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6439A

**Configuring and Troubleshooting Windows  
Server® 2008 Application Infrastructure**

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# Module 1

## Configuring Storage for Windows Server 2008 Applications

### Contents:

<b>Lesson 1:</b> Storage Concepts in Windows Server 2008	<b>8</b>
<b>Lesson 2:</b> Configuring iSCSI Storage for Windows Server	<b>11</b>
<b>Lesson 3:</b> Working with Virtual Hard Disks	<b>16</b>
Module Reviews and Takeaways	<b>18</b>
Lab Review Questions and Answers	<b>19</b>

## Lesson 1

# Storage Concepts for Windows Server 2008

### Contents:

Question and Answers	9
Additional Reading	10



## Question and Answers

### What Is RAID?

**Question:** Should all disks be configured with the same amount of fault tolerance?

**Answer:** Not all disks need the same tolerance. A common practice is to use RAID 1 for the operating system and RAID 5 for the data. You will learn more about RAID levels in the following section.

## Additional Reading

### What Is Network Attached Storage?

- [Windows Storage Server](#)

## Lesson 2

# Configuring iSCSI Storage for Windows Server

### Contents:

Detailed Demonstration Steps

12

# Detailed Demonstration Steps

## Demonstration: How to Configure the iSCSI Software

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 and 6439A-NYC-Support1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Create iSCSI targets on NYC-DC1.

1. Switch to NYC-DC1.
2. Click **Start**, point to **Administrative Tools**, and then click **Microsoft iSCSI Software Target**.
3. In the tree pane of the iSCSITarget console, right-click **iSCSI Targets**, and then click **Create iSCSI Target**.
4. On the **Welcome to the Create iSCSI Target Wizard** page, click **Next**.
5. In the **iSCSI target name** box of the **iSCSI Target Identification** page, type **NYC-Support1**, and then click **Next**.
6. On the **iSCSI Initiators Identifiers** page, click **Advanced**.
7. In the **Advanced Identifiers** dialog box, click **Add**.
8. In the **Identifier Type** box of the **Add/Edit Identifier** dialog box, click **IP Address**, in the **Value** box, type **10.10.0.27**, and then click **OK**.
9. In the **Advanced Identifiers** dialog box, click **Add**.
10. In the **Identifier Type** box of the **Add/Edit Identifier** dialog box, click **IP Address**, in the **Value** box, type **10.10.0.51**, and then click **OK**.
11. In the **Advanced Identifiers** dialog box, click **OK**.
12. On the **iSCSI Initiators Identifiers** page, ensure that the IQN Identifier box displays the text, "**Click Advanced button to view alternate identifiers**", and then click **Next**.
13. On the **Completing the Create iSCSI Target Wizard** page, click **Finish**.

#### ► Task 2: Add a virtual disk to the iSCSI target on NYC-DC1.

1. Right-click **NYC-Support1**, and then click **Add Existing Virtual Disk to iSCSI Target**.
2. In the **Add Virtual Disk** dialog box, in the **Virtual Disk Index** list, click **Virtual Disk 0**, and then click **OK**.

#### ► Task 3: Add the iSCSI target portal.

1. Switch to **NYC-Support1**.
2. Click **Start**, point to **Administrative Tools**, and click **iSCSI Initiator**.
3. If prompted by a dialog box to start the **Microsoft iSCSI** service, click **Yes**.
4. In the **iSCSI Initiator Properties** dialog box, select the **Discovery** tab.

5. To add a **Target portal**, point to and click the **Discover Portal** button.
6. In the **IP address or DNS name** field, type **10.10.0.10**. Use the default port of **3260**, and then click **OK**.
7. In the **Target portals** list, notice the new portal listed with the IP address and port.

► **Task 4: Add persistent binding on NYC-Support1.**

1. In the **iSCSI Initiator Properties** dialog box, click the **Targets** tab, and then click **Refresh**.
2. In the **Targets** list, select **iqn.1991-05.com.microsoft:nyc-dc1-nyc-support1-target**, and then click **Connect**.
3. On the **Connect to Target** dialog box, ensure that the **Add this connection to the list of Favorite Targets** check box is selected.
4. Click the **Advanced** button.
5. In the **Advanced Settings** dialog box, on the **General** tab, change the **Local Adapter** from **Default** to **Microsoft iSCSI Initiator**. Change **Initiator IP** to **10.10.0.27**. Change **Target Portal IP** to **10.10.0.10/3260**.
6. Click **OK** to close the **Advanced Settings** dialog box.
7. Click **OK** to close the **Connect to Target** dialog box.
8. Click **OK** to close the **iSCSI Initiator Properties** dialog box.

► **Task 5: Verify the presence of the new drive.**

1. Click **Start**, point to **Administrative Tools**, and then click **Computer Management**.
2. In the **Computer Management** console, expand the **Storage** node, and then click **Disk Management**. Notice that a new disk is added, which is currently offline and not formatted.
3. Close the **Computer Management** console.



**Note** Leave all virtual machines running.

## Demonstration: How to Configure MPIO and Redundant Connections

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 and 6439A-NYC-Support1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**. The virtual machines should be running from the preceding demonstration.

► **Task 1: Install MPIO on NYC-Support1.**

1. On NYC-Support1, click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
2. In Server Manager, in the navigation pane, click **Features**.
3. In the **Features** pane, click **Add Features**.

4. In the Add Features Wizard, on the **Select Features** page, select the **Multipath I/O** check box, and then click **Next**.
5. On the **Confirm Installation Selections** page, click **Install**.
6. When the installation is complete, on the **Installation Results** page, click **Close**.
7. Close **Server Manager**.

► **Task 2: Claim an iSCSI-attached device for use with MPIO.**

1. Click **Start**, point to **Administrative Tools**, and then click **MPIO**.
2. Click the **Discover Multi-Paths** tab.
3. Select the **Add support for iSCSI devices** check box, and then click **Add**. When prompted to reboot the computer, click **Yes**.
4. After the computer restarts, log on using the following credentials:
  - User name: **Administrator**
  - Password: **Pa\$\$w0rd**
  - Domain: **Contoso**
5. Click **Start**, point to **Administrative Tools**, then click **MPIO**.
6. Select the **MPIO Devices** tab. Notice that Additional hardware ID **MSFT2005iSCSIBusType\_0x9** has been added to the list.
7. Click **OK** to close the **MPIO Properties** dialog box.

► **Task 3: Select the target in iSCSI Initiator and enable the multi-path option.**

1. Click **Start**, point to **Administrative Tools**, and then click **iSCSI Initiator**.
2. On the **Targets** tab, click **Disconnect**.
3. In the **Disconnect From All Sessions** dialog box, click **Yes**.
4. In the **iSCSI Initiator Properties** dialog box, on the **Targets** tab, click **Refresh**.
5. In the **Targets** list, select **iqn.1991-05.com.microsoft:nyc-dc1-nyc-support1-target**, and then click **Connect**.
6. Verify that the **Add this connection to the list of Favorite Targets** check box is selected.
7. Select **Enable multi-path**, and then click the **Advanced** button.
8. In the **Advanced Settings** dialog box, on the **General** tab, change the **Local Adapter** from **Default** to **Microsoft iSCSI Initiator**. Change **Initiator IP** to **10.10.0.27**. Change **Target Portal IP** to **10.10.0.10/3260**.
9. Click **OK** to close the **Advanced Settings** dialog box.
10. Click **OK** to close the **Connect to Target** dialog box.
11. To create a second connection by using the second network adapter, in the **Targets** list, select **iqn.1991-05.com.microsoft:nyc-dc1-nyc-support1-target**, and then click **Connect**.
12. Verify that the **Add this connection to the list of Favorite Targets** check box is selected.
13. Select **Enable multi-path**, and then click the **Advanced** button.

14. In the **Advanced Settings** dialog box, on the **General** tab, change the **Local Adapter** from **Default** to **Microsoft iSCSI Initiator**. Change **Initiator IP** to **10.10.0.51**. Change **Target Portal IP** to **10.10.0.10/3260**. Click **OK**.
15. Click **OK** to close the **Connect to Target** dialog box.
16. Click **OK** to close the **iSCSI Initiator Properties** dialog box.

► **Task 4: Set the Load Balance Policy.**

1. Click **Start**, point to **Administrative Tools**, and then click **iSCSI Initiator**.
2. In the **Targets** list, select **iqn.1991-05.com.microsoft:nyc-dc1-nyc-support1-target**, and then click **Devices**.
3. In the **Devices** dialog box, click the **MPIO** button.
4. Verify that in **load balance policy**, **Round Robin** is selected.
5. Under **This device has the following paths**, notice that two paths are listed. Select the first path, and then click the **Details** button.
6. Note the **IP address** of the Source and Target portals.
7. Click **OK**.
8. Select the second path and click the **Details** button. Verify that the Source IP address is of the second NIC adapter. Click **OK**.
9. Click **OK** to close the **Device Details** dialog box.
10. Click **OK** to close the **Devices** dialog box.
11. Click **OK** to close the **iSCSI Initiator Properties** dialog box.



**Note** Revert all virtual machines.

## Lesson 3

# Working with Virtual Hard Disks

### Contents:

Question and Answers

17



# Question and Answers

## Virtual Hard Disks with Native Boot

**Question:** How can you access content in a VHD file?

**Answer:** You can attach the VHD file from Disk Management or by using DiskPart to access the content in the VHD file. You can also attach it as an additional hard disk drive to a virtual machine and access content from there.

## Module Reviews and Takeaways

### Review questions

**Question:** What are the primary benefits of a SAN over DAS?

**Answer:** The primary benefits of a SAN over DAS are highly effective resource sharing, better storage utilization, and hardware consolidation and availability.

**Question:** How does iSCSI differ from Fiber Channel?

**Answer:** iSCSI relies on standard Ethernet networking, and does not require any specialized hardware such as HBA or fiber channel network switches.

**Question:** How are MPIO and MC/S different?

**Answer:** MC/S is a feature of the iSCSI protocol that combines several connections inside a single session to provide better performance and failover capabilities.

MPIO is a very different way of providing redundancy. It requires the use of a DSM that is connected to the server running the iSCSI initiator. Windows includes a default DSM, installed as the Multipath I/O feature within Server Manager.

### Real-World Issues and Scenarios

Contoso Pharmaceuticals needs to decide how to implement various aspects of its storage infrastructure. What recommendations would you provide for the following business needs?

**Question:** The company will need to store shared files in a central location. They do not want to implement a complete file server at this time. What kind of storage would you recommend?

**Answer:** Answers will vary, but may include NAS or SAN.

**Question:** The company plans to implement several database servers, and wants to provide disk space for the databases. The company would prefer to create a single, centrally-managed array of disks for all the databases. What kind of storage would you recommend?

**Answer:** Answers will vary, but may include NAS or SAN.

## Lab Review Questions and Answers

**Question:** Contoso Pharmaceuticals will add several additional servers to the iSCSI storage solution. What additional hardware would you recommend to support a mission critical storage solution?

**Answer:** Multiple network adapters.

**Question:** What additional software will be installed and configured to support a mission critical storage solution?

**Answer:** Install Multi-path I/O. Configure iSCSI and MPIO with multiple connections.

**Question:** The Business Operations group would like to have a testing procedure for all mission critical components in the future implementation of their line of business application. What testing procedures would you recommend to validate mission critical storage access?

**Answer:** Fail various components of the individual network paths such as network adapters, switches, and cables to verify that storage access is maintained.

**Question:** The Disaster Recovery group has recovered data files to a VHD. They want users to be able to see and read the data files, but they do not want changes or deletions to occur. What can you do to help the Disaster Recovery group?

**Answer:** Attach the VHD and set the "read-only" option.

**Question:** The Deployment team is testing new boot VHDs. They create and detach several testing VHDs daily. These VHDs are not used again. The team complains that they are using up a lot of disk space. How can you help the Deployment team conserve disk space?

**Answer:** When detaching a VHD that will not be needed in the future, select **Delete the virtual hard disk after removing the disk** setting.

**Question:** A fellow administrator is trying to determine if a VHD is configured as a server boot disk. How can you help the administrator find that information?

**Answer:** Type Bcdedit and check the osdevice properties for a VHD.

# Module 2

## Configuring High Availability for Windows Server 2008 Applications

### Contents:

<b>Lesson 1:</b> Fundamentals of Network Load Balancing	<b>21</b>
<b>Lesson 2:</b> Implementing a Network Load Balancing Cluster	<b>24</b>
<b>Lesson 3:</b> Fundamentals of Windows Failover Cluster	<b>28</b>
<b>Lesson 4:</b> Preparing for Failover Clustering	<b>31</b>
<b>Lesson 5:</b> Implementing a Windows Failover Cluster	<b>35</b>
Module Reviews and Takeaways	<b>40</b>
Lab Review Questions and Answers	<b>43</b>

## Lesson 1

# Fundamentals of Network Load Balancing

### Contents:

Question and Answers	22
Additional Reading	23

# Question and Answers

## How NLB Works

**Question:** Are you already using Network Load Balancing? If yes, for what purpose?

**Answer:** Answers may vary. If some students already use NLB, most probably, it will be for web servers.

## Discussion: Considerations for Network Load Balancing

**Question:** In your network, what services might benefit from NLB?

**Answer:** Answers will vary, but may include Exchange Server Client Access Server role and front-end web servers.

**Question:** Do you have any servers hosting stateless information that would benefit from NLB in your environment?

**Answer:** Answers will vary.

## Additional Reading

### How NLB Works

- [Network Load Balancing](#)
- [Network Load Balancing](#)

### Windows Server 2008 NLB Features

- [NLB features](#)

## Lesson 2

# Implementing a Network Load Balancing Cluster

### Contents:

Detailed Demonstration Steps

25



# Detailed Demonstration Steps

## Demonstration: How to Implement Network Load Balancing

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1, 6439A-NYC-NLB1, 6439A-NYC-NLB2, and 6439A-NYC-User1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Install the Network Load Balancing feature.

