that you use to review high-level or detailed information.
17. In the Operations console, in the bottom left pane, click **Administration** to open the Administration workspace.
18. In the Administration pane, click **Connected Management Groups**. Explain that you can add other management groups to the Operations Manager hierarchy through this node.
19. In the Administration pane, under the Device Management node, click **Management Servers**. Explain that this node displays all of the management servers that the Operations Manager hierarchy uses. Explain that the other nodes under **Device Management** are empty because Operations Manager is not configured to manage any servers.
20. In the Administration pane, click **Management Packs**. Explain that this is where you would import management packs from different vendors.
21. In the Management Packs pane, double-click **Network Management – Core Monitoring**.
22. In the **Network Management – Core Monitoring** dialog box, click the **Dependencies** tab. Explain that management packs build on top of each other.
23. Close the **Network Management – Core Monitoring** dialog box.
24. In the Operations console, in the bottom left pane, click **My Workspace**. Explain that My Workspace is different for each user who accesses the Operations console.
25. In the Operations console, in the bottom left pane, click **Monitoring** to open the Monitoring workspace.
26. In the Monitoring pane, under the Operations Manager node, right-click **Active Alerts**, and then click **Add To My Workspace**.

27. In the **Add To My Workspace** dialog box, in the **Name** box, type **OpsMgr Active Alerts**, and then click **OK**.
28. In the Operations console, in the bottom left pane, click **My Workspace**. Explain that the view you have just added is now available from My Workspace.
29. Leave the Operations console open for the next demonstration.

## Demonstration: Installing the Operations Manager Agent

### Demonstration Steps

1. Switch to LON-OM1.
2. In the Operations console, on the bottom left pane, click **Administration** to open the Administration workspace.
3. Under the Administration pane, click **Discovery Wizard**.
4. In the Computer and Device Management Wizard, on the **Discovery Type** page, ensure that **Windows computers** is selected, and then click **Next**.
5. On the **Auto or Advanced** page, ensure that **Advanced discovery** is selected, and then click **Next**.
6. On the **Discovery Method** page, click **Browse for, or type-in computer names**, in the box below, type **LON-SVR1, LON-SVR2**, and then click **Next**.
7. On the **Administrator Account** page, click **Discover**.
8. On the **Select Objects to Manage** page, click **Select All**, and then click **Next**.
9. On the **Summary** screen, click **Finish**.
10. In the Agent Management Task Status window, wait for the task to complete, and then close the window.
11. Switch to LON-SVR1.
12. In the Start screen, click **Administrative Tools**.
13. In the Administrative Tools window, double-click **Services**.
14. In the Services window, point out the **System Center Management** service.

Lesson 3

# Planning and Configuring Management Packs

## Contents:

## Resources

## Creating Overrides

 **Reference Links:** Boris's OpsMgr Tools – Updated
http://go.microsoft.com/fwlink/?LinkID=285311

## Demonstration: Viewing Classes and Objects

### Demonstration Steps

1. Switch to LON-OM1.
2. In the left pane, click **Monitoring**, and then click **Discovered Inventory**.
3. In the tasks pane, click **Change Target Type**.
4. In the **Select Items to Target** dialog box, click **View all targets**.
5. Click **Operating System**, and then click **OK**.
6. In the list of discovered items, click **LON-OM1.Adatum.com**, and then point out the information in the **Detail View**. Explain that each one of the entries in the list is an object of the Operating System class.
7. In the tasks pane, click **Change Target Type**.
8. In the **Select Items to Target** dialog box, click **View all targets**.
9. Click **Windows Computer**, and then click **OK**.

Click **LON-SVR1.Adatum.**com, and then view the information in the **Detail View**.

## Demonstration: Setting Permissions

### Demonstration Steps

1. Switch to LON-OM1.
2. In the left pane, click **Administration** to open the Administration workspace.
3. In the Administration pane, under **Security**, right-click **User Roles**, click **New User Role**, and then click **Operator**.
4. In the **Create User Role Wizard – Operator Profile** dialog box, on the **General Properties** page, in the **User role name** box, type **Server Operators**.
5. Under **User role members**, click **Add**.
6. In the **Select Users or Groups** dialog box, in the **Enter the object names to select** box, type **IT**, then click **Check Names**, and then click **OK**.
7. On the General Properties page, click **Next**.
8. On the **Group Scope** page, under the **Groups** list, clear the checkbox next to **Adatum**, click **Windows Server Computer Group**, and then click **Next**.
9. On the **Tasks** page, select click **Only tasks explicitly added to the 'Approved tasks' grid are approved**, and then click **Add**.
10. In the **Select Tasks** dialog box, click the following tasks:
    - **Disable Audit Collection**

- **Enable Audit Collection**
- **Ping**
- **Restart Windows Service**

11. In the **Select Tasks** dialog box, click **OK**, and then click **Next**.
12. On the **Dashboard and Views** page, click **Only the dashboards and views selected in each tab are approved**.
13. In the **Monitoring Tree** tab, click **Microsoft Windows Server**, and then at the prompt, click **OK**.
14. Click **Task Pane**, and then click **Add**.
15. In the **Select Dashboards** dialog box, click the first dashboard named **Detailed Dashboard – List**, and then click **OK**.
16. On the **Dashboard and views** page, click **Next**, and then at the prompt, click **OK**.
17. On the **Summary** page, click **Create**.
18. Close the Operations console.
19. From the Start screen, right-click **Operations Console**, and then click **Run as a different user**.
20. Log on as **Adatum\April** with a password **Pa$$w0rd**.
21. Verify the views to which **April** has access.

Close the Operations console.

## Demonstration: Importing Management Packs

### Demonstration Steps

1. On **LON-**OM1, in the Start screen, click **Operations** Console. In the Operations console, in the left pane, click **Administration** to open the Administration workspace.
2. Under the Administration node, click **Management Packs**, and review the list of management packs deployed to Operations Manager.
3. In the tasks pane, click **Import Management Packs**.
4. In the **Import Management Packs** dialog box, click **Add**, and then in the **Add** drop-down list box, click **Add from disk**.
5. In the **Online Catalog Connection** dialog box, click **No**.
6. In the **Select Management Packs to import** dialog box, expand drive **C**, expand **Program Files (x86)**, expand **System Center Management Packs**, and then expand **System Center Monitoring Pack for SQL Server**. Click all SQL Server management pack files, and then click **Open**.
7. On the **Select Management Packs** page, click **Install**, wait for the management packs to be imported, and then click **Close**.
8. Scroll down the list of management packs to locate the new management packs.
9. On the bottom left pane, click **Monitoring** to open the Monitoring workspace.
10. Expand **Microsoft SQL Server**, and then click **Computers**. You may need to wait a few seconds before LON-OM1.Adatum.com displays. Explain that the discovery process for the SQL Server management pack is responsible for finding computers that are running SQL.

