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Course/Section: CPE 232 - CPE31S4	**Date Submitted:** 08-29-2023
Instructor: Dr. Jonathan V. Taylar	**Semester and SY:** 1st Sem. SY23-242

Activity 3: Install SSH server on CentOS or RHEL 8

1. **Objectives:**

1.1 Install Community Enterprise OS or Red Hat Linux OS

1.2 Configure remote SSH connection from remote computer to CentOS/RHEL-8

2. **Discussion:**

CentOS vs. Debian: Overview

CentOS and Debian are Linux distributions that spawn from opposite ends of the candle.

CentOS is a free downstream rebuild of the commercial Red Hat Enterprise Linux distribution where, in contrast, Debian is the free upstream distribution that is the base for other distributions, including the Ubuntu Linux distribution.

As with many Linux distributions, CentOS and Debian are generally more alike than different; it isn't until we dig a little deeper that we find where they branch.

CentOS vs. Debian: Architecture

The available supported architectures can be the determining factor as to whether a distro is a viable option or not. Debian and CentOS are both very popular for x86_64/AMD64, but what other archs are supported by each?

Both Debian and CentOS support AArch64/ARM64, armhf/armhfp , i386 , ppc64el/ppc64le. (Note: armhf/armhfp and i386 are supported in CentOS 7 only.)

CentOS 7 additionally supports POWER9 while Debian and CentOS 8 do not. CentOS 7 focuses on the x86_64/AMD64 architecture with the other archs released through the AltArch SIG (Alternate Architecture Special Interest Group) with CentOS 8 supporting x86_64/AMD64, AArch64 and ppc64le equally.

Debian supports MIPSel, MIPS64el and s390x while CentOS does not. Much like CentOS 8, Debian does not favor one arch over another —all supported architectures are supported equally.

CentOS vs. Debian: Package Management

Most Linux distributions have some form of package manager nowadays, with some more complex and feature-rich than others.

CentOS uses the RPM package format and YUM/DNF as the package manager.

Debian uses the DEB package format and dpkg/APT as the package manager.

Both offer full-feature package management with network-based repository support, dependency checking and resolution, etc.. If you're familiar with one but not the other, you may have a little trouble switching over, but they're not overwhelmingly different. They both have similar features, just available through a different interface.

Task 1: Download the CentOS or RHEL-8 image (Create screenshots of the following)

1. Download the image of the CentOS here: http://mirror.rise.ph/centos/7.9.2009/isos/x86_64/

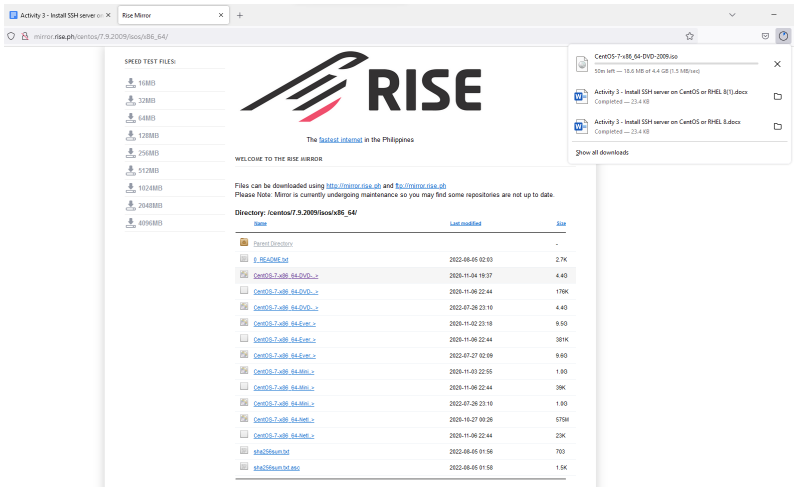

Figure 1.1 - Downloading CentOS image at given website.

2. Create a VM machine with 4 Gb RAM and 35 Gb HD.

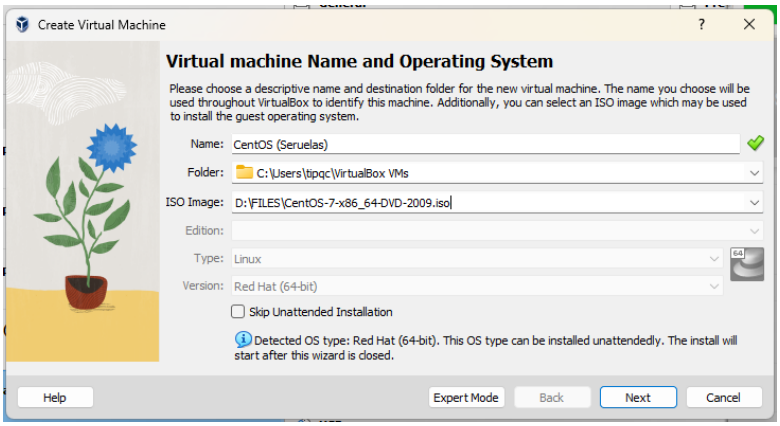

Figure 2.1 - Creating new VM with CentOS Image.

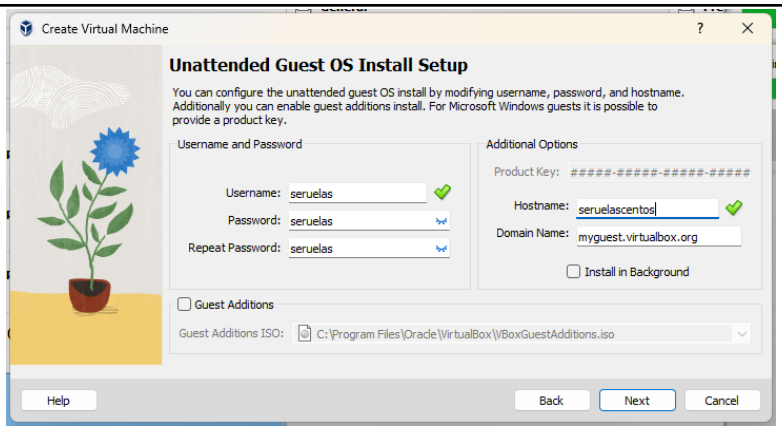

Figure 2.2 - Setting up Unattended Guest OS Install.

