

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

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Your Lecturers Today

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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](https://www.slido.com) with **#2239149**

Pre-Test

<https://forms.gle/fwCPft3yo9eceD7a9>

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

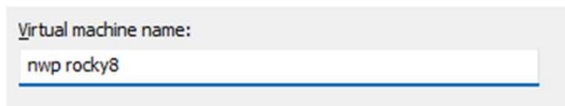
☒ Linux

☐ Other

Version

CentOS 8 64-bit

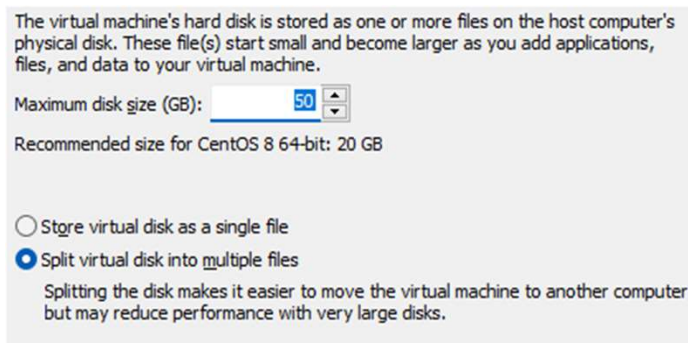
5. input Virtual machine name, nwp rocky8



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):

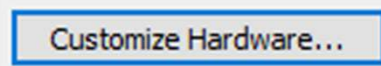
Recommended size for CentOS 8 64-bit: 20 GB

☐ 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
Processors	2
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:

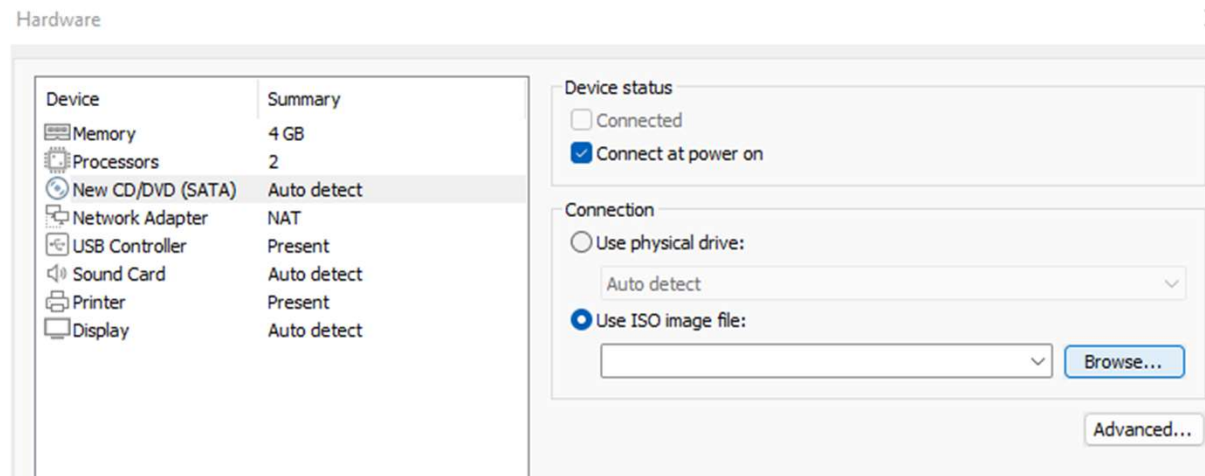
Virtualization engine

☐ 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

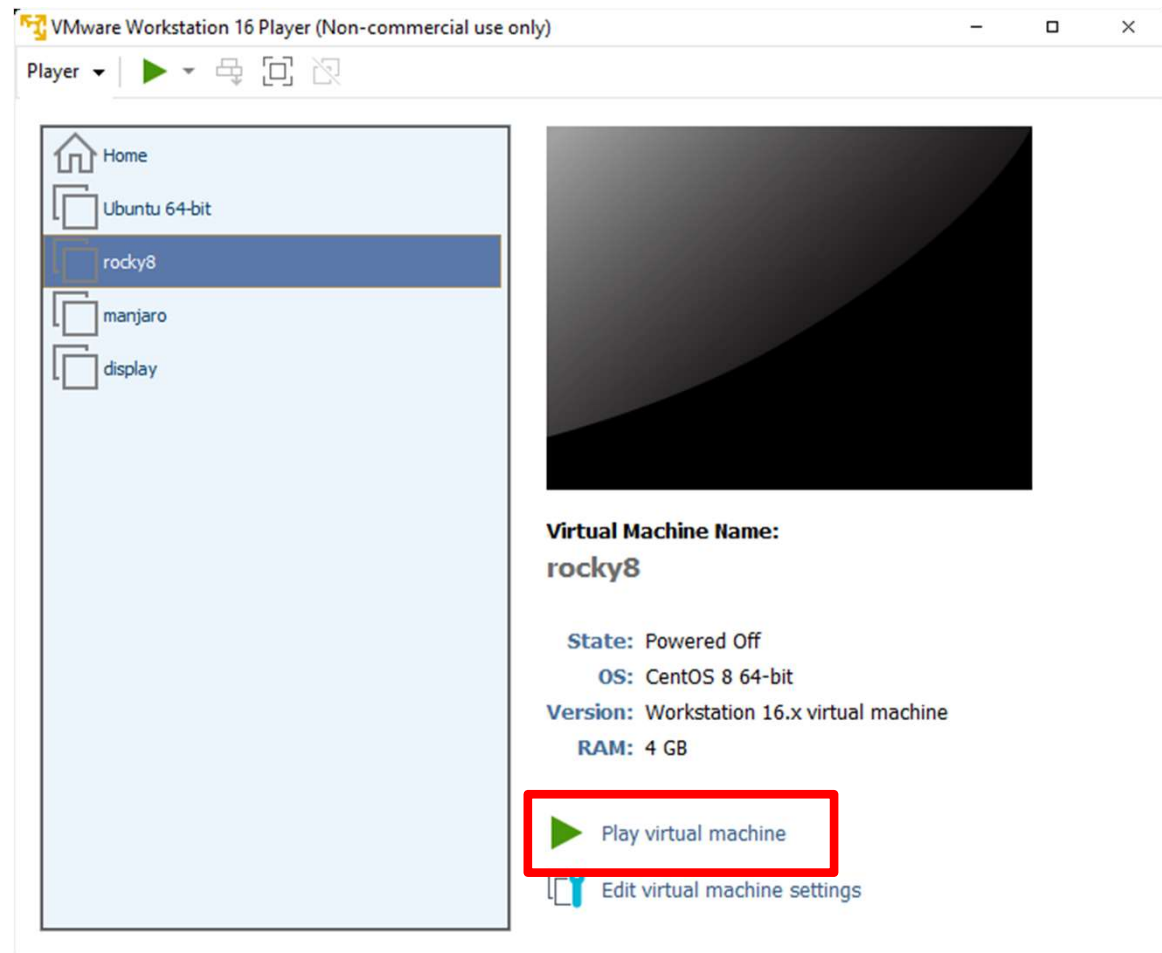


ISO file can be downloaded in the official website of the linux distribution

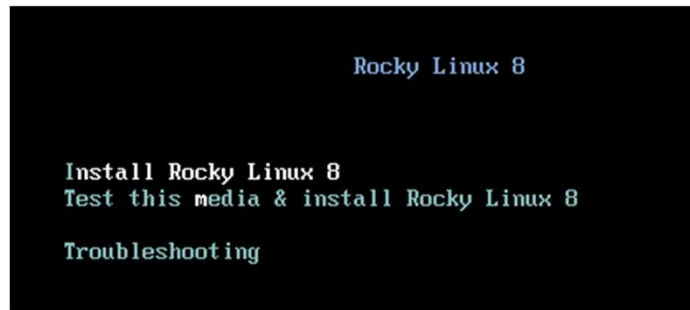
The ISO files of Rocky Linux 8 and Ubuntu 22.04 have been downloaded and located in Downloads folder

