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<b>Course/Section:</b> CPE31S2	<b>Date Submitted:</b> Sept. 12, 2024
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<b>Activity 3: Install SSH server on CentOS or RHEL 8</b>	
<b>1. Objectives:</b> 1.1 Install Community Enterprise OS or Red Hat Linux OS 1.2 Configure remote SSH connection from remote computer to CentOS/RHEL-8	
<b>2. Discussion:</b>  <b>CentOS vs. Debian: Overview</b>  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.  <b>CentOS vs. Debian: Architecture</b>  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.  <b>CentOS vs. Debian: Package Management</b>  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/](http://mirror.rise.ph/centos/7.9.2009/isos/x86_64/)



The [fastest internet](#) in the Philippines

WELCOME TO THE RISE MIRROR

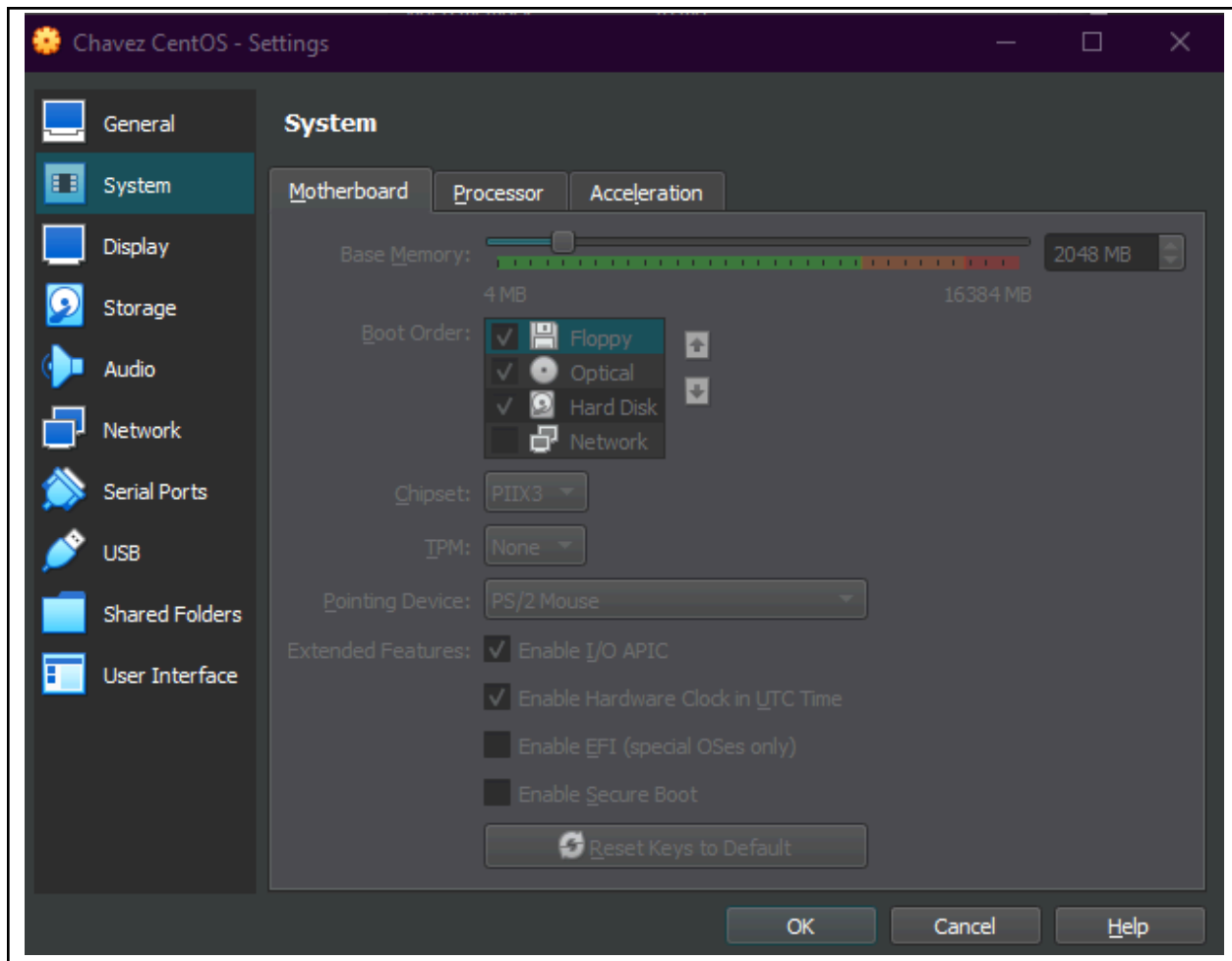
Files can be downloaded using <http://mirror.rise.ph> and <ftp://mirror.rise.ph>

