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Course/Section: CPE 212-CPE31S2	**Date Submitted:9/13/2024**
Instructor: Engr. Robin Valenzuela	**Semester and SY:**

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.

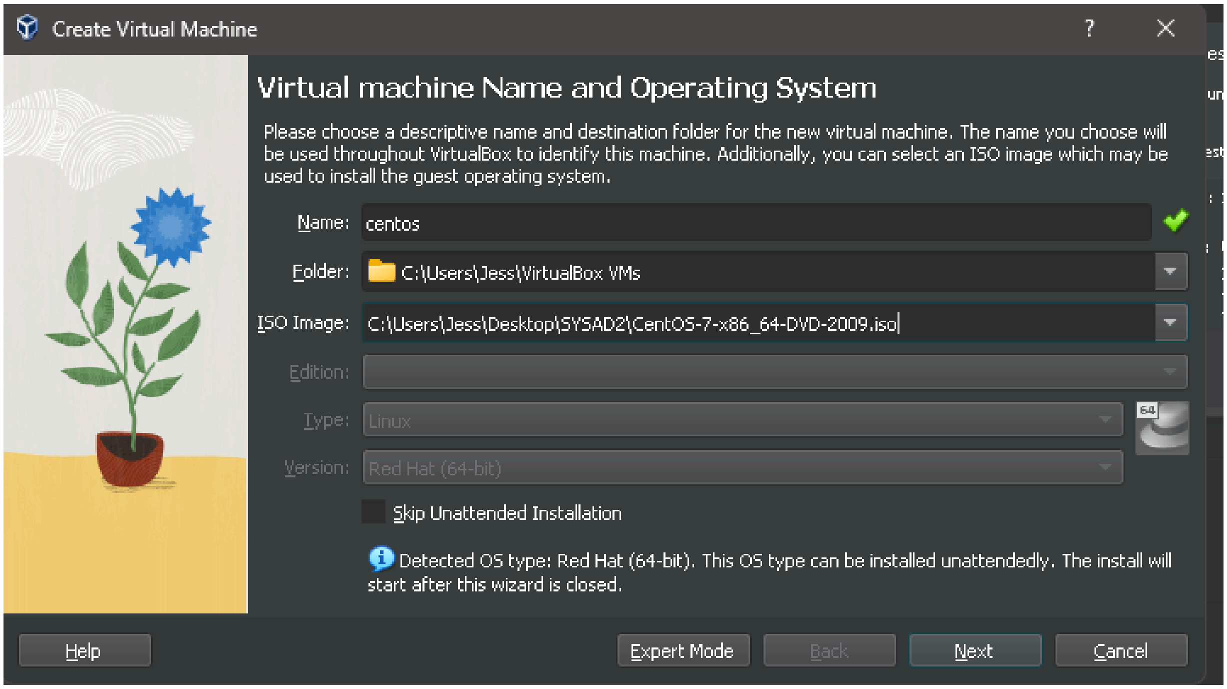
CentOS uses the RPM package format and YUM/DNF as the package manager.

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.
3. Install the downloaded image.
4. Show evidence that the OS was installed already.



Create Virtual Machine

Virtual machine Name and Operating System

Please choose a descriptive name and destination folder for the new virtual machine. The name you choose will be used throughout VirtualBox to identify this machine. Additionally, you can select an ISO image which may be used to install the guest operating system.

Name: centos

Folder: C:\Users\Jess\VirtualBox VMs

ISO Image: C:\Users\Jess\Desktop\SYSAD2\CentOS-7-x86_64-DVD-2009.iso

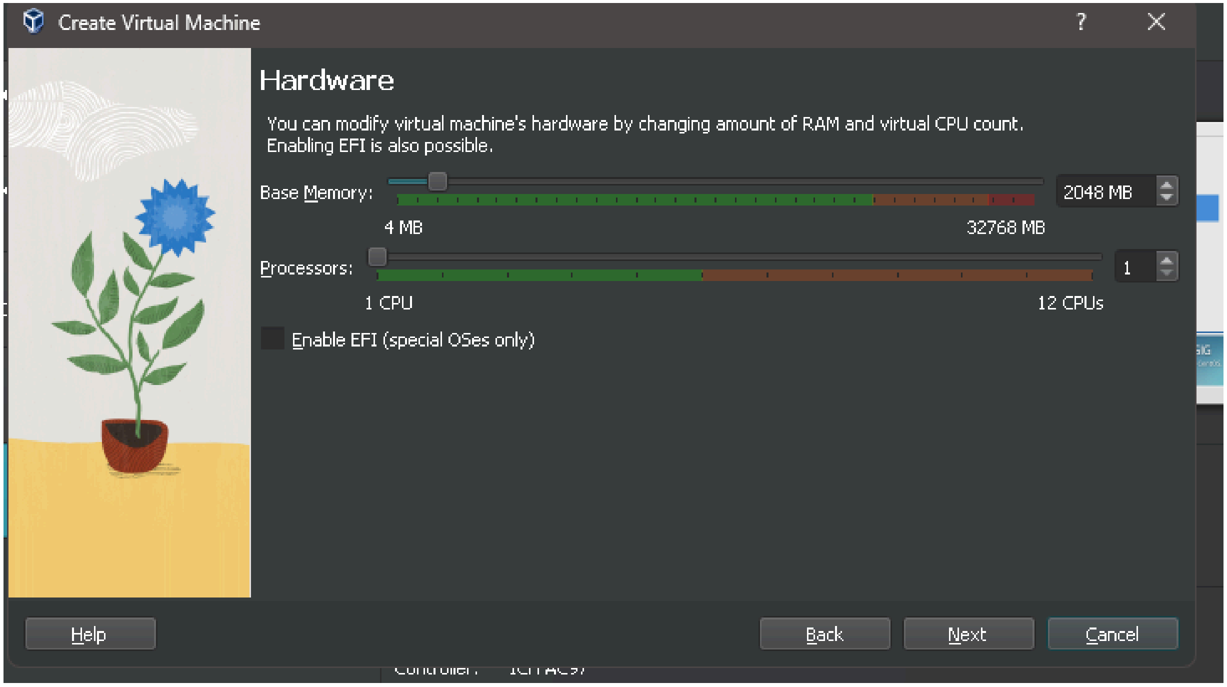
Edition:

Type: Linux

Version: Red Hat (64-bit)

□ Skip Unattended Installation

Detected OS type: Red Hat (64-bit). This OS type can be installed unattendedly. The install will start after this wizard is closed.



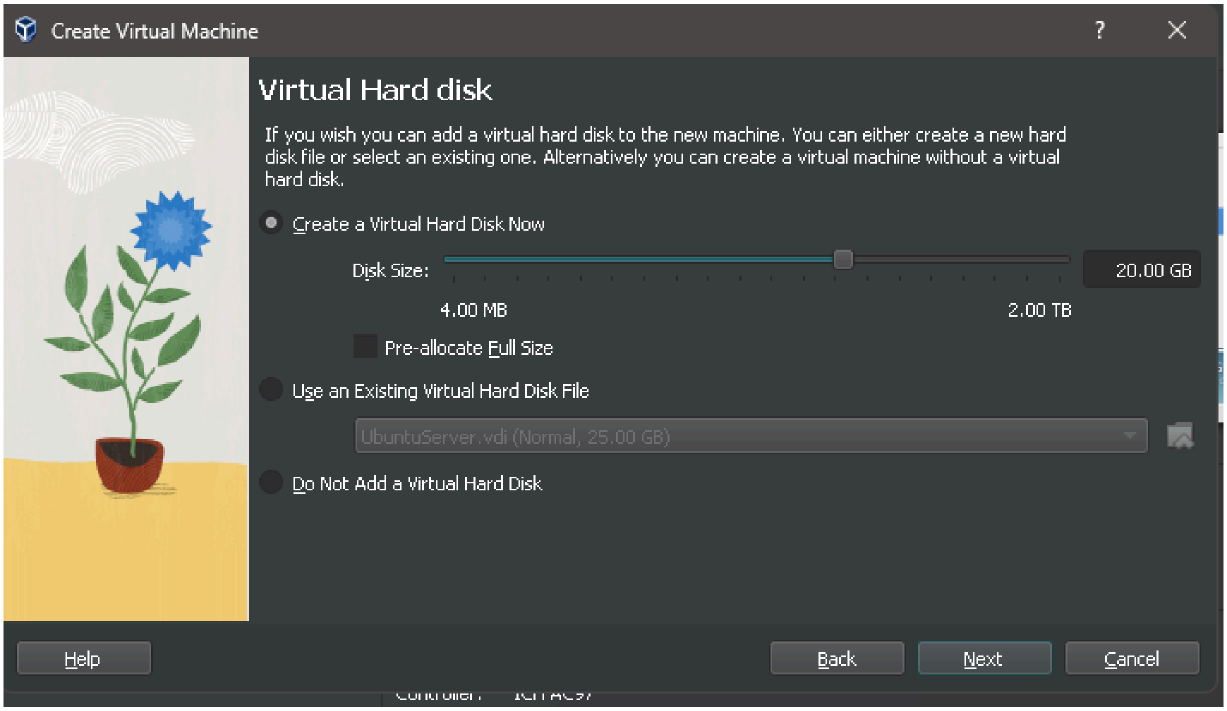
Hardware

You can modify virtual machine's hardware by changing amount of RAM and virtual CPU count. Enabling EFI is also possible.

Base Memory: 2048 MB (4 MB – 32768 MB)

Processors: 1 (1 CPU – 12 CPUs)

□ Enable EFI (special OSes only)



Virtual Hard disk

If you wish you can add a virtual hard disk to the new machine. You can either create a new hard disk file or select an existing one. Alternatively you can create a virtual machine without a virtual hard disk.

