Lab B: Creating and Managing Checkpoints and Monitoring Hyper-V

Scenario

A. Datum is continuing with its pilot virtualization project. You have deployed the virtualization hosts by installing Windows Server 2012 R2 Hyper-V in one of the subsidiaries. The next step is to deploy virtual machines on these hosts.

Because the virtualization platform is new to A. Datum, you need to spend some time becoming familiar with Hyper-V features and components, including checkpoints. As the pilot project continues, you will need to be able to monitor server performance to ensure that virtual machines are configured properly. For now, you will familiarize yourself with the monitoring tools that are available in Windows Server 2012 R2 and Hyper-V.

Objectives

After completing this lab, you will be able to:

- Import virtual machines and work with checkpoints.

- Monitor Hyper-V.

Lab Setup

Estimated Time: 60 minutes

Virtual machines: 20409B-LON-HOSTx, 20409B-LON-CLx, 20409B-LON-DC1

User name: **Adatum\Administrator**

Password: **Pa$$w0rd**

For this lab, you will use the available virtual machine environment. Before you begin the lab, you must complete the following steps:

1. Sign in to LON-HOSTx as **Adatum\Administrator** with the password of **Pa$$w0rd**.

2. On LON-HOST1, start **Hyper-V Manager**.

3. In Hyper-V Manager, click **20409B-LON-DC1**, and in the Actions pane, click **Start**.

4. In the Actions pane, click **Connect**. Wait until the virtual machine starts.

5. Sign in by using the following credentials:

    o   User name: **Adatum\Administrator**

    o   Password: **Pa$$w0rd**

6. Repeat steps 3 through 5 for **20409B-LON-CLx**. The letter x is 1 for the first student in the team, and 2 for the second student in the team.

📑   **Note:** Because you will be using the same virtual machines in the next lab, do not revert the virtual machines. However, you can shut down all virtual machines after finishing this lab. You will be working in pairs. Communicate clearly with your lab partner, and cooperate fully with each other during this lab.

Exercise 1: Importing Virtual Machines and Working with Checkpoints

Scenario

Your colleague has heard about the enhanced session mode when connecting to a virtual machine, but he has never seen it. You want to demonstrate to your colleague how to configure it, use it, and show the benefits of the enhanced session mode.

You are aware that you should avoid using checkpoints in the production environment, but you want to test them for use in training and explore how to implement checkpoints at the file level. You would also like to see how a virtual machine can detect whether a checkpoint was applied.

The main tasks for this exercise are as follows:

1. Import a virtual machine.

2. Use enhanced session mode.

3. Create checkpoints.

4. Manage checkpoints.

5. Explore Generation ID.

▶ Task 1: Import a virtual machine

1. On LON-HOSTx, use Hyper-V Manager to import a virtual machine by using the following data:

   o   Virtual Machine in Folder: **C:\VirtualMachines\LON-EXPORT**

   o   Number of virtual processors: **1**

   o   Connect to Network: **External Network**

2. You will get an error message because the parent virtual hard disk was not found.

3. In Hyper-V Manager, use the **Edit Disk** feature to link the **C:\VirtualMachines\LON-EXPORT \Virtual Hard Disks\LON-EXPORT.vhd** virtual hard disk to the parent disk **E:\Program Files \Microsoft Learning\Base\Base14A-WS12R2.vhd**. Note that this path might differ on your host machine.

4. Use Hyper-V Manager to import the LON-EXPORT virtual machine again from **C:\VirtualMachines\LON-EXPORT**.

5. Use Hyper-V Manager to confirm that LON-EXPORT is imported, that it is configured with a single virtual processor, and that it is connected to a virtual switch named **External Network**.

▶ Task 2: Use enhanced session mode

1. On LON-HOSTx, copy a few line of text from the **C:\Windows\Win.ini** file.

2. On LON-CLx, confirm that the **Paste** option in Notepad is disabled.

3. In Virtual Machine Connection to LON-CLx, from the **Clipboard** menu, click **Type clipboard text**. Confirm that the text that you copied from the Win.ini file displays. Close the LON-CLx window.

4. On LON-HOSTx, use Hyper-V Manager to configure **Allow enhanced session mode**.

5. Use Hyper-V Manager to connect to LON-CLx. Configure the option to redirect the local drives.

6. Confirm that you are not signed in automatically to LON-CLx, and then sign in as **ADATUM\administrator**, with **Pa$$w0rd** as the password.

7. In Notepad, paste the copied text from Win.ini.

8. On LON-HOSTx, use File Explorer to copy the **C:\Windows\Write.exe** file.

9. On LON-CLx, paste **Write.exe** to the desktop.

10. On LON-CLx, use File Explorer to confirm that drives from LON-HOSTx are mapped to the virtual machine.

11. On LON-CLx, confirm that **Remote Desktop** is disabled.

12. Turn Off 20409B-LON-CLx.

13. On LON-HOSTx, start the **LON-CLx** virtual machine, and then connect to it.

14. Confirm that after LON-CLx is started and the sign-in screen displays, the Connect to LON-CLx window opens.

📄 **Note:** Because Integration Services are not available during system start, enhanced session mode is available only after the operating system is fully started.

