Name: Rio Marie G. Suzuki	**Date Performed:** 11/16/2023
Course/Section: CPE232S6	**Date Submitted:** 11/16/2023
Instructor: Dr. Jonathan Taylar	**Semester and SY:** 1st Sem-2023-2024

Activity 11: Containerization

1. Objectives

Create a Dockerfile and form a workflow using Ansible as Infrastructure as Code (IaC) to enable Continuous Delivery process

2. Discussion

Docker is an open platform for developing, shipping, and running applications. Docker enables you to separate your applications from your infrastructure so you can deliver software quickly. With Docker, you can manage your infrastructure in the same ways you manage your applications. By taking advantage of Docker's methodologies for shipping, testing, and deploying code quickly, you can significantly reduce the delay between writing code and running it in production.

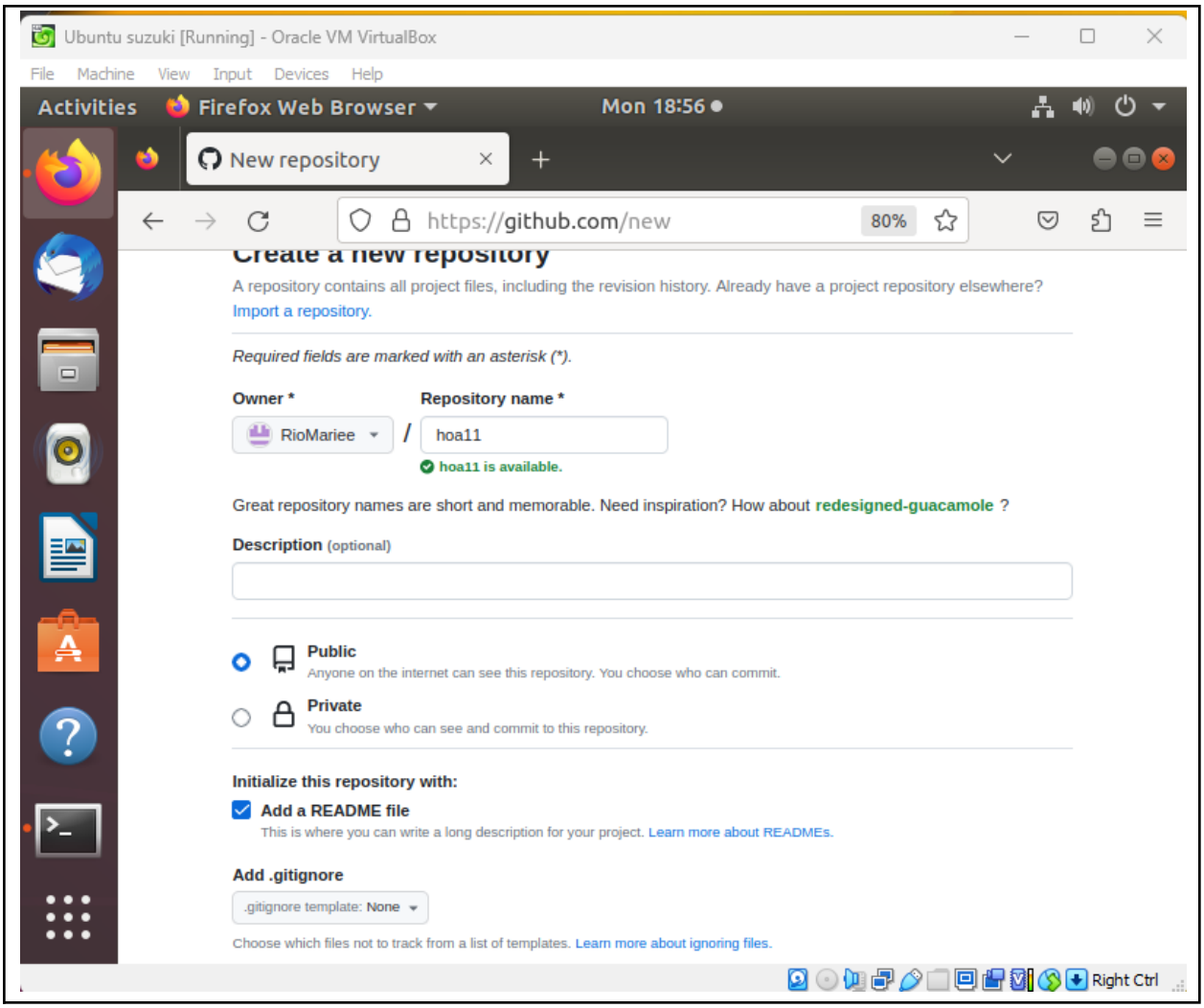
Source: https://docs.docker.com/get-started/overview/

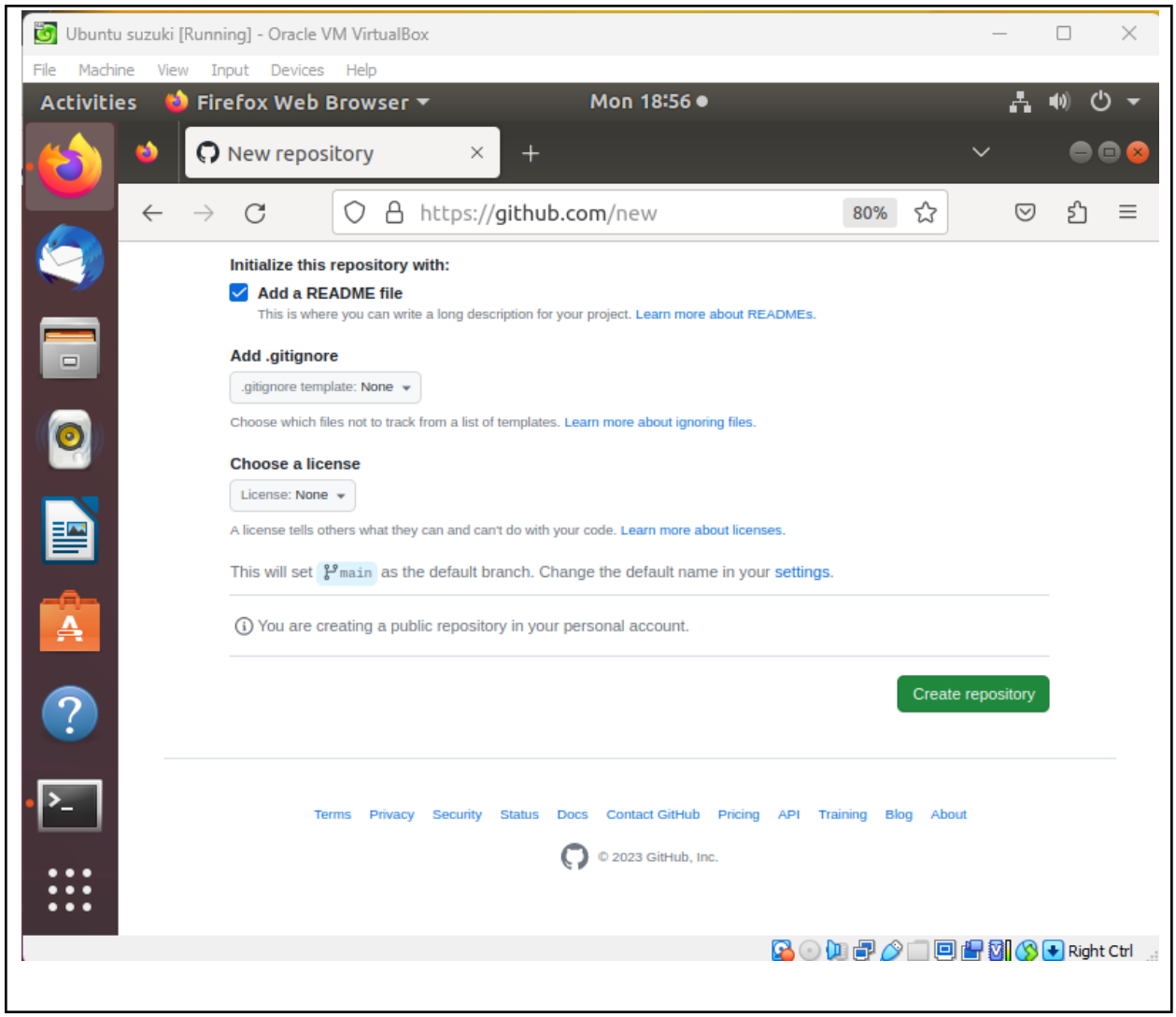
You may also check the difference between containers and virtual machines. Click the link given below.

