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6423A

Implementing and Managing Windows Server® 2008 Clustering

Companion Content

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Module 1

Introduction to Clusters

Contents:

Lab Answer Keys

Lab: Identifying Windows Server 2008 High-Availability Solutions

Exercise 1: Identifying Solutions for Web Servers

▶ Task 1: Answer the following questions based on the scenario above

Question: What technology can you use to provide more processing power to the Web site?

Answer: You can use network load balancing to add additional nodes to handle more load during peak load times.

Question: How would this technology solve the problem of a single point of failure?

Answer: Using network load balancing adds multiple server nodes into the cluster, which allows continued operation during a node failure.

Exercise 2: Identifying Solutions for Database Servers

▶ Task 1: Answer the following questions based on the scenario above

Question: What technology can you use to minimize downtime during operating system updates and hardware failures?

Answer: You can use failover clustering to minimize downtime during updates and when hardware failures occur.

Question: How would this solution solve the problem of a single point of failure?

Answer: A failover cluster adds at least two of each device, which removes any single point of failure.

Exercise 3: Identifying Complex Solutions

▶ Task 1: Answer the following questions based on the scenario above

Question: What clustering solution(s) can you use to solve the Web site problems?

Answer: You can solve the problem by adding both a failover cluster for the database and a network load balancing cluster for the Web server.

Question: At a minimum, how many servers would you need to complete this configuration?

Answer: You will need at least four servers to complete this configuration: two Web servers and two failover cluster servers.

Module 2

Introduction to Microsoft Windows Server 2008 Failover Clusters

Contents:

Lab Answer Keys

Lab: Identifying Windows Server 2008 Clustering Solutions

Exercise 1: Identifying Clustered Scenarios

▶ Task 1: Answer the following questions based on each of the scenarios above

Question: Which quorum mode would you recommend for this scenario?

Answers:

Scenario 1: The recommended quorum mode is node and disk majority.

Scenario 2: The recommended quorum mode is node and file share majority.

Scenario 3: The recommended quorum mode is node majority. As a best practice, you might consider adding a file share witness, as this would provide an extra vote, if required.

Question: How would you deploy and configure the nodes?

Answers:

Scenario 1: To ensure that at least three file server instances are highly available, the organization should deploy at least four nodes and configure file server instances on three of these. The fourth node will be the passive node that is available for failover. The organization has deployed a SAN and is experienced in operating the SAN, so it makes sense to locate the witness disk on one of the logical unit numbers (LUN) that is attached to the SAN.

Scenario 2: The node and file share majority quorum mode is recommended for geographically dispersed clusters. In this scenario, you could deploy a failover cluster with nodes in each office. If the node in one office fails, the print server instance would fail over to a node in another office. You could locate the printer spooler on shared storage that is replicated between the organizations.

Scenario 3: The node majority quorum mode requires the least amount of disk I/O for the shared storage. In this scenario, you would configure an odd number of nodes and configure at least one passive node. You should also consider configuring a file share witness if you have the option of doing so, without creating additional disk I/O on the SAN.

Module 3

Preparing to Install a Failover Cluster

Contents:

Lab Answer Keys

Lab: Preparing for a Cluster Installation

Exercise 1: Installing the Failover Clustering Feature

▶ Task 1: Start the virtual servers

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-SRV3A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-SRV3B, click **Launch**.
5. Minimize the **Lab Launcher** window.

▶ Task 2: Install and verify the Failover Clustering feature

1. Log on to 6423A-VAN-SRV3A as **Administrator** using the password **Pa$$w0rd**.
2. In **Server Manager**, in the **Features Summary** section, click **Add Features**.
3. Select the **Failover Clustering** check box, and then click **Next**.
4. On the **Confirm Installation Selections** page, review the selection, and then click **Install**.
5. Allow the installation process to complete, and then click **Close**.
6. In Server Manager, note that the Features Summary section has been updated to reflect the installation of the Failover Clustering feature.
7. Log on to 6423A-VAN-SRV3B as **Administrator** using the password **Pa$$w0rd**.
8. In **Server Manager**, in the **Features Summary** section, click **Add Features**.
9. Select the **Failover Clustering** check box, and then click **Next**.
10. On the **Confirm Installation Selections** page, review the selection and then click **Install**.
11. Allow the installation process to complete, and then click **Close**.
12. In Server Manager, note that the Features Summary section has been updated to reflect the installation of the Failover Clustering feature.

Exercise 2: Validating the Failover Cluster

▶ Task 1: Validate the failover cluster

1. On 6423A-VAN-SRV3A, click **Start,** point to **Administrative Tools**, and then click **Failover Cluster Management**.
2. In the **Failover Cluster Management** action pane, click **Validate a Configuration**.
3. Click **Next**.
4. In the **Enter Name** field, type **VAN-SRV3A**.
5. Click **Add**.
6. In the **Enter Name** field, type in **VAN-SRV3B**.

7. Click **Add**, and then click **Next**.
8. Verify that **Run all test (recommended)** is selected, and then click **Next**.
9. In the **Confirmation** window, click **Next**.
10. Wait for the validation tests to finish, then, in the **Summary** window, click **View Report**.
11. Notice the warnings listed in the Storage section related to the potential cluster disks.
12. Close Internet Explorer.
13. In the **Summary** window, click **Finish**.

▶ Task 2: Close all virtual machines and discard undo disks

1. For each running virtual machine, close the **Virtual Machine Remote Control** window.
2. In the **Close** box, select **Turn off machine and discard changes**, and then click **OK**.
3. Close the 6423A Lab Launcher.

