# 12
# NETWORK MANAGEMENT

## PROJECTS

| Project 12.1 | Understanding Key Concepts |
|---|---|
| Overview | Understanding the management process means, in part, understanding terms related to the management process. Understanding the tools and technologies available to you to help with the management process is also important.<br>During this project, you will match various management-related terms to the definitions and descriptions of how they are used. |
| Outcomes | After completing this project, you will know how to:<br>▲ identify key terms and concepts related to network management |
| What you'll need | To complete this project, you will need:<br>▲ the following worksheet |
| Completion time | 20 minutes |
| Precautions | None |

The worksheet includes a list of management-related networking terms on the left and descriptions on the right. Match each term with the description that it most closely matches. You will *not* use all descriptions. Each description can be used only once.

| | | |
|---|---|---|
| ___ | SMS | A. Referring to a device that can be replaced without powering off |
| ___ | Full backup | B. RAID 1 disk fault tolerant configuration using two hard disks with identical data connected to a single disk controller |
| ___ | Incremental backup | C. Disk operations waiting to be processed |
| ___ | Differential backup | D. Microsoft's SNMP-based network management system |
| ___ | Disk mirroring | E. All management information objects on a network |
| ___ | Disk striping with parity | F. Emerging ESD software standard |
| ___ | MIB | G. RAID 1 disk fault tolerant configuration using two hard disks with identical data connected to a separate disk controller |
| ___ | Threshold | H. Switch between a primary and a redundant server that does not require administrator or operator intervention |

| | | |
|---|---|---|
| ___ | NOC | I. Backup in which only changed files are backed up and the archive bit is not changed |
| ___ | Hot-swappable | J. Backup in which only changed files are backed up and the archive bit is reset on each file |
| ___ | Disk queue | K. Process by which software and updates are distributed automatically to network computers |
| ___ | ESD | L. Target value used as a reference to determine if an activity or performance counter is out of expected tolerance |
| ___ | Automatic failover | M. Switch between a primary and a redundant server that requires administrator or operator intervention |
| ___ | Manual failover | N. RAID 5 disk fault tolerant configuration using three or more hard disks and protecting against the failure of a single disk |
| | | O. Physically secure location for the storage of network hardware |
| | | P. Backup in which all data is backed up and the archive bit on each file is reset |

| Project 12.2 | Backing Up and Restoring Data |
|---|---|
| Overview | Your best chance of recovering from a catastrophic system failure is to have a good backup of the data. A critical part of network management is to ensure that critical data is backed up on a regular basis. At times you will need to run additional backups beyond your scheduled backups. For example, some applications and operating systems updates, including many service packs, recommend that you back up your data as the first step in the installation process.<br>During this project, you will simulate setting up backups for a network environment. You will configure a network share to act as the destination for network backups. You will back up selected files, configure regular backups, and restore data from a backup. |
| Outcomes | After completing this project, you will know how to:<br>▲ back up data to a network share<br>▲ configure periodic backups<br>▲ restore backup data |

| | |
|---|---|
| What you'll need | To complete this project, you will need:<br>▲ the following worksheet<br>▲ a computer running Windows 7 Professional or Windows 7 Enterprise<br>▲ a domain controller running Windows Server 2008 |
| Completion time | 45 minutes |
| Precautions | The instructions in this project assume you are working on a two-node network with one computer running Windows 7 Professional or Windows 7 Enterprise and one computer running Windows Server 2008. If these computers are part of a larger classroom network, your instructor will provide you with alternate instructions.<br>If working on an existing network, you must review the project steps with your network administrator. Your network administrator may need to make changes or additions to the instructions. |

## ■ Part A: Prepare for Backup

In this part, you will prepare to test backup and restore operations. You will need a computer running Windows 7 Professional, or Windows 7 Enterprise and a computer running Windows Server 2008. You should log on as an Administrator on both computers. Complete Steps 1 through 7 on the computer running Windows 7 Professional, or Windows 7 Enterprise and Steps 8 through 15 on the computer running Windows Server 2008.

1. On the computer running Windows 7 Professional or Windows 7 Enterprise, open the **Start** menu and select **Computer**.
2. Open the **C:** drive.
3. Select **New folder**.
4. Enter **BackupDest** as the folder name and press the *Enter* key.
5. Right-click **BackupDest** and select **Share With**.
6. Select **Specific People** then choose **Everyone** and **Add**.
7. For the moment, give **Read and Write** permission, as full control is not available for security reasons.
8. Once the folder is shared, right-click on it and choose **Properties** and the **Security** Tab. Note that giving the above permission to Everyone effectively gave **Full Control**, as shown in Figure 12-1, and click *OK*.

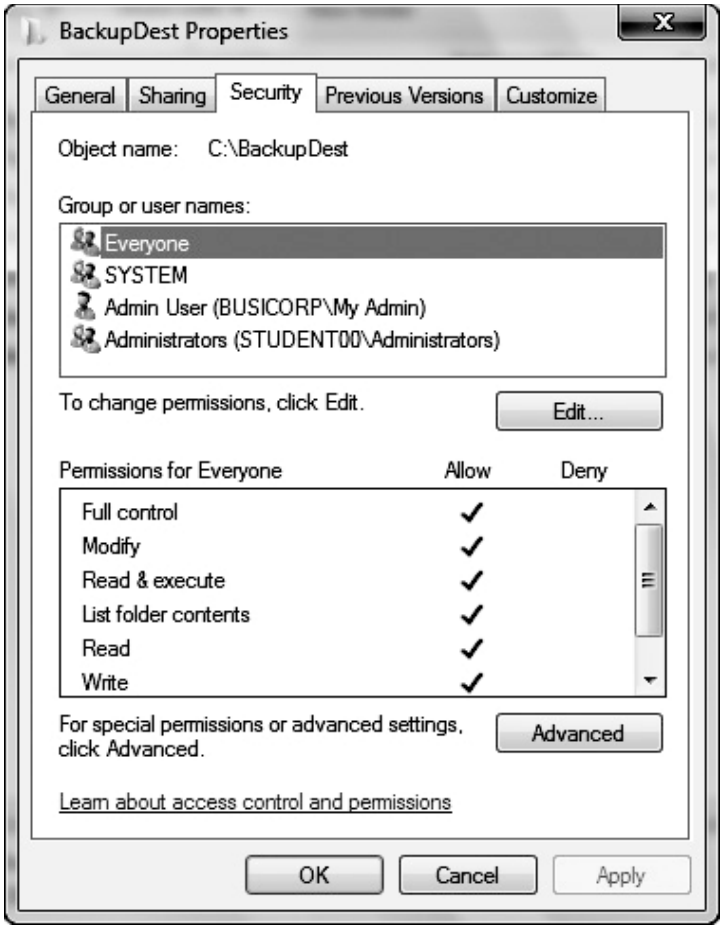


**Figure 12-1: Configured permission**

9. Click *OK* to create the share.
10. Open **BackupDest** and verify that the folder is empty. Exit **Computer**.
11. On the computer running Windows Server 2008, open the **Start** menu and select **Computer**.
12. Open the **C:** drive.
13. Right-click a clear area, and select **New** and then **Folder**. Name the folder **MySource**.
14. Open **MySource**.
15. Right-click the details pane, and select **New** and then **Text Document**. Name the file **Sample.txt**.
16. Double-click **Sample.txt** to launch **Notepad** with the file open.
17. Type the following: **This is a sample file for backup**.
18. Open the **File** menu and select **Save** and **Exit**.

    ***Note:*** Do not close **Computer**.

## ■ Part B: Backup Data

During this part of the project, you will back up data to a shared network location. You will complete Part B on the computer running Windows Server 2008. You must have access to the network share on the computer running Windows 7 Professional or Windows 7 Enterprise. To access Backup and Recovery tools for Windows Server 2008, you must install the **Windows Server Backup**, **Command-Line Tools**, and **Windows Power Shell** that are available in the **Add Features Wizard** in **Server Manager**.

Also note that the new **Windows Server Backup utility** is for **Volume** or **System** Backup, and you can no longer backup individual files. For an individual file, you would use the built in **xcopy** utility from the Command Prompt.

1. Open the **Start** menu and point to **Administrative Tools** and **Server Manager**.
2. Scroll down to the **Features** window and **Add Features** and add **Windows Server Backup**, **Command-line Tools**, as shown in Figure 12-2.

