

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

Zainal Abidin

DR. Danang Eko Nuryanto



**BMKG**  
Corporate  
University



WORLD  
METEOROLOGICAL  
ORGANIZATION  
Regional Training Centre - Indonesia



**OceanTeacher**  
GLOBAL ACADEMY  
Specialized Training Centre - Indonesia

# 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](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 Subsystem 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



### Create a New Virtual Machine

Create a new virtual machine, which will then be added to the top of your library.

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

☒ I will install the operating system later.

The virtual machine will be created with a blank hard disk.

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



Guest operating system

☐ Microsoft Windows

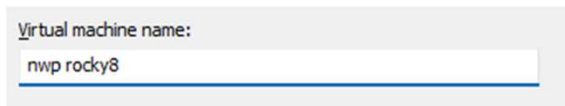
☒ Linux

☐ Other

Version

CentOS 8 64-bit

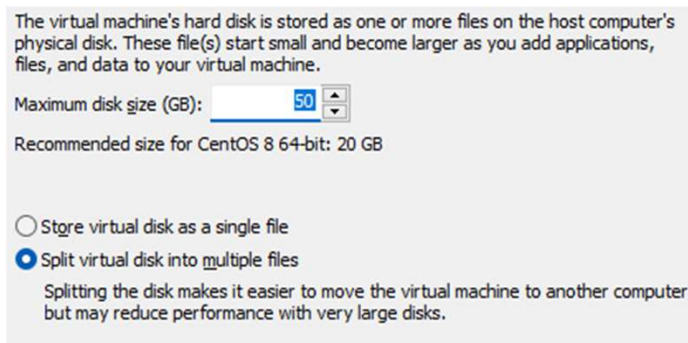
5. input Virtual machine name, nwp rocky8



Virtual machine name:

nwp rocky8

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



The virtual machine's hard disk is stored as one or more files on the host computer's physical disk. These file(s) start small and become larger as you add applications, files, and data to your virtual machine.

Maximum disk size (GB):

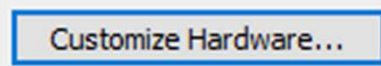
Recommended size for CentOS 8 64-bit: 20 GB

☐ Store virtual disk as a single file

☒ Split virtual disk into multiple files

Splitting the disk makes it easier to move the virtual machine to another computer but may reduce performance with very large disks.

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

Device	Summary
Memory	2 GB
<b>Processors</b>	<b>2</b>
New CD/DVD (SATA)	Auto detect
Network Adapter	NAT
USB Controller	Present
Sound Card	Auto detect
Printer	Present
Display	Auto detect

Processors

Number of processor cores:

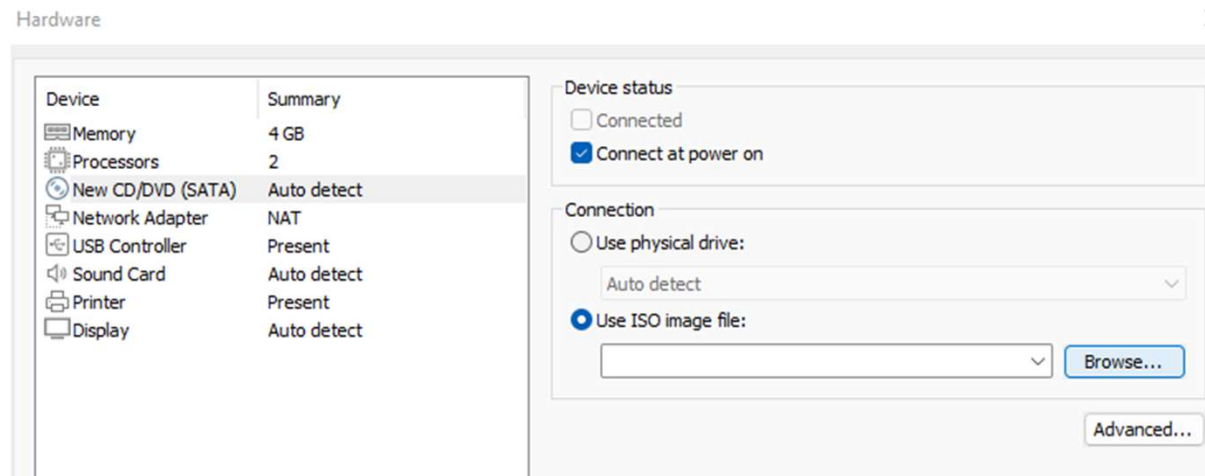
Virtualization engine

☐ Virtualize Intel VT-x/EPT or AMD-V/RVI

☐ Virtualize CPU performance counters

☐ Virtualize IOMMU (IO memory management unit)

