CNT 4603: System Administration
Fall 2010

Introduction

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Windows Server 2008 Platforms

- Different styles of operating systems
  - For different business needs
- Eight versions:
  - Windows Server 2008 Standard Edition
  - Windows Server 2008 Enterprise Edition
  - Windows Web Server 2008
  - Windows Server 2008 Datacenter Edition
  - Windows Server 2008 for Itanium-Based Systems
  - Windows Server 2008 Standard Edition without Hyper-V

Windows Server 2008 Platforms

- Windows Server 2008 Enterprise Edition without Hyper-V
- Windows Server 2008 Datacenter Edition without Hyper-V

Windows Server 2008 Standard Edition

- Most basic server version
- Basis for other versions
- Everyday needs of small to large businesses
- Used on x86 and x64 computers
- Supports:
  - File and print sharing
  - Essential network services
  - Application and other sharing
  - Multiprocessor computers
    - **Symmetric multiprocessor (SMP)**

Windows Server 2008 Standard Edition

- Compatible with Microsoft .NET Framework and Microsoft Visual Studio .NET
- **Hyper-V**
  - **Virtualization** environment
  - Cuts cost by using fewer computers
  - Only runs on x64 computers

Windows Server 2008 Enterprise Edition

- Intended for midsized and large organizations with scaling needs
- Supports x86 and x64
- Enables **clustering**
  - Links two or more computers systems to provide fail-safe services
- Supports **hot-add memory**
  - Can add RAM without shutting down
- **Fault tolerant memory sync**
- Provides Microsoft Metadirectory Services

Windows Web Server 2008

- Designed for hosting and deploying Web services and applications
- Supports x86 and x64 computers
- Cannot be used to manage directory resources via hosting Active Directory

Windows Server 2008 Datacenter Edition

- Designed for:
  - Environments with mission-critical applications
  - Very large databases
  - Information access requiring high availability
- Support for clustering with up to 16 computers
- RAM capabilities identical to Enterprise Edition

Windows Server 2008 for Itanium-Based Systems

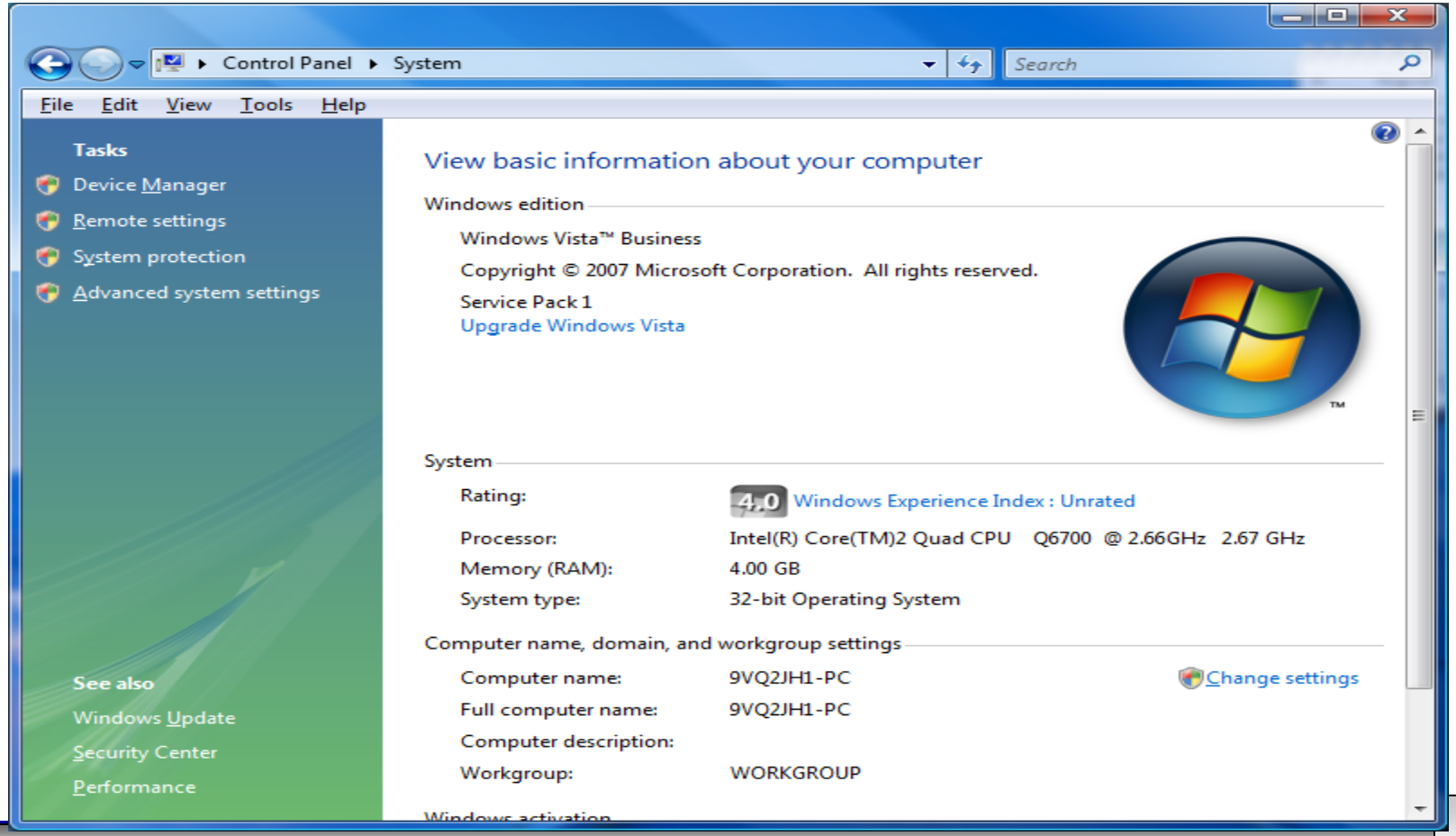
- Itanium processor
  - 64-bit processor that allows more instructions per processor cycle than typical x86 and x64 processors
- 2TB maximum RAM
- Supports:
  - Hot-add memory, processor
  - Hot-replace processor
  - SMP
- Intended for resource-intensive applications

