Module 9

Virtualization and Network Printing

Objectives

VIRTUALIZATION

Purpose of Virtualization

1. Desktop virtualization is used to separate a computer desktop environment from the physical computer
2. Occurs when a host machine uses its system resources to host a virtual machine
3. A virtual machine uses the system resources on the host machine to boot and run its own OS
4. The OS of the virtual machine is independent of the OS installed on the host machine
5. Considered a type of client-server computing model because the "virtualized" desktop may be stored on a centralized, or remote, server and not the physical machine being virtualized
6. Provides critical resources, such as applications, file-sharing services, and other productivity tools
7. Can provide access to programs that are not available on a specific OS
8. A virtual machine is sometimes called a guest

Hypervisor

1. The software that creates and manages a virtual machine on a host machine is called the hypervisor, or Virtual Machine Manager (VMM)
2. A hypervisor can run multiple virtual machines on a single host computer
3. Each virtual machine runs its own operating system
4. The number of virtual machines that can be made available depends on the host machine's hardware resources
5. The hypervisor allocates the physical system resources, such as CPU, RAM, and hard drive, to each virtual machine as needed
6. There are two types of hypervisors:
    A. A Type 1 (native) hypervisor runs directly on the hardware of a host and manages the allocation of system resources to guest operating systems
    B. A Type 2 (hosted) hypervisor is hosted by an OS

Virtual Software

1. Virtualization software allows a single host computer to create and run one or more virtual environments
2. Several companies make virtualization software for both desktops and servers
3. Server Virtualization:
   A. Windows Hyper-V
   B. VMWare vSphere
4. Desktop Virtualization:
   A. Windows Virtual PC
   B. VMWare Workstation (PC)
   C. Oracle VirtualBox (PC)
   D. VMWare Fusion (Mac)
   E. Parallels (Pac)

Virtual PC and XP Mode

1. Windows Virtual PC
   A. Type 2 hypervisor
   B. Allows you to divide system resources for the Windows OS among virtual machines running Windows 7, Windows Vista, or Windows XP
   C. Required to run the Windows XP Mode

Virtual PC and XP Mode

2. Windows XP Mode
   A. Available for Windows 7 Professional, Enterprise, and Ultimate
   B. Allows users to run Windows XP programs inside of Windows 7
   C. Opens a virtual machine on the Windows 7 desktop that provides a fully functional version of Windows XP, including access to all system resources
   D. After installing a program in Windows XP Mode, it can be accessed from the Windows 7 Start Menu
   E. To access XP Mode click Start > All Programs > Windows Virtual PC > Windows XP Mode
   F. You must download and install Virtual PC and XP Mode

Host Machine Requirements

Host machines must meet basic system requirements to run virtualization

Hardware	Requirements
Processor	1 GHz or higher 32-bit or 64-bit OS
Hard Drive Space	15 Gb per virtual machine
Memory	2 GB
Networking	Virtual network adaptor
Video	Super VGA or higher

Virtual Machine Requirements

Virtual machines must meet the basic system requirements of a typical OS

Virtual OS	Minimum Hard Disk Space	Minimum Memory
Windows 98	500 MB	64 MB
Windows ME	2 GB	96 MB
Windows 2000	2 GB	96 MB
Windows XP	2 GB	128 MB
Windows Vista	15 GB	512 MB
Windows 7	20 GB	1 GB

Security Requirements

1. Virtual machines are susceptible to attacks just like physical machines
2. Just like on physical machines, you should:
   A. Install antivirus/security software
   B. Install Windows updates
   C. Update drivers
   D. Use a firewall
   E. Update programs