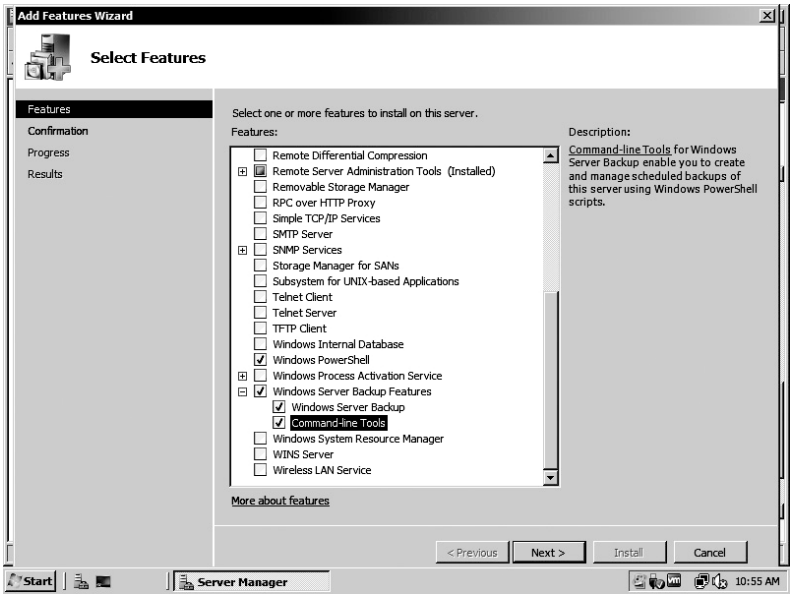


**Figure 12-2: Add Features Wizard**

3. You will get a warning that you must add **Power Shell** when you check the **Command-line Tools** to add, as shown in Figure 12-3.

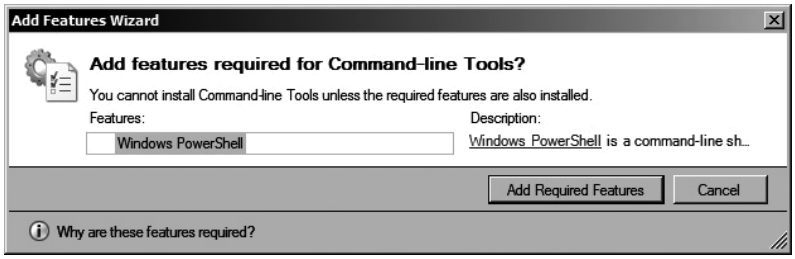


**Figure 12-3: Add Features Required**

4. After you select it, click *Next* and *Install*.
5. When the **Results** window opens, close it and exit **Server Manager**.
6. Open **Start/Administrative Tools** and select **Windows Server Backup**, as shown in Figure 12-4.

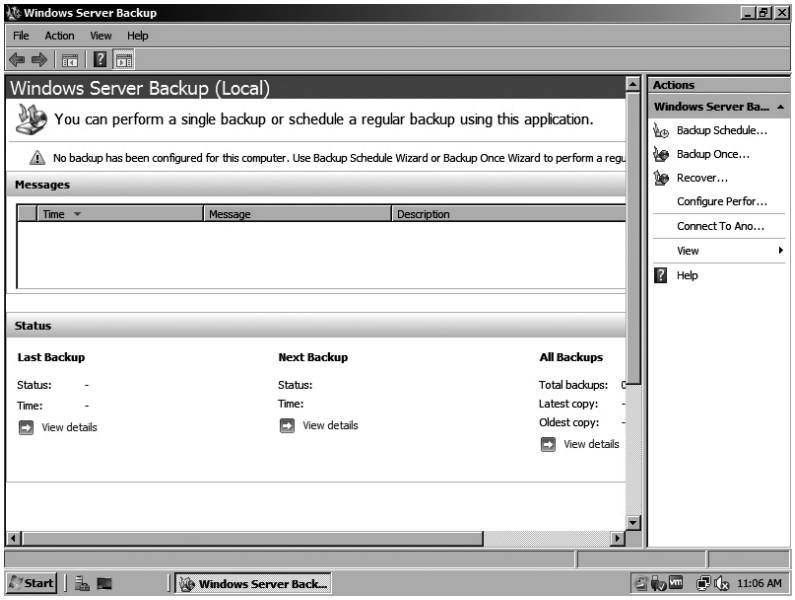


**Figure 12-4: Windows Server Backup**

7. Under **Actions**, select **Backup Once**, which opens the **Backup Options** menu as shown in Figure 12-5.

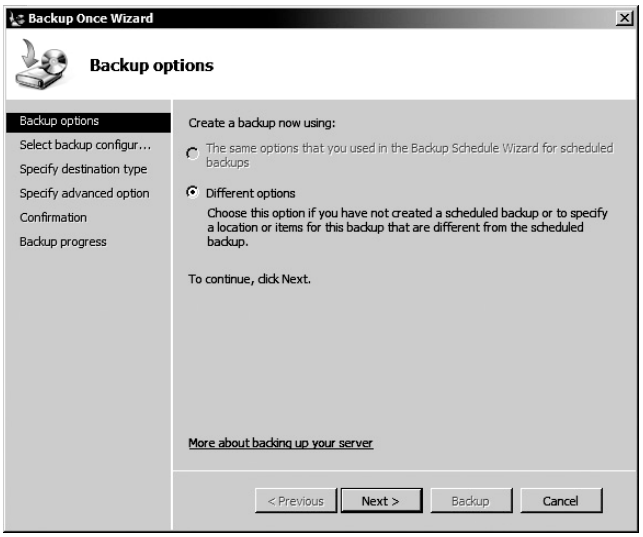


**Figure 12-5: Backup Options**

8. Leave **Different options** selected, and click *Next.*
9. Select **Custom** and click *Next.*
10. Check **Local Disk and Enable System Recovery Option**, as shown in Figure 12-6.

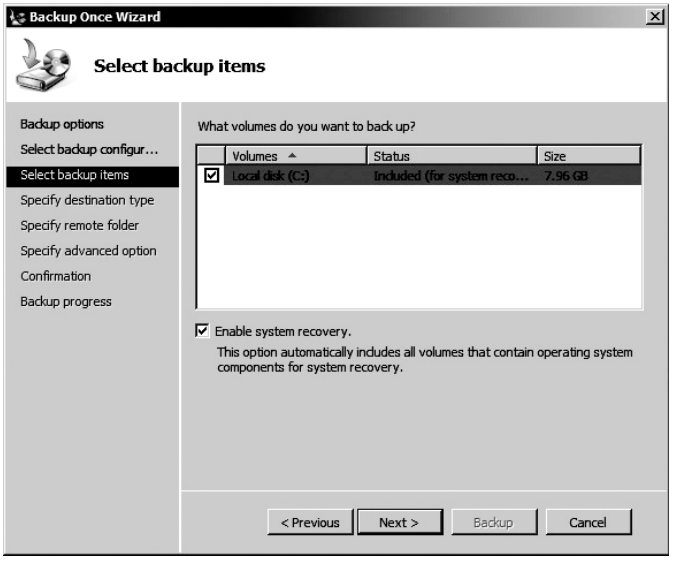


**Figure 12-6: Backup Options**

11. Click *Next.*
12. Under **Specify a Destination Type**, choose **Remote Shared Folder**, click *Next* to continue.
13. Type **\\STUDENT00\BackupDest** in the path to the remote shared folder, as shown in Figure 12-7.

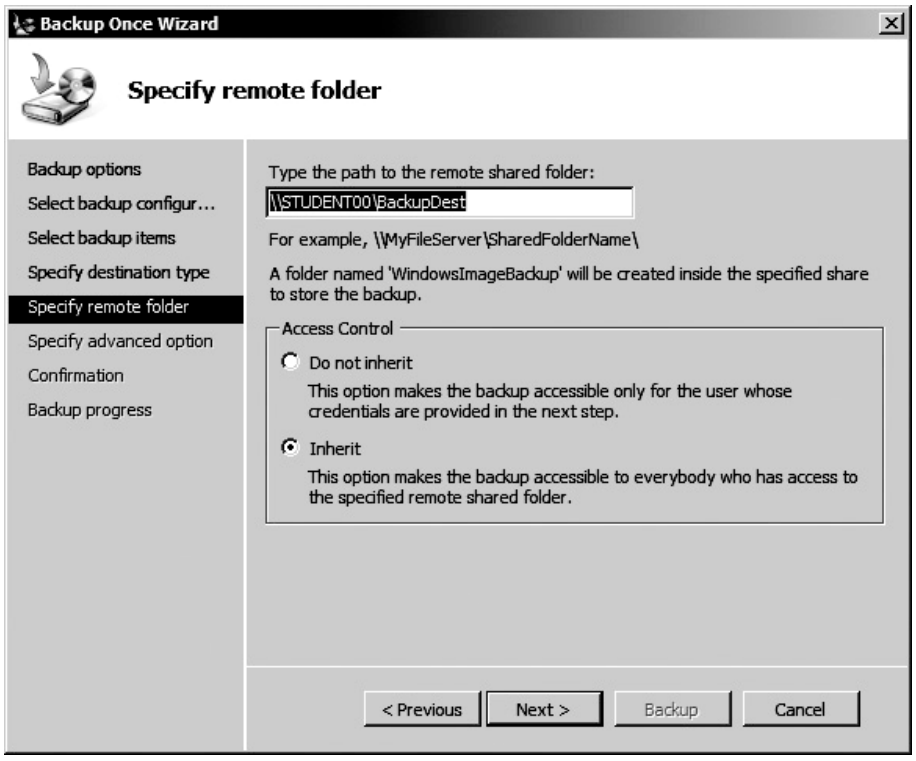


**Figure 12-7: Backup destination**

14. Click *Next* and maintain the Volume Shadow Copy Service (VSS) Default, then click *Next.* The Confirmation screen should look like Figure 12-8.