Windows Server 2008 Versions Without Hyper-V

- Non-Hyper-V versions:
  - Windows Server 2008 Standard Edition without Hyper-V
  - Windows Server 2008 Enterprise Edition without Hyper-V
  - Windows Server 2008 Datacenter Edition without Hyper-V
- Small cost savings
- Steps to access virtual server in Microsoft Hyper-V

Windows Server 2008 Versions Without Hyper-V

- Activity 1-1: Determining the Windows Server 2008 Edition



Using Windows Server 2008 with Client Systems

- **Client**
  - Accesses resources on another computer via a network or direct cable connection
- **Workstation**
  - Has its own central processing unit (CPU)
  - Can be used as a stand-alone or network computer
- **Total cost of ownership (TCO)**
  - Full cost of owning a network
  - Using Windows Server 2008 and Windows Vista or Windows 7 reduces TCO

Using Windows Server 2008 with Client Systems

- **Domain**
  - Grouping of network objects, such as computers, servers, and user accounts
- **Windows 7**
  - Ideal for networking
  - Advantages and new features
- **Active Directory**
  - Database of computers, users, groups of users, shared printers, shared folders, and other network resources

Using Windows Server 2008 with Client Systems

- **Subsystem for UNIX-based Applications (SUA)**
  - Windows Server 2008 support for UNIX and Linux clients

Windows Server 2008 Features

- Server Manager
- Security
- Clustering
- Enhanced Web services
- Windows Server Core
- Windows PowerShell
- Virtualization
- Reliability
- Multitasking and multithreading

Server Manager

- Manage configuration from one tool
- Uses of Server Manager:
  - View computer configuration information
  - Change properties of a system
  - View network connections
  - Configure Remote Desktop
  - Configure security

Server Manager

- Uses of Server Manager (cont'd.):
  - Configure security
  - Configure server roles
  - Add and remove features
  - Run diagnostics
  - Manage storage and backup

Security

- **Network Access Protection (NAP)**
  - Umbrella of security protection features
  - Capabilities
- Security implemented by default
- Security Configuration Wizard (SCW)
  - Simplifies security configuration
- Other basic security features

Clustering and Clustering Tools

- Testing
- Migrate configuration settings
- Quick configuration and troubleshooting
- Storage configuration
- Performance and reliability
- Security

Enhanced Web Services

- Microsoft **Internet Information Services (IIS)**
  - Enhanced security
  - Easier application of patches
  - Easier for programmers to write and configure Web applications
  - Better management tools: IIS Manager

