

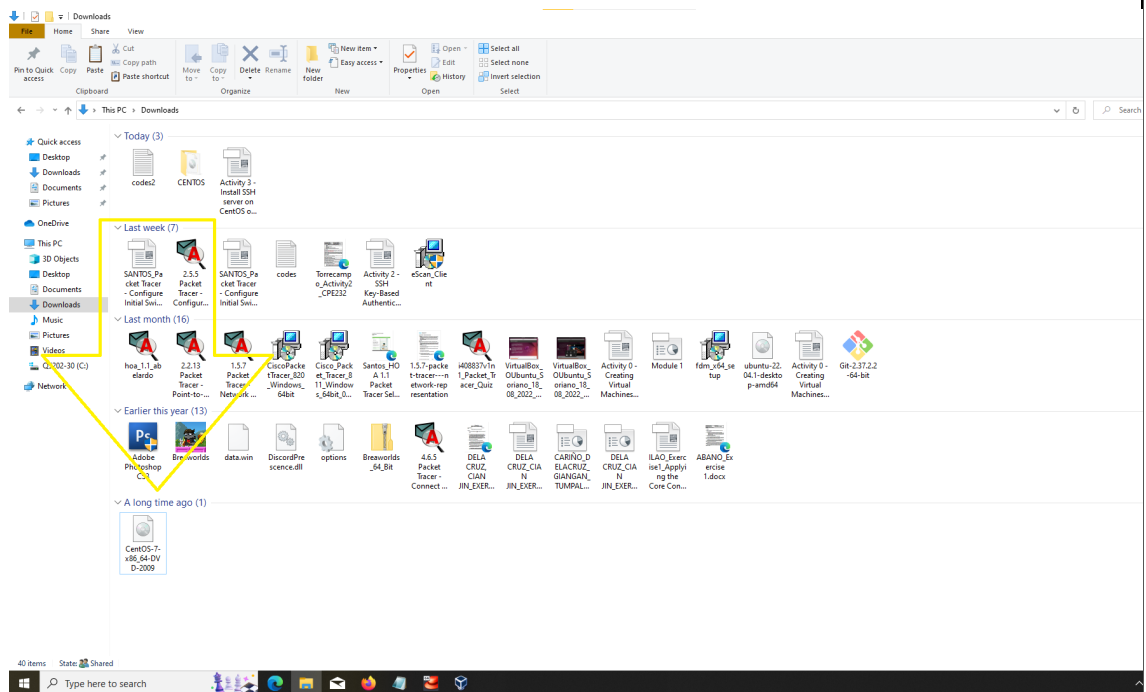
Name: Gabriel Soriano	Date Performed: September 01, 2022
Course/Section: CPE31S23	Date Submitted: September 01, 2022
Instructor: Engr. Taylar	Semester and SY: 1st Sem/2022-2023
Activity 3: Install SSH server on CentOS or RHEL 8	
1. Objectives: 1.1 Install Community Enterprise OS or Red Hat Linux OS 1.2 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/

SCREENSHOT:



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

SCREENSHOT:

Oracle VM VirtualBox Manager

FileMachineHelp

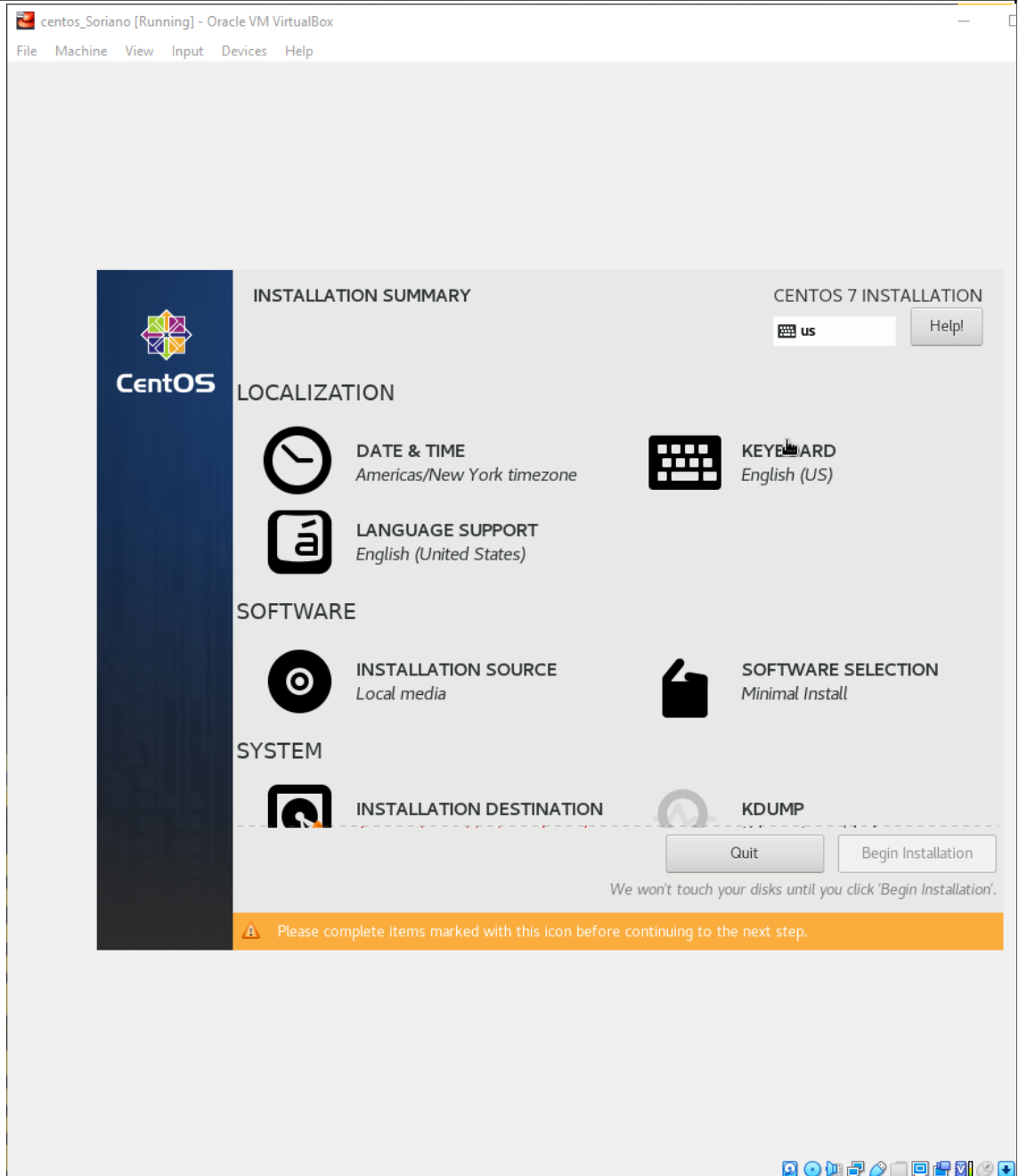
Tools

NewSettingsDiscardShow

GNS3 VM Saved	General Name: centos_Soriano Operating System: Red Hat (64-bit)	Preview
Ubuntu LTS Powered Off	System Base Memory: 2000 MB Boot Order: Floppy, Optical, Hard Disk Acceleration: VT-x/AMD-V, Nested Paging, PAE/NX, KVM Paravirtualization	
Ubuntu LTS Clone1 Powered Off	Display Video Memory: 16 MB Graphics Controller: VMSVGA Remote Desktop Server: Disabled Recording: Disabled	