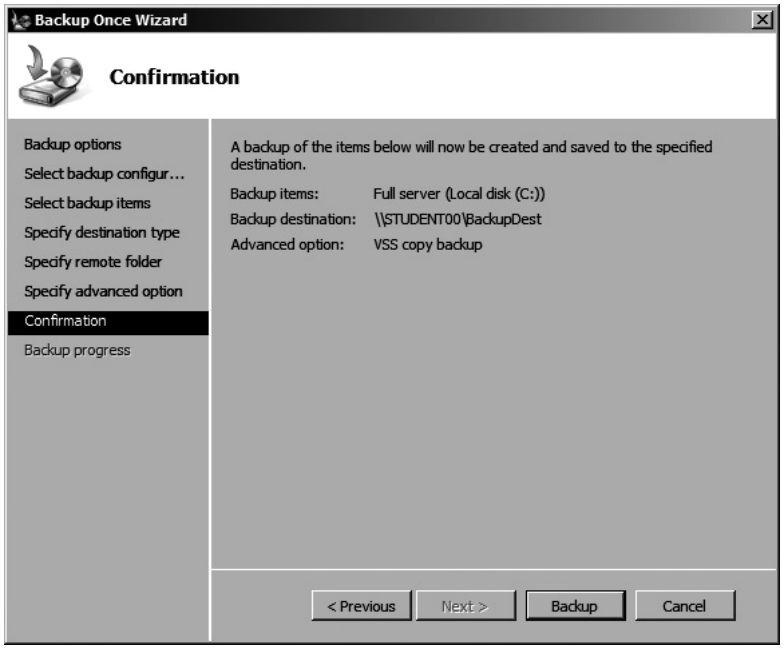


**Figure 12-8: Backup Configuration confirmation**

15. Click *Backup* and the **Backup progress** screen will appear as shown in Figure 12-9.

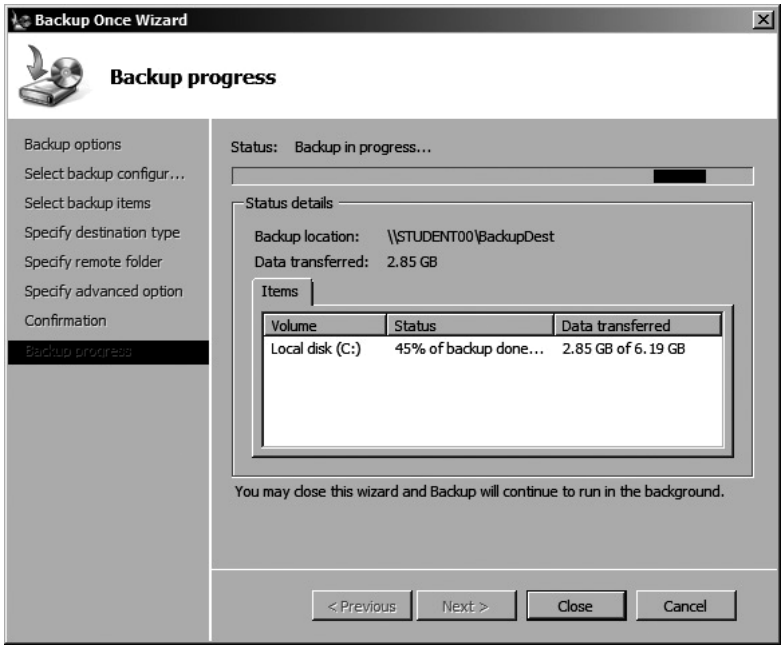


**Figure 12-9: Backup Progress**

16. When the backup is complete, as shown in Figure 12-10, click *Close.*

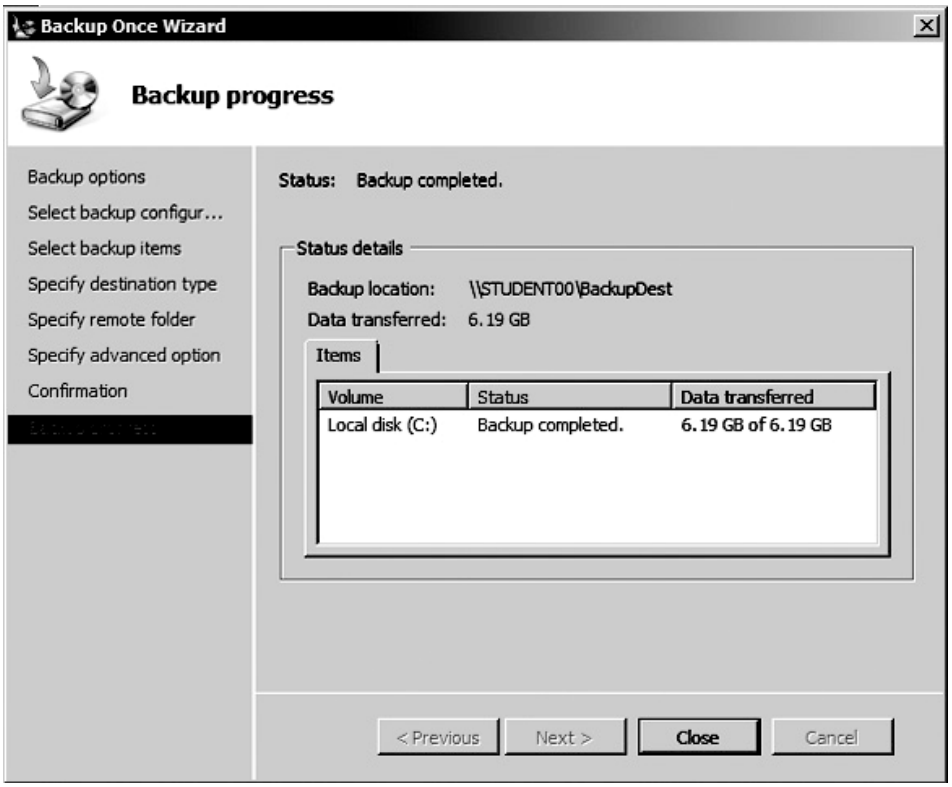


**Figure 12-10: Completed backup**

## ■ Part C: Restore Data

During Part C you will restore from a backup and verify that the data is successfully restored. You will complete Part C on the computer running Windows Server 2008. You must have access to the network share on the computer running Windows 7 Professional or Windows 7 Enterprise.

1. In **Computer**, click **Folders** on the toolbar to open the tree view pane on the left.
2. Expand **My Network Places**, **Entire Network**, **Microsoft Windows Network**, **Busicorp**, and **the computer running Windows 7 Professional**, or **Windows 7 Enterprise**, and select **BackupDest**. What files, if any, do you see listed?

   _____

3. Navigate to **C:\MySource**.
4. Right-click **Sample.txt** and select **Delete**.
5. When prompted to verify your action, click *Yes.*
6. Launch the **Windows Server Backup** utility.

