CompTIA A+ Core 1 Exam 220-1101

Lesson 2

Installing System Devices

Objectives

- Install and configure power supplies and cooling
- Select and install storage devices
- Install and configure system memory
- Install and configure CPUs

Lesson 2

Topic 2A

Install and Configure Power Supplies and Cooling

Power Supply Units

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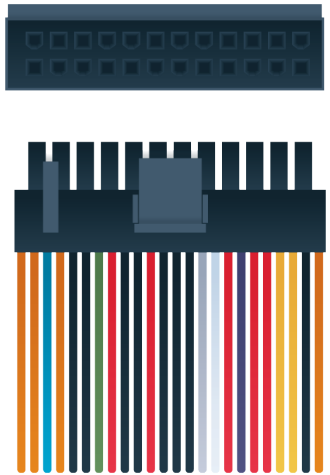
- Power Supply Unit (PSU) components
  - Alternating current (AC) to direct current (DC) conversion
  - Filters and regulators
  - Fans
- Input volts AC (VAC)
  - 100-127 VAC (low-line)
  - 220-240 VAC (high-line)
  - Manual, auto-switching, and fixed PSU types

Wattage Rating

- Power requirement
  - Volts DC (VDC)
  - Watts — Voltage (V) * Current (I)
- Wattage rating
  - Power efficiency
- Output voltages
  - 3.3V, 5V, 12V rails
  - Power distribution

Power Supply Connectors

- Power supply form factors
- P1 connector
  - 20-pin versus 24-pin
  - Adapters
- Modular connectors
- Redundant power supplies



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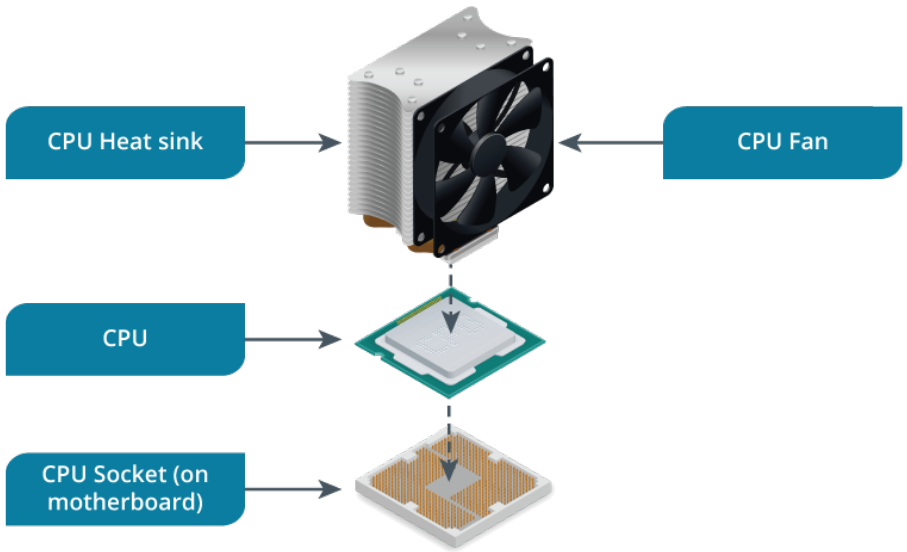
Fan Cooling Systems