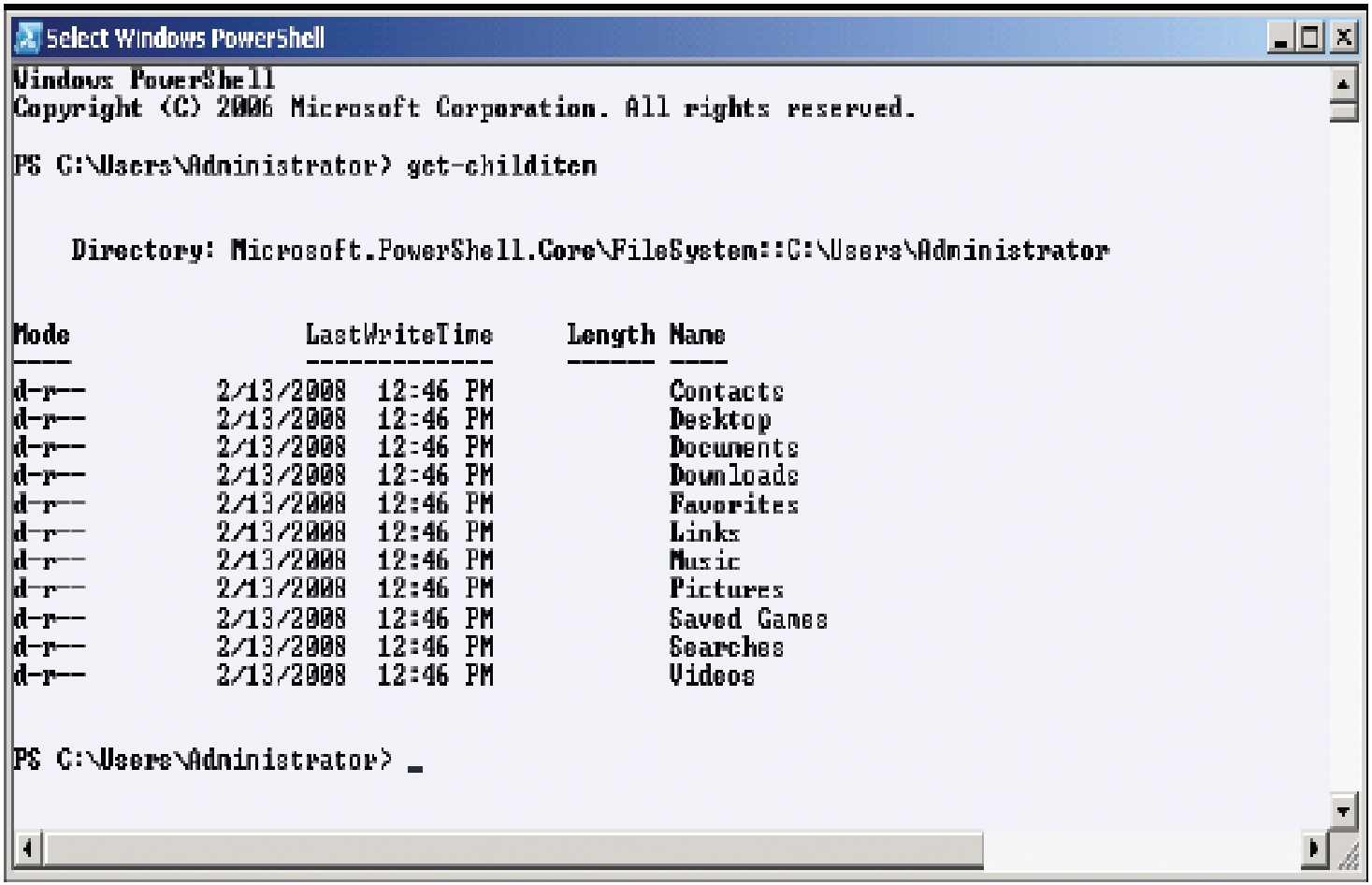
Windows Server Core

- Minimum server configuration
- Advantages:
  - No GUI overhead
  - Less disk space and memory needed
  - Smaller attack surface
- Interact with server via command line

Windows PowerShell

- Command-line interface that offers a shell
- Perform common administration tasks
- Use **cmdlets**
  - 130 command line-tools
- Scripting language

Windows PowerShell



Virtualization

- Using Hyper-V
- Capabilities:
  - Compatible with clustering
  - Able to handle up to a four-processor SMP computer
  - Can be used with Windows and Linux operating systems
  - Compatible with different types of disk storage methods
  - Enables fast migration from one computer to another
  - Can house 64-bit and 32-bit operating