7. Click **Recover**, as indicated in Figure 12-11.

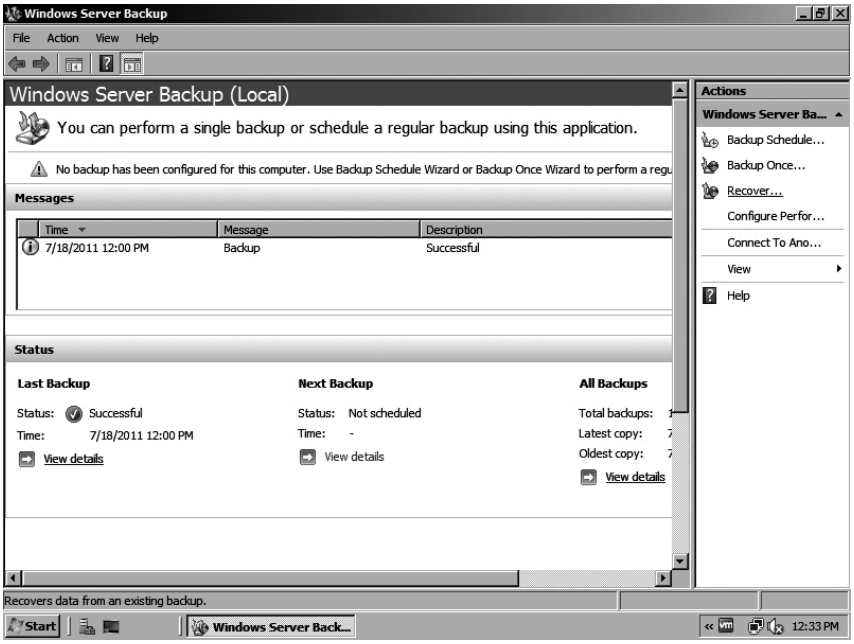


**Figure 12-11: Choosing Recover**

8. In the **Getting started** window, maintain the default **This server**, as indicated in Figure 12-12.

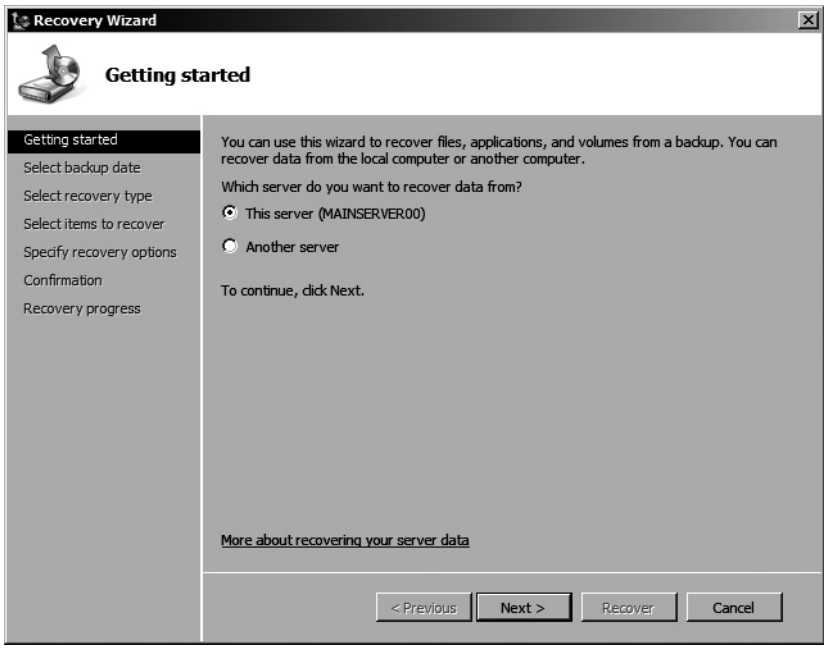


**Figure 12-12: Choosing Server**

9. Select the Backup you just completed from the **Backup Date** window, then *Next*, as indicated in Figure 12-13.

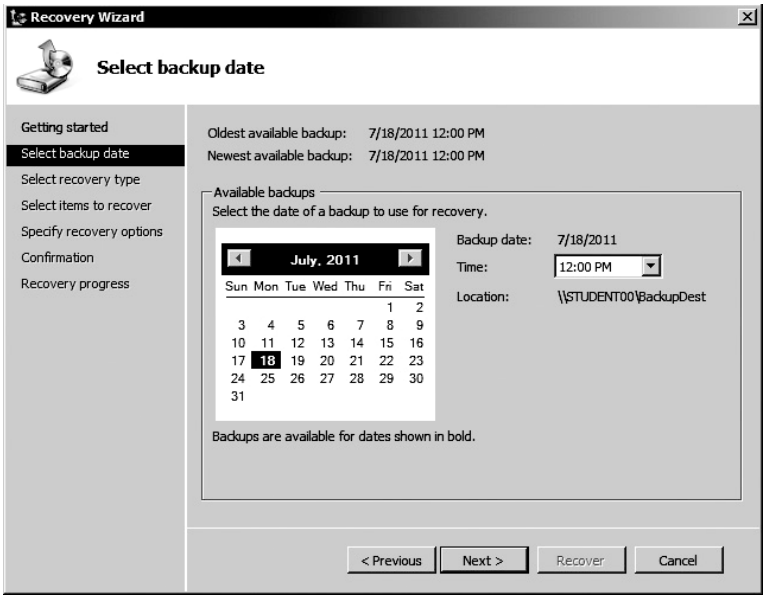


**Figure 12-13: Backup Date**

10. In the **Select Recovery Type** window choose **Files and Folders** and then **Select Files to Recover** and **MainServer00/C**:, then choose **MySource**, as indicated in Figure 12-14.

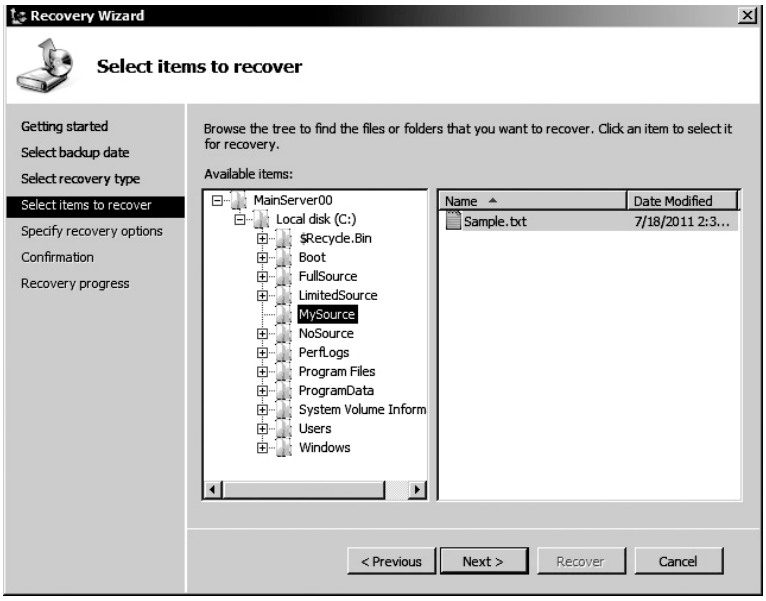


**Figure 12-14: Select Items**

11. Click *Next* and leave the defaults as indicated in Figure 12-15.

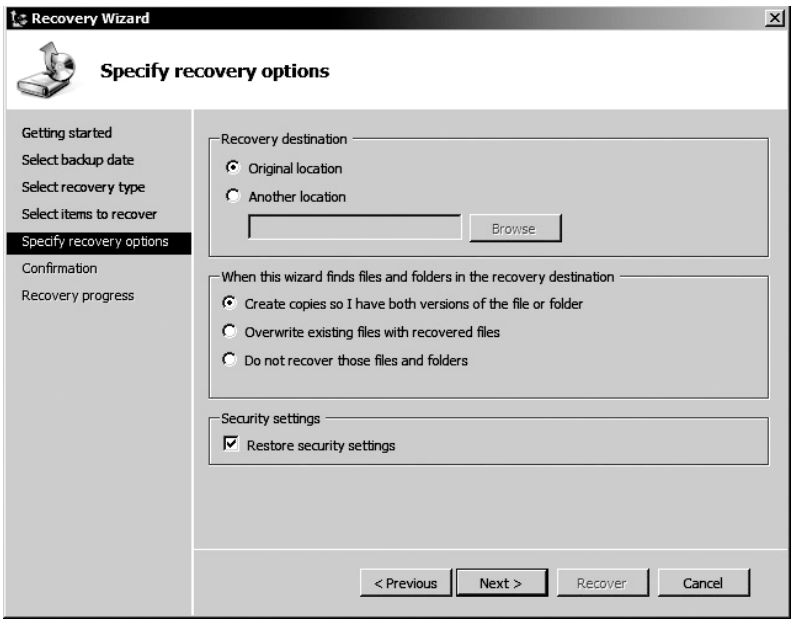


**Figure 12-15: Recovery Options**

12. By default, what will happen if the file already exists?

    _____

13. In the recover confirmation Window, click *Recover.* A **Recover** dialog box reports progress while the restore is running.
14. When the restore is complete, click *Close.*
15. In **My Computer**, check the contents of **MySource**. Was the file restored?