Lesson 4

# Planning and Configuration Notifications and Reporting

## Contents:

## Demonstration: Configuring Notifications (Optional)

### Demonstration Steps

1. In the Operations console, on the bottom left pane, click **Administration** to open the Administration workspace.
2. Under the Notifications node, click **Channels**.
3. In the tasks pane, click **New**, and then in the drop-down list box, click **E-Mail (SMTP)**.
4. In the **E-Mail Notification Channel** dialog box, on the **Description** page, in the **Channel name** box, type **SMTP Notification Channel**, and then click **Next**.
5. On the **Settings** page, click **Add**.
6. In the **Add SMTP Server** dialog box, in the **SMTP server (FQDN)** box, type **LON-SVR1.Adatum.com**, and then click **OK**.
7. In the **Return address** box, type **om@adatum.com**, and then click **Next**.
8. On the **Format** page, explain the variables used in the default subject, explain the message for the email, and then click **Finish**.
9. Wait for the task to successfully finish, and then click **Close**.
10. In the Administration workspace, click **Subscribers**.
11. In the tasks pane, click **New**.
12. In the **Notification Subscriber Wizard** dialog box, on the **Description** page, in the **Subscriber Name**, type **ADATUM\Administrator**, and then click **Next**.
13. On the **Schedule** page, click **Notify only during the specified times**, and then click **Add**.
14. In the **Specify Schedule** dialog box, under **Weekly recurrence**, click **From**, and then set the first time to **8:00 AM** and the second time to **8:00 PM**.
15. Under **On the selected days of the week**, click **Monday**, **Tuesday**, **Wednesday**, **Thursday**, **Friday**, and **Saturday**, and then click **OK**.
16. On the **Schedule** page, click **Next**.
17. On the **Addresses** page, click **Add**.
18. In the **Describe the Subscriber Address** dialog box, in the **Address name** box, type **ADATUM\Administrator**, and then click **Next**.
19. In the **Channel Type** drop-down list box, click **E-Mail (SMTP)**.
20. In the **Delivery address for selected channel** box, type **administrator@adatum.com**, and then click **Next**.
21. On the **Schedule** page, click **Finish**.
22. On the **Addresses** page, click **Finish**, and then click **Close**.
23. In the Administration pane, click **Subscriptions**.
24. In the tasks pane, click **New**.
25. In the **Create Notification Subscription** dialog box, in the **Subscription name** box, type **Critical SQL Alerts**, and then click **Next**.
26. On the **Criteria** page, in the **Conditions** list, click both **raised by any instance in a specific group**, and **of a specific severity**.

27. In the **Criteria description (click the underlined value to edit)** box, click the first occurrence of **specific**.
28. In the **Group Search** dialog box, in the **Filter by (optional)** box, type **SQL**, and then click **Search**.
29. In the **Available groups** list, click **SQL Server 2008 Computers**, click **Add**, and then click **OK**.
30. In the **Criteria description (click the underlined value to edit)** box, click the second occurrence of **specific**.
31. In the **Alert Type** dialog box, click **Critical**, and then click **OK**.
32. On the **Criteria** page, click **Next**.
33. On the **Subscribers** page, click **Add**.
34. In the **Subscriber Search** dialog box, click **Search**, click **ADATUM\Administrator**, click **Add**, and then click **OK**.
35. On the **Subscribers** page, click **Next**.
36. On the **Channels** page, click **Add**.
37. In the **Channel Search** dialog box, click **Search**, click **SMTP Notification Channel**, click **Add**, and then click **OK**.
38. On the **Channels** page, click **Next**.
39. On the **Summary** page, click **Finish**, and then click **Close**.
40. On the host computer, start Hyper-V® Manager.
41. In the **Virtual Machines** list, right-click **20414B-LON-DC1** and then click **Revert**.
42. In the **Revert Virtual Machine** dialog box, click **Revert**.
43. Repeat steps 2 and 3 for **20414B-LON-SVR1**, **20414B-LON-SVR2**, and **20414B-LON-OM1**.

Lesson 5

# Configuring Integration with VMM

## Contents:

## Resources

## Operations Manager Integration with VMM

 **Reference Links:** For more information about System Center 2012 – Virtual Machine Manager: PRO-enabled management packs, see http://go.microsoft.com/fwlink/?LinkID=285324.