Module 4

Overview of Failover Cluster Storage Requirements

Contents:

Lab Answer Keys

Lab: Identifying SAN Components

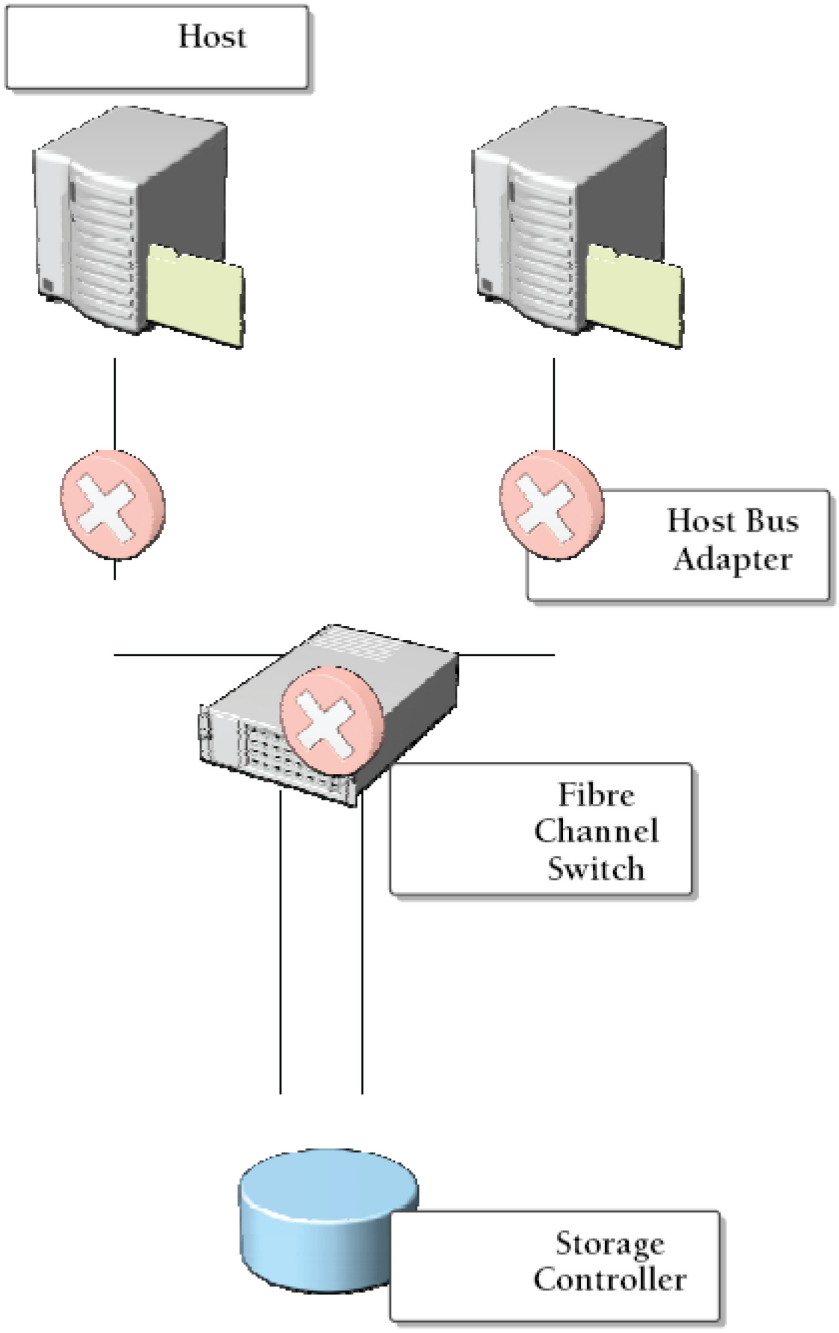
Exercise 1: Identifying Fibre Channel Storage Area Network (SAN) Components

▶ Task 1: Scenario 1

1. Identify each item in the diagram using the word list shown.
2. Identify any single points of failure.

Answer: The single points of failure include:

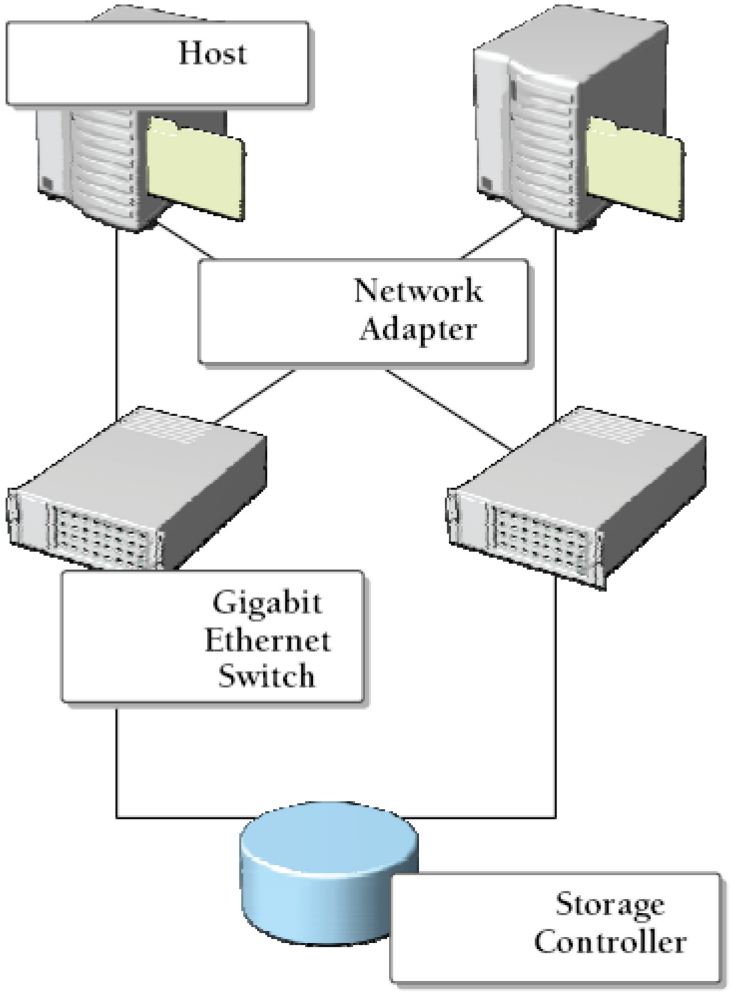
- Fibre Channel Switch
- Host bus adapter in each server



Task 2: Scenario 2

1. Identify each component in the diagram using the word list shown.
2. Identify any single points of failure.

Answer: There are no single points of failure in this configuration.



Exercise 2: Configuring Internet SCSI (iSCSI) Storage Connections

▶ Task 1: Start the virtual machines

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-SRV3A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-SRV3B, click **Launch**.
5. Minimize the **Lab Launcher** window.

▶ Task 2: Add the iSCSI target portal to VAN-SRV3A

1. Log on to VAN-SRV3A as **Administrator** using the password **Pa$$w0rd**.
2. Click **Start**, point to **Administrative Tools**, and then click **iSCSI Initiator**.
3. In the **Microsoft iSCSI** dialog box, click **Yes**.
4. In the second **Microsoft iSCSI** dialog box, click **Yes**.
5. Click the **Discovery** tab, and then click **Add Portal**.