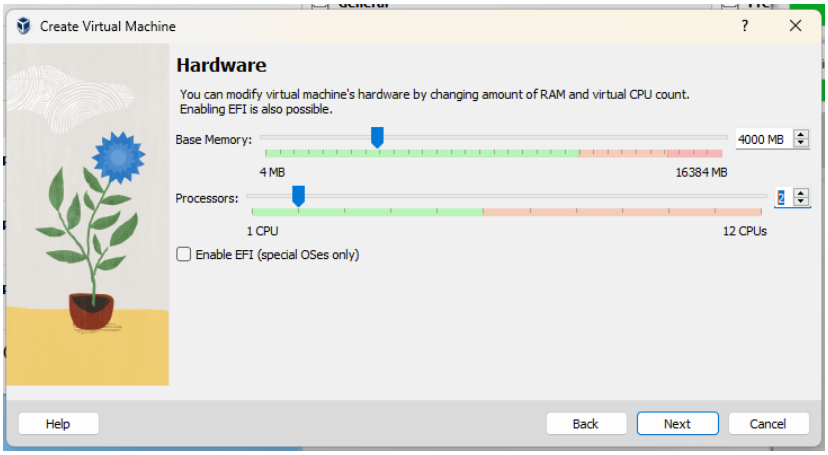

Figure 2.3 - Setting up hardware for the Virtual Machine.

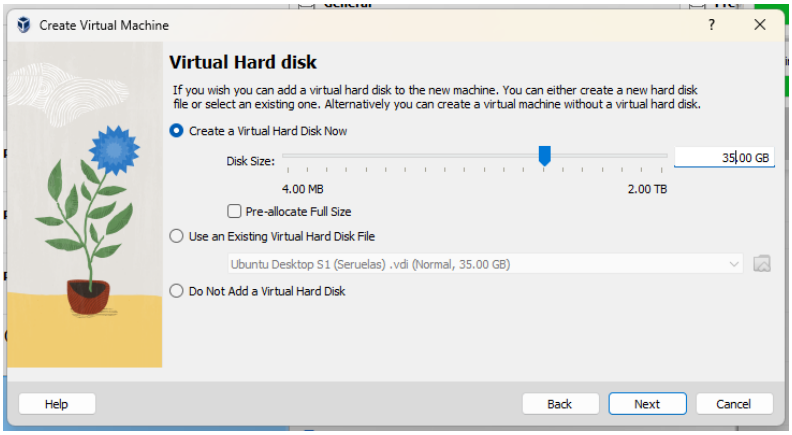

Figure 2.4 - Setting up Virtual Hard disk for the virtual machine.

3. Install the downloaded image.

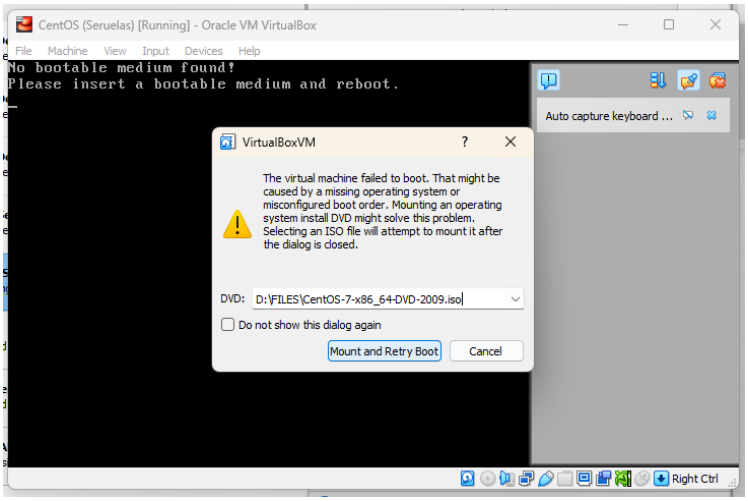

Figure 3.1 - Mount image file for installation of CentOS.

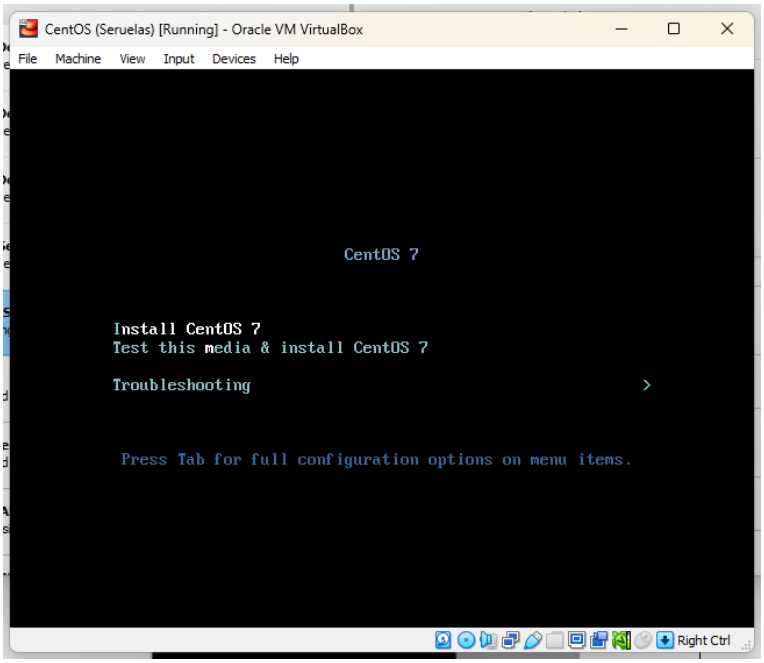

Figure 3.2 - Installing CentOs 7 in the virtual machine.

