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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/
2. Create a VM machine with 2 Gb RAM and 20 Gb HD.

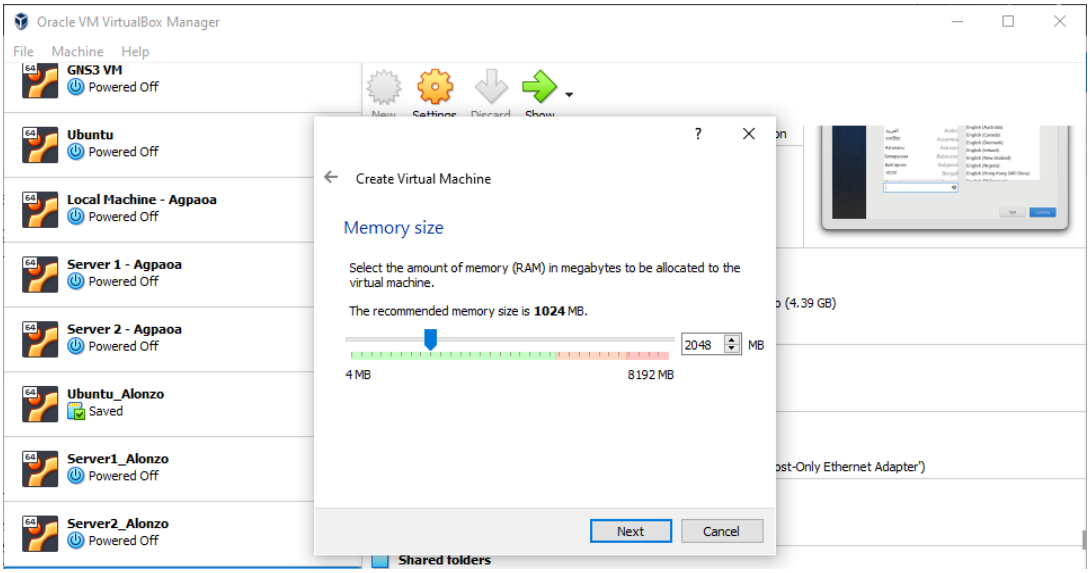

Figure 1. Creating a VM machine with 2GB RAM

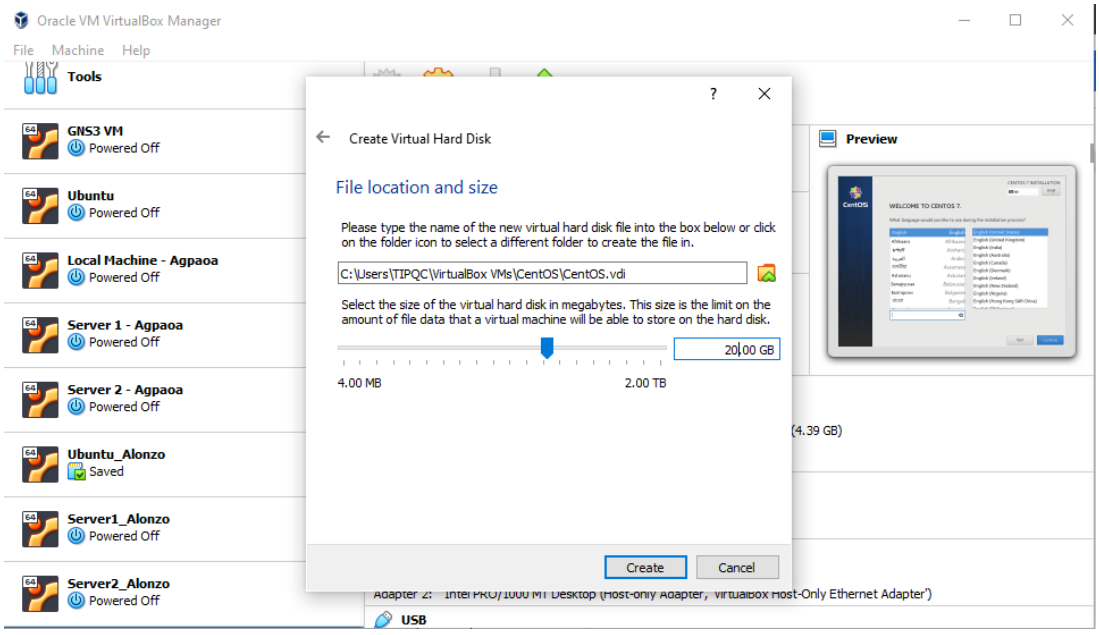

Figure 1.2. Creating a VM machine with 2GB HD