select the Virtual Machine that just created

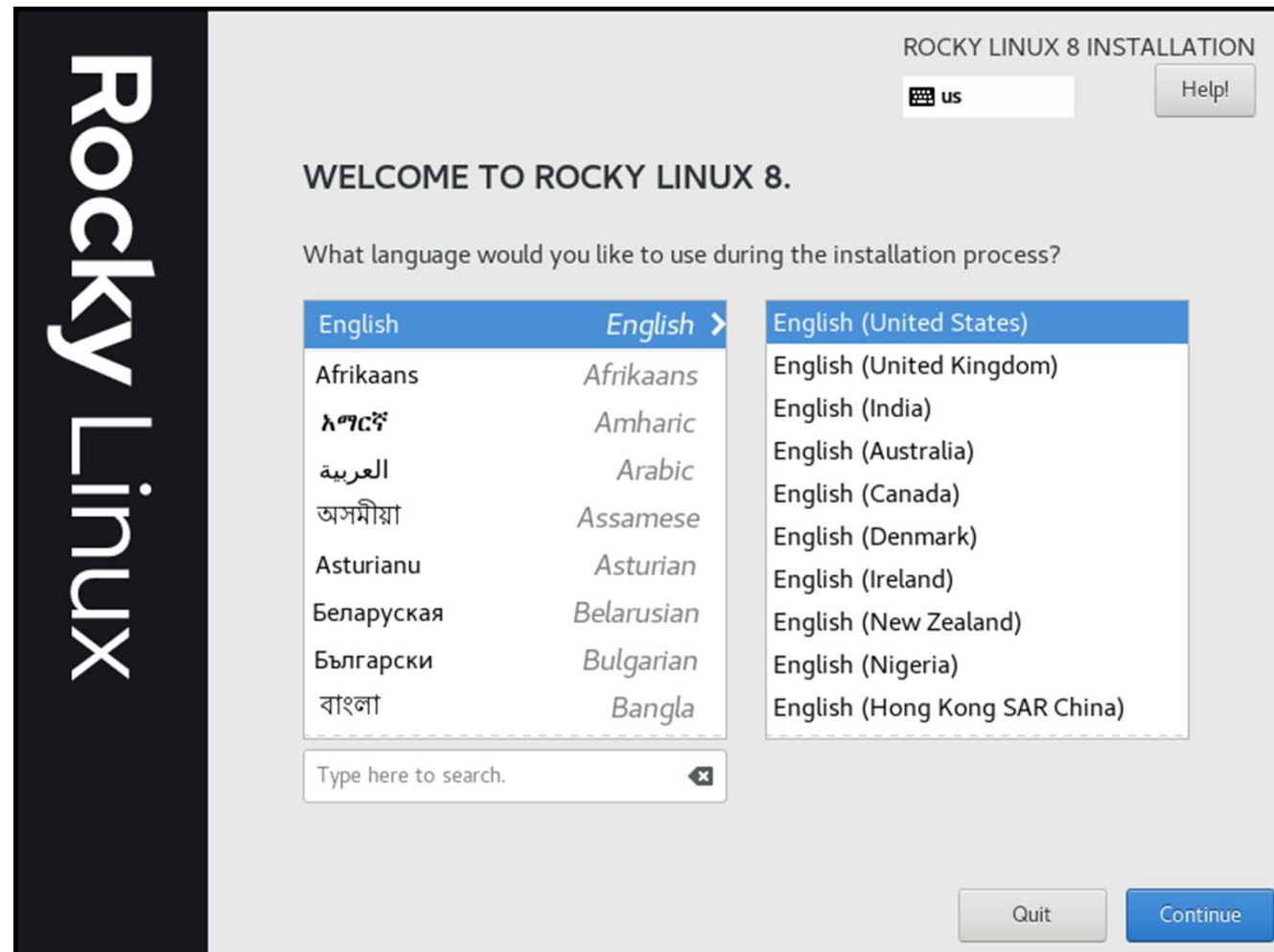
Click Play Virtual Machine to start the VM