● Create a Virtual Hard Disk Now

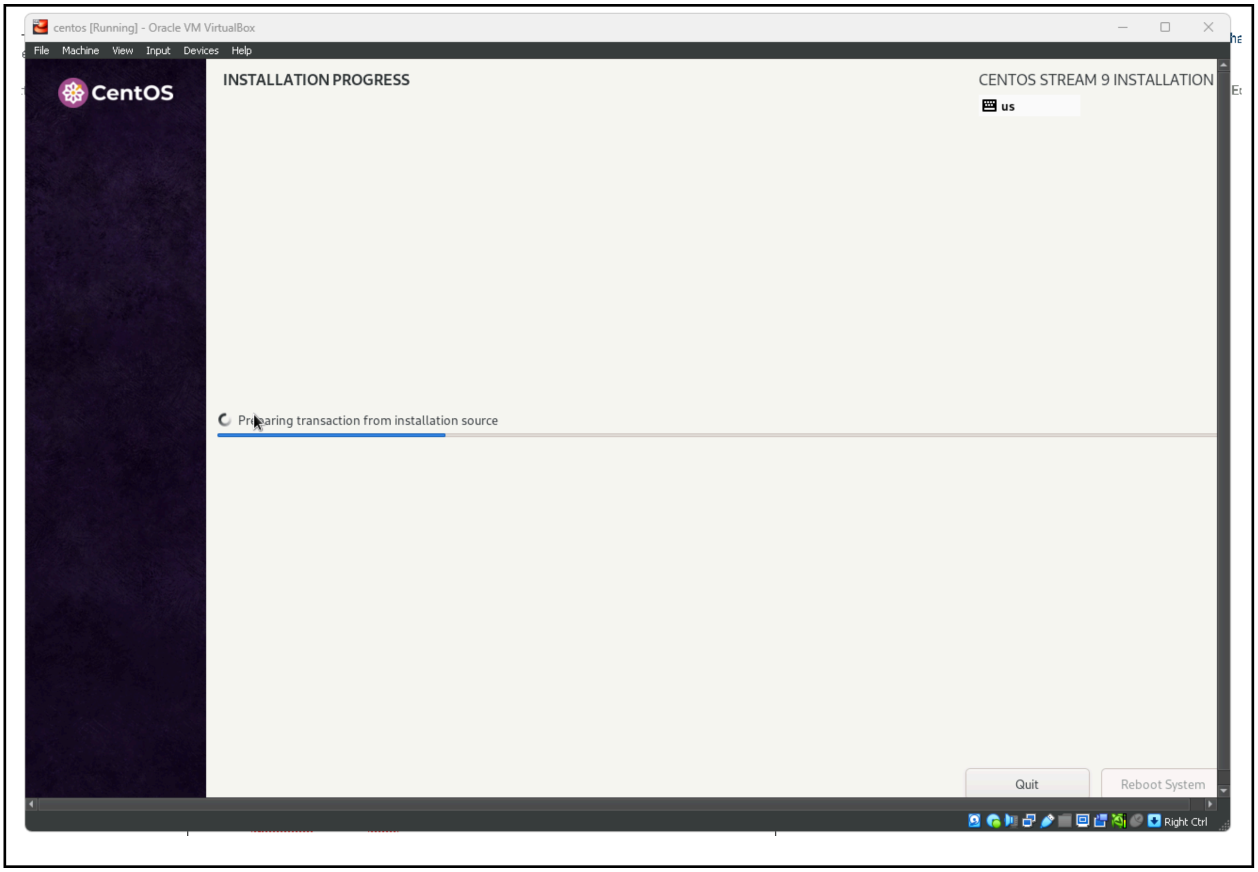
Disk Size: 20.00 GB (4.00 MB – 2.00 TB)

□ Pre-allocate Full Size

○ Use an Existing Virtual Hard Disk File

UbuntuServer.vdi (Normal, 25.00 GB)