3. Install the downloaded image.

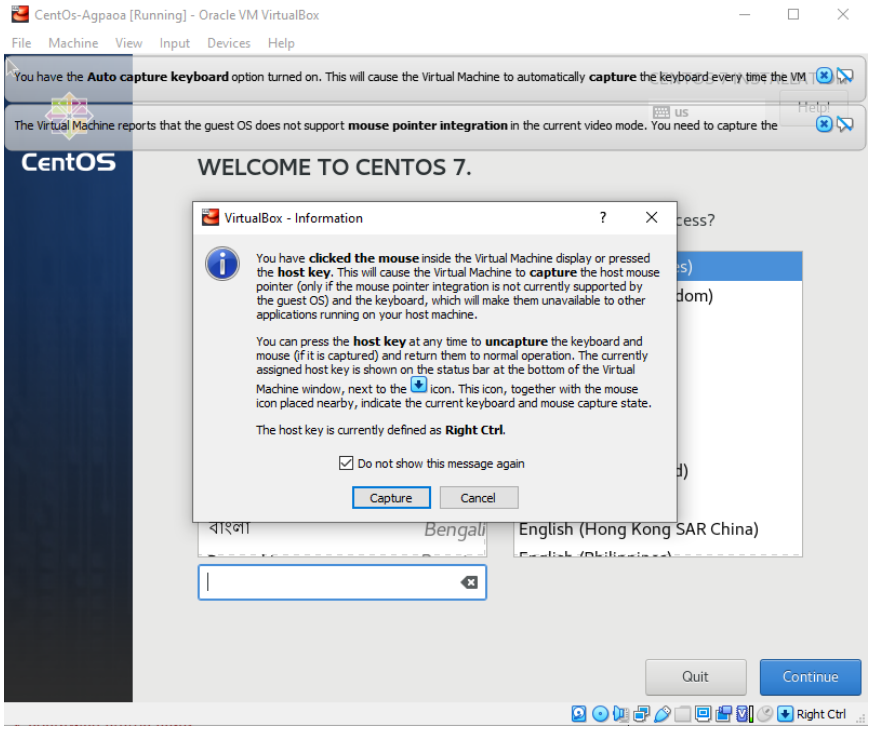

Figure 2. Choosing the Capture option

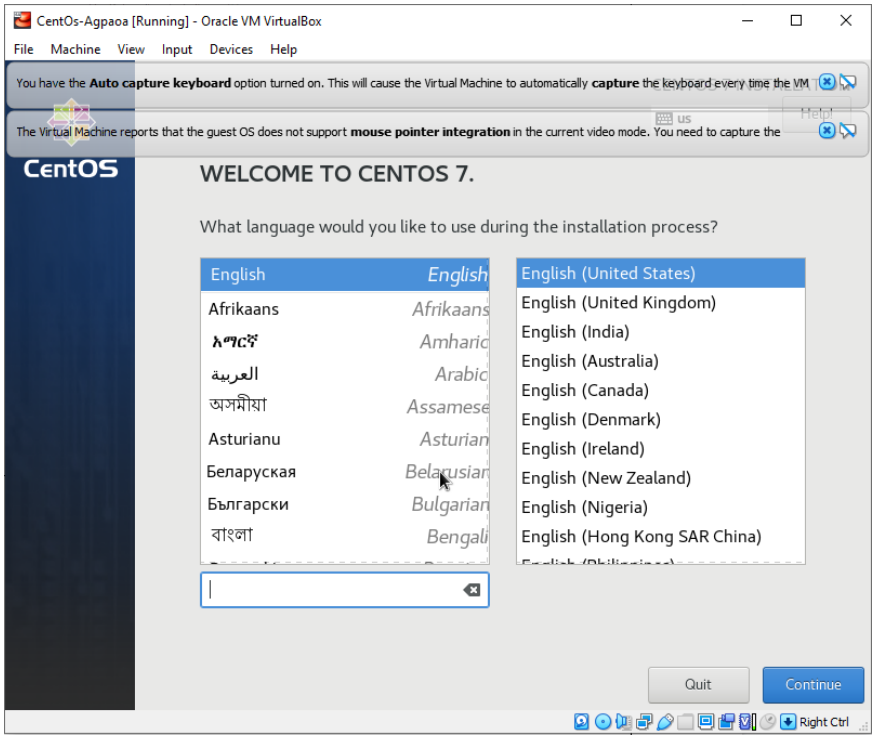

Figure 3. Choosing the language and clicking the Continue button

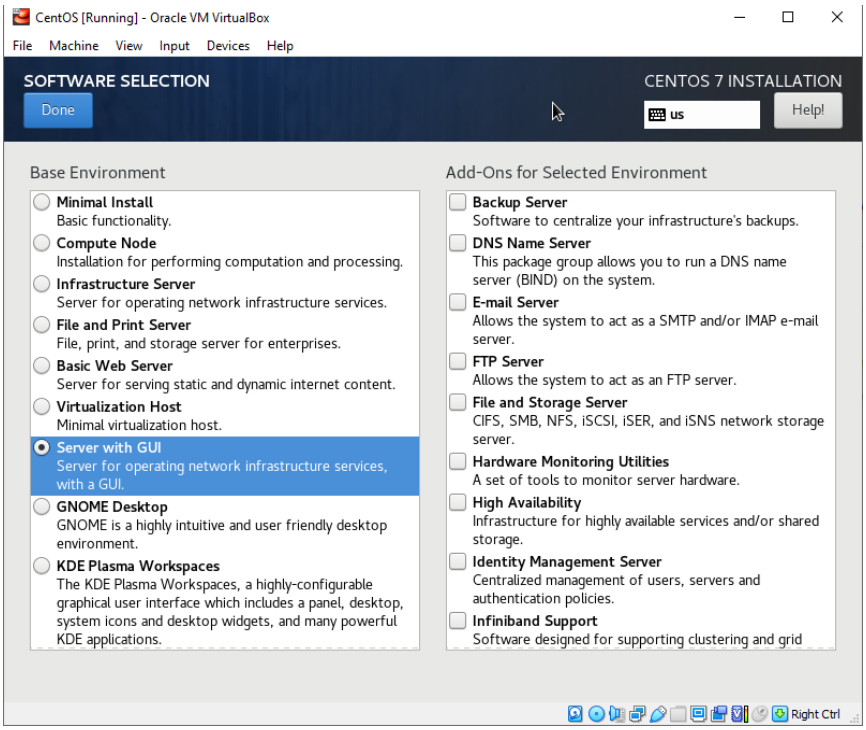

Figure 4. Choosing the Server with GUI in Software Selection

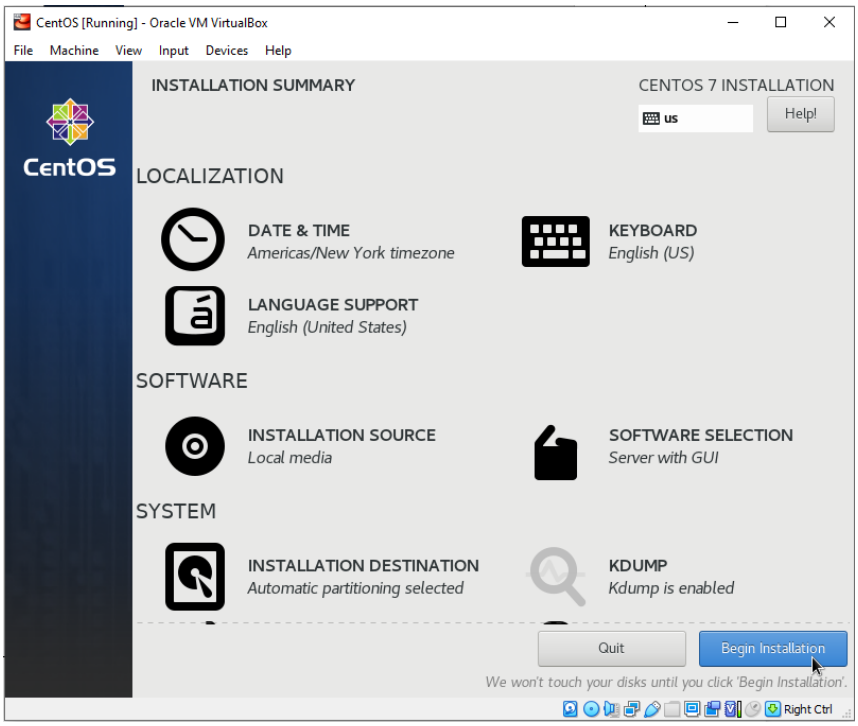