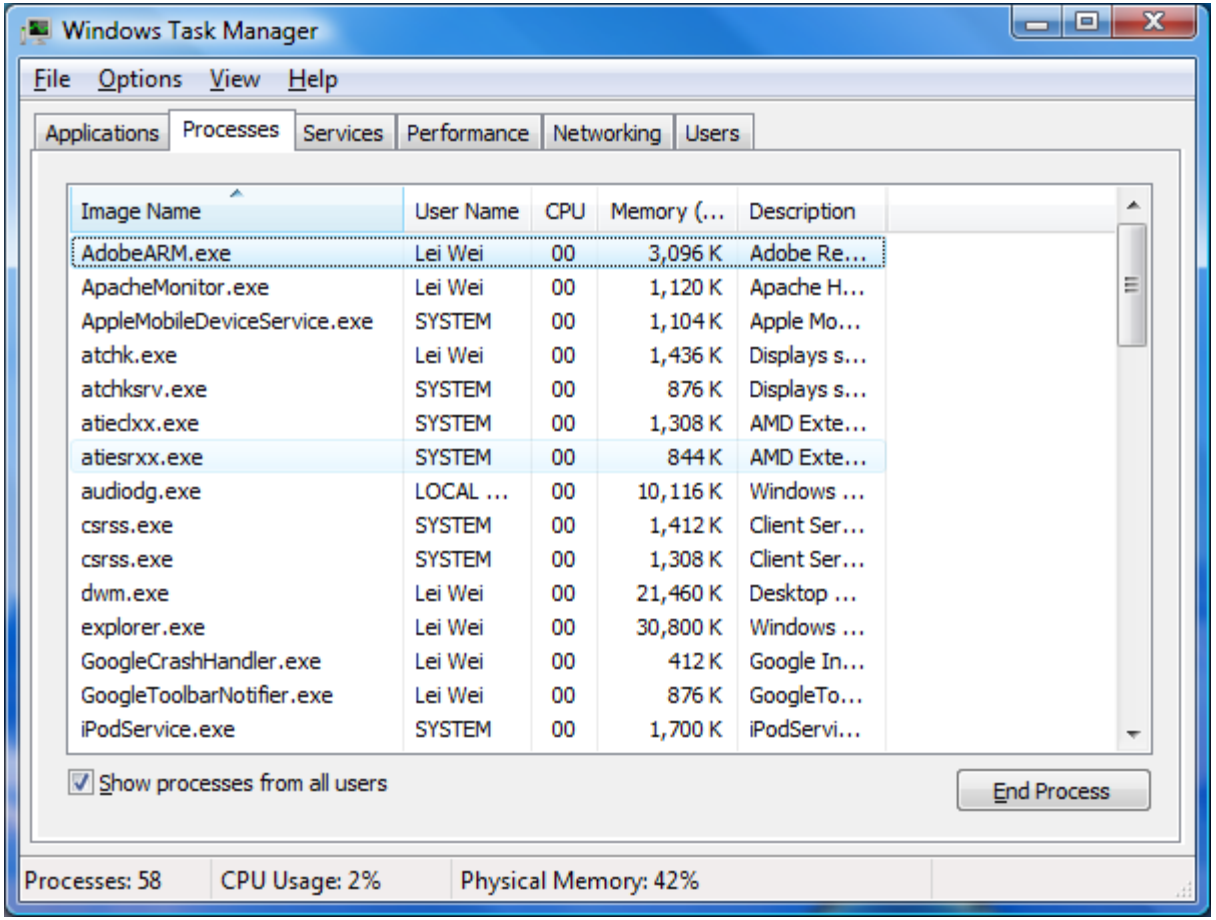
Reliability

- **Kernel** runs in **privileged mode**
  - Core programs; computer code of operating system
  - Extra level of security
- Protected **processes**
  - Computer program or portion of program
  - Protects premature interruption
- Management features:
  - Server Manager
  - Wizards
  - Windows Reliability and Performance Monitor

Multitasking and Multithreading

- **Multitasking**
  - Ability to run two or more programs at the same time
- **Multithreading**
  - Capability of programs written to run several program code blocks at the same time
  - **Preemptive multitasking**

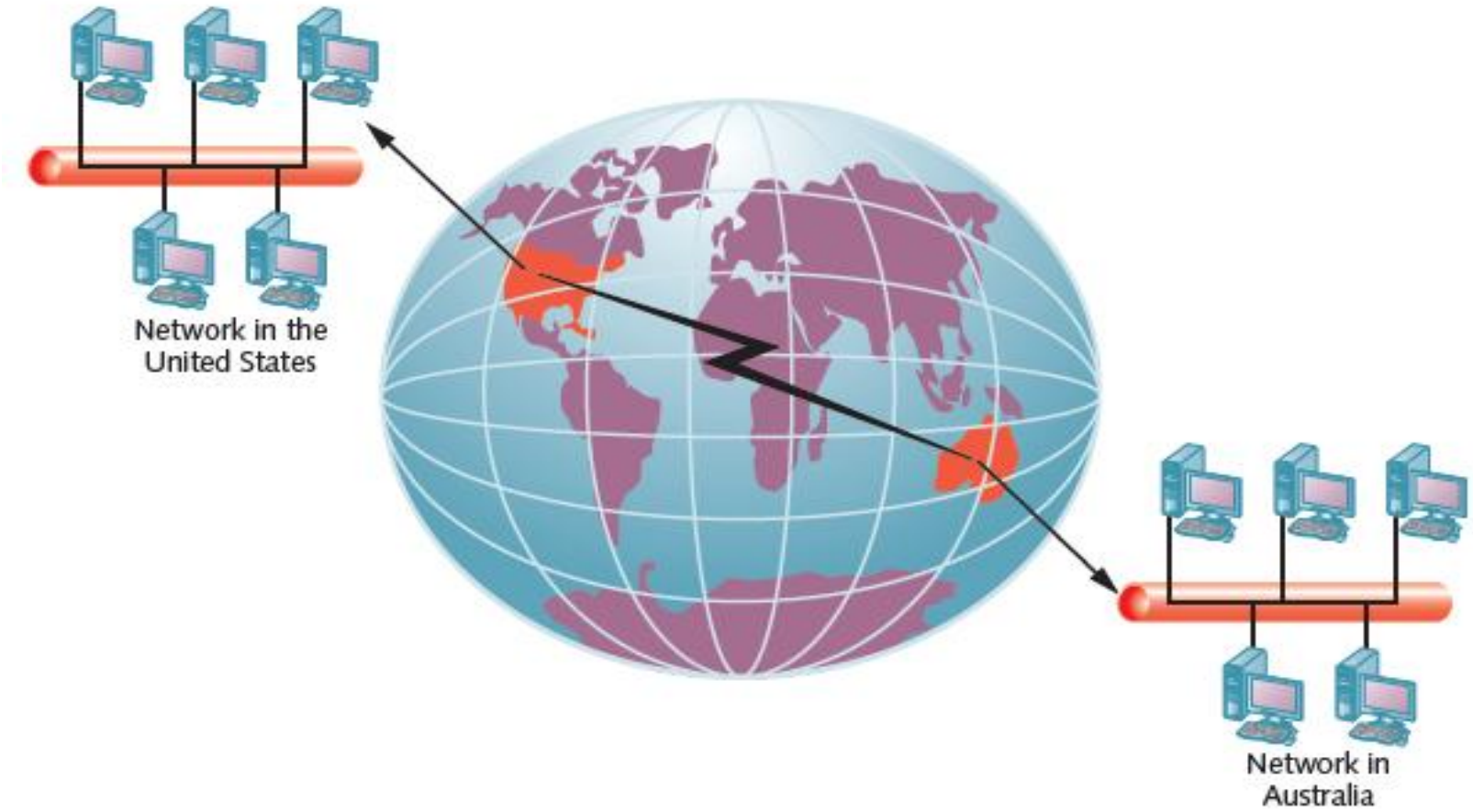
Multitasking and Multithreading (cont'd.)



