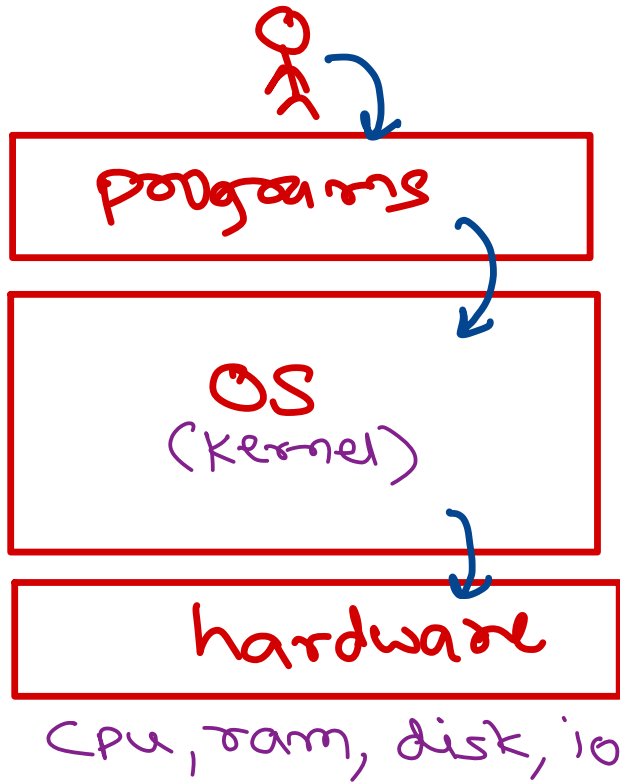


Operating System – Linux Programming

Sunbeam Infotech



Operating Systems



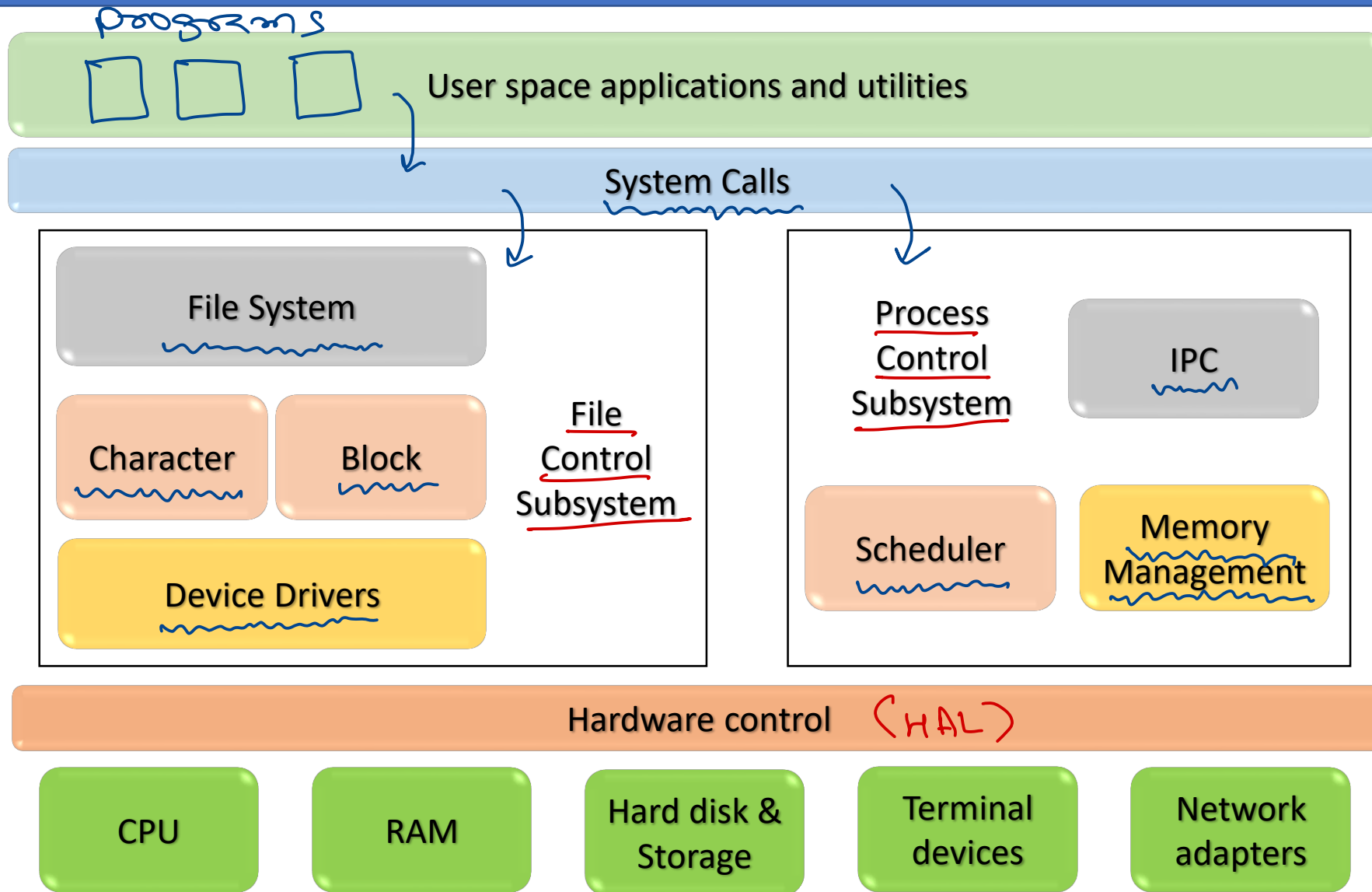
OS learning

- ① end user
 - commands
- ② administrator
 - installation
 - shell scripts
- ③ programmer
 - system calls
- ④ designer
 - OS internals