1. Switch to **6439A-NYC-NLB1**.
2. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
3. In the left pane, click **Features**, and then click **Add Features**.
4. In the Features list, select the **Network Load Balancing** check box, click **Next**, and then click **Install**.
5. When the installation is complete, click **Close**.
6. Close **Server Manager**.
7. Switch to **6439A-NYC-NLB2**.
8. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
9. In the left pane, click **Features**, and then click **Add Features**.
10. In the Features list, select the **Network Load Balancing** check box, click **Next**, and then click **Install**.
11. When the installation is complete, click **Close**.
12. Close **Server Manager**.
13. Switch to **6439A-NYC-DC1**.
14. Click **Start**, point to **Administrative Tools**, and then click **Network Load Balancing Manager**.
15. In the left pane, right-click **Network Load Balancing Clusters**, and then click **New Cluster**.
16. In the **New Cluster: Connect** dialog box, in the **Host** field, type **NYC-NLB1**, and then click **Connect**.
17. Click **Local Area Connection 2**, and then click **Next**.
18. Notice the default values for **Priority**, **Dedicated IP addresses** and **Initial host state**. Click **Next** to accept the default values for host parameters.
19. On the **New Cluster: Cluster IP Addresses** page, click **Add**.
20. In the **Add IP Address** dialog box, in the **IPv4 address** field, type **10.10.0.100**.
21. In the **Subnet mask** field, type **255.255.0.0**, click **OK**, and then click **Next**.
22. On the **New Cluster: Cluster Parameters** page, in the **Full Internet name** field, type **COSalesApp.contoso.com**.
23. Under **Cluster operation mode**, click **Multicast**, click **Next**, and then click **Finish**.

24. After several seconds, the **Network Load Balancing Manager** should display the new host, **NYC-NLB1**, in **green** color.

► **Task 2: Add a second host to the cluster.**

1. In **Network Load Balancing Manager**, in the left pane, right-click **COSalesApp.contoso.com**, and then click **Add Host to Cluster**.
2. In the **Add Host to Cluster: Connect** dialog box, in the **Host** field, type **NYC-NLB2**, and then click **Connect**.
3. Click **Local Area Connection 2**, and then click **Next**.
4. On the **Add Host to Cluster: Host Parameters** page, notice the default values for **Priority**, **Dedicated IP addresses**, and **Initial host state**. Click **Next** to accept the default values for host parameters.
5. On the **Add Host to Cluster: Port Rules** page, accept the default **Port rules**, and then click **Finish**.
6. After several seconds, the **Network Load Balancing Manager** should display the new host, **NYC-NLB2**, in **green** color.

► **Task 3: View cluster parameters and configure port rules.**

1. Switch to 6439A-NYC-DC1.
2. Switch to the **Network Load Balancing Manager**.
3. In the left pane, right-click **COSalesApp.contoso.com**, and then click **Cluster Properties**.
4. In the **COSalesApp.contoso.com(10.10.0.100) Properties** dialog box, on the **Cluster IP Addresses** tab, notice that the additional cluster IP address can be added or edited.
5. Select the **Cluster Parameters** tab. Notice that the **Full Internet name** and **Cluster operation mode** can be edited.
6. Click the **Port Rules** tab.
7. In the Defined port rules list, click the existing port rule, and then click **Remove**.
8. Click **Add** to create a new port rule.
9. Verify that the **All** check box is selected.
10. In the **Port range** field, type from **80** to **80**.
11. In the **Protocols** area, click **TCP**.
12. In the **Filtering mode** area, click **Single host**, and then click **OK**.
13. Click **OK** to save the changes to the cluster properties. Wait until the hosts are shown as converged. You may need to refresh the screen.

► **Task 4: Adjust affinity.**

1. In the Network Load Balancing Manager on NYC-DC1, right-click **COSalesApp.contoso.com**, and then click **Cluster Properties**.
2. Click the **Port Rules** tab.
3. Click the existing port rule, and then click **Edit**.
4. In the **Filtering mode** area, click **Multiple host**.

5. Next to the **Affinity** label, click **None**, and then click **OK**.
6. Click **OK** to save the changes to the cluster properties. Wait until the hosts are shown as converged. You may need to refresh the screen.



**Note** Revert all virtual machines.

## Lesson 3

# Fundamentals of Windows Failover Cluster

### Contents:

Question and Answers	29
Additional Reading	30

## Question and Answers

### Failover Clusters and Networks

**Question:** Why is it recommended to have separate networks for intra-cluster communication and communication with clients?

**Answer:** To maintain redundancy for cluster communication.

### Types of Quorum Modes

**Question:** What is specific to the No Majority: Disk Only quorum mode?

**Answer:** In this quorum mode, the quorum-shared disk can veto all other possible votes, regardless of the number of nodes in the cluster.

## Additional Reading

### What Is Quorum?

- [quorum](#)

### Choosing a Quorum Mode

- [quorum modes](#)

## Lesson 4

# Preparing for Windows Failover Cluster

### Contents:

Detailed Demonstration Steps	32
Additional Reading	34

## Detailed Demonstration Steps

### Demonstration: How to Run the Validate a Configuration Wizard

#### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1, 6439A-NYC-Cluster1, and 6439A-NYC-Cluster2 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.



**Important:** Please run the steps on the lesson introduction slide in the instructor notes prior to commencing this demonstration. These establish the storage configuration for the demonstrations.

► **Run the validate configuration wizard.**

1. Switch to **6439A-NYC-Cluster1**.
2. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
3. In the **Server Manager** console, click **Features**. In the Features Summary section, click **Add Features**.
4. Select the **Failover Clustering** check box, and then click **Next**.
5. On the **Confirm Installation Selections** page, review the selection, and then click **Install**.
6. Allow the installation process to complete, and then click **Close**.
7. Close Server Manager and Computer Management.
8. Switch to **6439A-NYC-Cluster2**.
9. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
10. In the **Server Manager** console, click **Features**. In the Features Summary section, click **Add Features**.
11. Select the **Failover Clustering** check box, and then click **Next**.
12. On the **Confirm Installation Selections** page, review the selection, and then click **Install**.
13. Allow the installation process to complete, and then click **Close**. In Server Manager, note that the Features Summary section has been updated to reflect the installation of the Failover Clustering feature.
14. Close Server Manager and Computer Management.
15. Switch to 6439A-NYC-Cluster1.
16. Click **Start**, point to **Administrative Tools**, and then click **Failover Cluster Manager**.
17. In the **Action** pane, click **Validate a Configuration**.
18. In the **Validate a Configuration Wizard**, on the **Before You Begin** page, click **Next**.



19. On the **Select Servers or a Cluster** page, in the **Enter name** field, type **NYC-Cluster1**.
20. Click **Add**.
21. In the Enter Name field, type **NYC-Cluster2**.
22. Click **Add**, and then click **Next**.
23. On the **Testing Options** page, verify that **Run all tests (recommended)** is selected, and then click **Next**.
24. On the **Confirmation** page, click **Next**.
25. Wait for the validation tests to finish. This will take several minutes.
26. When the validation tests complete, in the Summary window, click **View Report**.
27. Review the report. Note that there are no failures. You may receive a warning about the **Memory Dump** settings. This will have no impact on this task.
28. Close the report, and then click **Finish** in the **Summary** screen.

Leave all virtual machines running.

## Additional Reading

### Failover Cluster Server Hardware Requirements

- [Server Hardware Requirements](#)

## Lesson 5

# Implementing a Windows Failover Cluster

### Contents:

Detailed Demonstration Steps

36

# Detailed Demonstration Steps

## Demonstration: How to Create a Cluster

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1, 6439A-NYC-Cluster1, and 6439A-NYC-Cluster2 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**. These should still be running from the preceding demonstration.

#### ► Task 1: Run the Create Cluster Wizard.

1. On **6439A-NYC-Cluster1**, in **Failover Cluster Manager**, in the **Action** pane, select **Create a Cluster**.
2. On the **Before You Begin** page, click **Next**.
3. On the **Select Servers** page, in the **Enter server name** field, type **NYC-Cluster1**.
4. Click **Add**.
5. In the **Enter server name** field, type **NYC-Cluster2**.
6. Click **Add**, and then click **Next**.
7. On the **Access Point for Administering the Cluster** page, in the **Cluster Name** box, type **Cluster1**.
8. Under **Address**, type **10.10.0.125** as the IP address, and then click **Next**.
9. On the **Confirmation** page, click **Next**.
10. On the **Summary** page, click **Finish** to return to the **Failover Cluster Manager**.
11. In **Failover Cluster Manager**, right-click **Cluster1.contoso.com**.
12. Point to **More Actions**, and then click **Configure Cluster Quorum Settings**.
13. On the **Before you Begin** page, click **Next**.
14. On the **Select Quorum Configuration** page, verify that **Node and Disk Majority** is selected, and then click **Next**.
15. On the **Configure Storage Witness** page, expand the cluster drives. Select **Volume E:**, and click **Next**.
16. On the **Confirmation** page, click **Next**.
17. On the **Summary** page, click **Finish**.
18. On **NYC-Cluster1**, switch to **Failover Cluster Manager**.
19. In the **Failover Cluster Manager Actions** pane, click **Validate This Cluster**.
20. On the **Before You Begin** page, click **Next**.
21. On the **Testing Options** page, click **Next**.
22. Click **Next** to run all tests.
23. On the **Summary** page, click **Finish**.

24. Leave all windows as they are.

Leave all virtual machines running.

## Demonstration: How to Cluster File Services

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1, 6439A-NYC-Cluster1, and 6439A-NYC-Cluster2 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**. These should still be running from the preceding demonstration.

#### ► Task 1: Add the File Services role.

1. Switch to **6439A-NYC-Cluster1**.
2. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
3. In the **Server Manager** console, click **Roles**. In the Roles Summary section, click **Add Roles**.
4. In the **Add Roles Wizard**, on the **Before You Begin** page, click **Next**.
5. On the **Select Server Roles** page, select the **File Services** check box, and then click **Next**.
6. On the **File Services** page, click **Next**.
7. On the **Select Role Services** page, ensure that the **File Server** check box is selected, and then click **Next**.
8. On the **Confirm Installation Selections** page, review the selection, and then click **Install**.
9. Allow the installation process to complete, and then click **Close**.
10. Switch to **NYC-Cluster2**.
11. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
12. In the **Server Manager** console, click **Roles**. In the Roles Summary section, click **Add Roles**.
13. In the **Add Roles Wizard**, on the **Before You Begin** page, click **Next**.
14. On the **Select Server Roles** page, select the **File Services** check box, and then click **Next**.
15. On the **File Services** page, click **Next**.
16. On the **Select Role Services** page, ensure that the **File Server** check box is selected, and then click **Next**.
17. On the **Confirm Installation Selections** page, review the selection, and then click **Install**.
18. Allow the installation process to complete, and then click **Close**.

#### ► Task 2: Cluster the File Services role.

1. Switch to **6439A-NYC-Cluster1**.

2. Switch to **Failover Cluster Manager**.
3. In the left pane, expand **Cluster1.Contoso.com**, right-click **Services and applications**, and then click **Configure a Service or Application**.
4. On the **Before You Begin** page, click **Next**.
5. On the **Select Service or Application** page, select **File Server**, and then click **Next**.
6. On the **Client Access Point** page, in the **Name** box, type **COFileServer**.
7. Under **Address**, type **10.10.0.135**, and then click **Next**.
8. Select **Cluster Disk 3** as the storage device, and then click **Next**.
9. Review the confirmation information, and then click **Next**.
10. On the Summary page, click **Finish**. Click the **Services and applications node**, and then note in the center pane of the **Failover Cluster Manager** that the **COFileServer** is **online**.
11. In the left pane, expand the **Services and applications** node, right-click **COFileServer**, and then click **Add a shared folder**.
12. In the **Provision a Shared Folder Wizard (COFileServer)**, on the **Shared Folder Location** page, in the **Location** box, type **G:\data**, and then click **Next**. Click **Yes**.
13. On the **NTFS Permissions** page, accept the defaults for the **NTFS Permissions** page, and then click **Next**.
14. On the **Share Protocols** page, verify that **SMB** is selected, and then click **Next**.
15. On the **SMB Settings** page, click **Next**.
16. On the **SMB Permissions** page, click **Next**.
17. On the **DFS Namespace Publishing** page, click **Next**.
18. After reviewing the settings, click **Create**.
19. When successfully created, click **Close**.
20. In the left pane, click **COFileServer**. In the center pane, notice that the **COFileServer** is **online** and you have a shared folder listed of **G:\data**.

Leave all virtual machines running.

## Demonstration: How to Configure Failover Clusters

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1, 6439A-NYC-Cluster1, and 6439A-NYC-Cluster2 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**. These should still be running from the preceding demonstration.

#### ► Task 1: Set Policies for file share application.

1. On **6439A-NYC-Cluster1**, switch to **Failover Cluster Manager**.
2. In **Failover Cluster Manager**, in the left pane, right-click **COFileServer**, and then click **Properties**.

3. On the **General** tab, select **NYC-Cluster2** as the **preferred owner**.
4. On the **Failover** tab, verify that the **Maximum failures in a specified period** is set to **1**, change the **Period** to **3** hours.
5. Verify that **Prevent Failback** is selected.
6. Click **OK** to close the **COFileServer Properties** dialog box.
7. In the left pane, click **COFileServer**, in the center pane, right-click **FileServer-(COFileServer)**, and then click **Properties**.
8. Click the **Policies** tab.
9. Review the current policy settings. Change the **Maximum restarts in the specified period** to **2**.
10. Clear the check box for **If all the restart attempts fail, begin restarting again after a specified period**.
11. Click **Apply**, and then click the **Advanced Policies** tab.
12. Verify that the possible owners are **NYC-Cluster1** and **NYC-Cluster2**.
13. Click **OK**.

Revert all virtual machines.

## Module Reviews and Takeaways

### Review questions

**Question:** Which option in a port filtering rule defines the NLB node that will respond to a client's second request?

**Answer:** The affinity setting in a port filtering rule determines how subsequent requests are handled by the NLB nodes. With single affinity, a single NLB node handles all requests from a single client.

**Question:** You are troubleshooting an eight-host NLB cluster, with four host members configured in multicast mode and four host members configured in unicast mode. Why would the cluster not function properly?