## What Is PRO?

 **Reference Links:** F5 PRO-enabled Management Pack for System Center (F5 PRO pack)

http://go.microsoft.com/fwlink/?LinkID=285324

- Emulex PRO-enabled Management Pack

http://go.microsoft.com/fwlink/?LinkID=285316

- Citrix NetScaler PRO-Enabled Management Pack for System Center

http://go.microsoft.com/fwlink/?LinkID=285315

# Module 7

## Planning and Implementing High Availability for File Services and Applications

### Contents:

Lesson 2

# Planning and Implementing DFS

## Contents:

## Resources

## Guidelines for Designing DFS Namespace Availability

 **Reference Links:** For more information about DFS namespaces, go to http://go.microsoft.com/fwlink/?LinkID=285325

# Module 8

## Planning and Implementing a High Availability Infrastructure Using Failover Clustering

### Contents:

Lesson 2

# Implementing Failover Clustering

## Contents:

# Demonstration: Configuring the Scale-Out File Server Cluster

## Demonstration Steps

1. On LON-SVR1, in **Server Manager**, click **Dashboard**, and then click **Add roles and features**.
2. On the **Before you begin** page, click **Next**.
3. On the **Select installation type** page, click **Next**.
4. On the **Select destination server** page, click **Next**.
5. On the **Select server roles** page, expand **File and Storage Services (Installed)**, expand **File and iSCSI Services (Installed)**, and then verify that **File Server** has been selected.
6. Click **Next**.
7. On the **Select features** page, select **Failover Clustering**, click **Add Features** and click **Next**..
8. On the **Confirm installation selections** page, click **Install**.
9. When **Installation Succeeded** message appears, click **Close**.
10. Repeat steps 1 through 9 on LON-SVR2.
11. On LON-SVR1, open **Server Manager**, click **Tools**, and then click **iSCSI Initiator**. At the **Microsoft iSCSI** prompt, click **Yes**.
12. Click the **Discovery** tab.
13. Click **Discover Portal**.
14. In the **IP address or DNS Name** box, type **172.16.0.10**, and then click **OK**.
15. Click the **Targets** tab, and then click **Refresh**.
16. In the Targets list, select **iqn.1991-05.com.microsoft:lon-dc1-dctarget1-target**, and then click **Connect**.
17. Select **Add this connection to the list of Favorite Targets**, and then click **OK**.
18. Click **OK** to close iSCSI Initiator Properties.
19. On LON-SVR2, open Server Manager, click **Tools**, and then click **iSCSI Initiator**.
20. In the **Microsoft iSCSI** dialog box, click **Yes**.
21. Click the **Discovery** tab.
22. Click **Discover Portal**, and in the IP address or DNS name box, type **172.16.0.10**, and then click **OK**.
23. Click the **Targets** tab.
24. In the **Discovered Targets** list, select **iqn.1991-05.com.microsoft:lon-dc1-dctarget1-target**, and then click **Connect**.
25. Select **Add this connection to the list of Favorite Targets**, and then click **OK**.
26. Click **OK** to close iSCSI Initiator Properties.
27. On LON-SVR2, in the Server Manager window, click **Tools**, and then click **Computer Management**.
28. Expand **Storage**, and then click **Disk Management**.
29. Right-click **Disk 2**, and then click **Online**. (Note: Make sure that you do not click Disk1, as it is the disk being used in the previously created cluster).
30. Right-click **Disk 2**, and then click **Initialize Disk**. In the **Initialize Disk** dialog box, click **OK**.

31. Right-click the unallocated space next to **Disk 2**, and then click **New Simple Volume**.
32. On the **Welcome** page, click **Next**.
33. On the **Specify Volume Size** page, click **Next**.
34. On the **Assign Drive Letter or Path** page, click **Next**.
35. On the **Format Partition** page, in the **Volume label** box, type **ClusterDisk**. Select the **Perform a quick format** check box, and then click **Next**.
36. Click **Finish**.
37. Right-click **Disk 3**, and then click **Online**.
38. Right-click **Disk 3**, and then click **Initialize Disk**. In the **Initialize Disk** dialog box, click **OK**.
39. Right-click the unallocated space next to **Disk 3**, and then click **New Simple Volume**.
40. On the **Welcome** page, click **Next**, and then on the
41. **Specify Volume Size** page, click **Next**.
42. On the **Assign Drive Letter or Path** page, click **Next**.
43. On the **Format Partition** page, in the **Volume label** box, type **Quorum**. Select the **Perform a quick format** check box, and then click **Next**.
44. Click **Finish**.
45. Close Computer Management, and then cancel any prompts to format the disk.
46. On LON-SVR1 in Server Manager, click **Tools**, and then click **Computer Management**.
47. Expand **Storage**, and then click **Disk Management**.
48. Right-click **Disk Management**, and then click **Refresh**.
49. Right-click **Disk 3**, and then click **Online**. (Note: Make sure that you do not click Disk 2).
50. Right-click **Disk 4**, and then click **Online**.

 **Note:** LON-SVR1 already has two disks that are marked as Disk 3 and Disk 4. However, please note that on LON-SVR2, the same disks are marked as Disk 2 and Disk 3.

51. Close Computer Management.
52. On LON-SVR1, in the Server Manager console, click **Tools**, and then click **Failover Cluster Manager**.
53. In Failover Cluster Manager, in the center pane, under **Management**, click **Create Cluster**.
54. In the Create Cluster Wizard on the **Before You Begin** page, read the information, and then click **Next**,
55. In the **Enter server name** box, type **LON-SVR1**, and then click **Add**. Type **LON-SVR2**, and then click **Add**.
56. Verify the entries, and then click **Next**.
57. On the **Validation Warning** page, click **No. I do not require support from Microsoft for this cluster**, and then click **Next**.
58. In the **Access Point for Administering the Cluster** page, in the **Cluster Name** box, type **FSCluster**.
59. In the **IP Address Name** box, under **Address**, type **172.16.0.127**, and then click **Next**.

60. In the **Confirmation** dialog box, verify the information, clear the check mark next to **Add all eligible storage to the cluster**, and then click **Next**.
61. In the Create Cluster Wizard **Summary** page, click **Finish**.
62. In the Failover Cluster Manager, expand **FSCluster.Adatum.com**, expand **Storage**, and then right-click **Disks**.
63. Click **Add Disk**.
64. In the **Add Disks to Cluster** dialog box, verify that Cluster Disk 1 and Cluster Disk 2 are selected, and then click **OK**.
65. Verify that disk appears available for cluster storage in **Failover Cluster Manager**.
66. Right-click **Cluster Disk 1** that is assigned to Available Storage, and then select **Add to Cluster Shared Volumes.**
67. Right-click **FSCluster.adatum.com**, select **More Actions**, and then click **Configure Cluster Quorum Settings**. Click **Next**.
68. On the **Select Quorum Configuration Option** page, click **Use typical settings**, and then click **Next**.
69. On the **Confirmation** page, click **Next**, and then on the **Summary** page, click **Finish**.
70. Right-click **Roles**, and then select **Configure Role**.
71. On the **Before You Begin** page, click **Next**.
72. On the **Select Role** page, select **File Server**, and then click **Next**.
73. On the **File Server Type** page, click **Scale-Out File Server for application data**, and then click **Next**.
74. On the **Client Access Point** page, in the **Name** box, type **AdatumFS**, and then click **Next**.
75. On the **Confirmation** page, click **Next**.
76. On **Summary** page, click **Finish**.
77. On LON-SVR1, in Failover Cluster Manager console, click **Roles**, and then in the central pane, right-click **AdatumFS.**
78. Select **Add File Share.** If you receive a message that the Client Access Point is not ready, wait for a minute, and then try again.
79. In the New Share Wizard, on the **Select the profile for this share** page, select **SMB Share-Applications**, and then click **Next.**
80. On the **Select the server and path for this share**, click **Select by volume**, and then click **Next**.
81. On the **Specify share name** page, in the **Share name** text box, type **TestShare**, and then click **Next**.
82. On the **Configure share settings** page, click **Next**.
83. On the **Specify permissions to control access** page, click **Next**.
84. On the **Confirm selections** page, click **Create**, and then click **Close**.