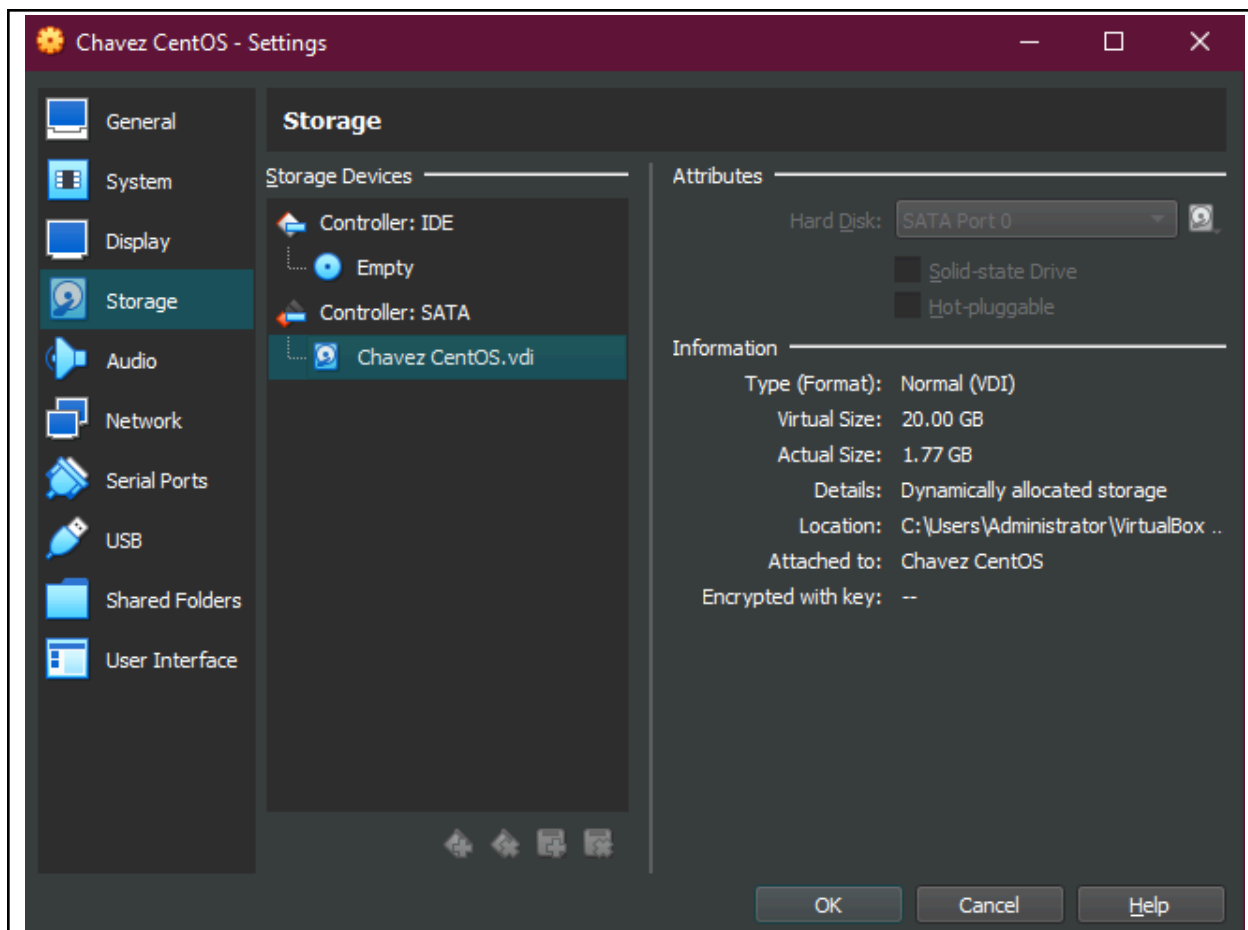
Please Note: Mirror is currently undergoing maintenance so you may find some repositories are not up to date.

