CPSC 614:Graduate Computer Architecture

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I/O Introduction: Storage Devices & RAID

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Motivation: Who Cares About I/O?

- **CPU Performance: 60% per year**
- **I/O system performance limited by *mechanical* delays (disk I/O)**
  - < 10% per year (IO per sec)
- **Amdahl's Law: system speed-up limited by the slowest part!**
  - 10% IO & 10x CPU => 5x Performance (lose 50%)
  - 10% IO & 100x CPU => 10x Performance (lose 90%)
- **I/O bottleneck:**
  - Diminishing fraction of time in CPU
  - Diminishing value of faster CPUs

Big Picture: Who cares about CPUs?

- **Why still important to keep CPUs busy vs. IO devices ("CPU time"), as CPUs not costly?**
  - Moore's Law leads to both large, fast CPUs but also to very small, cheap CPUs
  - 2001 Hypothesis: 600 MHz PC is fast enough for Office Tools?
  - PC slowdown since fast enough unless games, new apps?
- **People care more about about storing information and communicating information than calculating**
  - "Information Technology" vs. "Computer Science"
  - 1960s and 1980s: Computing Revolution
  - 1990s and 2000s: Information Age