

Objectives

- ◆ SCSI History
- ◆ SCSI Architecture and Operation
- ◆ Why SCSI ?
- ◆ Advancements

How Does the CPU talk to the drive?

- **Basic ways of doing I/O**

- Programmed I/O (the old way)
 - CPU directly moves data between memory and storage
- DMA (direct memory access)
 - CPU tells DMA engine to move data between memory and storage

- **Popular drive interfaces**


- IDE
 - low-end, programmed I/O
- SCSI (Small Computer Systems Interface)
 - always been DMA, multiple requests outstanding



What Is SCSI?

Small Computer System Interface

Standard for connecting peripherals, via a standard hardware interface, which uses standard SCSI commands



Brief History

◆ SCSI-1 In the beginning 1987

- * SCSI was adapted from SASI interface(1979).
- * Specified a physical interface, transport protocol & standard command for disk, tape & other storage devices

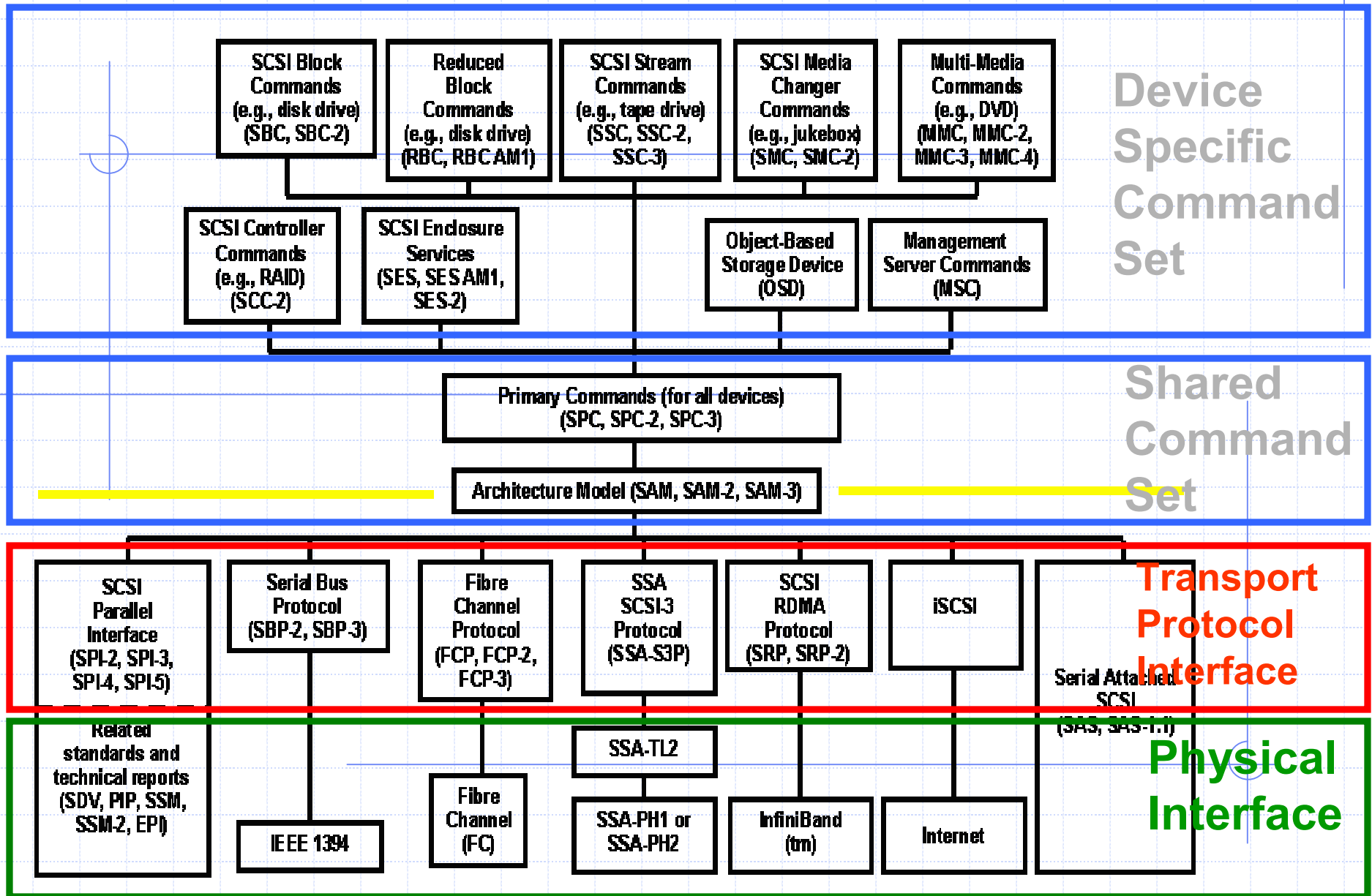
◆ SCSI-2 Second Coming of SCSI

- * Speed and bus bandwidth enhancement.
- * Multithreading commands & transport protocol cleanup.
- * Added storage device type command sets

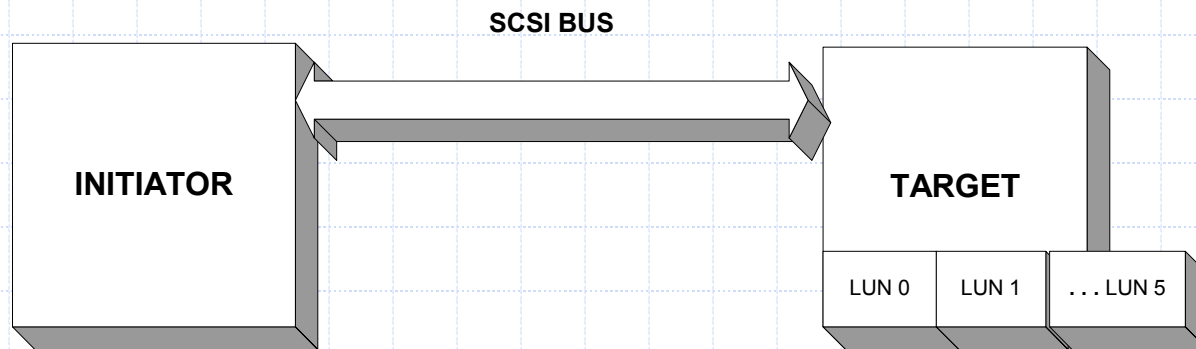
◆ SCSI-3 Today & Beyond

- * More Speed.
- * Separation of physical interface, transport protocols & the SCSI Command set.