**Answer:** The NLB service does not support a mixed unicast and multicast environment. All cluster hosts must be either multicast or unicast; otherwise, the cluster will not function properly.

**Question:** You plan to deploy a web farm. You want to provide a fault tolerant front end for client computers connecting from the Internet. Which would be the most suitable technology?

**Answer:** Network Load Balancing. This provides for load balancing and high availability of front-end services. To provide high availability of the back end, consider using failover clustering.

**Question:** Which high availability option provides both scalability and availability?

**Answer:** Network Load Balancing offers both scalability and availability. Scalability is increased by adding nodes. Availability occurs when a node is lost and requests are distributed automatically to remaining nodes.

**Question:** Which high availability option typically requires shared storage?

**Answer:** Failover clustering typically requires shared storage. The shared storage is accessed by the node with the active virtual server.

**Question:** Why is using a disk only quorum configuration generally not a good idea?

**Answer:** The failover cluster stops functioning if the LUN used as the disk for the quorum fails. Even if all other resources, including disk for the applications, are available, all nodes do not provide any service when the quorum disk is not available.

**Question:** What must you install before you can validate a cluster configuration?

**Answer:** You must install the failover clustering feature before you can validate a cluster configuration.

### Common Issues Related to Failover Clustering

Issue	Troubleshooting tip
When you create a new clustered service or application, a computer object (computer account) for that clustered service or application must be created in the Active Directory domain. This computer object is created by the computer object of the cluster. If the computer object of the	Ensure that user and computer objects have appropriate permissions, prior to creating a cluster.



Issue	Troubleshooting tip
cluster does not have the appropriate permissions, it cannot create or update the computer object for the clustered service or application.	
The cluster service is shutting down because quorum was lost. This could be due to the loss of network connectivity between some or all nodes in the cluster, or a failover of the disk witness.	Run the Validate a Configuration Wizard to check your network configuration. If the condition persists, check for hardware or software errors related to the network adapter. Also check for failures in any other network components to which the node is connected, such as hubs, switches, or bridges.
The cluster service is the essential software component that controls all aspects of the failover cluster operation and manages the cluster configuration database. If the cluster service fails to start on a failover cluster node, the node cannot function as part of the cluster.	Ensure that the cluster service is running on all nodes.

## Real-World Issues and Scenarios

**Question:** Your organization is considering the use of a geographically dispersed cluster that includes an alternate data center. Your organization has only a single physical location plus the alternate data center. Can you provide automatic failover in this configuration?

**Answer:** No. To provide automatic failover, you need to have three physical locations. This organization only has two physical locations.

**Question:** A web-based application in your organization is hosted in an NLB cluster to provide high availability. After a recent update, some users complain that sometimes they are presented with the user interface from the older version. What could be causing this?

**Answer:** The most likely cause of this problem is one or more nodes in the NLB cluster not being updated when the web-based application was updated. You need to determine which node was not updated, and then update it.

**Question:** A web-based application in your organization is hosted in an NLB cluster to provide high availability. The help desk has started receiving calls indicating that users are getting an error message when accessing the web-based application. However a person on the help desk troubleshooting the problem does not receive the error. What is the most likely cause of this issue?

**Answer:** NLB recognizes the failure of a cluster node, but does not recognize the failure of an application. It is likely that the application is failing on a single node in the cluster. The help desk troubleshooter is being directed to a node in the cluster on which the application is functional. You need to identify the individual node with the issue and resolve it. In the short term, you can remove the node from the cluster until the issue is resolved.

**Question:** Your company has a four-node failover cluster that uses the Node and File Share Majority quorum configuration. The help desk has started receiving calls that some of the services provided by virtual servers on the failover cluster are running very slow. Testing shows that some services are running fine, but others are very slow. Further investigation shows that one node in the cluster has failed. What is the most likely cause of the problems and how can it be resolved?

**Answer:** This problem is likely occurring because of inadequate planning for failover. If all the virtual servers on the failed node were moved to a single surviving node, then the single surviving node is likely overloaded. To resolve this issue, move the virtual servers among the surviving nodes to even out the load. In the long term, you need to plan out the failover process for node failure to ensure that this does not happen again.

### **Best Practices Related to Failover Clustering**

- Ensure that you have the same hardware on all cluster nodes.
- Combine failover clustering with Network Load Balancing (NLB) when you want to provide full redundancy and high availability to web services that work with databases.
- Ensure that you have exactly the same software on all failover clustering or NLB nodes.
- Always run the Validate a Configuration Wizard, prior to creating a cluster.

## Lab Review Questions and Answers

**Question:** The web application team created a new website on the NLB cluster. The website was created for port 8080. They cannot access the website. What could be the cause?

**Answer:** You must create a port rule for TCP port 8080 and the TCP protocol.

**Question:** A new NLB cluster has been installed with a cluster IP address of 10.10.0.200. Port rules have been created for port 80 to support a website. You test the website from Internet Explorer using the IP address and it displays correctly. When users try to use the URL WebApp.contoso.com, the webpage is not displayed. What could be the reason?

**Answer:** You must create a host record (A) in DNS to support the new cluster IP address and URL.

**Question:** The Business Operations group would like to have a testing procedure for all mission critical components in the future implementation of the COSalesApp. What testing procedures would you recommend to validate mission critical business logic servers?

**Answer:** Power off fail the servers in the NLB Cluster to verify that access continues.

**Question:** The Business Operations group is concerned that an existing cluster may not have the proper hardware, or may in fact be misconfigured. How can you determine if the existing cluster was built correctly?

**Answer:** Run a validation report and check for problems.

**Question:** You ran a validation report on an existing cluster and several disk storage errors have been produced. What is a logical area for the problem?

**Answer:** The storage devices may not have been properly set up or the shared disks have not been initialized.

**Question:** You are tasked with building a new two-node cluster with an iSCSI storage array. What would be the best Quorum configuration for this cluster?

**Answer:** Node and Disk Majority.

# Module 3

## Configuring Remote Desktop Services

### Contents:

<b>Lesson 1:</b> Overview of Remote Desktop Services	<b>45</b>
<b>Lesson 2:</b> Configuring a Remote Desktop Services Host Server	<b>47</b>
<b>Lesson 3:</b> Configuring the Remote Desktop User Experience	<b>51</b>
<b>Lesson 4:</b> Deploying and Connecting to RemoteApp Programs	<b>53</b>
<b>Lesson 5:</b> Connecting to Applications with RD Web Access, and RemoteApp and Desktop Connection	<b>57</b>
Module Reviews and Takeaways	<b>61</b>
Lab Review Questions and Answers	<b>62</b>

## Lesson 1

# Overview of Remote Desktop Services

### Contents:

Additional Reading

46

## Additional Reading

### Key Features and Improvements in Remote Desktop Services

- [What's New in Remote Desktop Services](#)

### Components of Remote Desktop Services

- [Remote Desktop Services](#)

## Lesson 2

# Configuring a Remote Desktop Services Host Server

### Contents:

Detailed Demonstration Steps	48
Additional Reading	50

## Detailed Demonstration Steps

### Demonstration: Installing and Configuring an RD Session Host Server

#### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 and NYC-RDSH1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Install the Remote Desktop Services role and the RD Session Host role service.

1. On NYC-RDSH1, click the **Server Manager** icon on the taskbar.
2. In **Server Manager**, in the tree pane, click **Roles**.
3. Click **Add Roles**.
4. Click **Next** on the **Before You Begin** page.
5. On the **Select Server Roles** page, select the **Remote Desktop Services** check box, and then click **Next**.
6. On the **Remote Desktop Services** screen, click **Next**.
7. On the **Select Role Services** page, select **Remote Desktop Session Host**, and then click **Next**.
8. On the **Uninstall and Reinstall Applications for Compatibility** page, click **Next**.
9. On the **Select Authentication Method for Remote Desktop Session Host** page, select **Require Network Level Authentication**, and then click **Next**.
10. On the **Select Licensing Mode** page, select **Configure Later**, and then click **Next**.
11. On the **Select User Groups Allowed Access to This RD Session Host Server** page, click **Add**. In the dialog box, enter **SalesApp**, and then click **OK**. Click **Next**.
12. On the **Configure Client Experience** page, click **Next**.
13. On the **Confirm Installation Selections** page, click **Install**.
14. After the installation completes, click **Close**.
15. When prompted, click **Yes** to restart the server.

#### ► Task 2: Perform Initial Configuration of the RD Session Host Server.

1. On NYC-RDSH1, click the **Server Manager** icon on the taskbar.
2. Expand **Configuration**.
3. Expand **Local Users and Groups**.
4. Click **Groups**, and then double-click **Remote Desktop Users**.
5. Click **Add**.
6. Enter **HelpDesk**, and then click **OK** twice.





**Note** Explain to students that user groups that require access to the RD Session Host server must be added to this group on the RD Session Host server.

7. Double click the **RDP-Tcp** connection.
8. Navigate through the tabs in this window, explaining to students the settings on each tab.

► **Task 3: Install an application on the RD Session Host Server.**

1. Log on to **NYC-RDSH1** with the account, **Contoso\Administrator**, and the password, **Pa\$\$w0rd**.
2. Click **Start**, and then click **Control Panel**.
3. Click **Programs**.
4. Click **Install Application on Remote Desktop**.
5. On the **Install Program from Floppy Disk or CD-ROM** dialog box, click **Next**.
6. On the **Run Installation Program** dialog box, browse to **\\NYC-DC1\D\$\LabFiles\Wordview\_en-us.exe**. If you browse to the location, you will have to select **Programs (\*.exe;\*.com;\*.bat;\*.cmd)** from the file type drop-down menu. Click **Next**. DO NOT close the Admin Install dialog box until the Word Viewer installation is complete.
7. Select the check box to accept Microsoft Software License Terms, and then click **Continue**.
8. On the **Microsoft Office Word Viewer 2003** screen, select the check box to accept the License Agreement, and then click **Next**.
9. Accept the default installation location, and then click **Install**. Click **OK** when finished.
10. Click **OK** on the **Installation is Complete** dialog box.
11. On the **Finish Admin Install** dialog box, click **Finish**.
12. Close **Control Panel**.

## Additional Reading

### Installing Applications on an RD Session Host Server

- [Install Programs on an RD Session Host Server](#)

## Lesson 3

# Configuring the Remote Desktop User Experience

### Contents:

Additional Reading

52

## Additional Reading

### Configuring the Look and Feel of RD Client Sessions

- [Microsoft RemoteFX](#)

## Lesson 4

# Deploying and Connecting to RemoteApp Programs

### Contents:

Question and Answers	54
Detailed Demonstration Steps	55

## Question and Answers

### Discussion: When Should RemoteApp Programs Be Used?

**Question:** What trade-offs exist between choosing a Remote Desktop Connection over RemoteApp programs? Which situations are best for RemoteApp programs?

**Answer:** While RemoteApp programs can be deployed in a more targeted way when compared to Remote Desktops, each RemoteApp program requires installation and configuration. However, RemoteApp can be a good solution when a single application needs to be delivered to users. RemoteApp programs are presented like local applications to the user, so there is typically less user training required for users running RemoteApp programs.

# Detailed Demonstration Steps

## Demonstration: Creating and Deploying a RemoteApp Program

### Detailed demonstration steps



**Note** To perform this demonstration, you must have completed Exercises 1-3 from Lab A.

#### ► Task 1: Create a RemoteApp Program

1. On **NYC-RDSH1**, open **Server Manager** and expand **Roles**.
2. Expand **Remote Desktop Services** and select **RemoteApp Manager**.
3. In the Actions pane, select **Add RemoteApp Programs**.
4. On the Welcome page, click **Next**.
5. In the list of programs, select the **Microsoft Office Word Viewer 2003** check box, and then click **Next**.
6. Click **Finish**.
7. Under RemoteApp Programs in the RemoteApp Manager, select **Microsoft Office Word Viewer 2003**.
8. Right-click the Microsoft Office Word Viewer 2003 program and click **Properties**.
9. On the **RemoteApp Properties** page, edit the **RemoteApp program name** and delete **2003**.
10. Click the User Assignment tab.
11. Click **Specified domain users and domain groups**. Click **Add**.
12. Enter **SalesApp**, and then click **OK**.
13. Repeat steps 11 and 12 for **HelpDesk**.
14. Click **OK**.

#### ► Task 2: Create an .rdp File to Deploy a RemoteApp Program

1. Under Other Distribution Options in RemoteApp Manager, click the link for Create .rdp file.
2. On the **RemoteApp Wizard** Welcome page, click **Next**.
3. On the **Specify Package Settings** page, accept the default settings and click **Next**.
4. Click **Finish**.
5. Right-click in the Explorer window that opens and click **Share with | Advanced sharing**.
6. On the Sharing tab, click Advanced Sharing.
7. Select the **Share this folder** check box.
8. Change the share name to **Packages**.
9. Click **OK**.
10. Click Close.

11. Close the Explorer window.

► **Task 3: Create an .rdp File to Deploy a RemoteApp Program**

1. Select the **Microsoft Office Word Viewer** RemoteApp program.
2. Under Other Distribution Options in RemoteApp Manager, click the link for Create Windows Installer Package.
3. On the **RemoteApp Wizard** Welcome page, click **Next**.
4. On the Specify Package Settings page, accept the default settings and click **Next**.
5. On the Configure Distribution Package page, under **Shortcut icons**, select the **Desktop** check box.
6. Click **Next**.
7. Click **Finish**.
8. Close the Windows Explorer window that opens upon completion.

► **Task 4: Install a RemoteApp Program**

1. Log on to **NYC-USER1**, as **Contoso\Adam**, with the password, **Pa\$\$w0rd**.
2. Click the **Windows Explorer** button on the task bar.
3. Click **Network**.
4. Double-click the icon for **NYC-RDSH1**.
5. Double-click the **Packages** share.
6. Double-click the Windows Installer package for **WordViewWordviewer**.
7. When prompted for credentials, enter **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
8. Double click the Microsoft Word Viewer Shortcut on the desktop to open the Remote App.



