

Lecture 1

CprE 308

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Welcome!

Instructor

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- Research Interests: Sensor Networks & Control Systems

Course Info

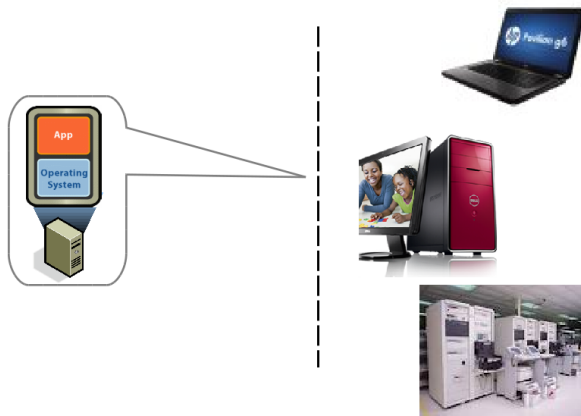
- Grades on Blackboard
- Course materials on Blackboard and Github:
`https://github.com/CprE308`.
- Announcements on Blackboard.
- IRC Channel on Freenode: `#CprE308-ISU`
- Access via IRC client or `http://webchat.freenode.net`

Why learn about Operating Systems?

A quick history lesson

- Computerphile video (6:30 to end): <https://youtube.com>

A computer, and



4

Figure 1:

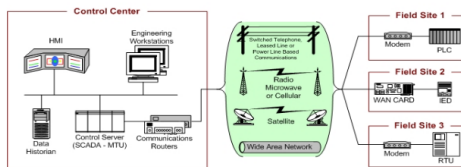
More than a computer, and...

■ Sensing & medical devices



More than a computer, and...

■ Cyber-assisted Critical Infrastructures



Tech Trend: Virtualization

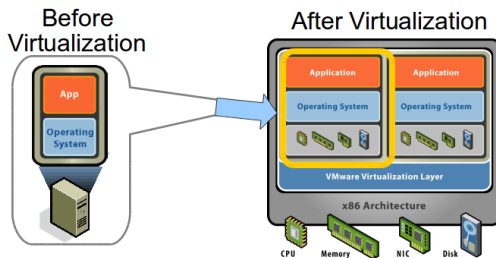


Figure 4:

Tech Trend: Virtualization

Basic Idea

- Decouple [OS, *service*] pair from hardware
- Multiplex lightly-used services on common host hardware
- Migrate services from host to host as needed
- Introduce new [OS, *service*] pairs as needed
- Examples: VMWare, Xen, Parallel, etc.

Tech Trend: Mobile/Networked/Distributed Apps



Figure 5:

Tech Trend: Mobile/Networked/Distributed Apps

Examples

- Webinar
- Stock Information
- On-line TV/Video
- Group-based Apps: Google Docs, Multiplayer games

Operating Systems

Introduction

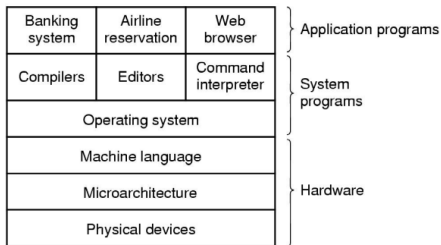


Figure 6:

A computer system consists of:

- hardware
- system programs

What is an Operating System?

It is an extended machine

- Hides messy details which must be performed
- Presents user with a virtual machine, easy to use abstractions

It is a resource manager

- Each program gets time with the resource
- Each program gets space on the resource

Floppy Disk I/O

Anybody who directly communicates with the floppy disk controller must deal with:

- Physical address on disk (disk block)
- The data recording format
- Turn on/off the motor
- Error detection/correction

Operating Systems History

- 1945-60: Batch Systems - Cards
- 1960-70: Spooling Batch Systems - Tapes
 - Spool: Simultaneous Peripheral Operation On Line
- 1960-: Multiprogramming
- 1970-: Timesharing
- 1990-: Real-time, distributed
- 2000-: Multi-OS?
- 2005-: WebOS (Web2.0, etc.)

MS-DOS History

- On August 12, 1981, IBM introduced its new revolution in a box, the “Personal Computer” complete with a brand new operating system from Microsoft and a 16-bit computer operating system called MS-DOS 1.0.
- “I don’t think it’s that significant.” - Tandy president John Roach on IBM’s entry into the microcomputer field.
- “If you are intelligent and know how to apply your intelligence you can accomplish anything” – Bill Gates

The Operating System Zoo

- Personal computer operating systems
 - Single user (usually), performance, GUIs.
 - MS-DOS, Windows, Linux
- Server operating systems
 - Focus on networking
 - Linux, SunOS, Windows NT
- Multiprocessor operating systems
- Real-time operating systems
 - Hard versus soft real-time OS
- Embedded operating systems
 - Memory, power constraints
- Smart card operating systems
 - Extreme resource constraints