Ubuntu LTS LM Powered Off	Storage Controller: IDE IDE Secondary Device 0: [Optical Drive] CentOS-7-x86_64-DVD-2009.iso (4.39 GB) Controller: SATA SATA Port 0: centos_Soriano.vdi (Normal, 20.00 GB)	
Ubuntu LTS Clone2 Powered Off	Audio Host Driver: Windows DirectSound Controller: ICH AC97	
Ubuntu_Soriano2 Powered Off	Network Adapter 1: Intel PRO/1000 MT Desktop (NAT)	
Server1.1.1 Powered Off	USB USB Controller: OHCI Device Filters: 0 (0 active)	
Server2.2.2 Powered Off	Shared folders None	
CentOS Powered Off	Description None	
centos_Soriano Running		

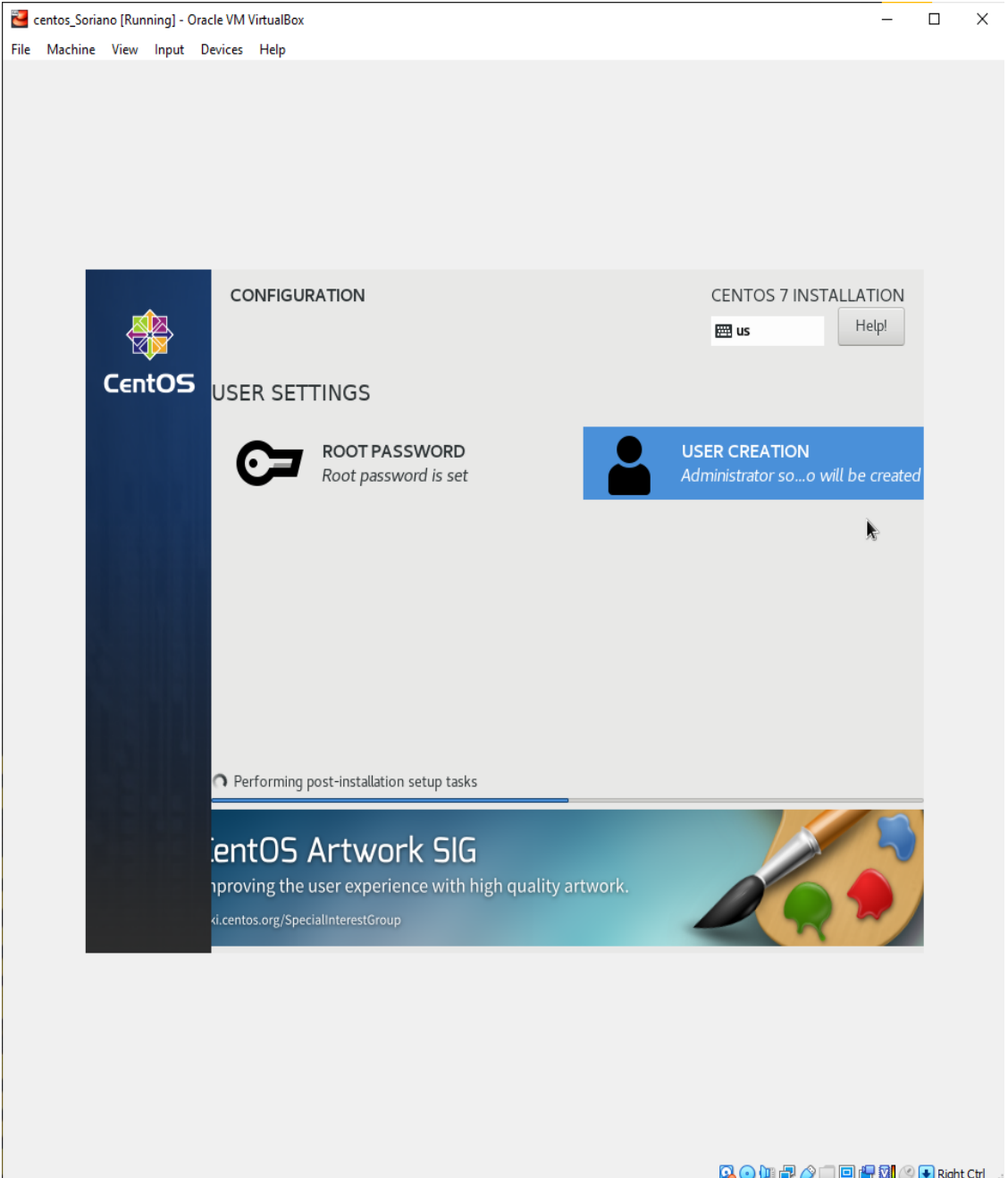
3. Install the downloaded image.

