Ubuntu-Linux Operation: Installation Procedure (Hands-on Practice)

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Your Lecturers Today

Zainal Abidin

Dissemination of Public Weather Service

System Administrator

DR. Danang Eko Nuryanto

Meteorological Research and Development

Researcher

Day 1 Outline

Linux installation in Virtual Machine (VMware)

Linux Basic Command

Day 2 Outline

Linux basic monitoring

Linux basic shell scripting

Task scheduler

Polling

https://app.sli.do/event/rRZkkJCuuHt5RHkSmajbUQ

Participants can join at **slido.com** with **#2239149**

Pre-Test

https://forms.gle/fwCPft3yo9eceD7a9

Supplementary Files

https://github.com/abidinz/linux-nwp-wmo

Module

https://github.com/abidinz/linux-nwp-wmo/blob/main/01.04_FINAL_UbuntuLinux.pdf

Linux command summary for Day 1

https://github.com/abidinz/linux-nwp-wmo/blob/main/day1.md

Remote Desktop to Lecturer Monitor

VNC Viewer

10.10.25.226

Linux Installation

Bare Metal	: Linux directly installed/run on laptop, PC, or server
Virtual Machine	: Linux as virtual machine using VMware or VirtualBox as hypervisor
WSL	: Windows Subsytem for Linux, in Windows 10/11 has feature that enable developer to run GNU/Linux environment without the overhead of a traditional virtual machine or dual-boot setup

https://ubuntu.com/tutorials/install-ubuntu-on-wsl2-on-windows-10

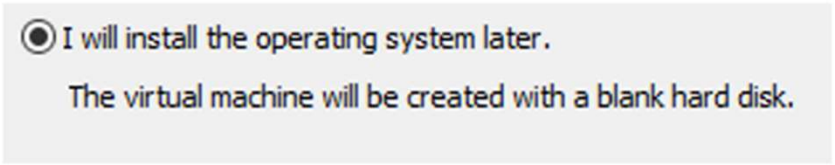
https://learn.microsoft.com/en-us/windows/wsl/

Linux Installation with VMware

Locate VMware Workstation Player application in your PC

1. Open VMware Workstation Player
2. Click Create New Virtual Machine

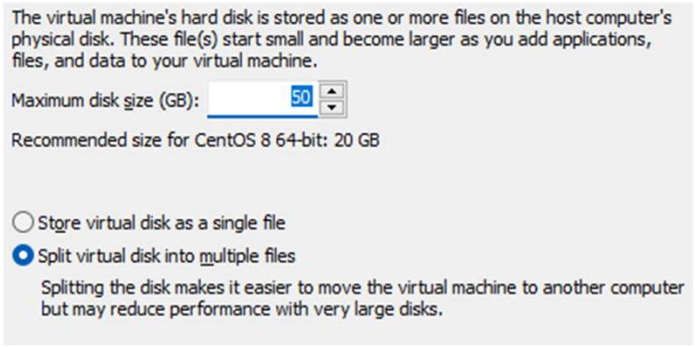
3. choose I will install the operating system later, click Next



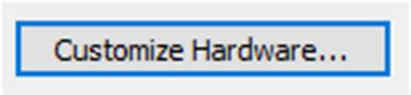
4. choose Linux as Guest Operating System and CentOS 8 64-bit version

5. input Virtual machine name, nwp rocky8

6. input Maximum disk size (GB), 50 and choose Split virtual disk into multiple files

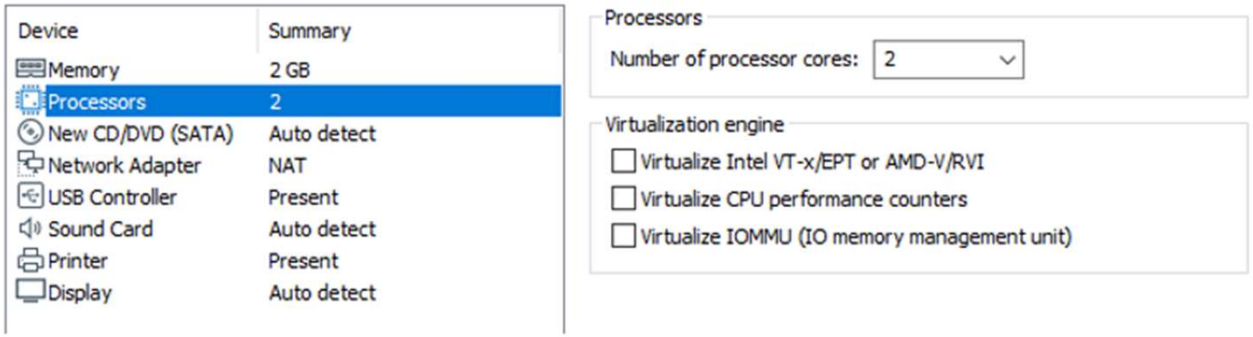


7. click Customize Hardware



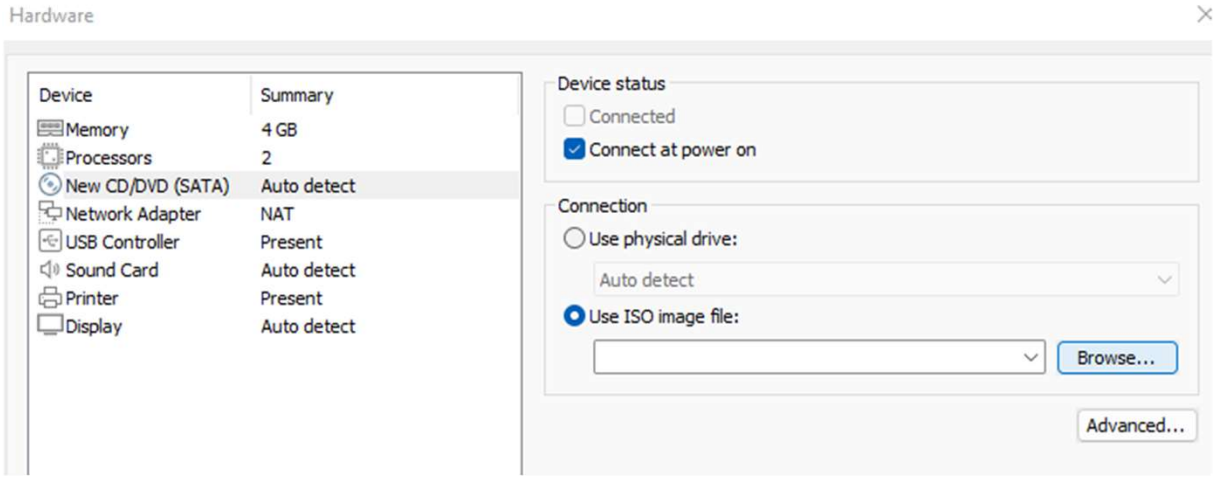
It allows us to define virtual hardware that want to be utilized. We can define number of processor, memory, network adapter and configuration for this VM.

