System Administration 101 (Linux)
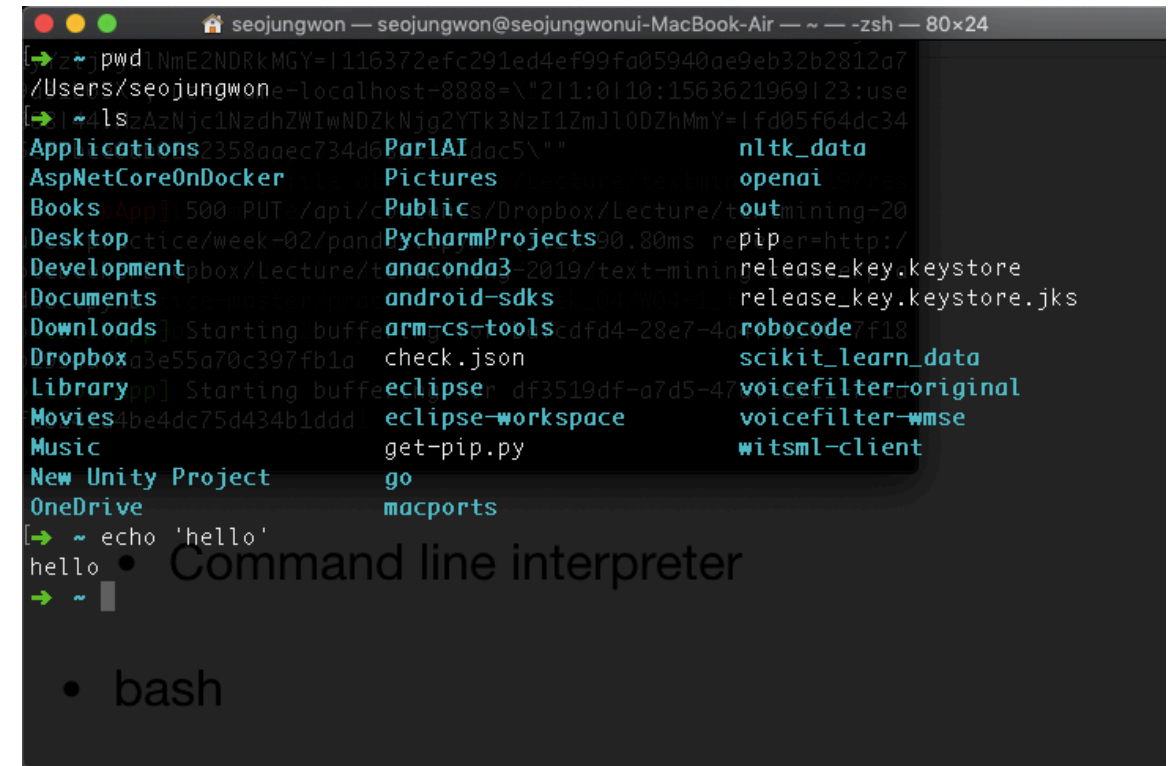
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Goal

- Reviewing basic terms in the Linux environment

- Reviewing the most common Linux commands

- Looking at some git commands

- Tasks

Terms

- shell

- terminal

- bash

- server

- host

- port

- directory

- folder

- file

- path

- resource

- memory

- cpu

- disk

- core

- permission

- root

- sudo

Shell, Terminal, Bash

- **Terminal**

  - Text input/output environment

- **Shell**

  - Command line interpreter

- **Bash**

  - One types of shell

  - The most common shell in modern linux systems

e.g.,
"Open your terminal,
and generate the file using a bash script"

Server, Host, Port

- 'Server' and 'Host' are often used interchangeably.

- **Host** is a computer or another device that connects to the network while a **server** is a software or a hardware device that provides services to other programs or devices in the network.

  - e.g., *"A web host (or web hosting company) maintains multiple web servers and provides web hosting services for clients."*

- Port

  - A port is an **addressable network location** implemented in an operating system to help differentiate traffic destined for different services or applications.

Path, Directory, Folder, File

- **Path:** the general form of the name of a file or directory, specifies a unique location in a file system.

  - **Absolute path**: full path from root directory
    e.g., : C:\Users\Desktop, /home/User1

  - **Relative path**: way to specify the directory from another
    e.g., : ../, ../../, ../Users

- **Directory** = Folder

  - A directory is a **file system cataloging structure** which contains references to other computer files, and possibly other directories.

- **File**: *"In Linux, everything is a File"*

  - A file is an object on a computer that stores data, information, settings, or commands used with a computer program.

Resource, memory, disk, core

- **Resource** is any physical or virtual component of limited availability within a computer system.

- **Memory** mainly means the size of RAM.

- **Disk** means disk space (HDD, SSD).

- **Core** means each processor in CPU.

Permission, Root, Sudo

- Each file and process is owned by different users.

- We do not have '**permission**' to manipulate others'.

- However, the **root** account has permission for everything.

- When we run a command as a root account in Linux, we start the command with **sudo.**

Linux commands

- File and directory commands

- Archives related commands

- Network related commands

- Other useful commands

File and directory commands

- **cd**: move to the certain directory

- **pwd**: show the current path

- **ls**: display the files in the specified directory

- **touch**: create a new file

- **rm**: remove the file

- **cp**: copy the file to others

- **mv**: move (rename) the file.