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

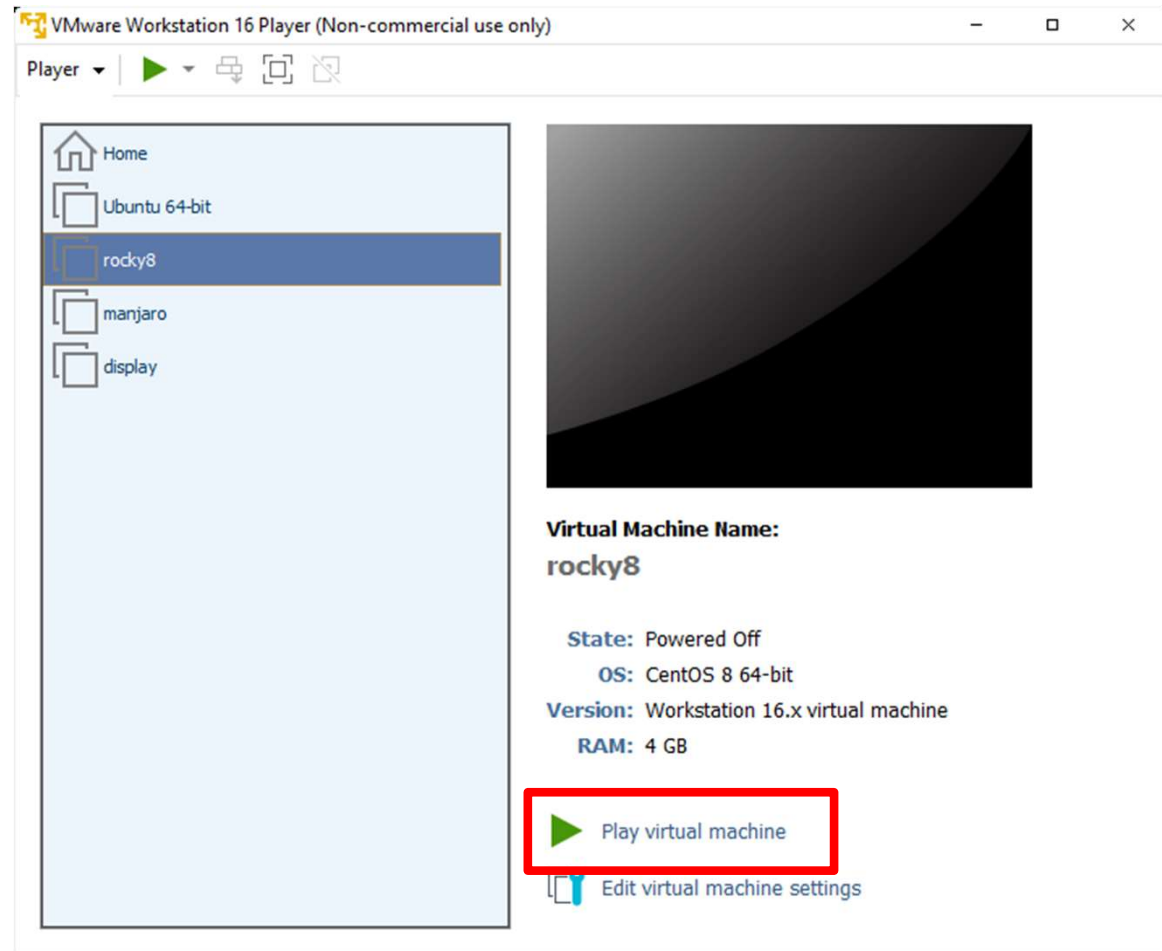


ISO file can be downloaded in the official website of the linux distribution

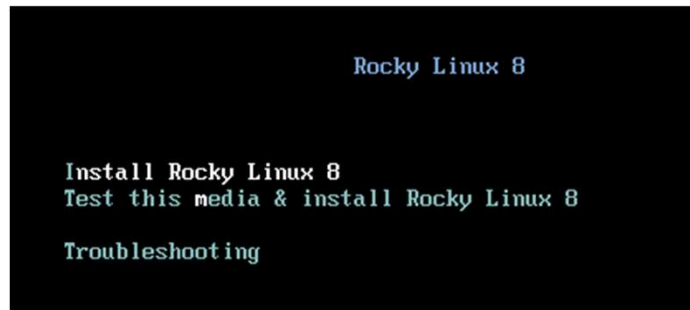
The ISO files of Rocky Linux 8 and Ubuntu 22.04 have been downloaded and located in Downloads folder

