



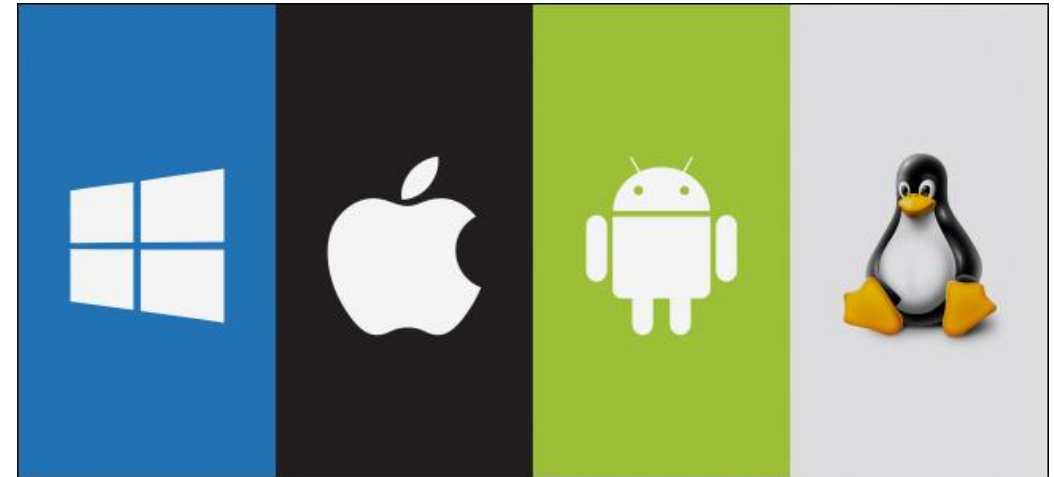
JOHNS HOPKINS
WHITING SCHOOL
of ENGINEERING

EN.540.635 Software Carpentry

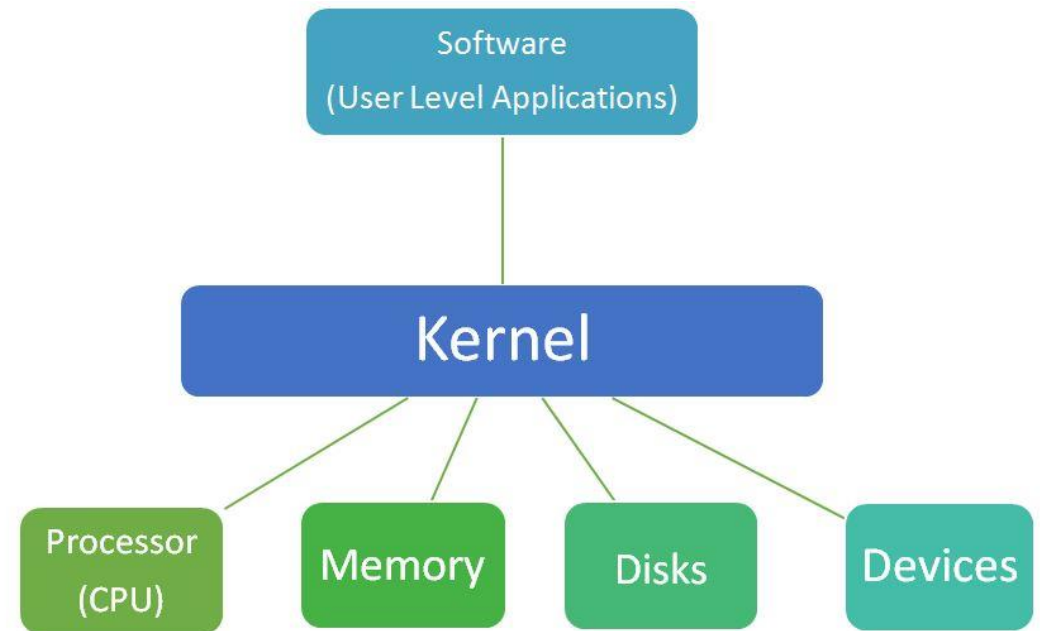
Lecture 2 Linux | SSH & SCP

- Software that allows the user and the application on a computer to interact with the computer hardware
- Common components include:
 - Kernel
 - Networking
 - Security
 - User Interface

... and many others.



- It is the central component of an Operating System
- The kernel performs the following tasks
 - Process Management
 - Memory Management
 - I/O requests/ System Calls
 - Device Management



You switch on your computer ...

- The CPU executes firmware code stored in non volatile memory.
 - Examples of firmware code are BIOS and UEFI.
- Firmware locates the OS specific bootloader.
- Bootloader locates the kernel file on storage device and unzips it
- Kernel loaded into the RAM file.
- Last action by Bootloader : call kernel's `main()` function.
- Kernel takes over control and you see the login page.

```
Displays a list of files and subdirectories in a directory.

DIR [drive:][path][filename] [/P] [/W] [/A[[:]attribs]] [/O[[:]sortord]]
    [/S] [/B] [/L] [/C[H]]

[drive:][path][filename] Specifies drive, directory, and/or files to list.
/P      Pauses after each screenful of information.
/W      Uses wide list format.
/A      Displays files with specified attributes.
attribs  D Directories  R Read-only files      H Hidden files
          S System files A Files ready to archive - Prefix meaning "not"
/O      List by files in sorted order.
sortord  N By name (alphabetic)      S By size (smallest first)
          E By extension (alphabetic) D By date & time (earliest first)
          G Group directories first  - Prefix to reverse order
          C By compression ratio (smallest first)
/S      Displays files in specified directory and all subdirectories.
/B      Uses bare format (no heading information or summary).
/L      Uses lowercase.
/CIH]   Displays file compression ratio; /CH uses host allocation unit size.

Switches may be preset in the DIRCMD environment variable. Override
preset switches by prefixing any switch with - (hyphen)--for example, /-W.

C:\>_
```