Figure 5. Beginning the Installation

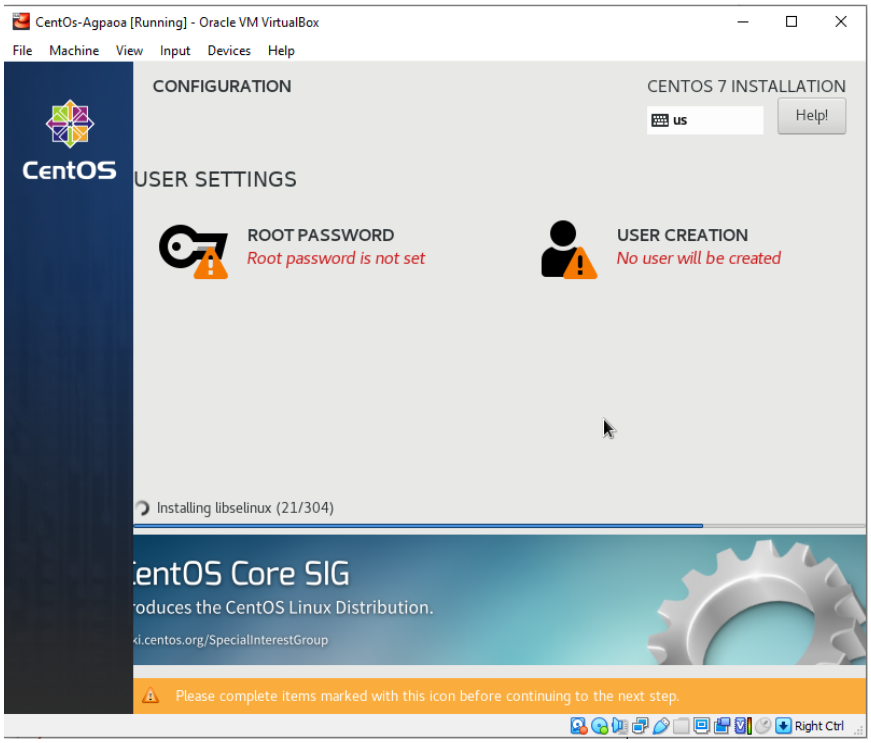

Figure 6. Setting the Root Password and creating a User

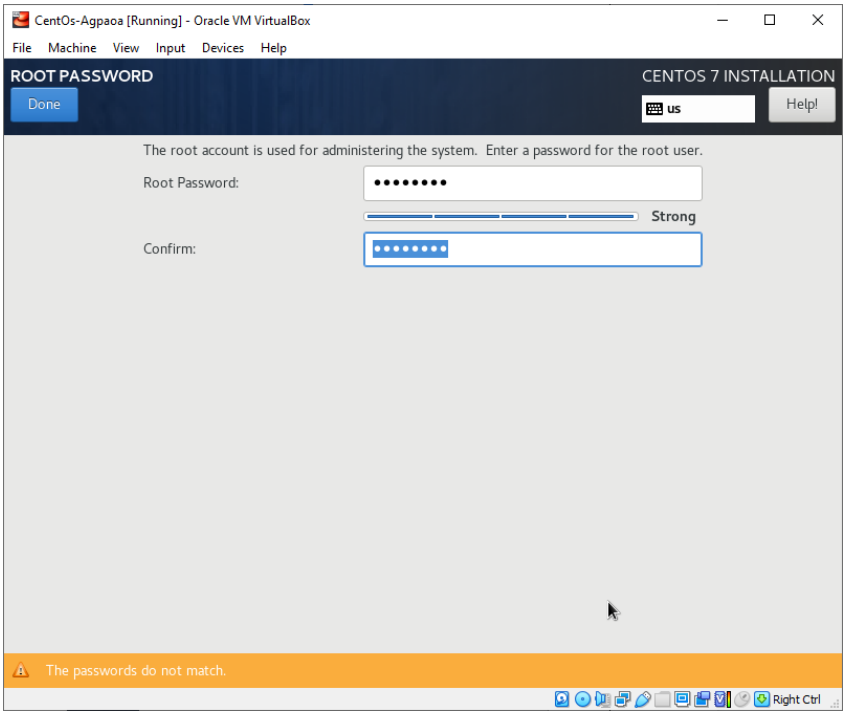

Figure 7. Creating a Root password

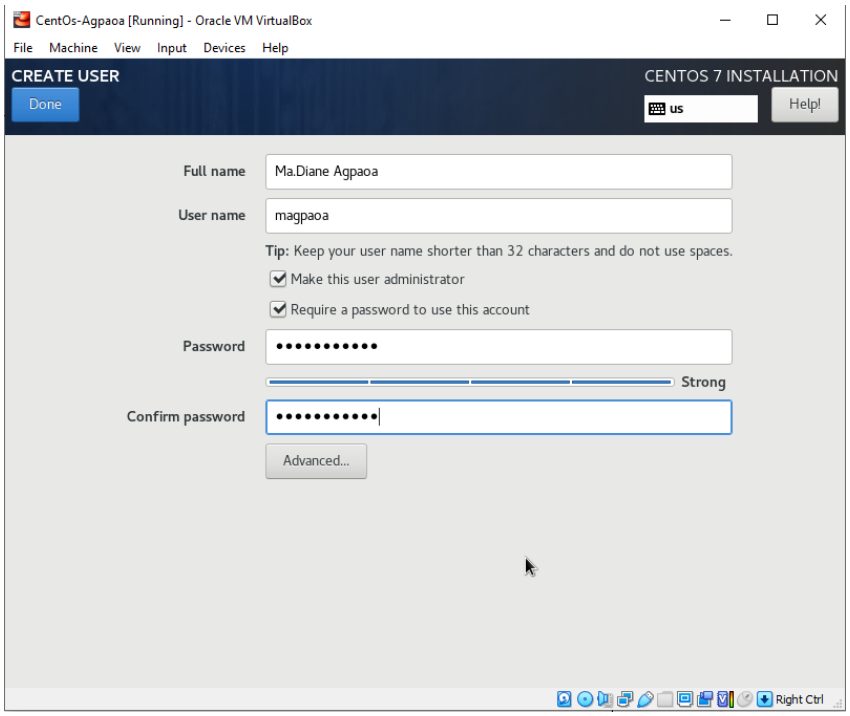

Figure 8. Creating a User

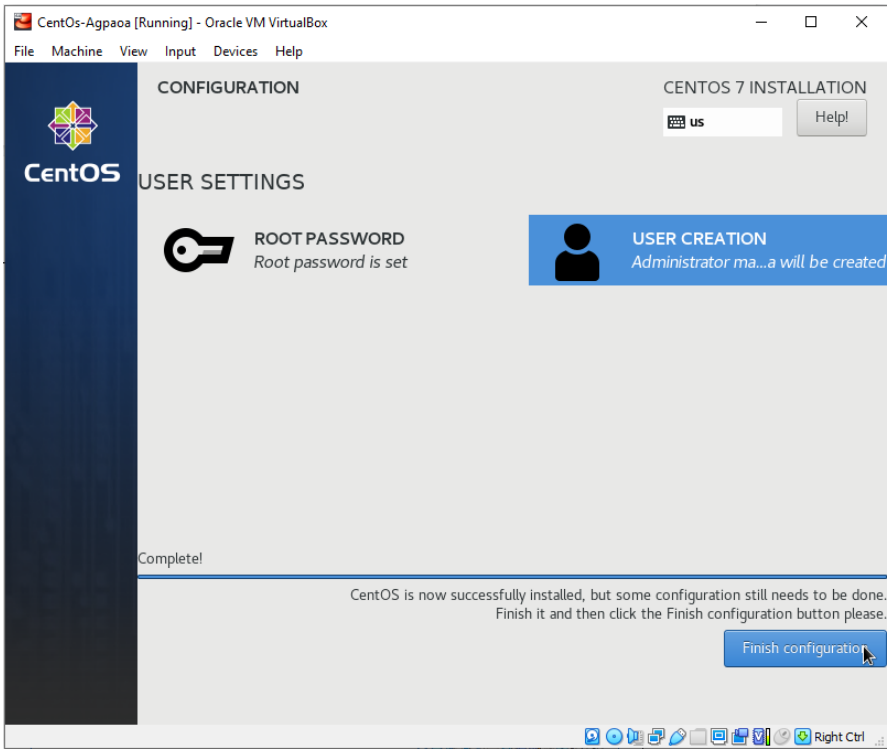