Planning a Windows Server 2008 Networking Model

- **Network**
  - Communication system
  - Enables computer users to share equipment, software, data, and transmissions
- **Peer-to-peer networking**
  - Spreads resource administration among server and nonserver members of network
  - Used by small businesses
- **Server-based networking**
  - Centralizes network administration on servers
  - Used by medium and large networks

Planning a Windows Server 2008 Networking Model



Peer-to-Peer Networking

- One of the simplest ways to configure a network
- No special computer needed
- Disadvantages:
  - Network management decentralized
  - Security is responsibility of each user
  - Less effective as number of workstations exceeds 10
- Activity 1-3: Determining if a Computer Is in a Domain or a Workgroup
  - Objective: Discover if a particular computer is in a domain or a workgroup

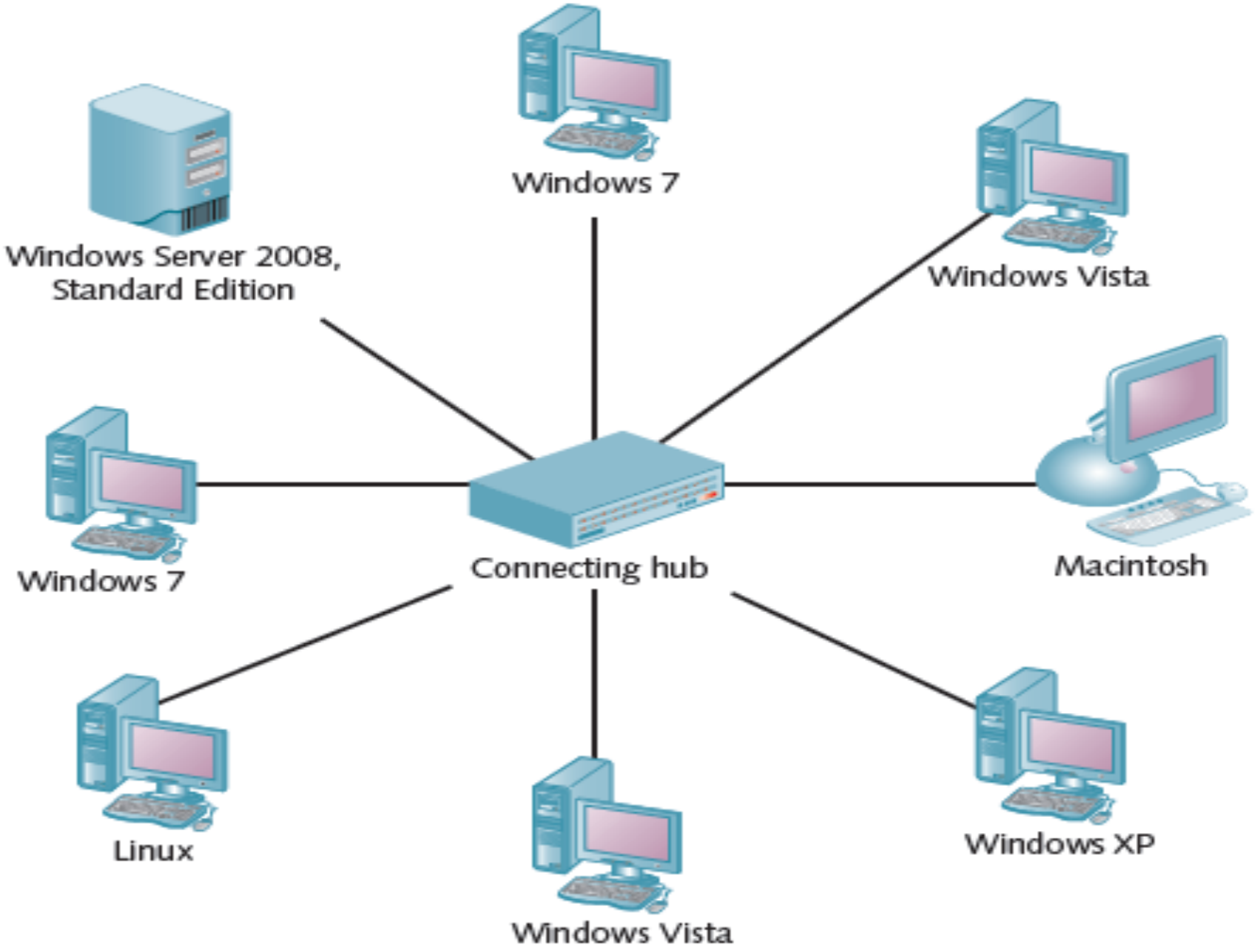
Server-Based Networking

- **Server**
  - Single server can act as file and print server, Web server, network administration server, database server, e-mail server
  - Can handle many users at once
- Advantages
  - Single log on
  - Stronger security
  - Sharing of files and resources
  - E-mail server

Server-Based Networking (cont'd.)