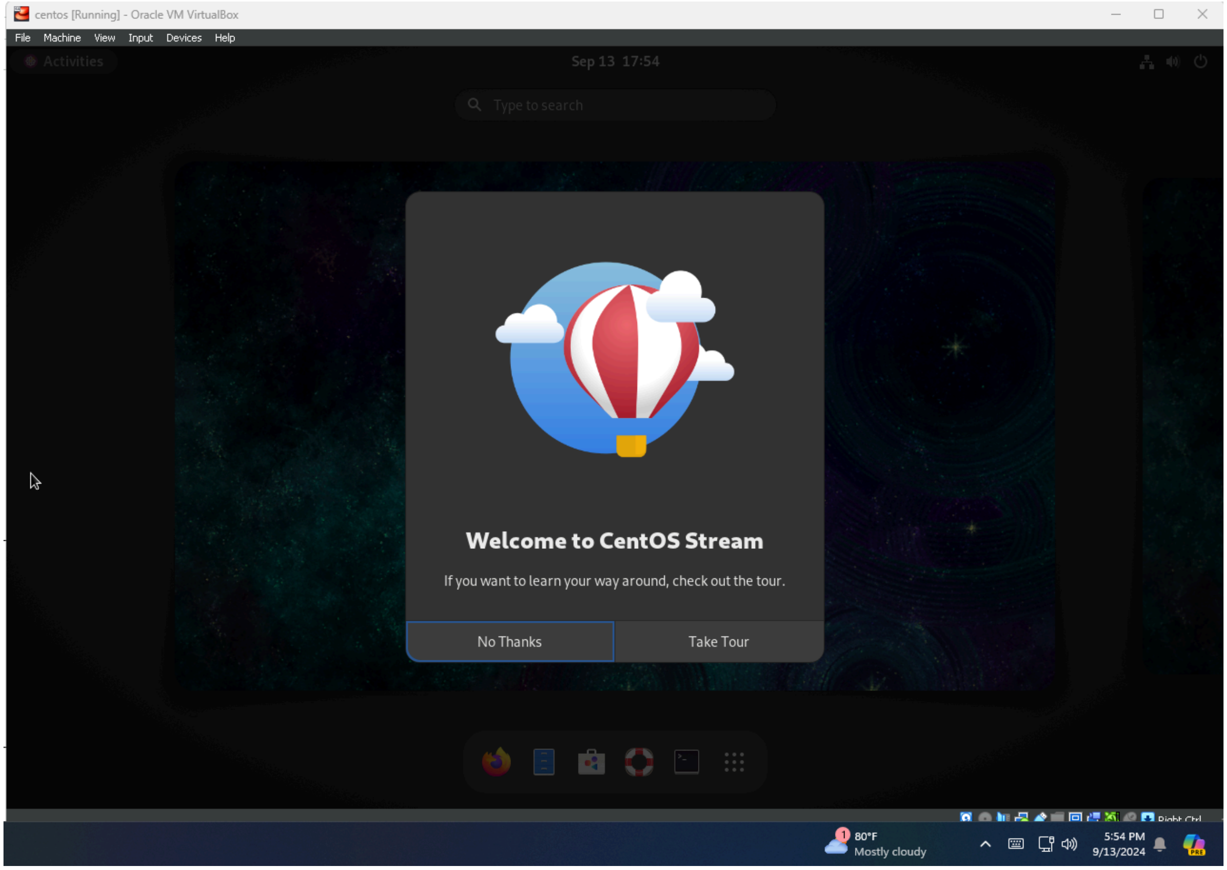
○ Do Not Add a Virtual Hard Disk



INSTALLATION PROGRESS

CENTOS STREAM 9 INSTALLATION

Preparing transaction from installation source



Welcome to CentOS Stream

If you want to learn your way around, check out the tour.

No Thanks | Take Tour

Task 2: Install the SSH server package *openssh*

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

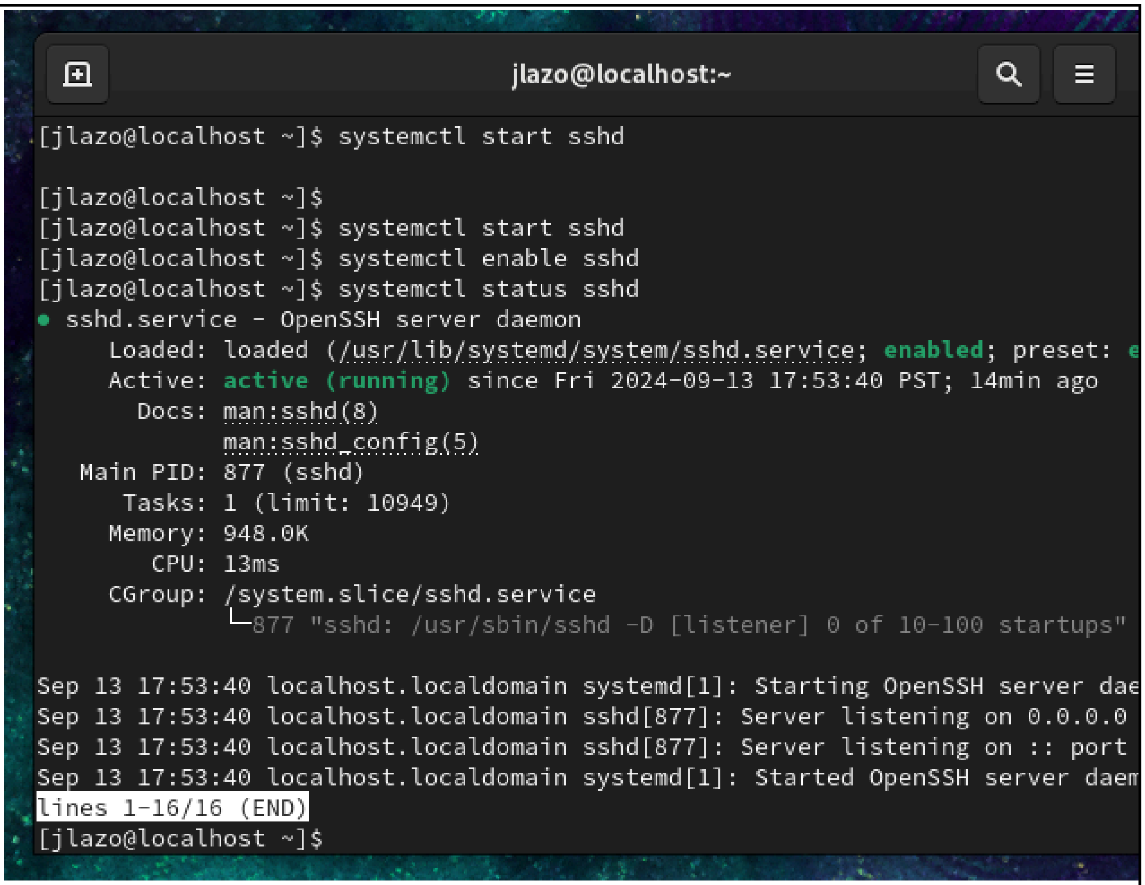
   ```
   $ dnf install openssh-server
   ```