select the Virtual Machine that just created

Click Play Virtual Machine to start the VM

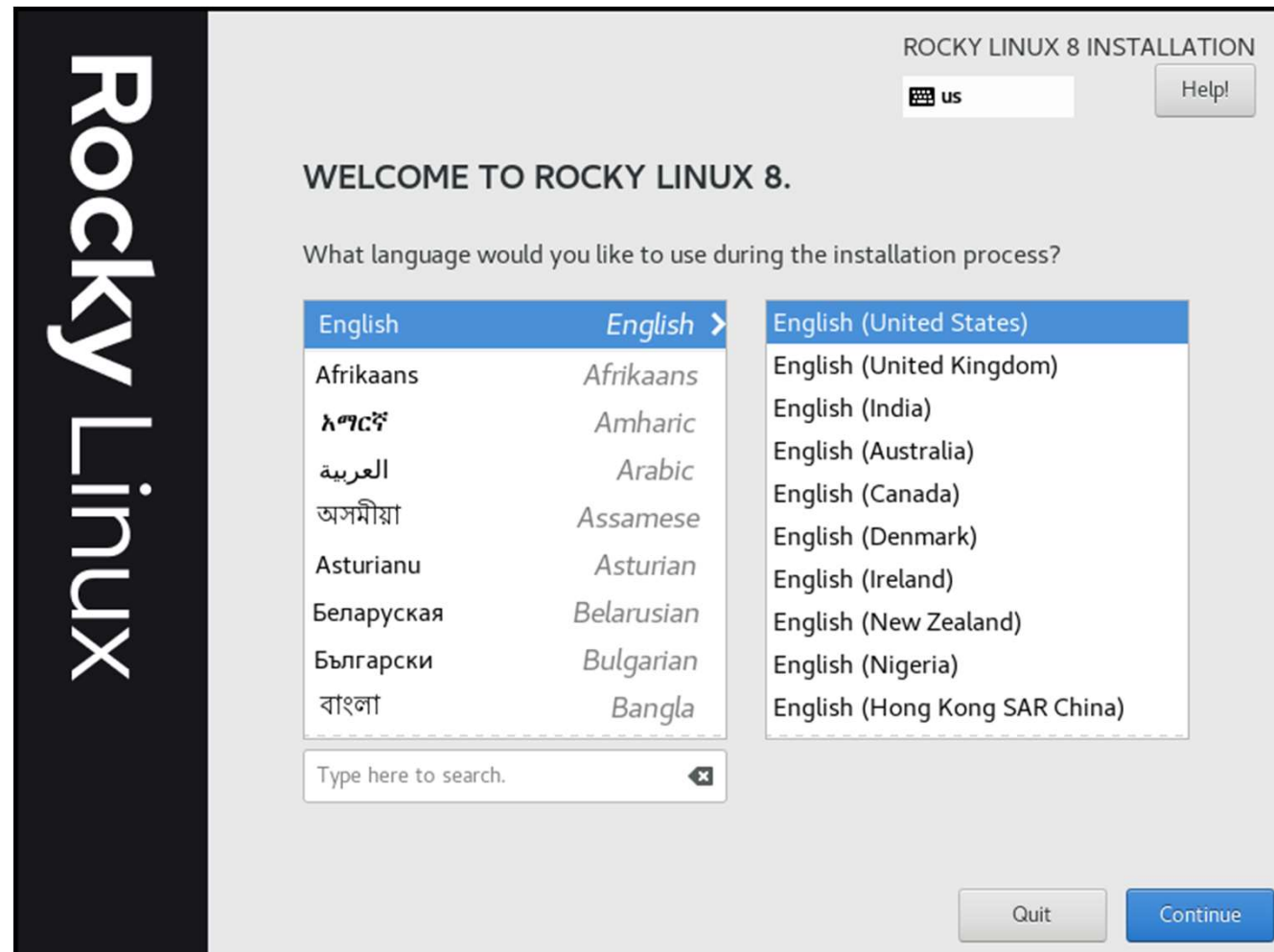


Choose Install Rocky Linux 8





Choose Language



Some things need to be configured

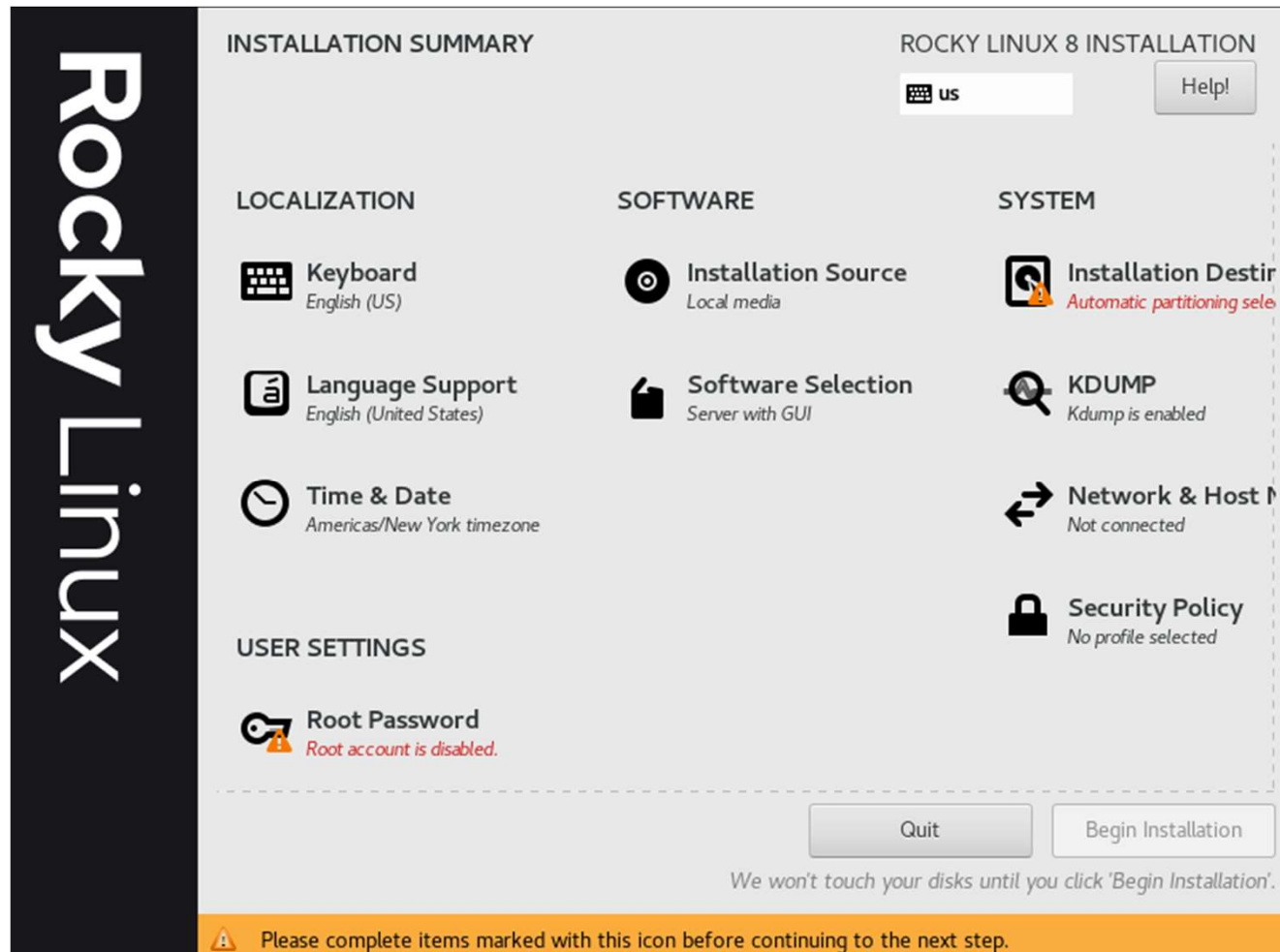
Root Password

Installation Destination

Network and Hostname

Create User

Time & Date




## Input Root Password

ROOT PASSWORD

ROCKY LINUX 8 INSTALLATION

Done

 us


Help!

The root account is used for administering the system. Enter a password for the root user.

Root Password:

Too short


Confirm:

 The password is too short You will have to press **Done** twice to confirm it.

## Select Installation Destination

**INSTALLATION DESTINATION**ROCKY LINUX 8 INSTALLATION

Done

 us


Help!

**Device Selection**

Select the device(s) you'd like to install to. They will be left untouched until you click on the main menu's "Begin Installation" button.