6. In the **IP address** or **DNS name** field, type **192.168.12.10**, and then click **OK**.

Task 3: Add a persistent binding on VAN-SRV3A

1. Click the **Targets** tab, and then click **Refresh**.
2. In the **Targets** list, select **iqn.1991-05.com.microsoft:van-dc1-van-srv3atarget**, and then click **Log on**.
3. Select **Automatically restore this connection when the computer starts**.
4. Select **Enable multi-path**, and then click **OK**.

Task 4: Add the iSCSI target portal to VAN-SRV3B

1. Log on to VAN-SRV3B as **Administrator** using the password **Pa$$w0rd**.
2. Click **Start**, point to **Administrative Tools**, and then click **iSCSI Initiator**.
3. In the **Microsoft iSCSI** dialog box, click **Yes**.
4. In the second **Microsoft iSCSI** dialog box, click **Yes**.
5. Click the **Discovery** tab, and then click **Add Portal**.
6. In the **IP address** or **DNS name** field, type **192.168.12.10**, and then click **OK**.

Task 5: Add a persistent binding on VAN-SRV3B

1. Click the **Targets** tab.
2. Click **Refresh**.
3. In the **Targets** list, select **iqn.1991-05.com.microsoft:van-dc1-van-srv3btarget**, and then click **Log on**.
4. Select **Automatically restore this connection when the computer restarts**.
5. Select **Enable multi-path**.
6. Click **OK**, and then click **OK** again.

Task 6: Close all virtual machines and discard undo disks

1. For each running virtual machine, close the Virtual Machine Remote Control window.
2. In the **Close** box, select **Turn off machine and discard changes**, and then click **OK**.
3. Close the 6423A Lab Launcher.

Module 5

Configuring a Failover Cluster

Contents:

Lab Answer Keys

Lab: Creating and Administering a Cluster

Exercise 1: Creating a Cluster

▶ Task 1: Start the virtual servers

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-SRV5A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-SRV5B, click **Launch**.
5. Minimize the Lab Launcher window.

▶ Task 2: Configure the iSCSI target software on VAN-SRV5A

1. Log on to VAN-SRV5A as Administrator using the password Pa$$w0rd.
2. Click **Start**, point to **Administrative Tools**, and then click **iSCSI Initiator**.
3. In the **Microsoft iSCSI** dialog box, click **Yes**.
4. In the second **Microsoft iSCSI** dialog box, click **Yes**.
5. Click the **Discovery** tab.
6. Click **Add Portal**.
7. In the **IP address** or **DNS name** field, type **192.168.12.10**, and then click **OK**.
8. Click the **Targets** tab.
9. Click **Refresh**.
10. Select **iqn.1991-05.com.microsoft:van-dc1-van-srv5a-target** in the targets list, and then click **Log on**.
11. Select **Automatically restore this connection when the computer starts**.
12. Select **Enable multi-path**, and then click **OK**.

▶ Task 3: Configure the iSCSI target software on VAN-SRV5B

1. Log on to VAN-SRV5B as Administrator using the password Pa$$w0rd.
2. Click **Start**, point to **Administrative Tools**, and then click **iSCSI Initiator**.
3. In the **Microsoft iSCSI** dialog box, click **Yes**.
4. In the second **Microsoft iSCSI** dialog box, click **Yes**.
5. Click the **Discovery** tab.
6. Click **Add Portal**.
7. In the **IP address** or **DNS name** field, type **192.168.12.10**, and then click **OK**.
8. Click the **Targets** tab.

9. Click **Refresh**.
10. Select **iqn.1991-05.com.microsoft:van-dc1-van-srv5b-target** in the targets list, and then click **Log on**.
11. Select **Automatically restore this connection when the computer restarts**.
12. Select **Enable multi-path**, click **OK**, and then click **OK** again.

▶ Task 4: Configure the shared disks

1. On VAN-SRV5A, open Server Manager.
2. Expand **Storage**, and click **Disk Management**.
3. Right-click **Disk 1**, and then click **Online**.
4. Right-click **Disk 1**, and then click **Initialize disk**. In the **Initialize Disk** dialog box, click **OK**.
5. Right-click the unallocated space beside Disk 1, and then click **New Simple Volume**.
6. On the **Welcome** page, click **Next**.
7. On the **Specify Volume Size** page, click **Next**.
8. On the **Assign Drive Letter or Path** page, click **Next**.
9. On the **Format Partition** page, in the **Volume Label** field, type **Data**. Select the **Perform a quick format** check box, and click **Next**.
10. Click **Finish**.
11. On VAN-SRV5B, open Server Manager.
12. Expand **Storage**, and then click **Disk Management**.
13. Right-click **Disk Management**, and then click **Refresh**.
14. Right-click **Disk 1**, and then click **Online**.

▶ Task 5: Validate the failover cluster

1. On VAN-SRV5A, click **Start**, point to **Administrative Tools**, and then click **Failover Cluster Management**.
2. In the **Failover Cluster Management** action pane, click **Validate a Configuration**.
3. Click **Next**.
4. In the **Enter Name** field, type **VAN-SRV5A**.
5. Click **Add**.
6. In the **Enter Name** field, type **VAN-SRV5B**.
7. Click **Add**, and then click **Next**.
8. Verify that **Run all tests (recommended)** is selected, and then click **Next**.
9. In the **Confirmation** window, click **Next**.
10. Wait for the validation tests to finish, then, in the **Summary** window, click **View Report**.
11. Verify that all tests completed successfully.
12. Close Microsoft® Internet Explorer®.

13. In the **Summary** window, click **Finish**.

▶ Task 6: Use the Create a Cluster Wizard to build a simple failover cluster

1. In **Failover Cluster Management**, in the **Management** section of the center pane, select **Create a Cluster**.
2. Read the **Before You Begin** information.
3. Click **Next**, type **VAN-SRV5A**, and then click **Add**.
4. Type **VAN-SRV5B**, and then click **Add**.
5. Verify the entries, and then click **Next**.
6. In the **Access Point for Administering the Cluster** section, enter **Cluster1** for the Cluster Name.
7. Under **Address**, type **10.10.0.125** as the IP Address, and then click **Next**.
8. In the **Confirmation** dialog box, verify the information, and then click **Next**.
9. On the **Summary** page, click **Finish** to return to the Failover Clusters Management snap-in.