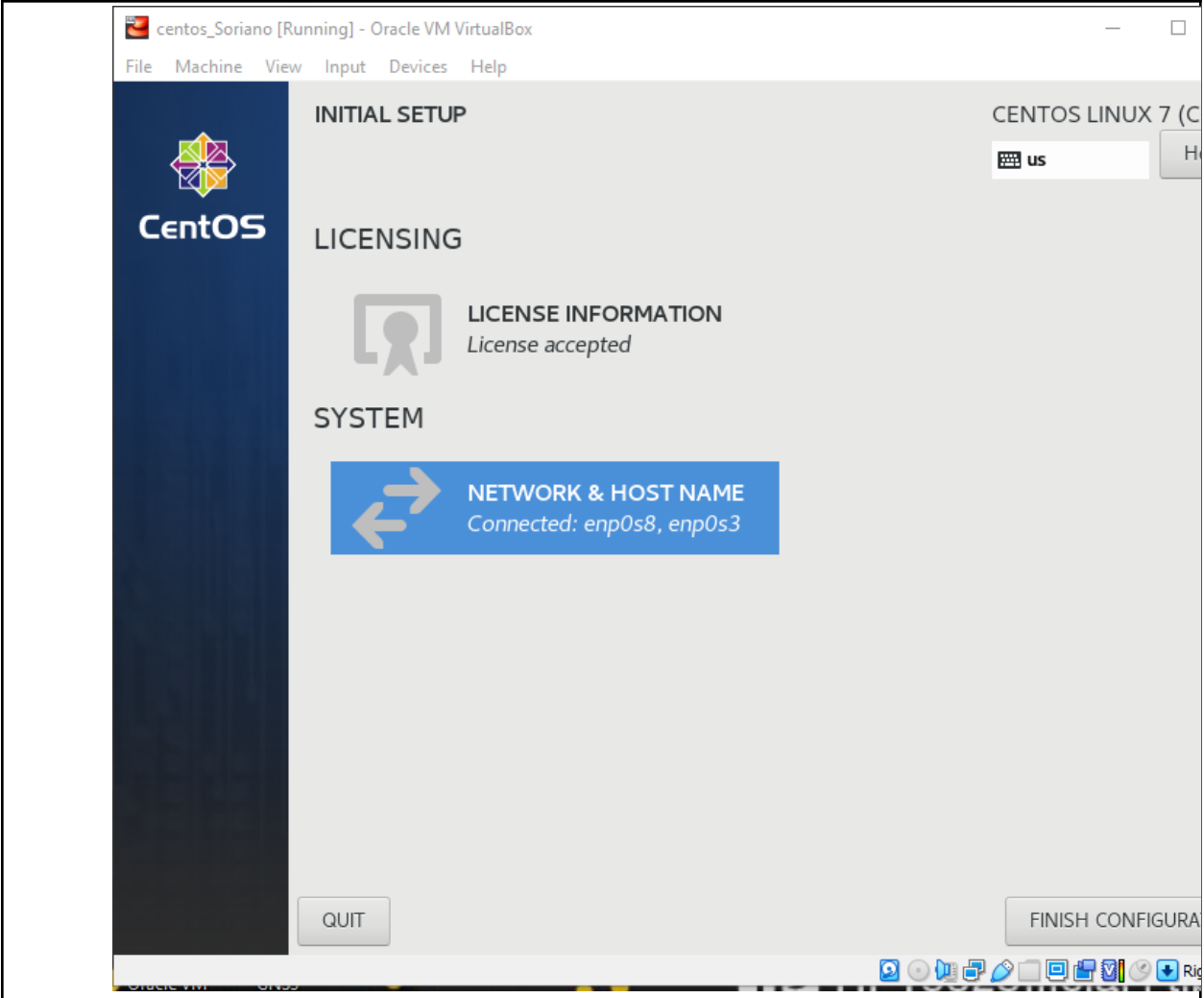
SCREENSHOT:

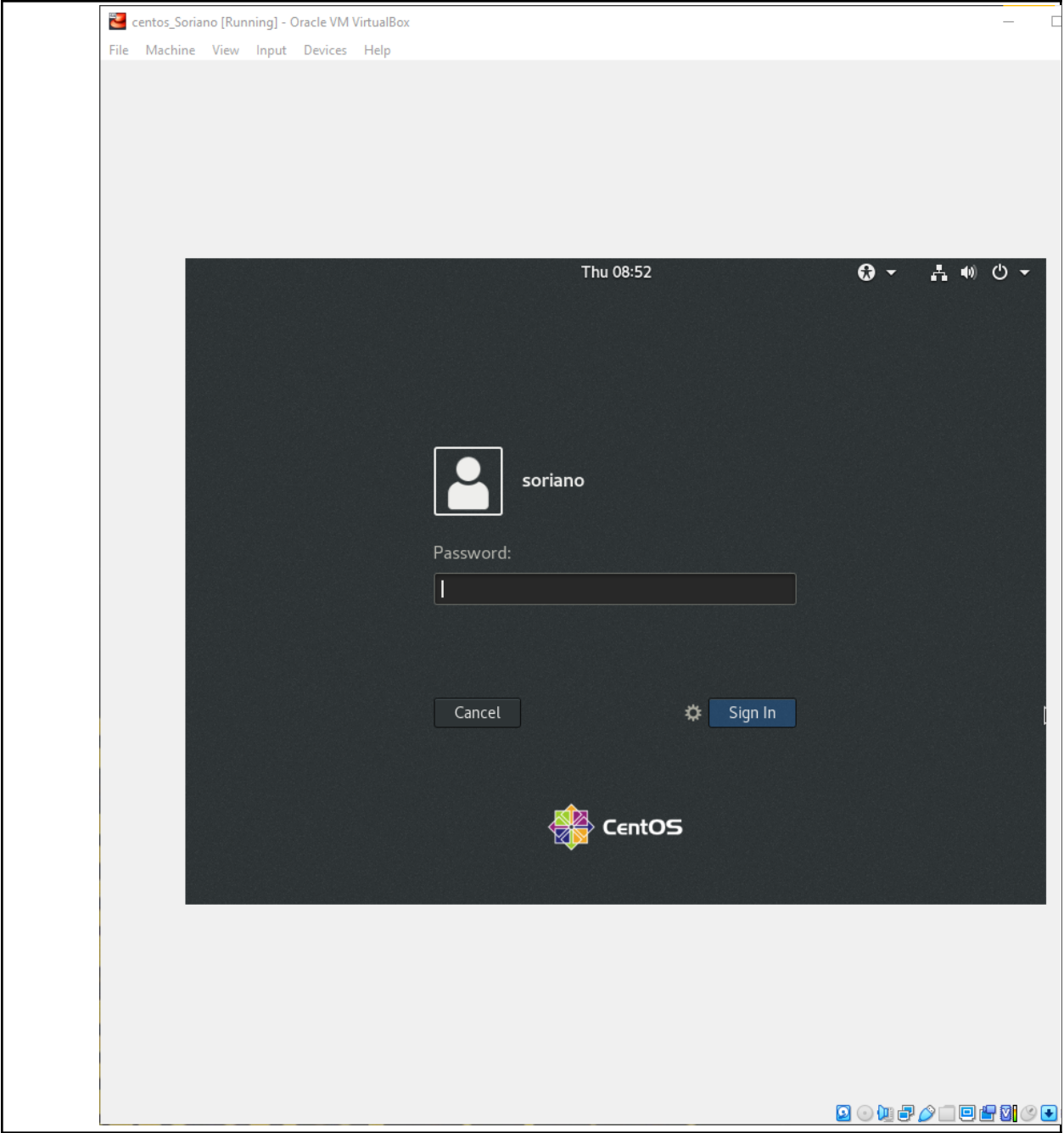


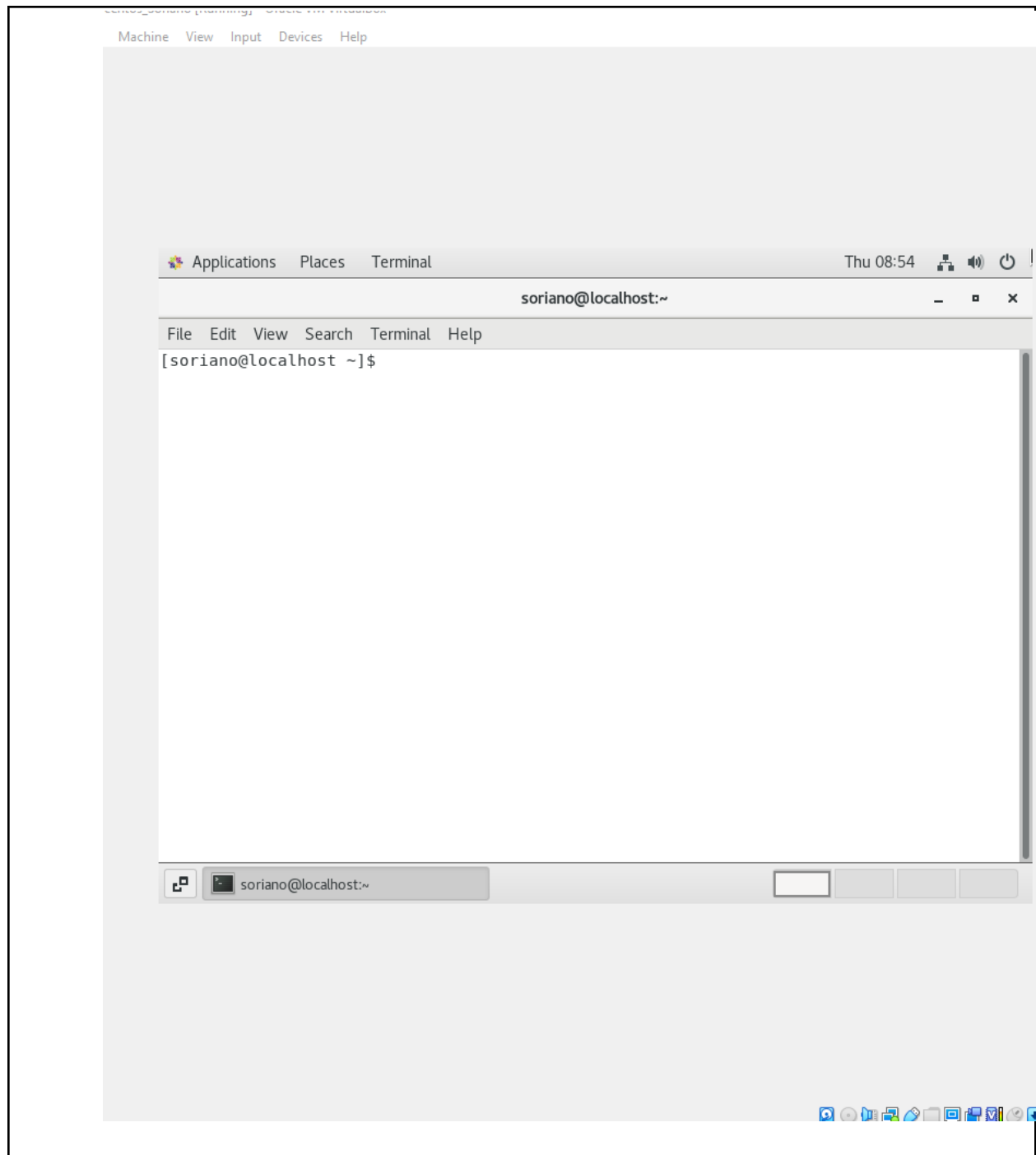
4. Show evidence that the OS was installed already.

SCREENSHOT:





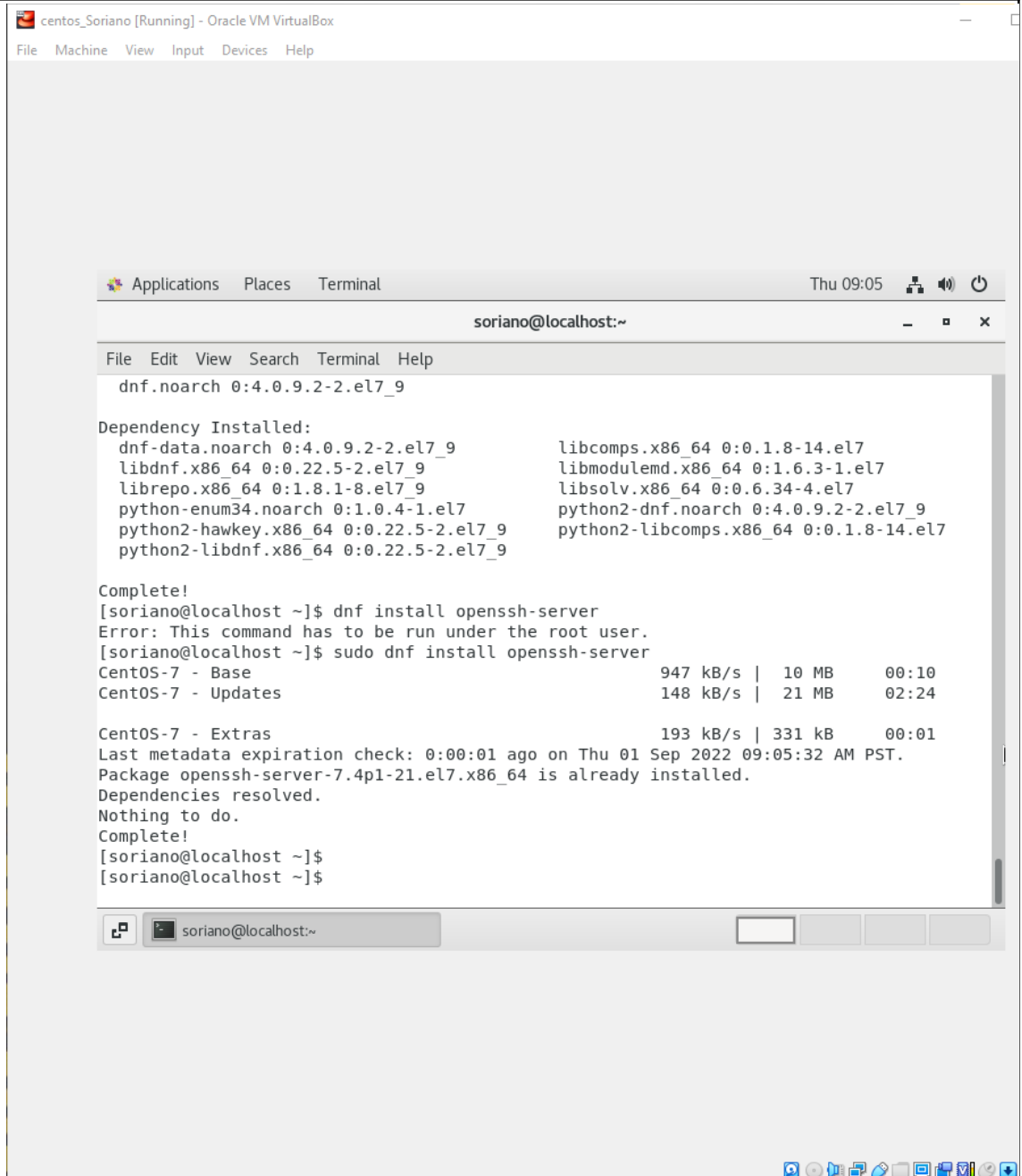




Task 2: Install the SSH server package *openssh*

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

SCREENSHOT:



```
centos_Soriano [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Applications Places Terminal Thu 09:05

soriano@localhost:~
File Edit View Search Terminal Help
dnf.noarch 0:4.0.9.2-2.el7_9

Dependency Installed:
dnf-data.noarch 0:4.0.9.2-2.el7_9      libcomps.x86_64 0:0.1.8-14.el7
libdnf.x86_64 0:0.22.5-2.el7_9      libmodulemd.x86_64 0:1.6.3-1.el7
librepo.x86_64 0:1.8.1-8.el7_9      libsolv.x86_64 0:0.6.34-4.el7
python-enum34.noarch 0:1.0.4-1.el7  python2-dnf.noarch 0:4.0.9.2-2.el7_9
python2-hawkey.x86_64 0:0.22.5-2.el7_9 python2-libcomps.x86_64 0:0.1.8-14.el7
python2-libdnf.x86_64 0:0.22.5-2.el7_9

Complete!
[soriano@localhost ~]$ dnf install openssh-server
Error: This command has to be run under the root user.
[soriano@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base                      947 kB/s | 10 MB      00:10
CentOS-7 - Updates                   148 kB/s | 21 MB      02:24

CentOS-7 - Extras                    193 kB/s | 331 kB     00:01
Last metadata expiration check: 0:00:01 ago on Thu 01 Sep 2022 09:05:32 AM PST.
Package openssh-server-7.4p1-21.el7.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[soriano@localhost ~]$
[soriano@localhost ~]$
```

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

```
$ systemctl start sshd
$ systemctl enable sshd
```

SCREENSHOT:

```
centos_Soriano [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Applications Places Terminal Thu 09:06

soriano@localhost:~
File Edit View Search Terminal Help
libdnf.x86_64 0:0.22.5-2.el7_9 libmodulemd.x86_64 0:1.6.3-1.el7
librepo.x86_64 0:1.8.1-8.el7_9 libsolv.x86_64 0:0.6.34-4.el7
python-enum34.noarch 0:1.0.4-1.el7 python2-dnf.noarch 0:4.0.9.2-2.el7_9
python2-hawkey.x86_64 0:0.22.5-2.el7_9 python2-libcomps.x86_64 0:0.1.8-14.el7
python2-libdnf.x86_64 0:0.22.5-2.el7_9

Complete!
[soriano@localhost ~]$ dnf install openssh-server
Error: This command has to be run under the root user.
[soriano@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base 947 kB/s | 10 MB 00:10
CentOS-7 - Updates 148 kB/s | 21 MB 02:24

CentOS-7 - Extras 193 kB/s | 331 kB 00:01
Last metadata expiration check: 0:00:01 ago on Thu 01 Sep 2022 09:05:32 AM PST.
Package openssh-server-7.4p1-21.el7.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[soriano@localhost ~]$
[soriano@localhost ~]$ systemctl start sshd
[soriano@localhost ~]$ system enable sshd
bash: system: command not found...
[soriano@localhost ~]$ systemctl enable sshd
[soriano@localhost ~]$
```

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

\$ systemctl status sshd

SCREENSHOT:

The screenshot shows a terminal window within an Oracle VM VirtualBox environment. The window title is 'centos_Soriano [Running] - Oracle VM VirtualBox'. The terminal output shows the following commands and their results:

```
Dependencies resolved.
Nothing to do.
Complete!
[soriano@localhost ~]$
[soriano@localhost ~]$ systemctl start sshd
[soriano@localhost ~]$ system enable sshd
bash: system: command not found...
[soriano@localhost ~]$ systemctl enable sshd
[soriano@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 Thu 2022-09-01 08:50:41 PST; 16min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
    Main PID: 1091 (sshd)
      CGroup: /system.slice/sshd.service
              └─1091 /usr/sbin/sshd -D

Sep 01 08:50:41 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 01 08:50:41 localhost.localdomain sshd[1091]: Server listening on 0.0.0.0 port 22.
Sep 01 08:50:41 localhost.localdomain sshd[1091]: Server listening on :: port 22.
Sep 01 08:50:41 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[soriano@localhost ~]$
```

4. Open the SSH port 22 to allow incoming traffic:

```
$ firewall-cmd --zone=public --permanent --add-service=ssh
```

```
$ firewall-cmd --reload
```

SCREENSHOT:

Applications Places Terminal Thu 09:08

soriano@localhost:~

File Edit View Search Terminal Help

```
[soriano@localhost ~]$
[soriano@localhost ~]$ systemctl start sshd
[soriano@localhost ~]$ system enable sshd
bash: system: command not found...
[soriano@localhost ~]$ systemctl enable sshd
[soriano@localhost ~]$ systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; vendor preset: en
d)
   Active: active (running) since Thu 2022-09-01 08:50:41 PST; 16min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
    Main PID: 1091 (sshd)
      CGroup: /system.slice/sshd.service
              └─1091 /usr/sbin/sshd -D

Sep 01 08:50:41 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 01 08:50:41 localhost.localdomain sshd[1091]: Server listening on 0.0.0.0 port
Sep 01 08:50:41 localhost.localdomain sshd[1091]: Server listening on :: port 22.
Sep 01 08:50:41 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[soriano@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
[soriano@localhost ~]$
```

soriano@localhost:~

The screenshot shows a terminal window titled 'Applications Places Terminal' with a timestamp of 'Thu 09:09'. The user 'soriano@localhost' is at the prompt. The terminal output shows the following commands and their results:

```
bash: system: command not found...
[soriano@localhost ~]$ systemctl enable sshd
[soriano@localhost ~]$ systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; vendor preset: en
   d)
   Active: active (running) since Thu 2022-09-01 08:50:41 PST; 16min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
   Main PID: 1091 (sshd)
    CGroup: /system.slice/ssh.service
            └─1091 /usr/sbin/sshd -D

Sep 01 08:50:41 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 01 08:50:41 localhost.localdomain sshd[1091]: Server listening on 0.0.0.0 port
Sep 01 08:50:41 localhost.localdomain sshd[1091]: Server listening on :: port 22.
Sep 01 08:50:41 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[soriano@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
[soriano@localhost ~]$ sudo firewall-cmd --reload
[sudo] password for soriano:
success
[soriano@localhost ~]$
```

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

SCREENSHOT:

```
Applications  Places  Terminal  Thu 09:12
soriano@localhost:~

File Edit View Search Terminal Help

[soriano@localhost ~]$ whoami
soriano
[soriano@localhost ~]$ cd /etc/ssh/sshd_config
bash: cd: /etc/ssh/sshd_config: Not a directory
[soriano@localhost ~]$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
[soriano@localhost ~]$ ls -l
total 0
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Desktop
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Documents
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Downloads
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Music
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Pictures
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Public
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Templates
drwxr-xr-x. 2 soriano soriano 6 Sep  1 08:52 Videos
[soriano@localhost ~]$ cd /etc/ssh/sshd_config
bash: /etc/ssh/sshd_config: No such file or directory
[soriano@localhost ~]$ cd /etc/ssh/sshd_config
bash: cd: /etc/ssh/sshd_config: Not a directory
[soriano@localhost ~]$ systemctl reload sshd
Failed to reload sshd.service: Access denied.
See system logs and 'systemctl status sshd.service' for details.
[soriano@localhost ~]$ sudo systemctl reload sshd
[soriano@localhost ~]$
```

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.

SCREENSHOT:

```
TIPQC@Q5202-30 MINGW64 ~
$ ssh-copy-id -i ~/.ssh/id_rsa soriano@192.168.56.109
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/c/Users/TIPQC/.ssh/id_rsa.pub"
The authenticity of host '192.168.56.109 (192.168.56.109)' can't be established.
ED25519 key fingerprint is SHA256:PFECzi+x+v02CmtMXpDTSTPG4QJZug6q8rUhvKD00Zs.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to filter out any that are already installed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be installed -- if you are prompted now it is to install the new keys
soriano@192.168.56.109's password:

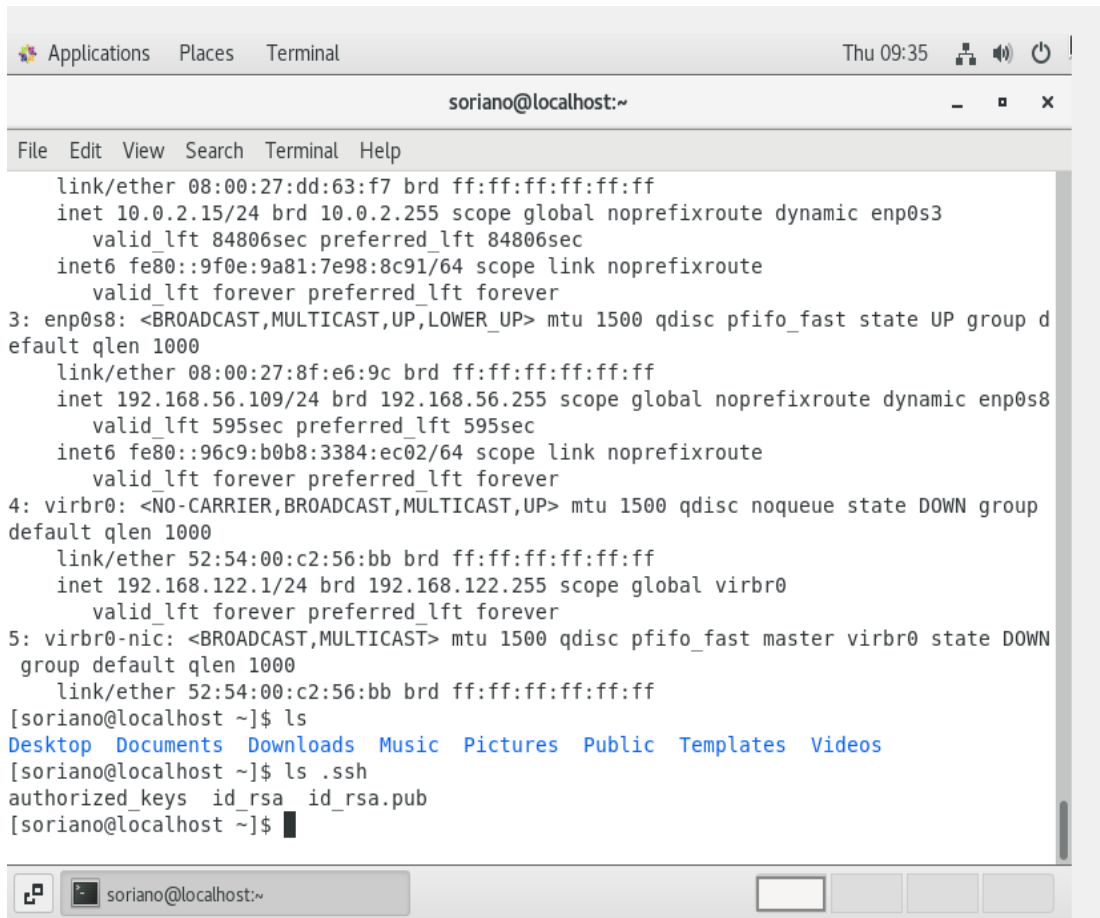
Number of key(s) added: 1

Now try logging into the machine, with: "ssh 'soriano@192.168.56.109'"
and check to make sure that only the key(s) you wanted were added.

TIPQC@Q5202-30 MINGW64 ~
$ ssh soriano@192.168.56.109
Last login: Thu Sep  1 08:52:43 2022
[soriano@localhost ~]$
```