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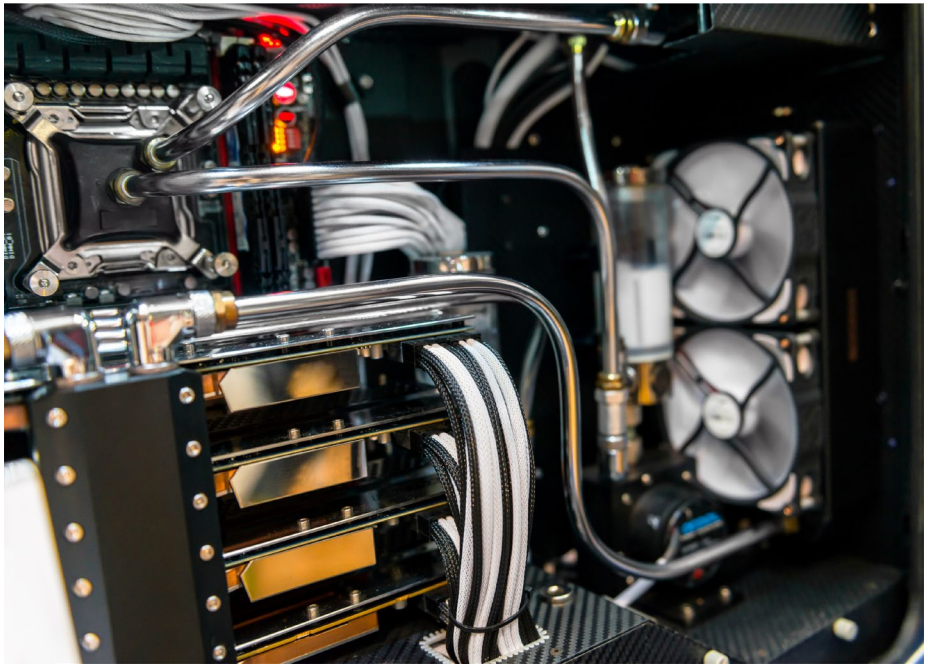
- Heat sinks
  - Thermal paste
  - Thermal pad
- Device and chassis fans
  - Airflow
  - Sensors
  - Cleaning and maintenance

Liquid Cooling Systems

- Water loop/tubing, pump, and reservoir
- Water blocks and brackets
- Radiators and fans



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Review Activity: Power Supplies and Cooling

- Power Supply Units
- Wattage Rating
- Power Supply Connectors
- Fan Cooling Systems
- Liquid Cooling Systems
- Power Supplies and Cooling

Lab Activity

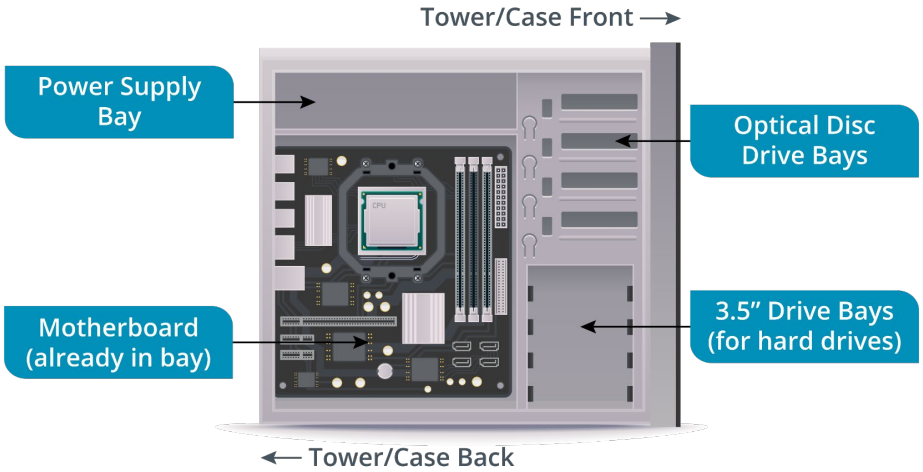
- Virtual Workbench Lab: Install Power Supplies and Cooling

