System Architecture

Joseph Booker

Department of Physics and Astronomy
University of Toledo

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Layout of Today

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- Structure of File System

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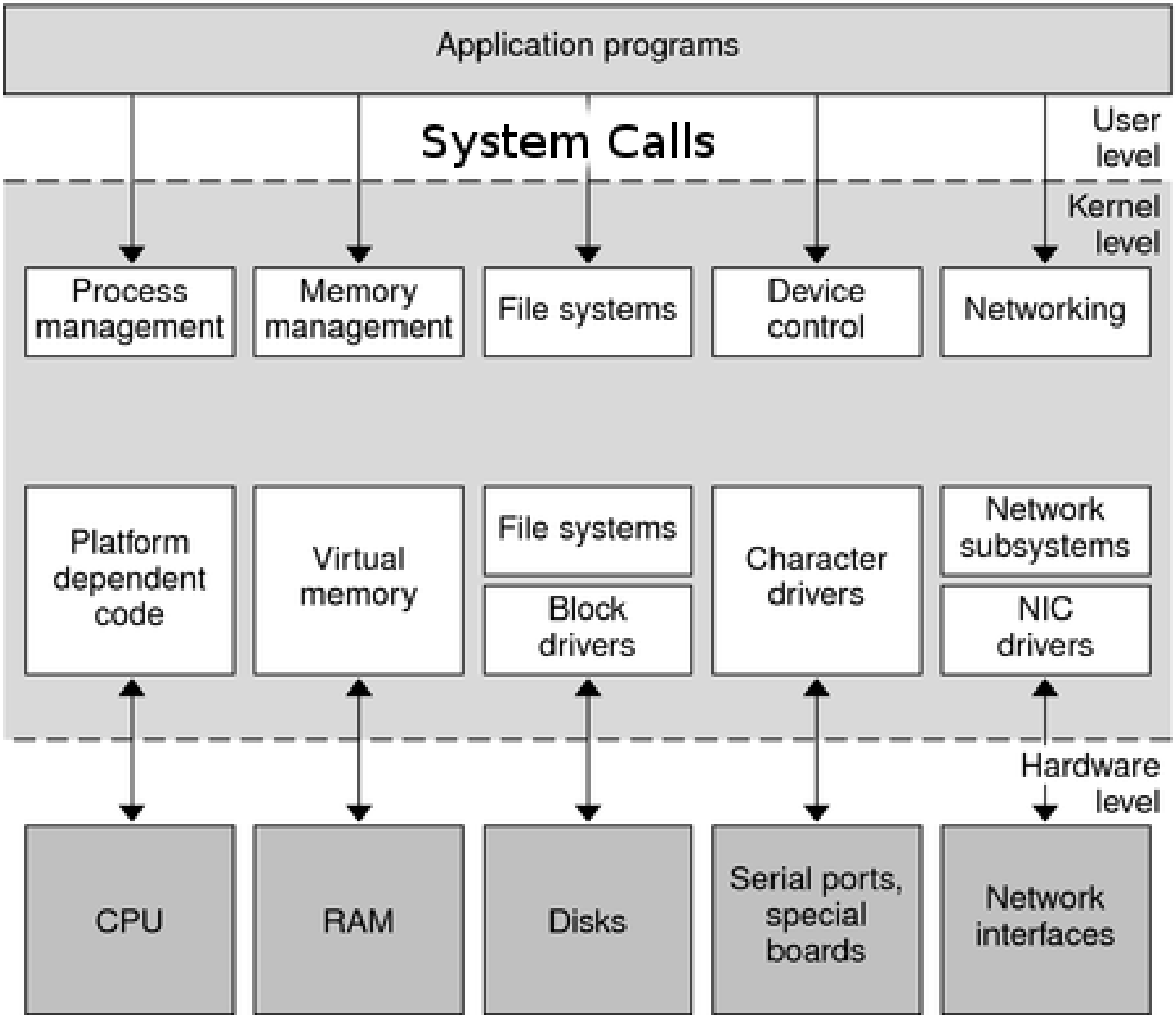
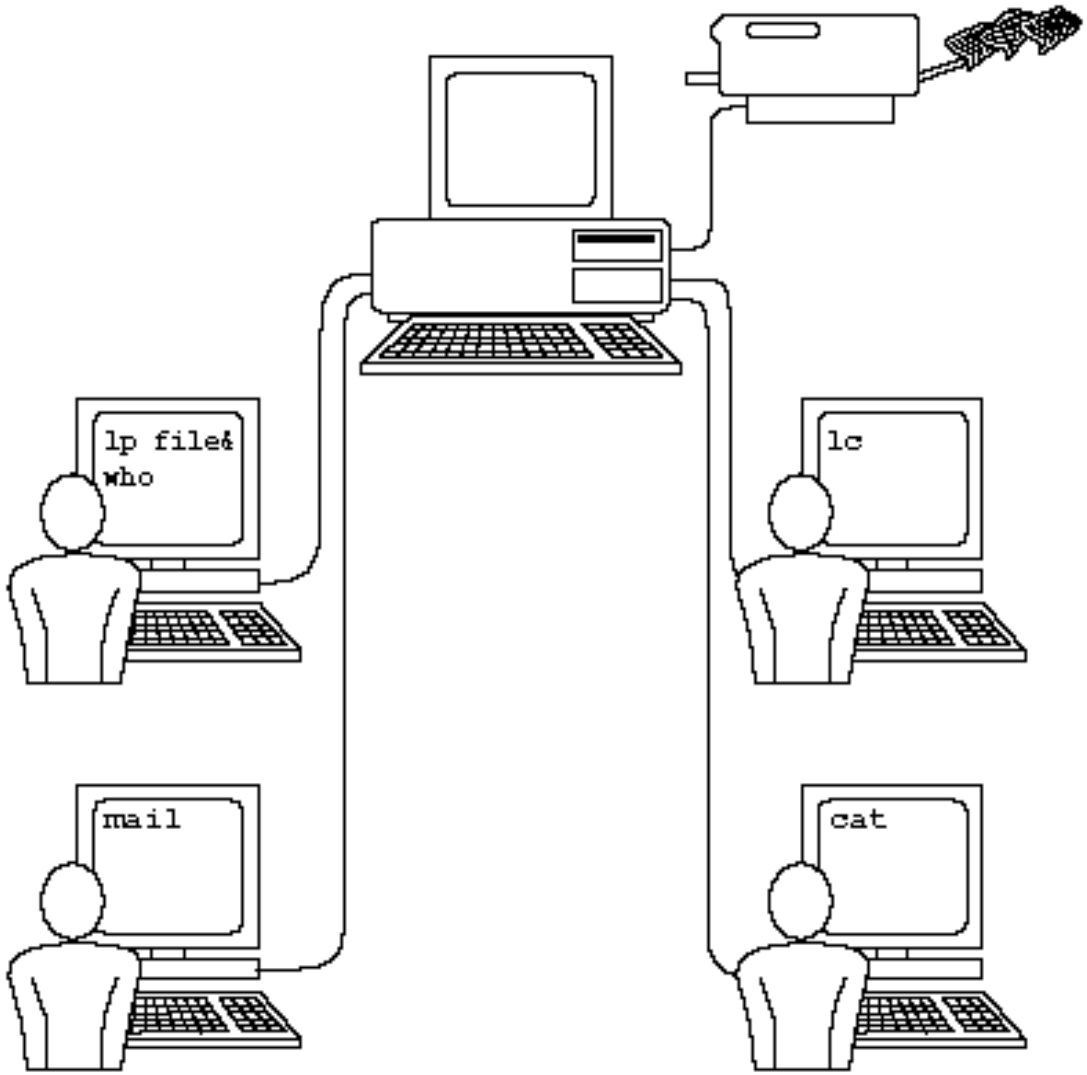
- In Linux/UNIX, program use the system to do the hard work.

```
.data
msg: .ascii "Hello World\n"

.text
.global _start

_start:
movq $1, %rax    ; use the write syscall
movq $1, %rdi    ; write to stdout
movq $msg, %rsi  ; use string "Hello World"
movq $12, %rdx   ; write 12 characters
syscall          ; make syscall

movq $60, %rax   ; use the _exit syscall
movq $0, %rdi    ; error code 0
syscall          ; make syscall
```