# Module Review and Takeaways

## Best Practices

- Try to avoid using quorum model that depends just on disk.
- Use CSVs for Hyper-V high availability or scale-out file server.
- Be sure that in case of one node failure, other nodes can handle the load.
- Carefully plan multisite clusters.
- Develop standard configurations before you implement highly available virtual machines. You should configure the host computers as close to identically as possible. To make sure that you have a consistent Hyper-V platform, you should configure standard network names, and use consistent naming standards for CSV volumes.
- Implement VMM. VMM provides a management layer on top of Hyper-V and Failover Cluster Management that can block you from making mistakes when you manage highly available virtual machines. For example, it blocks you from creating virtual machines on storage that is inaccessible from all nodes in the cluster.

## Review Question(s)

**Question:** What are main benefits of scale-out file server?

**Answer:** The most important benefit of scale-out file server, compared to clustered file server in previous Windows versions, is the addition of the scalability feature, or active-active operating mode.

**Question:** Does live migration require that you implement a cluster?

**Answer:** In Windows Server 2012, it is not mandatory to have cluster for live migration to work.

**Question:** How data you replicate data between storage in a multisite cluster?

**Answer:** Multisite data replication can be synchronous or asynchronous. For example, synchronous replication does not acknowledge data changes that are made in Site A until the data successfully writes to Site B. With asynchronous replication, data changes that are made in Site A are eventually written to Site B.

## Tools

- Failover Cluster Manager: Use for managing clusters. Access from Administrative Tools.
- Windows PowerShell: Use for command-line management of Windows Server. Access from Administrative Tools.
- Virtual Machine Manager: Use for virtual environment management. Access from Start menu.
- Hyper-V Manager: Use for virtual machines management. Access from Administrative Tools.

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| Virtual machine failover fails after I implement CSV and migrate the shared storage to CSV. | The CSV home folder is located on the host-server system drive. You cannot move it. If the host computers use different system drives, the failovers will fail because the hosts cannot access the same storage location. All failover cluster nodes should use the same hard-drive configuration. |
| Four hours after restarting a Hyper-V host that is a member of a host cluster, there | By default, virtual machines do not fail back to a host computer after they migrate to another host. You can |

| Common Issue | Troubleshooting Tip |
| --- | --- |
| are still no virtual machines running on the host. | enable failback on the virtual machine properties in Failover Cluster Management, or you can implement PRO in VMM. |

# Lab Review Questions and Answers

## Lab: Planning and Implementing a Highly Available Infrastructure by Using Failover Clustering

## Question and Answers

**Question:** What is the main difference between Hyper-V Replica and Hyper-V clustering?

**Answer:** Hyper-V replica is a disaster-recovery mechanism that is not automated, while failover clustering is a highly available technology that automatically manages failover and failbacks.

**Question:** What are the main benefits of having PRO implemented in VMM?

**Answer:** PRO is very important component in managing server workloads in virtualized environment. PRO integrates VMM and Operations Manager to deliver automation of some tasks that manage workloads on your infrastructure.

# Module 9

## Planning and Implementing Server Update Infrastructure

### Contents:

# Module Review and Takeaways

## Review Question(s)

**Question:** What is the difference between managing updates with Configuration Manager and managing updates with VMM?

> **Answer:** Configuration Manager works well with client workstations and servers that are not part of a cluster. For servers that are part of the VMM infrastructure, and for host clusters, VMM is better because it can provide more control for the VMM administrator. VMM also provides an orchestrated update process for host cluster resources.

## Tools

- WSUS Management console
- VMM Console
- Cluster Aware updating console
- Group Policy Management console

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| WSUS fails to synchronize with Microsoft Update. | Check the error in the synchronization's details pane.<br>Check proxy server settings by using the WSUS console.<br>Check the firewall.<br>Verify that users and the network service have Read permissions to the local update storage directory. |
| Client computers appear in the wrong groups. | Check if the client-side targeting is enabled in Options in the WSUS Administration Console.<br>Verify that the target computer group names match groups on the WSUS server.<br>Reset the Automatic Updates client using:<br>wuauclt.exe /resetauthorization /detectnow |

# Lab Review Questions and Answers

## Lab: Planning and Implementing an Update Remediation Infrastructure

## Question and Answers

**Question:** What are the most common scenarios of deploying WSUS?

**Answer:** You typically deploy WSUS as a single WSUS server. However, if you're deploying multiple servers, you can deploy a set of internally synchronized WSUS servers.

**Question:** You need to modify the products that synchronize with Windows Update. Where would you perform this task?

**Answer:** You would configure this setting from the Update Server Properties window. Note that you do not perform management tasks from the WSUS Administration console.

# Module 10

## Planning and implementing a Business Continuity Strategy

### Contents:

Lesson 1

# Overview of Business Continuity Planning

## Contents:

## Resources

## Considerations for Using Windows Azure Online Backup

 **Additional Reading:** For more information about Windows Azure Online Backup, go to http://go.microsoft.com/fwlink/?LinkID=288908

Lesson 4

# Planning and Implementing Backup and Recovery of Virtual Machines

## Contents:

## Resources

## Configuring Hyper-V Replica

 **Reference Links:** Deploy Hyper-V Replica at http://go.microsoft.com/fwlink/?LinkID=285327

# Module Review and Takeaways

## Best Practices

- You must test your backup and restore strategies before you deploy them in a production environment. You also should test your backup and restore strategies in production on regular bases. However, be careful not to affect your production environment when testing. For your testing, you should use an isolated, nonproduction environment with a copy of the production data.

## Review Question(s)

**Question:** What is more convenient for organizations, to use centralized protection solution such as DPM, or having separate products to protect different servers, data and services?

**Answer:** The first step in planning should be determining what technologies are supported by DPM? If DPM supports the technologies that an organization is using, then DPM can provide a centralized dashboard for managing backups and restores, and for reporting on different protection jobs and relevant information. Having separate products is only a solution when organizations use servers that run software that DPM does not. Also, organizations that have only a small number of servers might consider using Windows Server Backup for their backup and restore procedures.

## Real-world Issues and Scenarios

Your organization has defined the backup and restores strategy. But after several months of successful backup jobs running, your IT manager wants to test the restore of data located on a file server. No server failures have been detected so far. When performing restore, backup administrator found out that no corporate data has been restored, because the wrong folder from the file server has been configured for backup. Your organization now will have to conduct regular testing on the restore procedures to verify that the correct data will be restored if a failure occurs.

## Tools

- DPM. A global user interface (GUI) for configuring and managing DPM.
- DPM Management Shell. Windows PowerShell for configuring and managing DPM.