## Lesson 5

# Connecting to Applications with RD Web Access, and RemoteApp and Desktop Connection

### Contents:

Detailed Demonstration Steps	58
Additional Reading	60

## Detailed Demonstration Steps

### Demonstration: Installing and Configuring RD Web Access

#### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1, NYC-RDSH1, and NYC-USER1 virtual machines to complete this demonstration.

#### ► Task 1: Install the RD Web Access role service.

1. If necessary, log on to **NYC-RDSH1**, with the account, **Contoso\Administrator**, and the password, **Pa\$\$w0rd**.
2. Open **Server Manager** and expand **Roles**.
3. Click **Remote Desktop Services**, and then scroll down to **Role Services**.
4. Click **Add Role Services**.
5. On the **Add Role Services** page, select the **Remote Desktop Web Access** check box.
6. Click **Add Required Role Services** when prompted.
7. Click **Next**.
8. On the **Web Server (IIS)** page, click **Next**.
9. On the **Select Role Services** page, click **Next**.
10. On the **Confirm Installation Selections** page, click **Install**.
11. On the **Installation Results** page, click **Close**.
12. Click **Start**, click **Administrative Tools**, and then click Internet **Information Services (IIS) Manager**.
13. In the **IIS Manager** window, expand **NYC-RDSH1**, expand **Sites**, right-click **Default Website**, and then click **Edit Bindings...**
14. In the **Site Bindings** window, click the **https** entry, and then click **Edit**.
15. In the **Edit Site Binding** window, select the first **NYC-RDSH1.Contoso.com** entry, and then click **View**.
16. Ensure that the **Issued By** field on the general tab is **ContosoCA**. If this is not the case, select the other **NYC-RDSH1.Contoso.com** certificate in the **Edit Site Binding** window.
17. Click **OK**.
18. In the **Edit Site Binding** window, click **OK**.
19. Click **Close**.
20. Close the **IIS Manager** window.

#### ► Task 2: Configure the RD Web Access role service.

1. On **NYC-RDSH1**, in **Server Manager**, under **Roles**, expand the **Remote Desktop Services** node.
2. Select **RemoteApp Manager**.

3. Under **Distribution with RD Web Access**, click **Change**.
4. In the **RemoteApp Deployment Settings** dialog box, on the RD Session Host Server tab, click the **Show a remote desktop connection to this RD Session Host server** in the **RD Web Access** check box.
5. Click **OK**.
6. In Server Manager, expand **Configuration**, and then expand **Local Users and Groups**.
7. Select **Groups**.
8. Double-click the **TS Web Access Computers** group.
9. Click **Add**.
10. Click **Object Types** and select the **Computers** check box. Click **OK**.
11. Enter the name **NYC-RDSH1**, and then click **OK** twice.

► **Task 3: Use RD Web Access to connect to RemoteApp programs.**

1. Switch to the **NYC-USER1**.
2. Click the **Internet Explorer** icon on the taskbar.
3. In the address bar, type **http://nyc-rdsh1.contoso.com/rdweb**, and then press Enter.
4. When the **ActiveX** prompt at the top of the **Internet Explorer** screen appears, click it, and then click **Run Add-on**.
5. In the **Security Warning** window, click **Run**.
6. On the **RD Web Access** page, enter the user credentials, **Contoso\Adam**, with the password, **Pa\$\$w0rd**.
7. Select **This is a private computer**.
8. Click **Sign In**.
9. At the **AutoComplete Password** prompt, click **No**.
10. On the Remote Web Access page, click the icon for **Microsoft Office Word Viewer**.
11. Click **Connect** and enter the password, **Pa\$\$w0rd**. Click **OK**.
12. In the **Open** dialog box, click **Cancel**.
13. Close the **Microsoft Word Viewer** application.
14. In Internet Explorer, click **Sign out**.
15. Close Internet Explorer.

## Additional Reading

### What Is RD Web Access?

- [Remote Desktop Web Access](#)

### What Is RemoteApp and Desktop Connection?

- [Checklist: Configuring RemoteApp and Desktop Connection](#)

### Single Sign-On for RD Web Access

- [About Digitally Signing RemoteApp Programs](#)

## Module Reviews and Takeaways

### Review questions

**Question:** What are some common maintenance tasks that are required of an RD Session Host server in production?

**Answer:** may include monitoring users, removing inactive sessions, remoting into user sessions with problems, and regularly restarting RD Session Host servers with problem applications.

**Question:** How is an RD Session Host server like a Windows desktop?

**Answer:** It is a location where multiple users can connect to access client applications, in either RemoteApp form or through a published desktop.

**Question:** What kinds of applications should not be hosted on an RD Session Host server?

**Answer:** Applications with extremely high resource utilization, and applications that are specifically incompatible with the multiple-session nature of an RD Session Host server.

### Tools

The following tools have been used or mentioned in this module.

Tool	Use for	Where to find it
Remote Desktop Connection	Connecting to RD Session Host sessions	Start menu–All Programs–Accessories
Remote Desktop Licensing Manager	Managing and maintaining licensing for your RDS environment	Start menu–Administrative Tools–Remote Desktop
Remote Desktop Services Manager	Managing the RDS environment on a server	Start menu–Administrative Tools–Remote Desktop
Remote Desktop Session Host Configuration	Managing RD Session Host configuration and functionality	Start menu–Administrative Tools–Remote Desktop
Remote Desktop Web Access Configuration	Managing RD Web Access configuration	Start menu–Administrative Tools–Remote Desktop
RemoteApp Manager	Deploying and managing RemoteApps on an RD Session Host server	Start menu–Administrative Tools–Remote Desktop

## Lab Review Questions and Answers

**Question:** For a user to log on to an RD Session Host server, what local group must the user belong to?

**Answer:** Remote Desktop Users

**Question:** What is the proper way to install an application for users in an RD Session Host server?

**Answer:** Use the Install Application on the Remote Desktop link in Control Panel.

**Question:** Do you have to configure licensing when setting up an RD Session Host server?

**Answer:** No. You can use the server for 120 days before licensing must be configured.

**Question:** What is the most secure authentication mechanism?

**Answer:** Network Level Authentication.

**Question:** Why is it important to control session configurations and client settings?

**Answer:** Sessions and client settings consume server resources. You need to strike a balance between providing an optimum experience for the user, yet maintaining enough system resources to service all the other users.

**Question:** Which is the new feature that eliminates the need for the fallback printer driver?

**Answer:** Easy Print.

**Question:** Which feature needs to be installed on the remote desktop session host so that the client connections can support display elements such as Aero?

**Answer:** Desktop Experience.

**Question:** Which user resources can be redirected in a remote desktop session?

**Answer:** Drives, ports, smart cards, printers, and audio.

**Question:** In which two ways can you configure IP virtualization?

**Answer:** IP virtualization can be configured per session or per program.

**Question:** What are the drawbacks in enabling multimedia redirection?

**Answer:** Multimedia redirection requires more system resources such as memory from the remote desktop session host and increased bandwidth utilization between the server and the user.

**Question:** Where do you create a RemoteApp?

**Answer:** On the Remote Desktop Services host, under Remote Desktop Services | RemoteApp manager.

**Question:** In which two ways can you package a RemoteApp?

**Answer:** As an RDP file or as an MSI package.

**Question:** What are the some of the disadvantages of these packages?

**Answer:** The user has to find the files through a file share. The user has to install the application on the desktop before using it. Both of these could be handled with Group Policy but that adds another layer of complexity.

**Question:** When you create a RemoteApp package, who can see it?

**Answer:** By default, all authenticated users can see the package, but you can configure each package and restrict it by domain group membership.

**Question:** In which two ways can you make remote applications available to users?

**Answer:** Remote Desktop Web Access and RemoteApp and Desktop Connection.

**Question:** Which local security group do you need to add the remote desktop host computers?

**Answer:** TS Web Access Computers.

**Question:** In which two ways can you configure a desktop with the source for RemoteApp and Desktop Connection?

**Answer:** You can use the RemoteApp and Desktop Connection program in Control Panel and manually add the source URL, or you can distribute a WCX configuration file.

**Question:** Does single sign-on work with RemoteApp and Desktop Connection?

**Answer:** No. Single Sign-On can be configured for Remote Desktop Web Access to limit the number of authentication requirements. Users will need to authenticate once to the website, and then once when they start their first application. Subsequent applications will not require additional credentials.

**Question:** Which Remote Desktop role service do you need to issue and track licenses?

**Answer:** Remote Desktop Licensing Service.

**Question:** In which two ways can you assign licenses?

**Answer:** Per User or Per Device.

**Question:** What are the available licensing discovery scopes?

**Answer:** Workgroup, domain, and forest.

**Question:** Which tool can you use to determine license compliance and detect potential licensing problems?

**Answer:** Licensing Diagnosis.

# Module 4

## Managing Availability of Remote Desktop Services

### Contents:

<b>Lesson 1:</b> Overview of a Remote Desktop Services Server Farm	<b>65</b>
<b>Lesson 2:</b> Implementing a Remote Desktop Services Server Farm	<b>69</b>
Module Reviews and Takeaways	<b>71</b>
Lab Review Questions and Answers	<b>72</b>



## Lesson 1

# Overview of Remote Desktop Services Server Farm

### Contents:

Question and Answers	66
Detailed Demonstration Steps	67

## Question and Answers

### What Is a Remote Desktop Services Server Farm?

**Question:** Which application delivery situations might drive the implementation of an RD Session Host farm? Are there any application delivery methods in your environment that would benefit from an RD Session Host farm and why?

**Answer:** Possible answers might be a critical application that cannot be unavailable or an application with a heavy user load that cannot be handled by either the processing or network capability of a single server. If students are already implementing RDS in their environment, have them give examples of applications that they are delivering and how they might take advantage of the benefits discussed in the first part of the answer.

## Detailed Demonstration Steps

### Demonstration: Installing and Configuring Remote Desktop Connection Broker

#### Detailed demonstration steps



**Note** For this demonstration, you must have performed the Lab Setup instructions for Lab A and Exercises 1 and 2 from Lab A.

#### ► Task 1: Add RD Session Host servers to the local Session Broker Computers group.

1. Switch to **NYC-RDSH1**. If necessary log on as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
2. Open **Server Manager**, expand **Configuration**, and then expand **Local Users and Groups**.
3. Click **Groups**. Double-click **Session Broker Computers**.
4. Click **Add**, click **Object Types**, and then select the **Computers** check box. Click **OK**.
5. Enter **NYC-RDSH1; NYC-RDSH2**, and then click **OK** twice.

#### ► Task 2: Add RD Session Host servers to a farm.

1. In Server Manager, on **NYC-RDSH1**, navigate to **Roles | Remote Desktop Services | RD Session Host Configuration**.
2. Under **RD Connection Broker**, double-click **Member of farm in RD Connection Broker**.
3. Click **Change Settings**.
4. Click **Farm member**.
5. Enter **NYC-RDSH1.contoso.com** for the **RD Connection Broker server name**.
6. Enter **rdfarm.contoso.com** for the **Farm Name**, and then click **OK**.
7. On the **RD Connection Broker** tab, select the check box next to **Participate in Connection Broker Load-Balancing**.
8. On the **RD Connection Broker** tab, select the check box next to **10.10.0.24**.
9. Click **OK** to close the **Properties** dialog box.
10. In Server Manager, click **RemoteApp Manager**.
11. Click **Change** for **RD Session Host Server Settings**.
12. In the **Connection Settings server name** field, enter the name of the new farm, **RDFARM.Contoso.com**. Click **OK**.
13. Repeat steps 1-12 on **NYC-RDSH2**.

#### ► Task 3: Install NLB.

1. In Server Manager on **NYC-RDSH1**, select **Features**, and then click **Add Features**.
2. Select the **Network Load Balancing** check box.

3. Click **Next**, and then click **Install**.
4. Click **Close** when finished.
5. Repeat Steps 1-4 for **NYC-RDSH2**.

► **Task 4: Configure NLB.**

1. **Switch to the NYC-RDSH1 virtual machine and if necessary log on as contoso\administrator, with the password, Pa\$\$w0rd.**
2. Click **Start | Administrative Tools | Network Load Balancing Manager**.
3. Right-click **Network Load Balancing Clusters**, and then click **New Cluster**.
4. In the **Host** field, enter **NYC-RDSH1.CONTOSO.COM**, and then click **Connect**.
5. Click **Next twice**.
6. Click **Add**, and then define a cluster IP address of **10.10.0.123** with a subnet mask of **255.255.0.0**.
7. Click **OK**, and then click **Next**.
8. Enter **rdfarm.contoso.com** for the **Full Internet name**.
9. In the **Cluster Operation Mode** section, select **Multicast**.
10. Click **Next**.
11. Click **Edit**. Change the port range from **3389 TCP** to **3389 TCP**.
12. Set the Affinity to **None**.
13. Click **OK**, and then click **Finish**.
14. After the cluster is created, right-click **rdfarm.contoso.com**, and then select **Add Host to Cluster**.
15. Enter **NYC-RDSH2.CONTOSO.COM** for the **Host**, and then click **Connect**.
16. Click **Next**.
17. Click **Next**, and then click **Finish**.
18. Close the **Network Load Balancing Manager**.

► **Task 5: Configure DNS for RD Connection Broker load balancing.**

1. Switch to the **NYC-DC1** virtual machine.
2. Click **Start | Administrative Tools | DNS**.
3. Expand **NYC-DC1**.
4. Expand **Forward lookup zones**, and then expand **Contoso.com**.
5. Right-click **Contoso.com**, and select **New Host (A or AAAA)**.
6. Enter the name, **rdfarm**.
7. Enter the IP address of **10.10.0.123**.
8. Click **Add Host**. Click **OK**.
9. Click **Done**, and then close the DNS manager.

## Lesson 2

# Implementing a Remote Desktop Services Server Farm

### Contents:

Additional Reading

70

## Additional Reading

### Distributing Connections in an RD Session Host Server Farm

- [Implementing a New Network Load Balancing Cluster](#)

## Module Reviews and Takeaways

### Review questions

**Question:** What are the most common reasons to go beyond a single RD Session Host server?

**Answer:** To add additional resources in support of user requirements, or to add high availability.

**Question:** Why do RD roaming profiles become extremely important when a single server environment is upgraded to become an RDS farm?