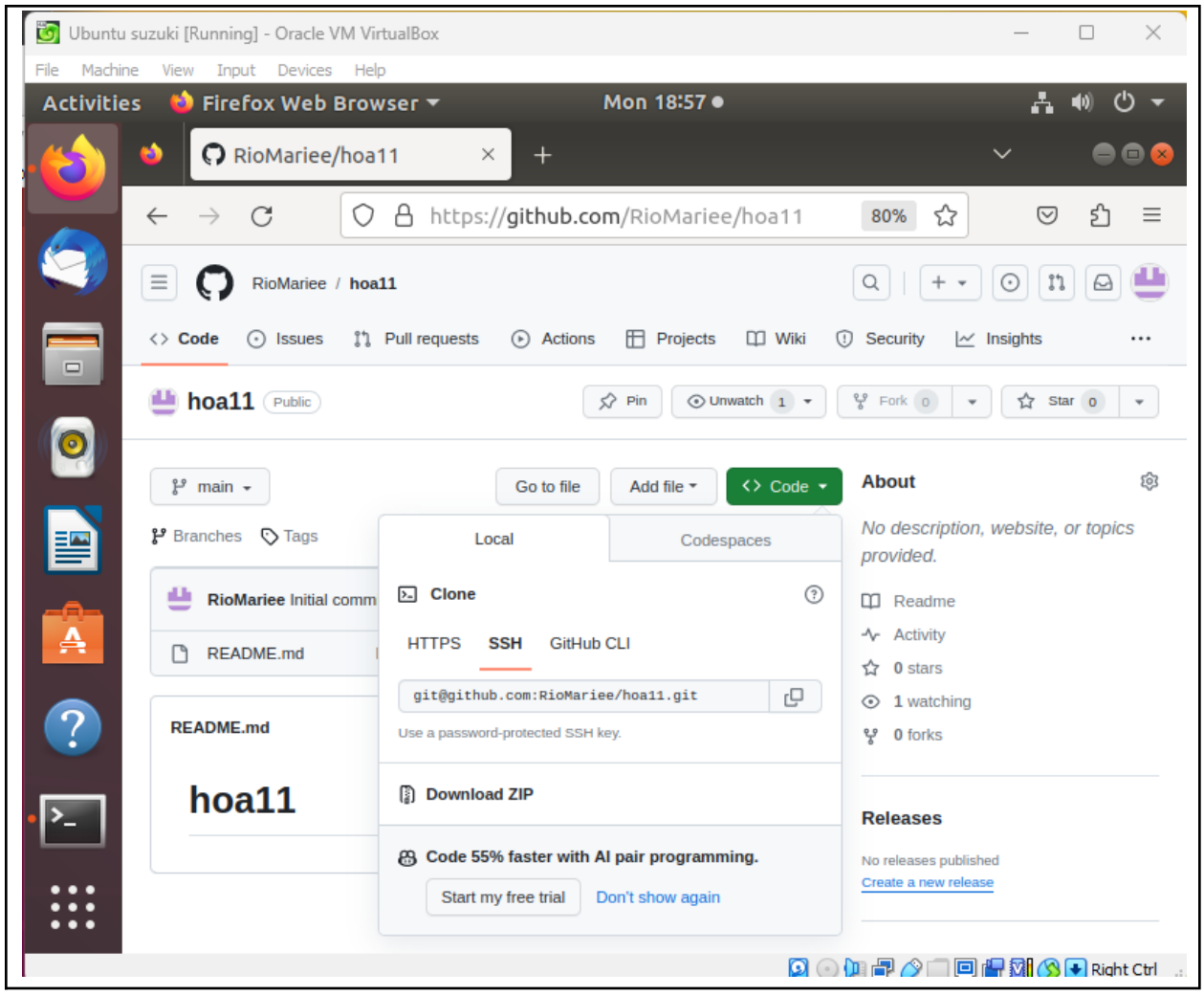
Source: https://docs.microsoft.com/en-us/virtualization/windowscontainers/about/containers-vs-vm

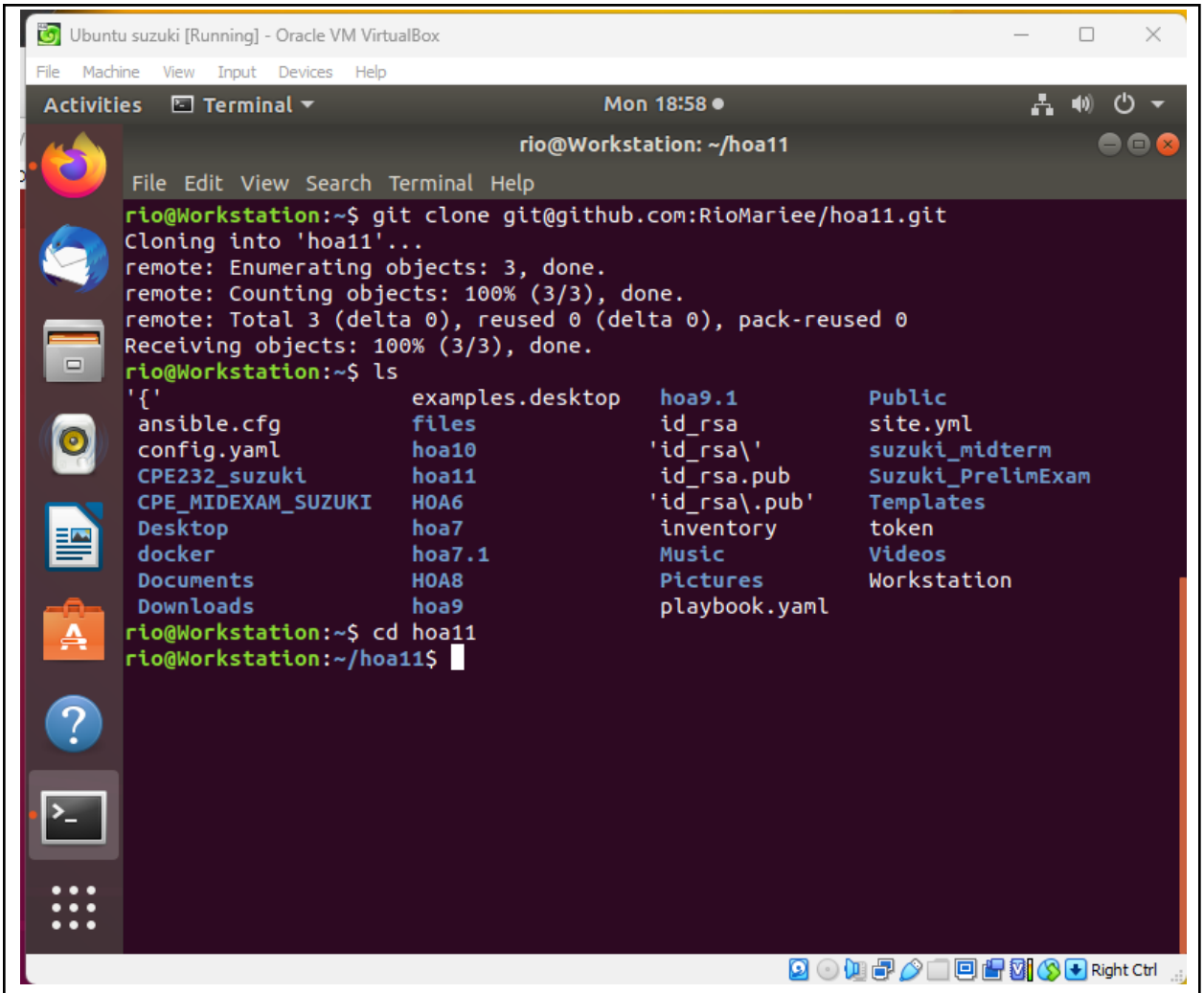
3. Tasks

1. Create a new repository for this activity.

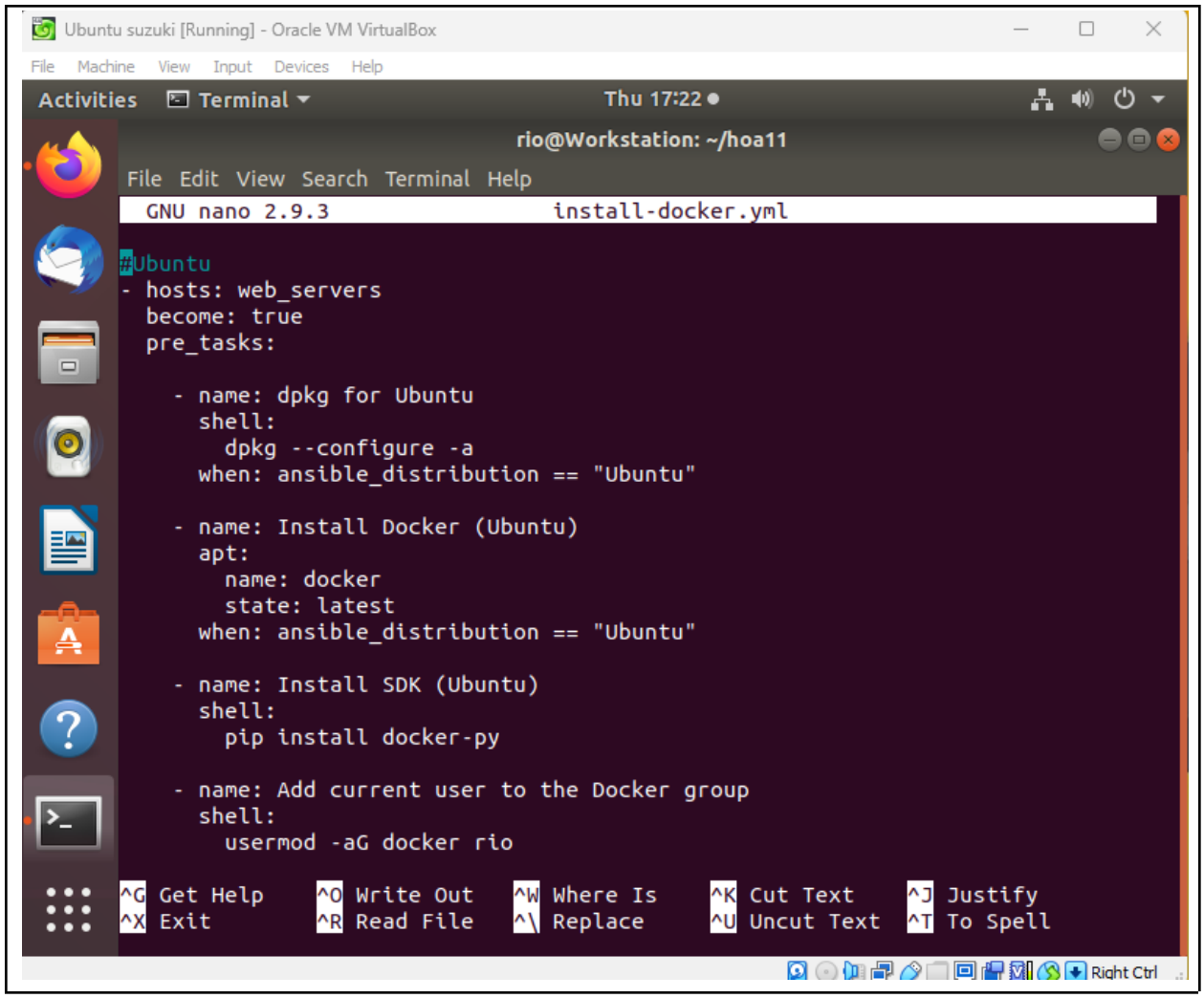

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Firefox Web Browser
Mon 18:56
New repository
https://github.com/new
80%
Create a new repository
A repository contains all project files, including the revision history. Already have a project repository elsewhere?
Import a repository.
Required fields are marked with an asterisk (*).
Owner *
Repository name *
RioMariee
/
hoa11
hoa11 is available.
Great repository names are short and memorable. Need inspiration? How about redesigned-guacamole ?
Description (optional)
Public
Anyone on the internet can see this repository. You choose who can commit.
Private
You choose who can see and commit to this repository.
Initialize this repository with:
Add a README file
This is where you can write a long description for your project. Learn more about READMEs.
Add .gitignore
.gitignore template: None
Choose which files not to track from a list of templates. Learn more about ignoring files.
Right Ctrl