Lesson 2

Topic 2B

Select and Install Storage Devices

Mass Storage Devices



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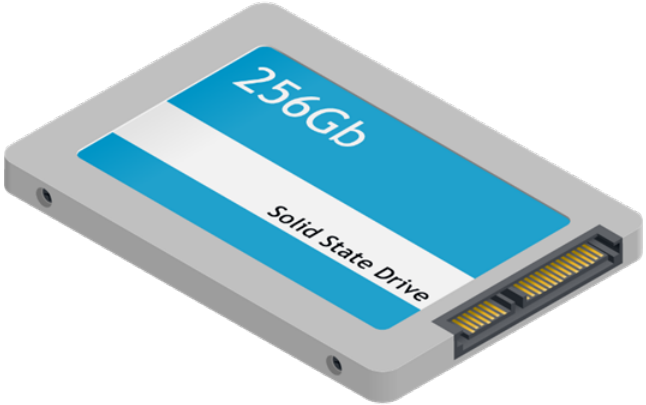
- Drive bays and drive unit form factors
  - 5.25", 3.5", 2.5"
  - Drive caddies
- External and removable storage
- Reliability and performance comparisons

Solid-State Drives

- SSD performance characteristics
  - Wear leveling
  - Use as boot drive with additional hard disk drives
- Interfaces
  - Serial ATA (SATA) and mSATA
  - PCI Express (PCIe) adapter slot and Non-volatile Memory Express (NVMe)
  - M.2 adapter (SATA or NVMe)



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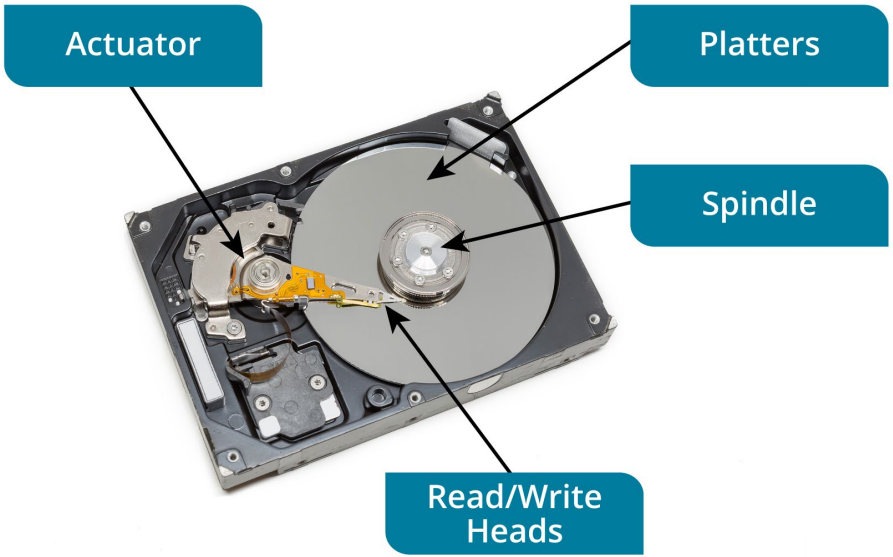
Hard Disk Drives



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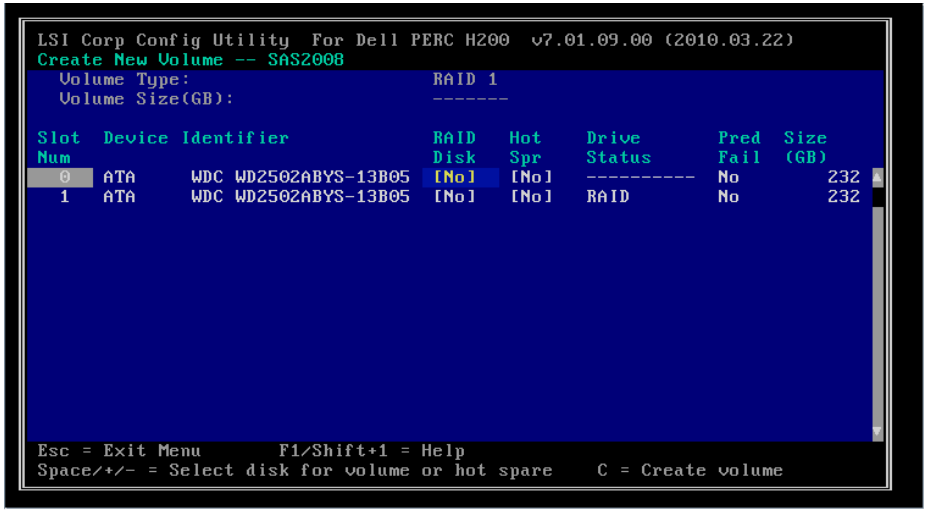
- HDD characteristics
  - Speed (RPM)
  - Latency
- Interfaces
  - SATA, EIDE, and SCSI
- Form factors
  - 3.5” and 2.5”

