

COP3502: Introduction to Computer Science

Lecture 11 -Supplement

Wickus Nienaber

Department of Computer Science
COP3502 - 1 Introduction to Computer Science
Florida State University

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Serial ATA

- Longer cabling (3 feet vs 18 inches for PATA)
- Lower power consumption (250mV vs 5V)
- Eradicate Master/Slave configuration and drive jumpers.
- Increased transfer rates: 150MB for first generation, second generation 300MB, new generation up to 6Gb/s.

Solid State Drive

- No moving parts.
- Use microchips which retain data in non-volatile memory chips.
- Can be flash based (non-volatile NAND flash memory) or DRAM based (volatile).

SSD - NOR and NAND

- NOR:
 - Reading is similar to random-access memory.
 - Erasure is a block at a time, Reset all bits back to one.
 - Used in random-access ROM.
 - Slow write speeds compared to NAND flash.
- NAND:
 - Much like block devices such as hard disks or memory cards.
 - Best suited to systems requiring high capacity data storage.
 - Faster erase, sequential write, and sequential read speeds.
 - Sacrifices random-access and execute in place advantage of NOR.
- NOR and NAND devices require bad block management.
- NAND can be shipped with bad blocks (all have at least 1).
- Flash memory has a finite number of program-erase cycles.

Hard drive vs Solid-state drive

- **Attribute/Characteristic:** Solid-state drive - Hard disk drive
- **Spin-up time:** Instantaneous - Several seconds
- **Random access time:** About 0.1 ms (direct flash access) - 5 - 10 ms as head has to move and data has to move under the head.
- **Read latency times:** Low as data can be read directly. - High since mechanical components need to move.
- **Consistent read performance:** Unchanged as data location does not affect the reading. - Fragmented disk take longer
- **Environmental factors:** Unaffected by shock, altitude or vibration - Moving parts are subject to failure.
- **Power consumption:** 1/2 to 1/3 the power of HDD's - Requires between 12-18 watts (2 watts for notebook drives).

Blue-ray

- Blue-ray vs HD-DVD
 - HD-DVD initially a better product.
 - Consumer confusion and indifference ended the war.
- Physically different from DVD.
- Used a blue laser to read data (vs red) enable 5 x more data per layer.
- Improvements in data encoding that further increase the capacity
- Data layer is closer to the surface - vulnerable to scratches.