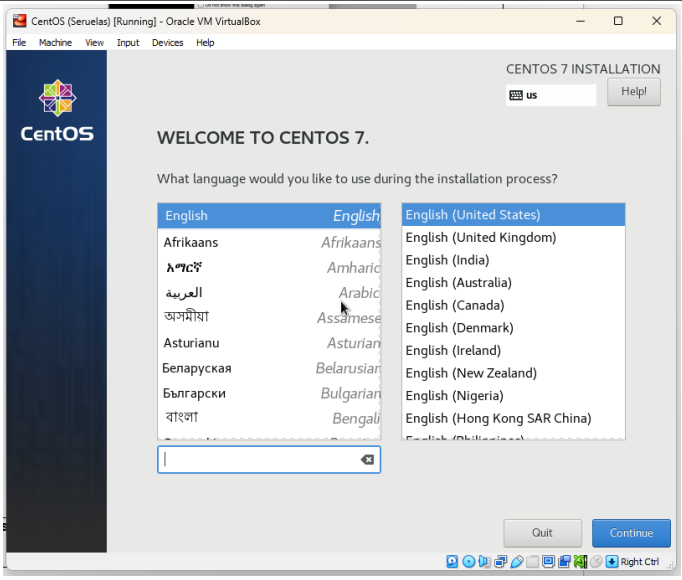

Figure 3.3 - Choosing the installation language for CentOS 7.

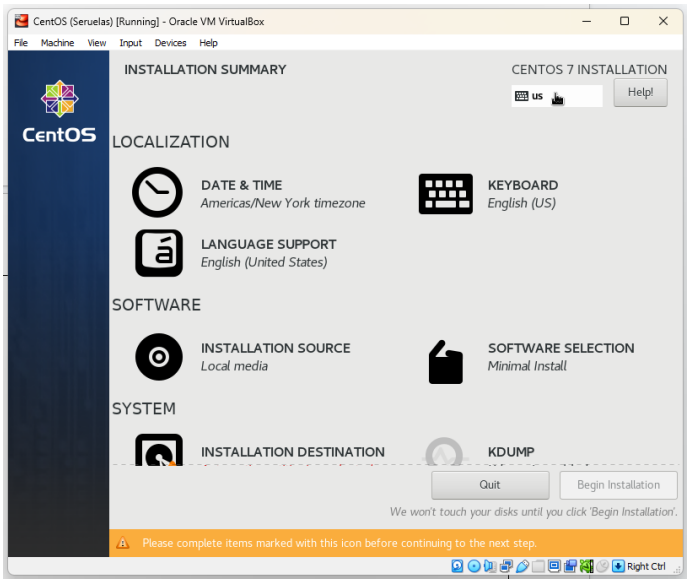

Figure 3.4 - Setting up CentOs 7.

Figure 3.5 - Choosing location for date and time.

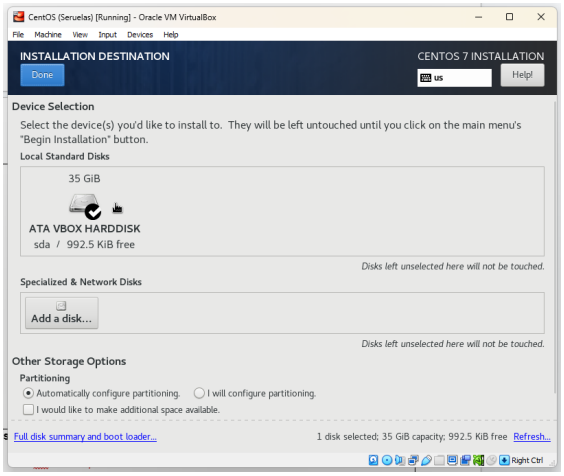

Figure 3.6 - Choosing installation destination for CentOS.

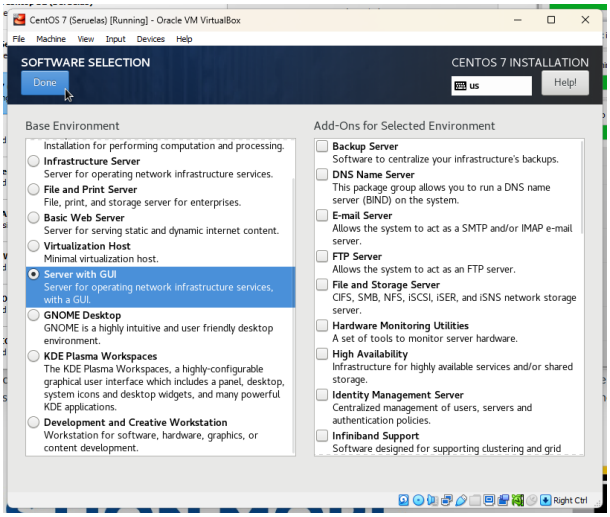

Figure 3.7 - Select **Server with GUI** at Software Selection.