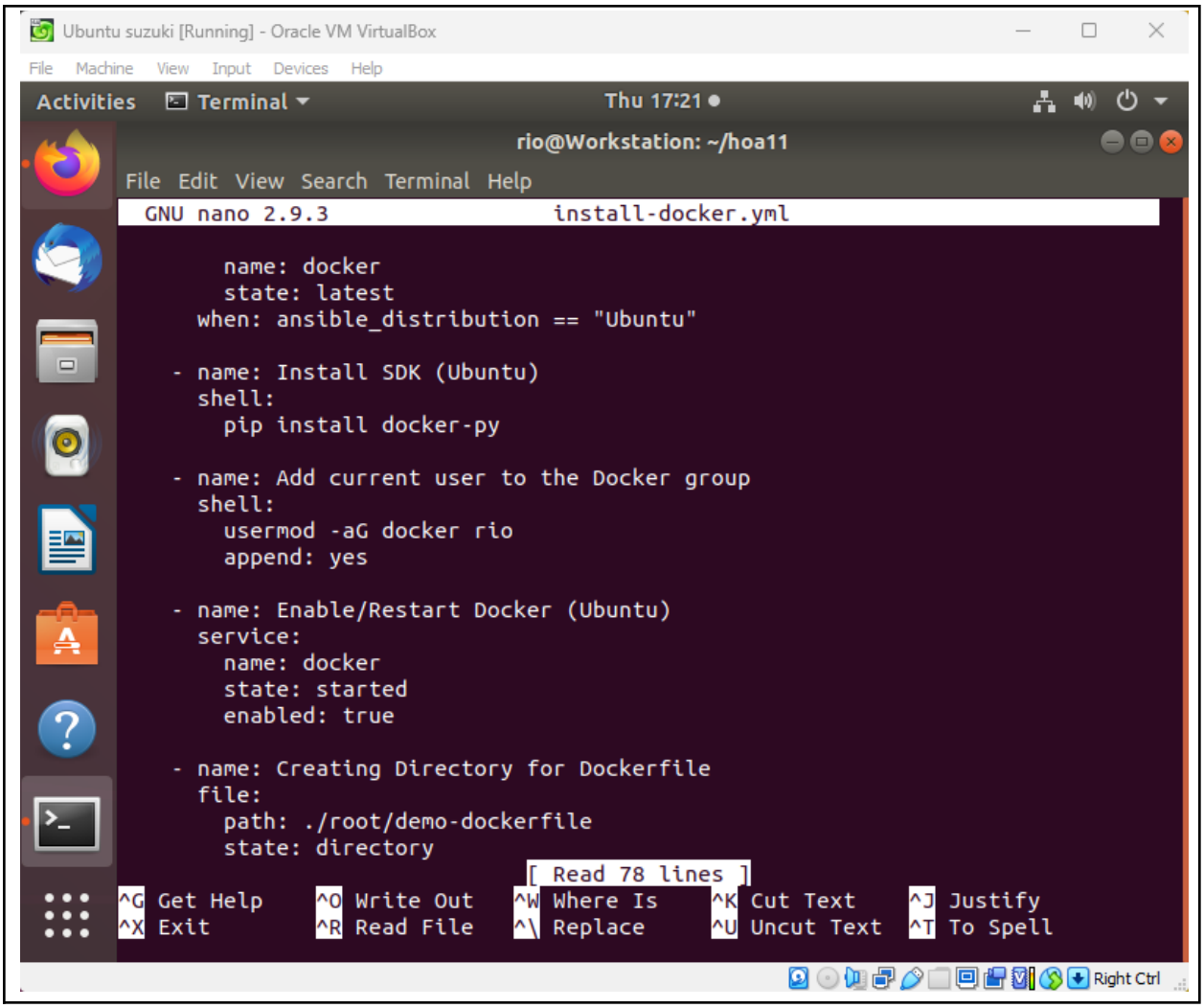

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Firefox Web Browser
Mon 18:56
New repository
https://github.com/new
80%
Initialize this repository with:
Add a README file
This is where you can write a long description for your project. Learn more about READMEs.
Add .gitignore
.gitignore template: None
Choose which files not to track from a list of templates. Learn more about ignoring files.
Choose a license
License: None
A license tells others what they can and can't do with your code. Learn more about licenses.
This will set main as the default branch. Change the default name in your settings.
You are creating a public repository in your personal account.
Create repository
Terms Privacy Security Status Docs Contact GitHub Pricing API Training Blog About
© 2023 GitHub, Inc.
Right Ctrl

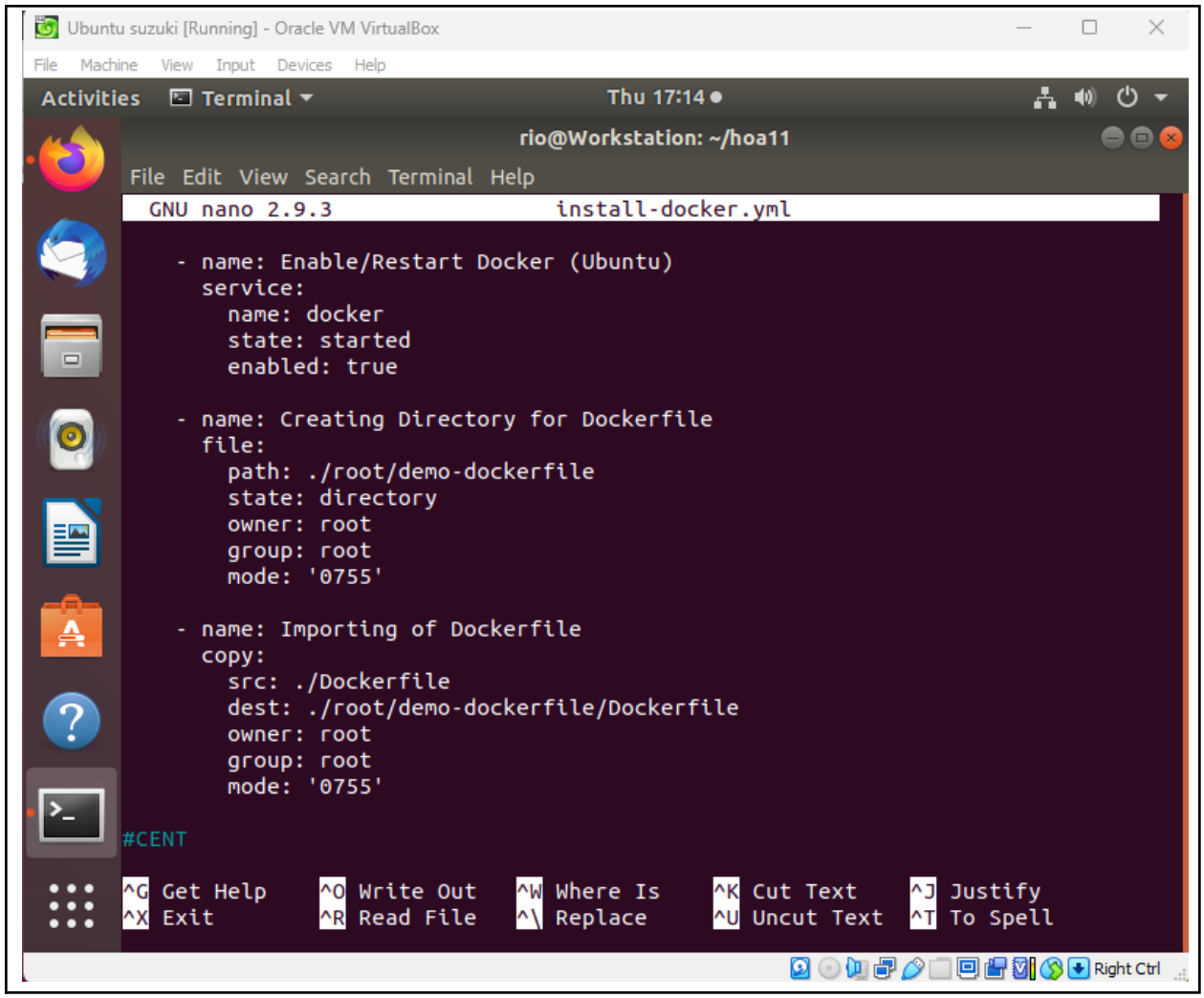

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Firefox Web Browser
Mon 18:57
RioMariee/hoa11
https://github.com/RioMariee/hoa11
80%
RioMariee / hoa11
Code
Issues
Pull requests
Actions
Projects
Wiki
Security
Insights
hoa11
Public
Pin
Unwatch 1
Fork 0
Star 0
main
Go to file
Add file
Code
Branches
Tags
RioMariee Initial comm
README.md
README.md
hoa11
Local
Codespaces
Clone
HTTPS
SSH
GitHub CLI
git@github.com:RioMariee/hoa11.git
Use a password-protected SSH key.
Download ZIP
Code 55% faster with AI pair programming.
Start my free trial
Don't show again
About
No description, website, or topics provided.
Readme
Activity
0 stars
1 watching
0 forks
Releases
No releases published
Create a new release
Right Ctrl