Figure 9. Finishing the configuration

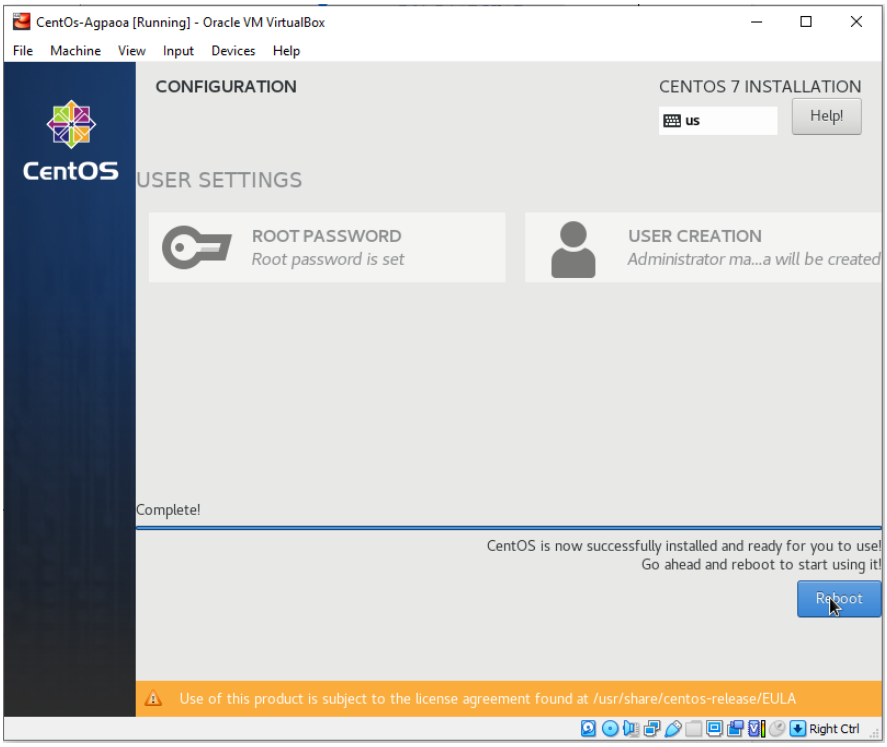

Figure 10. Choosing the Reboot option

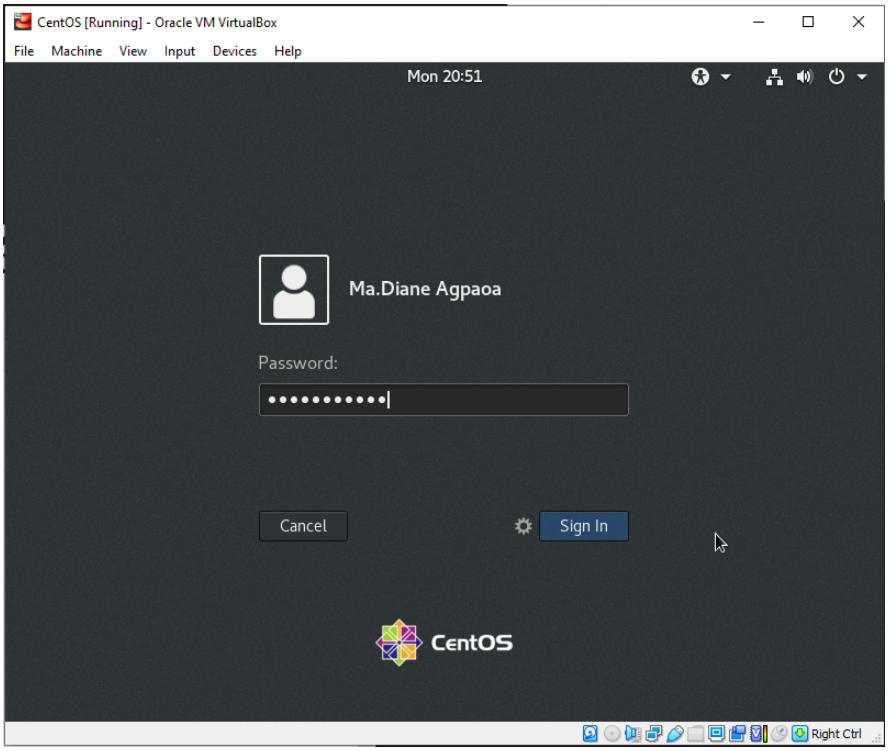

Figure 11. Signing-in

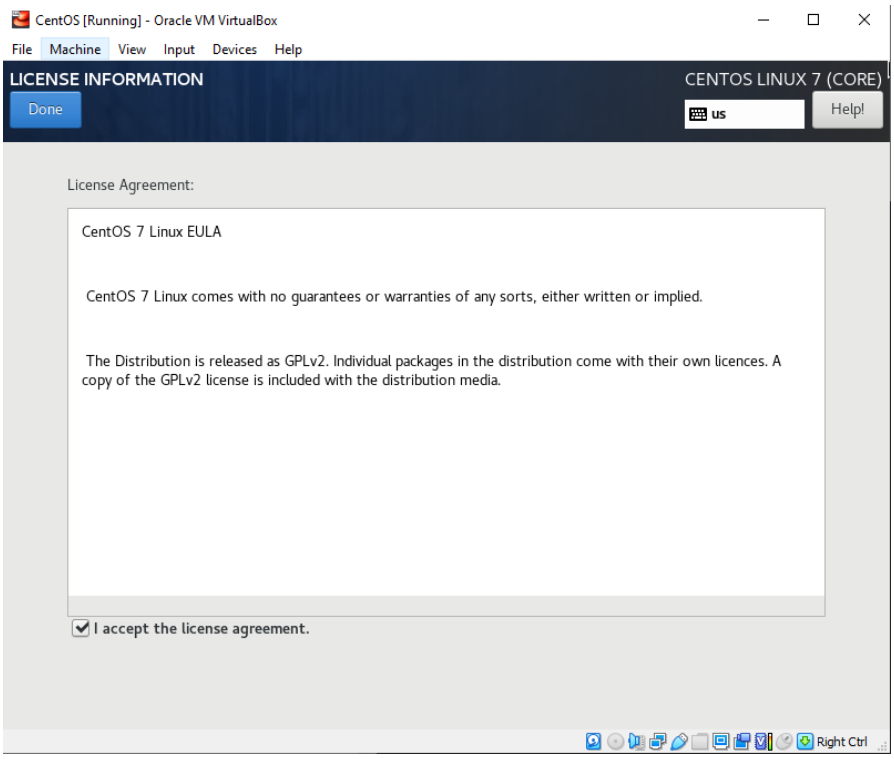

Figure 12. Accepting the license agreement

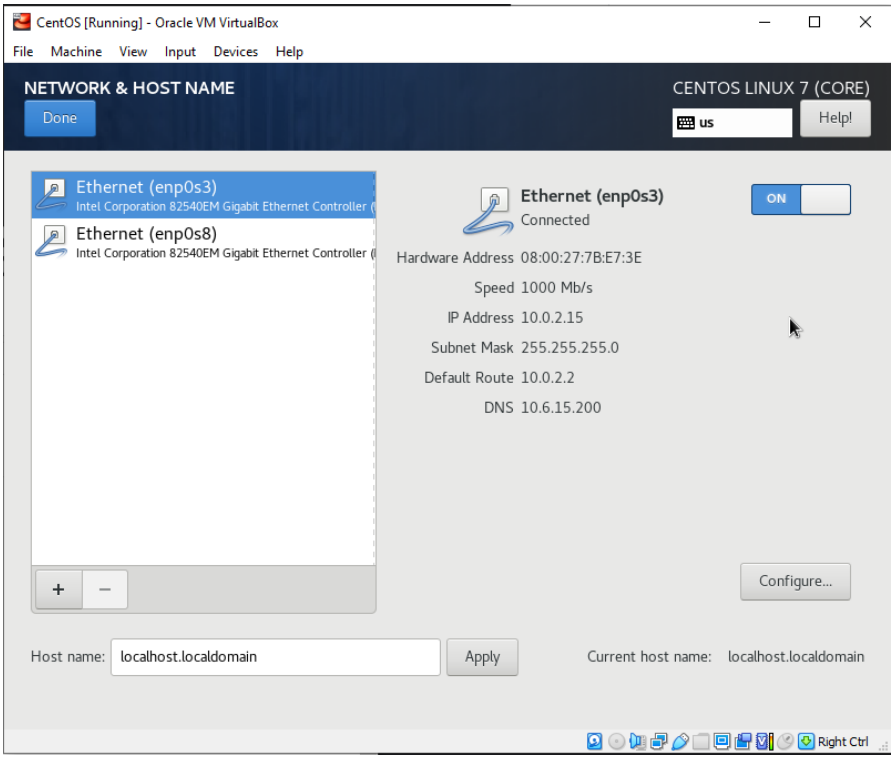

Figure 13. Activating the Ethernet(enp0s3)