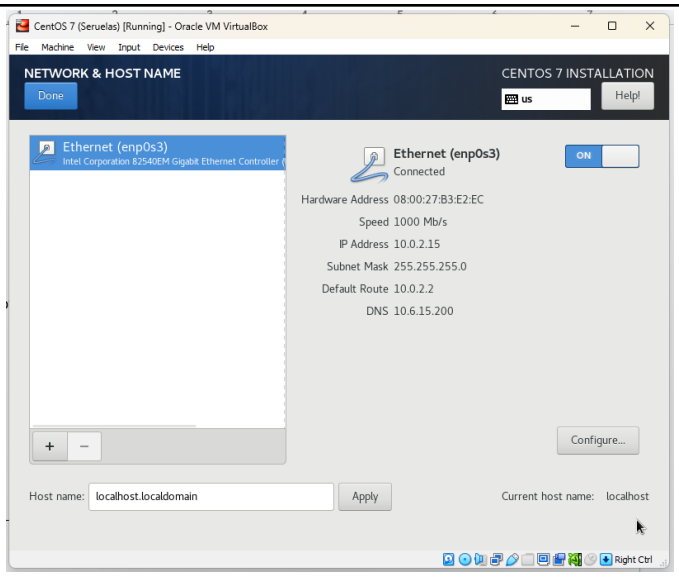

Figure 3.9 - Enable networking at ethernet at Network and Hostname.

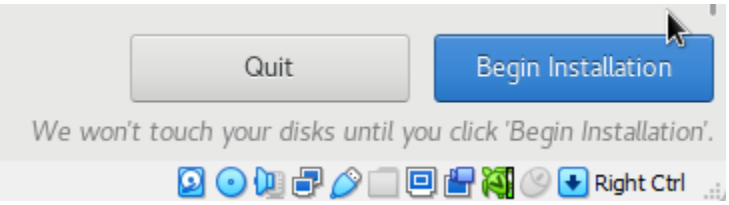

Figure 3.10 - Beginning of installation of CentOS.

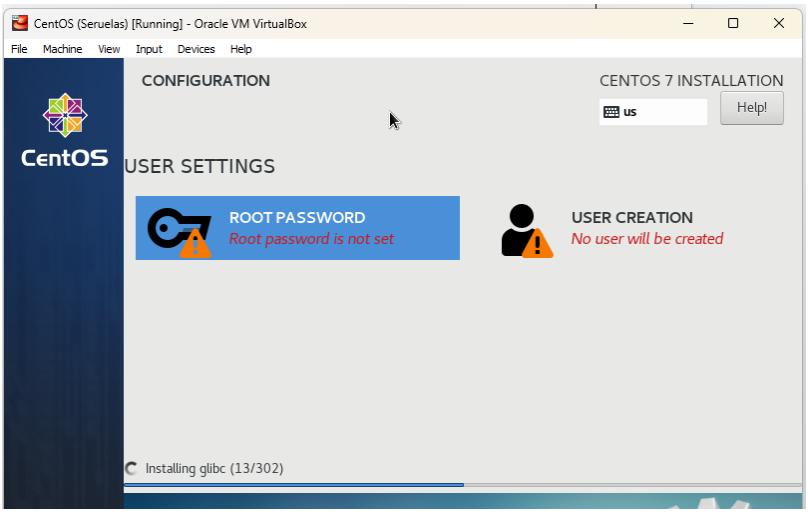

Figure 3.11 - Configuration of Root and User/s.

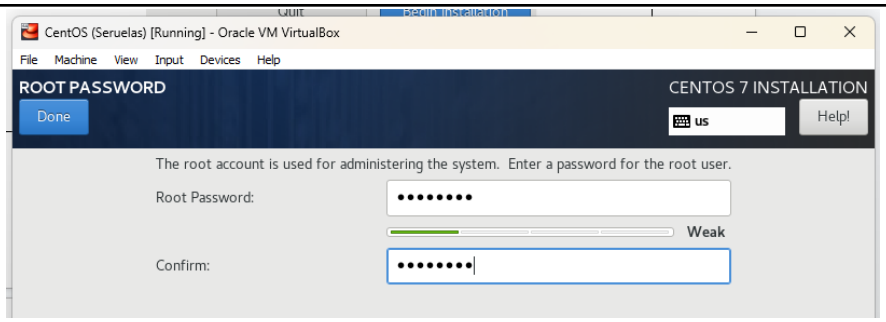

Figure 3.12 - Creation of root password. (root password: seruelas)

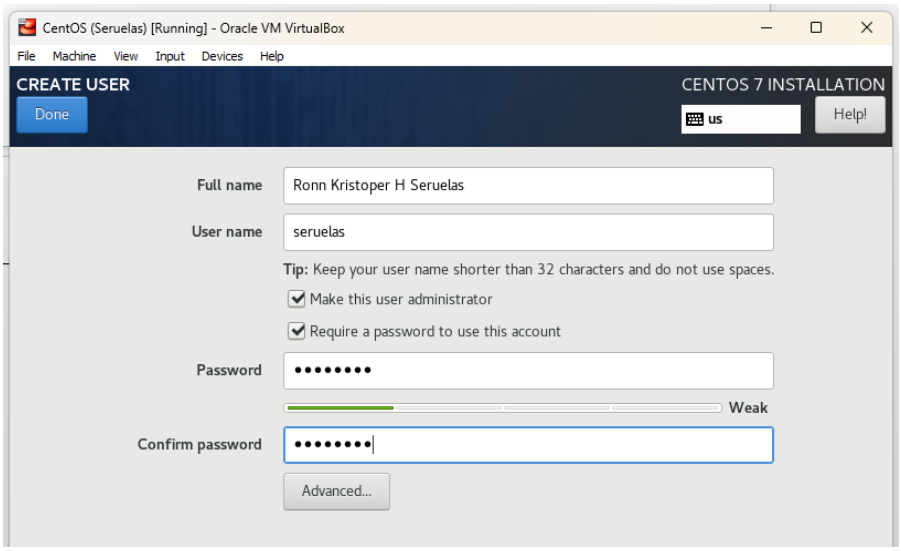

Figure 3.13 - Creation of an administrative user. (user: seruelas, pass: seruelas)

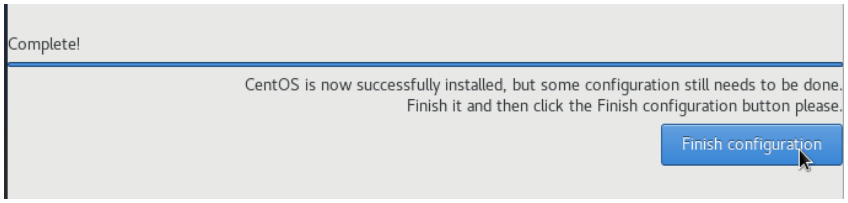

Figure 3.14 - Installation done, and proceeding with configurations.