**Answer:** Without RD Roaming Profiles, one cannot guarantee that the user's experience will be maintained as they are distributed to different RDSH servers in a farm.

**Question:** For what reasons would you use an NLB cluster for load balancing, instead of Round-Robin DNS?

**Answer:** An NLB cluster includes more options for customizing session distribution. An NLB cluster will automatically recognize when an RDSH server has failed and cease sending user sessions until it becomes available again.

## Lab Review Questions and Answers

**Question:** What is the preferred way to configure remote desktop roaming policies?

**Answer:** Use a Group Policy object.

**Question:** What are the different ways you can configure a remote desktop farm to balance workloads?

**Answer:** Use DNS round robin or use an NLB cluster.

**Question:** When creating a farm, what IP address should you use for the new A record?

**Answer:** The IP address of the RCDB server or the NLB cluster.

**Question:** Do all the RDS servers need to be configured the same in a farm?

**Answer:** If you want users to have a seamless experience regardless of what RDS server they actually connect to, then yes, every server should have the same configuration. You can simplify this process by using Group Policy.

**Question:** What is the difference between resetting and disconnecting a remote desktop session?

**Answer:** When you disconnect a session, any open files or applications remain running. When the user reconnects, they can resume where they left off. When you reset a session, everything is terminated. When the user reconnects, they have an entirely new session.

**Question:** Which feature can you use to manage and monitor resource utilization for your remote desktop servers?

**Answer:** Windows System Resource Manager.

**Question:** Which three priorities can you assign to users and groups to control CPU usage?

**Answer:** Basic, Standard, and Premium.



# Module 5

## Delivering Remote Desktop Services Applications to Remote Users

### Contents:

Lesson 2: Installing and Configuring Remote Desktop Gateway	74
Module Reviews and Takeaways	78
Lab Review Questions and Answers	79

## Lesson 2

# Installing and Configuring Remote Desktop Gateway

### Contents:

Detailed Demonstration Steps

75

## Detailed Demonstration Steps

### Demonstration: Installing and Configuring RD Gateway

#### Detailed demonstration steps



**Note** For this demonstration, you must have performed the Lab Setup instructions for the module 5 Lab.

#### ► Task 1: Install and complete the RD Gateway initial configuration.

1. Log on to **6349A-NYC-RDG1** as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
2. Open **Server Manager**, click the **Roles** node, and then click **Add Roles**.
3. On the **Before You Begin** page, click **Next**.
4. Select the **Remote Desktop Services** check box, and then click **Next**.
5. Click **Next**.
6. Select the **Remote Desktop Gateway** check box. Install additional role services as prompted.
7. Click **Next**.
8. Choose the existing certificate and click the certificate for **NYC-RDG1**.
9. Click **Next**.
10. On the screen for **Authorization Policies**, select **Later**, and then click **Next**.
11. Click **Next**.
12. On the **Select Role Services** page, accept the default checked box for **Network Policy Server**, and then click **Next**.
13. Click **Next** to start the **Web Server (IIS)** installation.
14. Accept the default role services, and then click **Next**.
15. Click **Install**.
16. Click **Close**.
17. Expand **Roles | Remote Desktop Services | RD Gateway Manager | NYC-RDG1**.
18. Click **Properties**.
19. Click the **Server Farm** tab.
20. Enter **NYC-RDG1.contoso.com** as an RD Gateway farm member. Click **Add**.
21. Click **OK**.

#### ► Task 2: Configure RD CAPs and RD RAPs.

1. In **Server Manager** on **NYC-RDG1**, expand on **Roles | Remote Desktop Services | RD Gateway Manager | NYC-RDG1**.
2. Click the link for **Create connection authorization policy**.
3. On the **General** tab, enter a **Policy name** of **COSalesApp CAP**.

4. Click the **Requirements** tab.
5. Next to **user group membership**, click **Add Group**.
6. Enter **Contoso\Marketing; Contoso\IT**, and then click **OK**.
7. Click the **Device Redirection** tab.
8. Click **Disable device redirection**.
9. Clear the boxes for **Clipboard** and **Printers**.
10. Click the **Timeouts** tab.
11. **Enable** idle timeout of 30 minutes.
12. **Enable** session timeout of 240 minutes (4 hours).
13. Click **OK**.
14. Click **Resource Authorization Policies**.
15. Click **Create New Policy | Custom**.
16. On the **General** tab, enter the policy name of **Marketing RAP**.
17. Verify that the check box for **Enable this policy** is marked.
18. Click the **User Groups** tab.
19. Click **Add**.
20. Enter **Contoso\Marketing; Contoso\IT**, and then click **OK**.
21. Click the **Network Resource** tab.
22. Click **Select an existing RD Gateway-managed group**.
23. Click **Browse**.
24. Click **Create New Group**.
25. In the **Name** field, type **RDFARM**.
26. Click the **Network Resources** tab, type **NYC-RDSH1.Contoso.com** in the computer field, and then click **Add**.
27. Click **OK**.
28. In the Select a RD Gateway-managed computer group window, **RDFARM** should be selected. Click **OK**.
29. Click the **Allowed Ports** tab, and verify that connections are allowed only through port **3389 TCP**.
30. Click **OK**.

► **Task 3: Update RemoteApp for use with RD Gateway.**

1. Switch **NYC-RDSH1**. If necessary, log on as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
2. Open Server Manager and browse to **Roles | Remote Desktop Services | RemoteApp Manager**.
3. Click **Change** next to **RD Gateway Settings**.
4. Click **Use these RD Gateway server settings**. Next to Server name, type **NYC-RDG1.contoso.com**.

5. Select **Ask for Password (NTLM)** from the drop-down for the **Logon method**.
6. For lab purposes, clear the box for **Bypass RD Gateway server for local addresses**.

## Module Reviews and Takeaways

### Review questions

**Question:** Why does the RD Gateway become important when extending RemoteApp support onto the Internet?

**Answer:** RemoteApps and any RDC connection by itself are not encrypted. Over internal LAN connections, this does not usually present a problem; however, over Internet or other untrusted connections, RD Gateway provides for necessary encryption. Regular connections are also point-to-point. RD Gateway enables the termination and re-creation of RDP connections, and proxies communication between external and internal networks.

**Question:** In what situations might it make sense to host RD Gateway on a perimeter network?

**Answer:** An RD Gateway on an internal network requires port 443 to be open from the external network. In many organizations, this direct Internet connection is unacceptable. As a result, relocating the RD Gateway onto a perimeter network may be required to meet security requirements.

**Question:** What is the primary role of certificates for RemoteApps accessed through RD Gateway? On which computers do certificates need to be installed?

**Answer:** The RD Gateway requires certificates to authenticate clients and encrypt communication. A trusted certificate must be installed on both the RD Gateway server and any RD Session Host computers to which clients attempt to connect through RD Gateway.

## Lab Review Questions and Answers

**Question:** What are the two types of policies that are required before users can connect to a Remote Desktop Gateway?

**Answer:** Connection Authorization Policy (CAP) and Resource Authorization Policy (RAP).

**Question:** Can you use previously deployed RemoteApps with a new Remote Desktop Gateway?

**Answer:** No. You must configure the Remote Desktop host to use the Remote Desktop Gateway and then build a new RDP or MSI package and distribute it.

**Question:** Where can you view active connections through the Remote Desktop Gateway?

**Answer:** On the Remote Desktop Gateway server, under RD Gateway Manager, select the gateway server and then Monitoring.

# Module 6

## Implementing IIS Web Applications

### Contents:

<b>Lesson 1:</b> Functional Overview of IIS	<b>81</b>
<b>Lesson 3:</b> Managing IIS Websites and Applications	<b>86</b>
Module Reviews and Takeaways	<b>88</b>
Lab Review Questions and Answers	<b>89</b>



## Lesson 1

# Creating IIS Websites and Applications

### Contents:

Detailed Demonstration Steps	82
Additional Reading	85

# Detailed Demonstration Steps

## Demonstration: How to Configure Websites

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 and 6439A-NYC-Support1 virtual machines to complete this demonstration. Log on to the virtual machines as Contoso\Administrator, with the password, Pa\$\$w0rd.

#### ► Task 1: Add an application pool.

1. In **Internet Information Services (IIS) Manager**, in the **Connections** pane, click **Application Pools**.
2. Right-click **Application Pools** and click **Add Application Pool**.
3. In the **Add Application Pool** dialog box, in the **Name** box, type **NewAppPool**.
4. In the drop-down box labeled **.Net Framework Version:**, select **.NET Framework v2.0.50727**.
5. In the **Managed pipeline mode** list, click **Integrated**.
6. Ensure that the **Start application pool immediately** check box is selected, and then click **OK**.

#### ► Task 2: Configure authentication.

1. In the **Connections** pane, click **NYC-SUPPORT1 (CONTOSO\Administrator)**.
2. In NYC-SUPPORT1 Home pane, double-click **Authentication**.
3. In the **Authentication** pane, click **Windows Authentication**, and then in the **Actions** pane, click **Enable**.

#### ► Task 3: Configure the application pool's worker process identity.

1. In the **Connections** Pane, expand **NYC-SUPPORT1 (CONTOSO\Administrator)** and then click **Application Pools**.
2. In the **Application Pools** pane, click **NewAppPool** and in the **Actions** pane click **Advanced Settings....**
3. In the **Advanced Settings** dialog box, in the **Process Model** section, click on **Identity**.
4. Click the **Browse (...)** button next to **Application Pool Identity**.
5. In the Application Pool Identity dialog box, in the **Built-in account** list, click **LocalSystem**, and then click **OK**.
6. In the **Advanced Settings** dialog box, click **OK**.

#### ► Task 4: Create a new website.

1. In **Internet Information Services (IIS) Manager**, in the **Connections** pane, click **Sites**.
2. Right-click **Sites**, and then click **Add Web Site**.
3. In the **Add Web Site** dialog box, in the **Site name** box, type **New\_Site**.
4. Click **Select**, and then in the **Select Application Pool** dialog box, in the **Application Pool** list, click **NewAppPool**.

5. Click **OK**.
6. In the **Add Web Site** dialog box, under **Content Directory**, next to the **Physical path** box, click the ellipse button (...).
7. In the **Browse For Folder** dialog box, expand **Computer**, expand **Local Disk (C:)**, and then click **inetpub**.
8. Click **Make New Folder**, type **NewAppFolder**, press Enter and then click **OK**.
9. Under **Binding**, in the **Port** box, type **88**.
10. Ensure that the **Start Web site immediately** is selected, and then click **OK**.

► **Task 5: Change the connection timeout.**

1. In the **Internet Information Services (IIS) Manager**, in the **Connections** pane, expand **NYC-SUPPORT1 (CONTOSO/Administrator)**, and click **Sites**.
2. In the **Sites** list, click **New\_Site**.
3. In the **Actions** pane, in the section labeled **Manage Web Site**, click **Advanced Settings**.
4. In the **Advanced Settings** dialog box, under **Behavior**, expand **Connection Limits**.
5. In the **Connection Time-out(seconds)** box, type **120** and then click **OK**.

► **Task 6: Create a backup.**

1. Click **Start**, click **All Programs**, then click **Accessories**, and then click **Command Prompt**.
2. In the command prompt window, type the following command and then press Enter:

```
cd \windows\system32\inetsrv
```

3. In the command prompt window, type the following command and then press Enter:

```
Appcmd add backup New_Site
```

4. In the command prompt window, type the following command and then press Enter:

```
Appcmd list backups
```

5. Verify the presence of the **New\_Site** backup in the list. Close the command prompt.

► **Task 7: Create a Virtual Directory.**

1. In **Internet Information Services (IIS) Manager**, in the **Connections** pane, expand the **Sites** node in the tree, and click the **New\_Site** web site.
2. In the **Actions** pane, click **View Virtual Directories**.
3. On the **Virtual Directories** page, in the **Actions** pane, click **Add Virtual Directory**.
4. In the **Add Virtual Directory** dialog box, in the **Alias** box, type **Test**.
5. Next to the **Physical path:** field, click the **Browse (...)** button.
6. Browse to **C:\inetpub**, and then click **Make New Folder**.
7. Type **Test** press Enter, and then click **OK**.
8. Click **OK**.

Revert all virtual machines.

## Additional Reading

### What Is an Application Pool?

- [Managing Application Pools in IIS 7](#)
- [Metabase Compatibility with IIS 7.0](#)

### Backup and Recovery for Websites and Applications

- [IIS7 Backup Restore UI](#)
- [Using IIS 7.0 Configuration History](#)

## Lesson 3

# Managing IIS Websites and Applications

### Contents:

Additional Reading

87

## Additional Reading

### Storing Session State

- [Session-State Modes](#)

## Module Reviews and Takeaways

### Review questions

**Question:** You have deployed seven web applications on the same server. Three of these applications are in one site, while four are in a different site. You have not modified the default application pool settings. One of the applications runs in Classic mode. What is the minimum number of application pools you must configure?

**Answer:** Two. While it may be desirable to isolate each application, or site, by application pool, the restricting requirement is Classic versus Integrated mode, assuming that all of the Integrated mode applications run the same .NET framework version.

**Question:** You want to remove an application pool from your server. What must you do before you remove the application pool?

**Answer:** You must assign applications or sites currently assigned to the application pool to other application pools before you remove it.

**Question:** You need to configure Request Filtering for your website, but you were not able to find that feature in IIS Manager. What is the problem?

**Answer:** You first need to access your website to see the available options in the Details pane. If Request Filtering is not visible, the Request Filtering role service is either not installed on your server, or you were not delegated this feature.

**Question:** How can you install ASP.NET on Windows Server 2008 R2 Server Core?

**Answer:** You can use the ocsetup.exe or DISM.exe command-line tools. You cannot install just the ASP.NET feature, because it depends on other features that must be installed first.

### Best Practices Related to Managing Web Servers and Websites

Supplement or modify the following best practices for your own work situations:

- The domain name restrictions rules restrict access by domain name. This rule significantly affects server performance because it requires a DNS lookup for every request.
- Employ minimal install to install only the bare minimum number of components. With fewer components installed, there is a smaller surface area available to attackers and there are fewer components to manage and maintain.