▶ Task 7: Verify the successful creation of the cluster

1. Click **Start**, expand **All Programs**, expand **Accessories**, and then click **Windows Explorer**.
2. In the navigation pane, expand **Computer**, expand **Local Disk (C:)**, expand **Windows**, expand **Cluster**, and then click **Reports**.
3. In the content pane, double-click **CreateCluster.mht**.
4. In the Internet Explorer window, verify that **The cluster was successfully created** appears.
5. Close Internet Explorer.

Exercise 2: Managing a Failover Cluster

▶ Task 1: Use the cluster administration tools to manage the failover cluster

1. On VAN-SRV5A, switch to the **Failover Clusters Manager** console.
2. In the **Navigation** pane, select **Cluster1.Fabrikam.com**.
3. In the **Actions** pane, select **More Actions**, and then click **Configure Cluster Quorum Settings**.
4. On the first page of the **Configure Cluster Quorum Wizard**, click **Next**.
5. Click **Node and File Share Majority**, and then click **Next**.
6. Type **\\VAN-DC1\FSW5**, and then click **Next**.
7. Click **Next**, and then click **Finish**.

▶ Task 2: Pause and resume the server

1. In the **Navigation** pane, expand **Cluster1**, and then expand **Nodes**.
2. In the **Navigation** pane, select **VAN-SRV5A**.
3. In the **Actions** pane, click **Pause**.
4. In the center pane, verify that the status for VAN-SRV5A has changed to **Paused**.
5. In the **Actions** pane, click **Resume**.

▶ Task 3: Close all virtual machines, and discard undo disks

1. For each running virtual machine, close the Virtual Machine Remote Control window.
2. In the **Close** box, select **Turn off machine and discard changes**, and then click **OK**.
3. Close the 6423A Lab Launcher.

Module 6

Configuring Cluster Resources and Server Roles

Contents:

Lab Answer Keys

Lab: Clustering Server Roles and Features

Exercise 1: Clustering the Print Services Role Using Failover Cluster Management

▶ Task 1: Start the virtual machines, and then log on

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-SRV6A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-SRV6B, click **Launch**.
5. Log on to VAN-SRV6A as **Administrator** with the password **Pa$$w0rd**.
6. Log on to VAN-SRV6B as **Administrator** with the password **Pa$$w0rd**.
7. Minimize the Lab Launcher window.

▶ Task 2: Configure the printer disk

1. On VAN-SRV6A, open Server Manager.
2. Expand **Storage**, and then click **Disk Management**.
3. Right-click **Disk 2**, and then click **Online**.
4. Right-click **Disk 2**, and then click **Initialize disk**. In the **Initialize Disk** dialog box, click **OK**.
5. Right-click the unallocated space located beside Disk 2, and then click **New Simple Volume**.
6. On the **Welcome** page, click **Next**.
7. On the **Specify Volume Size** page, click **Next**.
8. On the **Assign Drive Letter or Path** page, click **Next**.
9. On the **Format Partition** page, in the **Volume Label** field, type **Printer1**. Select **Perform a quick format**, and then click **Next**.
10. Click **Finish**.
11. On VAN-SRV6B, open Server Manager.
12. Expand **Storage**, and then click **Disk Management**.
13. Right-click **Disk Management**, and then click **Refresh**.
14. Right-click **Disk 2**, and then click **Online**. If a Disk Management error message appears, click **OK**.
15. Right-click **Disk 2**, and then click **Online**.

▶ Task 3: Cluster the Print Services role

1. On VAN-SRV6A, click **Start**, click **Administrative Tools**, and then click **Failover Cluster Management**. If the **User Account Control** dialog box appears, confirm that the correct action displays, and then click **Continue**.

2. In the console tree, expand **VAN-CLUSTER01**, and then click **Storage**.
3. In the **Actions** pane, click **Add a disk**, and then click **OK**.
4. Click **VAN-CLUSTER01**, and in the **Actions** pane, click **Configure a Service or Application**.
5. Review the text on the first page of the wizard, and then click **Next**.
6. Click **Print Server**, and then click **Next**.
7. Type **VAN-Print** for the Name and **10.10.0.108** as the IP Address in the network specified as 10.10.0.0/16, and then click **Next**.
8. Select **Cluster Disk 2** as the storage volume for the print server, click **Next**, and then click **Next**.
9. After the wizard runs and the Summary page appears, you can view a report of the tasks the wizard performed by clicking **View Report**. Review the report, and then close Microsoft® Internet Explorer®.
10. Click **Finish**.
11. In the console tree, expand Services and Applications, and verify that the clustered print server VAN-Print has been created.

▶ Task 4: Failover the VAN-Print clustered service from VAN-SRV6A to VAN-SRV6B

1. In the console tree, click **VAN-Print**. In the center pane, identify the service's current owner.
2. In the **Actions** pane, click **Move this service or application to another node**.
3. Click **Move to node servername**, where *servername* is the cluster node that is not the current owner.
4. In the **Please confirm action** dialog box, click **Move VAN-Print to servername**.
5. Wait for the service to move to the new owner. Then, in the center pane, verify that VAN-Print now shows the new current owner and that all components are online.

Exercise 2: Configuring Cluster Resources

▶ Task 1: Change the preferred owner of VAN-Print to VAN-SRV6B

1. In the console tree, click **VAN-Print**.
2. In the **Actions** pane, click **Properties**.
3. On the **General** tab, in the preferred owners area, select the **VAN-SRV6B** check box, click **Up**.

▶ Task 2: Change the failback settings to allow only failback to the preferred node between 01:00 and 04:00

1. On the **Failover** tab, click **Allow Failback**.
2. Click **Failback between**.
3. Type in **1** in the first box and **4** in the second box, and then click **OK**.

▶ Task 3: Close all virtual machines, and discard undo disks

1. For each running virtual machine, close the Virtual Machine Remote Control window.
2. In the **Close** box, select **Turn off machine and discard changes**. Click **OK**.
3. Close the 6423A Lab Launcher.

Exercise 3: Clustering the File Services Role on Windows Server Core

▶ Task 1: Start the virtual machines, and then log on

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-CORE6A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-CORE6B, click **Launch**.
5. In the Lab Launcher, next to 6423A-VAN-SRV6A, click **Launch**.
6. Minimize the Lab Launcher window.
7. Log on to VAN-CORE6A as **Fabrikam\administrator** using a password of **Pa$$w0rd**.

