SNS COLLEGE OF TECHNOLOGY

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

COURSE NAME :   **23CST202-OPERATING SYSTEMS**

II YEAR / IV SEMESTER

Unit 1-OVERVIEW AND PROCESS MANAGEMENT

Topic : Computer System Organization

Storage Definitions and Notation Review

The basic unit of computer storage is the **bit**. A bit can contain one of two values, 0 and 1. All other storage in a computer is based on collections of bits. Given enough bits, it is amazing how many things a computer can represent: numbers, letters, images, movies, sounds, documents, and programs, to name a few. A **byte** is 8 bits, and on most computers it is the smallest convenient chunk of storage. For example, most computers don't have an instruction to move a bit but do have one to move a byte. A less common term is **word**, which is a given computer architecture's native unit of data. A word is made up of one or more bytes. For example, a computer that has 64-bit registers and 64-bit memory addressing typically has 64-bit (8-byte) words. A computer executes many operations in its native word size rather than a byte at a time.

Computer storage, along with most computer throughput, is generally measured and manipulated in bytes and collections of bytes.

A **kilobyte**, or **KB**, is 1,024 bytes

a **megabyte**, or **MB**, is 1,024² bytes

a **gigabyte**, or **GB**, is 1,024³ bytes

a **terabyte**, or **TB**, is 1,024⁴ bytes

a **petabyte**, or **PB**, is 1,024⁵ bytes

Computer manufacturers often round off these numbers and say that a megabyte is 1 million bytes and a gigabyte is 1 billion bytes. Networking measurements are an exception to this general rule; they are given in bits (because networks move data a bit at a time).

Storage Structure

Main memory – only large storage media that the CPU can access directly

- **Random access**
- Typically **volatile**

Secondary storage – extension of main memory that provides large **nonvolatile** storage capacity

Hard disks – rigid metal or glass platters covered with magnetic recording material

- Disk surface is logically divided into **tracks**, which are subdivided into **sectors**

The **disk controller** determines the logical interaction between the device and the computer

Solid-state disks – faster than hard disks, nonvolatile

- Various technologies
- Becoming more popular

Storage Hierarchy
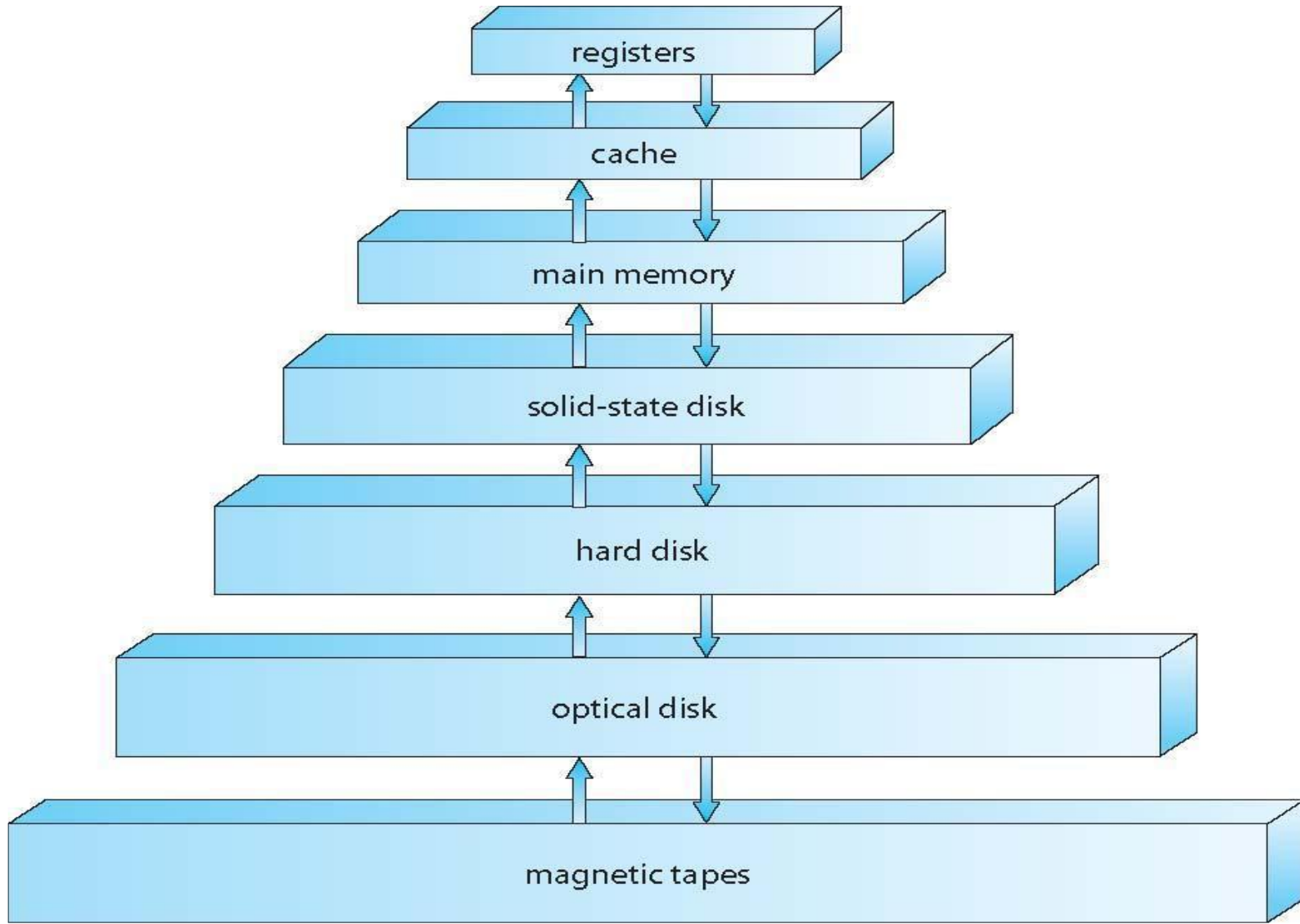
Storage systems organized in hierarchy