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
   ```

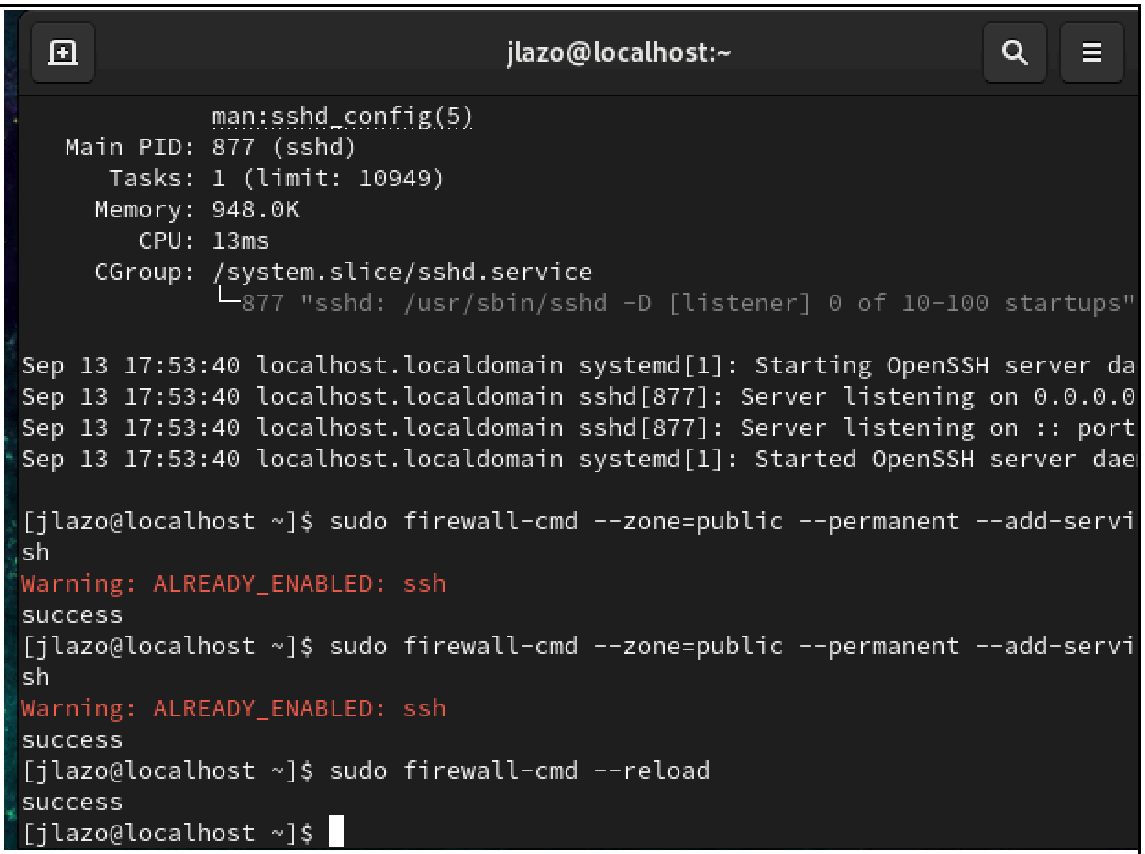


```
[jlazo@localhost ~]$ systemctl start sshd

[jlazo@localhost ~]$
[jlazo@localhost ~]$ systemctl start sshd
[jlazo@localhost ~]$ systemctl enable sshd
[jlazo@localhost ~]$ systemctl status sshd
● sshd.service - OpenSSH server daemon
     Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: e
     Active: active (running) since Fri 2024-09-13 17:53:40 PST; 14min ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 877 (sshd)
      Tasks: 1 (limit: 10949)
     Memory: 948.0K
        CPU: 13ms
     CGroup: /system.slice/sshd.service
             └─877 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Sep 13 17:53:40 localhost.localdomain systemd[1]: Starting OpenSSH server dae
Sep 13 17:53:40 localhost.localdomain sshd[877]: Server listening on 0.0.0.0
Sep 13 17:53:40 localhost.localdomain sshd[877]: Server listening on :: port