Directory: /centos/7.9.2009/isos/x86\_64/

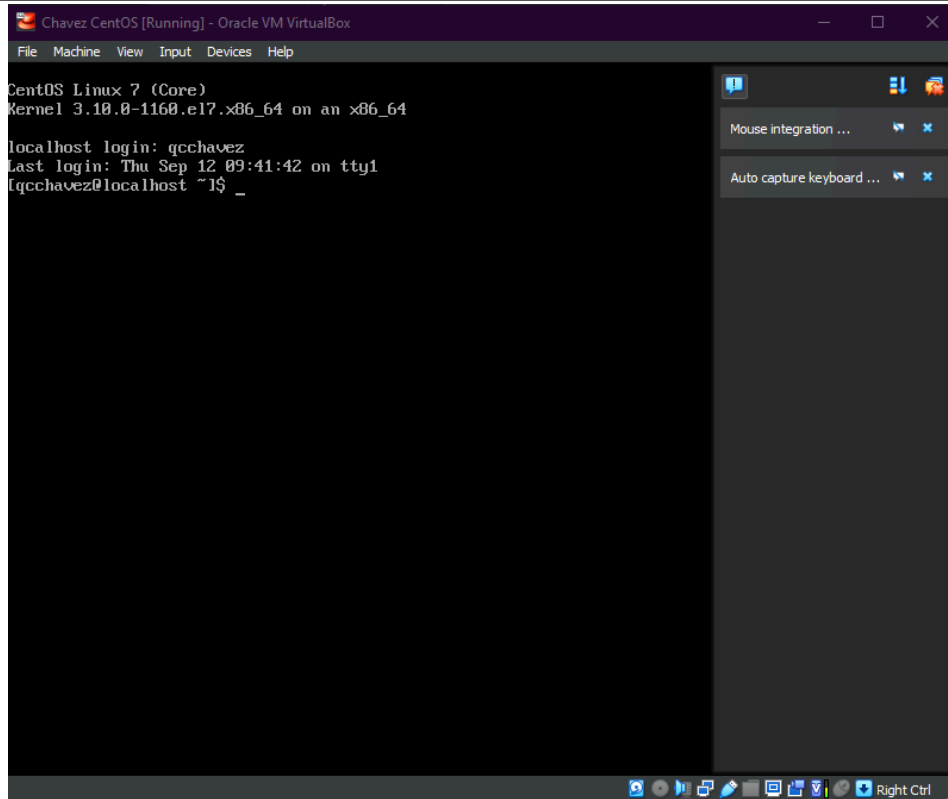
Name	Last modified	Size
Parent Directory		-
<a href="#">0_README.txt</a>	2022-08-05 02:03	2.7K
<a href="#">CentOS-7-x86_64-DVD-...&gt;</a>	2020-11-04 19:37	4.4G
<a href="#">CentOS-7-x86_64-DVD-...&gt;</a>	2020-11-06 22:44	176K
<a href="#">CentOS-7-x86_64-DVD-...&gt;</a>	2022-07-26 23:10	4.4G
<a href="#">CentOS-7-x86_64-Ever...&gt;</a>	2020-11-02 23:18	9.5G
<a href="#">CentOS-7-x86_64-Ever...&gt;</a>	2020-11-06 22:44	381K
<a href="#">CentOS-7-x86_64-Ever...&gt;</a>	2022-07-27 02:09	9.6G
<a href="#">CentOS-7-x86_64-Mini...&gt;</a>	2020-11-03 22:55	1.0G
<a href="#">CentOS-7-x86_64-Mini...&gt;</a>	2020-11-06 22:44	39K
<a href="#">CentOS-7-x86_64-Mini...&gt;</a>	2022-07-26 23:10	1.0G
<a href="#">CentOS-7-x86_64-Netl...&gt;</a>	2020-10-27 00:26	575M
<a href="#">CentOS-7-x86_64-Netl...&gt;</a>	2020-11-06 22:44	23K
<a href="#">sha256sum.txt</a>	2022-08-05 01:56	703
<a href="#">sha256sum.txt.asc</a>	2022-08-05 01:58	1.5K

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





3. Install the downloaded image.
4. Show 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*

```
python2-libcomps.x86_64 0:0.1.8-14.el7          python2-libdnf.x86_64 0:0.22.5-2.el7_9

Complete!
[root@localhost qcchavez]# exit
exit
[qcchavez@localhost ~]$ dnf install openssh-server
Error: This command has to be run under the root user.
[qcchavez@localhost ~]$ su root
Password:
[root@localhost qcchavez]# dnf install openssh-server
CentOS-7 - Base                                0.0 B/s | 0 B    00:00
CentOS-7 - Updates                             0.0 B/s | 0 B    00:00
CentOS-7 - Extras                             0.0 B/s | 0 B    00:00
Failed to synchronize cache for repo 'base', ignoring this repo.
Failed to synchronize cache for repo 'updates', ignoring this repo.
Failed to synchronize cache for repo 'extras', ignoring this repo.
Package openssh-server-7.4p1-21.el7.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
```