8. choose Processors and choose 2 as minimum Number of processor cores



New CD/DVD (SATA), select Connection with Use ISO image file, click Browse

Locate ISO file in Downloads folder, select Rocky-8.4-x86_64-dvd1.iso

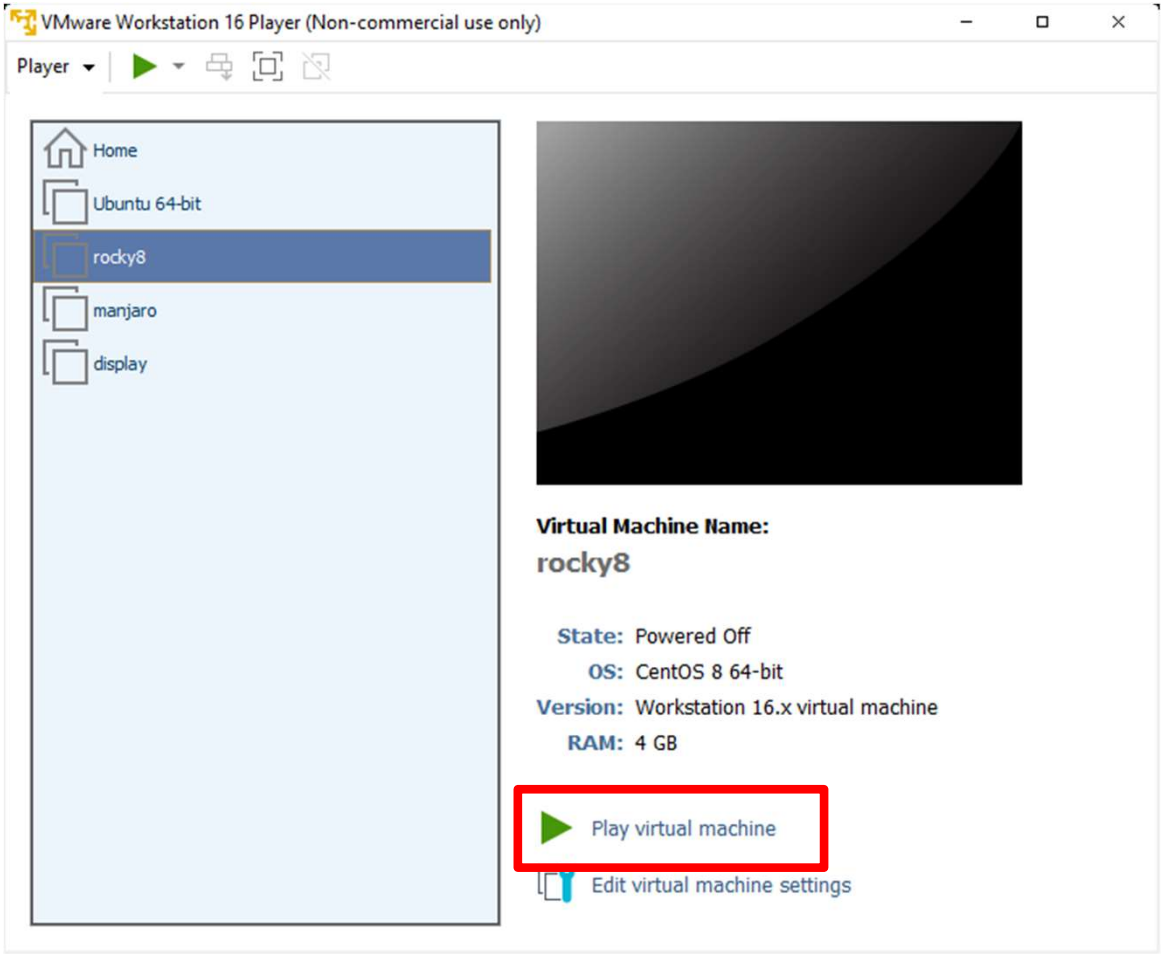


ISO file can be downloaded in the official website of the linux distribution

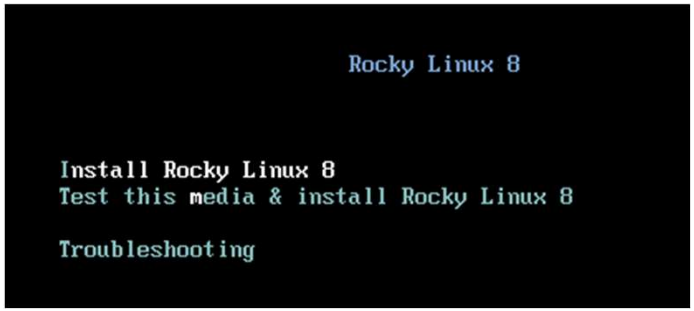
The ISO files of Rocky Linux 8 and Ubuntu 22.04 have been downloaded and located in Downloads folder

select the Virtual Machine that just created

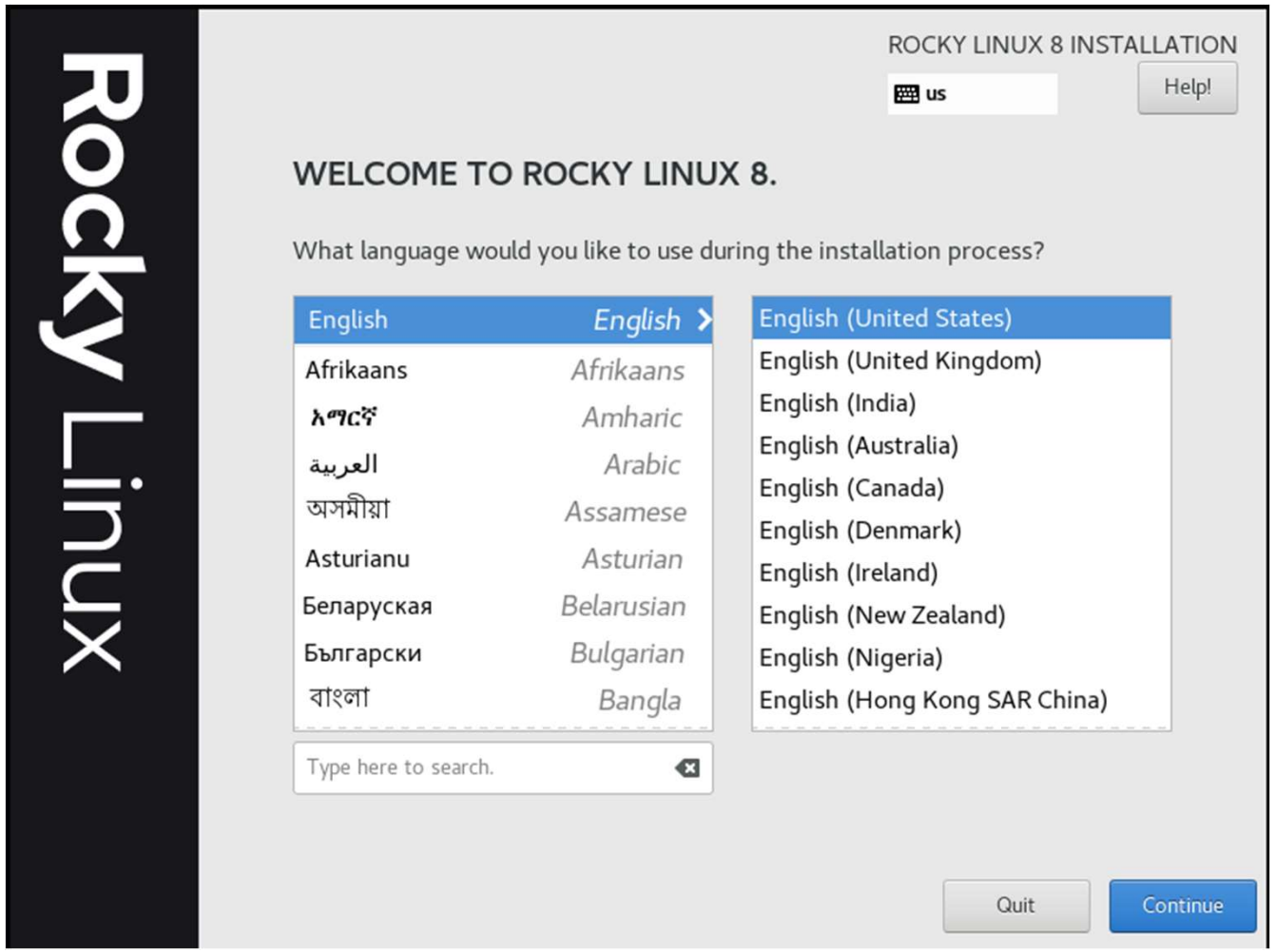
Click **Play Virtual Machine** to start the VM