▶ Task 2: Configure the iSCSI target mappings and shared drives on VAN-CORE6A

1. At the command prompt, type **sc config msiSCSI start= auto**, and then press ENTER.
2. At the command prompt, type **sc start msiSCSI**, and then press ENTER.
3. On VAN-CORE6A, at the command prompt, type **iscsicli QAddTargetPortal 192.168.12.10**, and then press ENTER.
4. At the command prompt, type **iscsicli listtargets**, and then press ENTER. Verify that the targets list includes an iSCSI Qualified Name (IQN) value.
5. At the command prompt, type **iscsicli QLoginTarget iqnvalue**, where *iqnvalue* is the IQN value displayed in step 4, and then press ENTER.
6. At the command prompt, type **iscsicli PersistentLoginTarget iqnvalue T * * * * * * * * * * * * * * * 0**, where *iqnvalue* is the IQN value displayed in step 5, and then press ENTER. The command must include 15 asterisks with a space between each asterisk.
7. At the command prompt, type **Diskpart**, and then press ENTER.
8. At the command prompt, type **Select Disk 1**, and then press ENTER.
9. At the command prompt, type **online disk**, and then press ENTER.
10. At the command prompt, type **attrib disk clear readonly**, and then press ENTER.
11. At the command prompt, type **create partition primary**, and then press ENTER.
12. At the command prompt, type **assign letter=F**, and then press ENTER.
13. At the command prompt, type **format fs=ntfs label=Cluster quick**, and then press ENTER.
14. At the command prompt, type **exit**, and then press ENTER.

▶ Task 3: Configure the iSCSI target mappings and shared drive on VANCORE6B

1. Log on to VAN-CORE6B as **Fabrikam\administrator** using a password of **Pa$$w0rd**.
2. At the command prompt, type **sc config msiSCSI start= auto**, and then press ENTER.
3. At the command prompt, type **sc start msiSCSI**, and then press ENTER.
4. On VAN-CORE6A, at the command prompt, type **iscsicli QAddTargetPortal 192.168.12.10**, and then press ENTER.

5. At the command prompt, type **iscsicli listtargets**, and then press ENTER. Verify that the targets list includes an IQN value.
6. At the command prompt, type **iscsicli QLoginTarget iqnvalue**, where *iqnvalue* is the IQN value displayed in step 5, and then press ENTER.
7. At the command prompt, type **iscsicli PersistentLoginTarget iqnvalue T * * * * * * * * * * * * * * * * 0**, where *iqnvalue* is the IQN value displayed in step 5, and then press ENTER.
8. At the command prompt, type **Diskpart**, and then press ENTER.
9. At the command prompt, type **Select Disk 1**, and then press ENTER.
10. At the command prompt, type **online disk**, and then press ENTER.
11. At the command prompt, type **attrib disk clear readonly**, and then press ENTER.
12. At the command prompt, type **exit**, and then press ENTER.

▶ Task 4: Install the Failover Clustering feature on VAN-CORE6A

1. On VAN-CORE6A, at the command prompt, type **start /w ocsetup FailoverCluster-Core** and then press ENTER. (This command is case sensitive.) The command will complete, and you will be returned to the default prompt.
2. Use the Service Control command to query the status of the cluster service. At the command prompt, type **sc qc clussvc**, and then press ENTER. Verify that the **sc** command returns **QueryServiceConfig SUCCESS**.

▶ Task 5: Install the Failover Clustering feature on VAN-CORE6B

1. On VAN-CORE6B, at the command prompt, type **start /w ocsetup FailoverCluster-Core** and then press ENTER. (This command is case sensitive.) The command will complete, and you will be returned to the default prompt.
2. Use the Service Control command to query the status of the cluster service. At the command prompt, type **sc qc clussvc**, and then press ENTER. Verify that the **sc** command returns: QueryServiceConfig SUCCESS.

▶ Task 6: Create a cluster

1. On VAN-CORE6A, in the command prompt, type **cd C:\Windows\cluster**, and then press ENTER.
2. Type **cluster VAN-CLUSTER02 /create /ipaddr:10.10.0.109/255.255.0.0** and then press ENTER.

▶ Task 7: Add VAN-CORE6B to the cluster

- On VAN-CORE6A, in the command prompt, type **cluster VAN-CLUSTER02 /addnode /node:VAN-CORE6B**, and then press ENTER.

▶ Task 8: Create a file share clustered service

1. Log on to VAN-SRV6A as **Administrator** with the password **Pa$$w0rd**.
2. Click **Start**, click **Administrative Tools**, and then click **Failover Cluster Management**. If the **User Account Control** dialog box appears, confirm that the correct action displays, and then click **Continue**.
3. Right-click **Failover Cluster Management**, and then click **Manage a cluster**.
4. In the **Cluster name** field, type **VAN-Cluster02.fabrikam.com**, and then click **OK**.

5. In the **Actions** pane, click **More Actions**, and then click **Configure Cluster Quorum Settings**.
6. Click **Next**.
7. On the **Select Quorum Configuration**, click **Node and File Share Majority**, and then click **Next**.
8. In the **Shared Folder Path** field, type **\\VAN-DC1\FSW5**, and then click **Next**.
9. Click **Next** again, and then click **Finish**.
10. In the console tree, press the PLUS SIGN next to VANCluster02. Fabrikam.com to expand it and view the items underneath it.
11. Click **Storage**, and then in the **Actions** pane, click **Add a disk**.
12. In the **Add Disks to a Cluster** dialog box, verify that the **Cluster Disk 1** check box is selected, and then click **OK**.
13. Click **Services and Applications**, and in the **Actions** pane, click **Configure a Service or Application**.
14. Review the text on the first page of the wizard, and then click **Next**.
15. Click **File Server**, and then click **Next**.
16. Type **VAN-FILE01** for the Name and **10.10.0.110** as the IP Address in the network specified as 10.10.0.0/16, and then click **Next**.
17. Select **Cluster Disk 1** as the storage volume for the file server, click **Next**, and then click **Next**.
18. After the wizard runs and the Summary page appears, view a report of the tasks the wizard performed by clicking **View Report**, and then click **Finish**.
19. In the console tree, make sure Services and Applications is expanded, and then select the clustered print server VAN-FILE01 that you just created.