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

*\$ systemctl start sshd*

*\$ systemctl enable sshd*

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

*\$ systemctl status sshd*

```
complete.  
[root@localhost qcchavez]# systemctl start sshd  
[root@localhost qcchavez]# systemctl enable sshd  
[root@localhost qcchavez]# systemctl status sshd  
■ sshd.service - OpenSSH server daemon  
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; vendor preset: enabled)  
   Active: active (running) since Tue 2024-09-10 21:59:33 EDT; 24min ago  
     Docs: man:sshd(8)  
           man:sshd_config(5)  
  Main PID: 908 (sshd)  
    CGroup: /system.slice/sshd.service  
            └─908 /usr/sbin/sshd -D
```

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

*\$ firewall-cmd --zone=public --permanent --add-service=ssh*

*\$ firewall-cmd --reload*

```
908 /usr/sbin/sshd -D  
Sep 10 21:59:33 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...  
Sep 10 21:59:33 localhost.localdomain sshd[908]: Server listening on 0.0.0.0 port 22.  
Sep 10 21:59:33 localhost.localdomain sshd[908]: Server listening on :: port 22.  
Sep 10 21:59:33 localhost.localdomain systemd[1]: Started OpenSSH server daemon.  
[root@localhost qcchavez]# firewall-cmd --zone=public --permanent --add-service=ssh  
Warning: ALREADY_ENABLED: ssh  
success  
[root@localhost qcchavez]# firewall-cmd --reload  
success  
[root@localhost qcchavez]# _
```

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*

Chavez CentOS [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

GNU nano 2.3.1 File: /etc/ssh/sshd\_config

```
# $OpenBSD: sshd_config,v 1.100 2016/08/15 12:32:04 naddy Exp $
# This is the sshd server system-wide configuration file. See
# sshd_config(5) for more information.
# This sshd was compiled with PATH=/usr/local/bin:/usr/bin
# The strategy used for options in the default sshd_config shipped with
# OpenSSH is to specify options with their default value where
# possible, but leave them commented. Uncommented options override the
# default value.
# If you want to change the port on a SELinux system, you have to tell
# SELinux about this change.
# semanage port -a -t ssh_port_t -p tcp #PORTNUMBER
#
#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

HostKey /etc/ssh/ssh_host_rsa_key
#HostKey /etc/ssh/ssh_host_dsa_key
HostKey /etc/ssh/ssh_host_ecdsa_key
HostKey /etc/ssh/ssh_host_ed25519_key

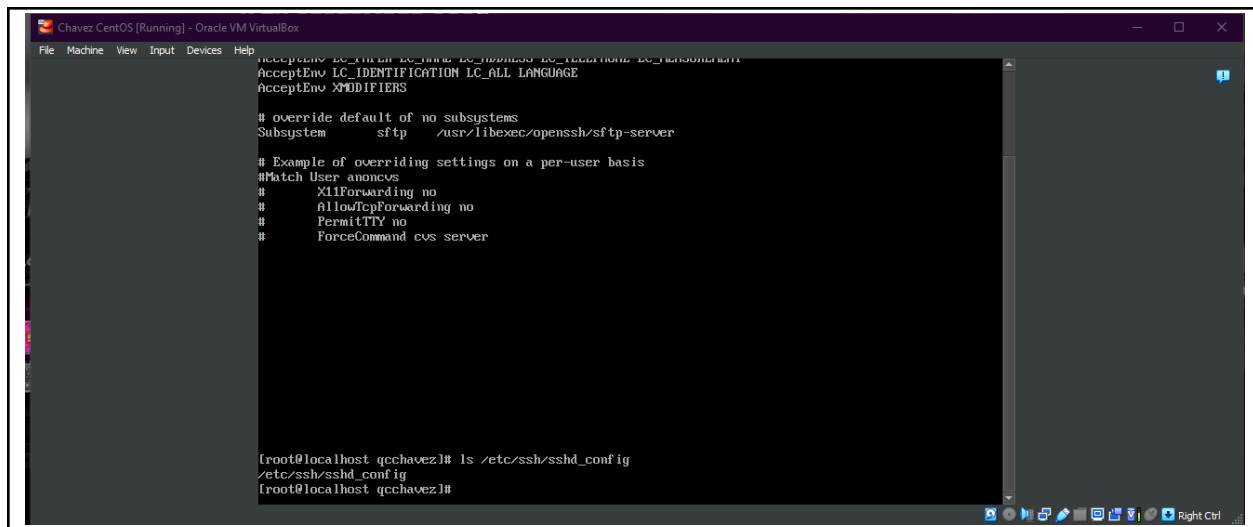
# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
SyslogFacility AUTHPRIV
```