- **cat**: display the contents of file

- **less**: browse through a text file

- **head**: display the first n-lines of a file

- **tail**: display the last n-lines of a file

- **find**: find files in the specified directory

Archive related commands

- **tar**

  - **(compress)** tar cf
    archive.tar directory

  - (**extract)** tar xf archive.tar

  - **(compress)** tar czf
    archive.tar.gz directory

  - **(extract)** tar xzf
    archive.tar.gz

- **(compress)** tar cjf
  archive.tar.bz2 directory

- **(extract)** tar xjf
  archive.tar.bz2

- **zip**

  - **(compress)** zip archive.zip
    directory

  - **(extract)** unzip archive.zip
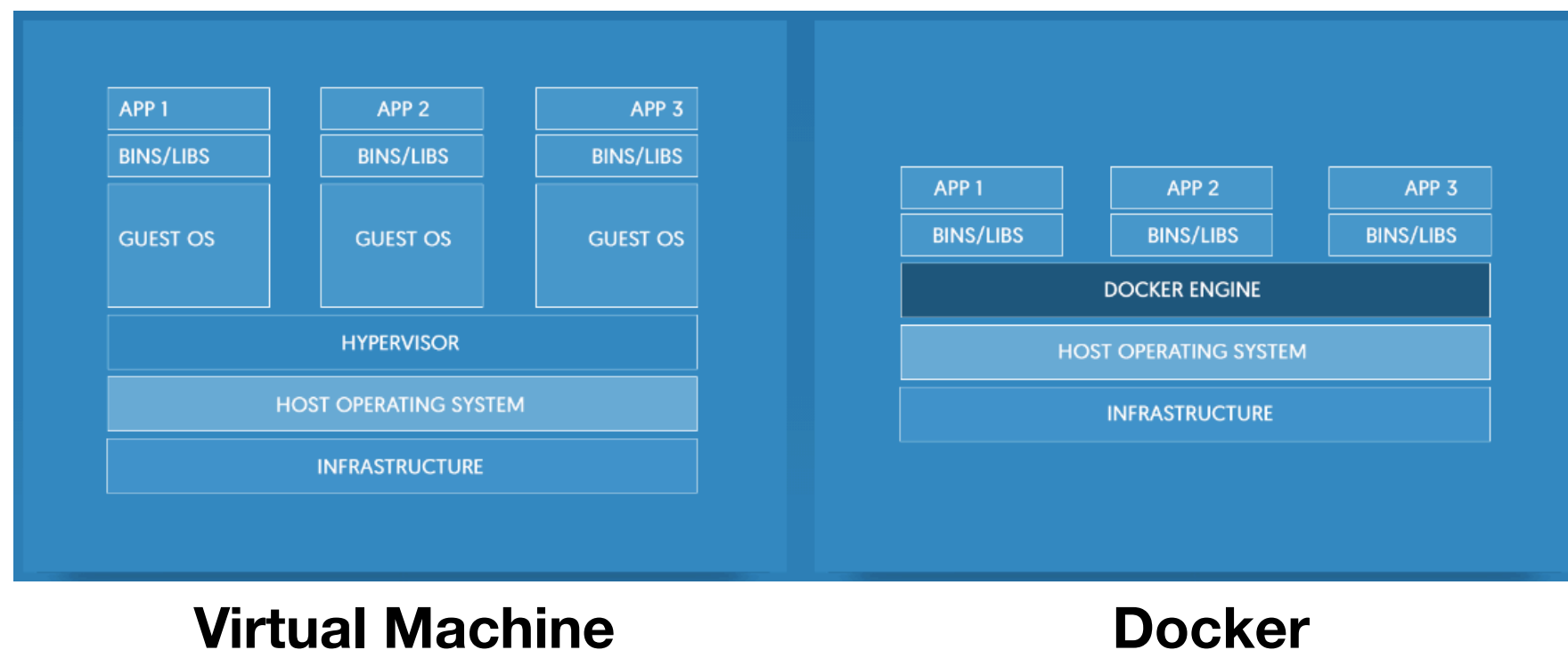
Network related commands

- **ssh:** connect to host using port

  - ssh -p port user@host

- **scp:** secure copy to/from host from/to local

  - (to server) scp file host:/path

  - (from server) scp host:/path/file /localpath

- **wget / curl:** download the file

  - wget host/file.txt

  - curl host/file.txt --output some.file

- **ping:** send echo request to host

  - ping **www.google.com**

Other useful commands

- **top (htop)**: display and manage the top processes

- **df -h (-i)**: show free and used space (inodes) on mounted filesystems

- **kill pid**: kill process with process ID of pid

- **chmod**: change the permission of a file

- **chown**: change the ownership of a file

- **man command:** show documentation of the given command

Virtualization

- How can we set up linux environment in our local machine? (when we use Windows or Mac)

  - Option #1: VirtualBox or VMware

  - Option #2: Docker

Virtual Machine   **Docker**

Tasks