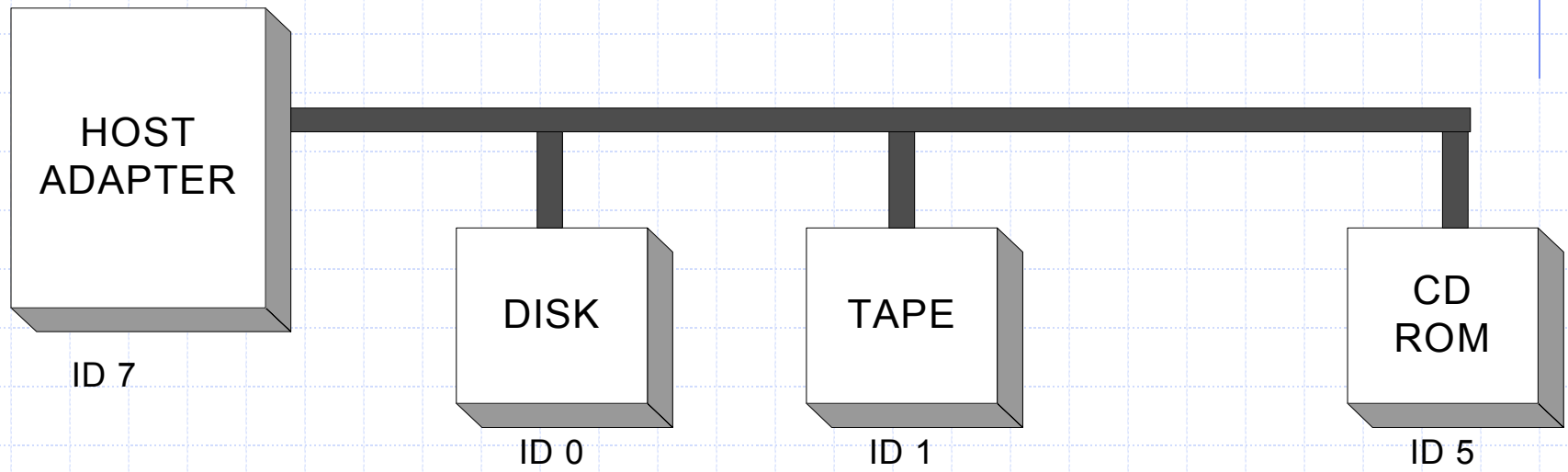
SCSI-3 Architecture



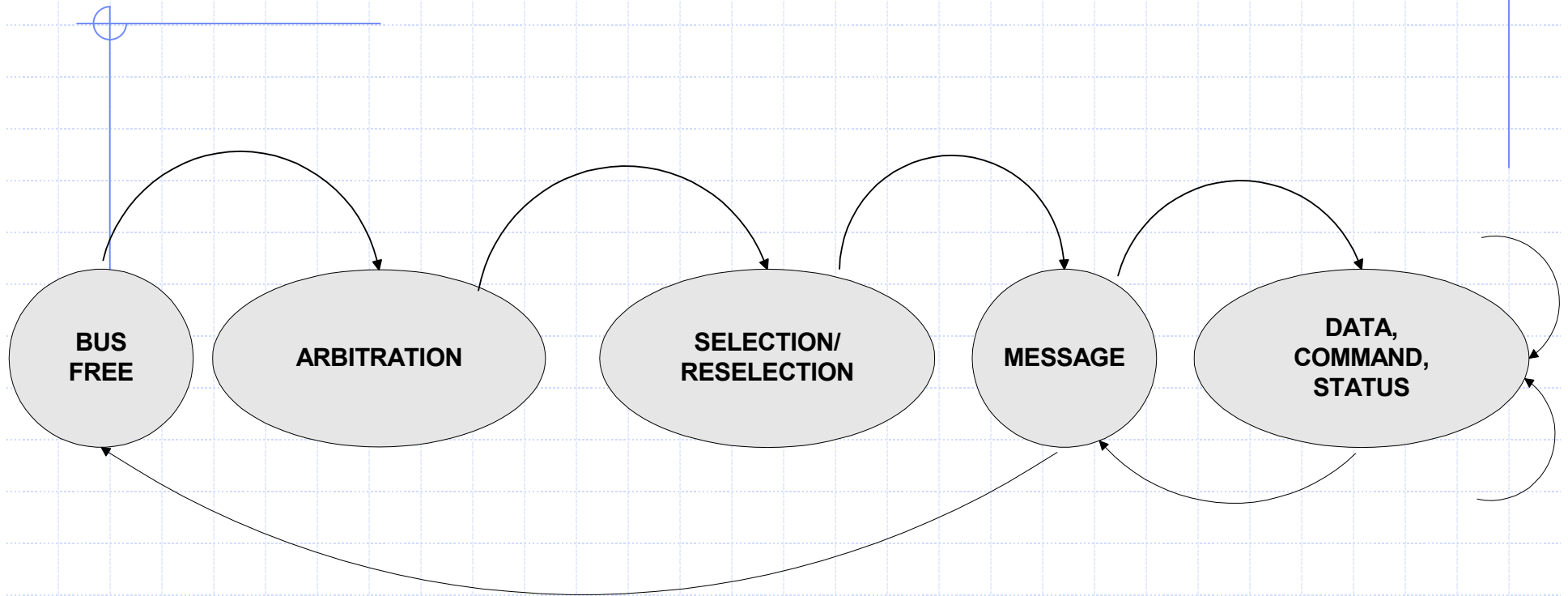
SCSI: Logical View



SCSI: Physical View



SCSI Bus States



SCSI Features

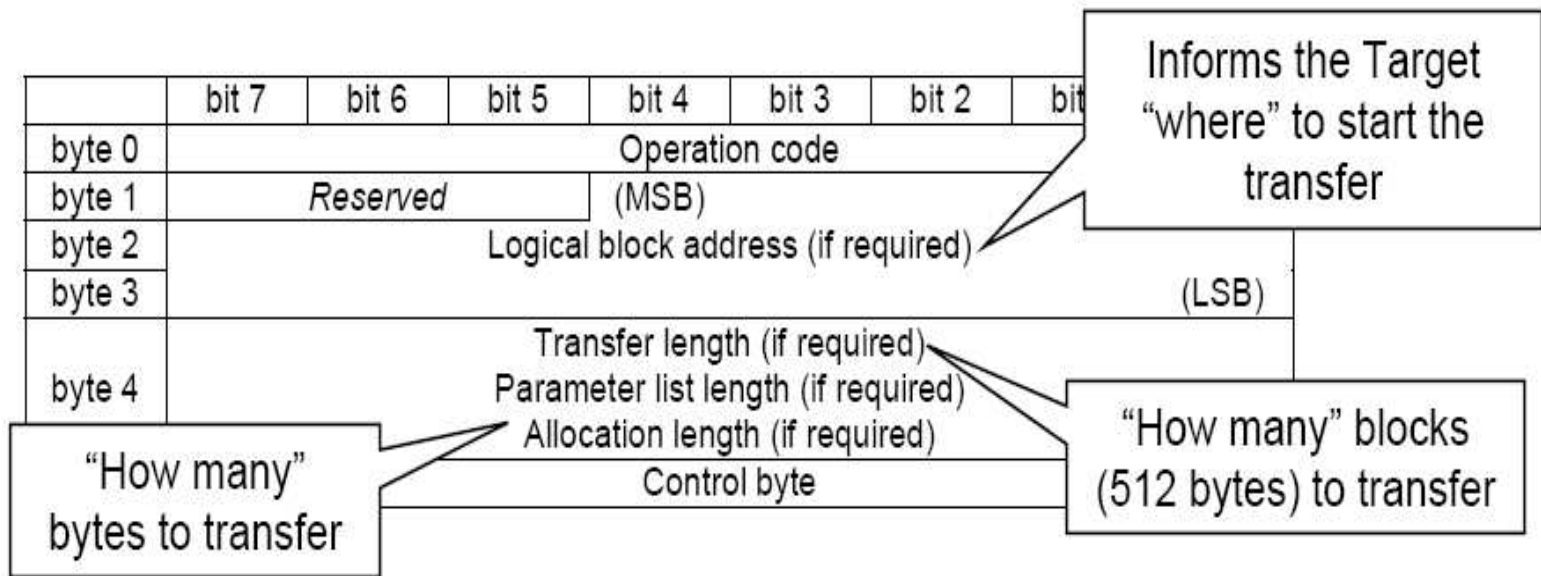
◆ SCSI Commands/ Messages

- Diversity of devices
- Command Queuing
- Operation Status

◆ Command format

Command Descriptor Block

Example Six Byte CDB



SCSI Vs. IDE

Features	SCSI	IDE
Device Support	Hard Disk, CD-ROM Optical, Scanner, Tape, WORM, etc	Hard Disk, CD-ROM
Max No. Of Devices	15 (16-bit wide SCSI)	4
External Device Support	YES	NO
Max Data Transfer Rate	40 MB/s 80 MB/s 160 MB/s	33 MB/s 66 MB/s 100 MB/s
Command Queuing	Yes	No
Overlapped IO	Yes	No
Multitasking Support	Yes	No

Future

◆ iSCSI

◆ FCP

◆ SCSI over Infiniband