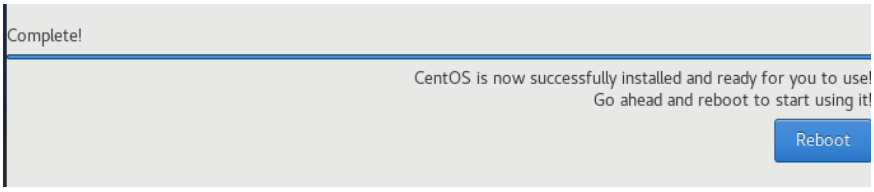

Figure 3.15 - Installation done and CentOS ready for reboot.

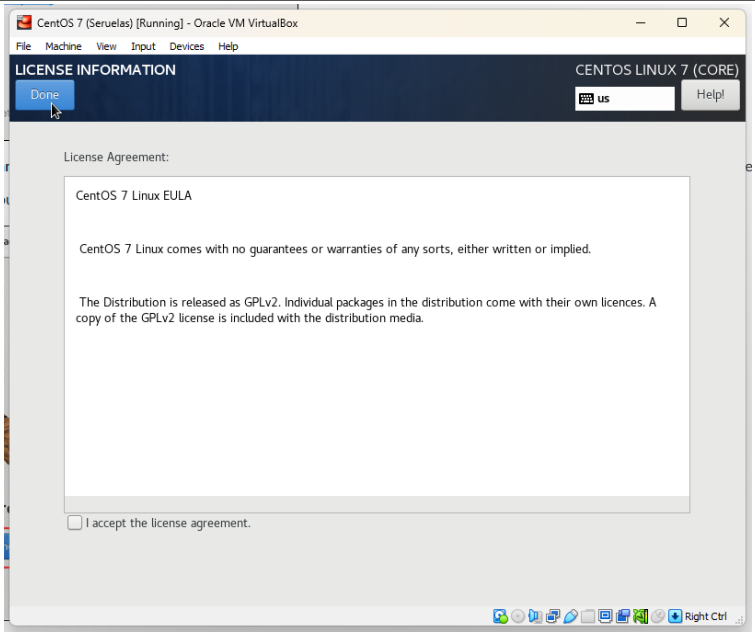

Figure 3.16 - Accepting license for CentOS 7.

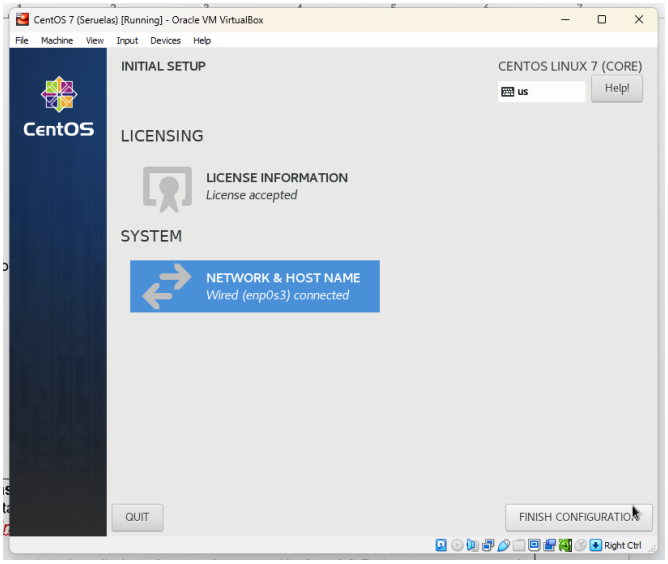

Figure 3.17 - Finishing configuration.

4. Show evidence that the OS was installed already.

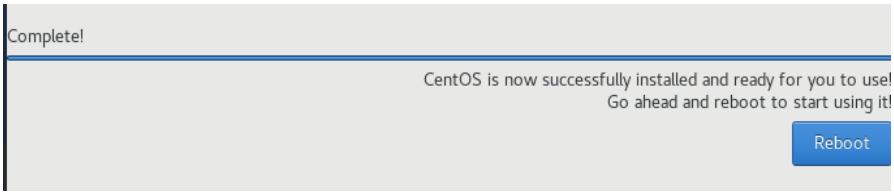

Figure 4.1 - CentOS Installation done and ready for use after reboot.