**Local Standard Disks**


20 GiB



VMware, VMware Virtual S  
sda / 20 GiB free

*Disks left unselected here will not be touched.*

**Specialized & Network Disks**

Add a disk...

*Disks left unselected here will not be touched.*

**Storage Configuration**

☒ Automatic☐ Custom

☐ I would like to make additional space available.

[Full disk summary and boot loader...](#)

1 disk selected; 20 GiB capacity; 20 GiB free [Refresh...](#)

Configure Network &  
Hostname

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

NETWORK & HOST NAME

ROCKY LINUX 8 INSTALLATION

Done

us

Help!

Ethernet (ens33)

Intel Corporation 82545EM Gigabit Ethernet Controller (

+ -

Ethernet (ens33)

Connected

Hardware Address 00:0C:29:C6:D9:78

Speed 1000 Mb/s

IP Address 192.168.120.138/24

Default Route 192.168.120.2

DNS 192.168.120.2

Configure...

Host Name: localhost.localdomain

Apply

Current host name: localhost.localdomain

Create user

For this training it's OK to  
leave Password blank

CREATE USER

ROCKY LINUX 8 INSTALLATION

Done

us

Help!

Full name

Zainal Abidin

User name

zabidin

☒ Make this user administrator

☐ Require a password to use this account

Password

Empty

Confirm password

Advanced...

Configure Time & Date


Select Region and City for  
Timezone

Enable Network Time

**TIME & DATE** ROCKY LINUX 8 INSTALLATION

Done us Help!