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| DPM protection agent installation fails | Check technical documentation about specific types of installation that you plan to perform, such as physical machine, virtual machine, workgroup machine, and similar, since those deployments are different. Also, check if computers that need to be protected are separated by firewalls, so the appropriate port–TCP Port 135—can be opened. |

# Lab Review Questions and Answers

## Lab: Implementing a Virtual Machine Backup Strategy with DPM

## Question and Answers

**Question:** Why is important to have a detailed strategy for backups and restores prepared for your organization?

**Answer:** By preparing a detailed backup and restore strategy, your organization is ready to address any potential risk to its data. Backup and restore strategies are initiated by an organization's business requirements.

**Question:** Once defined, should organizations consider that they have completed the requirements for addressing any risks?

**Answer:** No. In the IT world, risks and threats are evolving constantly. Organizations should evaluate their backup and restore strategies regularly and thoroughly, and change them according to the latest developments in information technology, as well as changes to their business requirements.

# Module 11

## Planning and Implementing an Public Key Infrastructure

### Contents:

# Module Review and Takeaways

## Best Practices

- When deploying a CA infrastructure, deploy a standalone (not joined to a domain) root CA and an enterprise subordinate CA (the issuing CA). After the enterprise subordinate CA receives a certificate from RootCA, take RootCA offline.
- Issue a certificate for RootCA for an extended period, such as 15 or 20 years.
- Use autoenrollment for certificates that are used widely.
- Use a Restricted Enrollment Agent, whenever possible.

## Review Question(s)

**Question:** Can you list the requirements to use autoenrollment for certificates?

**Answer:** You must have an enterprise CA, and then you must configure Group Policy options. Additionally, you must enable autoenrollment for the desired certificates, and then you must configure GPOs.

## Tools

- Certificate Authority console
- Certificate Templates console
- Certificates console
- Certutil.exe

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| The CA is not configured to include CRL distribution point locations in the extensions of issued certificates. Clients may not be able to locate a CRL to check the revocation status of a certificate, and certificate validation may fail. | Use the Certification Authority snap-in to configure the CRL distribution point extension and to specify the network location of the CRL.<br>The default locations of the CRL are added to the CRL distribution-point extension settings during a CA installation, and the CA is configured to include the default locations in the extensions of all issued certificates. |
| The CA was installed as an enterprise CA, but Group Policy settings for user autoenrollment have not been enabled. An enterprise CA can use autoenrollment to simplify certificate issuance and renewal. If autoenrollment is not enabled, certificate issuance and renewal may not occur as expected. | Use the Group Policy Management Console to configure user autoenrollment policy settings, and use the Certificate Templates snap-in to configure autoenrollment settings on the certificate template. |

# Lab Review Questions and Answers

## Lab: Planning and Implementing an AD CS Infrastructure

## Question and Answers

**Question:** Why is it not recommended to install just an enterprise root CA?

**Answer:** For security reasons, root CAs should be offline, without any network access. Root enterprise CAs cannot be offline, so there is no maximum protection for its key.

**Question:** What is the main benefit of OCSP versus CRL?

**Answer:** OCPS provides status for a single certificate that clients request, instead of downloading the entire CRL and delta CRLs. Furthermore, OCPS has responses that are much faster and more reliable, because clients do not cache them.

**Question:** What must you do to recover private keys?

**Answer:** You must configure your CA to archive private keys for specific templates, and then you must issue a KRA certificate.

# Module 12

## Planning and Implementing an Identity Federation Infrastructure

### Contents:

Lesson 1

# Planning and Implementing an AD FS Server Infrastructure

## Contents:

## Resources

## Integrating AD FS with Online Services

 **Additional Reading:** For more information on integrating AD FS with the Windows Azure ACS, go to http://go.microsoft.com/fwlink/?LinkID=285332.

Lesson 2

# Planning and Implementing AD FS Claims Providers and Relying Parties

## Contents:

## Resources

## Overview of AD FS Compatible Applications

**Additional Reading:** For more information on WIF, go to MSDN at http://go.microsoft.com/fwlink/?LinkID=285330.

## Options for Implementing Attribute Stores

**Additional Reading:** For more information on custom attribute stores, go to MSDN at http://go.microsoft.com/fwlink/?LinkID=285331

Lesson 3

# Planning and Implementing AD FS Claims and Claim Rules

## Contents:

## Resources

## Creating Claim Rules by Using the Claims Rule Language

 **Additional Reading:** For more information on the claims rule language, go to TechNet at AD FS 2.0 Claims Rule Language Primer at http://go.microsoft.com/fwlink/?LinkID=285329.

# Module Review and Takeaways

## Review Question(s)

**Question:** What is the difference between a claims provider trust and a relying party trust?

> **Answer:** You create a claims provider trust in a resource partner to establish a relationship with the organization that is hosting the users who will be accessing the resources. A relying party trust specifies an application or another Federation Service Federation Service that will consume the claims that your Federation Service produces.

## Tools

- AD FS Management Console
- Public key infrastructure (PKI) certification authority
- Windows PowerShell
- Server Manager

# Lab Review Questions and Answers

## Lab: Planning and Implementing AD FS Infrastructure

### Question and Answers

**Question:** When is the AD FS server deployed in Adatum considered an account federation server, and when is it considered a resource federation server?

**Answer:** When internal users in Adatum are accessing web applications, and AD FS is providing SSO functionality, the AD FS server in Adatum is acting as both an account federation server and a resource federation server. When users from Trey Research are accessing the claims-aware web application at Adatum, the Adatum AD FS server is acting as a resource federation server, while the Trey Research AD FS server is acting as an account federation server.

**Question:** How could a federation server proxy improve the security of Adatum's AD FS deployment?

**Answer:** A federation server proxy would provide a connection endpoint for external users, which helps avoid exposing the federation server directly to the Internet.

# Module 13

## Planning and Implementing an Information Rights Management Infrastructure

### Contents:

Lesson 1

# Planning and Implementing an AD RMS Cluster

## Contents:

## Question and Answers

## AD RMS Deployment Scenarios

**Question:** Do you have AD RMS implemented in your environment? If yes, which deployment scenario are you using? If you are not using it currently, but may in the future, which deployment scenarios would you use?

**Answer:** Answers will vary.

## Resources

## Implementing an AD RMS Backup and Recovery Strategy

**Additional Reading:** To restore a database, follow the regular procedures for a database restoration on SQL Server. See http://go.microsoft.com/fwlink/?LinkID=285335 for a review of these procedures.

