

System Administration 101 (Linux)

University of Stavanger

Goal

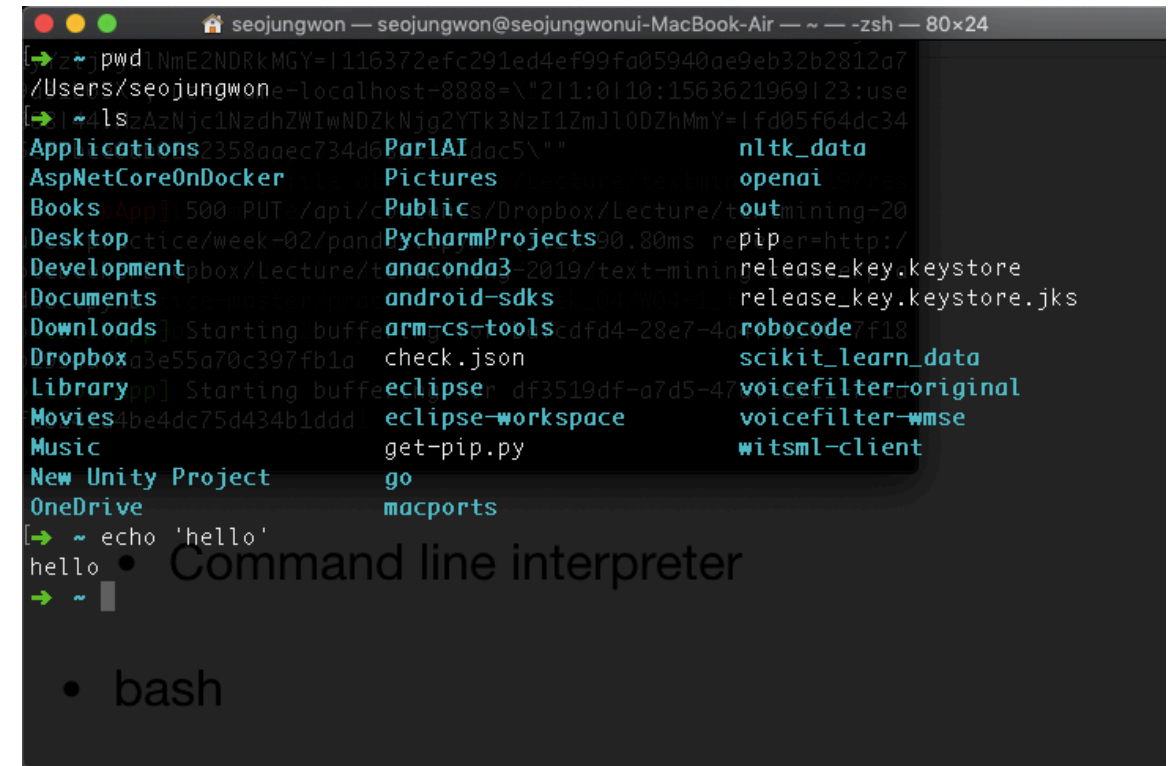
- Reviewing basic terms in the Linux environment
- Reviewing the most common Linux commands
- Looking at some git commands
- Tasks

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



The screenshot shows a terminal window titled 'sejungwon — sejungwon@sejungwonui-MacBook-Air — ~ — zsh — 80x24'. The user has executed 'pwd' and 'ls' commands. The 'ls' output shows a directory listing with various folders and files, including 'Applications', 'AspNetCoreOnDocker', 'Books', 'Desktop', 'Development', 'Documents', 'Downloads', 'Dropbox', 'Library', 'Movies', 'Music', 'New Unity Project', 'OneDrive', 'ParlAI', 'Pictures', 'Publics', 'PycharmProjects', 'anaconda3', 'android-sdks', 'arm-cs-tools', 'check.json', 'eclipse', 'eclipse-workspace', 'get-pip.py', 'go', 'macports', 'nltk_data', 'openai', 'out', 'release_key.keystore', 'release_key.keystore.jks', 'robocode', 'scikit_learn_data', 'voicefilter-original', 'voicefilter-wmse', and 'witsml-client'. The user has also executed 'echo 'hello'' and the output 'hello' is shown.