## Lab Review Questions and Answers

**Question:** When you installed IIS from the Role Manager, you were prompted to also install dependencies. What were these dependencies? What would happen if they were not installed?

**Answer:** IIS is dependent on WAS (Windows Activation Service). IIS will not run without WAS.

**Question:** What is the minimum number of application pools you must configure if you are running two applications with different .NET framework versions and a classic mode ASP application?

**Answer:** Three. Each application pool can only use one version of .NET framework and can either run in integrated or classic mode.

**Question:** When does an application pool start?

**Answer:** The application pool doesn't start until at least one of its applications is started.

**Question:** You have installed the ASP.NET role, but the ASP.NET configurations settings are not available in IIS Manager. What do you need to do to address this problem?

**Answer:** After you install ASP.NET, you might need to close IIS Manager and open it again if it was open during the installation.

**Question:** You have just added a new ASP.NET application. It is unable to write logs to the specified logging directory. Why?

**Answer:** You must give permission to the application pool identity to write to the log directory.

**Question:** Two instances of the same application are corrupting the others view state. How can you correct this?

**Answer:** Configure the machine key to isolate the application's state information.

# Module 7

## Implementing FTP and SMTP

### Contents:

Lesson 1: Implementing and Configuring IIS FTP Sites	91
Module Reviews and Takeaways	97
Lab Review Questions and Answers	99

## Lesson 1

# Implementing and Configuring IIS FTP Sites

### Contents:

Detailed Demonstration Steps

92

# Detailed Demonstration Steps

## Demonstration: How to Configure FTP Sites

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 virtual machine to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Create an FTP site.

1. Switch to NYC-DC1, and on the taskbar, click **Server Manager**.
2. In the navigation pane, click **Roles**, and then, in the Roles pane, under **Web Server (IIS)**, click **Add Roles Services**.
3. In the **Add Role Services** dialog box, on the **Select Role Services** page, select the **FTP Server** check box, and then click **Next**.
4. On the **Confirm Installation Selections** page, click **Install**, and then click **Close**.
5. Close Server Manager.
6. On the **Start** menu of NYC-DC1, point to **Administrative Tools**, and then click **Internet Information Services (IIS) Manager**.
7. In the Connections pane of the Internet Information Services (IIS) Manager console, expand **NYC-DC1 (CONTOSO\Administrator)**, expand and right-click **Sites**, and then click **Add FTP Site**.
8. On the **Site Information** page of the Add FTP Site Wizard, in the **FTP site name** box, type **FTP Site 1**, in the **Physical path** box, type **c:\inetpub\ftproot**, and then click **Next**.
9. On the **Binding and SSL Settings** page, in the **IP Address** box of the **Binding** area, click **All Unassigned**.
10. On the **Binding and SSL Settings** page, click **No SSL**, and then click **Next**.
11. In the **Authentication** area of the **Authentication and Authorization Information** page, select the **Basic** check box.
12. In the **Authorization** area, in the **Allow Access to** box, click **All users**, select the **Read** check box, and then click **Finish**.

#### ► Task 2: Connect to the FTP site.

1. On the **Start** menu of NYC-DC1, point to **All Programs**, click **Accessories**, and then click **Command Prompt**.
2. In the Administrator: Command Prompt window, run the following command and then press Enter to connect to the FTP site, FTP1.

```
ftp nyc-dc1.contoso.com
```

3. At the User (NYC-DC1.Contoso.com:none)) prompt, type the following command and then press Enter.

```
administrator
```

4. At the Password prompt, type the following command, and then press Enter.

```
Pa$$w0rd
```

5. Run the following command to create a folder on the FTP1 site.

```
mkdir FTP1
```



**Note** An Access Denied error message appears because you have only Read access to the FTP1.contoso.com ftp site.

```
quit
```

Leave the virtual machines running.

## Demonstration: How to Configure FTP User Isolation

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 virtual machine to complete this demonstration. Log on to the virtual machines as Contoso\Administrator, with the password, Pa\$\$w0rd.

#### ► Task: Configure different FTP user isolation options.

1. Switch to Internet Information Services (IIS) Manager.
2. In the tree pane of the Internet Information Services (IIS) Manager console, under **Sites**, click **FTP Site 1**.
3. In the result pane, double-click **FTP User Isolation**.
4. At the command prompt of the Administrator: Command Prompt window, run the following command to connect to the FTP site, FTP1.

```
ftp nyc-dc1.contoso.com
```

5. At the User (NYC-DC1.Contoso.com:none)) prompt, type the following command and then press Enter.

```
administrator
```

6. At the Password prompt, type the following command, and then press Enter.

```
Pa$$w0rd
```

7. Run the following command to list the content of the FTP1 site.

```
dir
```



**Note** No folders are listed.

8. Type the following command, and then press Enter to close the connection with the FTP1 site.

```
quit
```

9. Open Windows Explorer.
10. Navigate to C:\inetpub\ftproot and create a folder called Candy.
11. Navigate to C:\inetpub\ftproot\Candy and create a folder called test1.
12. Close Windows Explorer.
13. In the FTP User Isolation result pane of the Internet Information Services (IIS) Manager console, click **User name directory**, and then click **Apply**.
14. In the Administrator: Command Prompt window, run the following command to connect to the FTP site, FTP1.

```
ftp nyc-dc1.contoso.com
```

15. At the User (NYC-DC1.Contoso.com:none)) prompt, type the following command, and then press Enter.

```
Candy
```

16. At the Password prompt, type the following command and press Enter:

```
Pa$$w0rd
```

17. At the ftp> prompt, type the following command, and then press Enter.

```
ls
```

18. At the ftp> prompt, type the following command, and then press Enter.

```
Cd ..
```

19. At the ftp> prompt, type the following command, and then press Enter.

```
ls
```

20. Run the following command to close the connection with the FTP1 site.

```
quit
```

Leave the virtual machines running.

## Demonstration: How to Configure FTP User Isolation

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 virtual machine to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

► **Task 1: Verify that SSL computer certificate is available.**

1. On the **Start** menu of the NYC-DC1, in the **Search programs and files** box, type **mmc**, and then press Enter.
2. On the **File** menu of the Console1- [Console Root] console, click **Add/Remove Snap-in**.
3. In the **Available snap-ins** area of the **Add or Remove Snap-ins** dialog box, in the **Snap-in** list, click **Certificates**, and then click **Add**.
4. In the Certificates snap-in wizard, click **Computeraccount**, and then click **Next**.
5. In the Select Computer wizard, click **Finish**.
6. In the **Add or Remove Snap-ins** dialog box, click **OK**.
7. In the tree pane of the Console1 – [Console Root] window, under **Console Root**, expand **Certificates (Local Computer)**, expand **Personal**, and then click **Certificates**.



**Note** In the result pane of the Certificates snap-in, verify that the certificate with the name, NYC-DC1.contoso.com, is displayed.

8. In the result pane, right-click the second **NYC-DC1.contoso.com** certificate, and then click **Properties**.
9. In the **Friendly name** box, type **SSL Certificate**, and then click **OK**.
10. Close the Console1 – [Console Root\Certificates (Local Computer)\Personal\Certificates] window, and then click **No** when prompted to save the settings.

► **Task 2: Configure the existing FTP site to require SSL connection.**

1. On NYC-DC1, in the Connections pane of the Internet Information Services (IIS) Manager console, under **NYC-DC1 (CONTOSO\Administrator)**, click and right-click **Sites**, and then click **Add FTP Site**.
2. On the **Site Information** page of the Add FTP Site Wizard, in the **FTP site name** box, type **SSL FTP Site**, in the **Physical path** box, type **c:\inetpub\ftproot**, and then click **Next**.
3. On the **Binding and SSL Settings** page, in the **IP Address** box of the **Binding** area, ensure that **All Unassigned** is selected.
4. On the **Binding and SSL Settings** page, in the **SSL Certificate of the SSL** area, ensure that the **Require SSL** option is selected, and under the SSL Certificate section, click the drop-down list and select **SSL Certificate**, and then click **Next**.
5. In the **Authentication** area of the **Authentication and Authorization Information** page, select the **Basic** check box.
6. In the **Authorization** area, in the **Allow Access to** box, click **All users**, select the **Read** check box, and then click **Finish**.
7. In the SSL FTP Site Home result pane, under **FTP**, double-click **FTP SSL Settings**.
8. In the **SSL Policy** area of the **FTP SSL Settings** page, click **Custom**, and then click **Advanced**.
9. In the **Control Channel** area of the **Advanced SSL Policy** dialog box, click **Require only for credentials**, in the **Data Channel** area, click **Allow**, and then click **OK**.

10. In the Actions pane of the Internet Information Services (IIS) Manager console, click **Apply**.



# Module Reviews and Takeaways

## Review questions

**Question:** Why do you use FTP Virtual Host Names?

**Answer:** You use FTP Virtual Host names to configure multiple FTP sites on a single IP address. Using this feature, you can minimize the number of IP addresses that are required for hosting multiple FTP sites. The functionality is very similar to using host headers for hosting multiple websites on the same IP address.

**Question:** What is the minimum number of IP addresses that must be assigned to the web server, if you want to host ten websites and seven FTP sites on the server?

**Answer:** You can assign multiple websites to the same IP address by using Host Headers. In IIS 7.5, you can assign multiple FTP sites to the same IP address. This helps you use single IP address for hosting multiple websites and FTP sites.

**Question:** Why should you use FTP User Isolation?

**Answer:** You use FTP User Isolation to prevent users from viewing or overwriting other users' content by restricting them to their own directories. When you use this feature, the user is automatically moved to the user's directory after logging to an FTP site, and the user will not be able to navigate outside the directory tree.

**Question:** Why should you use an SSL-enabled FTP site?

**Answer:** FTP is an old protocol that does not provide enough security, and it transfers user credentials and data in plain text, similar to the HTTP protocol. In FTP 7.5, you can enable an SSL Policy for the FTP server and configure FTP to use SSL encryption, similar to the HTTPS protocol for accessing web content. By enabling SSL for the FTP site, you can protect user credentials and the data that is transferred between FTP servers.

**Question:** Why is logging in FTP important?

**Answer:** Logging is important because log files have a history of every successful and unsuccessful attempt to retrieve a file from an FTP site. Moreover, you can extract the entries from the access log and compile these entries into reports. Using these reports, you can find detailed information about your site visitors.

**Question:** You attempt to view the properties of your default SMTP Virtual Server, but cannot locate the node in Internet Information Services (IIS) Manager. What are you doing wrong?

**Answer:** The SMTP configuration is accessed through the IIS 6.0 Manager.

**Question:** Which client-based authentication mechanisms are supported by SMTP on Windows Server 2008?

**Answer:** Anonymous, Basic, and Integrated Windows.

**Question:** True or false? By default, the SMTP Virtual Server is configured to enable email relaying.

**Answer:** True.

## Common Issues Related to SMTP

Identify the causes for the following common issues related to a particular technology area in the module and fill in the troubleshooting tips. For answers, refer to relevant lessons in the module.

Issue	Troubleshooting tip
IIS SMTP does not deliver outgoing email	Ensure that IIS SMTP is either configured with the necessary DNS information to deliver to recipients' mail servers, or that it is configured with the name of a mail relay server that will be responsible for final delivery to the recipient's mail server.
Clients cannot retrieve email from their configured email server	IIS SMTP is used only for outgoing email; the SMTP protocol provides for the transmission of email, but not for its storage. To receive email, you need to implement a mailbox server by using POP3, IMAP4, or another mailbox protocol. Microsoft Exchange Server is also capable of receiving and storing email.

## Best Practices Related to SMTP

- Keep in mind that non-secure FTP will transmit user names and passwords in clear-text. This can be a security problem, so avoid doing this over the Internet or other unsecured networks.
- Understand the use of DNS SPF records that tell external mail servers which servers are allowed to send email from your domain. If IIS SMTP will be used to send email to external recipients, be sure that your SPF records are updated appropriately.
- If your organization can send email through a more robust and secure mechanism, use that in favor of IIS SMTP. IIS SMTP should generally be used only if a better option, such as a Microsoft Exchange Server, is not available.

## Lab Review Questions and Answers

**Question:** If you deploy the SMTP Server feature to a computer that is Internet-facing, what should you be aware of?

**Answer:** The SMTP Virtual Server that is created by default is configured not only for anonymous authentication, but also for the setting that any computer that can successfully authenticate and relay, regardless of any specific relay settings.

**Question:** What should you do?

**Answer:** You should either change the authentication method, or deselect the option that allows relay after successful authentication, or both.

# Module 8

## Managing and Securing IIS

### Contents:

Lesson 2: Managing IIS and SSL Security	101
Module Reviews and Takeaways	104
Lab Review Questions and Answers	105

## Lesson 2

# Managing IIS and SSL Security

### Contents:

Detailed Demonstration Steps

102

# Detailed Demonstration Steps

## Demonstration: How to Configure SSL

### Detailed demonstration steps



**Note** You require the 6439A-NYC-DC1 and 6439A-NYC-Support1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Create a website.

1. Switch to 6439A-NYC-Support1.
2. Click **Start**, point to **Administrative Tools**, and click **Internet Information Services (IIS) Manager**.
3. In **Internet Information Services (IIS) Manager**, in the **Connections** pane, expand **NYC-Support1 (Contoso\Administrator)**, and then click **Sites**.
4. Right-click **Sites**, and then click **Add Web Site**.
5. In the **Add Web Site** dialog box, in the **Site name** box, type **CoSalesApp**.
6. Under **Content Directory**, next to the **Physical path** box, click the ellipse button (...).
7. In the **Browse For Folder** dialog box, expand **Computer**, expand **Local Disk (C:)**, and then click **inetpub**.
8. Click **Make New Folder**, type **COSalesApp**, press Enter and then click **OK**.
9. Under **Binding**, in the **Port** box, type **88**.
10. Ensure that **Start Web site immediately** is selected, and then click **OK**.