[ Read 139 lines ]

<b>^G</b> Get Help	<b>^O</b> WriteOut	<b>^R</b> Read File	<b>^Y</b> Prev Page	<b>^X</b> Cut Text	<b>^C</b> Cur Pos
<b>^X</b> Exit	<b>^J</b> Justify	<b>^W</b> Where Is	<b>^U</b> Next Page	<b>^U</b> UnCut Text	<b>^I</b> To Spell

Right Ctrl



The image shows a terminal window titled "Chavez CentOS [Running] - Oracle VM VirtualBox". The terminal displays the contents of the `/etc/ssh/sshd_config` file. The configuration includes settings for `AcceptEnv`, a subsystem for `sftp`, and a `Match` block for the `anoncvs` user. At the bottom, the user `root` runs the command `ls /etc/ssh/sshd_config` and then the prompt returns.

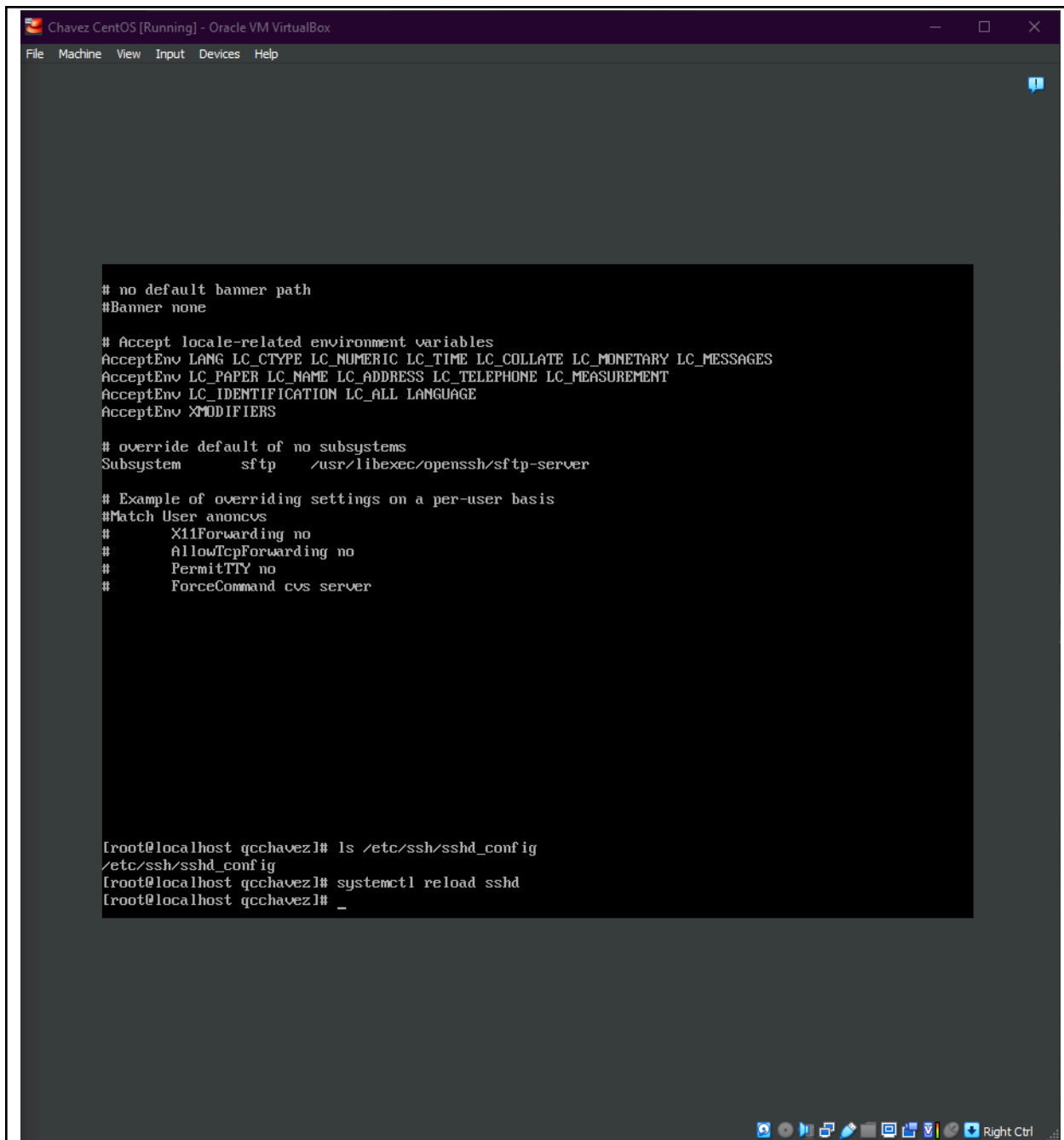
```
File Machine View Input Devices Help
AcceptEnv LC_CTYPE LC_TIME LC_ADDRESS LC_TELEPHONE LC_LANGUAG
AcceptEnv LC_IDENTIFICATION LC_ALL LANGUAGE
AcceptEnv XMODIFIERS

# override default of no subsystems
Subsystem sftp /usr/libexec/openssh/sftp-server

# Example of overriding settings on a per-user basis
#Match User anoncvs
#    X11Forwarding no
#    AllowTcpForwarding no
#    PermitTTY no
#    ForceCommand cvs server

[root@localhost qcchavez]# ls /etc/ssh/sshd_config
/etc/ssh/sshd_config
[root@localhost qcchavez]#
```