Sep 13 17:53:40 localhost.localdomain systemd[1]: Started OpenSSH server daem
lines 1-16/16 (END)
[jlazo@localhost ~]$
```

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



```
             man:sshd_config(5)
   Main PID: 877 (sshd)
      Tasks: 1 (limit: 10949)
     Memory: 948.0K
        CPU: 13ms
     CGroup: /system.slice/sshd.service
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[jlazo@localhost ~]$ sudo firewall-cmd --zone=public --permanent --add-servi
sh
Warning: ALREADY_ENABLED: ssh
success
[jlazo@localhost ~]$ sudo firewall-cmd --zone=public --permanent --add-servi
sh
Warning: ALREADY_ENABLED: ssh
success
[jlazo@localhost ~]$ sudo firewall-cmd --reload
success
[jlazo@localhost ~]$ 
```
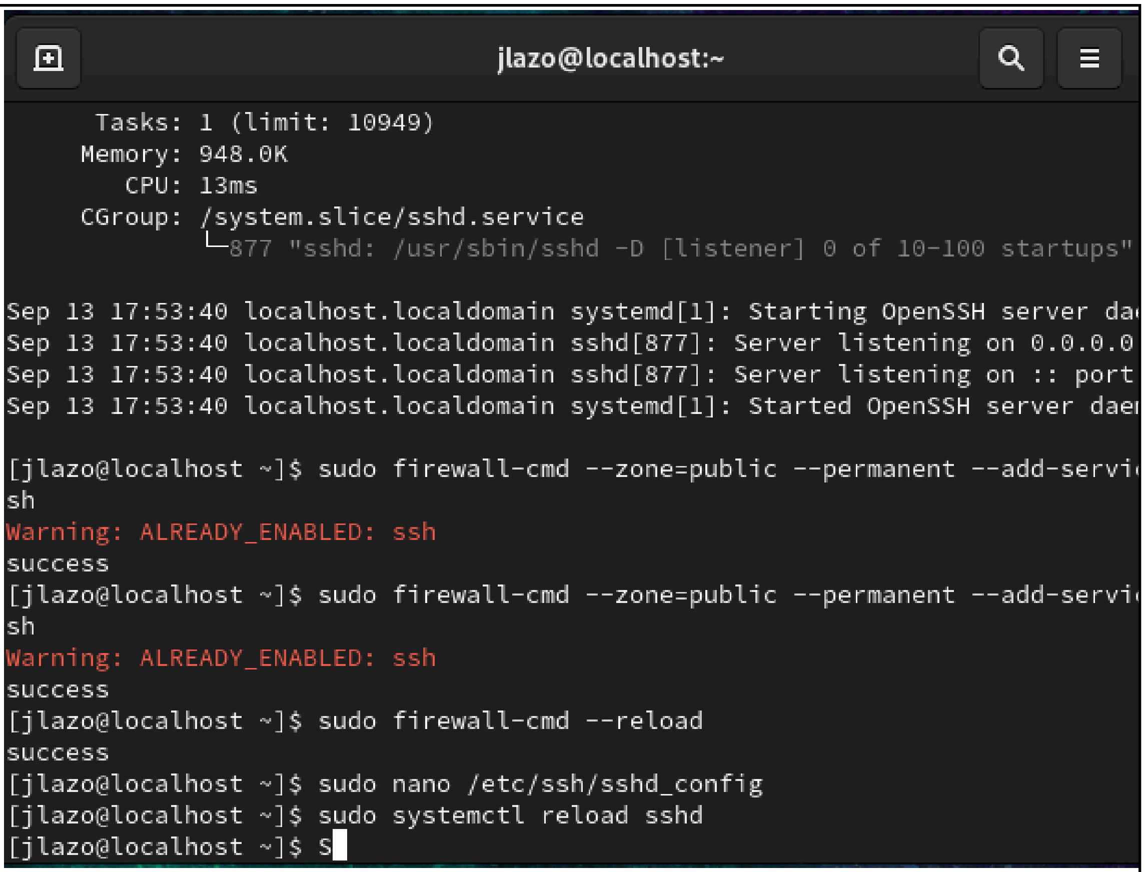

5. Locate the ssh server man config file */etc/ssh/sshd_config* and perform custom configuration. Every time you make any change to the */etc/ssh/sshd-config* configuration file reload the *sshd* service to apply changes:
   $ systemctl reload sshd