OS functions

- Core OS
↓
Kernel
- ① process mgmt
 - ② file & io mgmt
 - ③ memory mgmt
 - ④ CPU scheduling
 - ⑤ hardware abstraction
 - ⑥ user interfacing
 - ⑦ networking
 - ⑧ protection & security

Unix architecture



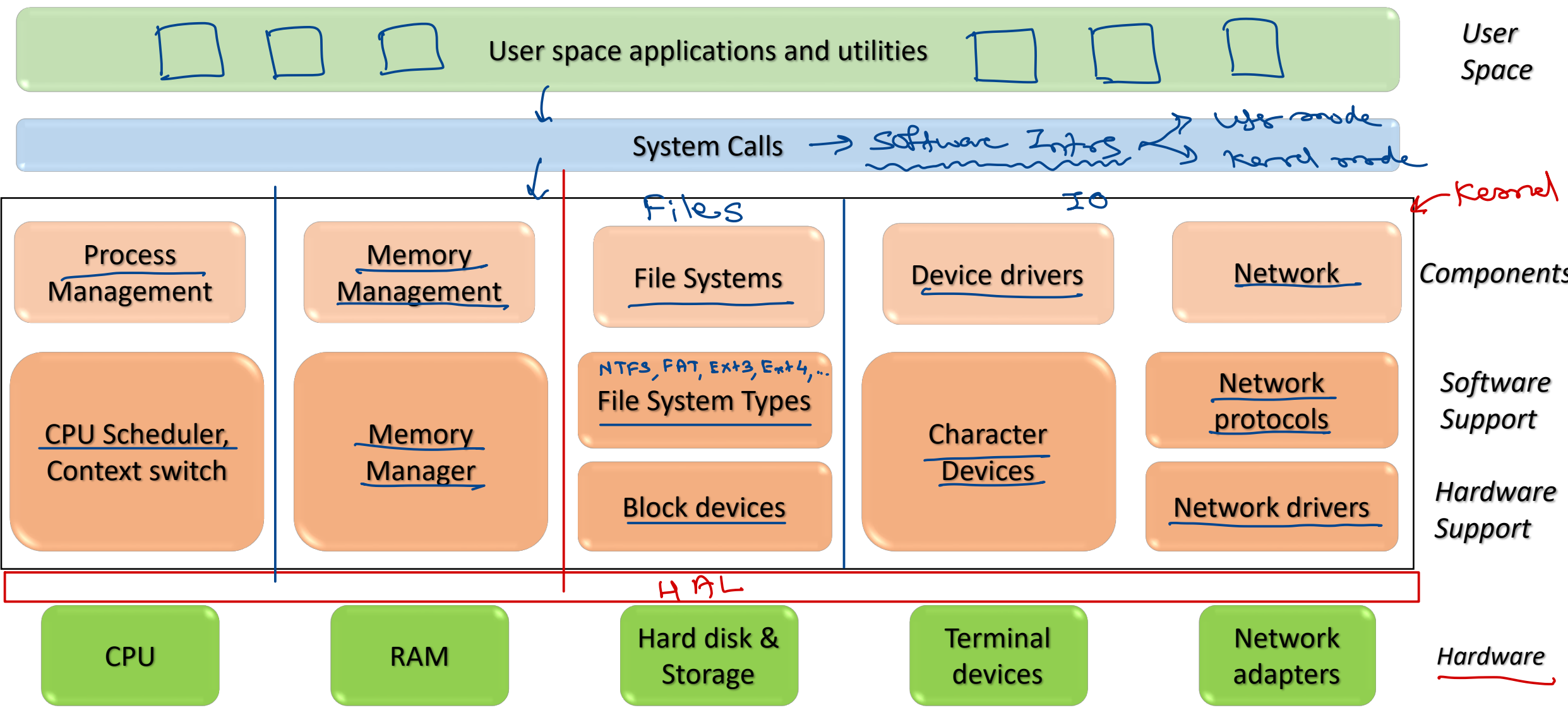
Files have spaces &
Process have lives.

every thing is a file.