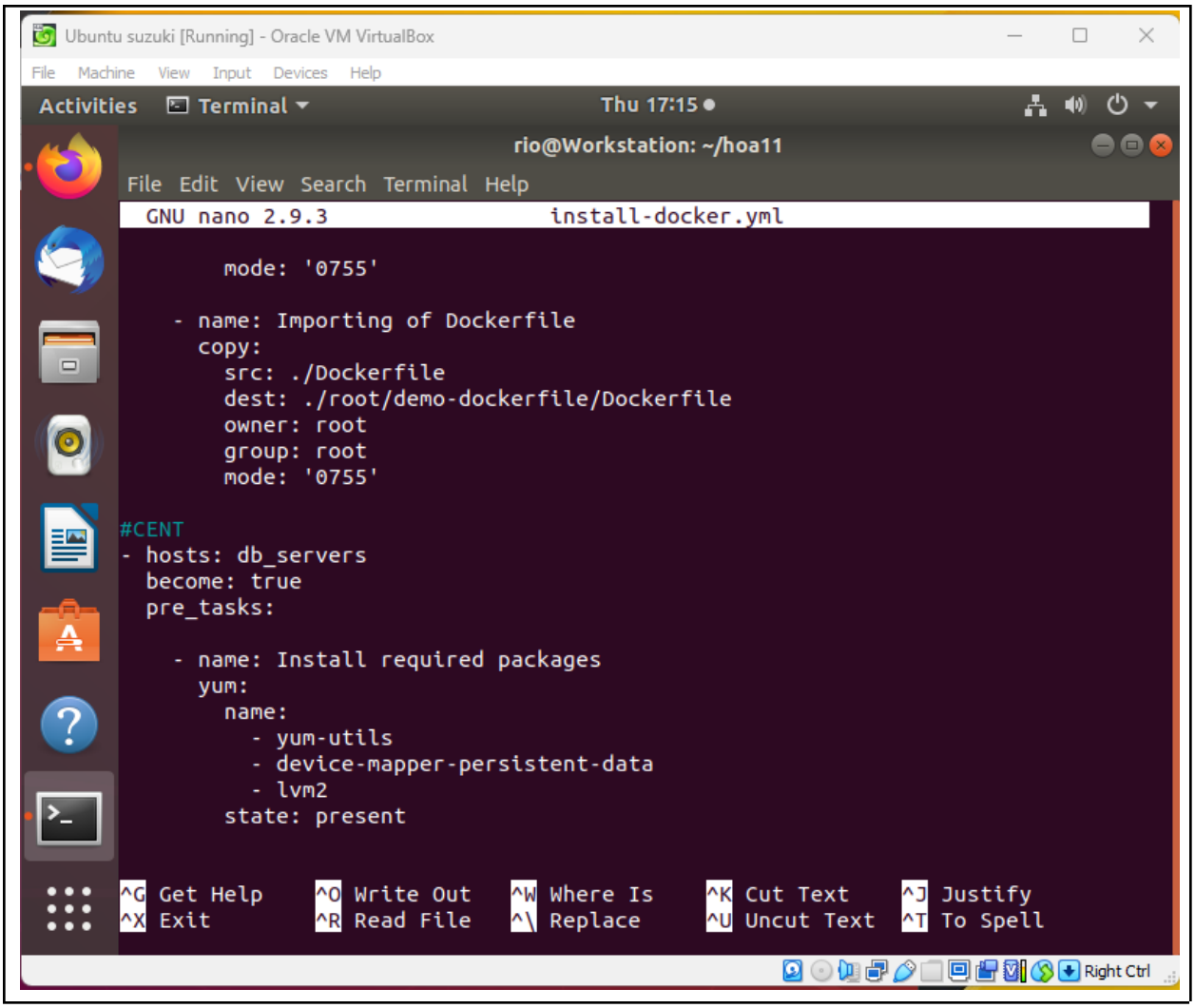


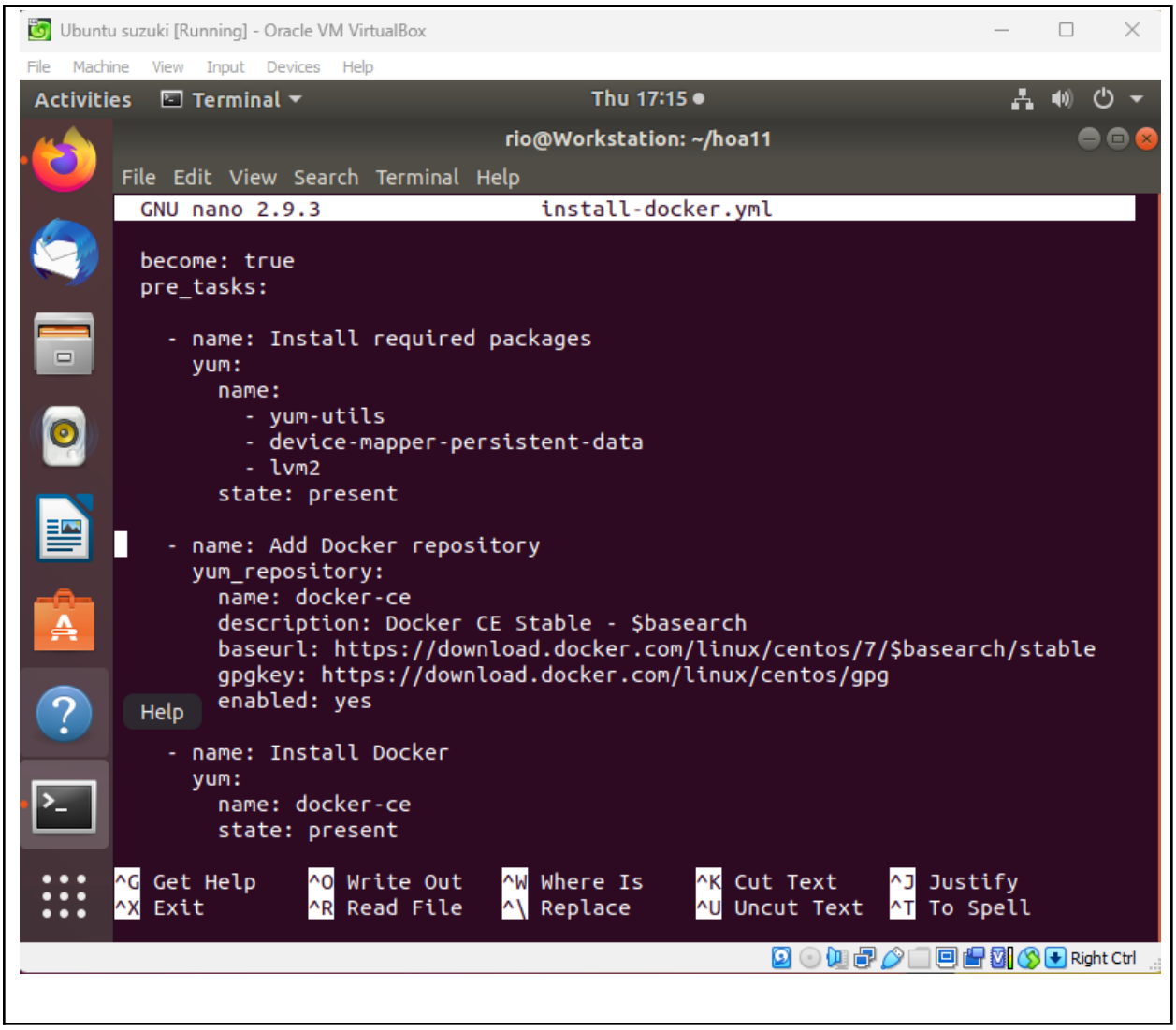
2. Install Docker and enable the docker socket.

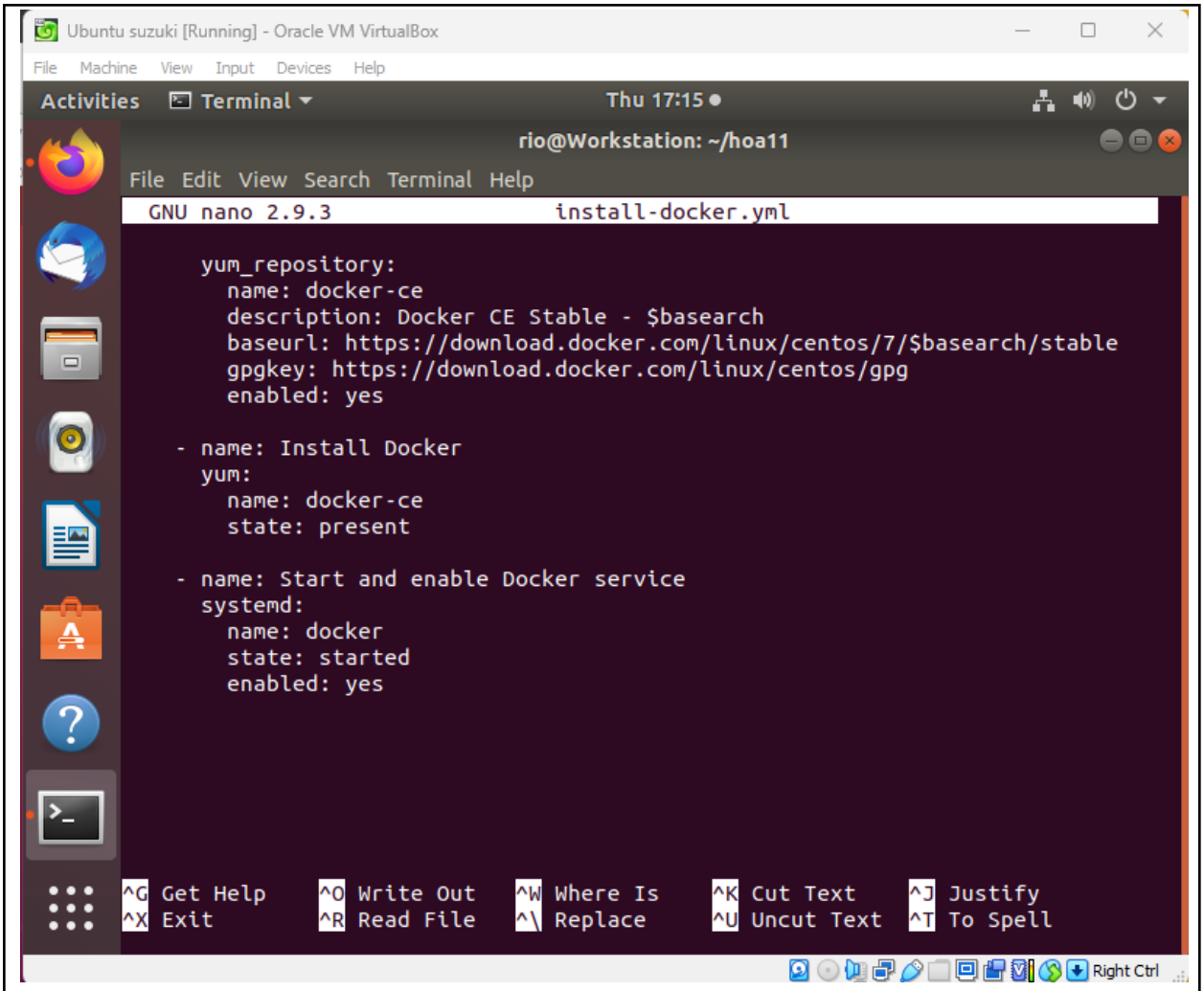

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 17:22
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
GNU nano 2.9.3 install-docker.yml
#Ubuntu
- hosts: web_servers
become: true
pre_tasks:
- name: dpkg for Ubuntu
shell:
dpkg --configure -a
when: ansible_distribution == "Ubuntu"
- name: Install Docker (Ubuntu)
apt:
name: docker
state: latest
when: ansible_distribution == "Ubuntu"
- name: Install SDK (Ubuntu)
shell:
pip install docker-py
- name: Add current user to the Docker group
shell:
usermod -aG docker rio
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl


Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 17:21
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
GNU nano 2.9.3 install-docker.yml
name: docker
state: latest
when: ansible_distribution == "Ubuntu"
- name: Install SDK (Ubuntu)
shell:
pip install docker-py
- name: Add current user to the Docker group
shell:
usermod -aG docker rio
append: yes
- name: Enable/Restart Docker (Ubuntu)
service:
name: docker
state: started
enabled: true
- name: Creating Directory for Dockerfile
file:
path: ./root/demo-dockerfile
state: directory
[Read 78 lines]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl

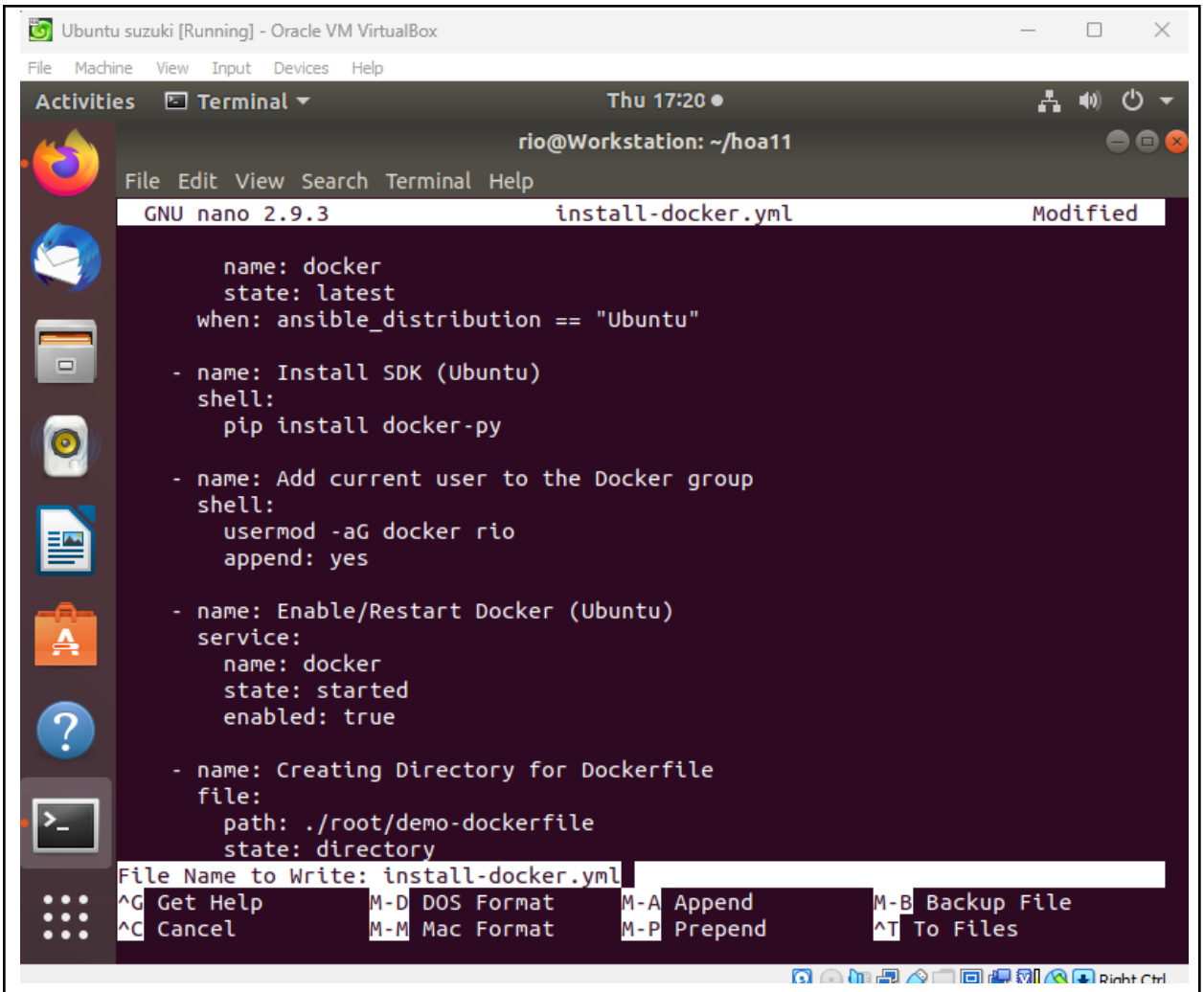

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 17:14
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
GNU nano 2.9.3 install-docker.yml
- name: Enable/Restart Docker (Ubuntu)
service:
name: docker
state: started
enabled: true
- name: Creating Directory for Dockerfile
file:
path: ./root/demo-dockerfile
state: directory
owner: root
group: root
mode: '0755'
- name: Importing of Dockerfile
copy:
src: ./Dockerfile
dest: ./root/demo-dockerfile/Dockerfile
owner: root
group: root
mode: '0755'
#CENT
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl


Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 17:15
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
GNU nano 2.9.3 install-docker.yml
mode: '0755'
- name: Importing of Dockerfile
copy:
src: ./Dockerfile
dest: ./root/demo-dockerfile/Dockerfile
owner: root
group: root
mode: '0755'
#CENT
- hosts: db_servers
become: true
pre_tasks:
- name: Install required packages
yum:
name:
- yum-utils
- device-mapper-persistent-data
- lvm2
state: present
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl

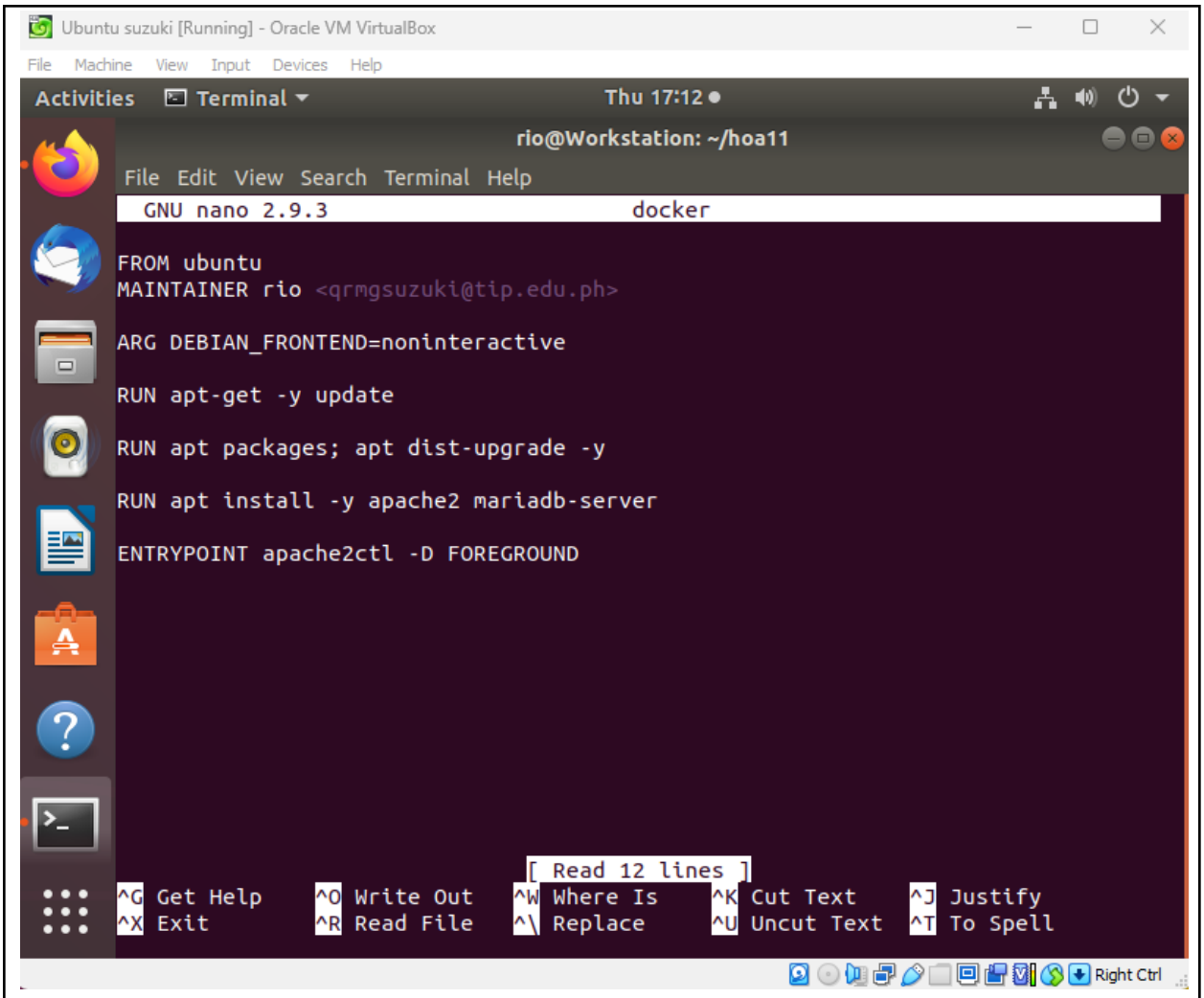

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 17:15
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
GNU nano 2.9.3 install-docker.yml
become: true
pre_tasks:
- name: Install required packages
yum:
name:
- yum-utils
- device-mapper-persistent-data
- lvm2
state: present
- name: Add Docker repository
yum_repository:
name: docker-ce
description: Docker CE Stable - $basearch
baseurl: https://download.docker.com/linux/centos/7/$basearch/stable
gpgkey: https://download.docker.com/linux/centos/gpg
enabled: yes
Help
- name: Install Docker
yum:
name: docker-ce
state: present
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Spell
Right Ctrl