Choose Install Rocky Linux 8



Choose Language



Some things need to be configured

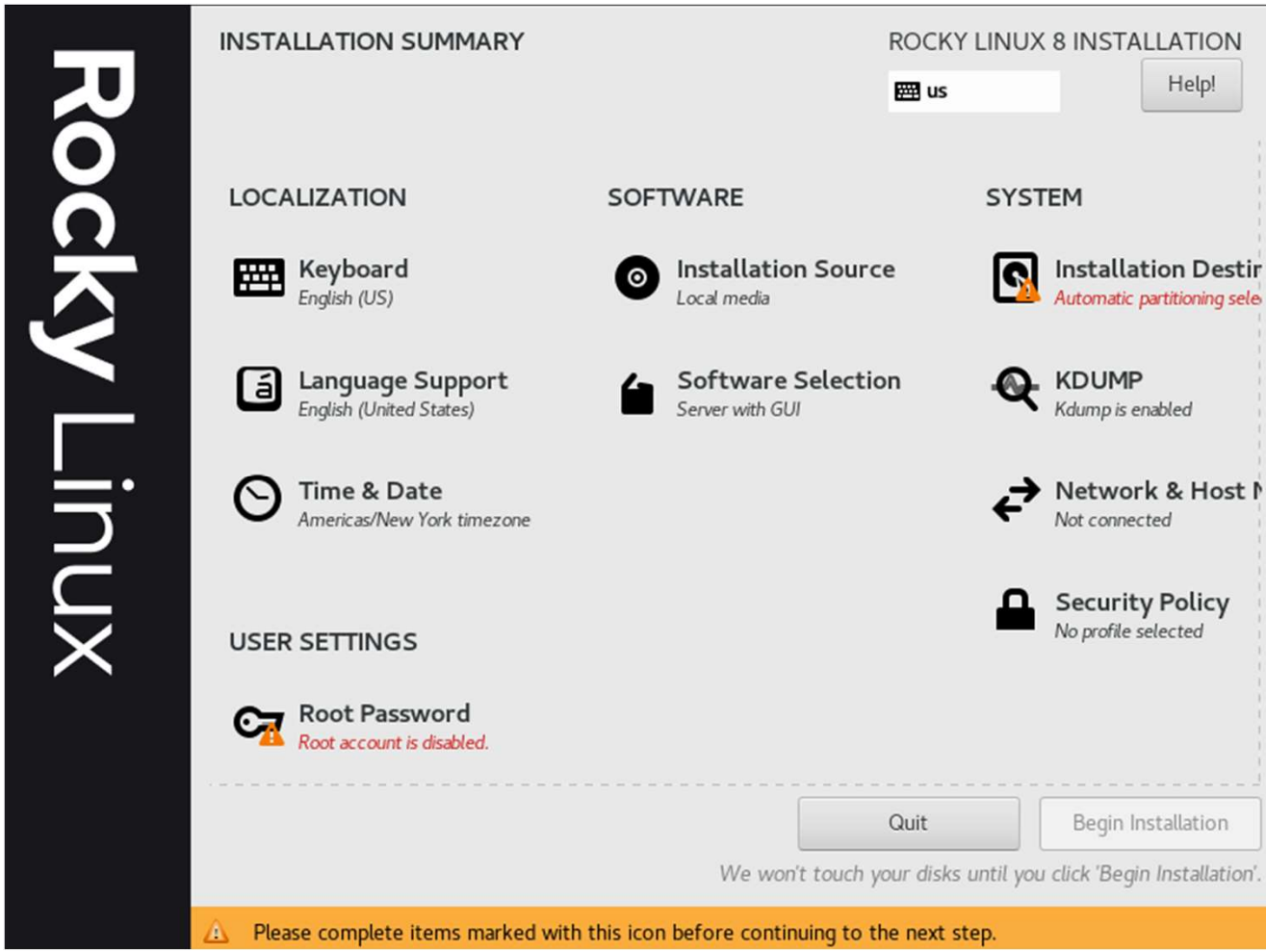
Root Password

Installation Destionation

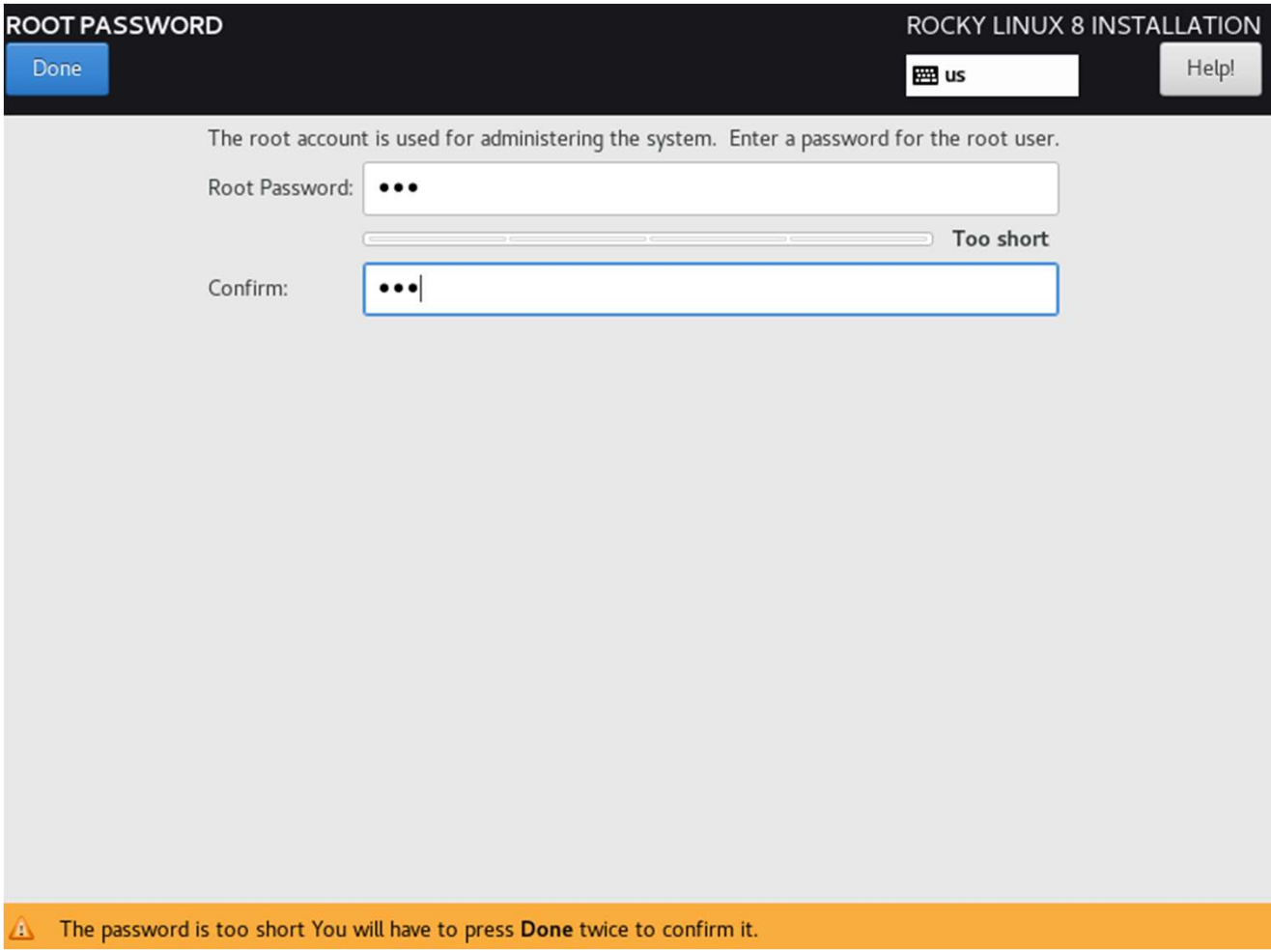