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

# no default banner path
#Banner none

# Accept locale-related environment variables
AcceptEnv LANG LC_CTYPE LC_NUMERIC LC_TIME LC_COLLATE LC_MONETARY LC_MESSAGES
AcceptEnv LC_PAPER LC_NAME LC_ADDRESS LC_TELEPHONE LC_MEASUREMENT
AcceptEnv LC_IDENTIFICATION LC_ALL LANGUAGE
AcceptEnv XMODIFIERS

# override default of no subsystems
Subsystem sftp /usr/libexec/openssh/sftp-server

# Example of overriding settings on a per-user basis
#Match User anoncvs
#       X11Forwarding no
#       AllowTcpForwarding no
#       PermitTTY no
#       ForceCommand cvs server

[root@localhost qcchavez]# ls /etc/ssh/sshd_config
/etc/ssh/sshd_config
[root@localhost qcchavez]# systemctl reload sshd
[root@localhost qcchavez]# _
```

### Task 3: Copy the Public Key to CentOS

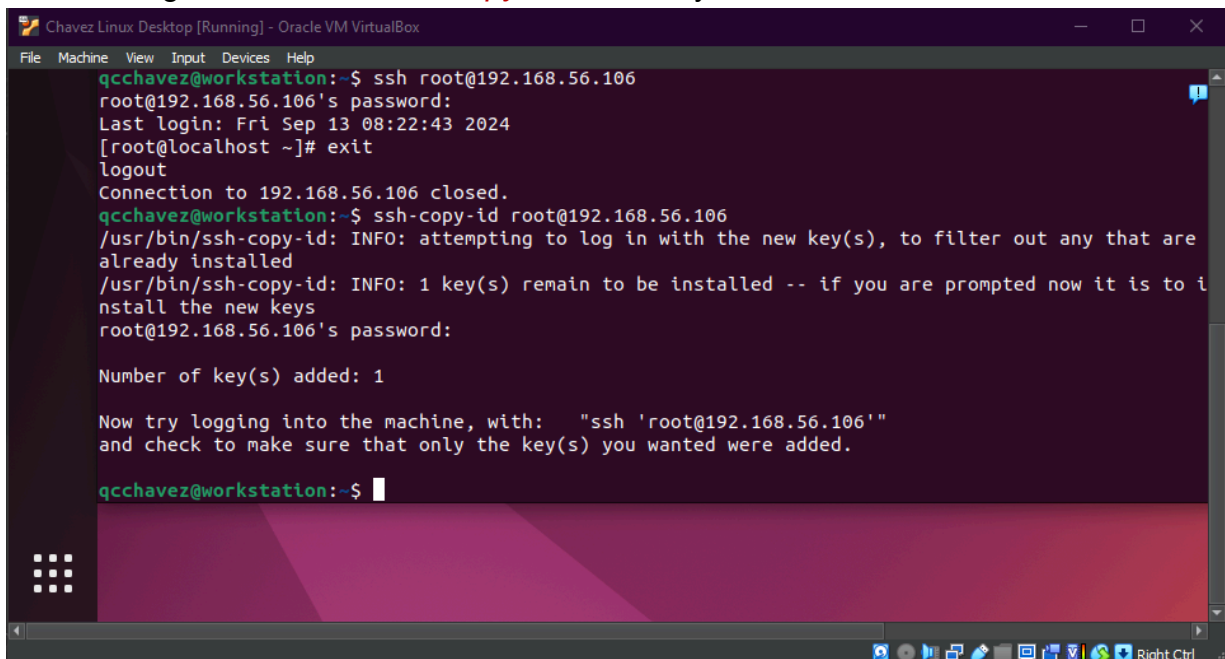
1. Make sure that **ssh** is installed on the local machine.