#### ► Task 2: Obtain a certificate.

1. Click **Start**, and in the **Search** box, type **mmc** and then press Enter.
2. In **Console1 – [Console Root]**, click **File** and then click **Add/Remove Snap-in**.
3. In the **Add or Remove Snap-ins** dialog box, in the **Available snap-ins** list, click **Certificates**, and then click **Add**.
4. In the **Certificates snap-in wizard**, click **Computer account** and then click **Next**.
5. On the **Select Computer** page, click **Local computer (the computer this console is running on)**, and then click **Finish**.
6. Click **OK**.
7. In the **Console Root** pane, expand **Certificates (Local Computer)**, expand **Personal**, and then click **Certificates**.
8. Right-click **Certificates**, click **All Tasks**, and then click **Request New Certificate**.
9. In the **Certificate Enrollment wizard**, click **Next**.
10. On the **Select Certificate Enrollment Policy** page, click **Next**.

11. On the **Request Certificates** page, select the **Contoso Web** check box, expand the **Details** button, and then click **Properties**.
12. In the **Certificate Properties** dialog box, on the **General** tab, in the **Friendly name** box, type **Contoso Web Server** and then click **OK**.
13. On the **Request Certificates** page, click **Enroll**.
14. Click **Finish**.
15. Close Console1 and do not save the changes.

► **Task 3: Enable Site Bindings for HTTPS.**

1. In Internet Information Services (IIS) Manager, in the **Connections** pane, expand **Sites**, and then click **COSalesApp**.
2. In the **Actions** pane, in the section labeled **Edit Site**, click **Bindings**.
3. In the **Site Bindings** dialog, click **Add**.
4. In the **Add Site Binding** dialog box, in the **Type:** drop-down menu, select **https**.
5. In the **SSL Certificate:** drop-down box, select **Contoso Web Server**.
6. Click **OK**.
7. Click **Close**.

Revert all virtual machines.

## Module Reviews and Takeaways

### Review questions

**Question:** You have configured a new website to use SSL. When users access the website, they get an error about the certificate being untrusted. You have verified that the domain name used to access the website matches the name on the certificate. How can you resolve this error?**Answer:** This error occurs when the certificate is not issued by a trusted certification authority. You need to obtain a certificate from the third-party certification authority that is automatically trusted by clients.

**Question:** You have configured a new intranet site for internal users. The intranet site is prompting users for their credentials to log on. You would like them to be automatically logged on by using their workstation credentials. How can you do this?**Answer:** Configure the intranet site to use Windows authentication. Windows authentication can automatically pass workstation credentials to the web server. This requires Internet Explorer to be the web browser and the intranet site must be configured as a part of the intranet security zone.

**Question:** You have created a new website that uses anonymous authentication. When you test access to the website, you are prompted for authentication credentials. To which system account should you give read permission, to prevent the authentication prompt from appearing?**Answer:** Access for anonymous users is controlled by the IUSR built-in account. IUSR must have read access to files for anonymous users to be able to access the content.

### Best Practices Related to Website and Web Server Logging

Supplement or modify the following best practices for your own work situations:

- Locate the log file on a secure, reliable drive. It should be stored in a directory other than %systemroot%.
- Monitor and manage the maximum number of log files to keep, and the maximum size of the log files.
- Maintain a reliable corporate policy on log file retention.
- Find and secure access to obsolete files.



## Lab Review Questions and Answers

**Question:** Why is an SSL certificate required to enable HTTPS?

**Answer:** SSL certificates contain information about the identity of the server which is vouched for by a trusted third party. The SSL certificate also contains information required to support encryption between a client and a server.

**Question:** In which cases would you use a Deny rule to limit access to web content?

**Answer:** Deny rules are used to prevent unauthorized access from known or potentially inappropriate uses, such as excessive downloading from a site or excessive number of requests for services.

**Question:** What are the steps in configuring the web management service?

**Answer:**

- Set feature delegation.
- Specify the users that can connect to the site or application.
- Install Web Services Management (WMSVC).
- Enable remote management.
- Start Web Services Management.
- Test configuration by connecting from a remote machine.

**Question:** What are some best practices for feature delegation?

**Answer:**

- Delegate only the needed level of access.
- Do not change the system account.
- Do not make delegation more restrictive after initial configuration.

# Module 9

## Implementing SharePoint Foundation

### Contents:

<b>Lesson 1:</b> Overview of SharePoint Foundation 2010	<b>107</b>
<b>Lesson 2:</b> Configuring SharePoint Servers	<b>111</b>
<b>Lesson 3:</b> Administering SharePoint Site Collections	<b>115</b>
<b>Lesson 4:</b> Configuring SharePoint Foundation Integration	<b>119</b>
Module Reviews and Takeaways	<b>122</b>
Lab Review Questions and Answers	<b>123</b>

## Lesson 1

# Overview of SharePoint Foundation 2010

### Contents:

Detailed Demonstration Steps	108
Additional Reading	110

# Detailed Demonstration Steps

## Demonstration: Installing SharePoint Foundation 2010

### Detailed Demonstration Steps



**Note** You require the **6439A-NYC-DC1** and **6439A-NYC-Support1** virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Install software prerequisites for SharePoint Foundation 2010.

1. On **NYC-Support1**, click **Start**, point to **All Programs**, click **Accessories**, and then click **Windows Explorer**.
2. Browse to **C:\Software**, and then double-click **SharePointFoundation.exe**.
3. On the **SharePoint Foundation 2010** installation wizard, click **Install software prerequisites**.
4. On the **Welcome to the Microsoft SharePoint 2010 Products Preparation Tool** screen, click **Next**.
5. On the **License Terms for software products** page, select the check box to accept the license terms, and then click **Next**.
6. On the **Now Installing Prerequisites** page, wait for the progress bar to complete and click **Next**.
7. On the **Your system needs to restart to continue** page, click **Finish**.
8. After the restart, log on to NYC-Support1 as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
9. On the **Installation Complete** page, click **Finish**.

#### ► Task 2: Install SharePoint Foundation in stand-alone mode.

1. On **NYC-Support1**, click **Start**, point to **All Programs**, click **Accessories**, and then click **Windows Explorer**.
2. Browse to **C:\Software**, and then double-click **SharePointFoundation.exe**.
3. On the **SharePoint Foundation 2010** page, click **Install SharePoint Foundation**.
4. On the **Read the Microsoft Software License Terms** page, select the check box to accept the license, and then click **Continue**.
5. On the **Choose the installation you want** page, click **Standalone**.
6. On the **Installation Progress** page, wait for the progress bar to complete.

#### ► Task 3: Run SharePoint Products Configuration Wizard

1. On the **Run Configuration Wizard** page, verify that the **Run the SharePoint Products Configuration Wizard now** check box is selected, and then click **Close**.
2. On the **Welcome to SharePoint Products** page, click **Next**.
3. In the **SharePoint Products Configuration Wizard** dialog box, click **Yes** to restart services.
4. On the **Configuring SharePoint Products** page, wait for the progress bar to complete.
5. On the **Configuration Successful** page, click **Finish**.

6. Internet Explorer will automatically start, displaying a logon prompt. Log on as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
7. The **Team Site** website will be displayed.
8. Close **Internet Explorer** and **Windows Explorer**.
9. On the **SharePoint Foundation** setup page, click **Exit**.

## Additional Reading

### Comparing SharePoint 2010 Editions

- [Compare SharePoint Editions](#)
- [Upgrading from SharePoint Foundation 2010 to SharePoint Server 2010](#)

## Lesson 2

# Configuring SharePoint Servers

### Contents:

Detailed Demonstration Steps	112
Additional Reading	114

## Detailed Demonstration Steps

### Demonstration: Configuring SharePoint Foundation Using Central Administration

#### Detailed Demonstration Steps



**Note** You require the **6439A-NYC-DC1** and **6439A-NYC-Support1** virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Navigate in Central Administration.

1. On **NYC-Support1**, click **Start**, click **All Programs**, click **Microsoft SharePoint 2010 Products**, and then click **SharePoint 2010 Central Administration**.
2. In Central Administration, navigate to several areas of the Central Administration website, and show students where the various configuration items are located and what the configuration dialogue looks like.

#### ► Task 2: Create a new web application for COSalesApp.

1. In the Central Administration website, under Application Management, click **Manage Web Applications**.
2. On the SharePoint ribbon, click **New**.
3. On the **Create New Web Application** page, select **Classic Mode Authentication**.
4. In the **IIS Web Site** section, select **Create a new IIS web site**. In the **Name** field, type **COSalesApp**, and then, in the **Port** field, enter **8440**.
5. Scroll down to the **Security Configuration** section. Leave all settings as the defaults.
6. Scroll down to the **Public URL** section and ensure that the **URL** field is **http://NYC-Support1:8440**.
7. Scroll down to the **Application Pool** section. Select **Create new application pool**, and in the **Application pool name** field, type **COSalesApp – SharePoint – 8440**.
8. Under **Select a security account for this application pool**, click the **Predefined** button, and then select **Network Service** from the drop-down menu.
9. Scroll down the **Search Server** section. Select **NYC-SUPPORT1** from the drop-down menu.
10. Scroll down the **Create New Web Application** page, leaving all other settings as they are.
11. Click **OK**.
12. Wait for the new web application to be created. In the Application Created window, click **OK**.

#### ► Task 3: Create a new site collection for COSalesApp.

1. On the Central Administration website, in the navigation pane, click **Application Management**.
2. In the **Application Management** screen, under **Site Collections**, click **Create site collections**.
3. On the **Create Site Collection** page, click the **Web Application** drop-down list, and then select **Change Web Application**.



4. In the Select Web Application window, click **COSalesApp**.
5. In the **Title and Description** section, in the **Title** field, type **COSalesApp**.
6. Scroll down to the **Primary Site Collection Administrator** section. In the **User name** field, type **Contoso\Administrator**, and then click the Check names icon.
7. Scroll to the end of the page, and then click **OK**.
8. On the **Top-Level Site Successfully Created** page, click the <http://nyc-support1:8440> link to open the new top-level site of the COSalesApp site collection.
9. Close both Internet Explorer windows.

## Additional Reading

### What Are Managed Service Accounts?

- [Managed Service Accounts](#)
- [PowerShell Commands for Managed Service Accounts](#)

### Working with SharePoint Timer Jobs

- [Timer jobs cmdlets](#)

## Lesson 3

# Administering SharePoint Site Collections

### Contents:

Detailed Demonstration Steps	116
Additional Reading	118

# Detailed Demonstration Steps

## Demonstration: Configuring SharePoint Sites

### Detailed Demonstration Steps



**Note** You require the **6439A-NYC-DC1**, **6439A-NYC-USER1**, and **6439A-NYC-Support1** virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Configure site settings.

1. On **NYC-Support1**, click **Start**, point to **All Programs**, and then click **Internet Explorer (64-bit)**.
2. For the URL, type **http://NYC-Support1** and log on as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
3. When the Team Site appears, point to the upper-left corner of the site, click **Site Actions**, and then click **Site Settings**.
4. On the **Site Settings** page, click **Title, description, and icon**.
5. On the **Title, Description, and Icon** page, change the **Title** to **Contoso Team Site**, change the **Description** to **Home of Team Contoso**, and then click **OK**.
6. On the **Site Settings** page, click **Site collection administrators**.
7. On the **Site Collection Administrators** page, add **Contoso\Ed**, click the **Check Names** icon, and then click **OK**.
8. Click the **Contoso Team Site** link at the top of the page to return to the Team Site home page.

#### ► Task 2: Create a document library for storage.

1. On the **Contoso Team Site** home page, point to the upper-left corner of the site and click **Site Actions**.
2. Under **Site Actions**, click **New Document Library**.
3. On the form for the new library, in the Name and Description section, add the Name: **Contoso Documents** and Description: **Contoso document storage**.
4. In the **Navigation** section, verify that **Display this document library on the Quick Launch?** is set to **Yes**.
5. In the **Document Version History** section, ensure that **Create a version each time you edit a file in this document library?** is set to **Yes**.
6. In the **Document Template** section, verify that the template selected is **Microsoft Word Document**.
7. At the end of the new document library form, click **Create**.
8. Close **Internet Explorer**.

#### ► Task 3: Upload a document to a document library.

1. Log on to **NYC-USER1**, as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

2. On **NYC-USER1**, click **Start**, click **All Programs**, click **Microsoft Office**, and then click **Microsoft Word 2010**.
3. At the **User Name** prompt, click **OK**.
4. When the Microsoft Office Activation Wizard window appears, click **Close**.
5. In the Welcome to Microsoft Office 2010 window, select **Don't make changes**, and then click **OK**.
6. In **Microsoft Word**, type **Hello World!**
7. Click the **File** tab, and then click **Save As**.
8. In the Save As window, click **Desktop** in the navigation pane, and then click **Save**.
9. Close **Microsoft Word**. Ensure that there is a Word document on your desktop named, **Hello**.
10. On **NYC-USER1**, click **Start**, point to **All Programs**, and then click **Internet Explorer (64-bit)**.
11. For the URL, type **http://NYC-Support1**, and then press Enter.
12. On the **Contoso Team Site** home page, click **Contoso Documents** in the navigation pane.
13. On the **Contoso Documents** page, click **Add document**.
14. In the Upload Document window, click the **Browse** button. Locate the **Hello** Word document and double-click it.
15. In the **Version Comments** field, type **First version**, and then click **OK**. Note the Hello document is now listed in the document library.
16. Close **Internet Explorer**.

## Additional Reading

### Configuring Site Permissions

- [User permissions and permission levels](#)

## Lesson 4

# Configuring SharePoint Foundation Integration

### Contents:

Detailed Demonstration Steps	120
Additional Reading	121

# Detailed Demonstration Steps

## Demonstration: Configuring SharePoint Integration

### Detailed Demonstration Steps



**Note** You require the **6439A-NYC-DC1**, **NYC-USER1**, and **6439A-NYC-Support1** virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Configure incoming and outgoing email settings.