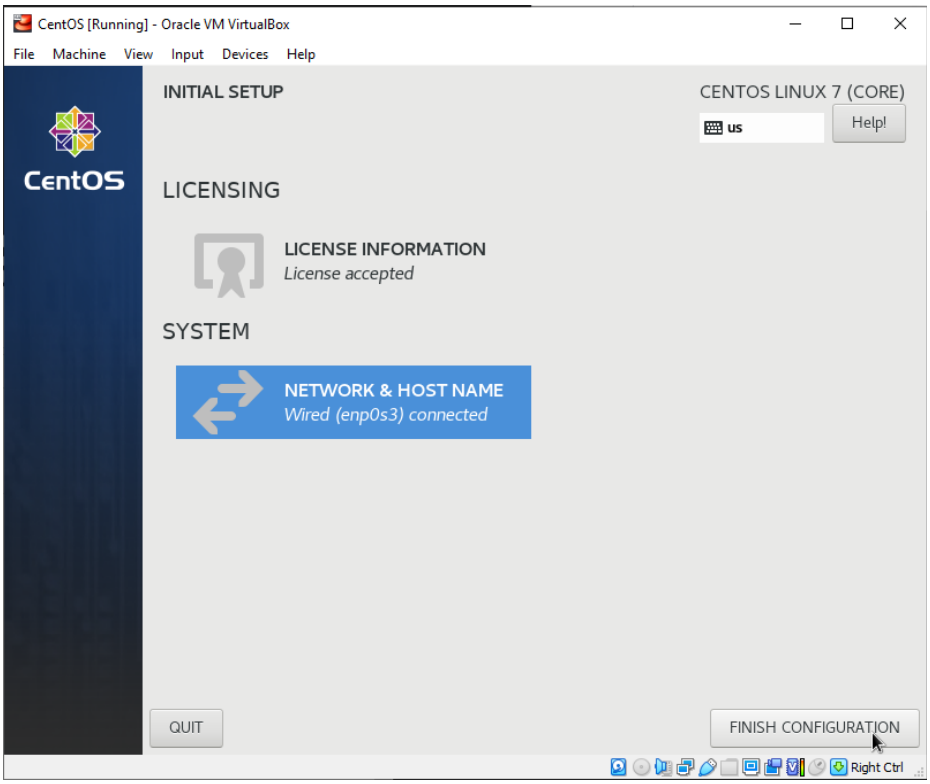

Figure 14. Finishing the configuration

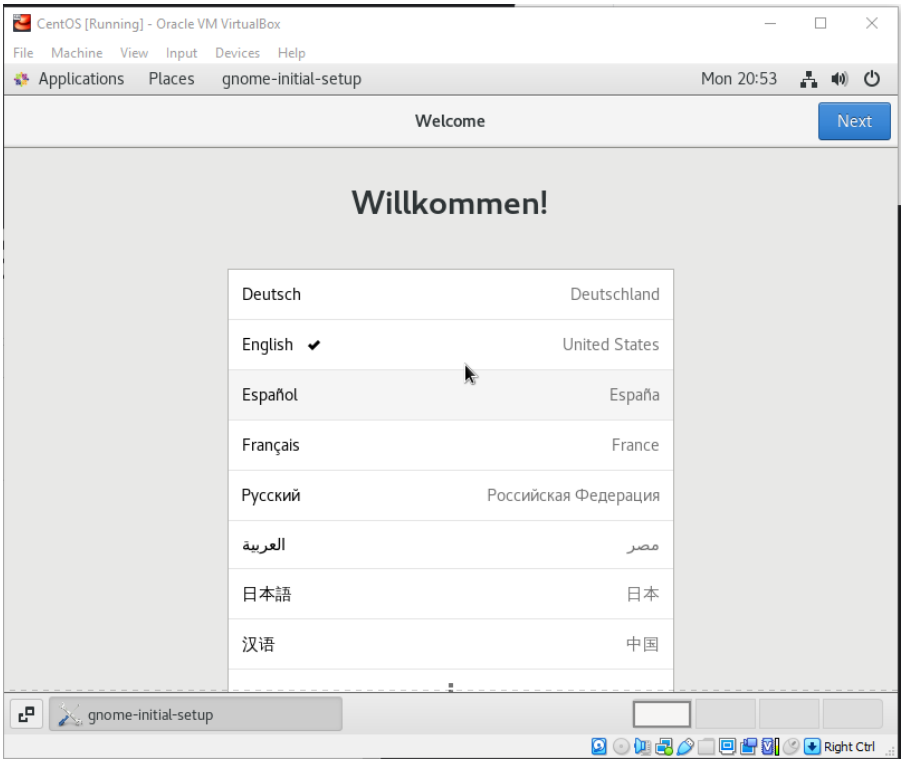

Figure 15. Choosing the language

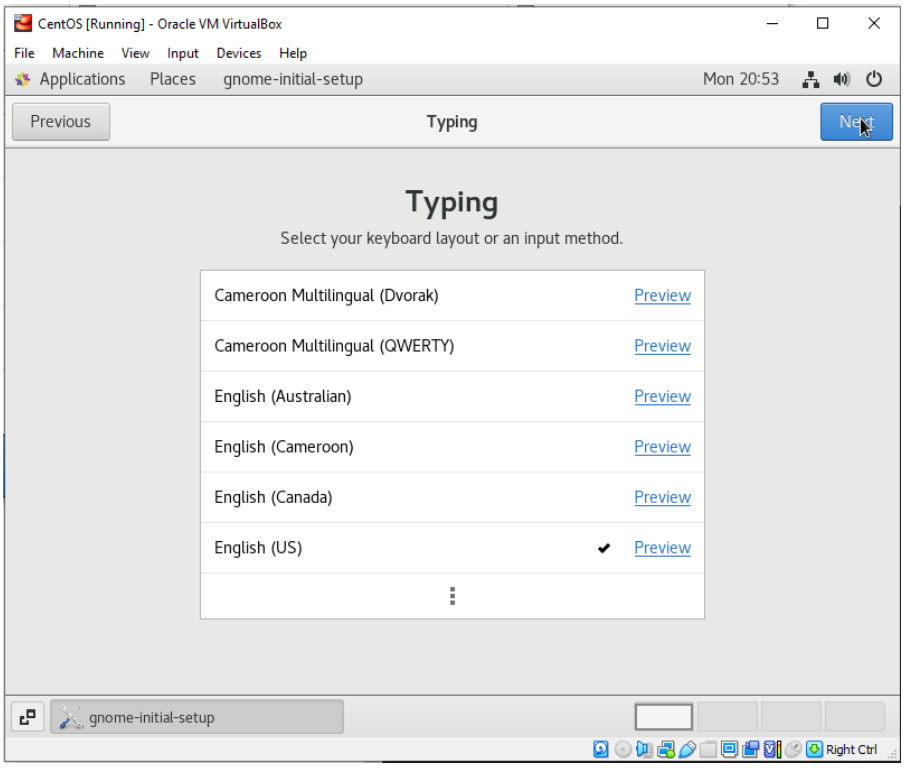

Figure 16. Choosing the keyboard language

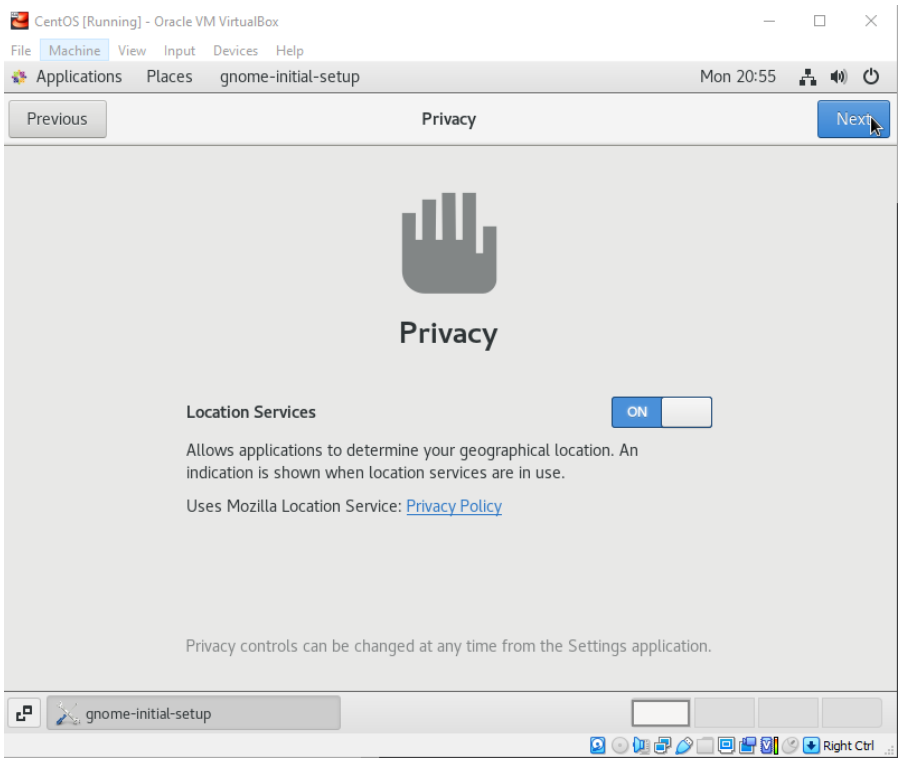

Figure 16. Turning on the Location Services

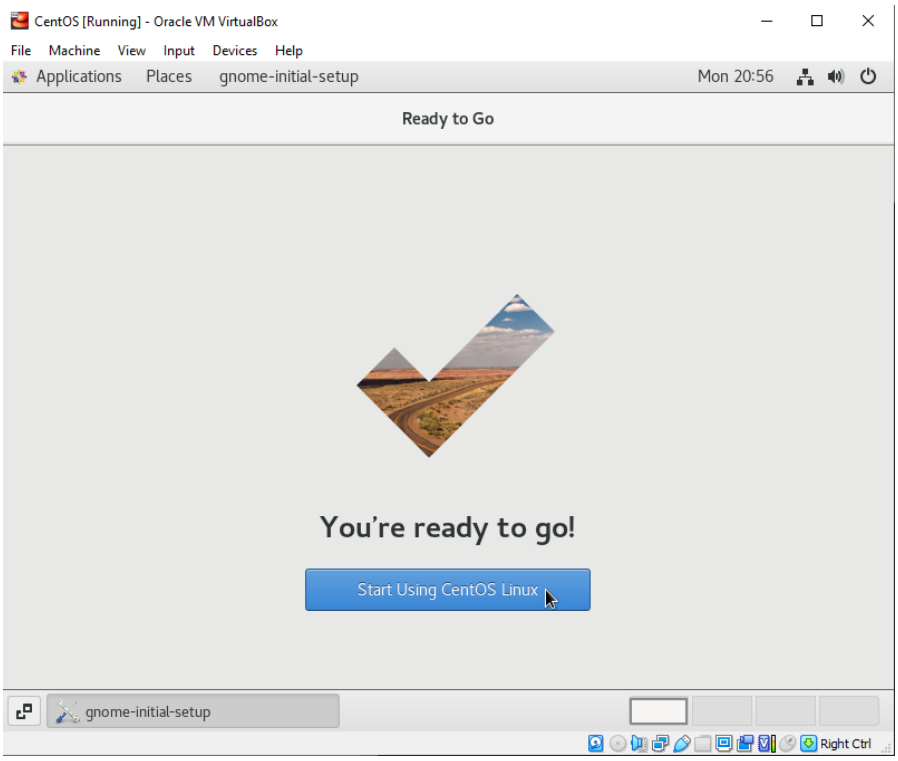

Figure 17. Starting the usage of CentOS Linux

4. Show evidence that the OS was installed already.

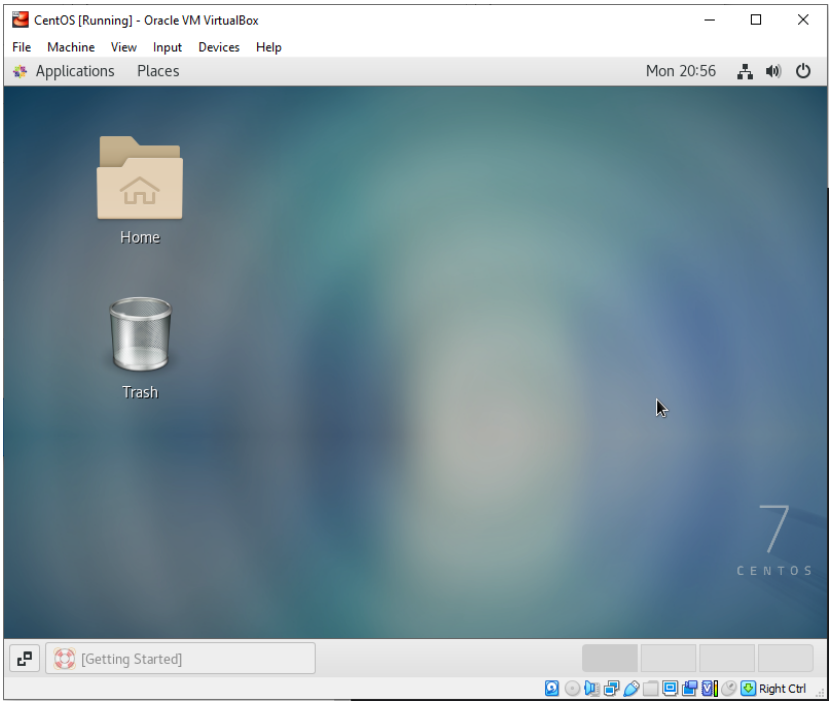

Figure 18. Evidence that the OS was installed already

Task 2: Install the SSH server package *openssh*

1. Install the ssh server package *openssh* by using the *dnf* command:
   $ dnf install openssh-server
   —Installing update, upgrade and dnf before executing the command “dnf install openssh-server”.

```
[magpaoa@localhost ~]$ sudo yum update

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

[sudo] password for magpaoa:
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: centos.exabytes.com.my
 * extras: mirror.rise.ph
 * updates: mirror.titansi.com.my
Resolving Dependencies
--> Running transaction check
---> Package NetworkManager.x86_64 1:1.18.8-1.el7 will be updated
---> Package NetworkManager.x86_64 1:1.18.8-2.el7_9 will be an update
---> Package NetworkManager-adsl.x86_64 1:1.18.8-1.el7 will be updated
---> Package NetworkManager-adsl.x86_64 1:1.18.8-2.el7_9 will be an update