▶ Task 9: Add a shared folder to VAN-FILE01

1. In the console tree, ensure that **VAN-FILE01** is selected.
2. In the **Actions** pane, click **Add a shared folder**.
3. In the **Location** field, type: **F:\Public**, click **Next**, click **Yes**, and then click **Next**.
4. In the **Share name** field, type **Public**, and then click **Next** five times until the **Review Settings and Create Share** page appears.
5. Click **Create**, and then click **Close**.

▶ Task 10: Log on to VAN-DC1, and verify the clustered shared folder

1. Log on to VAN-DC1 as **Administrator** with the password **Pa$$w0rd**.
2. Click **Start**, click **Run**, and then type **\\VAN-File01\Public** and then press ENTER.
3. In the Windows Explorer window, verify that you can connect to the share.
4. Close Windows Explorer.

▶ Task 11: Close all virtual machines, and discard undo disks

1. For each running virtual machine, close the Virtual Machine Remote Control window.
2. In the **Close** box, select **Turn off machine and discard changes**. Click **OK**.
3. Close the 6423A Lab Launcher.

Module 7

Maintaining Microsoft Failover Clusters

Contents:

Lab Answer Keys

Lab: Maintaining Failover Clusters

Exercise 1: Monitoring Failover Clusters

▶ Task 1: Start the virtual machines, and then log on

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-SRV6A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-SRV6B, click **Launch**.
5. Log on to VAN-SRV6A as **Administrator** with the password **Pa$$w0rd**.
6. Log on to VAN-SRV6B as **Administrator** with the password **Pa$$w0rd**.
7. Minimize the Lab Launcher window.
8. Complete the steps in the "To prepare for this lab" section.

▶ Task 2: Identify the cluster events that occurred during the last reboot

1. On VAN-SRV6A, click **Start**, click **Administrative Tools**, and then click **Event Viewer**.
2. In the console tree, press the PLUS SIGN to expand **Applications and Services Logs**.
3. In **Applications and Services Logs**, press the PLUS SIGN to expand **Microsoft**.
4. In **Microsoft**, press the PLUS SIGN to expand **Windows**.
5. In **Windows**, press the PLUS SIGN to expand **FailoverClustering**.
6. In **FailoverClustering**, click **Operational** to view the operational logs.
7. In the content pane, scroll through the list of events to locate Event ID 1061.
8. Click Event ID 1061.
9. Note the event text and time.
10. Click one of the events with an Event ID 1125. Review the event text.
11. Click one of the events with an Event ID 1131. Review the event text.

▶ Task 3: Failover VAN-Print, and identify the events that occur

1. In the Failover Management Console, under **VAN-CLUSTER01**, press the PLUS SIGN to expand **Services and Applications**.
2. In **Services and Applications**, right-click **VAN-Print**, click **Move this Service or Application to another node**, and then click **Move to node VAN-SRV6B**.
3. In the **Please confirm action** dialog box, click **Move VAN-Print to VANSRV6B**.
4. If not already opened, open Event Viewer by clicking **Start**, click **Administrative Tools**, and then click **Event Viewer**. If the **User Account Control** dialog box appears, confirm that the correct action displays, and then click **Continue**.

5. Access the **FailoverClustering Operational** log.
6. In the content pane, scroll through the list of events to locate Event ID **1200**.
7. Click Event ID **1200**.
8. Note the event text and time.
9. Click one of the events with an Event ID 1201. Review the event text.
10. Click one of the events with an Event ID 1203. Review the event text.
11. Click one of the events with an Event ID 1204. Review the event text, and then close the Event Viewer.

▶ Task 4: View dependencies on the file cluster

1. In the **Failover Cluster Management** console tree, expand **Services and Applications**.
2. In **Services and Applications**, right-click **VAN-Print**.
3. Click **Show Dependency Report**.
4. In the Dependency Report, scroll down to the bottom of the report, and identify the VAN-Print dependencies.
5. Close Microsoft® Internet Explorer®.

Exercise 2: Performing Backups on a Failover Cluster

▶ Task 1: Verify the cluster functionality

1. If not already opened, open the Failover Cluster Management snap-in by clicking **Start**, click **Administrative Tools**, and then click **Failover Cluster Management**.
2. In the console tree, click **VAN-CLUSTER01.Fabrikam.com**.
3. In the **Content** pane, verify that there are no application alerts and that the cluster is online.

▶ Task 2: Create a backup of the cluster configuration database

1. Open Windows Server Backup by clicking **Start**, **click Administrative Tools**, and then click **Windows Server Backup**.
2. In the Windows Server Backup window, in the **Actions** pane, select **Backup Once**.
3. In the Backup Once Wizard, verify that **Different Options** is selected, and then click **Next**.
4. Select **Custom**, and then click **Next**.
5. Verify that **Local Disk (C:)** and **Enable System Recovery** are selected, and then click **Next**.
6. Select **Remote Shared Folder**, and then click **Next**.
7. Type **\\VAN-DC1\Backup** as the remote shared folder, select **Inherit**, and then click **Next**.
8. Select **VSS Full Backup**, and then click **Next**.
9. Click **Backup**.
10. After the backup completes, click **Close**.
11. Wait for the backup to complete. The backup will take about 15 minutes. Close the Windows Server Backup window.

Exercise 3: Performing an Authoritative Restore on a Failover Cluster

▶ Task 1: Delete a cluster

1. If not already opened, open the Failover Cluster Management snap-in by clicking **Start**, click **Administrative Tools**, and then click **Failover Cluster Management**.
2. In the console tree, expand **VAN-CLUSTER01.Fabrikam.com**.
3. Expand **Services and Applications**.
4. In **Services and Applications**, right-click **VAN-Print**, and then click **Delete**.
5. In the **Confirmation** dialog box, click **Delete VAN-Print**.
6. Close Failover Cluster Management.