Redundant Array of Independent Disks

- Fault tolerance
- Drive configurations and RAID levels
- Software versus hardware RAID



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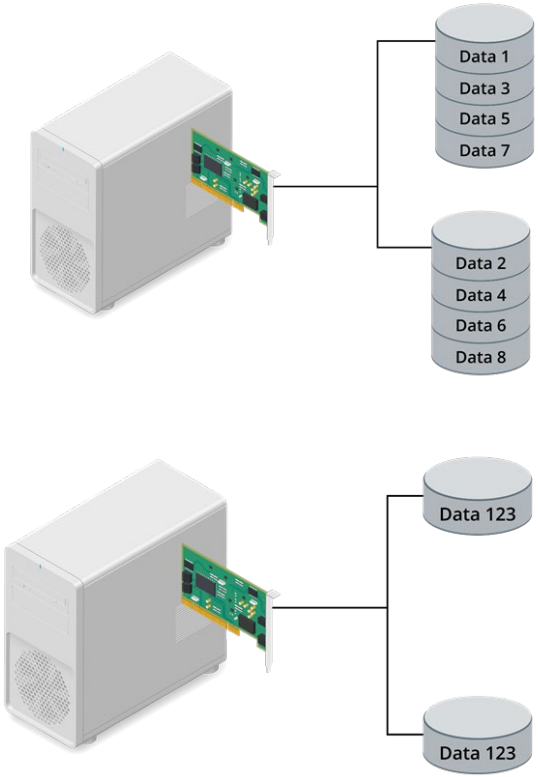
RAID 0 and RAID 1



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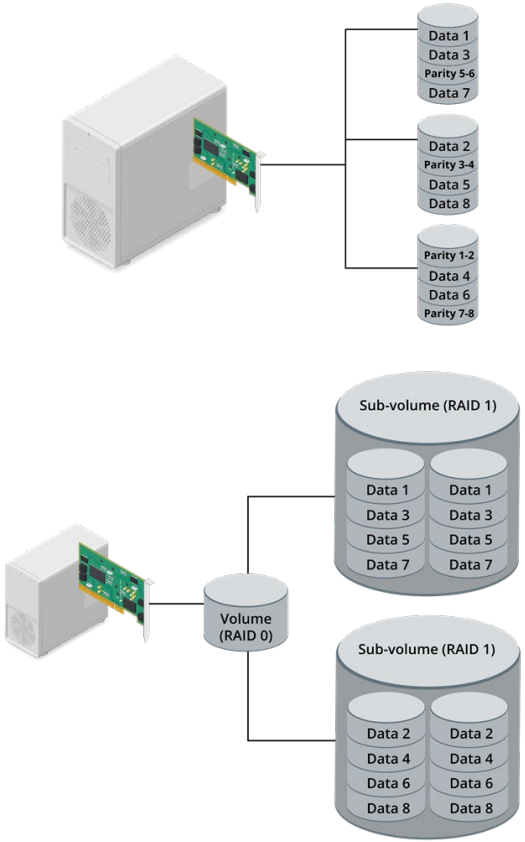
- RAID 0
  - Disk striping for performance
  - No fault tolerance
- RAID 1
  - Mirroring two disks for redundancy
  - Only 50% disk capacity available to volume