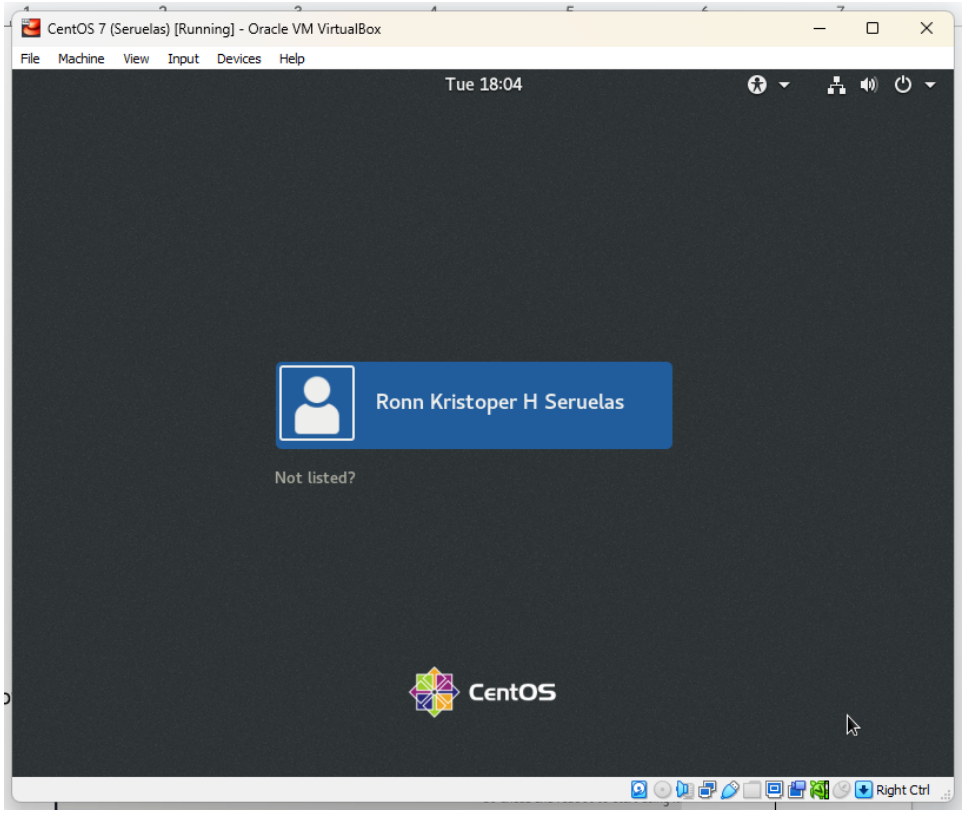

Figure 4.2 - Booted at the CentOS 7 terminal.

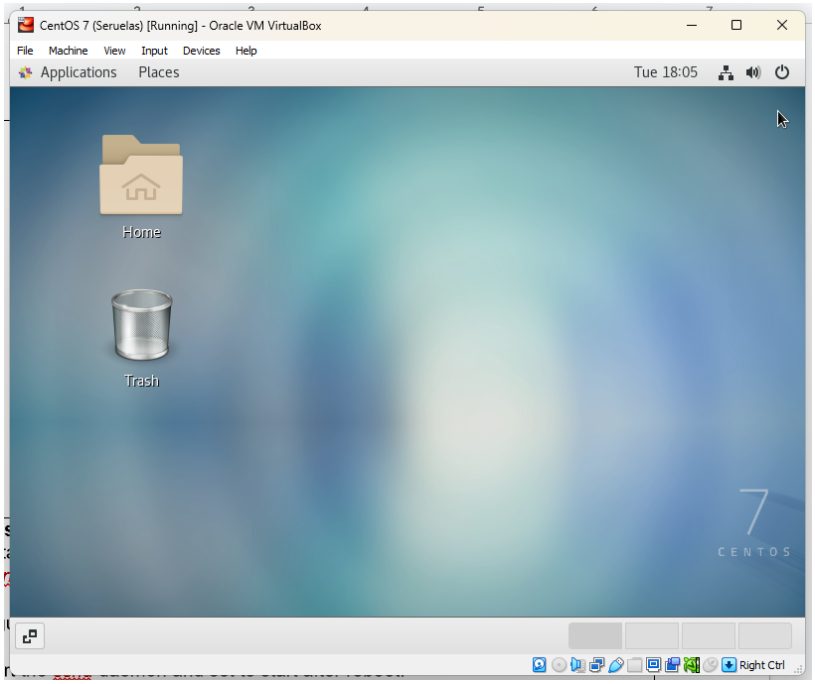

Figure 4.3 - Desktop of CentOS 7.

Task 2: Install the SSH server package *openssh*

1. Install the ssh server package *openssh* by using the *dnf* command:
   $ dnf install openssh-server

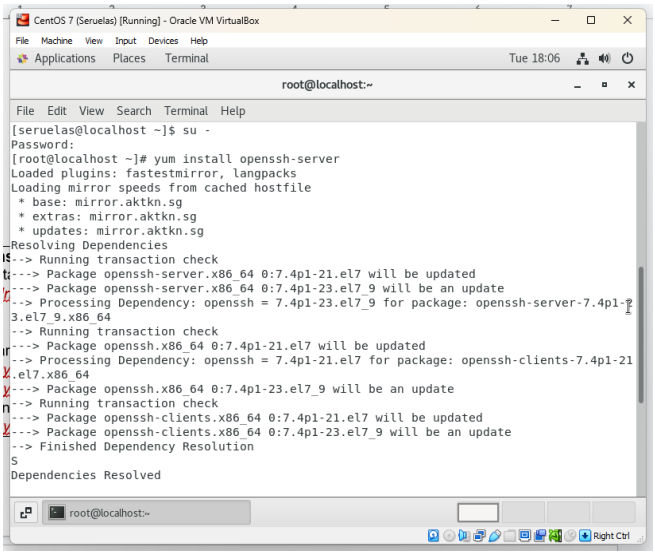

Figure 1.1 - Installation of openssh-server. (In Root User Mode)

2. Start the *sshd* daemon and set to start after reboot:
   $ systemctl start sshd
   $ systemctl enable sshd

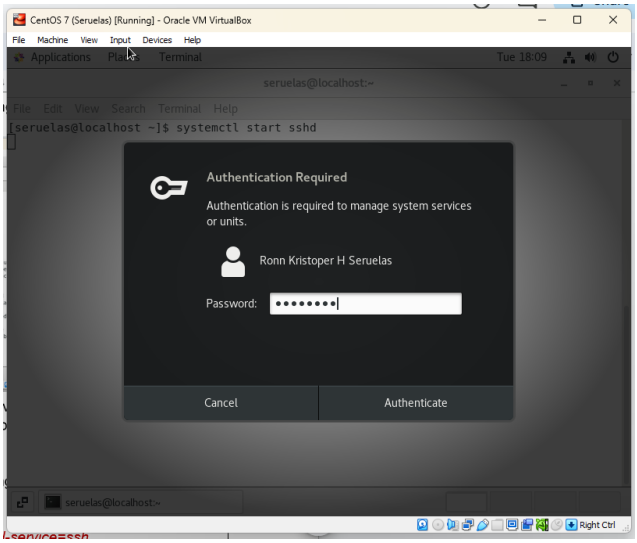

Figure 2.1 - Required authentication before execution of command.

```
[seruelas@localhost ~]$ systemctl start sshd
[seruelas@localhost ~]$ systemctl enable sshd
```

Figure 2.2 - Execution of commands.