- Advantages (cont'd.)
  - Software applications are shared
  - Databases are managed and secured
  - Easier backups
  - Resource sharing can be customized
  - Software updates quicker and easier to install

Server-Based Networking



Protocols for the Windows Server 2008 Networking Model

- **Protocol** sets guidelines for:
  - Data formatting into packets and frames
  - Data transmission
  - Interpretation of packets and frames
- **Packets** and **frames**
  - Units of data transmitted from a sending computer to a receiving computer

Protocols for the Windows Server 2008 Networking Model

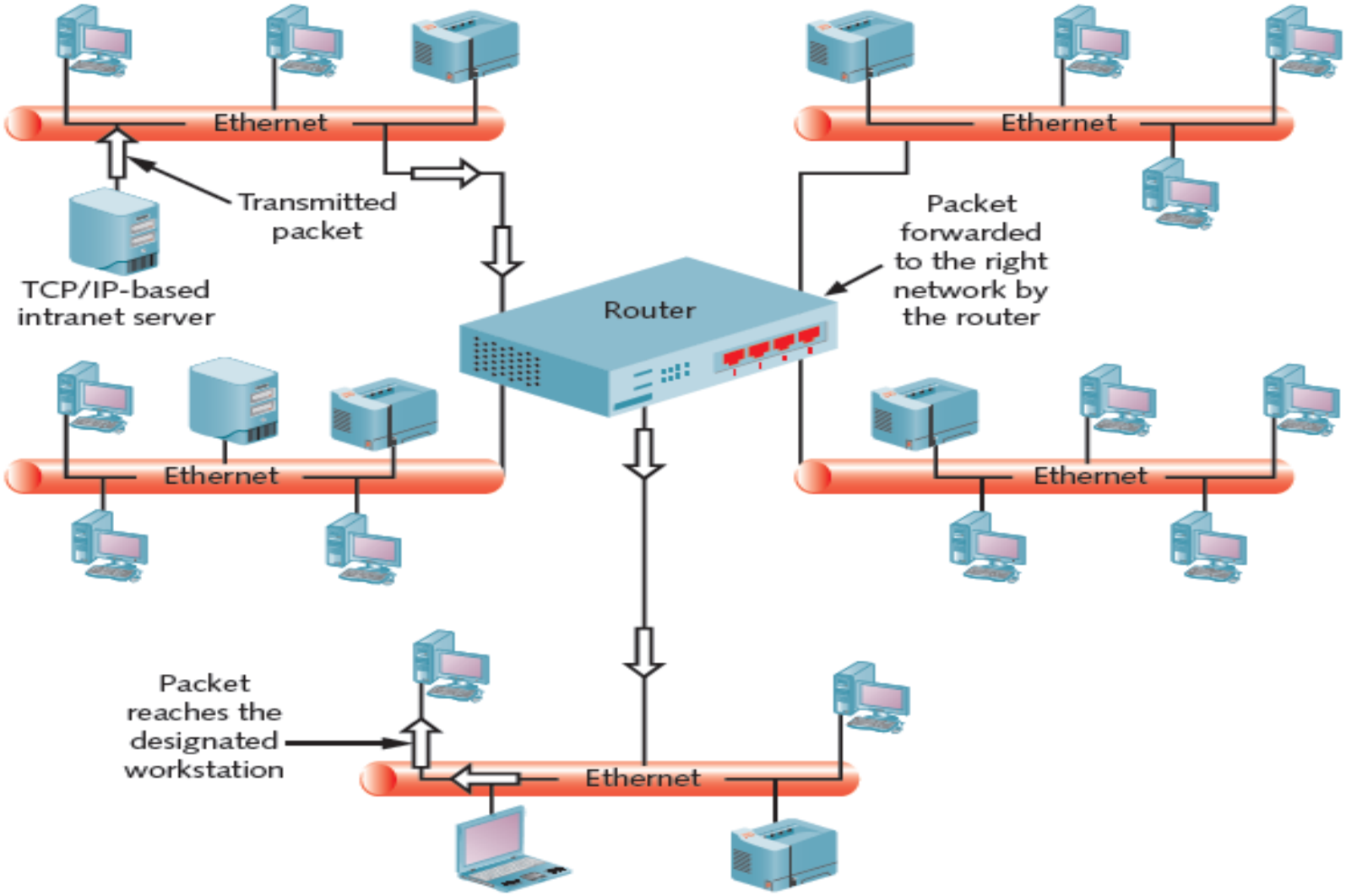
- **Transmission Control Protocol/Internet Protocol (TCP/IP)**
  - Suite of protocols and utilities that support communication across LANs and the Internet
- **Local area network (LAN)**
  - Network of computers in relatively close proximity
- TCP/IP used for several reasons

Transmission Control Protocol

- Provides for reliable end-to-end delivery of data by controlling data flow
- **Connection-oriented communication**
  - Ensures that packets are delivered in correct sequence with accurate contents

Internet Protocol

- Provides network addressing
  - Ensures data packets quickly reach the correct destination
- Versions
  - **Internet Protocol Version 4 (IPv4)**
    - Used on most networks
  - **Internet Protocol Version 6 (IPv6)**
- **Router**
  - Connects networks