▶ Task 2: Perform an authoritative restore

1. Start an administrator-elevated command prompt by clicking **Start**, right-click **Command Prompt**, and then click **Run as administrator**.
2. At the command prompt, type **wbadmin get versions**, and then press ENTER.
3. Locate the backup that you just performed by matching the backup time with the time that the backup was performed, and note the backup's version identifier.
4. At the command prompt, type **wbadmin start recovery - version:versionidentifier -itemtype:app -items:cluster**, and then press ENTER (where the version information matches the version noted in the previous step).
5. Type **Y**, and then press ENTER. Wait for the restore to complete. The restore will take about five minutes.
6. When the restore completes, at the command prompt, type sc stop clussvc, and then press ENTER.
7. Type **sc start clussvc**, and then press ENTER.
8. Open the Failover Cluster Management snap-in by clicking **Start**, click **Administrative Tools**, and then click **Failover Cluster Management**.
9. In the console tree, expand **VAN-CLUSTER01**.
10. Under VAN-CLUSTER01, click **Nodes**.
11. **In the center pane, verify that the server status is Up. If it is not**, rightclick **VAN-SRV6A**, and then click **Resume**.
12. In the **Nodes** pane, click **VAN-SRV6B**.
13. In the **Actions** pane, click **More Actions**, and then click **Start Cluster Service**.
14. In the left pane, under **Services and Applications**, click **VAN-Print** and verify that it is online. If it is not online, right-click VAN-Print, and then click **Bring this service or application online**.

▶ Task 3: Close all virtual machines, and discard undo disks

1. For each running virtual machine, close the Virtual Machine Remote Control window.
2. In the **Close** box, select **Turn off machine and discard changes**. Click **OK**.
3. Close the 6423A Lab Launcher.

Module 9

Implementing Network Load Balancing Clusters

Contents:

Lab Answer Keys

Lab: Implementing a Network Load Balancing (NLB) Cluster

Exercise 1: Preparing the NLB Cluster Nodes

▶ Task 1: Start the virtual machines

1. On your host machine, click **Start**, point to **All Programs**, point to **Microsoft Learning**, and then click **6423A**. The Lab Launcher starts.
2. In the Lab Launcher, next to 6423A-VAN-DC1, click **Launch**.
3. In the Lab Launcher, next to 6423A-VAN-SRV3A, click **Launch**.
4. In the Lab Launcher, next to 6423A-VAN-SRV3B, click **Launch**.
5. Minimize the Lab Launcher window.
6. Log on to **VAN-DC1** as **Administrator** using a password of **Pa$$w0rd**.
7. Log on to **VAN-SRV3A** as **Fabrikam\Administrator** using a password of **Pa$$w0rd**.
8. Log on to **VAN-SRV3B** as **Administrator** using a password of **Pa$$w0rd**.

▶ Task 2: Prepare network connections for NLB on VAN-SRV3A

1. On VAN-SRV3A, click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
2. In the **Computer Information** area, click **View Network Connections**.
3. Right-click **Local Area Connection**, and click **Rename**.
4. Type **Client Network**, and then press ENTER.
5. Right-click **Local Area Connection 2**, and then click **Rename**.
6. Type **Cluster Network**, and then press ENTER.
7. Close the Network Connections window.
8. Click **Start**, and then click **Command Prompt**.
9. At the command prompt, type **IPConfig /all**, and then press ENTER. Verify that the Client Network is assigned an IP address of 10.10.0.24 and the Cluster Network is assigned an address of 192.168.12.13.
10. Close Server Manager.

▶ Task 3: Prepare network connections for NLB on VAN-SRV3B

1. On VAN-SRV3B, click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
2. In the **Computer Information** area, click **View Network Connections**.
3. Right-click **Local Area Connection**, and then click **Rename**.
4. Type **Client Network**, and then press ENTER.
5. Right-click **Local Area Connection 2**, and then click **Rename**.
6. Type **Cluster Network**, and then press ENTER.
7. Close the Network Connections window.

8. Click **Start**, and then click **Command Prompt**.
9. At the command prompt, type **IPConfig /all**, and then press ENTER. Verify that the Client Network is assigned an IP address of 10.10.0.25 and the Cluster Network is assigned an address of 192.168.12.14.
10. Close Server Manager.

▶ Task 4: Create a Web site on VAN-SRV3A

1. On VAN-SRV3A, switch to the **Command Prompt**.
2. Type **md C:\Webapp**, and then press ENTER.
3. Type **copy c:\inetpub\SVR3A.txt C:\Webapp\default.htm**, and then press ENTER.
4. Close the command prompt.
5. Click **Start**, point to **Administrative Tools**, and then click **Internet Information Services (IIS) Manager**.
6. In the left pane, expand **VAN-SRV3A**, and then click **Sites**.
7. Right-click **Sites**, and then click **Add Web Site**.
8. In the **Web site name** field, type **Webapp**.
9. In the **Physical path** field, type **C:\Webapp**.
10. In the **Port** field, type **8080**, and then click **OK**.
11. Close Internet Information Services (IIS) Manager.

▶ Task 5: Create a Web site on VAN-SRV3B

1. On VAN-SRV3B, switch to the **Command Prompt**.
2. Type **md C:\Webapp**, and then press ENTER.
3. Type **copy c:\inetpub\SVR3B.txt C:\Webapp\default.htm**, and then press ENTER.
4. Close the command prompt.
5. Click **Start**, point to **Administrative Tools**, and then click **Internet Information Services (IIS) Manager**.
6. In the left pane, expand **VAN-SRV3B**, and then click **Sites**.
7. Right-click **Sites**, and then click **Add Web Site**.
8. In the **Web site name** field, type **Webapp**.
9. In the **Physical path** field, type **C:\Webapp**.
10. In the **Port** field, type **8080**, and then click **OK**.
11. Close Internet Information Services (IIS) Manager.

▶ Task 6: Configure firewall rules for the Web site

1. On VAN-SRV3A, click **Start**, point to **Administrative Tools**, and then click **Windows Firewall with Advanced Security**.
2. Click **Inbound Rules** to select it.
3. Right-click **Inbound Rules**, and then click **New Rule**.

4. Click **Port**, and then click **Next**.
5. Click **TCP**, click **Specific local ports**, type 8080, and then click **Next**.
6. Click **Allow the connection**, and then click **Next**.
7. Verify that the rule applies to all profiles, and then click **Next**.
8. In the **name** field, type **Web Application**, and then click **Finish**.
9. Close Windows Firewall with Advanced Security.
10. On VAN-SRV3B, click **Start**, point to **Administrative Tools**, and then click **Windows Firewall with Advanced Security**.
11. Click **Inbound Rules** to select it.
12. Right-click **Inbound Rules**, and then click **New Rule**.
13. Click **Port**, and then click **Next**.
14. Click **TCP**, click **Specific local ports**, type **8080**, and then click **Next**.
15. Click **Allow the connection**, and then click **Next**.
16. Verify that the rule applies to all profiles, and then click **Next**.
17. In the **name** field, type **Web Application**, and then click **Finish**.
18. Close Windows Firewall with Advanced Security.