15. On LON-HOSTx, use Hyper-V Manager to disable enhanced session mode.

▶ **Task 3: Create checkpoints**

1. On LON-HOSTx, confirm that LON-VM1 is using the **Differencing.vhd** virtual hard disk.

2. Create a checkpoint for LON-VM1.

3. Start LON-VM1.

4. Confirm that LON-VM1 is now using a virtual hard disk with a GUID in its name.

5. Complete the setup by clicking **Next**, and then clicking **I accept**.

6. On the **Settings** page, provide the password of **Pa$$w0rd**.

7. Sign in as **Administrator** by using the password **Pa$$w0rd**.

8. On LON-VM1, on the desktop, create a folder named **Folder1**.

9. Create a checkpoint for LON-VM1, and name it **Folder1**.

10. On LON-VM1, on the desktop, create a folder named **Folder2**.

11. Create a checkpoint for LON-VM1, and name it **Folder2**.

12. On LON-VM1, on the desktop, create a folder named **Folder3**.

13. On LON-HOSTx, use the Windows PowerShell cmdlet **Checkpoint-VM** to create checkpoint for LON-VM1, and then name it **Folder3**.

14. Use the cmdlet **Get-VMSnapshot** to view existing checkpoints for LON-VM1.

15. Use Hyper-V Manager to confirm that LON-VM1 has four checkpoints.

16. Apply the **Folder1** checkpoint.

17. Confirm that on the LON-VM1 desktop, there is only one folder named Folder1.

18. On LON-VM1, on the desktop, create a folder named **Folder1.1**.

19. Use Hyper-V Manager to create a checkpoint for LON-VM1, and then rename it **Folder1.1**.

20. On LON-HOSTx, use File Explorer to browse to **C:\Shares\Snapshots**, and then confirm that there are five .xml files and five subfolders.

21. Confirm that Size of the oldest folder in the details pane is 0, as the first checkpoint that you created was when LON-VM1 was turned off.

22. Confirm that each of other folders has larger sizes, as the other checkpoints were created while LON-VM1 was running.

▶ **Task 4: Manage checkpoints**

1. On LON-HOSTx, use the Windows PowerShell cmdlet **Get-VMSnapshot** to view checkpoints for LON-VM1, and then view how they relate to each other.

2. Use the Windows PowerShell cmdlet **Export-VMSnapshot** to export the **Folder2** checkpoint of LON-VM1 to the **C:\Exported** folder.

3. On LON-HOSTx, use File Explorer to confirm that in **C:\Exported\LON-VM1** there is no Snapshots subfolder. Double-click the **Virtual Hard Disks** folder, and then confirm that it contains multiple virtual hard disks, the Differencing.vhd virtual hard disk, and all of its parent disks.

4. Rename folder **LON-VM1** to **Folder2**.

5. Use the Windows PowerShell cmdlet **Export-VM** to export **LON-VM1** to the **C:\Exported** folder.

6. Use File Explorer to confirm that there is a **Snapshots** subfolder in **C:\Exported\LON-VM1**.

7. Double-click the **Virtual Hard Disks** folder, and then confirm that it contains the Differencing.vhd virtual hard disk, its parent disk, and all of the differencing virtual hard disks that the checkpoints created.

8. Use the Windows PowerShell cmdlet **Restore-VMSnapshot** to apply the **Folder3** checkpoint to LON-VM1.

9. On LON-VM1, confirm that on the desktop, there are three folders named **Folder1**, **Folder2**, and **Folder3**.

10. Use Hyper-V Manager to confirm that you cannot modify **Folder2** checkpoint settings, except for the **Name** and **Description**.

11. Use Hyper-V Manager to delete the **Folder1** checkpoint and its subtree.

12. Use Hyper-V Manager to confirm that all checkpoints for LON-VM1 except the first checkpoint are deleted instantly.

13. On LON-HOSTx, use File Explorer to confirm that there is single .xml file, and one subfolder in the **C:\Shares\Snapshots** folder.

▶ **Task 5: Explore Generation ID**

1. On LON-HOSTx, on LON-VM1, use Device Manager to confirm that the Microsoft Hyper-V Generation Counter system device is present. This is how virtual machine presents Generation ID to the operating system.

2. Turn off LON-VM1.

Results: After completing this exercise, you should have imported virtual machines and worked with checkpoints.