- special files
- * data file (-)
 - * directory (d)
 - * pipe (p)
 - * socket (s)
 - * links (l)
 - * char devices (c)
↳ byte by byte
 - * block devices (b)
↳ sector by sector
= 512 bytes

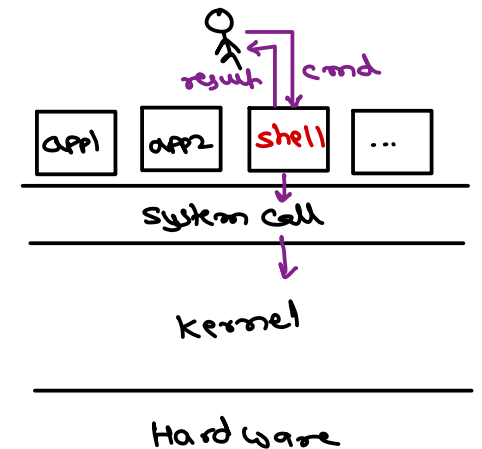
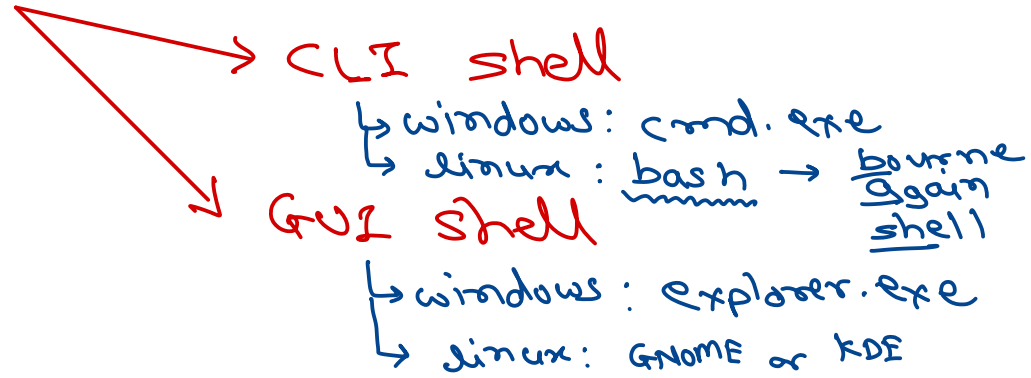
← hw

Linux kernel architecture



Linux shell

- Shell is a program that inputs commands from end user and get them executed from the kernel. It is also referred as command interpreter.
- Linux have variety of shells
 - bsh/bash
 - csht/csh → C shell
 - zsh
 - ksh → Korn shell (unix)
- BASH shell
 - Compatible with bsh/sh.



Linux File-system hierarchy

- / → root of FS
 - boot → kernel (vmlinuz)
bootloader (grub)
 - bin → executables / commands
 - sbin → system commands (admin)
 - lib → libraries (.so) and device drivers (.ko)
 - usr → installed programs / software
 - etc → config files (app, hw, sys config).
 - dev → device files (char & block)
 - proc → monitoring / dynamic config
 - sys → device management
 - tmp → temp file system (auto lost when shutdown).
 - mnt → mount point (to see other FS)
 - sudo mount -t vfat /dev/sdb1 /mnt
ls /mnt → mounting pen drive.
 - sudo umount /mnt
 - root
 - home
 - user1
 - user2 → Documents, Downloads, Desktop, ...
- directory for admin (root) user.
- If username is "sunbeam", its home dir is /home/sunbeam.



File system commands

- Absolute path
 - Complete path of file or directory.
 - Always starts from root (/).
 - Same path (irrespective of current directory)
- Relative path
 - Path of file or directory w.r.t. current directory.
 - Doesn't start from root (/).
 - Depends on current directory.
- Special directories
 - . : current directory → *• /a.out*
 - .. : parent directory
 - ~ : home directory → *e.s. /home/sunbeam*
- File system commands
 - pwd
 - cd dirpath → *absolute or relative*



File system commands

- ls dirpath
 - ls -l dirpath
- mkdir dirpath and rmdir dirpath
- cat filepath
- cat > filepath
- cp filepath dirpath
- cp -r srcdirpath destdirpath
- mv filepath dirpath
- mv oldfile newfile
- hidden files
- rm filepath
- rm -r dirpath
- Shell wildcards
 - *
 - .

} show dir contents.

→ make dir

→ remove empty dir

→ see file contents

→ write into file.

→ copy file into given dir.

→ copy dir into given dest dir.

→ move file into given dir.

→ rename the file.

→ recursive



Shell advanced topics

- Redirection

- Input redirection (<)
 - `command < in_file`
- Output redirection (>)
 - `command > out_file`
 - `command >> out_file` → append output in file
- Error redirection (2>)
 - `command 2> err_file`

- Pipe

- `command1 | command2` →

- Command execution

- `$?`
- `command1 && command2`
- `command1 || command2`
- `command &`





Thank you!

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