Choose Install Rocky Linux 8



Choose Language



Some things need to be configured

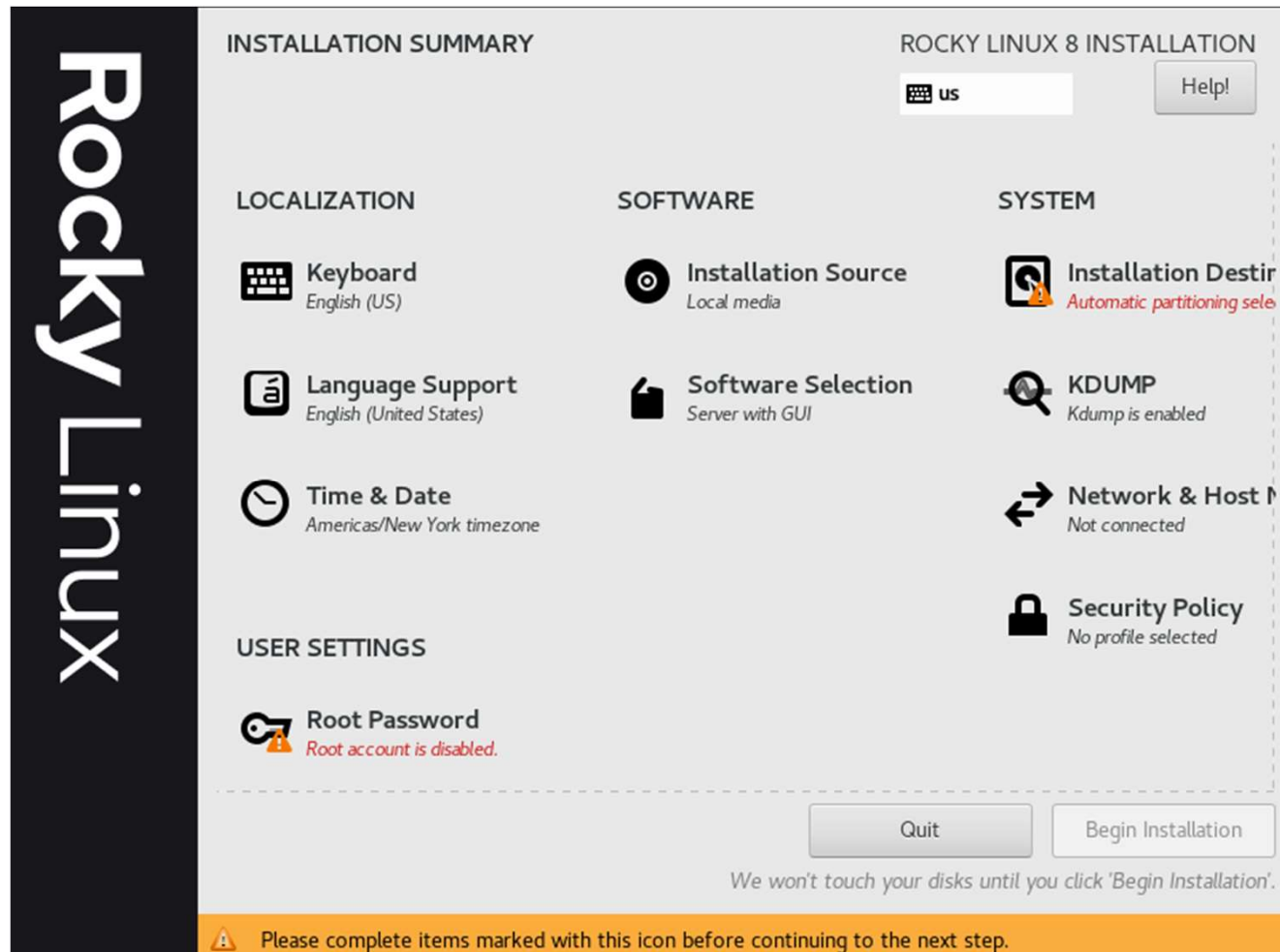
Root Password

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

Done

ROCKY LINUX 8 INSTALLATION

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 Done ROCKY LINUX 8 INSTALLATION us Help!