---> Package NetworkManager-glib.x86_64 1:1.18.8-1.el7 will be updated
---> Package NetworkManager-glib.x86_64 1:1.18.8-2.el7_9 will be an update
---> Package NetworkManager-libnm.x86_64 1:1.18.8-1.el7 will be updated
```

```
magpaoa@localhost:~
File  Edit  View  Search  Terminal  Help
unzip                          x86_64 6.0-24.el7_9                updates 172 k
util-linux                     x86_64 2.23.2-65.el7_9.1           updates 2.0 M
vim-common                     x86_64 2:7.4.629-8.el7_9           updates 5.9 M
vim-enhanced                   x86_64 2:7.4.629-8.el7_9           updates 1.1 M
vim-filesystem                 x86_64 2:7.4.629-8.el7_9           updates  11 k
vim-minimal                    x86_64 2:7.4.629-8.el7_9           updates 443 k
virt-what                      x86_64 1.18-4.el7_9.1              updates  30 k
webkitgtk4                     x86_64 2.28.2-3.el7                updates  28 M
webkitgtk4-jsc                 x86_64 2.28.2-3.el7                updates 5.7 M
wpa_supplicant                 x86_64 1:2.6-12.el7_9.2            updates 1.2 M
xorg-x11-drv-ati               x86_64 19.0.1-3.el7_7              updates 166 k
xorg-x11-server-Xorg           x86_64 1.20.4-18.el7_9             updates 1.5 M
xorg-x11-server-common         x86_64 1.20.4-18.el7_9             updates  56 k
xz                             x86_64 5.2.2-2.el7_9               updates 229 k