3. Confirm that the sshd daemon is up and running:
   $ systemctl status sshd

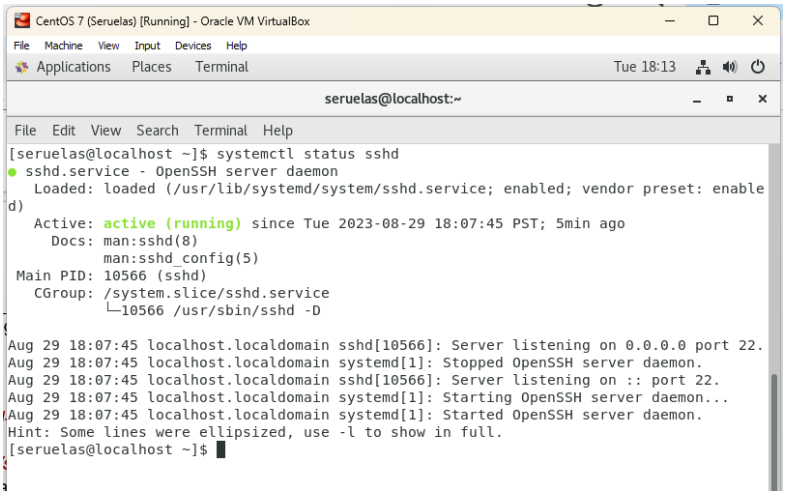

Figure 3.1 - SSHD daemon running in the background.

4. Open the SSH port 22 to allow incoming traffic:
   $ firewall-cmd --zone=public --permanent --add-service=ssh
   $ firewall-cmd --reload

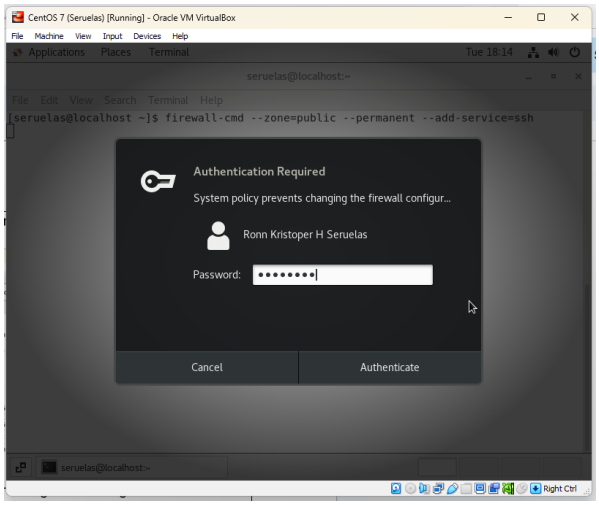

Figure 4.1 - CentOS 7 requiring authentication before execution.

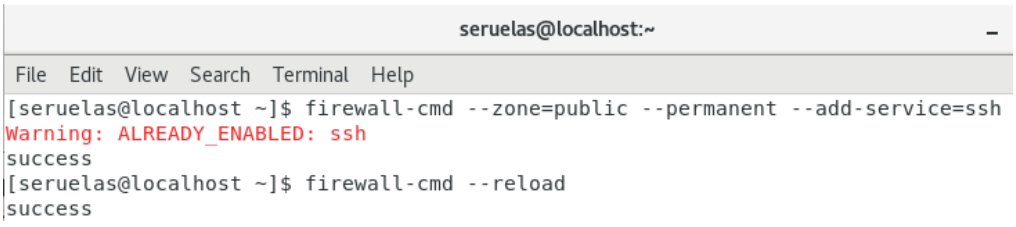

Figure 4.2 - Opening SSH port 22 for incoming traffic.

5. Locate the ssh server man config file */etc/ssh/sshd_config* and perform custom configuration. Every time you make any change to the */etc/ssh/sshd-config* configuration file reload the *sshd* service to apply changes:
   $ systemctl reload sshd

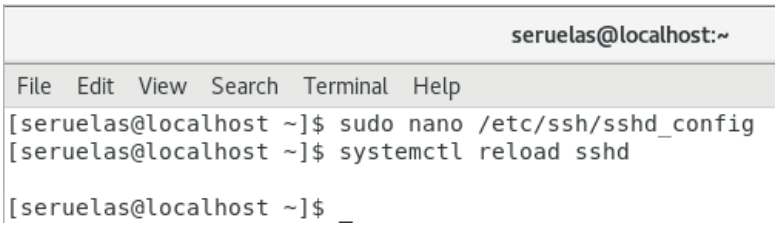

Figure 5.1 - After modifying the configuration via **sudo nano**, saving or committing the changes via new command.

Task 3: Copy the Public Key to CentOS

1. Make sure that *ssh* is installed on the local machine.

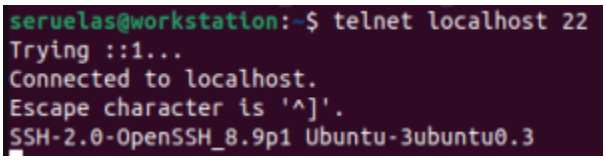

Figure 1.1 - Verifying the local machine if ssh is installed.