Exercise 2: Monitoring Hyper-V

Scenario

One of your colleagues is sure that you can monitor Hyper-V host utilization by using Task Manager. You want to show your colleague that this is incorrect. You also want to demonstrate the proper way to monitor the Hyper-V host and virtual machines and how to retrieve chargeback information for the running virtual machines.

The main tasks for this exercise are as follows:

1. Use Task Manager.

2. Use Performance Monitor to monitor Hyper-V performance.

3. Use Resource Metering.

▶ Task 1: Use Task Manager

1. On LON-HOSTx, open Task Manager, and then click the **Performance** tab.

2. On LON-CLx, sign in as **Adatum\Administrator** with the password **Pa$$w0rd**. Open Task Manager, and then click the **Performance** tab.

3. On LON-CLx, use Windows PowerShell to run the **C:\LabFiles\Mod03\Cpustres.exe** command.

4. In CPU Stress, set **Process Priority Class** to **High**. In the **Thread 1** section, set **Thread Priority** to **Highest**, and set **Activity** to **Busy**.

5. Confirm that the LON-CLx Task Manager shows high utilization, while the LON-HOSTx Task Manager shows low utilization.

📋   **Note:** As each Task Manager is reporting utilization of its own virtual environment, the utilization shown is very different.

6. In CPU Stress, in the **Thread 1** section, set **Thread Priority** to **Idle**, and set **Activity** to **Low**.

7. On LON-HOSTx, in Task Manager, click **Open Resource Monitor**. The Resource Monitor opens.

8. On LON-CLx, run the Windows PowerShell command **C:\LabFiles\Mod03\sqlio.exe**.

9. Confirm that on LON-CLx, Task Manager reports almost 100 percent Disk 0 utilization. Resource Monitor on LON-HOSTx reports only a slight increase in disk activity.

▶ Task 2: Use Performance Monitor to monitor Hyper-V performance

1. On LON-HOSTx, start Performance Monitor, and then add the following counters:

    o   **Hyper-V Hypervisor Virtual Processor\% Guest Run Time** for the **20409B-LON-CLx** instance

    o   **Hyper-V Virtual Storage Device\Read Operations/sec** for the instance that refers to **20409B-LON-CLx**

    o   **LogicalDisk\Disk Reads/sec** for the **C:** instance

2. Set **Scale Selected Counters** for **Disk Reads/sec** and **Read Operations/Sec**.

3. On LON-CLx, run the Windows PowerShell command **C:\LabFiles\Mod03\sqlio.exe**.

4. On LON-HOSTx, use Performance Monitor to follow how disk access increases in the virtual machine and on the Hyper-V host while **sqlio.exe** is running on the virtual machine.

5. On LON-CLx, in CPU Stress, set **Process Priority Class** to **High**. In the **Thread 1** section, set **Thread Priority** to **Highest** and **Activity** to **Busy**.

6. On LON-HOSTx, use Performance Monitor to follow how processor utilization on the virtual machine and on Hyper-V increases.

7. On LON-HOSTx, use Hyper-V Manager to view CPU Usage for the LON-CLx virtual machine.

8. Set **Virtual machine limit (percentage)** for 20409B-LON-CLx to **10**.

9. Use Hyper-V Manager to confirm that CPU Usage for the LON-CLx virtual machine is considerably lower.

10. On LON-CLx, close both CPU Stress and Task Manager.

11. On LON-HOSTx, close Performance Monitor, Resource Monitor, and Task Manager.

12. In Hyper-V Manager, set **Virtual machine limit (percentage)** for LON-CLx to **100**.

▶ **Task 3: Use Resource Metering**

1. On LON-HOSTx, use the Windows PowerShell cmdlet **Get-VM** to view whether resource metering is enabled for 20409B-LON-CLx.

2. Use the Windows PowerShell cmdlet **Enable-VMResourceMetering** to enable resource metering for 20409B-LON-CLx.

3. Use the Windows PowerShell cmdlet **Measure-VM** to view resource metering data for 20409B-LON-CLx.

4. On LON-CLx, run the Windows PowerShell command **C:\LabFiles\Mod03\Cpustres.exe**.

5. In CPU Stress, set **Process Priority Class** to **High**. In the **Thread 1** section, set **Thread Priority** to **Highest**, and then set **Activity** to **Busy**.

6. Run the Windows PowerShell command **C:\LabFiles\Mod03\TestLimit64.exe –d 400 –c 5**.

7. On LON-HOSTx, use the Windows PowerShell cmdlet **Measure-VM** to view resource metering data for 20409B-LON-CLx. Compare the data with previous results, and then notice the increase in use of AvgRAM(M) and AvgCPU(MHz).

8. On LON-CLx, close CPU Stress.

9. On LON-HOSTx, use the Windows PowerShell cmdlet **Disable-VMResourceMetering** to disable resource metering for LON-CLx.

Results: After completing this exercise, you should have monitored Hyper-V.