    _____

16. Exit **My Computer**.

    ***Note:*** Do not exit the **Backup** utility.

## ■ Part D: Creating an additional Virtual Hard Drive for storage

During Part D, you will configure a server to run periodic backups. You will complete Part D on a computer running Windows Server 2008. For this exercise, you will have to add an additional Virtual Hard Disk to your Windows 2008 Server.

1. Log off and shut down your Windows 2008 Server.
2. Open the settings window from the VM menu bar, choose **Add** and then the **Hard Disk** in the **Hardware Type** pop up screen appears, as shown in Figure 12-16.

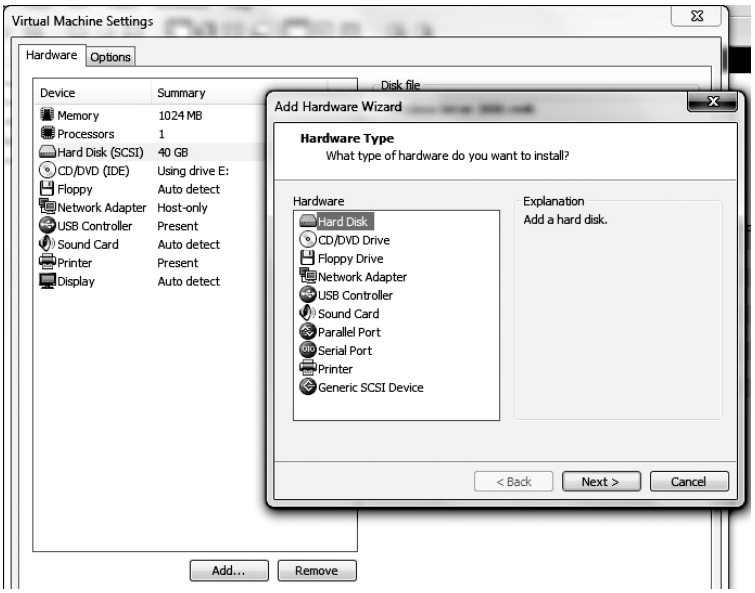


**Figure 12-16: Adding Hardware from the VM settings window**

3. Leave the **Create a New Virtual Hard Drive** in the **Select a Disk Window**, click *Next,* and leave the default **SCSI disk** selected.
4. Leave the default size and click *Next.*
5. Leave the default name: **Windows Server 2008-0.vmdk**, and click *Finish.*
6. You now have added an additional hard drive for storage to your Windows 2008 Server, as shown in Figure 12-17.

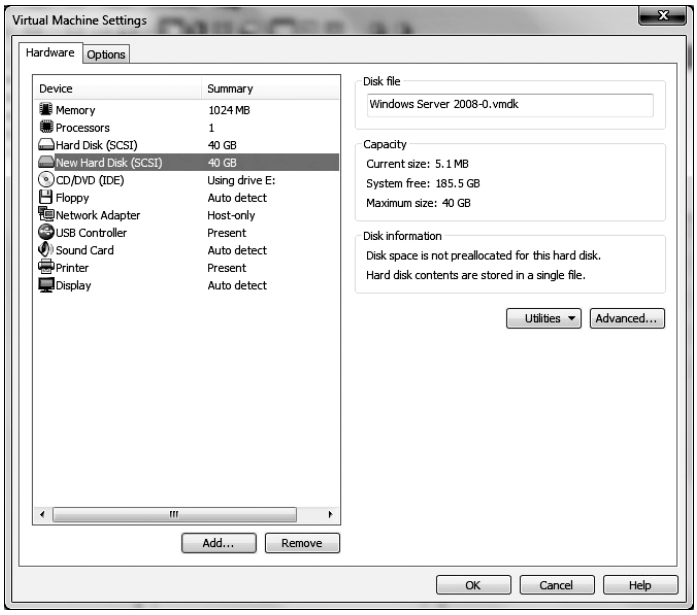


**Figure 12-17: VMware Windows 2008 Settings**

7. Restart and log on to your Windows 2008 Server as **Administrator**.
8. You must now go to **Start/Administrative Tools/Computer Manager** and choose **Disk Management**. A warning window will pop up telling that you must initialize your disk, as shown in Figure 12-18.

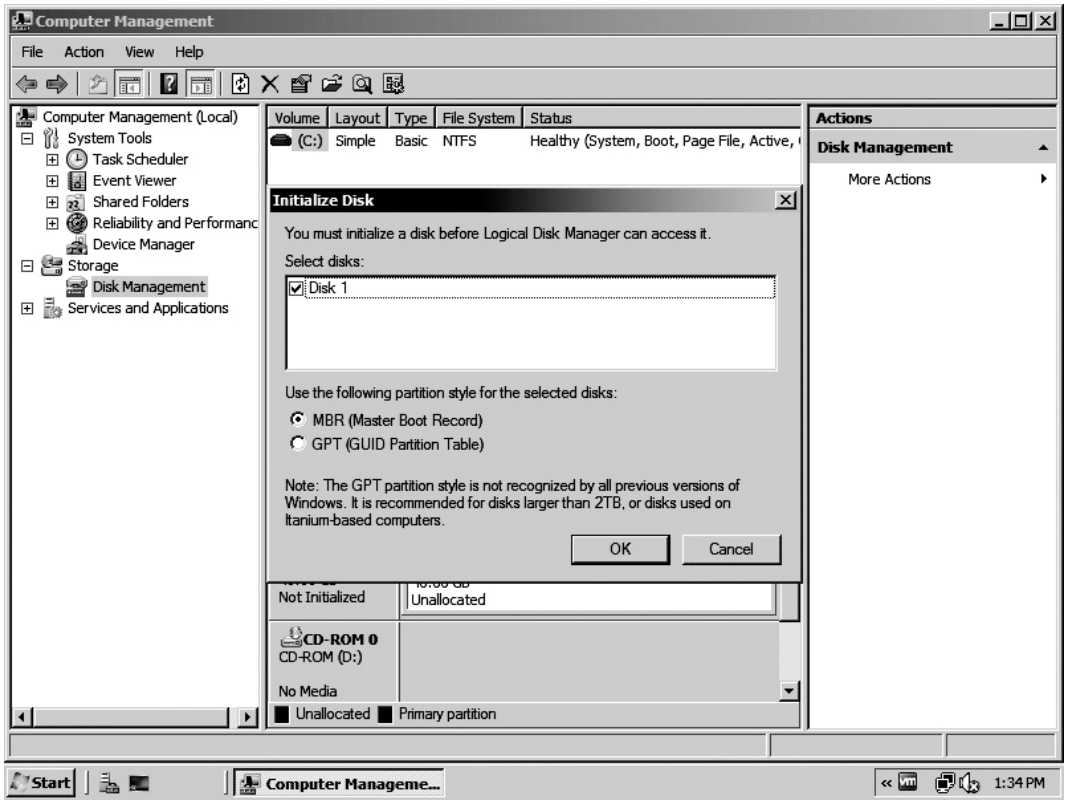


**Figure 12-18: Initializing New Disk**

9. Click on the **Unallocated Space** and **Choose to Create a New Simple Volume**. Accept all defaults in the **New Simple Volume** wizard.
10. Now you must format the disk for use in this exercise. Accept all defaults and format your disk, resulting in a new Disk E being available for use in your virtual server. Right-click on your new drive, select **Properties**, and rename the drive **Storage**, as shown in Figure 12-19.

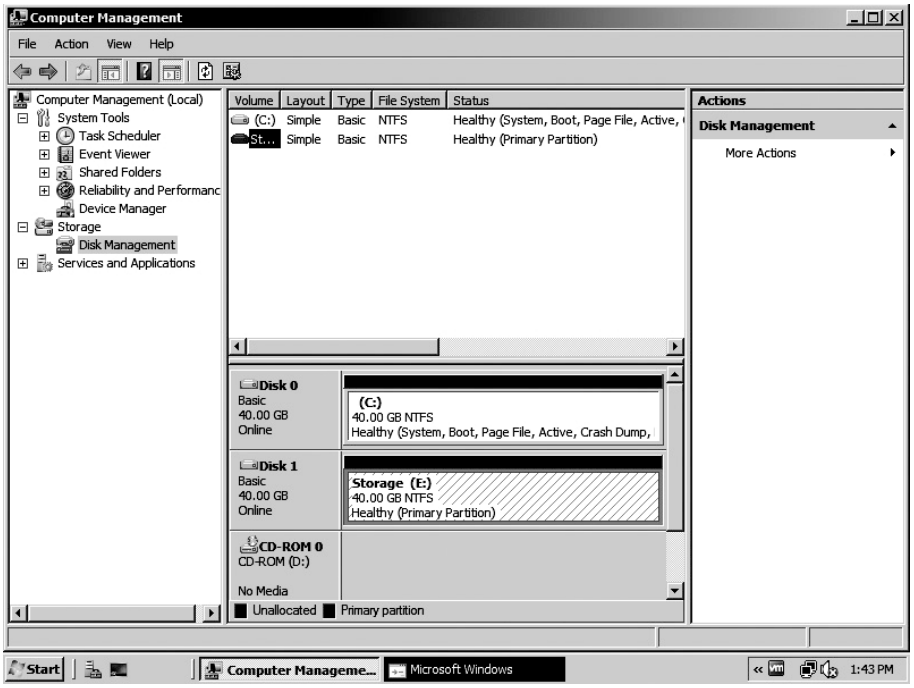


**Figure 12-19: New Storage Drive**

## ■ Part E: Manage Backups

1. In the **Backup** utility, select the **Backup Schedule** in the **Actions** pane.
2. In the **Getting Started** Windows, click *Next* and leave the default **Full Server (Recommended)**.
3. Click *Next.* Leave the default **Once a Day**, and Set the Time for Midnight (**12:00 AM**).
4. Click *Next.* Select your new hard disk from the available disks in the **Select Destination Disk** window as indicated in Figure 12-20.