Region: Asia City: Jakarta **Network Time** ON ⚙️



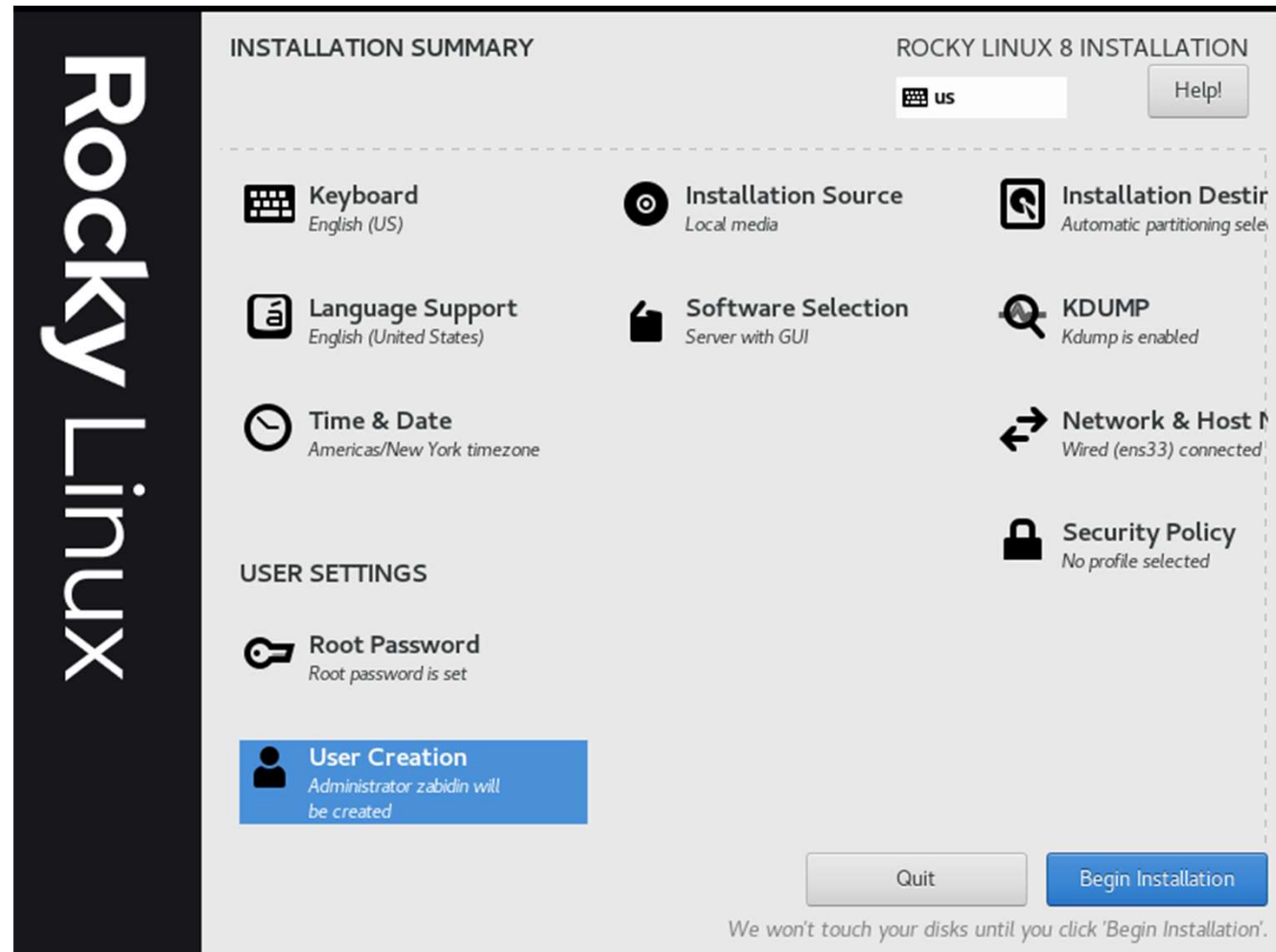
⬆ ⬆  
10:16  
⬇ ⬇

☒ 24-hour  
☐ AM/PM

09 / 25 / 2022

It is looked better and all things have been configured

Click **Begin Installation**





# Rocky Linux

INSTALLATION PROGRESS

ROCKY LINUX 8 INSTALLATION

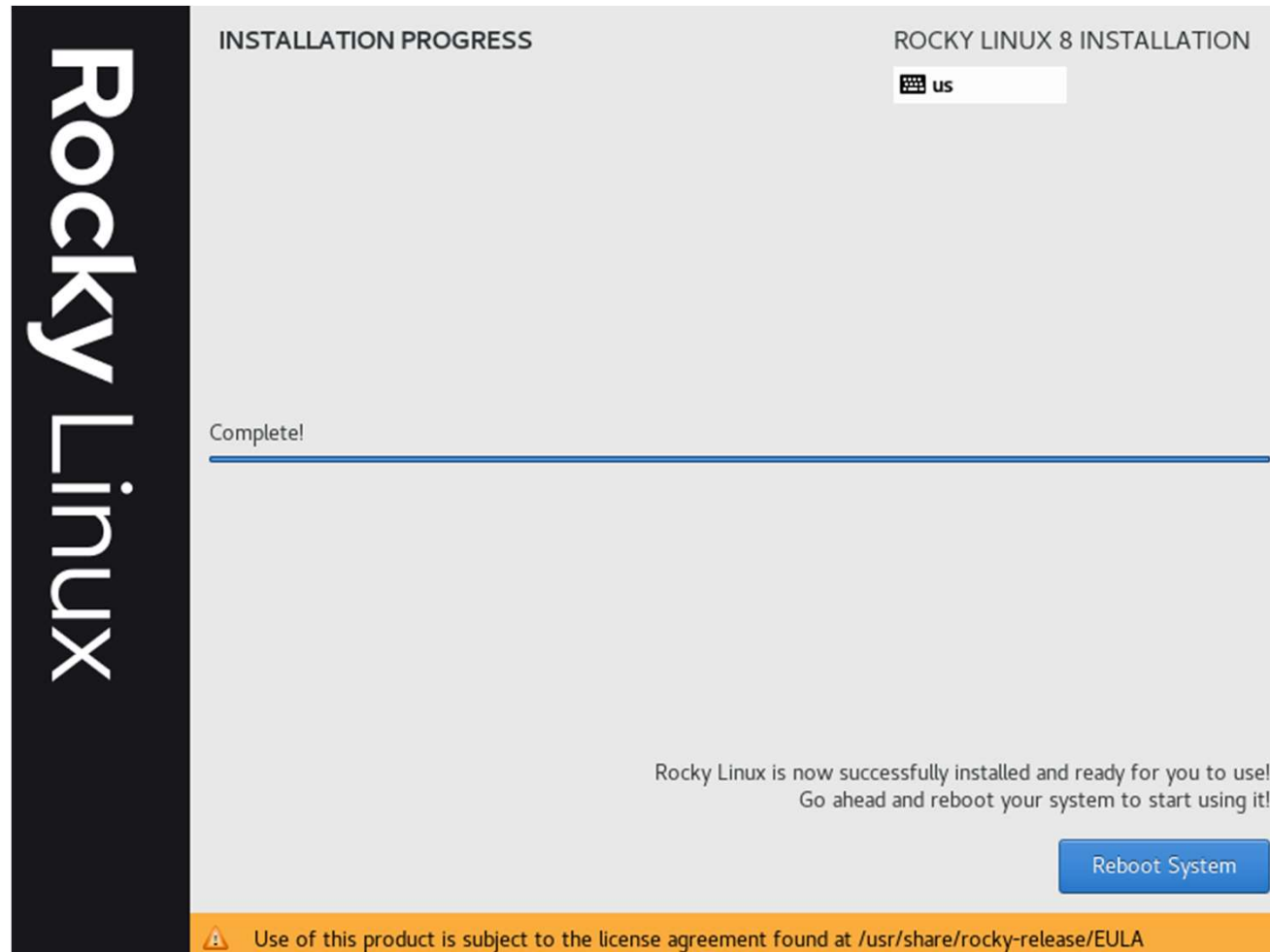
 us

 Downloading packages

Quit

Reboot System

Installation is Complete!



Need to tick EULA, I accept the license agreement

License Agreement:

Rocky Linux EULA

Rocky Linux comes with no warranties or guarantees of any kind, written or implied.

The Distribution is released as 3-Clause BSD. Individual packages in the distribution come with their own licenses which are available on install as well as the distribution git forge. A copy of the 3-Clause BSD license is included with the media of this distribution.

☒ I accept the license agreement.

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

Rocky Linux

INITIAL SETUP

ROCKY LINUX 8.4 (GREEN OBSIDIAN)

us

Help!