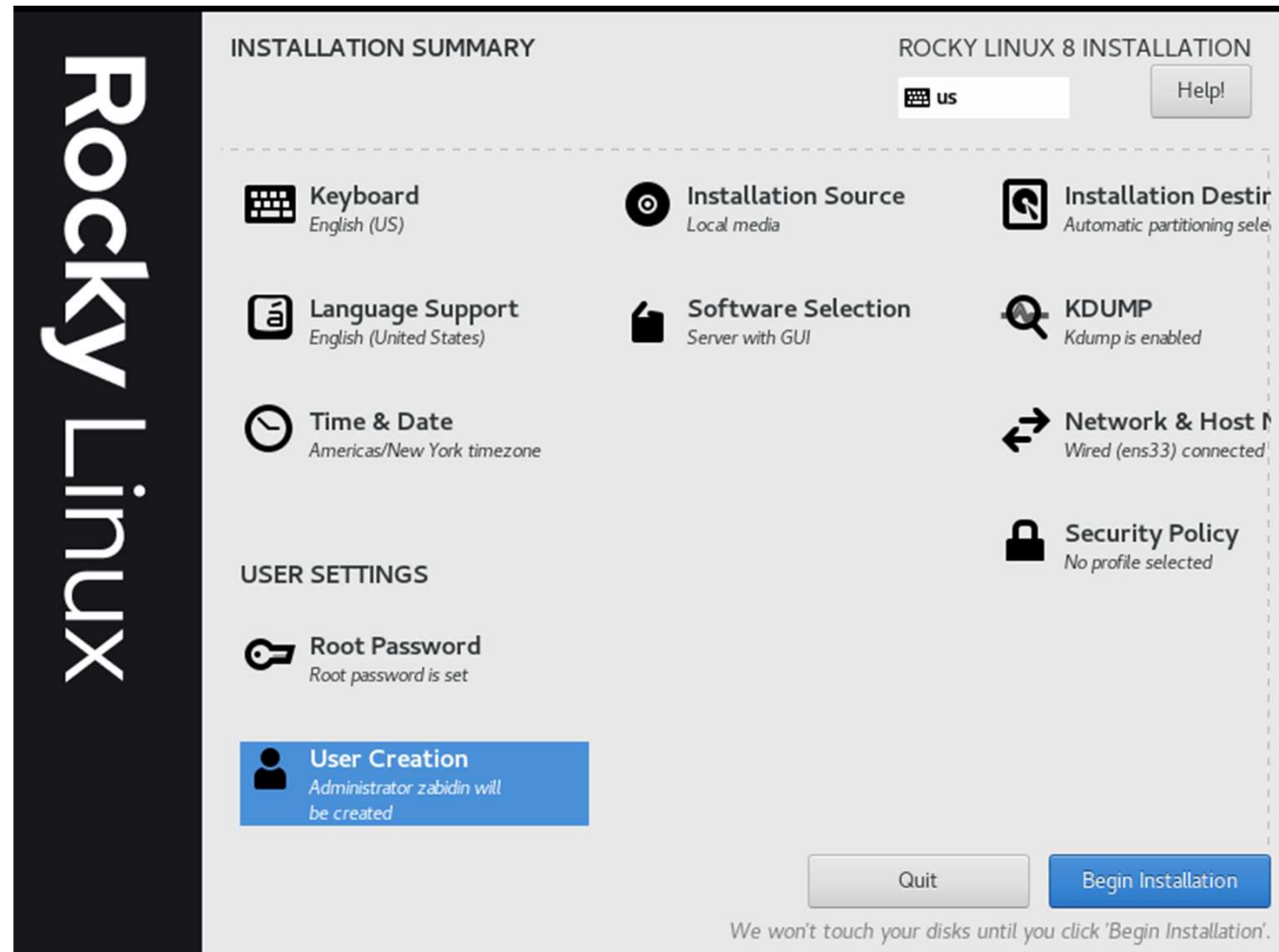
Region: Asia City: Jakarta **Network Time ON**