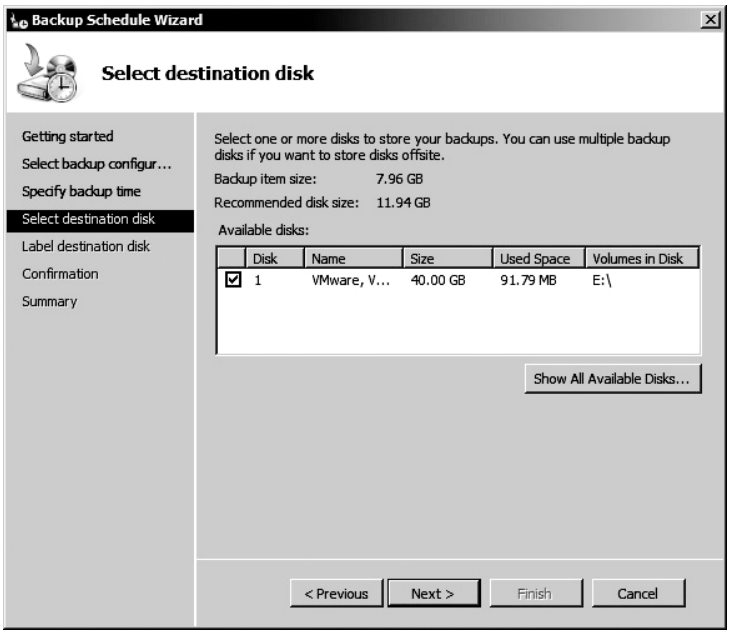


**Figure 12-20: Destination Disk**

5. What happens?

_____

6. Click *Yes* on the warning, and click *Next.*
7. In the confirmation window, click *Finish.*
8. To view your newly created schedule, scroll down in the **Windows Server Backup** window and select **View Details**, as indicated in Figure 12-21.

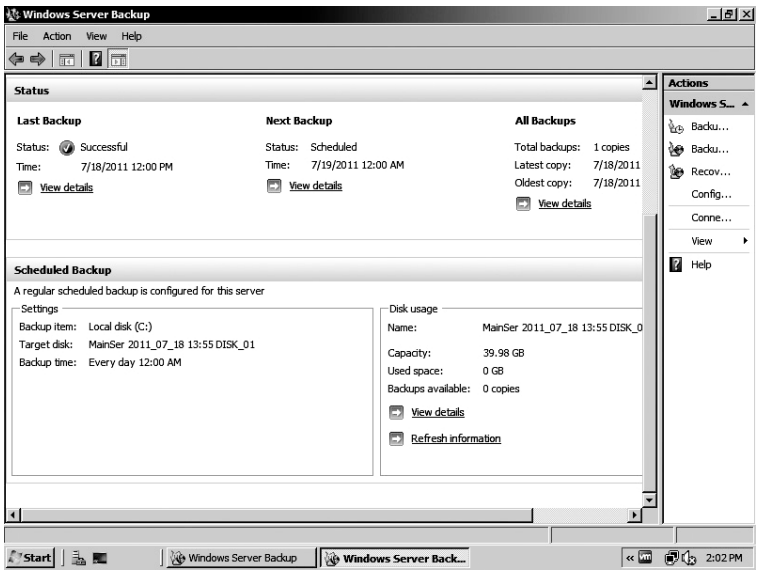


**Figure 12-21: View Backup Schedule Details**

9. What are the details listed?

_____

_____

10. Exit the **Backup** utility and close any open windows on the desktop.

| Project 2.3 | Monitoring Computer Activity |
|---|---|
| Overview | An important part of successful network management is careful monitoring. Different operating systems offer monitoring utilities, and several third-party products are available.<br>One flexible tool when using a Windows operating system is the Performance utility. It includes System Monitor, called Performance Monitor on older Windows versions. System Monitor lets you monitor real-time activity. The Performance utility also lets you log selected performance counters and sets alerts based on threshold values.<br>You will work with System Monitor and some monitoring options during this project. |
| Outcomes | After completing this project, you will know how to:<br>▲ monitor server activity<br>▲ monitor a computer from a remote location<br>▲ configure an alert |
| What you'll need | To complete this project, you will need:<br>▲ a computer running Windows Server 2008<br>▲ a computer running Widows 7<br>▲ to have completed Project 12.2<br>▲ the following worksheet |
| Completion time | 30 minutes |
| Precautions | The instructions in this project assume you are working on a two-node network with one computer running Windows 7 Professional or Windows 7 Enterprise and one computer running Windows Server 2008. If these computers are part of a larger classroom network, your instructor will provide you with alternate instructions.<br>If working on an existing network, you must review the project steps with your network administrator. Your network administrator may need to make changes or additions to the instructions. |

During this project, you will monitor computer activity using System Monitor. You will use one instance of System Monitor to monitor both a local server, the server on which it is running, and a remote computer. Doing so lets you compare the results from two different computers. Monitoring computer activity from two computers allows you to make side-by-side comparisons, and it can also let compare the effect of different activities on different network computers.

You will be using both computers during the project. You should be logged on as an Administrator on the computer running Windows Server 2008. At the beginning of this project, there should not be any user logged on at the computer running Windows 7 Professional, or Windows 7 Enterprise.

## ■ Part A: Launch System Monitor

In Part A of the project, you will launch System Monitor and configure the performance counters you want to watch. You will generate activity on the computer running Windows Server 2008 to see the effect.

1. Open the **Start** menu, point to **Administrative Tools**, and select **Reliability and Performance Monitor**. Doing so launches the utility with default performance counters selected in **Reliability and Performance Monitor**, as shown in Figure 12-22.