Network and Hostname

Create User

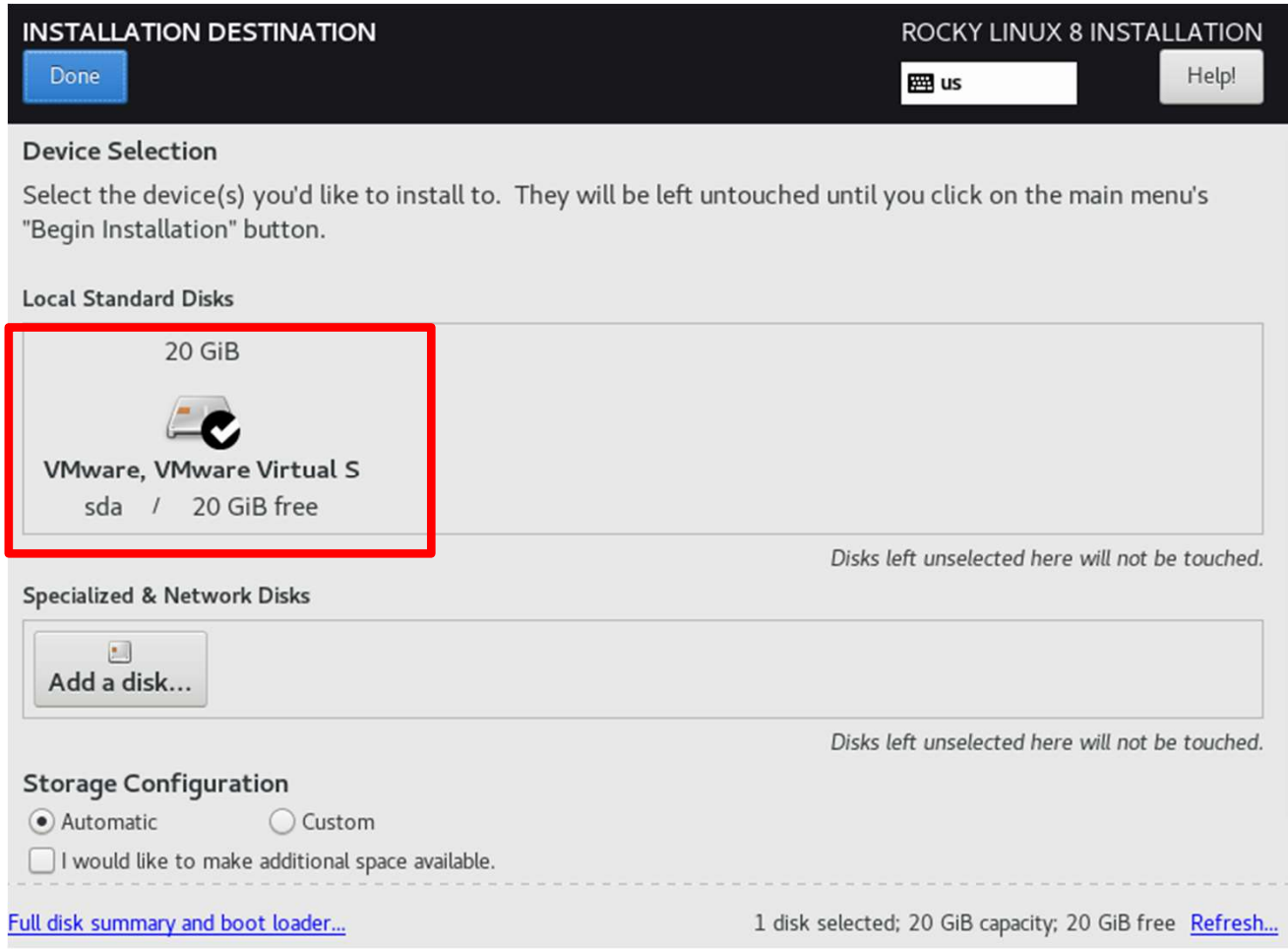
Time & Date



Input Root Password

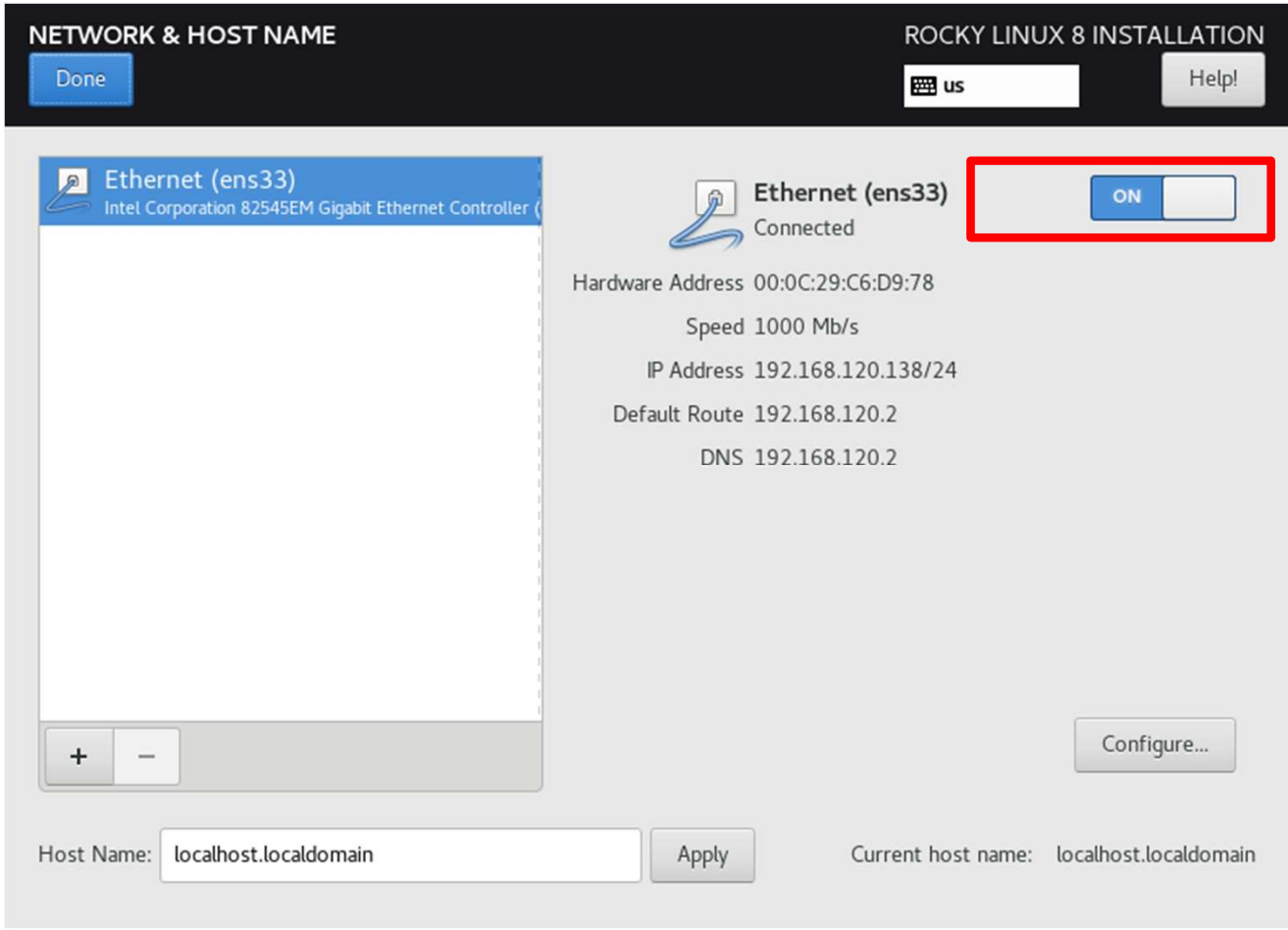


Select Installation Destination



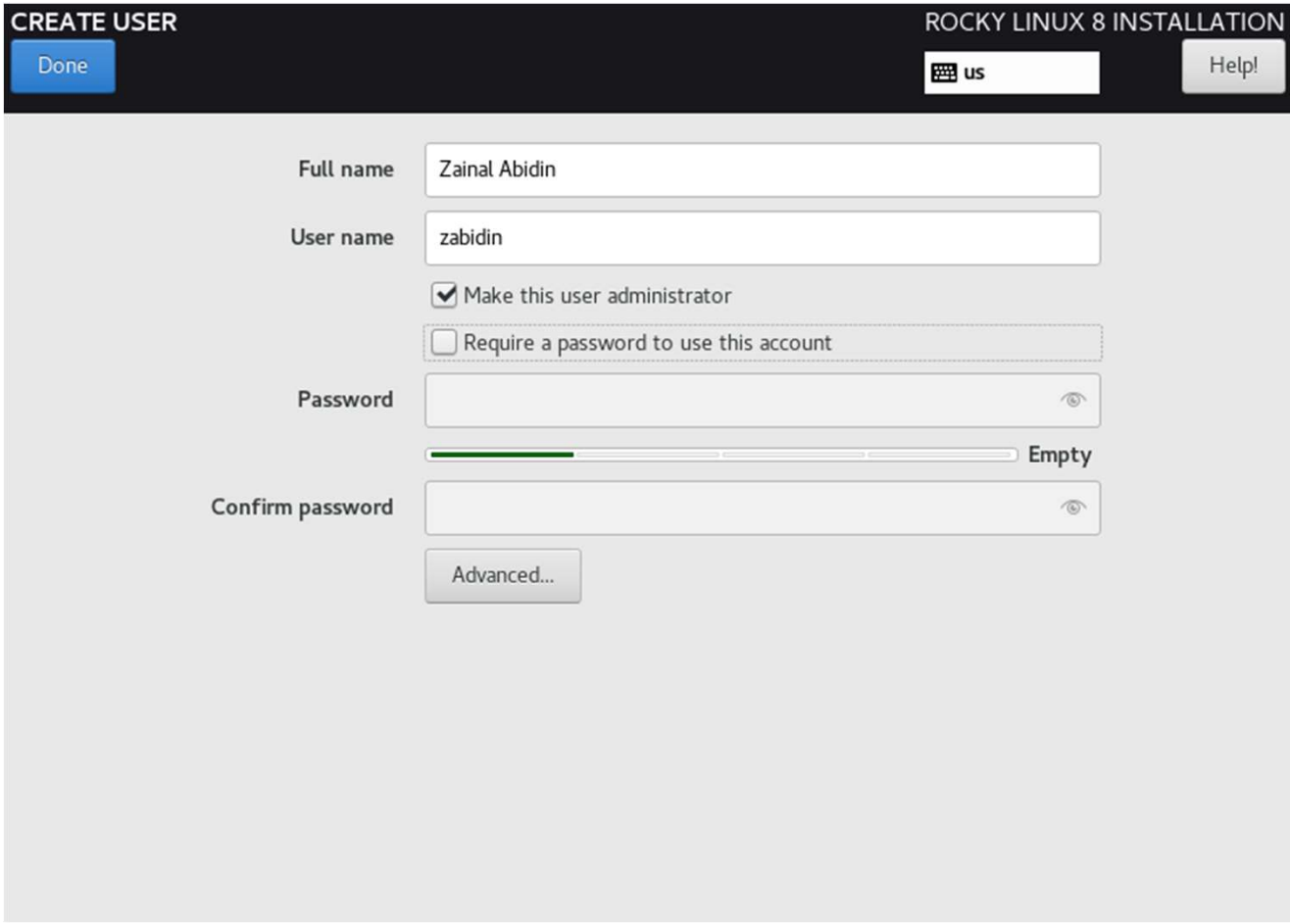