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

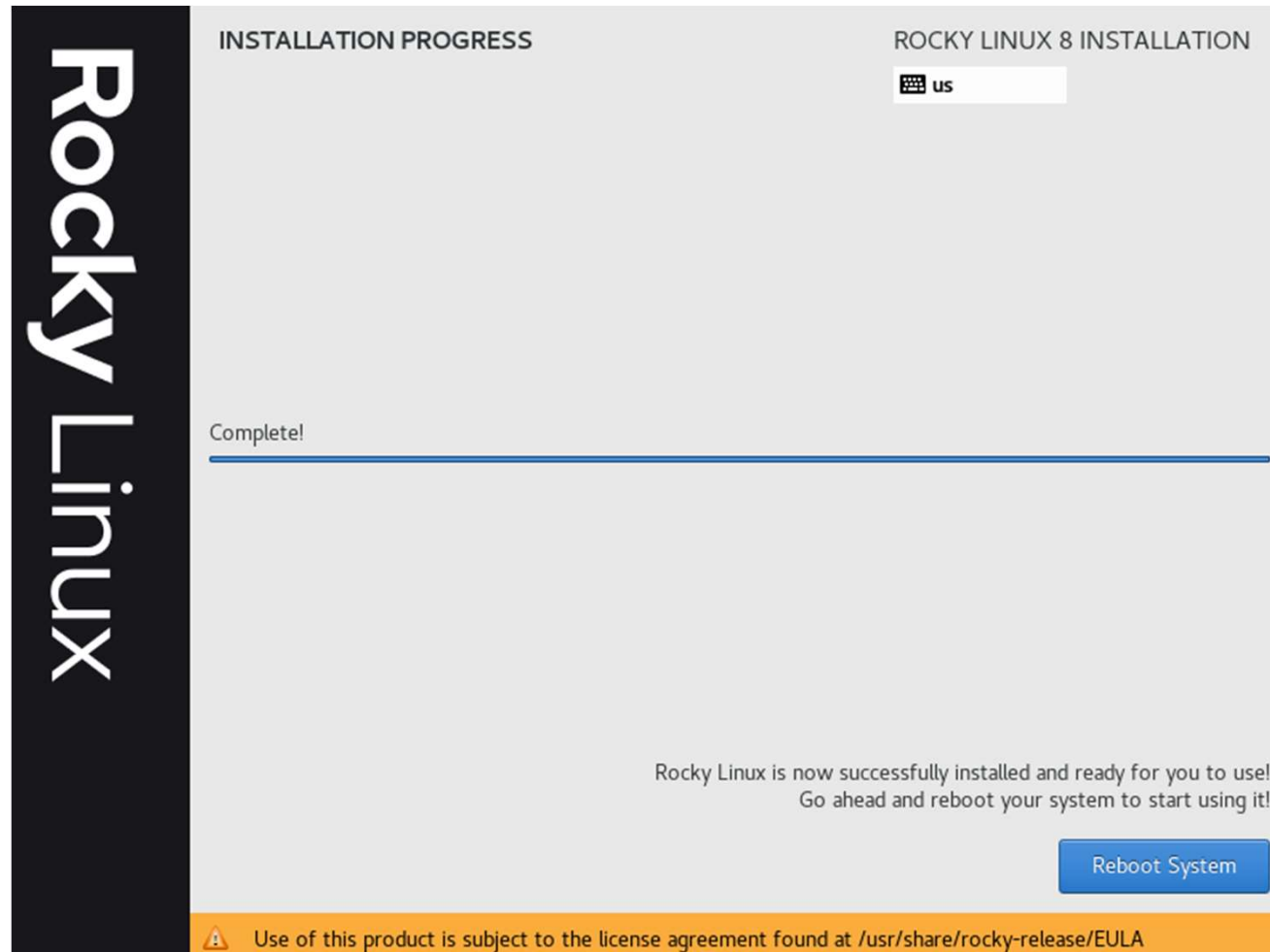
 Downloading packages



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

Supplementary Files

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

Linux command summary for Day 1

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

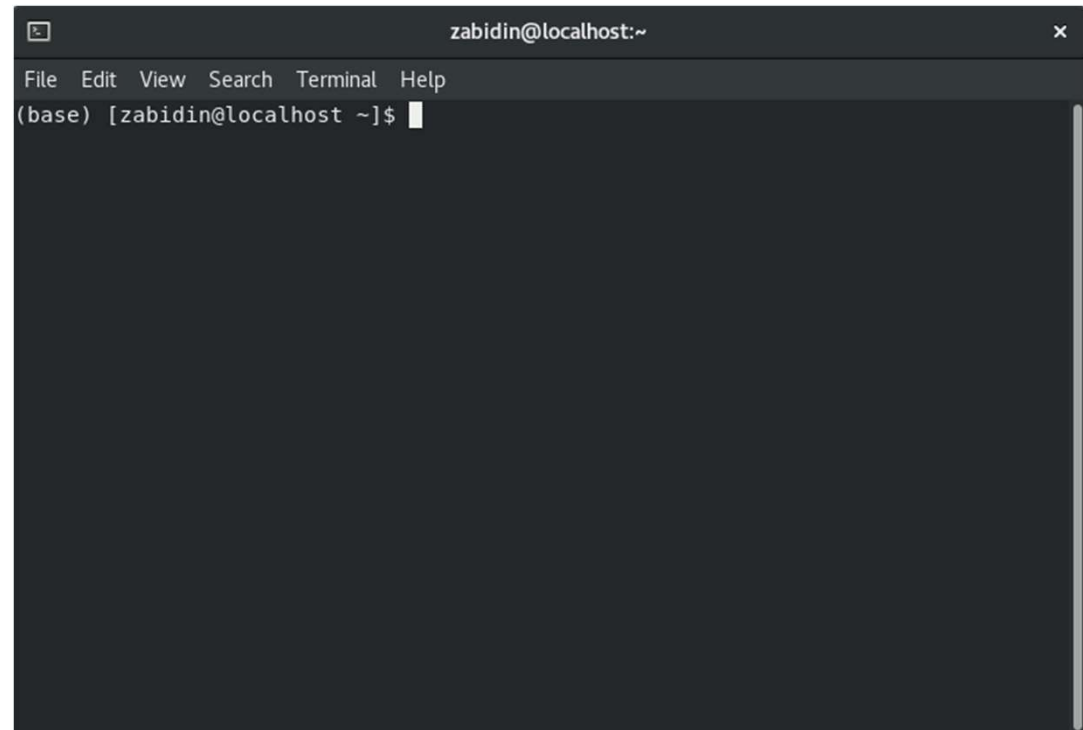
Command Line