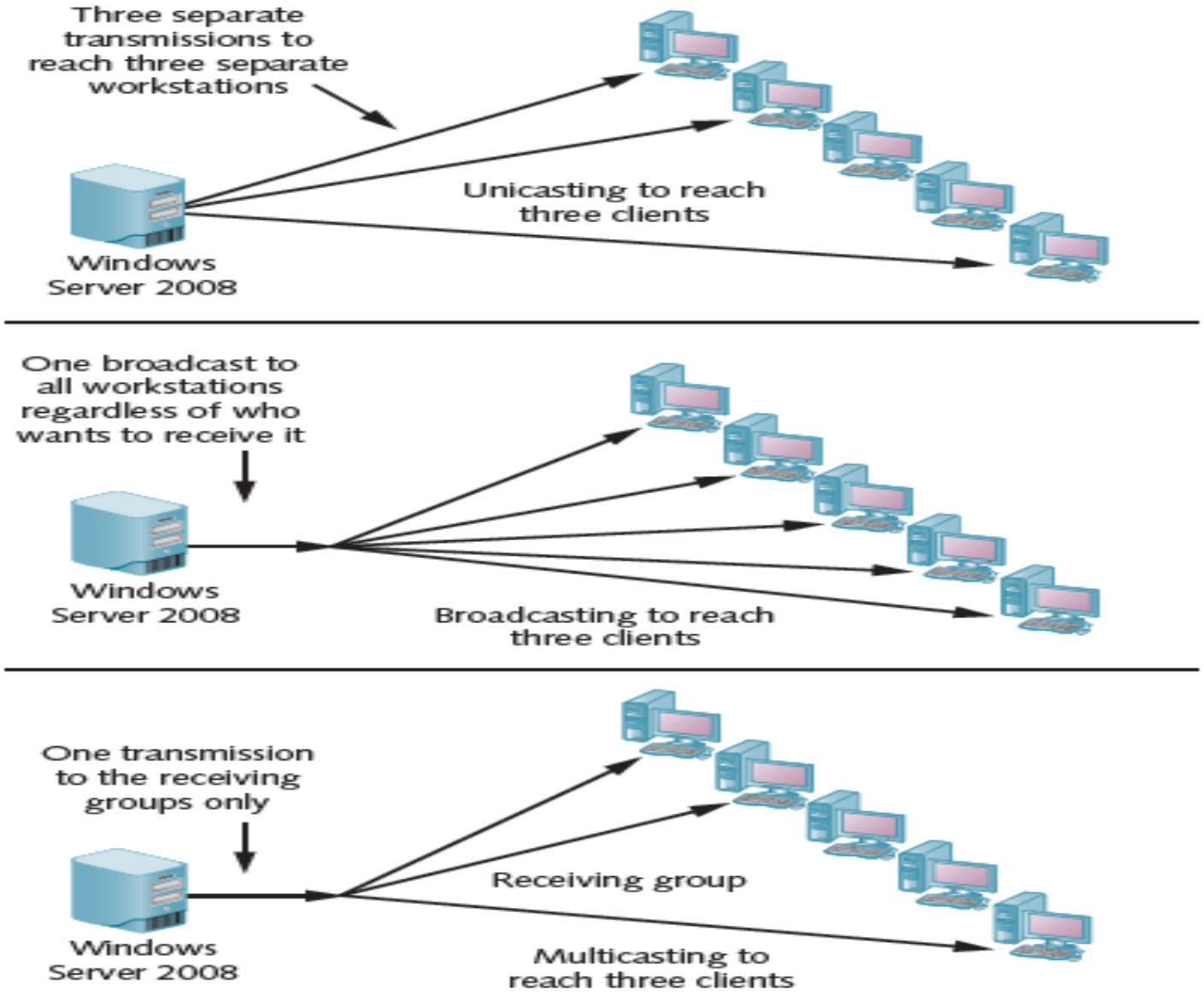
A router forwarding packets to a designated network

Internet Protocol

- **IP addressing**
  - Dotted decimal notation
  - 32 bits long
  - Four fields
  - Example: 10000001.00000101.00001010.01100100 or 129.5.10.100
- **Unicast**
  - One packet is sent from a server to each client on request
- **Multicast**
  - Packet is sent to all clients as a group

Internet Protocol

- **Broadcast**
  - Sends communication to all points on network
- **Subnet mask**
  - Used to show class of addressing and to divide network into subnets
- IP address considerations
  - Network number 127.0.0.0 cannot be assigned to any network
  - Private addresses reserved for **Network Address Translation (NAT)**
  - Cannot assign highest network number to a host



Unicasting, broadcasting, and multicasting

Internet Protocol

- Testing for IP Address and Connectivity
  - Later we'll see how this is done using the Windows Server 2008 Command Prompt window with the *pathping* and *tracert* commands
- Internet Protocol version 6
  - Overcomes limitations of IPv4
  - 128-bit address capability
  - Single address associated with multiple network interfaces
  - IP extension headers

