

Chapter 8

Mass Storage Technologies

Episode 8.01

Episode **Introduction to Mass Storage**
title:

Objective: N/A

Lower 3rds

storage area networks (SANs)

SAN networks connect servers to shared storage.

Episode 8.02

Episode **Magnetic Disk Drives**
title:

Objective: 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.

Lower 3rds

- OBJ - Spindle speed of hard disk drive can Identify its efficiency
- Revolutions per minute (RPM)
- OBJ - Standard 3.5-inch HDD Spindle speed - 5400 or 7200 RPM
- Form factors – size, shape, layout
- Form factors apply to hard disk drives
- OBJ - 2.5-inch
- OBJ - 3.5-inch

Lower 3rds

- SSDs and hard disk
- 3.5-inch are used in desktop computers and in dedicated case mountings
- 2.5-inch are most commonly used in laptop PCs.

Hard disk drives (HDD)



A photograph of two 2.5 inch Hard Disk Drives (HDDs) resting on a dark, textured surface. One drive is in the foreground, showing its blue printed circuit board (PCB) and the central spindle area. The other drive is slightly behind and to the left, showing its silver metal casing. The background is a dark blue gradient.

Hard disk drives (HDD)

2.5 inch HDDs

Hard disk drives (HDD)

Form factors – size, shape, layout

Form factors apply to hard disk drives



3.5-inch HDD

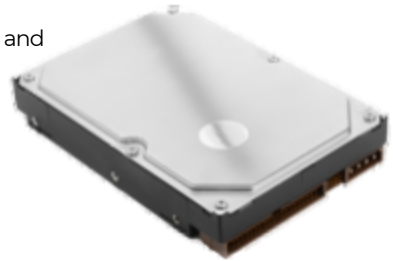


Disk platter diameters: 3.5 inches

- 4 inches wide, 5.75 inches long, 1 inch tall
- Uses Serial ATA or SATA interface



Desktop computers and external enclosures



2.5-inch HDD



Disk platter diameters: 2.5 inches

- 2.75 inches wide, 4 inches long, 0.25-0.5 inches tall
- Uses SATA interface



Commonly used in laptop computers



Episode 8.03

Episode **Solid-State Drives (SSDs)**
title:

Objective: 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.

Lower 3rds

- OBJ - Non-volatile Memory Express (NVMe)
- OBJ - Serial Advanced Technology Attachment (SATA)
- OBJ - Peripheral Component Interconnect Express (PCIe)
- OBJ - Serial Attached SCSI [Small Computer System Interface] (SAS)
- OBJ - M.2
- OBJ - Mini-serial Advanced Technology Attachment (mSATA)
- SATA has been the preferred interface for both HDDs and SSDs
- SATA and mSATA are different

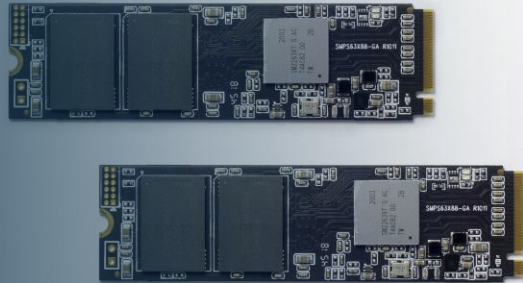
Lower 3rds

- mSATA / SATA = same data transfer rate
- mSATA = smaller capacity than SATA
- Single-level cell (SLC)
- Multiple-level cell (MLC)
- Triple-level cell (TLC)
- A Program-Erase (P/E)

Typical SSD Hard Drives

SSDs are organized into pages

A single page can store lots of blocks

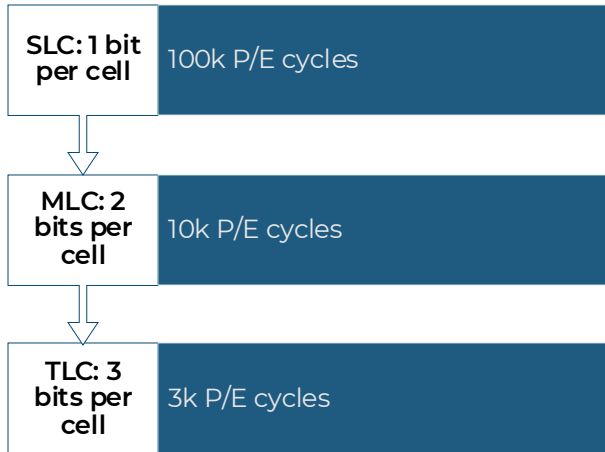


Program-Erase (P/E) Cycle

Process of erasing the contents of a cell and writing to it



Solid-State Drive Technology Interfaces



Episode 8.04

Episode **SCSI**
title:

Objective: N/A

Episode 8.05

Episode **Boot Order**
title:

Objective: N/A