Configure Network & Hostname

Enable Ethernet (ens33), to be connected to Network by default



Create user

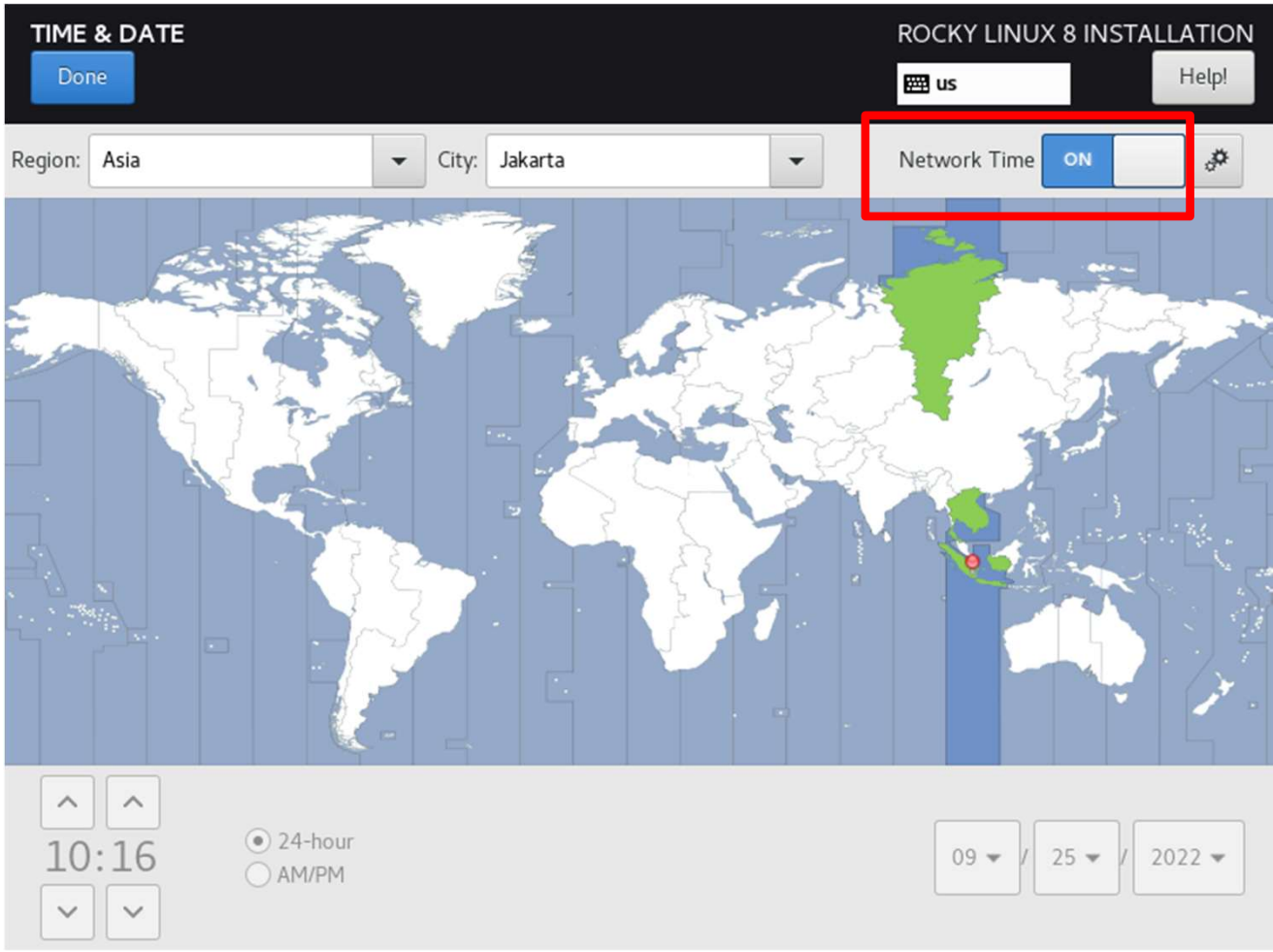
For this training it’s OK to leave Password blank