## Demonstration: Installing an AD RMS Cluster

### Demonstration Steps

**Prepare the Active Directory Rights Management Service (AD RMS) infrastructure**

1. On LON-DC1, in Server Manager, click **Tools**, and then select **Active Directory Users and Computers**.
2. In the console tree, expand **Adatum.com**.
3. Right-click **Users**, point to **New**, and then click **User**.
4. In the **New Object – User** dialog box, type **ADRMSSRVC** in the **First name** and **User logon name** boxes, and then click **Next**.
5. In the **New Object – User** dialog box, type **Pa$$w0rd** in the **Password** and **Confirm password** boxes. Clear the **User must change password at next logon** check box, click **Next**, and then click **Finish**.

**Note:** The ADRMSSRVC account was created to use for installing and managing the AD RMS server deployment. To ensure this account has the correct permissions to enable these tasks, including the ability to register the service connection point, it needs to be made a member of the Domain Admins group for the ADATUM.com domain. The AD RMS setup looks for the security identifier (SID) of the default Administrator account. The AD RMS service SID cannot match the SID of the default Administrator account.

**Add ADRMSSRVC to the Domain Admins group**

1. In the Active Directory Users and Computers console, click **Users**, and then double-click **Domain Admins**.
2. Click **Members**, and then click **Add**.
3. Type **adrmssrvc**, and then click **OK**.
4. Click **OK** to close **Domain Admins Properties**.

**Add email addresses to user and group**

1. In the Active Directory Users and Computers console, click the Research organizational unit (OU), and then double-click the account object **Hani Loza**.
2. On the **General** tab of the Hani properties sheet, in the **email** box, type **hani@adatum.com**, and then click **OK**.
3. Double-click the **Research** group within the **Research OU**.
4. On the **General** tab of the Research group properties, in the **email** box, type **Research@adatum.com**, and then click **OK**.
5. Close the Active Directory Users and Computers console.

**Create a shared network folder that members of the Research group can modify**

1. From the task bar, open File Explorer, and then right-click **Local Disk (C:)**.
2. Point to **New**, and then click **Folder**.
3. Type **ConfidentialResearch** for the new folder, and then press Enter.
4. Right-click **ConfidentialResearch**, point to **Share with**, and then click **Specific people**.
5. For **Choose people on your network to share with**, type **Research**, and then click **Add**.
6. In the list, click the arrow for **Permission Level** on the **Research** group, and then select **Read/Write**.
7. Click **Share**, and then click **Done**.

**Create a share on LON-DC1 to store the AD RMS templates**

1. From File Explorer, right-click **Local Disk (C:)**.
2. Point to **New**, and then click **Folder**.
3. Type **Public** for the new folder, and then press Enter.
4. Right-click **Public**, point to **Share with**, and then click **Specific people.**
5. For **Choose people on your network to share with**, click the arrow, select **Everyone**, and then click **Add**.
6. Click **Share**, and then click **Done**.
7. Close File Explorer.

**Add the AD RMS server role**

Windows Server 2012 includes the option to install AD RMS as a server role by using Windows Server 2012 Server Manager. The first server in an AD RMS environment is the root cluster, which has one or more AD RMS servers that you configure in a load-balancing environment.

 **Note:** AD RMS is a server role of Windows Server 2012, so a Windows Server 2012 Client Access License (CAL) is required for every user or device that accesses the server software.

**To add the AD RMS server role**

1. On LON-DC1, in the Dashboard console of Server Manager, click **Add roles and features**.
2. Click **Next** three times to get to the **Select Server roles** page.
3. On the **Select Server roles** page, select **Active Directory Rights Management Services**, click **Add Features**, and then click **Next**.
4. In the **Select features** page, click **Next**.

5. In the **Active Directory Rights Management Services** page, click **Next**.
6. In **Select role services**, verify that **Active Directory Rights Management Server** is selected, and then click **Next**.
7. Click **Install** to add the role.
8. Allow the installation to complete, and then click **Close**.

**Configure a new AD RMS root cluster**

In Windows Server 2012, there are separate processes to add the AD RMS role and then configure a new AD RMS cluster. After you add the role, you must configure the role to deploy it.

To configure a new AD RMS root cluster:

1. In Server Manager, click the **Notifications** icon (the white flag next to **Manage**).
2. For the task event labeled **Configuration Required for Active Directory Rights Management Services at LON-DC1**, click **Perform additional configuration**. The AD RMS Configuration Wizard opens.
3. In the AD RMS Configuration Wizard, on the **AD RMS** page, click **Next**.
4. On the **Create or Join an AD RMS Cluster** page, accept the default selection (**Create a new AD RMS root cluster**), and then click **Next**.
5. On the **Select Configuration Database Server** page, select the **Use Windows Internal Database on this server** radio button, and then click **Next**.
6. In **Specify Service Account**, click **Specify**, and in the **Windows Security** dialog box, type **ADRMSSRVC** and password **Pa$$w0rd**, and then click **OK**.
7. Verify that the **Domain User Account** is set to **ADATUM\ADRMSSRVC**, and then click **Next**.
8. For **Cryptographic Mode**, accept the default (**Cryptographic Mode 2**), and then click **Next**.
9. For **Cluster Key Storage**, accept the default (**Use AD RMS centrally managed key storage**) , and then click **Next**.
10. For **Cluster Key Password**, type and confirm **Pa$$w0rd**, and then click **Next**.
11. For **Cluster Web Site**, accept the default (**Default Web Site**), and then click **Next**.
12. For **Cluster Address**, accept the default (**Use an SSL-encrypted connection (https://)**). For **Fully Qualified Domain Name**, type **LON-DC1.adatum.com** (use the fully qualified domain name [FQDN], not just LON-DC1), and then click **Next**.
13. For **Server Certificate**, click **LON-DC1.Adatum.com**, and then click **Next**.
14. For **Licensor Certificate**, accept the default name (**LON-DC1** does not need to be the FQDN) , and then click **Next**.
15. For **SCP Registration**, accept the default (**Register the SCP now**), and then click **Next**.
16. For **Confirmation**, review your installation selections, and then click **Install**.
17. Click **Close**.
18. Sign off the server, and then sign in again to update the security token of the logged-on user account.

 **Note:** Your AD RMS root cluster now is installed and configured. Once you sign in again, you can further manage AD RMS by using the AD RMS console.

**Open the Active Directory Rights Management Services console**

1. In Server Manager on LON-DC1, click **Tools**, and then click **Active Directory Rights Management Services**.

   **Tip:** If using a self-signed certificate for the cluster, you can put a copy of that certificate in the Trusted Root-certification Authorities store so that it will be trusted. You also can place a copy in that same certificates store on the client computer, so that the website is trusted. If the **Certificate Warning** page appears, you can click **Yes** to load the website, or you can install the certificate in the Trusted Root Certificate Store. Do this for the local computer account.