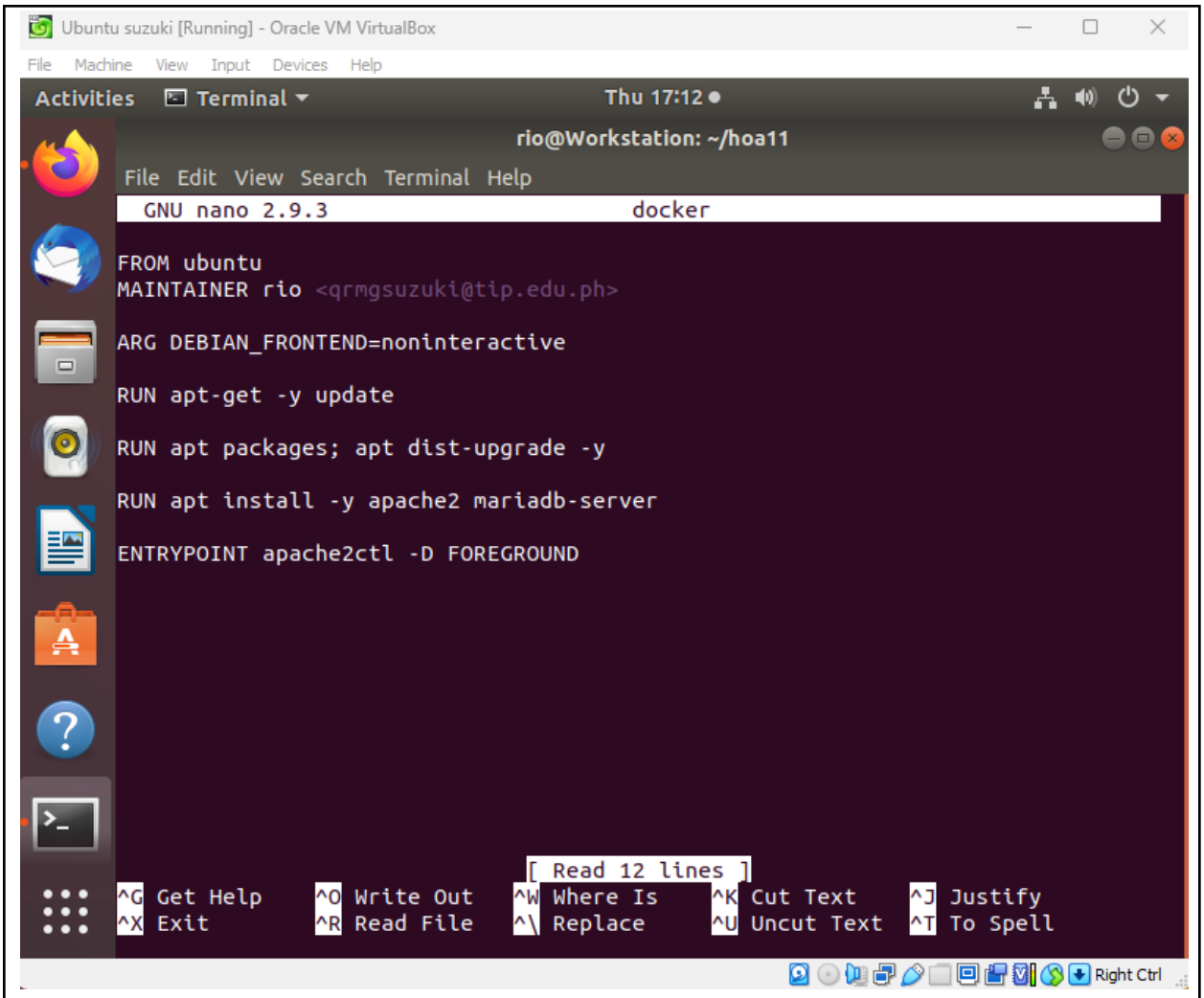
3. Add to Docker group to your current user.



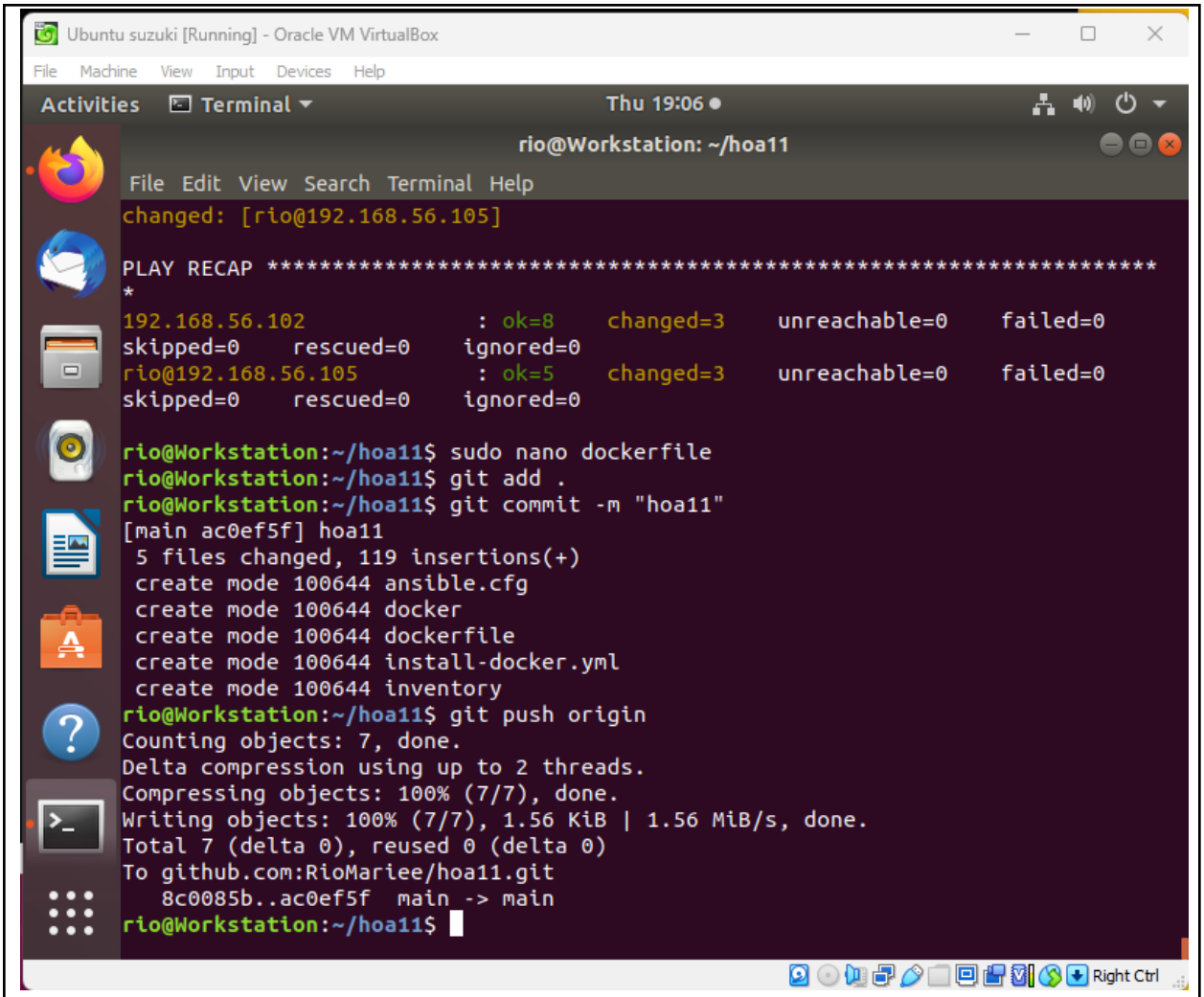
4. Create a Dockerfile to install web and DB server.



5. Install and build the Dockerfile using Ansible.



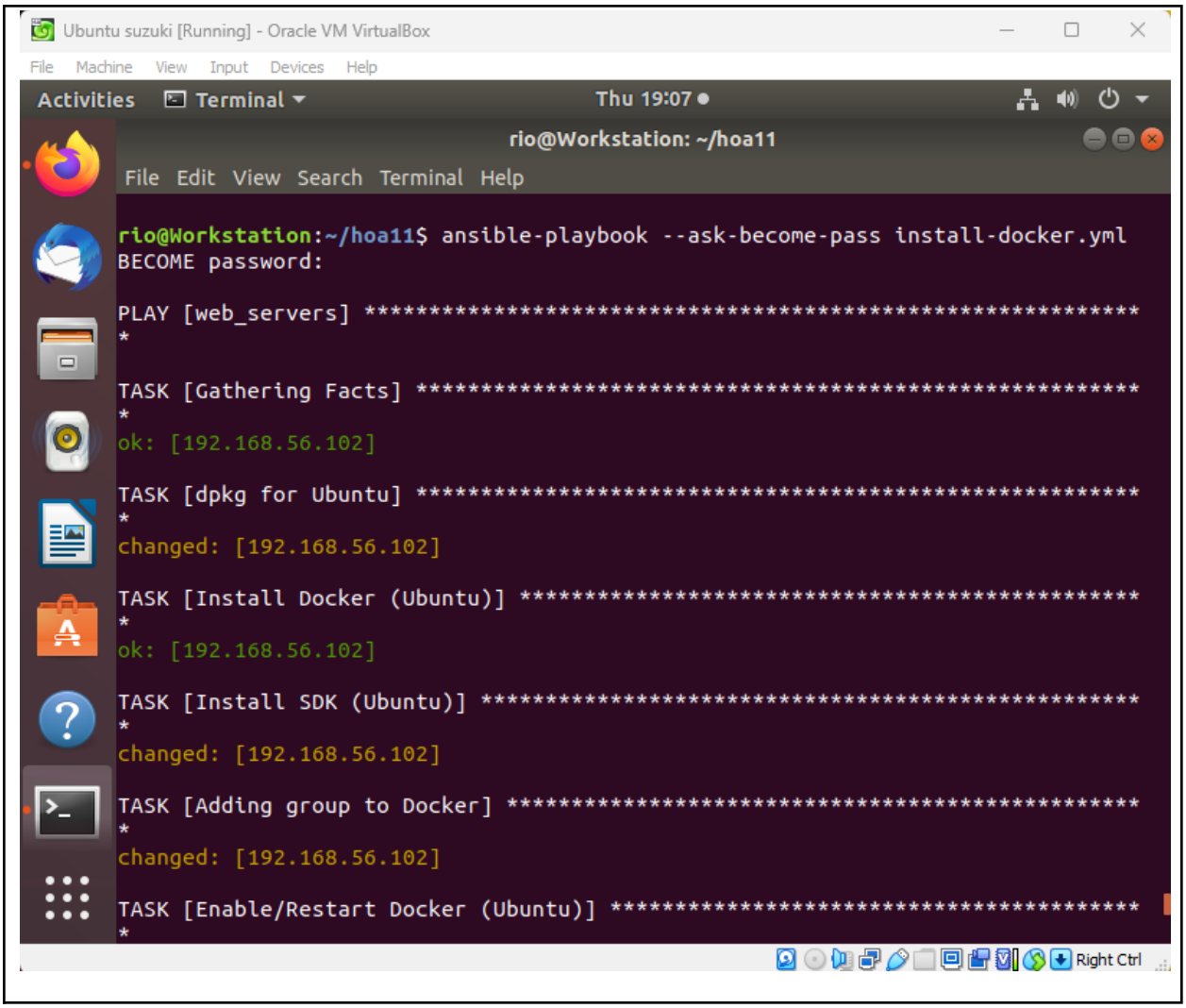
6. Add, commit and push it to your repository.