Configure Time & Date

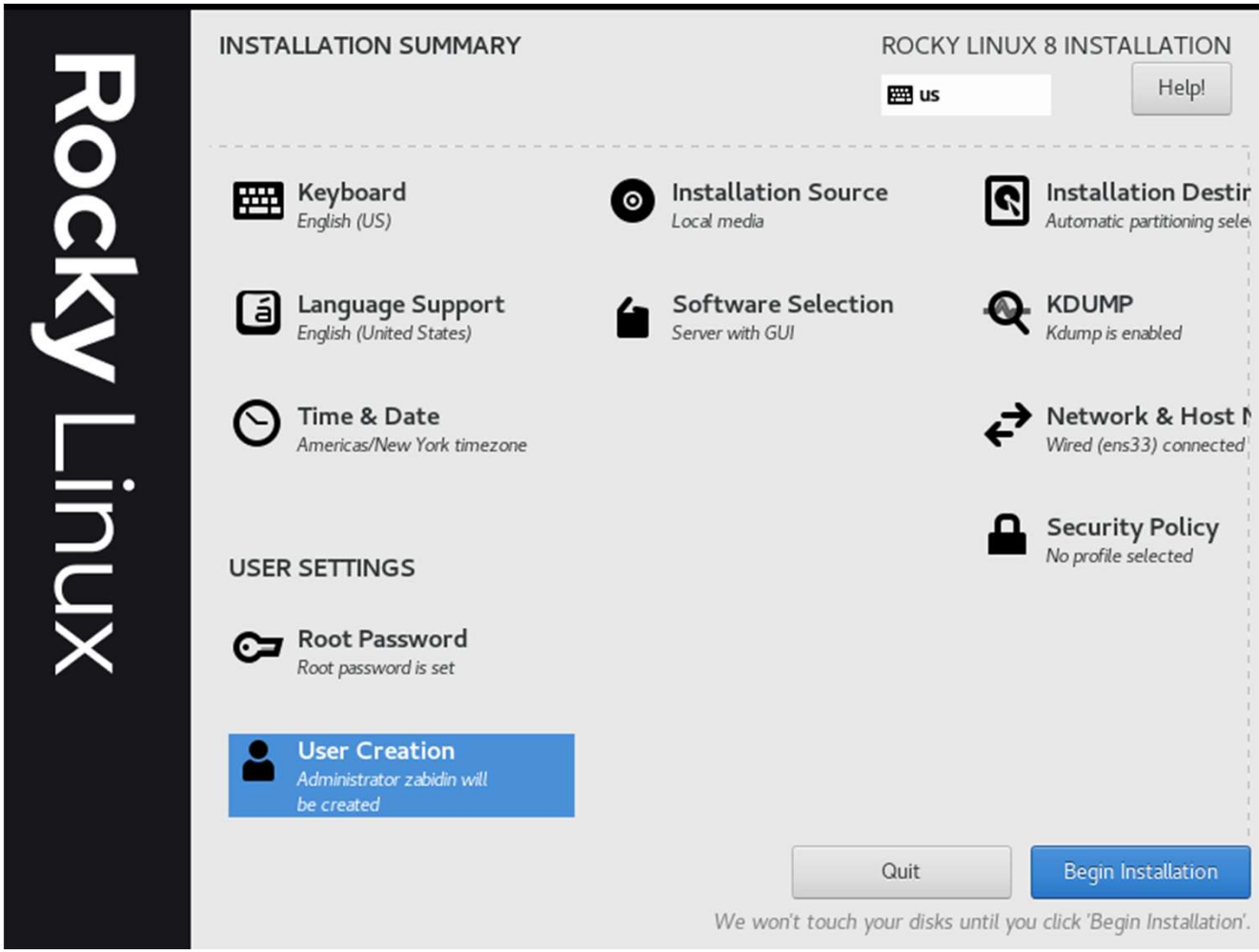
Select Region and City for Timezone

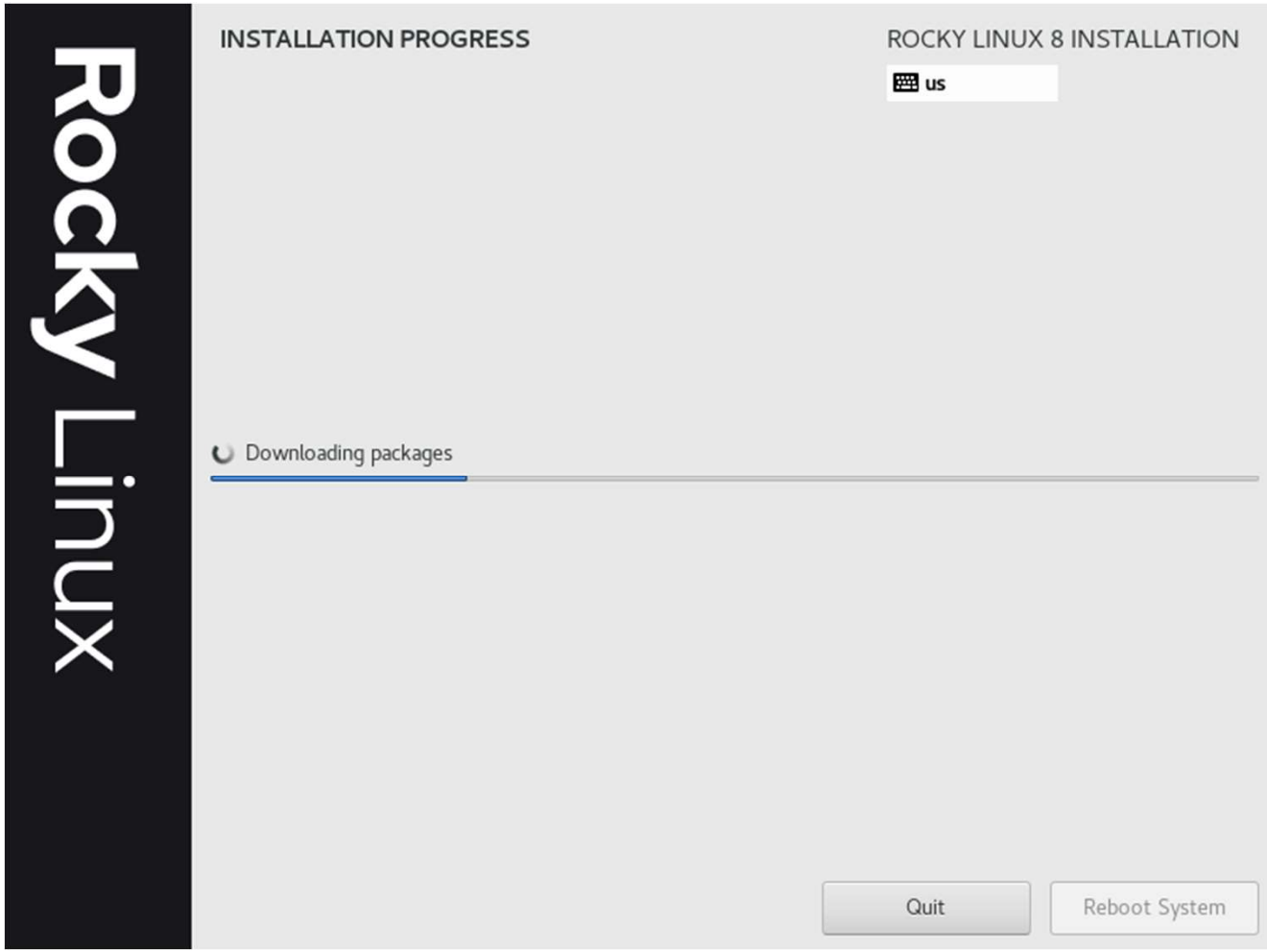
Enable **Network Time**



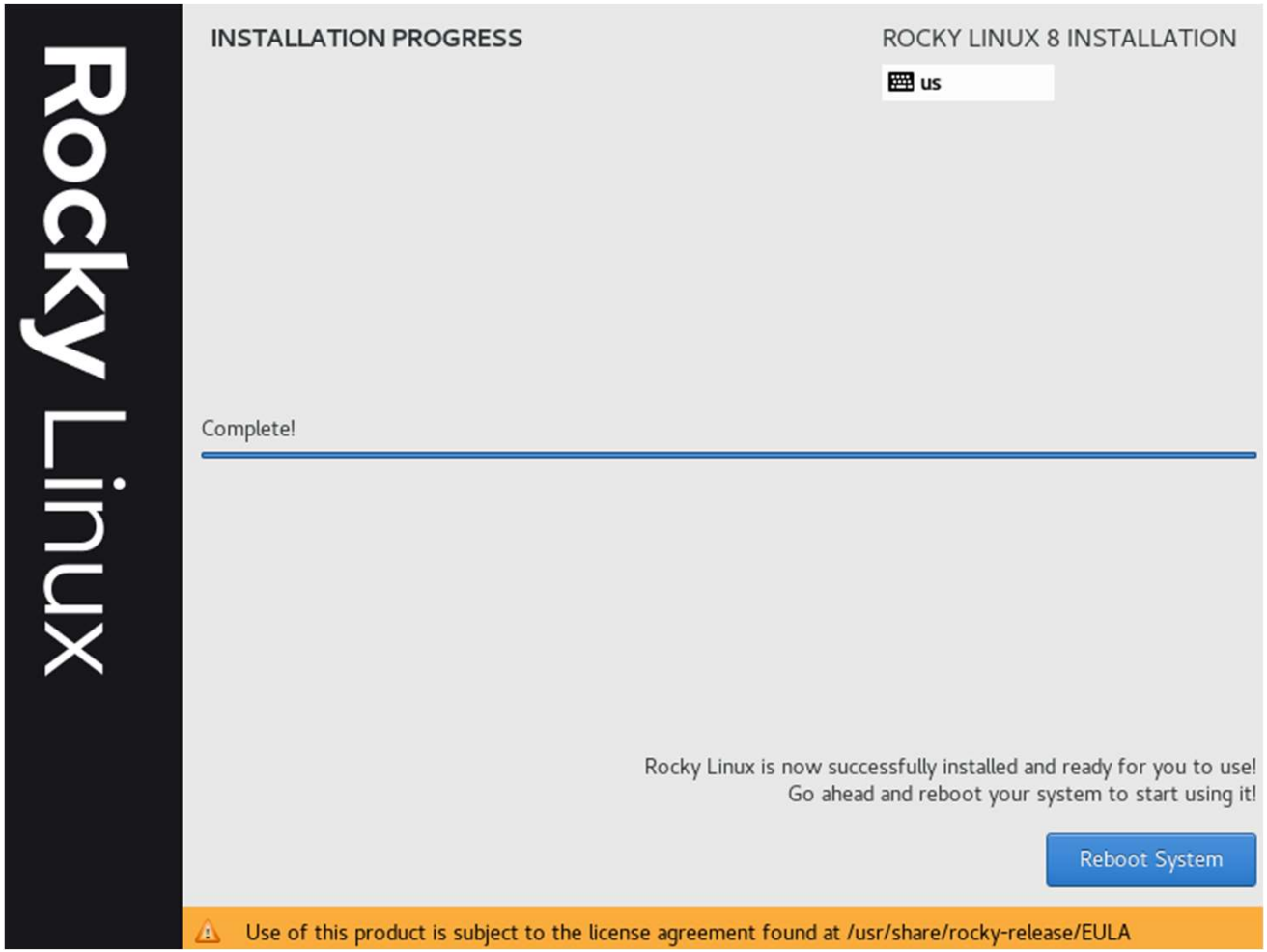
It is looked better and all things have been configured