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.

* source: <https://techterms.com/definition/host>

** source: <https://pediaa.com/difference-between-host-and-server/>

*** source: <http://www.linuxandubuntu.com/home/what-are-ports-how-to-find-open-ports-in-linux>

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.

* source: <https://www.tecmint.com/explanation-of-everything-is-a-file-and-types-of-files-in-linux/>

** source: <https://www.computerhope.com/jargon/f/file.htm>

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

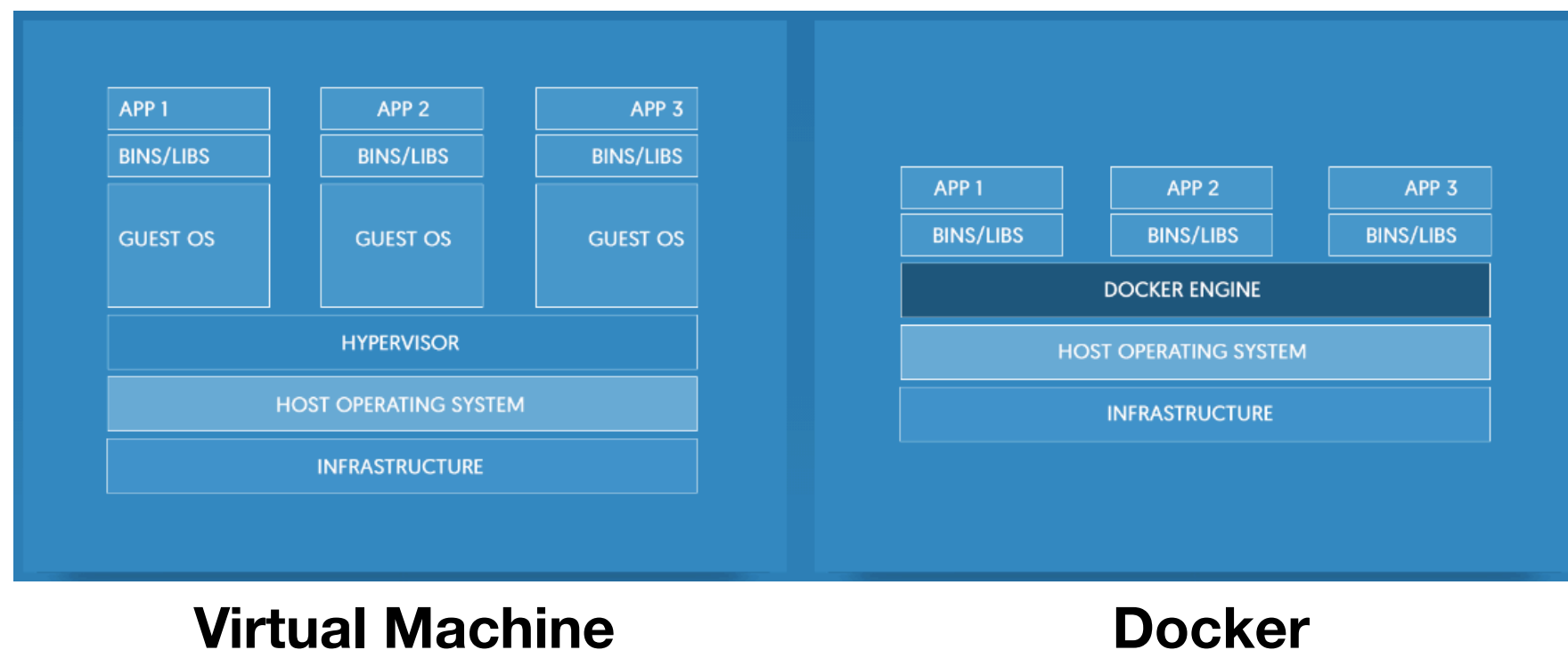
- **ssh:** connect to host using port
 - `ssh -p port user@host`
- **scp:** secure copy to/from host from/to local
 - (to server) `scp file host:/path`
 - (from server) `scp host:/path/file /localpath`
- **wget / curl:** download the file
 - `wget host/file.txt`
 - `curl host/file.txt --output some.file`
- **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



Tasks