2. Using the command *ssh-copy-id*, connect your local machine to CentOS.

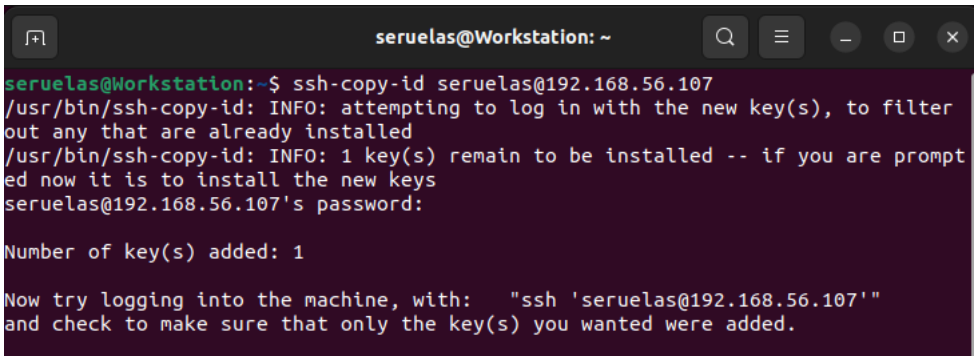

Figure 2.1 - Connecting the local machine to the CentOS.

3. On CentOS, verify that you have the *authorized_keys*.

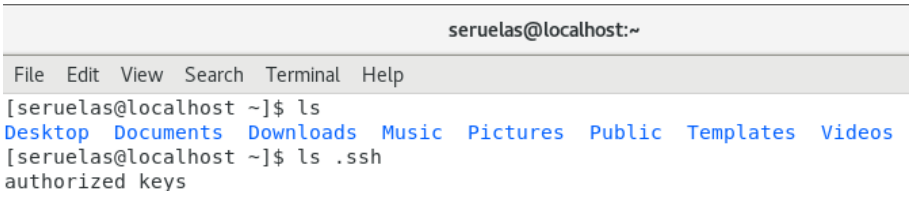

Figure 3.1 - Verifying the authorized_keys from CentOS.

Task 4: Verify ssh remote connection

1. Using your local machine, connect to CentOS using ssh.
2. Show evidence that you are connected.

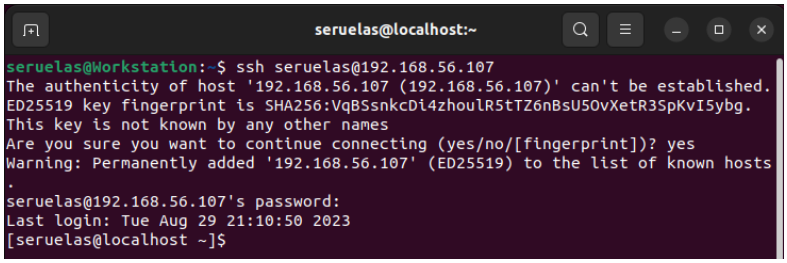

Figure 2.1 - Verifying by connecting the activity.

Reflections:

Answer the following:

1. What do you think we should look for in choosing the best distribution between Debian and Red Hat Linux distributions?
   - When looking into the best distribution between Debian and Red Hat Linux, users should look into the support and to-date kernels as both distributions have their own advantages and disadvantages. Requirements and technical resources are also important as both distributions.

2. What are the main differences between Debian and Red Hat Linux distributions?
   - The main difference between Debian and Red Hat Linux distributions is the updates and its support. Debian's support is built by a large community that offers consultants that may operate independently, while Red Hat Linux's large community is supported commercially, but also provides support through 3rd party services. Another focus is the updates or upgrades, as Debian is more focused on releasing multiple upgrades, keeping up their systems up to date and last longer through many years, while Red Hat Linux's releases the updates that may have a ten-year lifespan, but also may encounter multiple errors that need fixing.

Reflections/Conclusions:

In this activity, we students were able to educate ourselves on the two Linux distributions, CentOS and Debian. We learned that between two distributions, each distribution has their own differences ranging from their architectures, package management, and requirements, that both distributions serve different purposes for different people or communities. We have installed the CentOS 7 distribution on our virtual machines, and have effectively educated ourselves the basics of its terminal. We have also effectively connected both the CentOS 7 and the Ubuntu Linux Workstation through OpenSSH-Server, and have created a key to link or connect each other for remote-access.

Hands-On Rubirc (1)						
Criteria	**Ratings**					**Pts**
Completeness This criterion specifies the analysis of the student of the task given.	**5 pts** **Excellent** Components of all tasks are present in the documentation and execution.	**4 pts** **Good** Components of most of the tasks are present in the documentation and execution.	**3 pts** **Ok** Components of half of the tasks are present in documentation and execution.	**2 pts** **Poor** Components some tasks are present in documentation and execution	**1 pts** **Bad** Components of all tasks lacks data in documentation and execution.	5 pts
Design This criterion measures the components and engineering of the Hands-on activity.	**5 pts** **Execellent** Design is robust and acceptable in the industry	**4 pts** **Good** Design is acceptable in the industry but can be improved.	**3 pts** **Ok** Design is a satisfactory level in the industry.	**2 pts** **Poor** Design is poorly architected and engineered needs improvement.	**1 pts** **Bad** Design is badly architectured and engineered needs revisiting and rework.	5 pts
Documentation This criterion measures the context and completeness of artifacts of the activity.	**5 pts** **Excellent** The context of documentation is precise and understandable to readers.	**4 pts** **Good** The context of documentation is acceptable for readers.	**3 pts** **Ok** The documentation is satisfactory, has the main components needed, and grammar is acceptable.	**2 pts** **Poor** The documentation needs grammar checks but the content is complete.	**1 pts** **Bad** Documentation needs revisions from grammar to contexts.	5 pts
						Total Points: 15

“I affirm that I have not received or given any unauthorized help on this activity and that all work is my own.”