Click **Begin Installation**

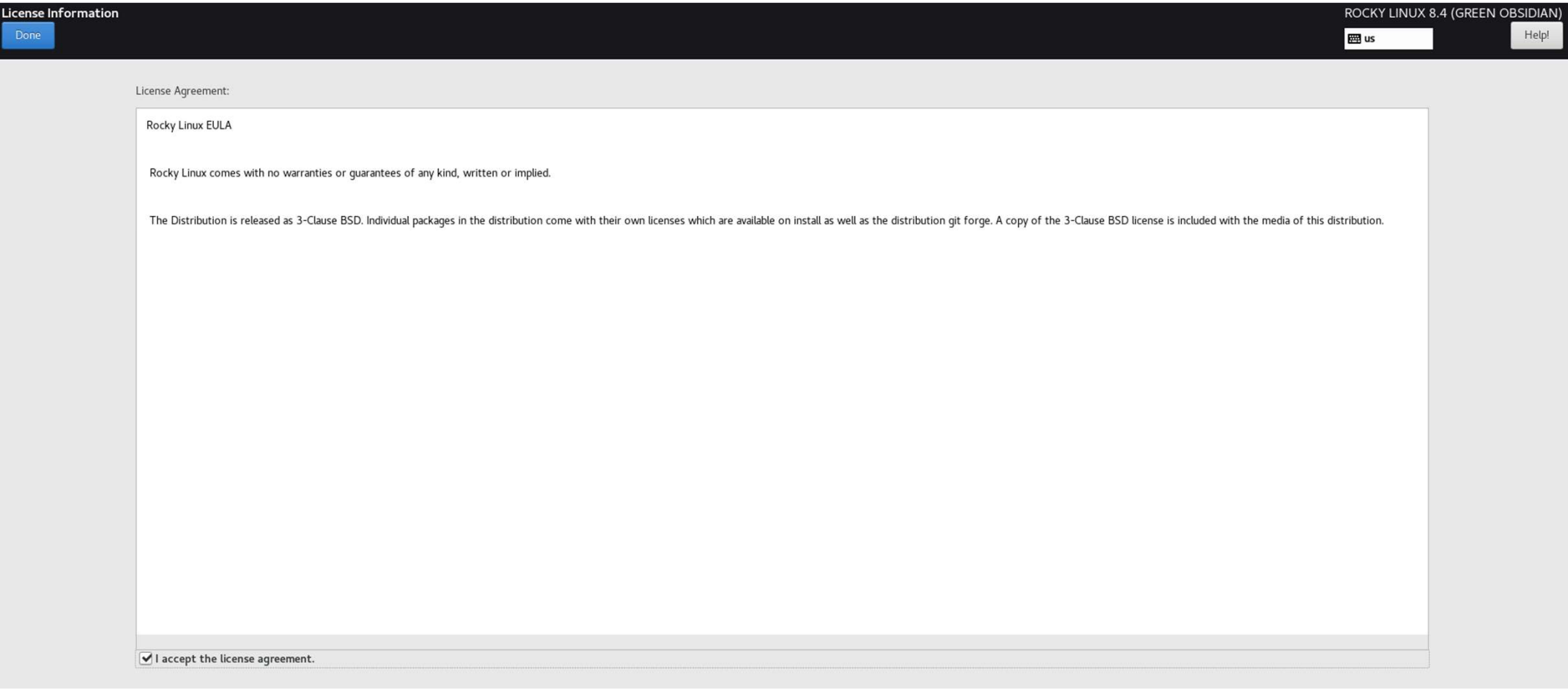



Rocky Linux
INSTALLATION PROGRESS
ROCKY LINUX 8 INSTALLATION
us
Downloading packages
Quit
Reboot System

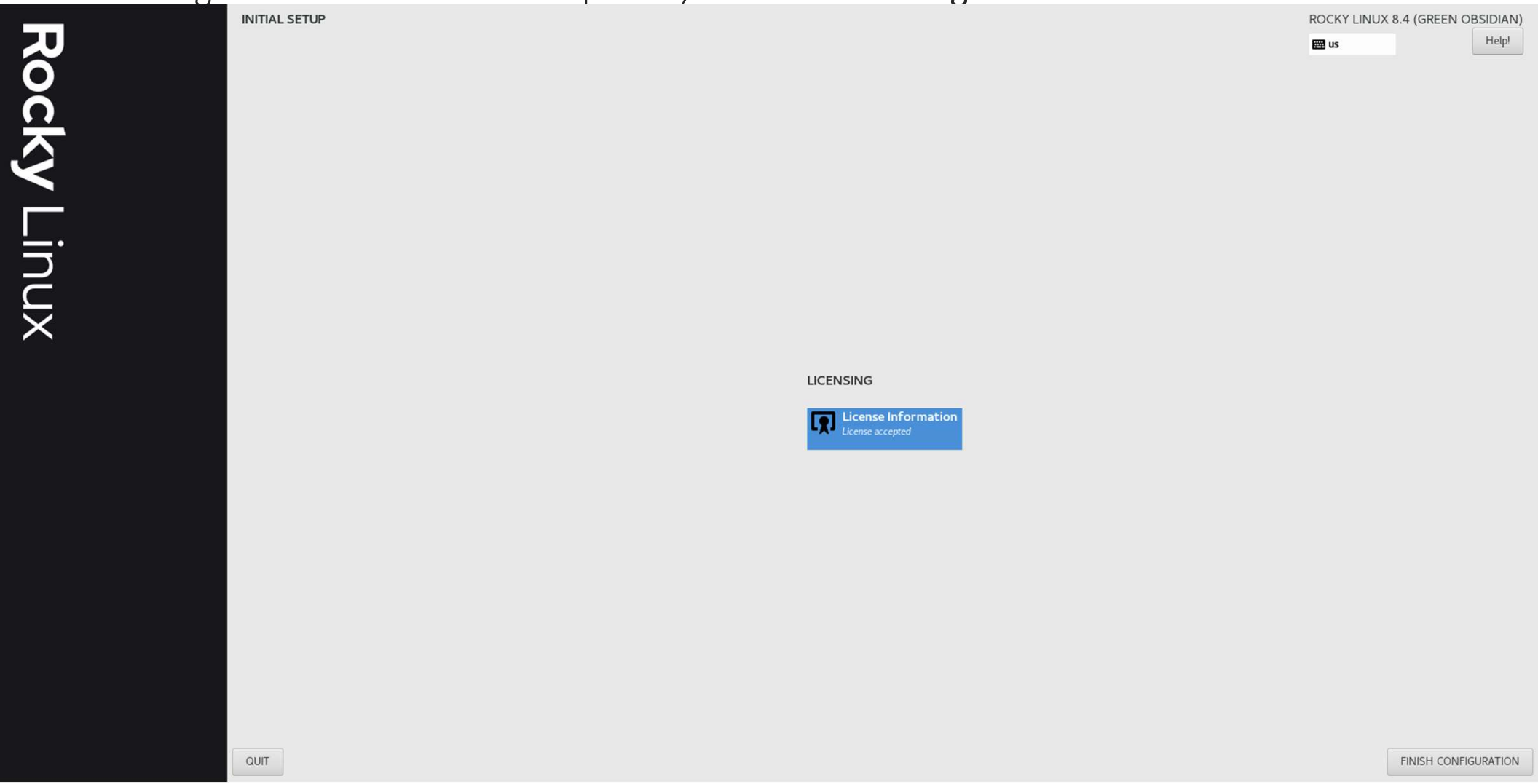
Installation is Complete!



Need to tick EULA, I accept the license agreement



Configurations have been completed, click **Finish Configuration**



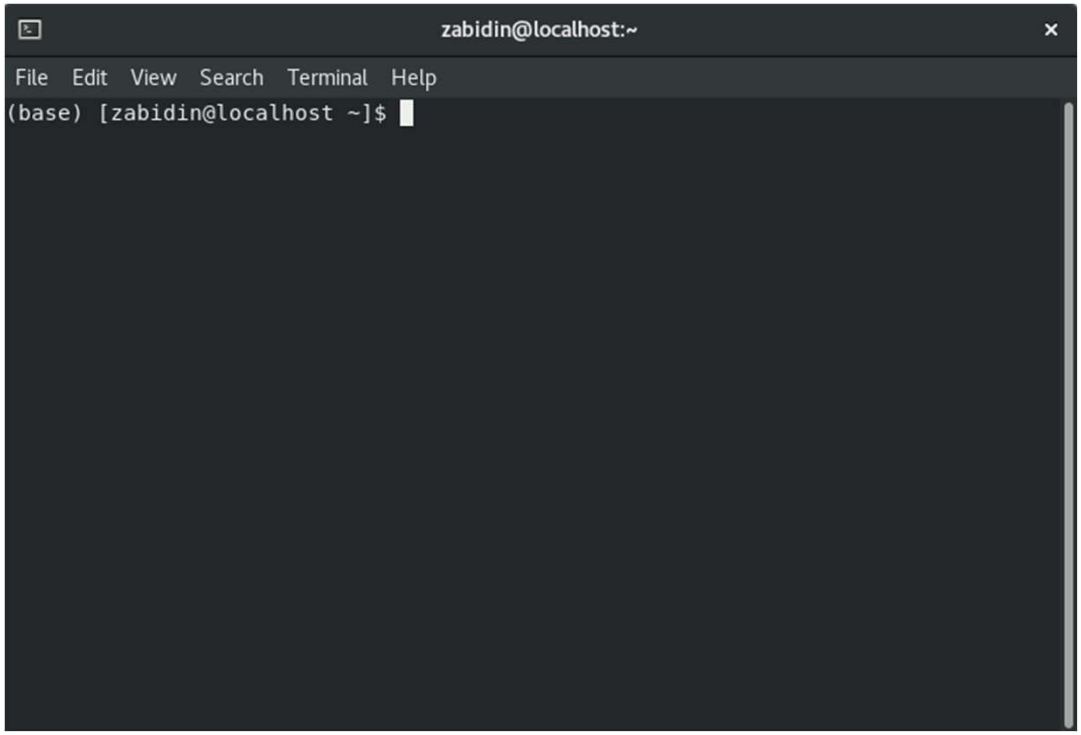
Command Line

```
$ command [options] [arguments]
```