[Source Code](#)

- An Open-Source Kernel, released by Linus Torvalds on September 17th, 1991
- Common “Linux” operating systems:

Ubuntu

CentOS

Fedora

Debian

Arch Linux



Advanced Research Computing at Hopkins

arch.jhu.edu



RockFish - Resource Allocation System

**Advanced Research
Computing at Hopkins**



Rockfish was rated #496 in top500.org at 1.9PFLOPs (June 2023)

Linux Command Line (Terminal): Bash Shell

- The 'shell' is part of the OS that allows the user to directly interface with the kernel
- Linux commonly uses the bash shell (stands for 'Bourne again shell')
- Can change your default shell by typing `chsh -s /bin/shell_name`

```
[dsharm23@jhu.edu@bc-login01 ~]$
```

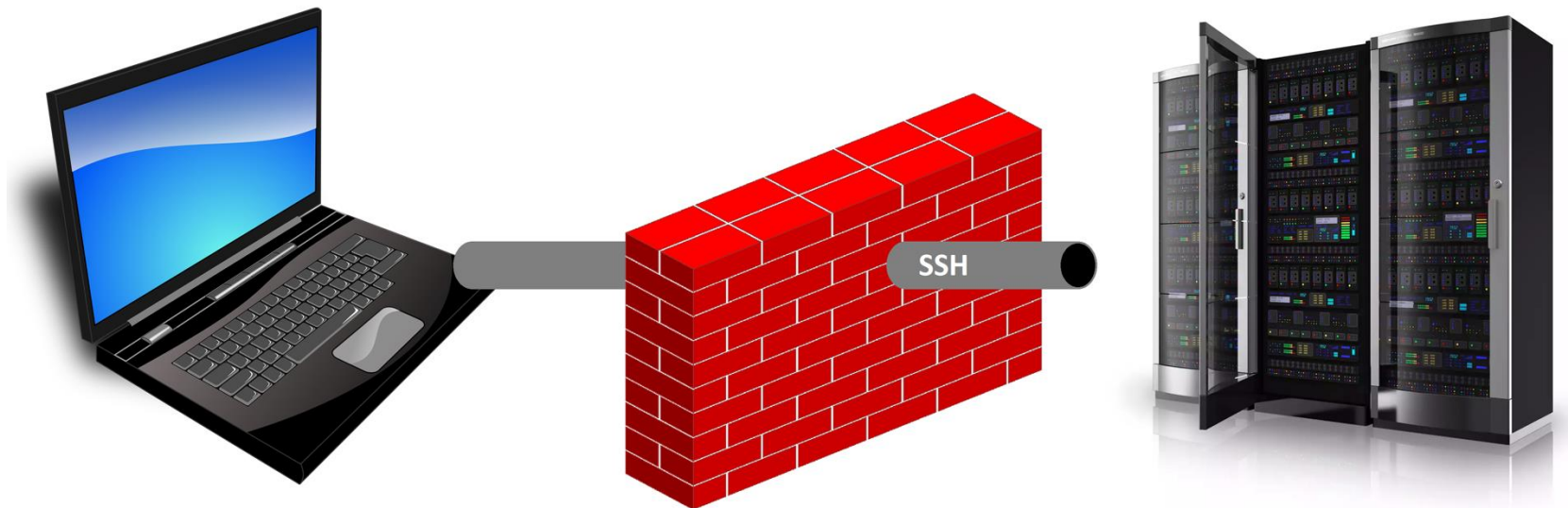
Command	Description	Usage
ls	List files in current folder	ls; ls -l; ls -la
cd	Change directory	cd ..; cd <name_of_dir>
mkdir	Create Directory	mkdir <name_of_dir>
cat	Returns content of file as output	cat <fptr>
head	Returns the beginning few lines of a file	head <fptr>; head -n <no_of_lines> <fptr>
tail	Returns the last few lines of a file	tail <fptr>; tail -n <no_of_lines> <fptr>
rm	Deletes file/folder	rm <fptr>; rm -f <name_of_dir>
touch	Create or change timestamps of a file	touch <name_of_file>

Commands are case sensitive!

<https://explainshell.com>

Secure Shell (**SSH**) is a cryptographic network protocol for operating network services securely over an unsecured network.

SCP (secure copy) is a command-line utility that allows you to securely copy files and directories between two locations.



Connecting using SSH and SCP

1. Open up a terminal
2. Use the SSH command as follows

```
ssh username_on_remote_machine@address_of_remote_machine
```

3. Use scp to Download or upload files as follows

```
scp [OPTION] [user@]SRC_HOST:]file1 [user@]DEST_HOST:]file2
```

- Make sure you have SSH capability in your laptop either using terminal or an SSH client
- For the next Homework, make sure you have python 3.10 set up
- You should be able to run saved python scripts, either from the terminal or using an IDE