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

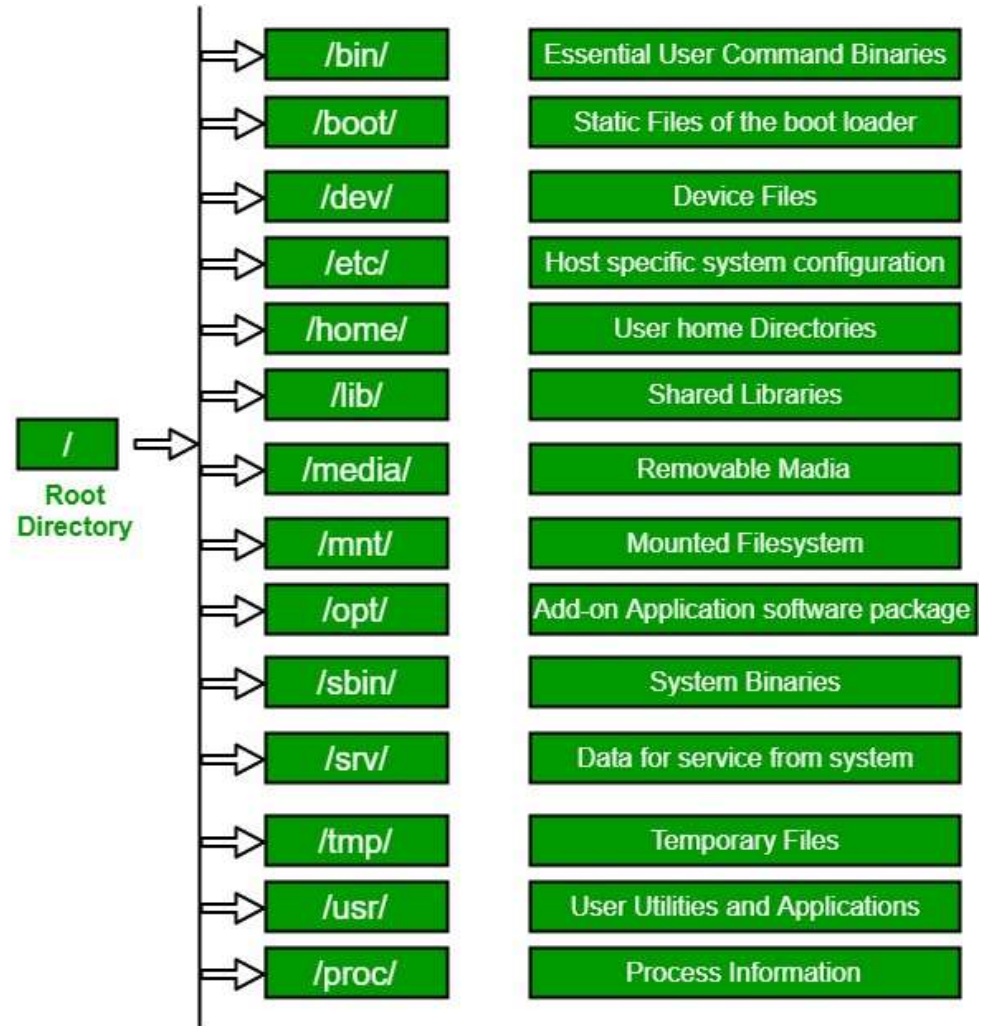
Most commands have options and arguments, some commands don't need options or arguments

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

<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

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

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