LESSON 5.1

98-365 Windows Server Administration Fundamentals

Identify Major Server Hardware Components

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Lesson Overview

In this lesson, you will learn:

- Server form factors
- Server processors
- Network components
- Storage options
- Memory
- Server cooling
- Server ports

Anticipatory Set

- What processor type is required for Windows® Server 2008® R2?

Server Form Factors

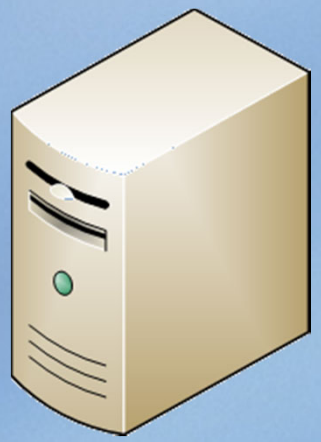
- Servers are designed to run for long periods without interruption, which makes hardware reliability and durability extremely important.
- Servers typically contain a higher number of computer fans or water cooling systems to remove heat.

  Servers will have hardware redundancy such as:

  - Power supplies
  - Fans
  - Hard drives

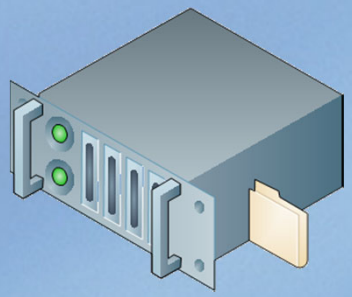
Server Form Factors (continued)

- Tower-form factor
  - Free-standing in tower chassis configuration
  - Tower-based servers have the same capabilities as rack-mountable servers.
  - Typically used in small business that do not require more than one or two servers



Server Form Factors (continued)

- Rack-mounted servers
  - Typically found in businesses that have more than two servers
  - Typically mounted on rails in a rack cabinet
  - Can be stacked on top of one another and accessed by the rail system, which is similar to a cabinet drawer
    - Reduces the footprint the server leaves in the datacenter
    - 3U rack-mounted server
    - Standard 19" rack cabinet enclosure



Server Processors

- Processor selection will be based on the server role and server operating system that will be installed.
  - Windows Server 2008 has both 32-bit and 64-bit versions
  - Windows Server 2008 R2 requires a 64-bit processor
- Multi-core processor
  - A single chip containing more than one microprocessor core
  - Multiplies performance with the number of cores
  - Operating system must be designed to support and recognize multiple cores or processors.

Network Components

- Network interface controller (NIC)
  - A hardware device that connects a server's interface to a computer network and allows a network-capable device to access that network
- A NIC is both a physical and data link layer device on the OSI Reference Model.
- A NIC is typically available in 10/100/1000 Mbps.
- Contemporary servers typically are configured with at least two 10/100/1000 Mbps adapters.
- Multiple server NICs can be "teamed" together to perform as one, thus allowing for twice the throughput as a single NIC.
  - Server 1 has two 1 Gbps NICs.
  - Both NICs can be configured to perform as a single NIC giving it a total throughput of 2 Gbps.

Storage Options

- Hard disks servers can be configured with Direct Access Storage (DAS) as well as Storage Area Network devices.
  - DAS is made of a data storage device connected directly to a computer through a Host Bus Adapter (HBA).
    - Serial Attached SCSI (SAS) is a computer bus used to move data to and from storage devices such as hard drives and tape drives.
  - SAN is an architecture to attach remote computer storage devices to servers such that the devices appear as locally attached to the operating system.
    - Typically connected using the SCSI protocol for communication between servers and disk drive devices
    - They are mapped to other protocols to form a network:
    - Fiber Channel Protocol (FCP)—the most prominent protocol, mapping SCSI over fiber channel.

Memory

- Refers only to a computer's main memory, the fast semiconductor storage (RAM) directly connected to the processor.
- Memory Types

Server Cooling

- In 2010, servers were responsible for 2.5% of energy consumption in the United States. A further 2.5% of United States energy consumption was used by cooling systems required to cool the servers [1].
- Server cooling reaches beyond internal fans.
- Heat generated by data center components must be removed, otherwise the heat will cause a malfunction.
- Air conditioning is used to control the temperature and humidity in the data center.
- A uninterruptable power supply (UPS) should be a standard component of any server rack enclosure or data center.
  - UPS is not used to maintain power, but to allow for a graceful power-down of all components or to switch to alternative power.

[1]"ARM chief calls for low-drain wireless". *The Inquirer*. 29 June 2010. http://www.theinquirer.net/inquirer/news/1719749/arm-chief-calls-low-drain-wireless.

Server Ports

- Servers share similar characteristics to desktop computers as it relates to the various port options available.
- Standard server ports include:
  - Universal serial bus (USB)
  - SVGA
  - Parallel
  - Serial
  - PS/2
  - SCSI
- Optional server ports may include:
  - Fiber channel
  - Firewire

Lesson Review

- What is the standard unit of measurement for a rack?
- Why is planning important when selecting a rack enclosure?
- Why is it important to have a climate controlled data center?