From the console, you can configure trust and exclusion policies, and create rights-policy templates.

The user account that is signed in when the AD RMS server role is installed automatically becomes a member of the AD RMS Enterprise Administrators local group. A user must be a member of that group to administer AD RMS.

Discuss the various nodes in the console tree. Explain how you can use the nodes in the console to configure trust and exclusion policies, and create rights-policy templates.

Lesson 2

# Planning and Implementing AD RMS Templates and Policies

## Contents:

# Question and Answers

## Options for Configuring AD RMS Rights Policy Templates

**Question:** Can an organization use AD RMS without using rights-policy templates? If so, what are the limitations?

> **Answer:** An organization can use AD RMS without using rights-policy templates. The main difference is that you must configure the authorized users manually, and then use rights each time you protect content with AD RMS.

## Demonstration: Adding User Entities to an Exclusion Policy

### Demonstration Steps

**Exclude Rights Account Certificates (RACs)**

1. Sign in to **LON-CL1** as **Adatum\hani** with the password **Pa$$w0rd**.
2. From the **Start** page, click the **Desktop** tile.
3. From the desktop taskbar, click **Internet Explorer**.
4. Click **Tools**, and then click **Internet options**.
5. Click the **Security** tab, click **Local intranet**, and then click **Sites**.
6. Click **Advanced**, and in the **Add this website to the zone**, type **https://LON-DC1.adatum.com**, and then click **Add**.
7. Click **Close**, and then click **OK** two times. Close Windows Internet Explorer®.
8. Click to the Start screen, and then type **Microsoft Word**.
9. Click **Microsoft Word 2010**. Click **OK** in the **User Name** dialog box.
10. In the **Help Protect and Improve Microsoft Office** dialog box, click **Don't make changes**. Click **OK**.
11. In Microsoft Word, type **Research employees can read this document, but they cannot change, print, or copy it on the blank document page**.
12. From the **File menu**, click **Protect Document**, point to **Restrict Permission by People**, and then click **Restricted Access**.
13. In the **Permission** dialog box, click the **Restrict permission to this document** check box, and then in the **Read** box, type **Research@adatum.com**.
14. Click **OK** to close the **Permission** dialog box.
15. From the File menu, click **Save As**, and then save the file as **\\LON-DC1\ConfidentialResearch\ADRMS-TST.docx**.
16. Close Microsoft Word, sign off LON-CL1, and remember that the above steps ensure a RAC has been created for Hani.

**Exclude the restriction on a user**

1. In Server Manager on **LON-DC1**, click **Tools**, and then click **Active Directory Rights Management Services**.
2. In the AD RMS console, expand **lon-dc1.adatum.com**.
3. Expand **Exclusion policies**, and then click **Users**.
4. In the Actions pane, click **Enable User Exclusion**.

5. In the Actions pane, click **Exclude RAC**.
6. In the **Add RAC to be excluded** page, ensure that the **Use this option for excluding rights account certificates of internal users who have an Active Directory Domain Services account** radio button is selected. Type **hani@adatum.com** in the **User name** box.
7. Click **Finish**.

Hani's email address and public key should appear in the table in the **User Exclusion Information** page.**Stop excluding the RACs of users**

1. Open the AD RMS console, and then expand the AD RMS cluster.
2. In the console tree, expand **Exclusion Policies**, and then click **Users**.
3. Do one of the following:
   - To disable user exclusion for all user accounts, in the Actions pane, click **Disable User Exclusion**. All user accounts previously excluded will be able to acquire AD RMS use licenses.
   - To stop excluding a specific user account, such as Holly from above, in the results pane, select her excluded user certificate. In the Actions pane, click **Delete**, and then click **Yes** to confirm the removal.

Lesson 3

# Planning and Implementing External Access to AD RMS Services

## Contents:

## Question and Answers

## Options for Enabling External Users to Access AD RMS

**Question:** In which scenarios do you need to provide external access to AD RMS?

> **Answer:** You need to provide external access to AD RMS if you want to distribute or accept AD RMS-protected documents from other organizations, or if you want to send AD RMS-protected content over the Internet.

## Resources

## Options for Enabling Application Access for AD RMS Clients

 **Additional Reading:** You can download these free from the Microsoft website, at http://go.microsoft.com/fwlink/?LinkID=285336.

## Integrating AD RMS with AD FS

 **Additional Reading:** Windows Phone clients can use certain extended features, which the article at http://go.microsoft.com/fwlink/?LinkID=285333 describes. All of these disparate client settings can increase support costs.

 **Additional Reading:** For more information, go to http://go.microsoft.com/fwlink/?LinkID=285334

 **Additional Reading:** For more information, go to http://go.microsoft.com/fwlink/?LinkID=285334.

Lesson 4

# Planning and Implementing AD RMS Integration with DAC

## Contents:

# Demonstration: Deploy Encryption of Office Files

## Demonstration Steps

### Enable resource properties

1. On LON-DC1, open Active Directory Administrative Center, and then click **Tree View**.
2. Expand **Dynamic Access Control**, and then select **Resource Properties**.
3. Scroll down to the **Impact** property in the **Display Name** column. Right-click **Impact**, and then click **Enable**.
4. Scroll down to the **Personally Identifiable Information** property in the **Display Name** column. Right-click **Personally Identifiable Information**, and then click **Enable**.
5. To publish the resource properties in the **Global Resource List**, in the left pane, click **Dynamic Access Control**, double click **Resource Property Lists**, and then double-click **Global Resource Property List**.
6. Under **Resource Properties**, click **Add**, and then scroll down to, and click, **Impact** to add it to the list. Do the same for **Personally Identifiable Information**. Click **OK** twice to finish.

**Note:** These resource properties may already be listed, if so, then the OK button may be grayed out. If this is the case, simply verify the resource properties are listed, and then click **Cancel**.