RAID 5 and RAID 10



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- RAID 5
  - Distributed parity
  - Can sustain single device failure
  - Capacity depends on number of disks
- RAID 10
  - Stripe of mirrors requiring at least four disks
  - Can sustain one device failure in each sub-volume
  - Only 50% disk capacity available to volume

Removable Storage Drives

- Drive enclosures
- Flash drives
- Memory cards
  - Form factors and readers

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Optical Drives

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- Optical disc types
  - Compact Disc (CD)
  - Digital Versatile Disc (DVD)
  - Blu-Ray Disc (BD)
- Recording formats
  - Recordable versus multisession recordable
  - Rewritable
- Optical drive features

Review Activity: Storage Devices

- Mass Storage Devices
- Solid-State Drives
- Hard Disk Drives
- Redundant Array of Independent Disks
- RAID 0, RAID 1, RAID 5, and RAID 10
- Removable Storage Drives
- Optical Drives

Lab Activity

- Virtual Workbench Lab: Install and Configure SSD Storage

Lesson 2

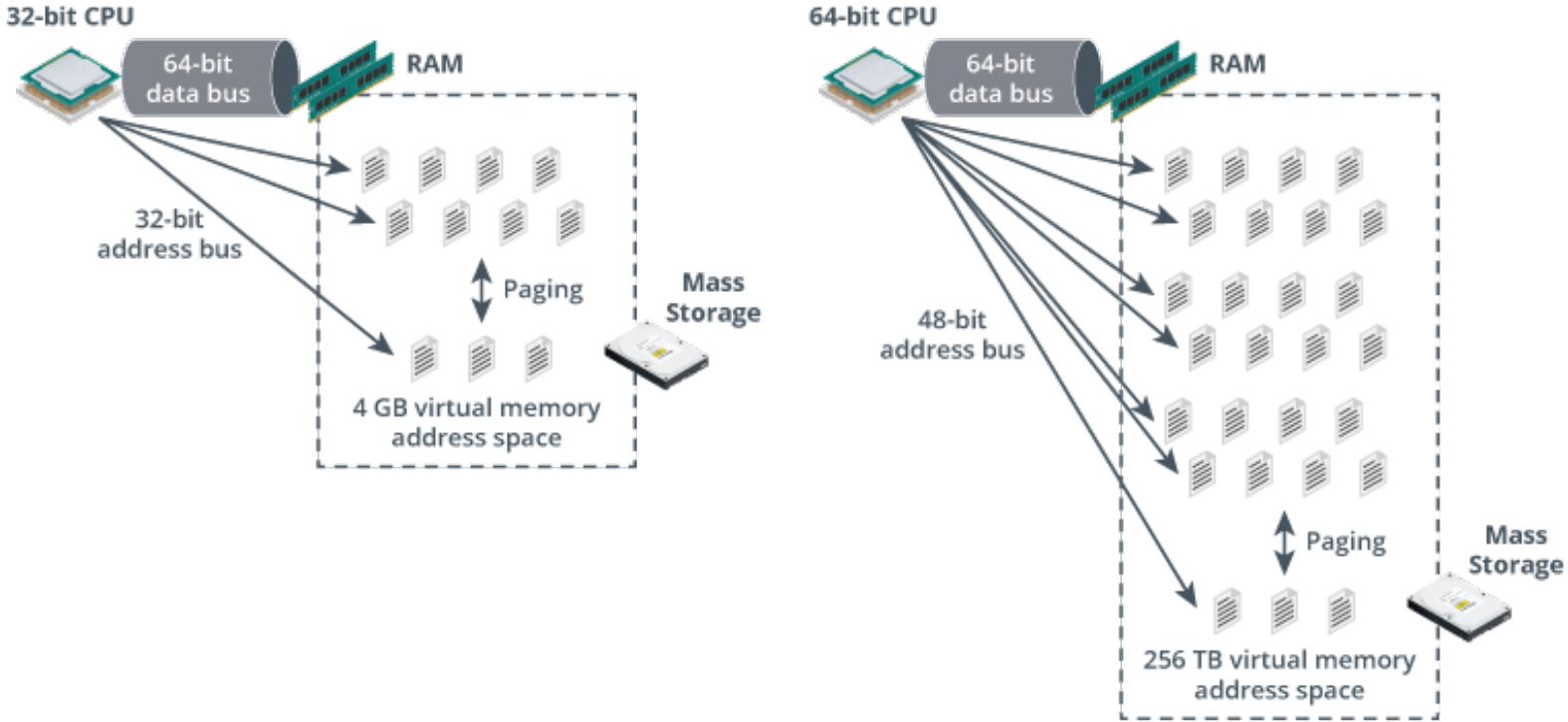
Topic 2C

Install and Configure System Memory

System RAM and Virtual Memory (Slide 1 of 2)

- System memory
  - Memory controller
  - Volatile random access memory (RAM)
- Virtual memory
  - Pagefile/swap space
  - Protected mode

System RAM and Virtual Memory (Slide 2 of 2)



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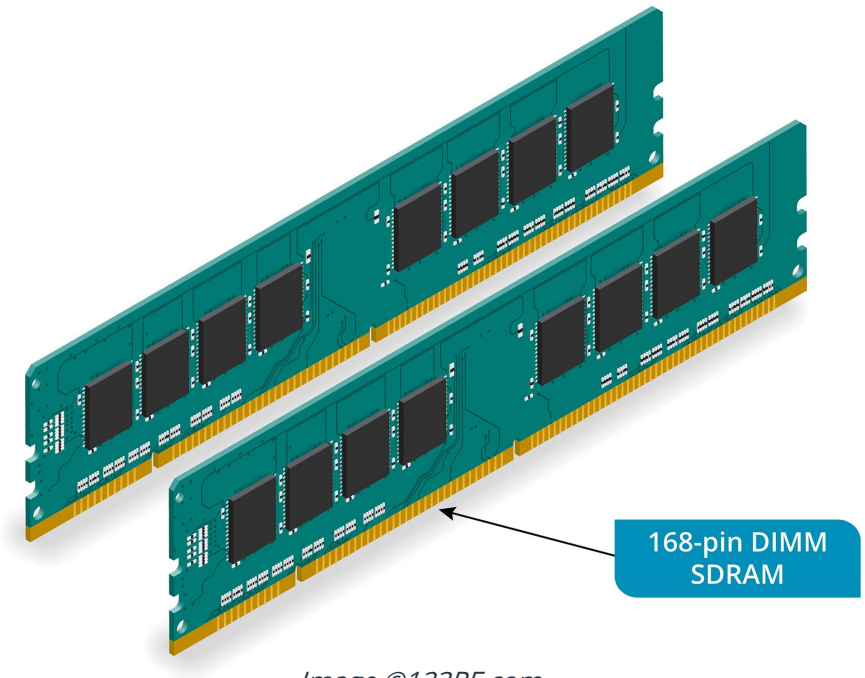
Memory Modules