Overview of Kernel



More Properties of Linux/UNIX Programs: User-owned



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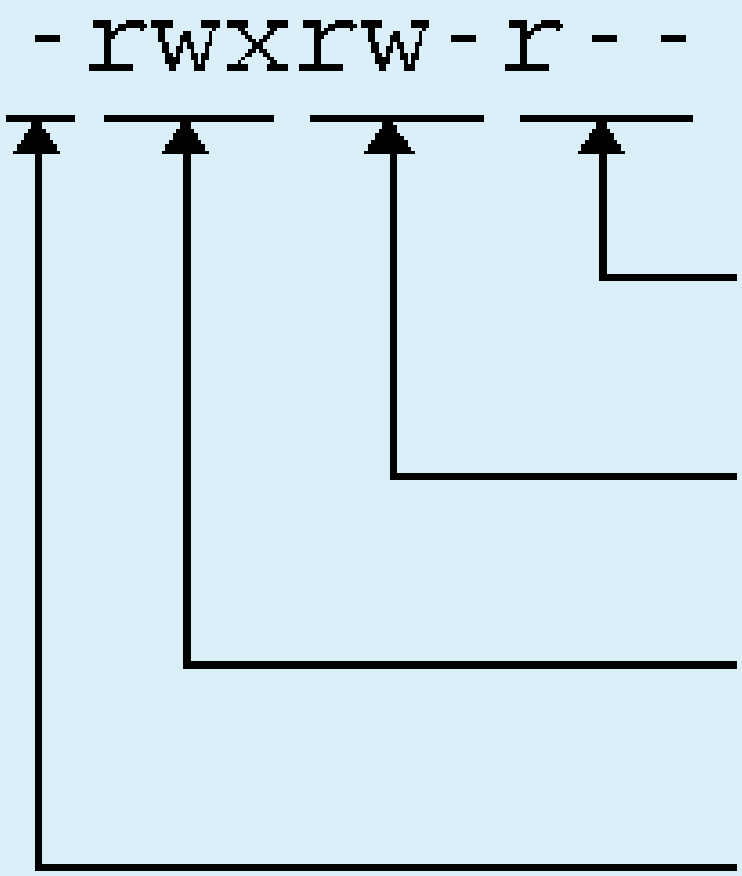
- These permissions are meaningful for directories:
  - Anyone with write permission can add/delete/rename files
  - Anyone with read permission can list files
  - Anyone with execute permission can `cd` into this directory

Describing Permissions of a File — ls -l listing



Read, write, and execute permissions for all other users

Read, write and execute permissions for members of the group owning the file.

Read, write and execute permissions for the owner of the file.

File type. "–" indicates a regular file. A "d" indicates a directory.

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- Permissions are given as a three digit number for the owning user, group, and everyone else. E.g., read/write permission for owner and read permission for everyone else would be 644.

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`/usr/`	Originally for non-essential software

Further Resources

- Interactive tool for understanding commands — `http://explainshell.com/`
- Software Carpentry Lesson — `https://swcarpentry.github.io/shell-novice/`
- Command Line Crash Course — `http://cli.learncodethehardway.org/book/`