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

SCREENSHOT:

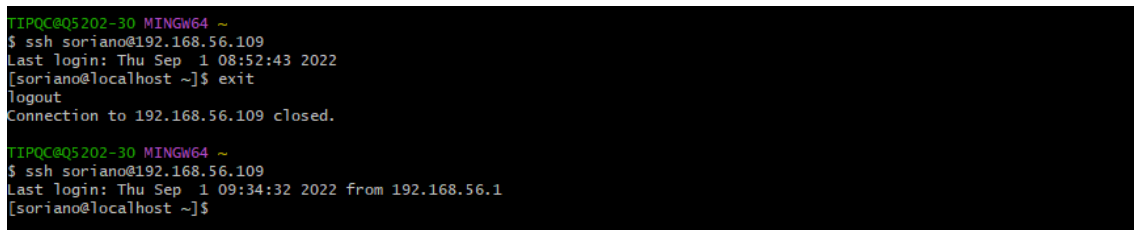


```
soriano@localhost:~  
File Edit View Search Terminal Help  
link/ether 08:00:27:dd:63:f7 brd ff:ff:ff:ff:ff:ff  
inet 10.0.2.15/24 brd 10.0.2.255 scope global noprefixroute dynamic enp0s3  
    valid_lft 84806sec preferred_lft 84806sec  
inet6 fe80::9f0e:9a81:7e98:8c91/64 scope link noprefixroute  
    valid_lft forever preferred_lft forever  
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group d  
efault qlen 1000  
    link/ether 08:00:27:8f:e6:9c brd ff:ff:ff:ff:ff:ff  
    inet 192.168.56.109/24 brd 192.168.56.255 scope global noprefixroute dynamic enp0s8  
        valid_lft 595sec preferred_lft 595sec  
    inet6 fe80::96c9:b0b8:3384:ec02/64 scope link noprefixroute  
        valid_lft forever preferred_lft forever  
4: virbr0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc noqueue state DOWN group  
default qlen 1000  
    link/ether 52:54:00:c2:56:bb brd ff:ff:ff:ff:ff:ff  
    inet 192.168.122.1/24 brd 192.168.122.255 scope global virbr0  
        valid_lft forever preferred_lft forever  
5: virbr0-nic: <BROADCAST,MULTICAST> mtu 1500 qdisc pfifo_fast master virbr0 state DOWN  
group default qlen 1000  
    link/ether 52:54:00:c2:56:bb brd ff:ff:ff:ff:ff:ff  
[soriano@localhost ~]$ ls  
Desktop Documents Downloads Music Pictures Public Templates Videos  
[soriano@localhost ~]$ ls .ssh  
authorized_keys id_rsa id_rsa.pub  
[soriano@localhost ~]$
```

Task 4: Verify ssh remote connection

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

SCREENSHOT:



```
TIPQC@Q5202-30 MINGW64 ~  
$ ssh soriano@192.168.56.109  
Last login: Thu Sep 1 08:52:43 2022  
[soriano@localhost ~]$ exit  
logout  
Connection to 192.168.56.109 closed.  
  
TIPQC@Q5202-30 MINGW64 ~  
$ ssh soriano@192.168.56.109  
Last login: Thu Sep 1 09:34:32 2022 from 192.168.56.1  
[soriano@localhost ~]$
```

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?
 - **Based on some research, I found out that Debian does have more available sources/packages that it distributes to its users, compared to RedHat distribution.**
2. What are the main differences between Debian and Red Hat Linux distributions?
 - **RedHat offers open source products for purchase and use, which can be licensed for free up to a certain limit. For further features, one can always pay and purchase licenses for additional features. The Debian Project of Debian provides free software products that allow anyone to access licensed applications without any limitation on the accessible functionality. While RedHat releases products like Linux as commercial distributions, Debian releases non-commercial products.**