LICENSING



QUIT

FINISH CONFIGURATION

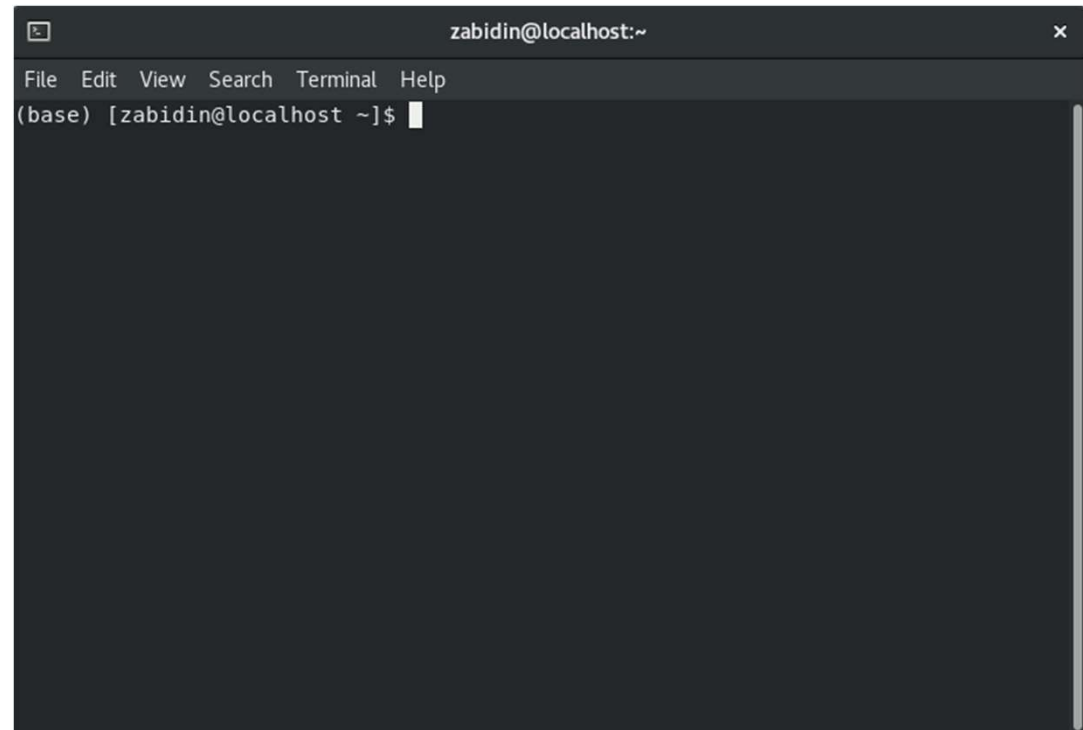
# Command Line

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

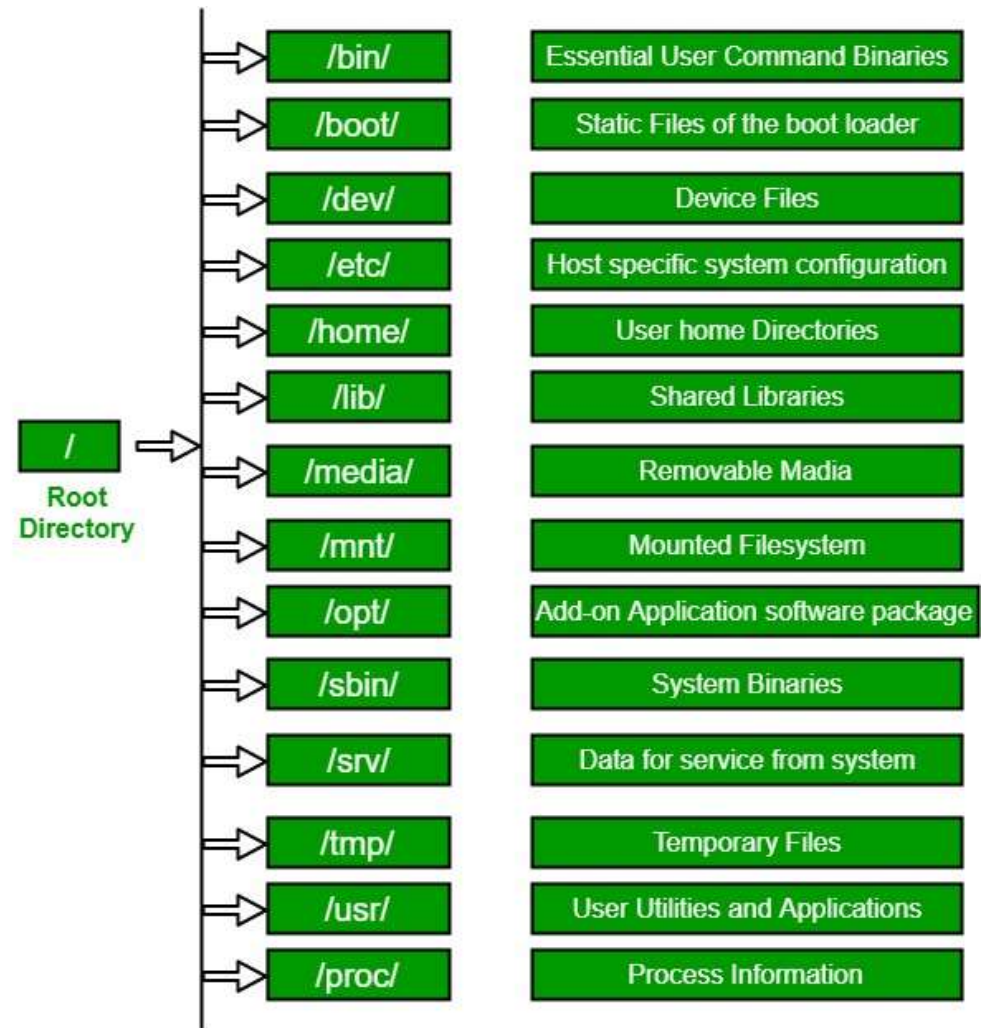
Most commands have options and arguments, some commands don't need options or arguments

# Open Terminal Console

push Window key, click this icon



# Linux File Structure



# Absolute and Relative Path



# List of Common Commands

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

# Let's Start with First Commands

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

\$ <b>ls -l</b>	list files or folders in column
\$ <b>ls -lt</b>	list files or folders in column, sorted by time
\$ <b>ls -ltr</b>	list files or folders in column, sorted by time in reversed order
\$ <b>ls -lS</b>	list files or folders in column, sorted by file size
\$ <b>ls -lSh</b>	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

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

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

<b>cat, less, more</b>	shows file content (try it yourself to see the differences)
<b>head, tail</b>	shows beginning and last line of a file content
<b>wc</b>	counts characters, words, and lines
<b>grep</b>	searchs a text pattern of a file
<b>cut</b>	cuts out the sections from each line of a file
<b>sort</b>	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 3 <sup>rd</sup> column with comma as delimiter
\$ cut -d" " -f1,5 [file]	show 1 <sup>st</sup> and 5 <sup>th</sup> columns with space as delimiter
\$ cut -c 1-10 [file]	show 1 <sup>st</sup> until 10 <sup>th</sup> character of the line
\$ cut -c 3,6,9 [file]	show 3 <sup>rd</sup> 6 <sup>th</sup> 9 <sup>th</sup> character of the line



# Linux Monitoring Command

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

End of Day 1