1. If required, log on to **NYC-Support1** as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
2. On **NYC-Support1**, click **Start**, point to **All Programs**, click **Microsoft SharePoint 2010 Products**, and then click **SharePoint 2010 Central Administration**.
3. On the **Central Administration** page, click **System Settings**.
4. On the **System Settings** page, click **Configure outgoing email settings**.
5. On the **Outgoing E-Mail Settings** page, fill in the following fields, and then click **OK**.
  - Outbound SMTP server: **smtp.contoso.com**
  - From address: [spadmin@contoso.com](mailto:spadmin@contoso.com)
  - Reply-to address **spadmin@contoso.com**
6. On the **System Settings** page, click **Configure incoming email settings**.
7. In the Message from webpage window, click **OK**.
8. Under **Enable sites on this server to receive email**, click **Yes**.
9. For **E-mail server display address**, type **Contoso.com**.
10. Under **E-mail drop folder**, type **C:\inetpub\mailroot\drop**, and then click **OK**.

#### ► Task 2: Connect to a SharePoint Site by using SharePoint Workspace.

1. Log on to **NYC-USER1** as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.
2. On **NYC-USER1**, click **Start**, click **All Programs**, click **Microsoft Office**, and then click **Microsoft SharePoint Workspace 2010**.
3. In the Account Configuration Wizard window, in the Name field, type **Administrator**, in the **Email Address** field, type [admin@contoso.com](mailto:admin@contoso.com), and then click **Finish**.
4. In the **SharePoint Workspaces Launchbar** window, click **New**, and then click **SharePoint Workspace**.
5. In the New SharePoint Workspace window, type **http://nyc-support1**, and then click **OK**.
6. Wait for synchronization to complete, and then click **Close**.
7. Double-click **Contoso Team Site** to view the open workspace. Explain to students that this computer can now be taken offline, and the Workspace would still be available.
8. Close **SharePoint Workspace**.



## Additional Reading

### Configuring SharePoint Information Rights Management

- [Apply Information Rights Management to a list or library](#)

### Supporting SharePoint Workspaces

- [Plan for SharePoint Workspace 2010](#)

## Module Reviews and Takeaways

### Review questions

**Question:** What does a SharePoint permission level consist of?

**Answer:** Permission levels contain a set of individual permissions grouped together, typically based on a specific role of task to be performed on the SharePoint server.

**Question:** To what entity should you grant SharePoint permissions?

**Answer:** Groups.

**Question:** What versions of SQL Server support a SharePoint Foundation 2010 installation?

**Answer:** SQL Server 2005 SP3, SQL Server 2008 and SQL Server 2008 R2, and SQL Server Express.

### Best Practices related to a particular technology area in this module

- Carefully consider before you install SQL Server and SharePoint Foundation on the same server, because this configuration is only suitable for smaller, less-active sites.
- Avoid installing SQL Server or SharePoint Foundation on a domain controller.
- Office Web Apps should usually be installed on a stand-alone web server, or its components spread across multiple web servers, for best performance.

## Lab Review Questions and Answers

**Question:** What are some of the reasons to deploy SharePoint Foundation in a farm configuration?

**Answer:** To increase performance by spreading out services amongst several servers, to use the full version of SQL Server, or to provide a more granular backup plan are answers that students may give.

**Question:** What are the minimum permissions for a file share used for SharePoint backup and restore?

**Answer:** Allow Read and Write for the Everyone group.

**Question:** Why would you want to back up specific sections of a SharePoint site rather than the site itself?

**Answer:** The site may contain sensitive information that needs to be backed up more often than the rest of the site, or a section of the site may get restored more frequently than the rest of the site. Backing up this section individually can make restoring just that section quicker and easier.

**Question:** When you install SharePoint Foundation 2010 in standalone mode. Why must SQL Server or SQL Server Express be installed as a prerequisite?

**Answer:** The site collections and document libraries are stored in a content database on SQL. Access to SQL Server must exist before the installation.

**Question:** You are assigning permissions for Active Directory groups to a new site for COSalesApp. You notice that group permissions from the parent site are assigned to COSalesApp and you cannot remove them. How can you configure the permissions so that only the groups you assign have access to COSalesApp?

**Answer:** In the Site Permissions, click Stop Inheriting Permissions.

**Question:** A fellow administrator has accidentally deleted a site. You recently performed a site collection backup by using the Central Administration site. How will you recover the deleted site?

**Answer:** Open the SharePoint 2010 Management Shell and use the Restore-SPSite cmdlet.

**Restore-SPSite -Identity http://nyc-support1 -Path \\nyc-dc1\spbackup\support1.bak -Force**

# Module 10

## Windows Streaming Media Services

### Contents:

<b>Lesson 2:</b> Installing and Configuring Streaming Media Services	<b>125</b>
<b>Lesson 4:</b> Securing Streaming Media Services	<b>128</b>
Module Reviews and Takeaways	<b>131</b>
Lab Review Questions and Answers	<b>132</b>

## Lesson 2

# Installing and Configuring Streaming Media Services

### Contents:

Detailed Demonstration Steps

126

## Detailed Demonstration Steps

### Demonstration: How to Install Windows Media Services

#### Detailed Demonstration Steps



**Note** You require the 6439A-NYC-DC1 and 6439A-NYC-Support1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**.

#### ► Task 1: Install the Streaming Media Services update.

1. Switch to 6439A-NYC-Support1.
2. Click **Start**, point to **All Programs**, click **Accessories**, and then click **Windows Explorer**.
3. Browse to **C:\Software**, and then double-click **Windows6.1-KB963697-x64.msu**.
4. In the **Windows Update Standalone Installer** dialog box, click **Yes**.
5. In the **Download and Install Updates** dialog box, click **I Accept** to accept the license agreement.
6. When installation is complete, click **Close**.
7. Close Windows Explorer.

#### ► Task 2: Add Media Server Role in Server Manager.

1. Click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
2. In the left pane, click **Roles**.
3. In the Roles details pane, under **Roles Summary**, click **Add Roles**. The Add Roles Wizard begins.
4. On the **Before You Begin** page, click **Next**.
5. On the **Select Server Roles** page, click **Streaming Media Services**, and then click **Next**.
6. On the **Streaming Media Services** page, read the introduction, and then click **Next**.
7. On the **Select Role Services** page, ensure that **Windows Media Server** is selected. Do not select any other options, and then click **Next**.
8. On the **Select Data Transfer Protocols** page, select **Real Time Streaming Protocol (RTSP)**, and then click **Next**.
9. On the **Confirm Installation Selections** page, click **Install**. The **Streaming Media Services** installation starts.
10. After the installation finishes, on the **Installation Results** page, click **Close**.
11. On the Roles pane, verify that **Streaming Media Services** is listed as one of the installed roles under **Roles Summary**.

#### ► Task 3: Create a network share for Windows Media Services content.

1. Click **Start**, point to **All Programs**, click **Accessories**, and then click **Windows Explorer**.
2. Click **Local Disk (C:)**.

3. On the menu bar, click **New folder**, type **Contoso** and press Enter.
4. Right-click **Contoso**, and then click **Properties**.
5. In the **Contoso Properties** dialog box, click the **Sharing** tab, and then click **Advanced Sharing**.
6. Select the **Share this folder** check box, and then click **OK**.
7. In the **Contoso Properties** dialog box, click the **Security** tab, and click **Edit**.
8. Click **Add**, click **Object Types**, select **Computers**, and click **OK**.
9. In the **Enter the object names to select (examples)** box, type **NYC-Support1**, and click **OK**.
10. Click **OK**.
11. In the **Contoso Properties** dialog box, click **Close**.
12. In Windows Explorer, in the center pane, double-click **wmpub**, double-click **wmroot**, select all files, then right-click and select **Copy**.
13. Navigate to **C:\Contoso** click **Organize**, and then click **Paste**.

► **Task 4: Create on-demand publishing point for a shared folder.**

1. On **NYC-Support1**, click **Start**, point to **Administrative Tools**, and then click **Windows Media Services**.
2. In the console pane, expand **NYC-SUPPORT1.Contoso.com**, and then click **Publishing Points**. Notice that two publishing points exist automatically after installation: **<Default>** and **Sample\_Broadcast**.
3. Right-click **Publishing Points**, and then click **Add Publishing Point (Wizard)**.
4. Click **Next** to start the **Add Publishing Point Wizard**.
5. In the Add Publishing Point Wizard, on the **Publishing Point Name** page, in the **Name** box, type **Contoso**, and then click **Next**.
6. On the **Content Type** page, click **Files (digital media or playlists) in a directory (useful for providing access for on-demand playback through a single publishing point)**, and then click **Next**.
7. On the **Publishing Point Type** page, click **On-demand publishingpoint**, and then click **Next**.
8. On the **Directory Location** page, in the **Location of directory** box, type **\\NYC-Support1\Contoso**, and then click **Next**.
9. On the **Content Playback** page, click **Next**.
10. On the **Unicast Logging** page, click **Next**.
11. On the **Publishing Point Summary** page, click **Next**.
12. On the Completing the Add Publishing Point Wizard page, clear the **After the wizard finishes** check box, and then click **Finish**.

Leave all virtual machines running.

## Lesson 4

# Securing Streaming Media Services

### Contents:

Detailed Demonstration Steps

129



# Detailed Demonstration Steps

## Demonstration: How to Configure Authentication and Authorization

### Detailed Demonstration Steps



**Note** You require the 6439A-NYC-DC1 and 6439A-NYC-Support1 virtual machines to complete this demonstration. Log on to the virtual machines as **Contoso\Administrator**, with the password, **Pa\$\$w0rd**. These should be running.

#### ► Task 1: View default authentication and authorization settings.

1. Switch to 6439A-NYC-Support1.
2. Click **Start**, point to **Administrative Tools**, and then click **Windows Media Services**.
3. In the navigation pane, click **NYC-SUPPORT1.Contoso.com**, and then click the **Properties** tab.
4. In the **Category** list, click **Authentication**. Notice that WMS Anonymous User Authentication and WMS Negotiate Authentication are enabled.
5. In the **Category** list, click **Authorization**. Notice that WMS NTFS ACL Authorization is **Enabled** and WMS Publishing Points ACL Authorization is **Enabled**.
6. Right-click **WMS Publishing Points ACL Authorization**, click **Properties**, and then click **Everyone**. Notice that the Everyone group is assigned read permissions.
7. Click **Cancel**.
8. Expand **Publishing Points**, click **Contoso**, and then click the **Properties** tab.
9. In the **Category** list, click **Authentication**. Notice that no authentication plug-ins are enabled by default on a newly created publishing point.
10. In the **Category** list, click **Authorization**. Notice that no authorization plug-ins are enabled by default on a newly created publishing point.

#### ► Task 2: Enable negotiation authentication on the publishing point.

1. On the **Properties** tab, in the **Category** list, click **Authentication**.
2. Right-click **WMS Negotiate Authentication**, and then click **Enable**.

#### ► Task 3: Configure authorization.

1. In the **Category** list, click **Authorization**.
2. Right-click **WMS Publishing Points ACL Authorization**, and then click **Enable**.
3. Right-click **WMS Publishing Points ACL Authorization**, and then click **Properties**.
4. In the **WMS Publishing Points ACL Authorization Properties** dialog box, in the **Name** box, click **Everyone**, and then click **Remove**.
5. Click **Add**, click the **Object Types** button, select **Groups**, and then click **OK**.
6. In the **Enter the object names to select (examples)** box, type **Marketing**, and then click **OK**.
7. In the **Name** box, click **CONTOSO\Marketing**. Notice that the group is assigned read permission.

8. Click **OK**.

Revert all virtual machines.

## Module Reviews and Takeaways

### Review questions

**Question:** What kinds of authentication are available in Streaming Media Services?

**Answer:** Anonymous, Negotiate, and Digest.

**Question:** Why might you configure bandwidth and connection limits?

**Answer:** Bandwidth and connection limits are two methods that you can implement to ensure that WMS client connections do not overload your network or server environment.

**Question:** What are the differences in the announcement files that unicast and multicast streaming use?

**Answer:** In both cases, an announcement file redirects clients to the proper URL for the content and contains metadata about the content. However, a unicast announcement file is a simple text file containing XML that can be edited manually. A multicast announcement file cannot be edited manually with a text editor.

**Question:** What is the difference between a client-side playlist and a server-side playlist?

**Answer:** Client-side playlists are typically created and controlled by the user with Windows Media Player. Server-side playlists are created by the content producers and have additional benefits of incorporating advertisements, switching between live and stored streams and can dynamically respond to user demographics.

**Question:** Why must content be synchronized between servers in a load-balancing cluster?

**Answer:** When clients contact the virtual IP of a load-balancing cluster, they are directed randomly to one of the cluster's servers. Content must be synchronized to ensure that the user experience is the same no matter which Windows Media server responds to the request. Placing reverse proxy servers in a load-balancing cluster and enabling caching on the reverse proxy servers is a way to enable content distribution automatically from an origin server to all servers in the load-balancing cluster.

## Lab Review Questions and Answers

**Question:** Before enabling the WMS HTTP Server Control, why might you need to modify the port number?

**Answer:** If you attempt to use WMS HTTP on a server that also has a web service such as Microsoft Internet Information Services (IIS) installed, conflicts can occur because both services attempt to bind to port 80 by default. You can avoid this by assigning WMS to a different port number or you can create additional IP Addresses so that each service can use port 80 on a separate IP address.

**Question:** When authentication and authorization plug-ins are not enabled for a publishing point, which authentication and authorization settings are used?

**Answer:** The publishing point inherits the authentication and authorization settings from the server configuration.

**Question:** How are authentication settings determined when authentication plug-ins are enabled at both the server and publishing point levels?

**Answer:** When authentication plug-ins are enabled at both the server and publishing point levels, only the authentication plug-ins enabled at the publishing point level are evaluated.

**Question:** After creating a new publishing point, users are not prompted to logon to the streaming media. What configuration change would need to be made?

**Answer:** Enable WMS Negotiate Authentication under the Authentication category of the publishing point.

**Question:** As part of a new initiative, you create a publishing point for internal users. After assigning group permissions for Marketing and Sales, some users complain that they cannot logon to the video training. What is the likely cause?

**Answer:** The users that cannot logon are probably not a member of the group sales or Marketing. Verify the users group membership.

**Question:** You created a public publishing point and enabled WMS Anonymous User Authentication. Some files that are being shared need to be restricted to only authorized users. After setting NTFS permissions on those files, anonymous users still have access. What is the likely cause?

**Answer:** You must enable WMS NTFS ACL Authorization in the category section of the publishing point.

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