### Use Windows PowerShell equivalent commands

The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraint; type the following, then press Enter:

```
Set-ADResourceProperty –Enabled:$true –Identity:"CN=Impact_MS,CN=Resource
Properties,CN=Claims Configuration,CN=Services,CN=Configuration,DC=adatum,DC=com"
Set-ADResourceProperty –Enabled:$true –Identity:"CN=PII_MS,CN=Resource
Properties,CN=Claims Configuration,CN=Services,CN=Configuration,DC=adatum,DC=com"
```

### Create classification rules

1. Switch to LON-SVR1.
2. From Server Manager, add the **File Server Resource Manager** server role.
3. In Server Manager, click **Add roles and features**.
4. Click **Next** three times until you reach the Select server roles page. Expand the **File And Storage Services (Installed),** and then expand the **File And iSCSI Services (Installed)**. Select the check box next to File Server Resource Manager. Click **Add Features**, click **Next** two times, and then click **Install**. When the installation is finished, click **Close**.
5. To refresh the Global Resource Properties, open, on the task bar, double-click the Windows PowerShell icon, and in the Windows PowerShell window, type **Update-FSRMClassificationPropertyDefinition**, and then press Enter. Close Windows PowerShell.
6. To open File Server Resource Manager, from the **Start** screen, click **File Server Resource Manager**.
7. In the left pane of File Server Resource Manager, expand **Classification Management**, and then select **Classification Rules**.

8. In the Actions pane, click **Configure Classification Schedule**. On the **Automatic Classification** tab, select **Enable fixed schedule**, select **Sunday**, and then select the **Allow continuous classification for new files** check box. Click **OK**.
9. In the Actions pane, click **Create Classification Rule**. This opens the **Create Classification Rule** dialog box.
10. In the **Rule Name** box, type **High Business Impact**.
11. In the **Description** box, type **Determines if the document has a high business impact based on the presence of the string Adatum Confidential**.
12. On the **Scope** tab, click **Set Folder Management Properties**, select **Folder Usage**, click **Add**, click **Browse**, and then browse to **C:\Finance Documents**. Click **OK**, select the Value named **Group Files**, and then click **OK** and click **Close**. On the **Scope** tab, select **Group Files**.
13. Click the **Classification** tab, and under **Choose a method to assign a property to files**, select **Content Classifier** from the drop-down list box.
14. Under **Choose a property to assign to files**, select **Impact** from the drop-down list box.
15. Under **Specify a value**, select **High** from the drop-down list box.
16. Click **Configure** under **Parameters**. In the **Classification Parameters** dialog box, in the **Expression Type** list, select **String**. In the **Expression** box, type: **Adatum Confidential**, and then click **OK**.
17. Click the **Evaluation Type** tab. Click **Re-evaluate existing property values**, click **Overwrite the existing value**, and then click **OK** to finish.

**Use Windows PowerShell equivalent commands**

The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraints ; type the following, then press Enter:

```
Update-FSRMClassificationPropertyDefinition
$date = Get-Date
$AutomaticClassificationScheduledTask = New-FsrmScheduledTask -Time $date -Weekly
@(3, 2, 4, 5,1,6,0) -RunDuration 0;
New-FSRMClassificationRule -Name "High Business Impact" -Property "Impact_MS" -
Description "Determines if the document has a high business impact based on the
presence of the string 'Contoso Confidential'" -PropertyValue "3000" -Namespace
@("C:\Finance Documents") -ClassificationMechanism "Content Classifier" -Parameters
@("StringEx=Min=1;Expr=Adatum Confidential") -ReevaluateProperty Overwrite
```

**Protect documents with AD RMS**

1. On LON-SVR1, open **File Server Resource Manager**.
2. In the left pane, select **File Management Tasks**. In the Actions pane, click **Create File Management Task**.
3. In the **Task name:** field, type **High Impact**. In the **Description** field, type **Automatic RMS protection for high impact documents**.
4. Click the **Scope** tab, and then select the **Group Files** check box.
5. Click the **Action** tab. Under **Type**, select **RMS Encryption**. In the **Read** box, type **Research@adatum.com**.
6. Click the **Condition** tab, and then click **Add**. Under **Property**, select **Personally Identifiable Information**. Under **Operator**, select **Equal**. Under **Value**, select **High**, and then click **OK**.

7. Click the **Schedule** tab. In the **Schedule** section, click **Weekly**, and then select **Sunday**. Running the task once a week ensures that you catch any documents that may have been missed due to a service outage or other disruptive event.
8. In the **Continuous operation** section, select **Run continuously on new files**, and then click **OK**. You now should have a file management task named **High Impact**.

**Use Windows PowerShell equivalent commands**

The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraints ; type the following, then press Enter:

```
$fmjRmsEncryption = New-FSRMFmjAction -Type 'Rms' -RmsTemplate 'Adatum Finance Admin
Only'
$fmjCondition1 = New-FSRMFmjCondition -Property 'PII_MS' -Condition 'Equal' -Value
'5000'
$date = get-date
$schedule = New-FsrmScheduledTask -Time $date -Weekly @('Sunday')
$fmj1=New-FSRMFileManagementJob -Name "High Impact" -Description "Automatic RMS
protection for high PII documents" -Namespace @('C:\Finance Documents') -Action
$fmjRmsEncryption -Schedule $schedule -Continuous -Condition @($fmjCondition1)
```

**View the results**

1. On LON-SVR1, in File Explorer, navigate to **C:\Finance Documents**.
2. Right-click the **Finance Memo** document, and then click **Properties**. Click the **Classification** tab, and then notice that the **Impact** property currently has no value. Click **Cancel**.
3. Switch to **LON-CL1**. Sign in as **Adatum\Hani** with the password **Pa$$w0rd**.
4. From the Desktop, browse to the **\\LON-SVR1\Finance Documents** shared folder.
5. Open the **Finance Memo** document. Type in **Adatum Confidential**. Save the document, and then close Microsoft Word.

**Note:** You may need to wait 30 seconds for the classification to occur.

6. Switch back to **LON-SVR1**. In File Explorer, navigate to **C:\Finance Documents**.
7. Right-click the **Finance Memo** document, and then click **Properties**. Click the **Classification** tab. Notice that the **Impact** property is now set to **High**. Click **Cancel**.

# Module Review and Takeaways

## Tools

- Active Directory Rights Management Service Administration Console
- File Services Resource Manager
- Active Directory Administrative Center
- Regedit.exe
- Windows PowerShell

## Common Issues and Troubleshooting Tips

| Common Issue | Troubleshooting Tip |
|---|---|
| Be aware that self-signed certificates can be used, but the server certificates from the AD RMS cluster servers will need to be added to any computer's (involved in IRM protection) Trusted Certification Authorities Store. | It will be far easier to acquire a commercial certificate or create one via your own Trusted Certificate Authority, such as AD CS. |
| When you installed the AD RMS cluster in the lab, you used the Windows Internal database. However, if you intend to have multiple AD RMS servers in the cluster, you will need to use a full version of SQL Server to be able to add database items from multiple servers. | Do not use the Windows Internal Database in a normal production environment |