NETWORKING PRINTING

Sharing Printers

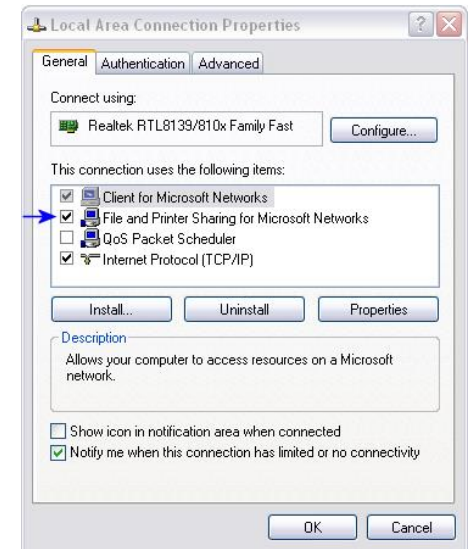1. Sharing printer resources is a huge savings to businesses and individuals
2. Common ways to share:
   A. Share a locally hosted printer over the network
   B. Directly connected to printers shared over the network
   C. Wired/Wireless printer servers sharing over the network:
      - Wireless printers allow hosts to connect and print wirelessly using Bluetooth, 802.11 standards
      - For wireless printers to use Bluetooth, both the printer and the host device must have Bluetooth capabilities and be paired
      - Wireless printers designed for 802.11 standards are equipped with installed wireless NICs and connect directly to a wireless router or access point
3. Wireless printers allow for printing from mobile devices

Print Servers

1. A hardware/software device that connects printers to client computers over a network. A print server has three functions:
    A. Provide client access to print resources
    B. Manage print jobs by storing them in a queue until the print device is ready for them and then spooling the print information to the printer
    C. Provide feedback to users
2. **Hardware Print Servers**
    A. Some printers do not have built-in network interfaces and require a separate print server device to allow network connectivity
    B. A hardware print server is a device and not a computer
    C. It connects to the network and printer to enable printers to be shared
3. **Software Print Servers**
    A. A computer can be used as a print server
    B. Built-in printer sharing capabilities is part of the operating system
4. Enable multiple computer users to access a single printer

Sharing a Printer in Windows XP

1. Turn on File and Print Sharing in XP:
    1. Click Start > My Network Places > View Network Connection in the left column >right- click on the Local Area Connection icon > Properties
    2. Under the "General" tab, check File and Printer Sharing for Microsoft Networks > OK
    3. Note: You may be asked to reboot the computer
2. Steps to configure a computer with the local printer attached to accept print jobs in Windows XP:
    1. Click Start > Control Panel > Printers and Other Hardware > Printers and Faxes
    2. Select the printer to share
    3. Select Share this printer
    4. In the Sharing tab, select Share this printer and enter the printer name
    5. To verify that sharing was successful, in the Printers and Faxes folder, check whether the printer icon has a hand under it, indicating that it is a shared resource

Local Area Connection Properties

General | Authentication | Advanced

Connect using:
Realtek RTL8139/810x Family Fast   Configure...

This connection uses the following items:
- ☑ Client for Microsoft Networks
- ☑ File and Printer Sharing for Microsoft Networks
- ☐ QoS Packet Scheduler
- ☑ Internet Protocol (TCP/IP)

Install...   Uninstall   Properties

Description
Allows your computer to access resources on a Microsoft network.

☐ Show icon in notification area when connected
☑ Notify me when this connection has limited or no connectivity

OK   Cancel

Sharing a Printer in Windows Vista

1. Turn on File and Print Sharing in Vista:
    1. Click Start > Control Panel > Network and Sharing Center > Change advanced sharing settings
    2. Expand the Home or Work network profile
    3. If printer sharing is off, under File and printer sharing, select Turn on file and printer sharing, and then click Save changes
2. Steps to configure a computer with the local printer attached to accept print jobs in Windows Vista:
    1. Click Start > Control Panel > Hardware and Sound > Printers
    2. Right-click the printer to share and choose Sharing (the Printer Properties dialog box opens)
    3. Select Share this printer and enter the desired shared printer name (this name is displayed to other users)
    4. To verify that sharing was successful, in the Printers window, check whether the printer has a share icon under it, indicating that it is a shared resource