xz-libs                        x86_64 5.2.2-2.el7_9               updates 103 k
zenity                         x86_64 3.28.1-2.el7_9              updates 4.0 M
zlib                           x86_64 1.2.7-20.el7_9              updates  90 k

Transaction Summary
================================================================================
Install    1 Package
Upgrade  291 Packages

Total download size: 555 M
Is this ok [y/d/N]: y
```

Figure 20. Installing update

```
[magpaoa@localhost ~]$ sudo yum upgrade
[sudo] password for magpaoa:
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: mirror.rise.ph
 * extras: mirror.rise.ph
 * updates: mirror.rise.ph
No packages marked for update
```

Figure 21. Installing upgrade

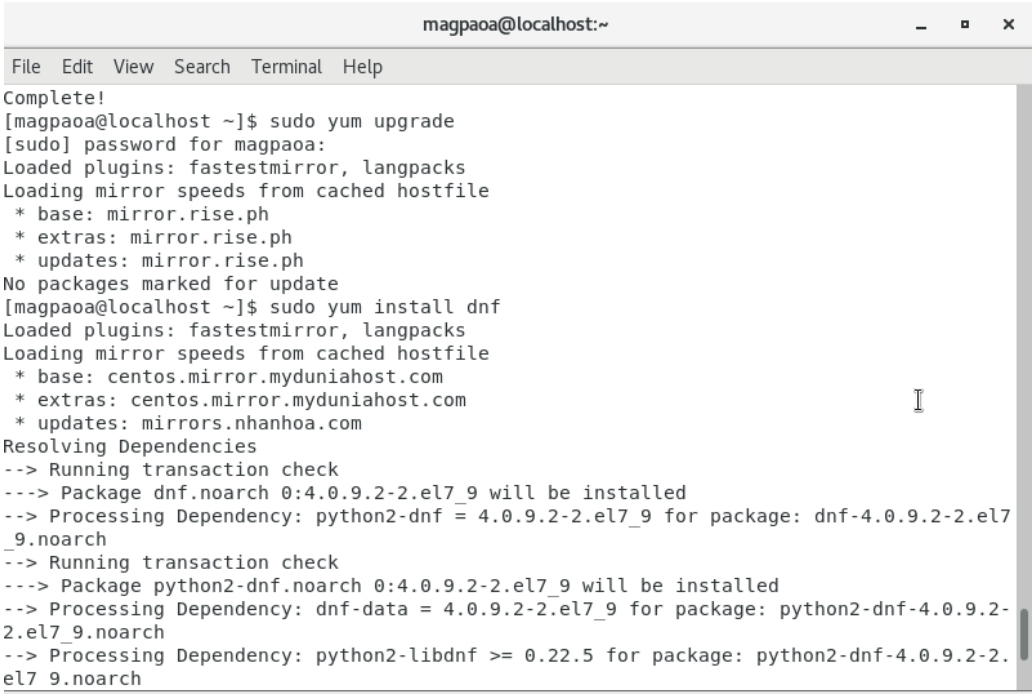

Figure 22. Installing dnf

```
[magpaoa@localhost ~]$ sudo dnf install openssh-server
[sudo] password for magpaoa:
CentOS-7 - Base                                  925 kB/s |  10 MB     00:11
CentOS-7 - Updates      100% [=======================] 868 kB/s |  11 MB     00:00 ETA
```

Figure 23. Installing the openssh-server

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

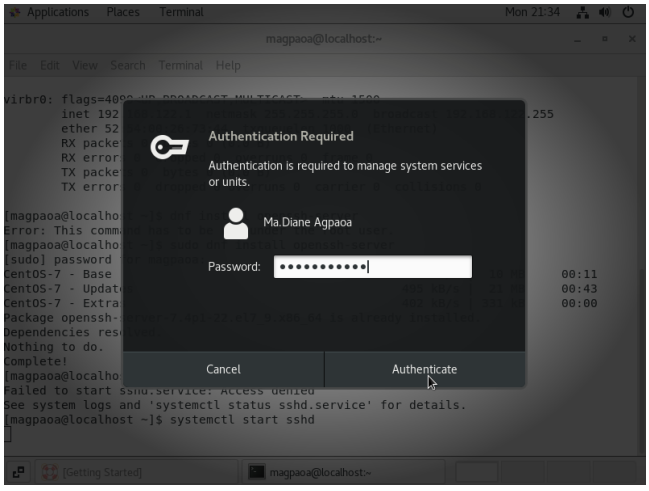

Figure 24. Authentication required for manage system services

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

Figure 25. Executing the commands "systemctl start sshd" and "systemctl enable sshd".

