Mass Storage Technologies

Chapter 8

CompTIA A+ (220-110x)

Mike Meyers and Steve Nicholson

Episode: **Introduction to Mass Storage**

Objective(s):
Core 1: 3.3 Given a scenario, select and install storage devices.
Core 1: 3.4 Given a scenario, install and configure motherboards, central processing units (CPUs), and add-on cards.

Episode Description

Mass storage (disk drives and solid-state drives) store the operating system and applications. Despite the different technologies, systems talk to these many devices in similar ways.

Key Terms

- 0:33 - Objective term - Optical media
- 0:33 - Objective term - Hard drive
- 0:38 - Objective term - Solid-state drive (SDD)
- 3:41 - Capacity
- 9:41 - 5.25” form factor
- 10:02 - Objective term - 3.5” form factor
- 10:37 - Objective term - 2.5” form factor
- 10:58 - 1.8” mass storage
- 10:57 - Objective term - M.2 form factor

Decimal vs. Binary Values

Decimal Values	IEC Values
1,000 = kilo = 10^3	2^{10} = kibi = **1,024**
1,000,000 = mega = 10^4	2^{20} = mebi = **1,048,576**
1,000,000,000 = giga = 10^5	2^{30} = gibi = **1,073,741,824**
1,000,000,000,000 = tera = 10^6	2^{40} = tebi = **1,099,511,627,776**
1,000,000,000,000,000 = peta = 10^7	2^{50} = pebi = **1,125,899,906,842,624**
1,000,000,000,000,000,000 = exa = 10^8	2^{60} = exbi = **1,152,921,504,606,846,976**

Quick Review

- There are many types of mass storage used today, including hard drives, solid-state drives (SSDs), and optical media
- Regardless of the media your operating system sees, mass storage is a string of logical block addresses
- There is a difference between decimal values and binary (IEC) values

Episode: **Magnetic Disk Drives**

Objective(s):

Core 1: 3.1 Explain basic cable types and their connectors, features, and purposes.

Core 1: 3.3 Given a scenario, select and install storage devices.

Core 1: 3.4 Given a scenario, install and configure motherboards, central processing units (CPUs), and add-on cards.

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Episode Description

Hard disk drives (HDDs), which store data on rotating magnetic disks, have been the go-to mass storage media for decades. A good tech understands how this venerable media works and understands magnetic media's unique needs.

Key Terms

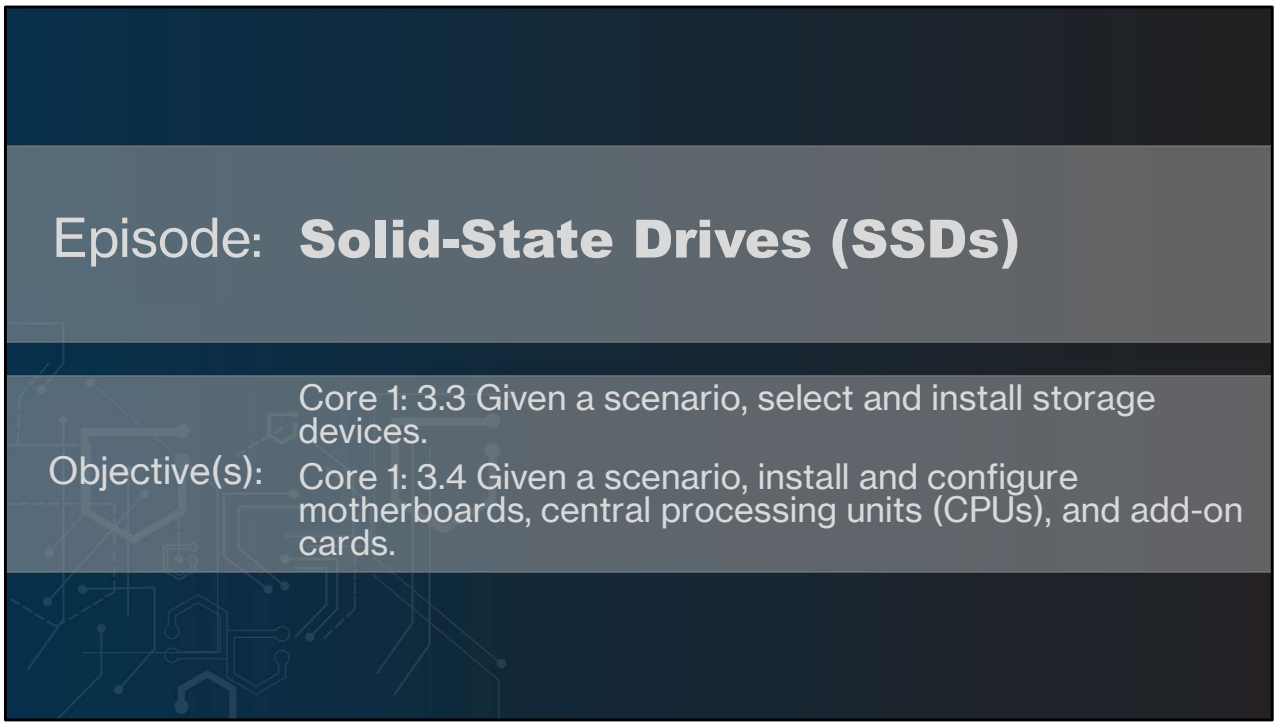
- 1:16 - Objective term - Hard disk drive (HDD)
- 1:44 - Objective term - 3.5” and 2.5” drives
- 2:27 - Advanced Technology Attachment (ATA)
- 2:39 - Objective term - Parallel ATA (PATA) (aka: Integrated Drive Electronics (IDE)
- 2:53 - Objective term - Serial ATA (SATA)
- 3:42 - SATA connector
- 5:24 - Objective term - eSATA
- 5:27 - eSATA connector