```
      Tasks: 1 (limit: 10949)
     Memory: 948.0K
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sh
Warning: ALREADY_ENABLED: ssh
success
[jlazo@localhost ~]$ sudo firewall-cmd --zone=public --permanent --add-servi
sh
Warning: ALREADY_ENABLED: ssh
success
[jlazo@localhost ~]$ sudo firewall-cmd --reload
success
[jlazo@localhost ~]$ sudo nano /etc/ssh/sshd_config
[jlazo@localhost ~]$ sudo systemctl reload sshd
[jlazo@localhost ~]$ s
```
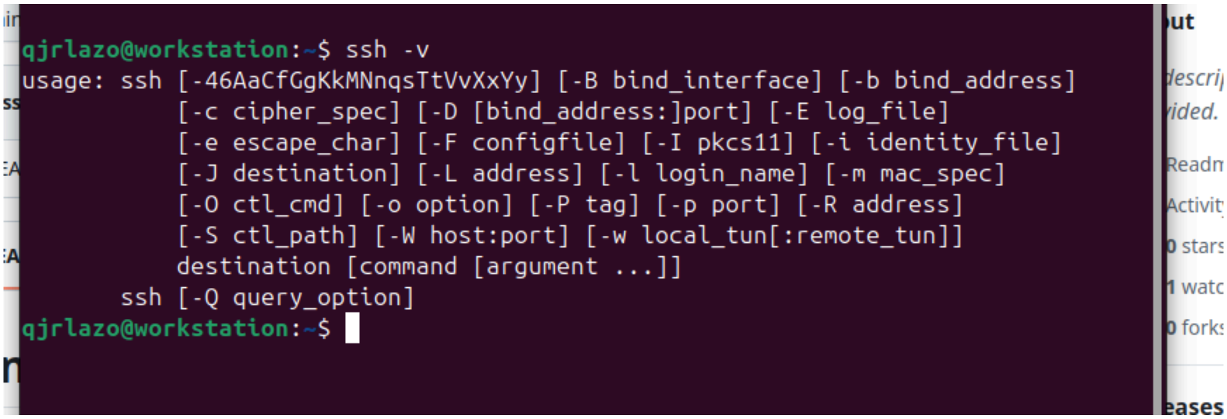
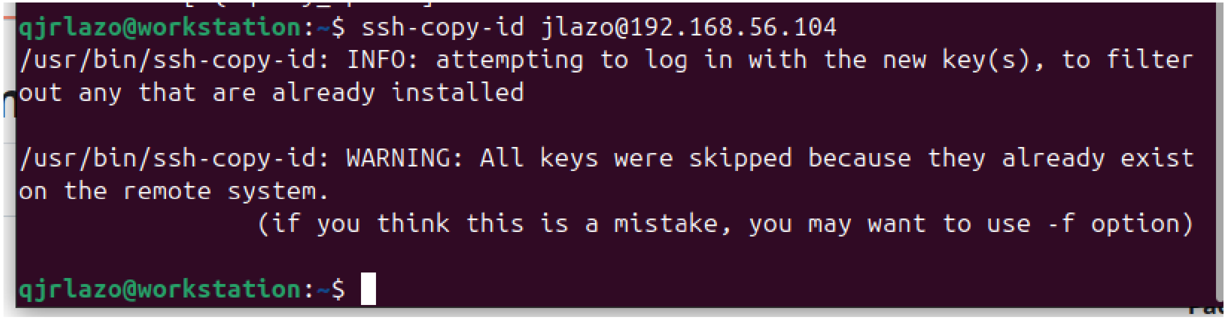

Task 3: Copy the Public Key to CentOS

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



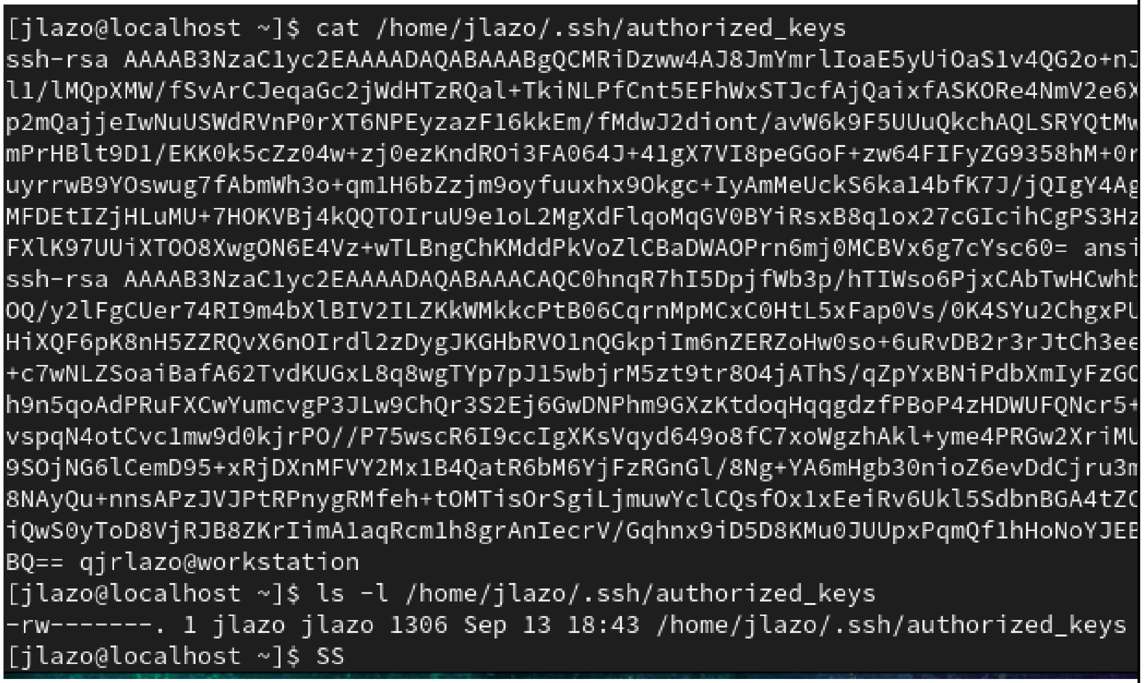
```
qjrlazo@workstation:~$ ssh -v
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface] [-b bind_address]
           [-c cipher_spec] [-D [bind_address:]port] [-E log_file]
           [-e escape_char] [-F configfile] [-I pkcs11] [-i identity_file]
           [-J destination] [-L address] [-l login_name] [-m mac_spec]
           [-O ctl_cmd] [-o option] [-P tag] [-p port] [-R address]
           [-S ctl_path] [-W host:port] [-w local_tun[:remote_tun]]
           destination [command [argument ...]]
       ssh [-Q query_option]
qjrlazo@workstation:~$
```

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