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

```
[magpaoa@localhost ~]$ systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; vendor preset: enable
d)
   Active: active (running) since Mon 2022-08-29 21:20:37 EDT; 19min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 1719 (sshd)
   CGroup: /system.slice/sshd.service
           └─1719 /usr/sbin/sshd -D

Aug 29 21:20:36 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Aug 29 21:20:37 localhost.localdomain sshd[1719]: Server listening on 0.0.0.0 port 22.
Aug 29 21:20:37 localhost.localdomain sshd[1719]: Server listening on :: port 22.
Aug 29 21:20:37 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[magpaoa@localhost ~]$
```

Figure 26. Executing the command "systemctl status sshd".

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

```
[magpaoa@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
[magpaoa@localhost ~]$ firewall-cmd --reload
success
```

Figure 27. Executing the commands "firewall-cmd --zone=public --permanent --add-service=ssh" and "firewall-cmd --reload".

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

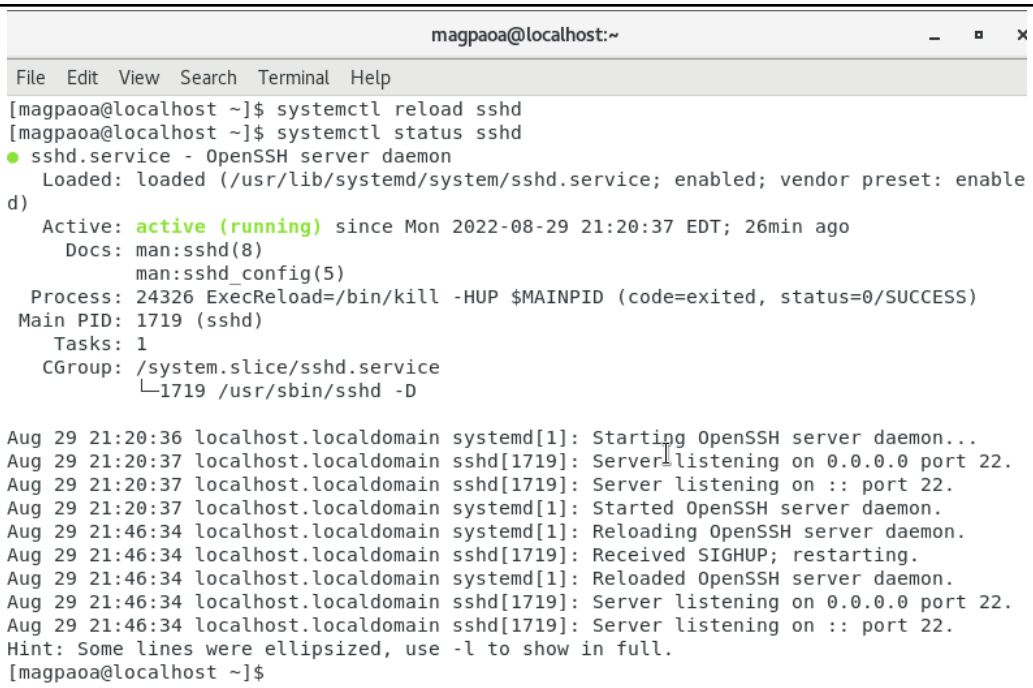

Figure 28. Executing the commands "systemctl reload sshd" "systemctl status sshd".

Task 3: Copy the Public Key to CentOS

1. Make sure that *ssh* is installed on the local machine.
2. Using the command *ssh-copy-id*, connect your local machine to CentOS.

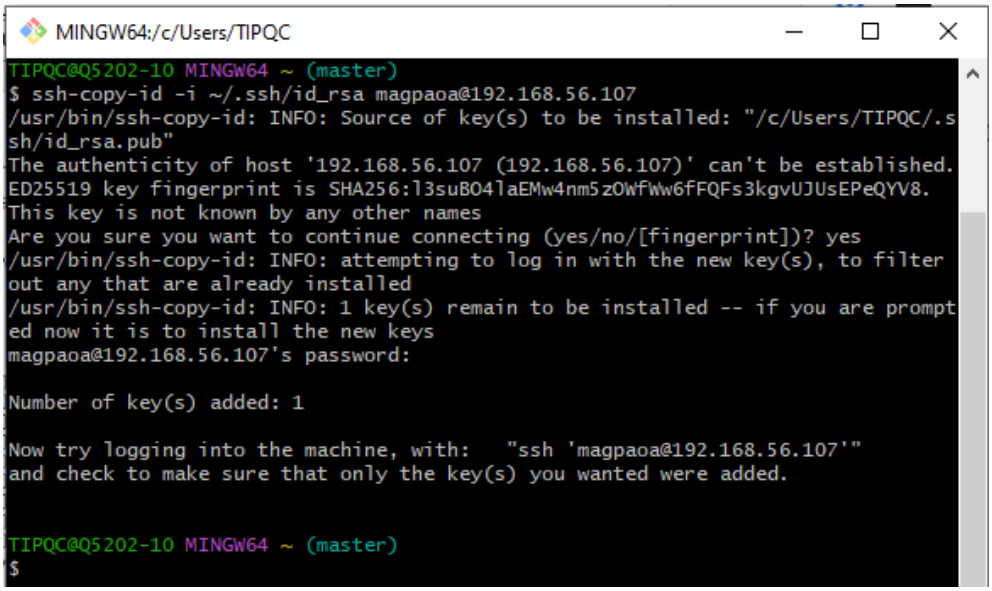

Figure 29. Connected the local machine to CentOS.

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

```
[magpaoa@localhost ~]$ ls -la .ssh
total 8
drwx------.  2 magpaoa magpaoa   29 Aug 29 22:07 .
drwx------. 16 magpaoa magpaoa 4096 Aug 29 22:07 ..
-rw-------.  1 magpaoa magpaoa  740 Aug 29 22:07 authorized_keys
[magpaoa@localhost ~]$
```

Figure 30. Verified that the CentOS has the authorize_keys.

Task 4: Verify ssh remote connection

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

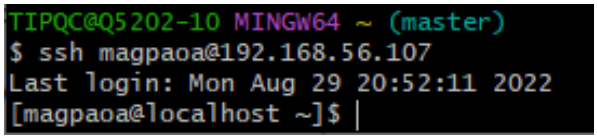

FIgure 31. Successfully connecting the local machine to CentOS using ssh.

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?

   In choosing the best distribution between Debian and Red Hat Linux, you should consider the stability, security, and the user's expertise on the distribution. In addition, we should consider the suitable distribution for the task that we will do in the distribution.

2. What are the main differences between Debian and Red Hat Linux distributions?

   The main differences between Debian and Red Hat Linux distributions are the package management, upgrading, and their distribution. Debian uses dpkg/APT as a package manager while Red Hat Linux uses YUM/DNF. In upgrading, Red Hat Linux has a disadvantage because CentOS only supports minor version upgrades while Debian has a feature that can give major upgrades. Lastly, Red Hat Linux is a downstream distribution while Debian is a free upstream distribution.