CMPSC 497: Introduction to Distributed Systems

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History

- From 1945 until mid-1980s, computers were large and expensive.
  - A mainframe costs millions
  - A minicomputer costs tens of thousands
- Start from mid-1980
  - Microprocessors
  - Computer networks, LAN, and WAN
  - Results: Distributed systems

Distributed Systems

- A distributed system is a collection of autonomous computing elements that appear to the users of the system as a single coherent system
- Two aspects:
  - Hardware: autonomous machines
  - Software: the users think of the system as a single computer.
- Example:
  - Department has a network of workstations. When a user types a command, the system could look for the best place to execute the command.

many definition of distributed system

- More general definition: A distributed system is a system whose components are located on different networked computers, which communicate and coordinate their actions by massage passing.

Advantages Over Centralized Systems

- Cost: microprocessors offer a better price/performance than mainframes
- Speed: a distributed system may have more total computing power than a mainframe
- Inherent distribution: some applications involve spatially separated machines
- Reliability: if one machine crashes, the system as a whole can still survive
- Incremental growth: computing power can be added in small increments

Advantages Over Independent PCs

- Data sharing: allow many users access to a common database
- Device sharing: allow many users to share expensive peripherals like printer.
- Communication: make human-to-human communication easier, e.g., email
- Flexibility: spread the workload over the available machines in the most cost effective way