```

[root@localhost qcchavez]# ssh -v
usage: ssh [-1246AaCfGgKkMmNnqsTtUuXxYy] [-b bind_address] [-c cipher_spec]
          [-D [bind_address:]port] [-E log_file] [-e escape_char]
          [-F configfile] [-I pkcs11] [-i identity_file]
          [-J [user@]host[:port]] [-L address] [-l login_name] [-m mac_spec]
          [-O ctl_cmd] [-o option] [-p port] [-Q query_option] [-R address]
          [-S ctl_path] [-W host:port] [-w local_tun[:remote_tun]]
          [user@]hostname [command]
[root@localhost qcchavez]# sudo dnf install openssh-clients
CentOS-7 - Base                                0.0 B/s | 0 B   00:00
CentOS-7 - Updates                            0.0 B/s | 0 B   00:00
CentOS-7 - Extras                            0.0 B/s | 0 B   00:00
Failed to synchronize cache for repo 'base', ignoring this repo.
Failed to synchronize cache for repo 'updates', ignoring this repo.
Failed to synchronize cache for repo 'extras', ignoring this repo.
Package openssh-clients-7.4p1-23.el7_9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[root@localhost qcchavez]#

```

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



The screenshot shows a terminal window titled "Chavez Linux Desktop [Running] - Oracle VM VirtualBox". The user is at a workstation and runs the following commands:

```

qcchavez@workstation:~$ ssh root@192.168.56.106
root@192.168.56.106's password:
Last login: Fri Sep 13 08:22:43 2024
[root@localhost ~]# exit
logout
Connection to 192.168.56.106 closed.
qcchavez@workstation:~$ ssh-copy-id root@192.168.56.106
/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 i
nstall the new keys
root@192.168.56.106's password:

Number of key(s) added: 1

Now try logging into the machine, with:  "ssh 'root@192.168.56.106'"
and check to make sure that only the key(s) you wanted were added.

qcchavez@workstation:~$

```

3. On CentOS, verify that you have the **authorized\_keys**.

```
Chavez CentOS 7 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
* Documentation: https://help.ubuntu.com
* Management: https://landscape.canonical.com
* Support: https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

27 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

1 additional security update can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

Failed to connect to https://changelogs.ubuntu.com/meta-release-lts. Check your Internet connection
or proxy settings