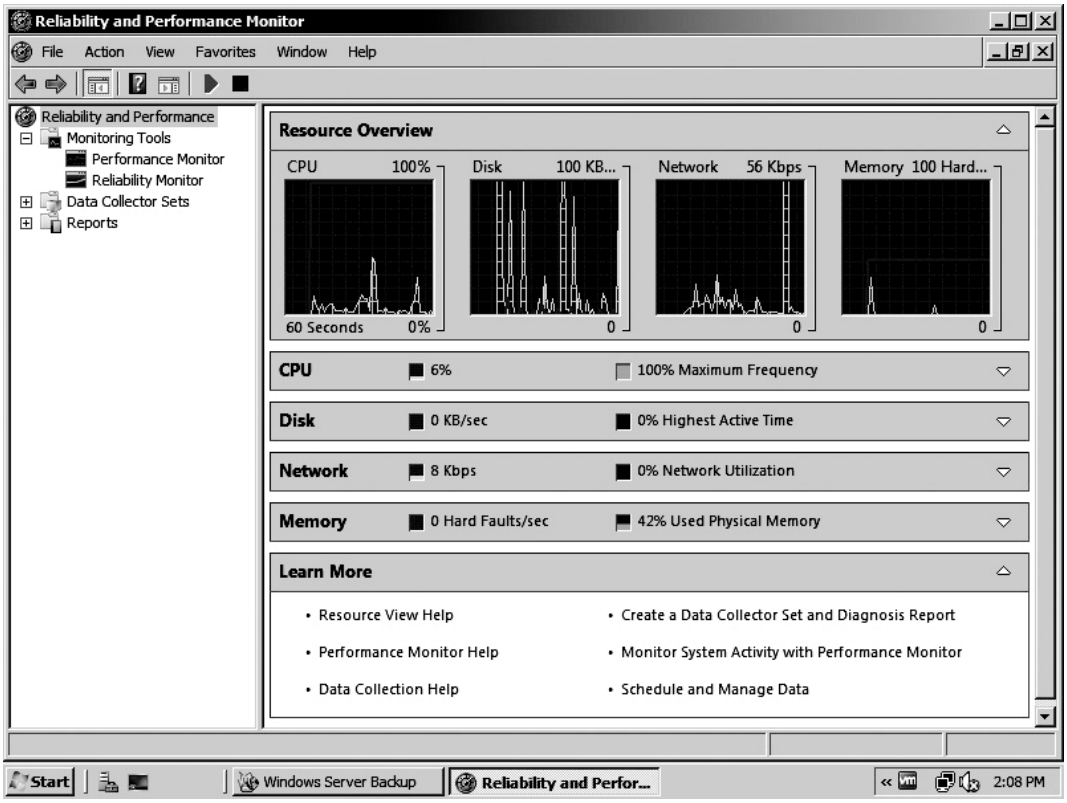


**Figure 12-22: Reliability and Performance Monitor**

2. What are the default resource objects and counters?

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_____

3. Now expand the **Monitor Tools** in the left-hand pane and select **Performance Monitor**, as shown in Figure 12-23.

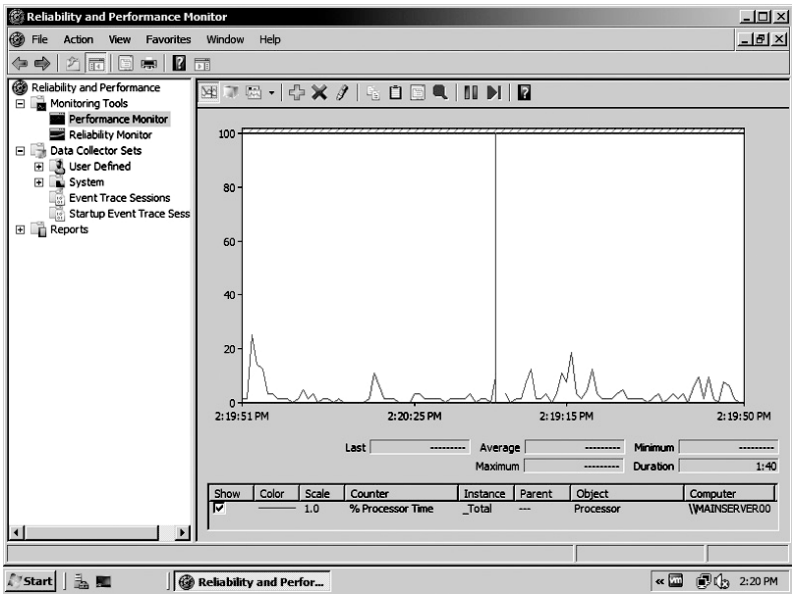


**Figure 12-23: Performance Monitor**

4. What are the default performance objects and counters?

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_____

_____

5. Click on the *Green* + and find **Network Interface** as the performance object, expand the options by clicking on the + sign next to Network Interface. Select **Bytes Total/sec** as the performance counter. Click *Add* and then *OK*.
6. Open the **Start** menu, point to **Administrative Tools**, and select **Active Directory Users and Computers**. Observe the performance counters as you open the utility. Exit the utility after it opens.

## ■ Part B: Configure an Alert

During Part B you will configure a performance alert based on a performance counter and threshold value by creating **User Defined Data Collection Set**. You will complete this part on the computer running Windows Server 2008.

1. In the **Performance Monitor screen**, expand **Data Collector Sets** and select **User Defined**.
2. Right-click the details pane and select **New** and then **Data Collector Set**.
3. Name the alert **Processor Alert** and click *OK*.

4. Accept the default setting in each window, and in the last window, select **Open Properties for this Data Collector Set**, and then click *Finish.*
5. The **Processor Alert Properties** window opens as shown in Figure 12-24.

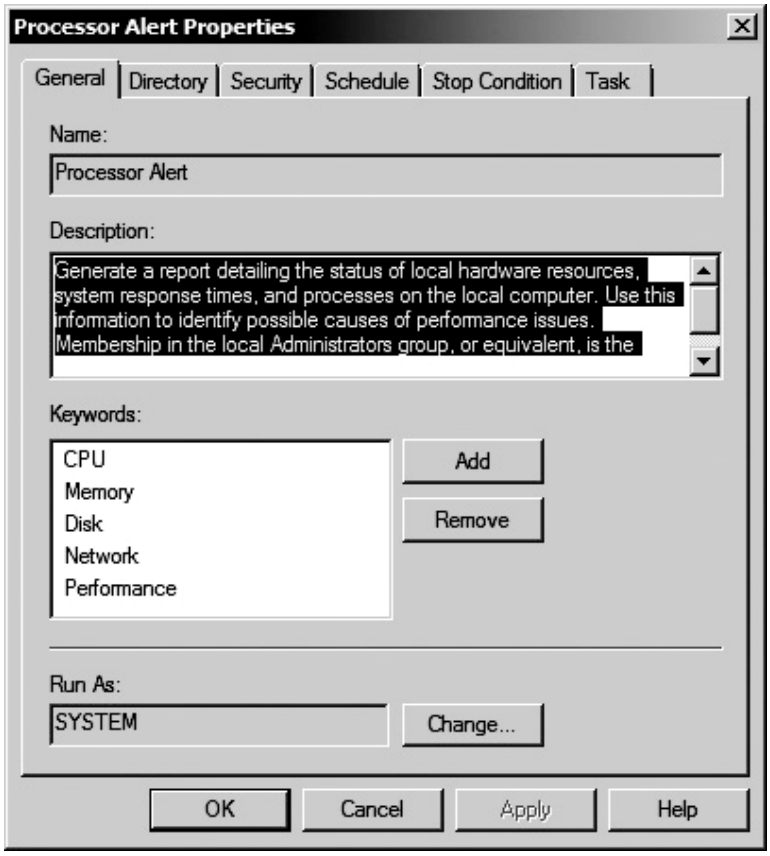


**Figure 12-24: Processor Alert Properties**

6. Click *OK.* In the Performance window, right-click on the newly created **Performance Counter** and choose **Properties**. A **Performance Counter Properties** window opens to allow you to add features, as shown in Figure 12-25.

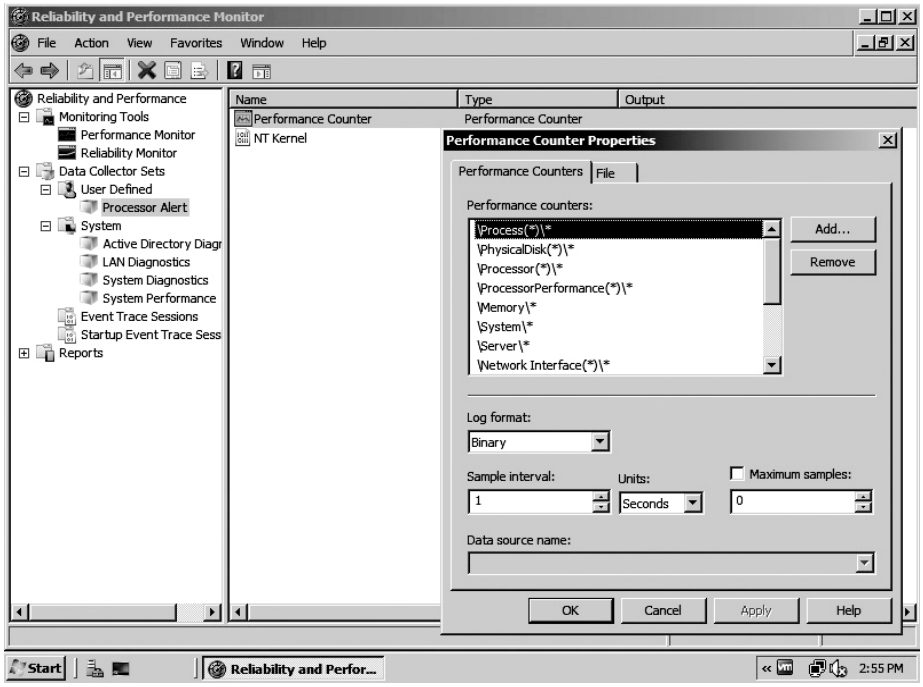


**Figure 12-25: Performance Counter Properties**

7. Click the **Add** button and then click on **Processor**. Scroll down to performance object, **%Processor Time** and click **Add**, as shown in Figure 12-26.