Sharing a Printer in Windows 7

1. Turn on File and Print Sharing:
   1. Click Start > Control Panel > Network and Sharing Center > Change advanced sharing settings
   2. Expand the Home or Work network profile
   3. If printer sharing is off, under File and printer sharing, select Turn on file and printer sharing, and then click Save changes
2. Steps to configure a computer with the local printer attached to accept print jobs in Windows 7:
   1. Select Start > Devices and Printers
   2. Right-click the printer to share and choose Printer Properties (the Printer Properties dialog box opens)
   3. On the Sharing tab, select Share this printer and enter the desired shared printer name
   4. Select Render print jobs of client computers to have client process the print job instead of the print server (local computer)
   5. Select List in the directory to make it easier for users to locate and install printers
   6. Click OK
   7. To verify that sharing was successful, in the Devices and Printers window check whether the printer has a share icon under it, indicating that it is a shared resource

Connecting To A Shared Printer in Windows XP

Steps to connect to a shared printer from a Windows XP computer:

1. Click Start > Control Panel > Printers and Faxes > Add a Printer
2. The Add Printer wizard appears > Click Next
3. Select a network printer, or a printer attached to another computer
4. The Specify a Printer wizard appears.
   A. To search for a printer, choose Browse for a printer
   B. To specify a printer by name, choose Connect to this printer (or to browse for a printer > select this option > click Next) and type the name of the printer in the Name: box
   C. To specify a printer by location, choose Connect to a printer on the Internet or on a home or office network and type the location of the printer in the URL box
5. After selecting the printer, click Next
6. You can set the printer as the default printer and test it > Click Finish
7. Printer appears in the Printers and Faxes window

Connecting To A Shared Printer in Windows Vista

Steps to connect to a shared printer from a Windows Vista computer:

1. Click Start > Devices and Printers > Add a Printer
2. When the Add Printer wizard appears, select Add a network, wireless or Bluetooth printer
3. Select the printer form the list of shared printers > click Next
4. Give the printer a name > click Next
5. You can set the printer as the default printer, test it, and obtain additional drivers > click Finish
6. The new printer is displayed and ready to use

Connecting To A Shared Printer in Windows 7

Steps to connect to a shared printer from a Windows 7 computer:

1. Click Start > Devices and Printers > Add a Printer
2. When the Add Printer wizard appears, select Add a network, wireless or Bluetooth printer
3. Select the printer form the list of shared printers > click Next
4. Give the printer a name > click Next
5. You can set the printer as the default printer, test it, and obtain additional drivers > click Finish
6. The new printer is displayed and ready to use

Additional Printer Drivers

1. Users who can now connect to the shared printer might not have the required drivers installed or be using different operating systems than the computer that is hosting the shared printer.

2. Windows can automatically download the correct drivers to these users:

   A. Click the Additional Drivers button to select operating systems that the other users are using

   B. When you click OK, Windows will ask you for those additional drivers

Network Printer as Local

There may be a few instances where a network printer does not have a print servers or you want to directly connect to the network printer without using its print server:

1. Click Start > Devices and Printers > Add a Printer
2. When the Add Printer wizard appears, select Add a Local Printer
3. Create a new port and set the type as Standard TCP/IP Port > click Next.
4. Enter the IP address of the network printer > click Next (it will automatically detect if the drivers are available or ask you to locate them)
5. Enter the Printer name > click Next
6. It will then test the connection and ask if you want to share the printer > click Next
7. You can set the printer as the default printer and test it > click Finish

Summary

In this module we discussed:
1. Purpose of virtualization
2. Types of hypervisors
3. Types of software
4. Virtual PC and XP mode
5. Host and virtual machine requirements
6. Security requirements
7. Ways to share printers in XP, Vista, 7
8. Print servers

Glossary and Terms

1. **Virtualization** – Used to separate a computer desktop environment from the physical computer.
2. **Hypervisor** – The software that creates and manages a virtual machine on a host machine.
3. **VMM** – Virtual Machine Manager
4. **Type 1 Hypervisor** – Native. Runs directly on the hardware of a host and manages the allocation of system resources to guest operating systems.
5. **Type 2 Hypervisor** – Hosted. Runs along with an operating system.
6. **XP Mode** – Opens a virtual machine on the Windows 7 desktop that provides a fully functional version of Windows XP, including access to all system resources.