Key Terms

- 9:10 - Objective term - Hard drive speeds are measured in rotations per minute (RPM)
- 9:10 - Objective term - Speeds include 5,400 RPM, 7,200 RPM, 10,000 RPM, 15,000 RPM

Quick Review

- Magnetic disk drives use spinning platters to store data via magnetism
- Data is accessed through read/write heads
- The most popular hard disk drive (HDD) form factors are 3.5” and 2.5”
- We use the Advanced Technology Attachment (ATA) protocol to communicate with hard disk drives
- The dominant ATA is called Serial ATA (SATA)


Episode: Solid-State Drives (SSDs)
Objective(s):
Core 1: 3.3 Given a scenario, select and install storage devices.
Core 1: 3.4 Given a scenario, install and configure motherboards, central processing units (CPUs), and add-on cards.

Episode Description

Solid-state drives (SSDs) are quickly replacing HDDs for mass storage needs on almost all computers. SSDs are faster and more robust than HDDs and come with their own maintenance needs.

Key Terms

- 0:10 - Objective term - Solid-state drives (SSDs)
- 1:32 - Objective term - 2.5" form factor
- 1:37 - Objective term - M.2 SSD form factor
- 2:04 - Objective term - Some SSDs still use SATA connectors for power and data
- 2:35 - SSDs are much faster than HDDs
- 2:59 - Objective term - Non-Volatile Memory Express (NVMe)
- 5:14 - Objective term - M.2 connector

Quick Review

- Solid-state drives (SSDs) store data using chips; there are no moving parts
- Data is stored in blocks and pages
- SSDs come in traditional 3.5" and 2.5" sizes, but also come in M.2 format
- Some SSDs use the very fast NVMe protocol instead of ATA for increased performance

Episode: SCSI

Objective(s): Core 1: 3.1 Explain basic cable types and their connectors, features, and purposes.

Episode Description

The Small Computer System Interface (SCSI) has been around in one form or another for decades. Despite its age, SCSI drives still appear in niche systems. It's important to recognize SCSI systems and where they're used today.

Key Terms

- 0:36 - Objective term - Parallel ATA (PATA) uses Integrated Drive Electronics (IDE) cables
- 0:48 - Objective term - Small Computer Systems Interface (SCSI)
- 2:07 - Serial Attached SCSI (SAS)
- 2:40 - Internet SCSI (iSCSI)

Quick Review

- The Small Computer Systems Interface (SCSI) is an ancient standard that still has great support
- The old parallel SCSI is standard, but the SCSI language lives on in serial SCSI versions
- Two modern SCSI standards are Serial Attached SCSI (SAS) and Internet SCSI (iSCSI)