- Speed
- Cost
- Volatility

Caching – copying information into faster storage system; main memory can be viewed as a cache for secondary storage

Device Driver for each device controller to manage I/O
- Provides uniform interface between controller and kernel

Storage Hierarchy

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Caching

Important principle, performed at many levels in a computer (in hardware, operating system, software)

Information in use copied from slower to faster storage temporarily

Faster storage (cache) checked first to determine if information is there

- If it is, information used directly from the cache (fast)
- If not, data copied to cache and used there

Cache smaller than storage being cached

- Cache management important design problem
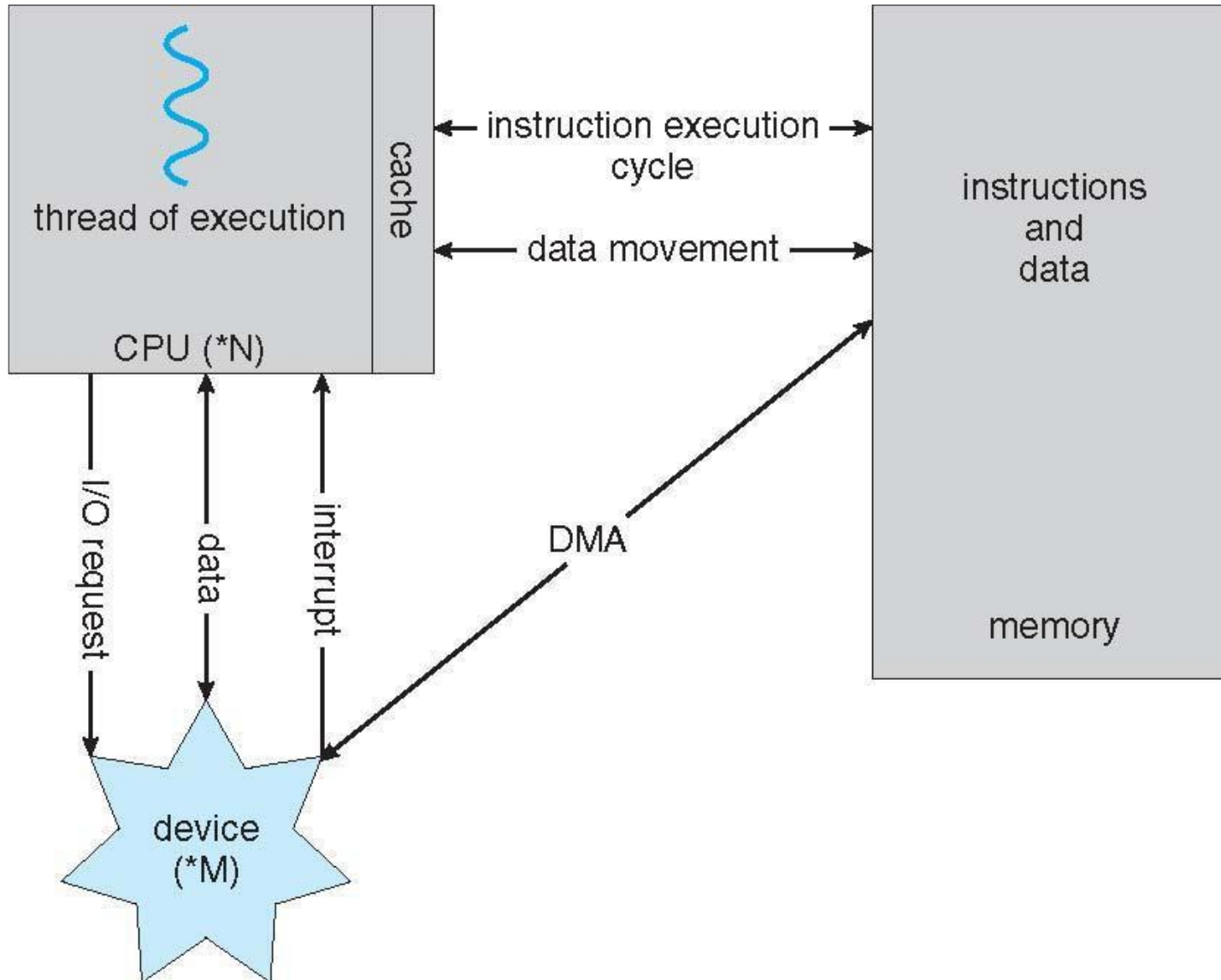- Cache size and replacement policy

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Direct Memory Access Structure

Used for high-speed I/O devices able to transmit information at close to memory speeds

● Device controller transfers blocks of data from buffer storage directly to main memory without CPU intervention

● Only one interrupt is generated per block, rather than the one interrupt per byte

How a Modern Computer Works

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THANK YOU