▶ Task 7: Verify Web site functionality

1. On VAN-DC1, click **Start**, click **All Programs**, and then click **Internet Explorer**.
2. In the Address bar, type **http://VAN-SRV3A:8080**, and then press ENTER.
3. In the Address bar, type **http://VAN-SRV3B:8080**, and then press ENTER.
4. Close Microsoft® Internet Explorer®.

▶ Task 8: Install the Network Load Balancing feature

1. On VAN-SRV3A, click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
2. In the left pane, click **Features**, and then click **Add Features**.
3. Select the **Network Load Balancing** check box, click **Next**, and then click **Install**.
4. When the installation is complete, click **Close**.
5. Close Server Manager.
6. On VAN-SRV3B, click **Start**, point to **Administrative Tools**, and then click **Server Manager**.
7. In the left pane, click **Features**, and then click **Add Features**.
8. Select the **Network Load Balancing** check box, click **Next**, and then click **Install**.
9. When the installation is complete, click **Close**.
10. Close Server Manager.

Exercise 2: Configuring an NLB Failover Cluster

▶ Task 1: Create an NLB cluster

1. On VAN-SRV3A, click **Start**, point to **Administrative Tools**, and then click **Network Load Balancing Manager**.
2. In the left pane, right-click **Network Load Balancing Clusters**, and then click **New Cluster**.
3. In the **Host** field, type **VAN-SRV3A**, and then click **Connect**.
4. Click **Client Network**, and then click **Next**.
5. Click **Next** to accept the default values for host parameters.
6. Click **Add** to add a cluster IP address.
7. In the **IPv4 address** field, type **10.10.0.100**.
8. In the **Subnet mask** field, type **255.255.0.0**, click **OK**, and then click **Next**.
9. In the **Full Internet name** field, type **webapp.fabrikam.com**.
10. Click **Unicast**, click **Next**, and then click **Finish**.
11. Click **Start**, and then click **Command Prompt**.
12. At the command prompt, type **Ipconfig /all**, and then press ENTER. Verify that the 10.10.0.100 address has been added to the Client Network. Close the command prompt.

▶ Task 2: Add VAN-SRV3B to the NLB cluster

1. On VAN-SRV3B, click **Start**, point to **Administrative Tools**, and then click **Network Load Balancing Manager**.
2. In the left pane, right-click **Network Load Balancing Clusters**, and then click **Connect to Existing**.
3. In the **Host** field, type **VAN-SRV3A**, and then click **Connect**.
4. Click **webapp.fabrikam.com**, and then click **Finish**.
5. Right-click **webapp.fabrikam.com**, and then click **Add Host To Cluster**.
6. In the **Host** field, type **VAN-SRV3B**, and then click **Connect**.
7. Click **Client Network**, and then click **Next**.
8. Click **Next** to accept the default values for host parameters, and then click **Finish**.
9. Click **Start**, and then click **Command Prompt**.
10. At the command prompt, type **Ipconfig /all**, and then press ENTER. Verify that the 10.10.0.100 address has been added to the Client Network. Close the command prompt.

▶ Task 3: Configure a Domain Name System (DNS) record for the NLB cluster

1. On VAN-DC1, click **Start**, point to **Administrative Tools**, and then click **DNS**.
2. Expand **VAN-DC1**, expand **Forward Lookup Zones**, and then expand **Fabrikam.com**.
3. Right-click **Fabrikam.com**, and then click **New Host (A or AAAA)**.
4. In the **New Host** dialog box, type **Webapp** as the Name and **10.10.0.100** as the IP Address. Click **Add Host**, click **OK**, and then click **Done**.

5. Close the DNS Manager.

Task 4: Configure port rules for failover

1. In the Network Load Balancing Manager on VAN-SRV3A, right-click **webapp.fabrikam.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 **Port range** field, type **from 8080 to 8080**.
5. In the **Protocols** area, click **TCP**.
6. In the **Filtering mode** area, click **Single host**, and then click **OK**.
7. Click **OK** to save the changes to the cluster properties. Wait until the hosts are shown as converged.

Task 5: Verify cluster failover

1. On VAN-DC1, click **Start**, point to **All Programs**, and then click **Internet Explorer**.
2. In the Address bar, type **http://webapp.fabrikam.com:8080**, and then press ENTER.
3. Reload the page several times to confirm the server from which the page is being loaded, and then close Microsoft® Internet Explorer®.
4. In the Network Load Balancing Manager on VAN-SRV3A, right-click *servername,* where *servername* is the server from which the page was being loaded, point to **Control Host**, and then click **Stop**.
5. On VAN-DC1, open Internet Explorer, and then connect to **http://webapp.fabrikam.com:8080**. Verify that the page now loads from the other server.
6. Close Internet Explorer.
7. In the Network Load Balancing Manager on VAN-SRV3A, right-click *servername,* where *servername* is the server that is stopped, point to **Control Host**, and then click **Start**.

Task 6: Configure a port rule for load balancing

1. In the Network Load Balancing Manager on VAN-SRV3A, right-click **webapp.fabrikam.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.

Task 7: Verify cluster load balancing

1. On VAN-DC1, click **Start**, point to **All Programs**, and then click **Internet Explorer**.
2. In the Address bar, type **http://webapp.fabrikam.com:8080**, and then press ENTER.
3. On VAN-SRV3A, click **Start**, point to **All Programs**, and then click **Internet Explorer**.
4. In the Address bar, type **http://webapp.fabrikam.com:8080**, and then press ENTER.

5. On VAN-SRV3B, click **Start**, point to **All Programs**, and then click **Internet Explorer**.
6. In the Address bar, type **http://webapp.fabrikam.com:8080**, and then press ENTER.
7. Verify that the page loads from different Web servers in the cluster.

▶ Task 8: Close all virtual machines, and discard undo disks

1. For each running virtual machine, close the Virtual Machine Remote Control window.
2. In the **Close** box, select **Turn off machine and discard changes**. Click **OK**.
3. Close the 6423A Lab Launcher.

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