```
qjrlazo@workstation:~$ ssh-copy-id jlazo@192.168.56.104
/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: WARNING: All keys were skipped because they already exist
on the remote system.
                (if you think this is a mistake, you may want to use -f option)

qjrlazo@workstation:~$
```

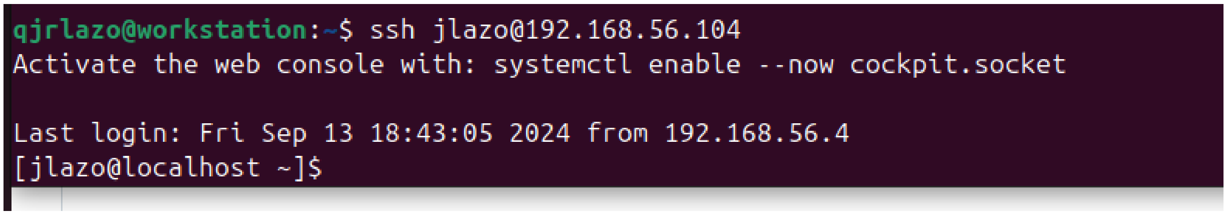
3. On CentOS, verify that you have the *authorized_keys*.



```
[jlazo@localhost ~]$ cat /home/jlazo/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQCMRiDzww4AJ8JmYmrlIoaE5yUiOaS1v4QG2o+nJ
l1/lMQpXMW/fSvArCJeqaGc2jWdHTzRQal+TkiNLPfCnt5EFhWxSTJcfAjQaixfASKORe4NmV2e6X
p2mQajjeIwNuUSWdRVnP0rXT6NPEyzazF16kkEm/fMdwJ2diont/avW6k9F5UUuQkchAQLSRYQtMw
mPrHBlt9D1/EKK0k5cZz04w+zj0ezKndROi3FA064J+41gX7VI8peGGoF+zw64FIFyZG9358hM+0r
uyrrwB9YOswug7fAbmWh3o+qm1H6bZzjm9oyfuuxhx9Okgc+IyAmMeUckS6ka14bfK7J/jQIgY4Ag
MFDEtIZjHLuMU+7HOKVBj4kQQTOIruU9e1oL2MgXdFlqoMqGV0BYiRsxB8q1ox27cGIcihCgPS3Hz
FXlK97UUiXTOO8XwgON6E4Vz+wTLBngChKMddPkVoZlCBaDWAOPrn6mj0MCBVx6g7cYsc60= ansi
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQC0hnqR7hI5DpjfWb3p/hTIWso6PjxCAbTwHCwhb
OQ/y2lFgCUer74RI9m4bXlBIV2ILZKkWMkkcPtB06CqrnMpMCxC0HtL5xFap0Vs/0K4SYu2ChgxPU
HiXQF6pK8nH5ZZRQvX6nOIrdl2zDygJKGHbRVO1nQGkpiIm6nZERZoHw0so+6uRvDB2r3rJtCh3ee
+c7wNLZSoaiBafA62TvdKUGxL8q8wgTYp7pJ15wbjrM5zt9tr8O4jAThS/qZpYxBNiPdbXmIyFzGC
h9n5qoAdPRuFXCwYumcvgP3JLw9ChQr3S2Ej6GwDNPhm9GXzKtdoqHqqgdzfPBoP4zHDWUFQNcr5+
vspqN4otCvc1mw9d0kjrPO//P75wscR6I9ccIgXKsVqyd649o8fC7xoWgzhAkl+yme4PRGw2XriMU
9SOjNG6lCemD95+xRjDXnMFVY2Mx1B4QatR6bM6YjFzRGnGl/8Ng+YA6mHgb30nioZ6evDdCjru3m
8NAyQu+nnsAPzJVJPtRPnygRMfeh+tOMTisOrSgiLjmuwYclCQsfOx1xEeiRv6Ukl5SdbnBGA4tZC
iQwS0yToD8VjRJB8ZKrIimA1aqRcm1h8grAnIecrV/Gqhnx9iD5D8KMu0JUUpxPqmQf1hHoNoYJEB
BQ== qjrlazo@workstation
[jlazo@localhost ~]$ ls -l /home/jlazo/.ssh/authorized_keys
-rw-------. 1 jlazo jlazo 1306 Sep 13 18:43 /home/jlazo/.ssh/authorized_keys
[jlazo@localhost ~]$ SS
```

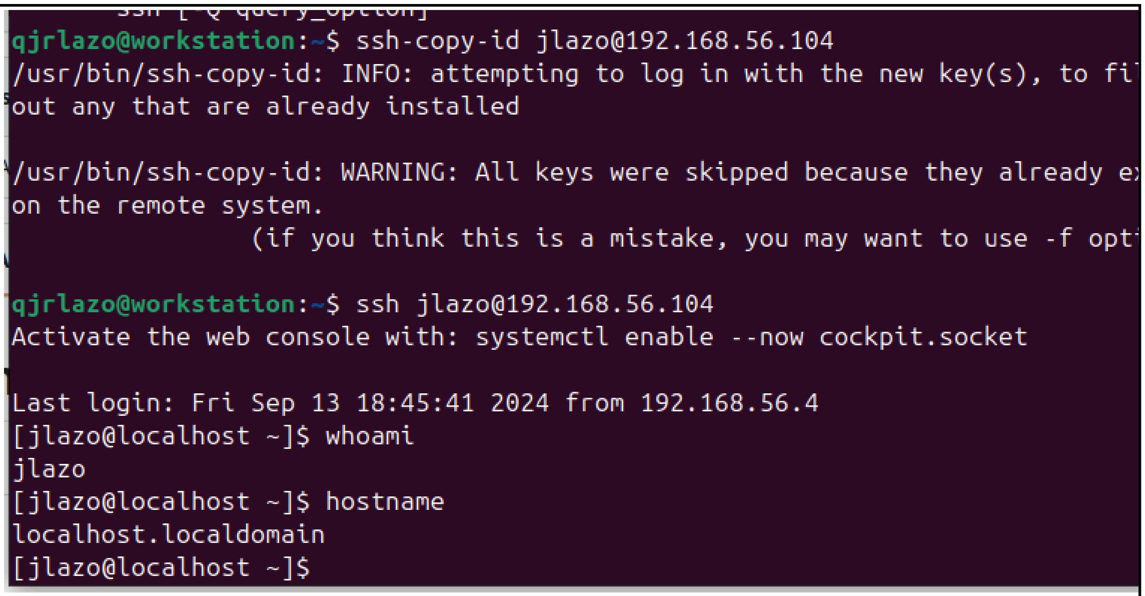
Task 4: Verify ssh remote connection

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



```
qjrlazo@workstation:~$ ssh jlazo@192.168.56.104
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Fri Sep 13 18:43:05 2024 from 192.168.56.4
[jlazo@localhost ~]$
```

2. Show evidence that you are connected.



```
       ssh [-Q query_option]
qjrlazo@workstation:~$ ssh-copy-id jlazo@192.168.56.104
/usr/bin/ssh-copy-id: INFO: attempting to log in with the new key(s), to fi
out any that are already installed

/usr/bin/ssh-copy-id: WARNING: All keys were skipped because they already ex
on the remote system.
                (if you think this is a mistake, you may want to use -f opt

qjrlazo@workstation:~$ ssh jlazo@192.168.56.104
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Fri Sep 13 18:45:41 2024 from 192.168.56.4
[jlazo@localhost ~]$ whoami
jlazo
[jlazo@localhost ~]$ hostname
localhost.localdomain
[jlazo@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?

In choosing the best distribution between Debian and Red Hat Linux distributions, I think If you need long term support and enterprise features, Red Hat might be more suitable. However, If you prefer flexibility and a community-driven approach, Debian is often a good choice.

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

Debian is known for its flexibility, community-driven nature, and extensive package management options. Red Hat, on the other hand, is recognized for its commercial support, structured release cycle, and enterprise-focused tools and services.