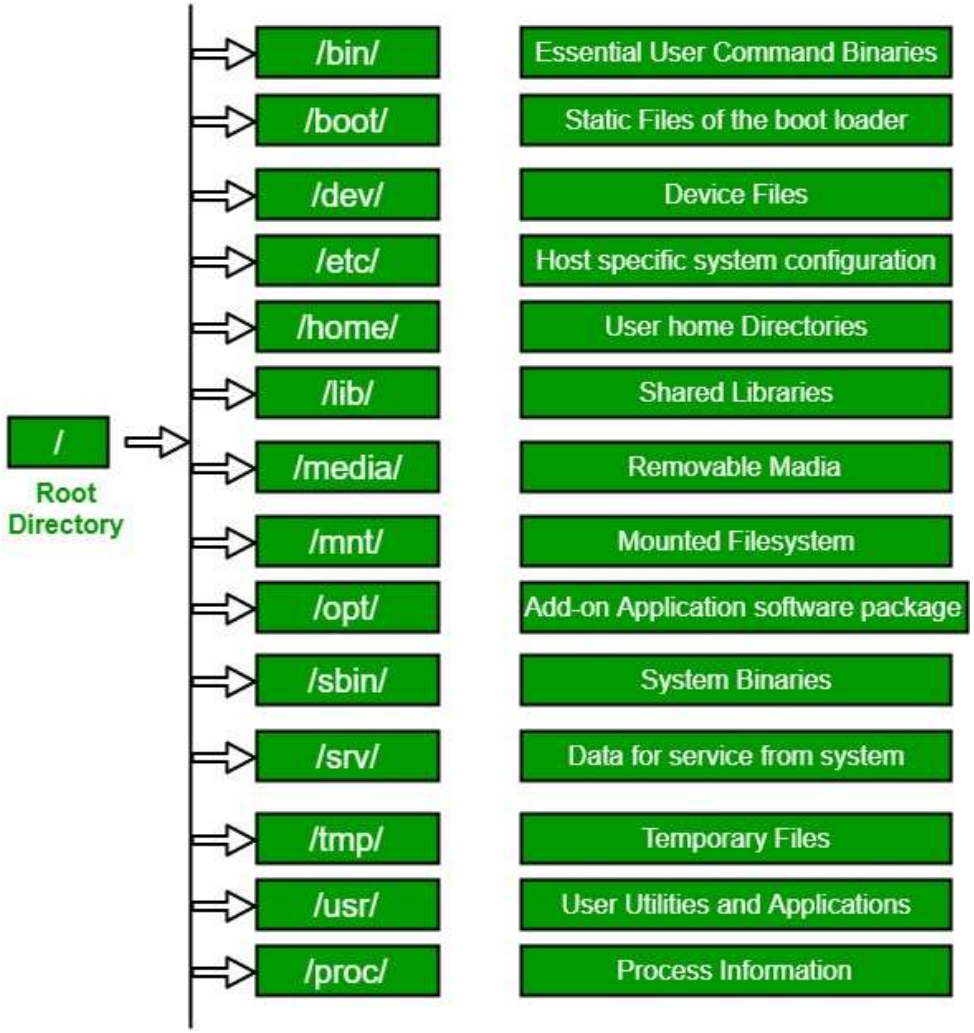
Most commands have options and arguments, some commands don’t need options or arguments

Open Terminal Console

push Window key, click this icon 



Linux File Structure



Absolute and Relative Path

List of Common Commands

`date`	print or set the system date and time
`cal`	display a calendar
`df`	report file system disk space usage
`pwd`	print name of current/working directory
`ls`	list directory contents
`cd`	change current directory
`rm`	remove/delete files or directories
`mv`	move/rename files or directories
`mkdir`	create directory
`rmdir`	remove/delete directory
`touch`	create a blank file
`wget`	the non-interactive network downloader

Let’s Start with First Commands

`date`	print or set the system date and time
`cal`	display a calendar
`df`	report file system disk space usage
`du`	estimates file space usage in particular directory
`pwd`	print name of current/working directory
`ls`	list directory contents

EPEL Installation

It is a repository, specific to linux-based Red Hat Enterprise Linux, to install additional common packages.

```
$ sudo dnf install https://dl.fedoraproject.org/pub/epel/epel-release-latest-8.noarch.rpm
$ sudo dnf update
$ sudo dnf repolist -v
$ sudo dnf install git
```

Download the WRF and WPS source code

```
$ git clone https://github.com/wrf-model/WRF
$ git clone https://github.com/wrf-model/WPS
```

cd for change directory WRF directory

```
$ cd WRF
```

`ls` List Files and Folders

```
$ ls
$ ls -l
```

`$ ls -l`	list files or folders in column
`$ ls -lt`	list files or folders in column, sorted by time
`$ ls -ltr`	list files or folders in column, sorted by time in reversed order
`$ ls -lS`	list files or folders in column, sorted by file size
`$ ls -lSh`	list files or folders in column, sorted by file size, file size in human-readable format (kB, MB, GB, TB)

ps: linux command is case-sensitive

`cd` change directory

`$ cd` or `cd ~`	change directory to home directory (usually `/home/[username]`)
`$ cd [folder]`	change directory target directory
`$ cd -`	change directory previous directory
`$ pwd`	show current/working directory

Getting Manual of Command

```
$ man [command]
$ command -h
$ command --help
```

```
$ man ls
```

show help/manual of **`ls`** command

or Google is your friend

Useful Options in Some Commands

`ls -ltr`	list files sorted by time in reversed order
`df -h`	disk usage in human-readable format (kB, MB, GB)
`du -h --max-depth=1`	list folder size in current directory
`date -u +%Y%m%d`	shows date of UTC in YYYYMMDD format
`cal -Y`	show calendar of the year
`cd -`	back to previous directory
`rm -frv [dir]`	delete a folder recursively (BEWARE!)
`cp -rv [srcdir] [trgdir]`	copy a folder recursively
`mkdir -p first/second/third`	create new folder recursively

Vim File Editor

`$ vim [file]`	open Vim editor
`$ vimtutor`	practice Vim keyboard

Vim is very extensible and has lot of plugins, if you are comfortably enough to use Vim, try SpaceVim or LunarVim to have best experiences with the plugins.

Vim Keyboard Command

`i`, `a`, INSERT	activate editing mode
ESC	disactivate editing mode
`gg`	go to first line
`GG`	go to last line
`dd`	delete current line
`dw`	delete 1 word
`3dw`	delete 3 words
`3dd`	delete 3 lines under
`:4`	go to 4-th line
`:q!`	quit without saving
`:wq`	save and quit
`:w`	save without quit

or just simply use **nano** editor

`$ nano [file]` open nano editor

Ctrl+o	save file as ..
Ctrl+x	quit (type Y for saving, N for quit without saving)

Play with DummyData

https://www.briandunning.com/sample-data/us-500.zip

`cat`, **`less`**, **`more`**	shows file content (try it yourself to see the differences)
`head`, **`tail`**	shows beginning and last line of a file content
`wc`	counts characters, words, and lines
`grep`	searchs a text pattern of a file
`cut`	cuts out the sections from each line of a file
`sort`	sort file content

`$ head -n5 [file]`	show 5 first lines
`$ tail -n5 [file]`	show 5 last lines
`$ tail -f [file]`	show 10 last line and print the updated last line, useful for log monitoring
`$ sort [file]`	sort the records of file
`$ sort -u [file]`	sort the records of file, only the unique values

grep

`$ grep ERROR [file]`	show line that contains “ERROR”
`$ grep -i ERROR [file]`	show line that contains “ERROR” or “error”
`$ grep ^ERROR [file]`	show line that begins with “ERROR”
`$ grep ERROR$ [file]`	show line that ends with “ERROR”

^ and $ are Regular Expression (RegEx) pattern

Learn more in https://regexr.com/

cut

`$ cut -d, -f3 [file]`	show 3rd column with comma as delimiter
`$ cut -d" " -f1,5 [file]`	show 1st and 5th columns with space as delimiter
`$ cut -c 1-10 [file]`	show 1st until 10th character of the line
`$ cut -c 3,6,9 [file]`	show 3rd 6th 9th character of the line

Linux Monitoring Command

`uptime`	tell how long the system has been running
`top`	display linux processes
`free`	display amount of free and used memory in the system
`watch`	execute a program periodically, showing output fullscreen
`kill`	terminate a process
`ps [aux]`	report a snapshot of current processes
`pgrep`	look up processes based on name

End of Day 1