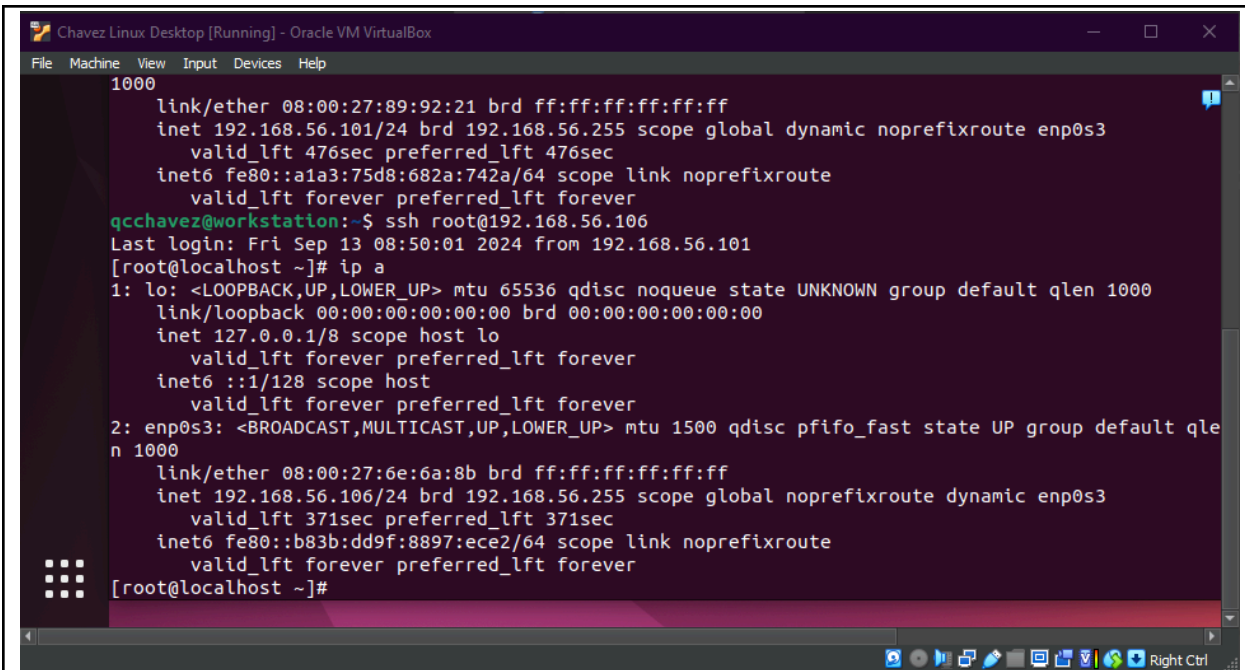
Last login: Fri Sep 13 18:19:24 2024 from 127.0.0.1
qcchavez@workstation:~$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQCAQCiiFt0I8HIYhLJ+mu15ar1BSb6R7sEg_jP7y/x3FMIS.jeIZfb1ykkdvAaDInvI0
qAmZvLGyF0G9tsD0S1KYotu0ILSEDZsQ+D/66BTamBumKhXeMcRRSBGhUbyQDu77yYU/P53BuoGRSaUGk5waEUy0j01RB7A1Ud3P
YyWJJoJngd.j1E1b9SSnSEo.jcrCWL5n1vaSLtC73XRDBC+wmBUEKioTP0IasGhk+dzfTP.j4c60BFSKK8fPbo49KpUNYvrbFkvd
3DRd8p4xAmfKUMu0P.IYvT9k1E11kgJdSQ/YfAHTKYpbkXkK2T1LJ1EV4S.Iy0qoYMD.jDDZpnFd3Q60.j63/iRIxY2FHMUMwGCBZyo
dvC6/95zWKnJbg.i6p3Ug7KB0W0ZDICT.joN3DP13xJvSD0IsfxbL8MzKbnHaoQ9KwQirG8fCZMiKJz7eKIUpG662QRD6/Qxd6EKYE
i5x4XeDs3JUEkNqzgeSZKLWtDQD.jTJHySQ1rhvGtwlwmF1a1HH/nzH.j2ZwNRGM1wiEHy4B1JdGkfDQ2+yk4GI1vMxexhaU+62D
/K3PIqpKaE69ULkv1GwUBwgHfeQMjxCCXR+rSrAlcfk8/JBNiSN+rRWjJUA1JH4hzUjSWkIxnYBm4MfD3t0g+dJur0QbhfSND09b
T/hizqwbKUCvaKjRkd3SLw== qcchavez@workstation
qcchavez@workstation:~$ _
```

#### Task 4: Verify ssh remote connection

1. Using your local machine, connect to CentOS using ssh.

```
Chavez Linux Desktop [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
1000
link/ether 08:00:27:89:92:21 brd ff:ff:ff:ff:ff:ff
inet 192.168.56.101/24 brd 192.168.56.255 scope global dynamic noprefixroute enp0s3
    valid_lft 476sec preferred_lft 476sec
inet6 fe80::a1a3:75d8:682a:742a/64 scope link noprefixroute
    valid_lft forever preferred_lft forever
qcchavez@workstation:~$ ssh root@192.168.56.106
Last login: Fri Sep 13 08:50:01 2024 from 192.168.56.101
```

2. Show evidence that you are connected.



```
Chavez Linux Desktop [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

1000
link/ether 08:00:27:89:92:21 brd ff:ff:ff:ff:ff:ff
inet 192.168.56.101/24 brd 192.168.56.255 scope global dynamic noprefixroute enp0s3
    valid_lft 476sec preferred_lft 476sec
inet6 fe80::a1a3:75d8:682a:742a/64 scope link noprefixroute
    valid_lft forever preferred_lft forever
qcchavez@workstation:~$ ssh root@192.168.56.106
Last login: Fri Sep 13 08:50:01 2024 from 192.168.56.101
[root@localhost ~]# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:6e:6a:8b brd ff:ff:ff:ff:ff:ff
    inet 192.168.56.106/24 brd 192.168.56.255 scope global noprefixroute dynamic enp0s3
        valid_lft 371sec preferred_lft 371sec
    inet6 fe80::b83b:dd9f:8897:ece2/64 scope link noprefixroute
        valid_lft forever preferred_lft forever
[root@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?
  - For me, it actually depends on what situation we will apply in order for us if which of the two that we will choose. Debian Linux is usually used for personal usage, while Red Hat is commonly used for organizations or enterprises.
2. What are the main difference between Debian and Red Hat Linux distributions?
  - Debian is community-driven, has a large and active community, while Red Hat is commonly used for commercials, also has a strong community support that is focused for enterprise users.