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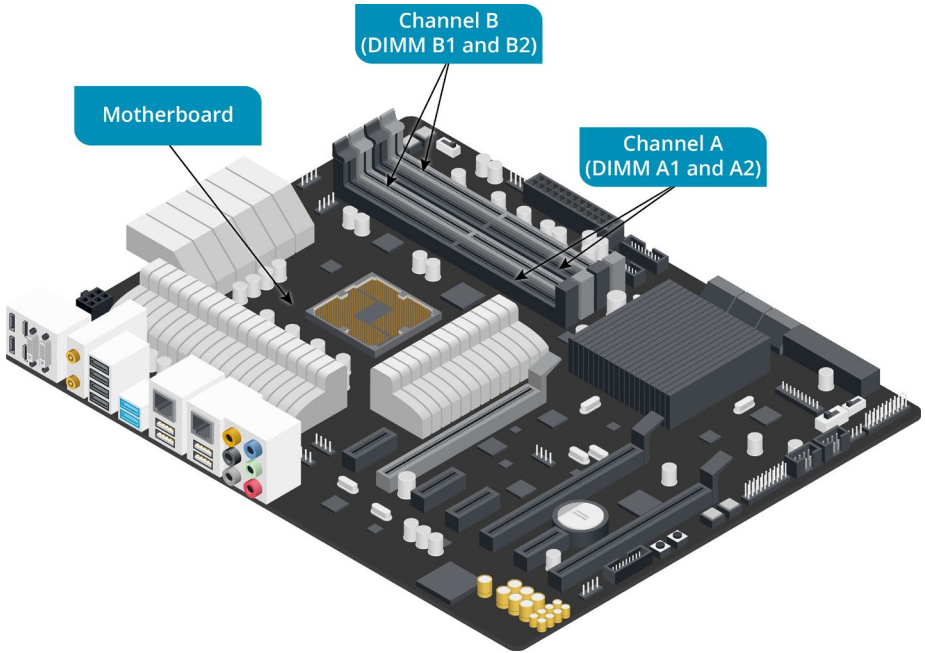
- Dual Inline Memory Module (DIMMs)
  - DDR type specific
  - Slot keying
  - Module speed and motherboard speed
- Small Outline DIMM (SO-DIMM)

Multi-channel System Memory



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- Single-channel
  - 64-bit data bus
- Dual-channel
  - Two 64-bit paths to memory controller
  - CPU and motherboard support
  - Slot labelling and color-coding
- Triple-channel and quad-channel

ECC RAM

- Error correcting code (ECC)
  - Adds 8-bit checksum to each transfer
  - Can correct 1-bit errors
  - Can detect 2/3/4-bit errors
- Registered DIMM (RDIMM) versus UDIMM (UDIMM)
- Compatibility issues

Review Activity: System Memory

- System RAM and Virtual Memory
- Memory Modules
- Multi-channel System Memory
- ECC RAM
- System Memory

Lab Activity

- Virtual Workbench Lab: Install RAM

Lesson 2

Topic 2D

Install and Configure CPUs

CPU Architecture

- CPU pipeline
  - Fetch, decode, execute, writeback
  - Registers and cache
- x86 CPU architecture
  - 32-bit IBM PC-compatible instruction set
- x64 CPU architecture
- Advanced RISC Machines (ARM) CPU architecture
  - System-on-a-chip
  - Better power and thermal efficiency
  - Software compatibility and emulation

CPU Features

- Clock speed
- Multithreading
  - Simultaneous multithreading (SMT)/HyperThreading
  - Requires software support
- Symmetric multiprocessing (SMP)
  - Requires multiple CPUs and sockets
  - CPUs must be identical models and specifications
- Single core versus multi-core
- Virtualization support

CPU Socket Types (Slide 1 of 2)

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- Socket form factor
  - Zero insertion force (ZIF)
- Land grid array (LGA)
  - Predominantly Intel socket form factors
  - Pins on the motherboard

CPU Socket Types (Slide 2 of 2)

- Pin grid array (PGA)
  - Predominantly AMD socket form factors
  - Pins on the CPU package

CPU Types and Motherboard Compatibility

- CPU generations and models
  - Motherboard compatibility
- Desktop CPU ranges and motherboards
  - “Ordinary” home and office PCs
  - Gaming PCs
- Workstations
  - Desktops with server-class features
- Servers
  - Multi-socket systems with additional cache
- Mobiles
  - System-on-a-chip

Review Activity: CPUs

- CPU Architecture
- CPU Features
- CPU Socket Types
- CPU Types and Motherboard Compatibility

Lab Activity

- Virtual Workbench Lab: Install a CPU and Cooler

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Lesson 2

Summary