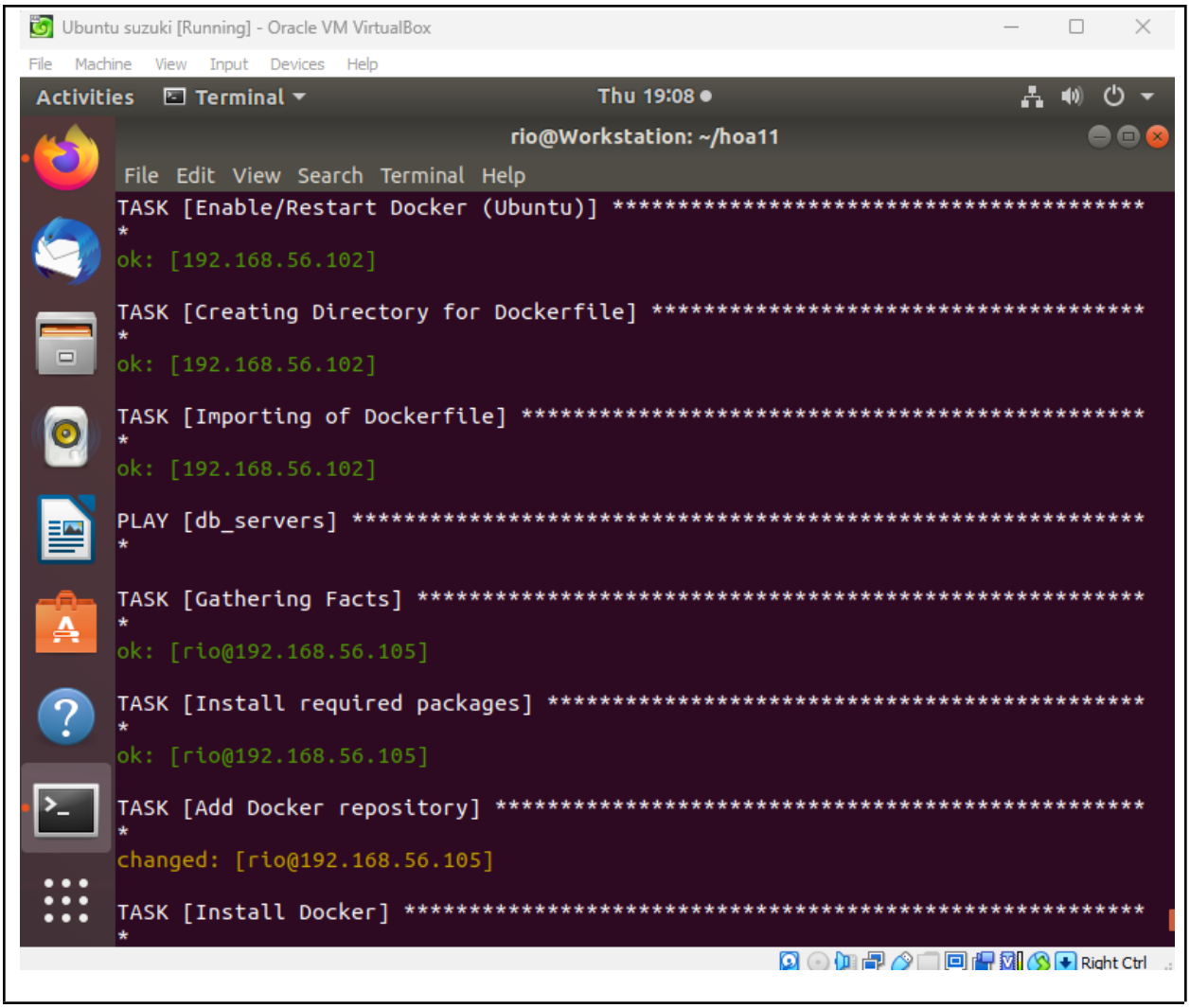


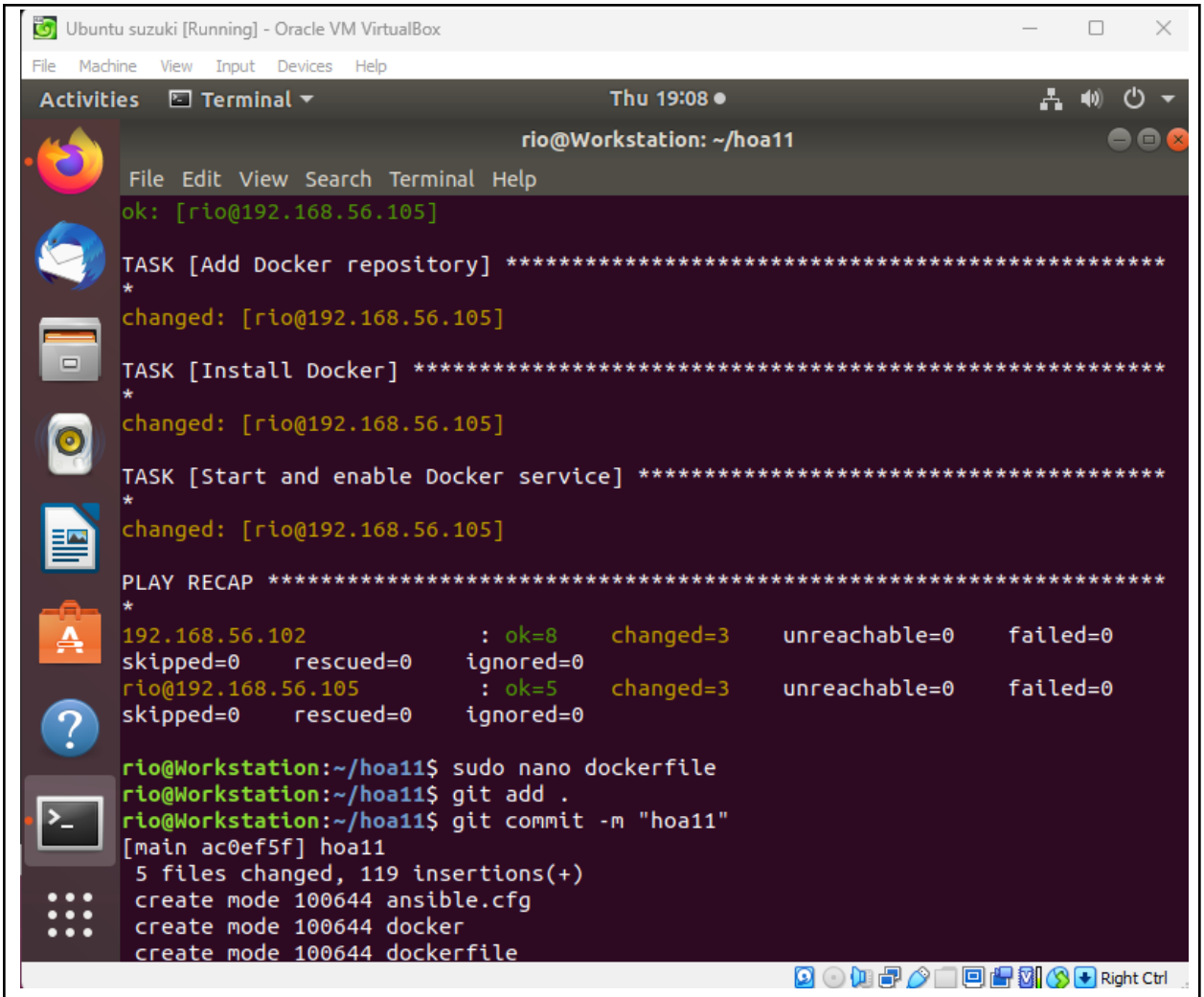
Github link: https://github.com/RioMariee/hoa11

4. **Output** (screenshots and explanations)

Process:

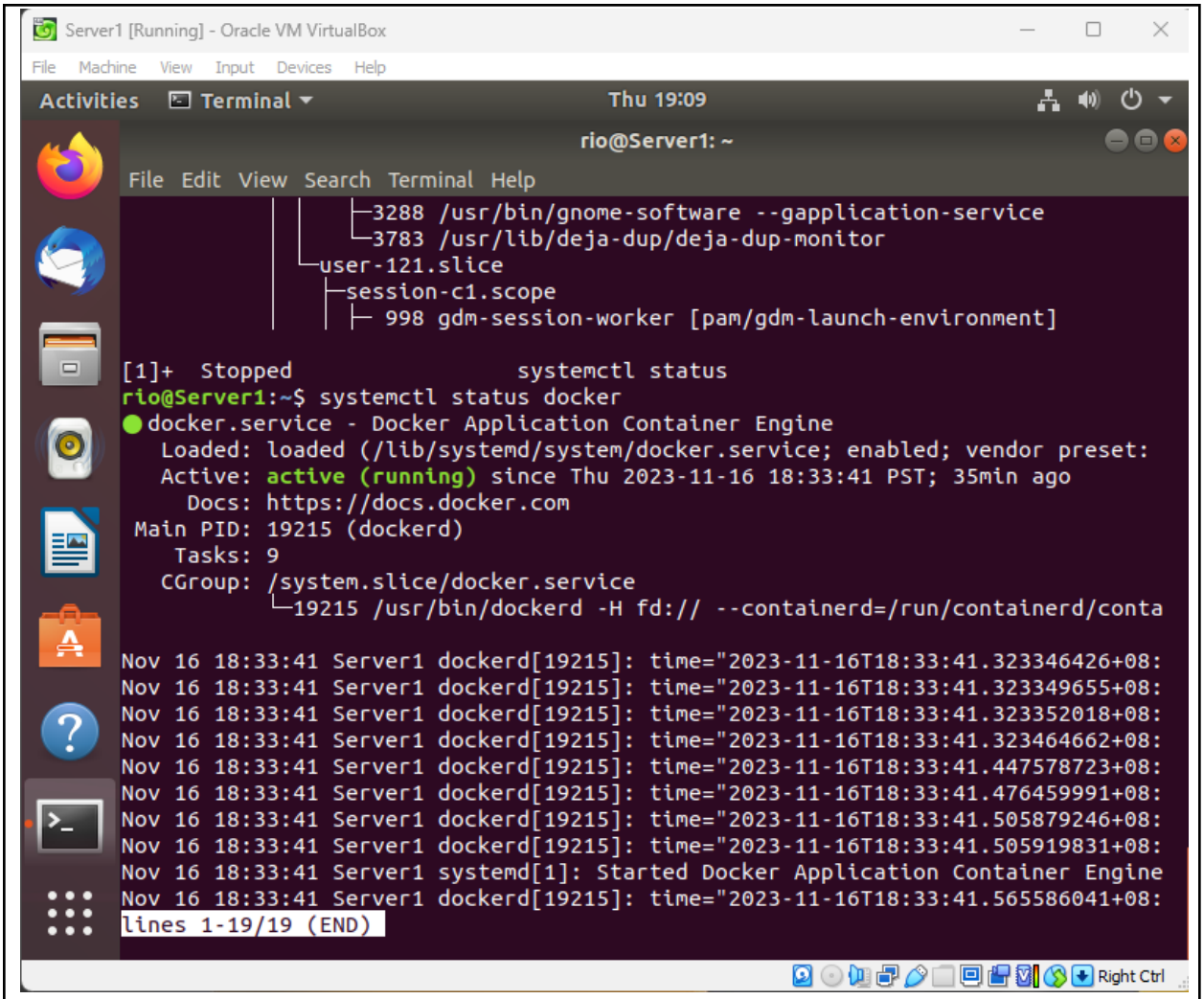

Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 19:07
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
rio@Workstation:~/hoa11$ ansible-playbook --ask-become-pass install-docker.yml
BECOME password:
PLAY [web_servers] ***
*
TASK [Gathering Facts] ***
*
ok: [192.168.56.102]
TASK [dpkg for Ubuntu] ***
*
changed: [192.168.56.102]
TASK [Install Docker (Ubuntu)] ***
*
ok: [192.168.56.102]
TASK [Install SDK (Ubuntu)] **
*
changed: [192.168.56.102]
TASK [Adding group to Docker] **
*
changed: [192.168.56.102]
TASK [Enable/Restart Docker (Ubuntu)] **
*
Right Ctrl


Ubuntu suzuki [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 19:08
rio@Workstation: ~/hoa11
File Edit View Search Terminal Help
TASK [Enable/Restart Docker (Ubuntu)] ***********************************
*
ok: [192.168.56.102]
TASK [Creating Directory for Dockerfile] ********************************
*
ok: [192.168.56.102]
TASK [Importing of Dockerfile] **
*
ok: [192.168.56.102]
PLAY [db_servers] ***
*
TASK [Gathering Facts] **
*
ok: [rio@192.168.56.105]
TASK [Install required packages] **
*
ok: [rio@192.168.56.105]
TASK [Add Docker repository] **
*
changed: [rio@192.168.56.105]
TASK [Install Docker] ***
*
Right Ctrl

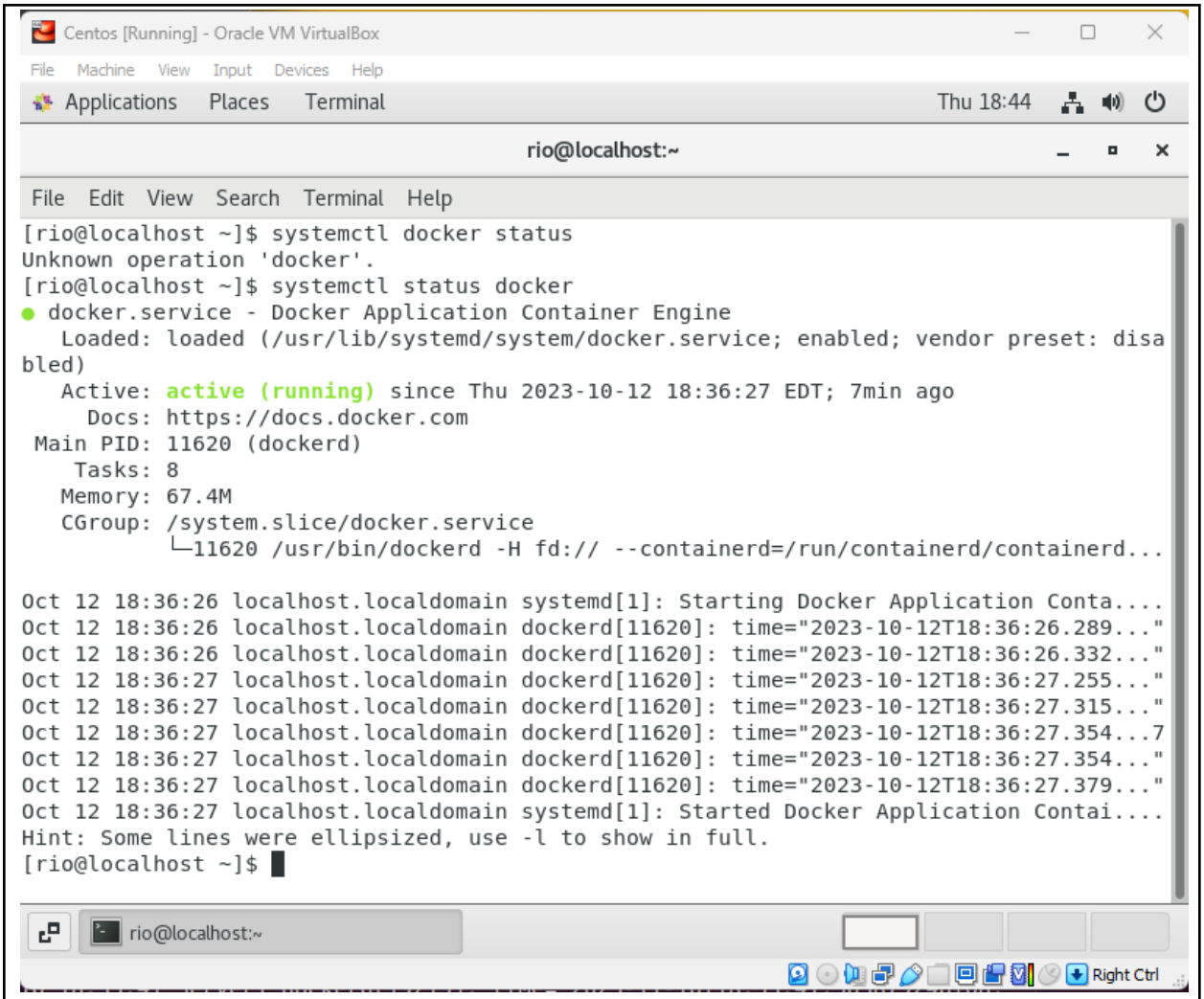


Output:

Server 1:


Server1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Thu 19:09
rio@Server1: ~
File Edit View Search Terminal Help
├─3288 /usr/bin/gnome-software --gapplication-service
└─3783 /usr/lib/deja-dup/deja-dup-monitor
└─user-121.slice
├─session-c1.scope
├─ 998 gdm-session-worker [pam/gdm-launch-environment]
[1]+ Stopped systemctl status
rio@Server1:~$ systemctl status docker
docker.service - Docker Application Container Engine
Loaded: loaded (/lib/systemd/system/docker.service; enabled; vendor preset:
Active: active (running) since Thu 2023-11-16 18:33:41 PST; 35min ago
Docs: https://docs.docker.com
Main PID: 19215 (dockerd)
Tasks: 9
CGroup: /system.slice/docker.service
└─19215 /usr/bin/dockerd -H fd:// --containerd=/run/containerd/conta
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.323346426+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.323349655+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.323352018+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.323464662+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.447578723+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.476459991+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.505879246+08:
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.505919831+08:
Nov 16 18:33:41 Server1 systemd[1]: Started Docker Application Container Engine
Nov 16 18:33:41 Server1 dockerd[19215]: time="2023-11-16T18:33:41.565586041+08:
lines 1-19/19 (END)
Right Ctrl

Centos:



Github link: https://github.com/RioMariee/hoa11

Reflections:

Answer the following:

1. What are the benefits of implementing containerizations?
    - Jumping into containerization has loads of perks in the software development scene. First, it is portable, smoothly running across different setups. Containers help in security and preventing conflicts. Containerization also helps resources, sharing the computer's brain (OS kernel) and squeezing in more apps. With containers, launching stuff is easy. Also, they're all about scalability, fitting right in with the crowd of developers and making those continuous integration and delivery things efficient. Tracking changes is also made easy, containerization helps so well with microservices – it's all about keeping things scalable,

manageable, and agile in the coding world. Containerization really helps in the industry of computer development.

Conclusions:

To conclude, this activity aims for us, students to learn establishing a Dockerfile and constructing a workflow utilizing Ansible as Infrastructure as Code (IaC) for Continuous Delivery signify a strategic approach to contemporary software development. This method integrates Docker for containerization and Ansible for IaC, simplifying the deployment process and encouraging a unified and replicability. Docker facilitates the encapsulation of applications and their dependencies, fostering a transportable and scalable environment. As an IaC tool, Ansible improves automation, ensuring version control and easy management of infrastructure configurations. Collectively, this fusion supports a resilient Continuous Delivery process, empowering development teams to efficiently and dependably deliver software in the swiftly evolving technological landscape.