Internet Protocol

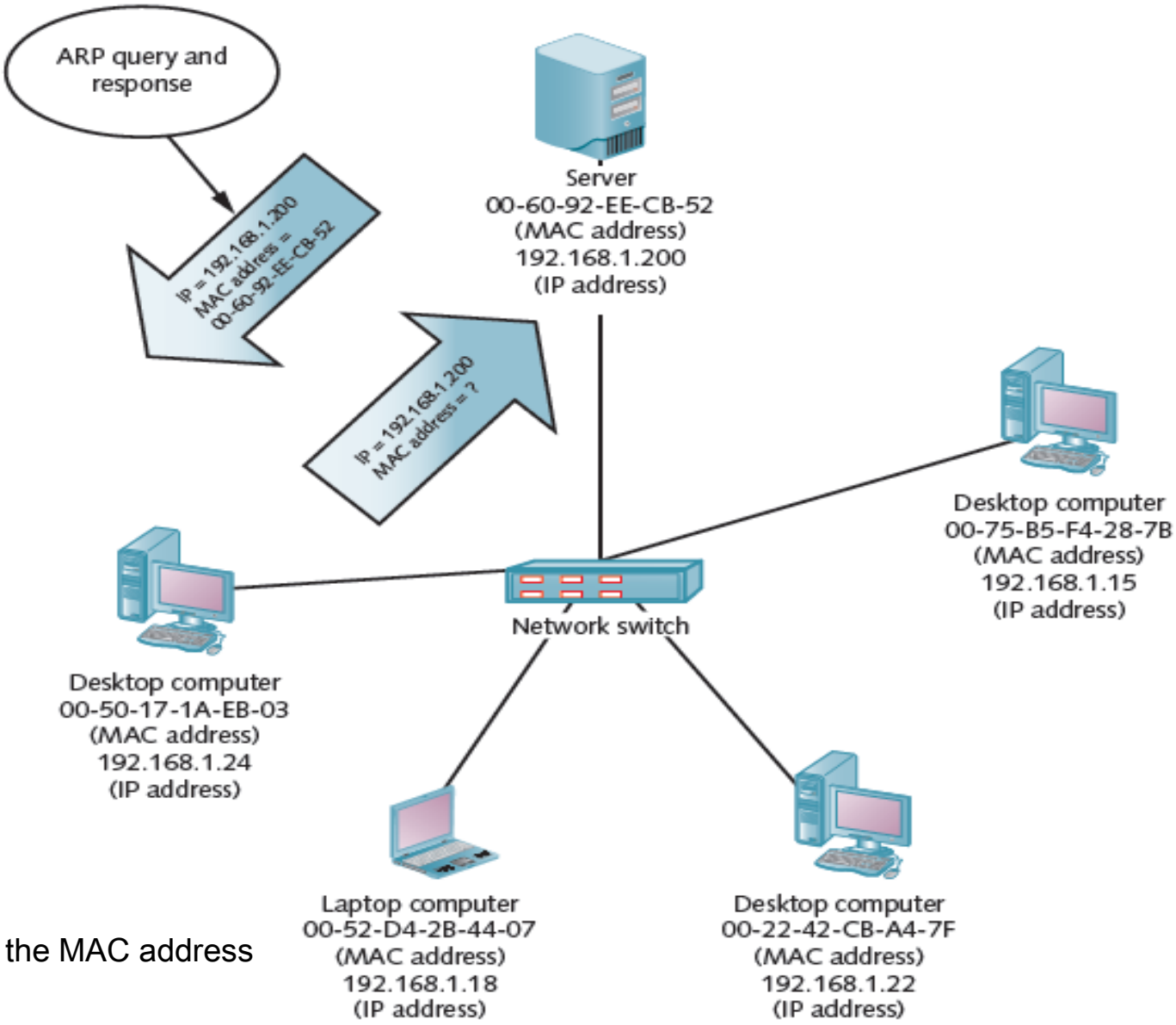
- **Static addressing**
  - Assign permanent IP address
  - Gives consistency for monitoring
  - Can be laborious for large networks
- **Dynamic addressing**
  - IP address assigned during logon
  - Uses the **Dynamic Host Configuration Protocol (DHCP)**

Internet Protocol

- **Default gateway**
  - IP address of the router that has a connection to other networks
- **Name resolution**
  - **Domain Name System (DNS)** translates domain and computer names to IP addresses
- **NetBIOS names**
  - **Windows Internet Naming Service (WINS)** server resolves NetBIOS names to IP addresses
- **Host names**
  - **Dynamic Domain Name System (DDNS)**

Physical Addresses and the Address Resolution Protocol

- **Address Resolution Protocol (ARP)**
  - Acquire the physical addresses associated with a computer's network interface card (NIC)
- **Media access control (MAC) address**
  - Physical address of NIC
- TCP/IP relies on both IP addresses and MAC addresses



Using ARP to query the MAC address

Implementing TCP/IP in Windows Server 2008

- Tasks
  - Verify TCP/IP enabled
  - Configure TCP/IP

Enabling TCP/IP

- TCP/IP
  - Only protocol installed by default when you install Windows Server 2008

Configuring TCP/IP

- Choose static or dynamic addressing
- **Automatic Private IP Addressing (APIPA)**
  - Automated addressing through automatic private IP addressing
- Dynamic addressing through a DHCP server