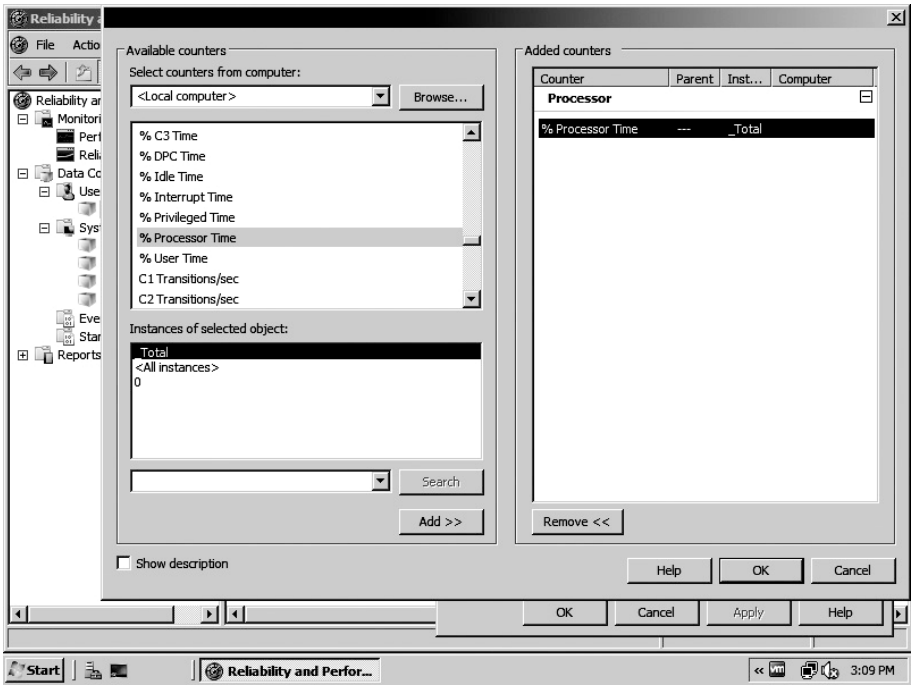


**Figure 12-26: Completed alert**

8. Right-click on the **Processor Alert** and click *Start.*
9. Select **Performance Monitor**. What did Performance Monitor do while you were creating the alert?

   _____

10. Close **Reliability and Performance Monitor**.

| Project 12.4 | Configuring SNMP Support |
|---|---|
| Overview | Network management systems are often used to make it easier for you to monitor, manage, and maintain enterprise networks. Management systems rely on SNMP- and SNMP-compliant devices, which include computers running Windows operating systems. However, SNMP support is not installed by default because of possible security holes if it is not configured properly. An unauthorized management console could be used to collect system information, reconfigure computers, and even install hidden applications.<br>During this project, you will install and configure SNMP support on your domain controller. You are simulating the procedures you would go through to set up for deploying a management system. |
| Outcomes | After completing this project, you will know how to:<br>▲ install SNMP support<br>▲ configure SNMP services |
| What you'll need | To complete this project, you will need:<br>▲ a running Windows Server 2008<br>▲ Windows Server 2008 installation CD<br>▲ the following worksheet |
| Completion time | 15 minutes |
| Precautions | The instructions in this project assume you are working on a two-node network with one computer running Windows 7 Professional or Windows 7 Enterprise and one computer running Windows Server 2008. If your domain controller is part of a larger classroom network, your instructor will provide you with alternate instructions.<br>If working on an existing network, you must review the project steps with your network administrator. Your network administrator may need to make changes or additions to the instructions. |

## ■ Part A: Install SNMP

In Part A, you will install SNMP, configure the SNMP service, and verify installation. You should be logged on to a computer running Windows Server 2008 as an Administrator.

1. Open the **Start** menu, and select **Administrative Tools** and then **Server Manager**. If not already expanded, expand your domain.
2. Scroll down to **Features/Add Features** and select both **SNMP Server** and **SNMP Services.** Note that a Warning pops up telling you that you must add the **Web Server (IIS) for SNMP to function**, as shown in Figure 12.27.

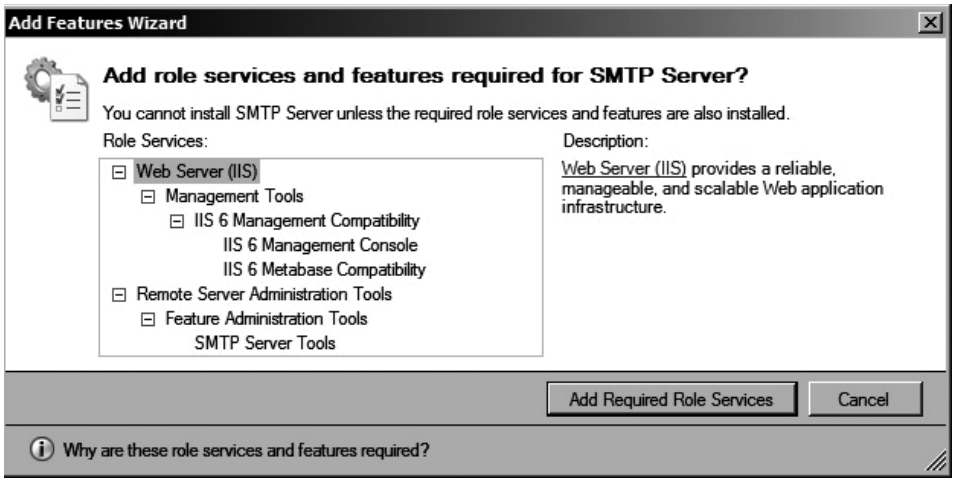


**Figure 12-27: Add Role Services Warning**

3. Click *Add Required Role Services* and *Install*.
4. Click *Next*, *Next*, and *Next*, accepting the defaults and *Install.*
5. You will receive the **Instaltaion Successful** screen and then the **Server Manager** screen showing the **Features Installed**, as shown in Figure 12-28.

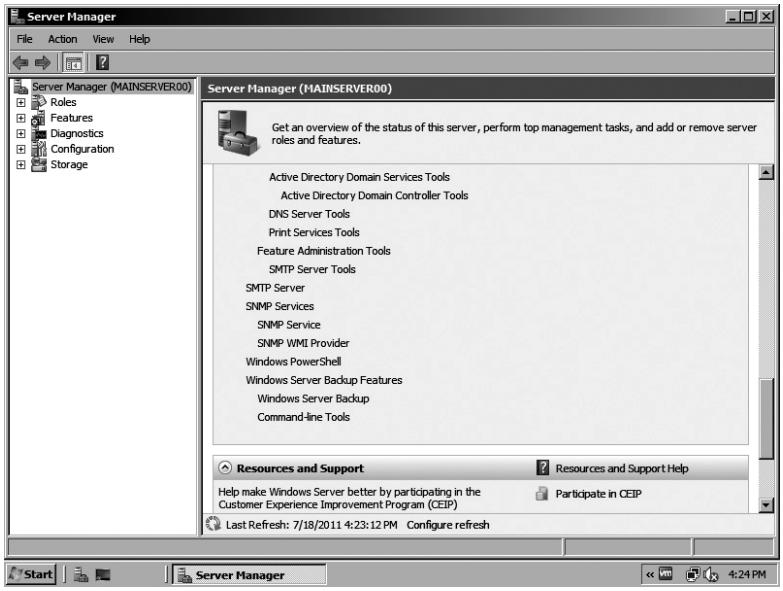


**Figure 12.28: SNMP installed**

6. Exit the **Server Manager** window.
7. Open the **Start** menu and select **Administrative Tools** and then **Services**.
8. Scroll down and locate **SNMP Service** and **SNMP Trap Service**. Verify that both services are running. If SNMP Trap is set to manual and not running, start it.

   ***Note:*** Do not exit the Services utility.

## ■ Part B: Configure SNMP

During Part B, you will configure SNMP parameters.

1. Select **SNMP Service**, right-click it, and select **Properties**. How is the start-up type configured?

   _____

   _____

2. Select the **Log on** tab. What account is configured as the **Log on** account?

   _____

3. Select the **Agent** tab. Which types of services are identified as managed by this computer (checked)?

   ***Note:*** To view a description of what each service indicates, select that service and press *F1*.

   _____

4. Type your name in the **Contact** field.
5. Select the **Traps** tab. Enter **Default** in the **Community name** field and click *Add to list.*
6. Under **Trap destinations**, click *Add.* How can you specify a trap desitnation?

   _____

7. Click *Cancel* to close the **SNMP Service Configuration** dialog box.
8 Select the **Dependencies** tab. On what services, if any, does SNMP depend?

   _____

9. What services, if any, depend on SNMP?

   _____

10. Click *OK* to save the changes and close the properties.
11. Close **Services**.