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Course/Section: CpE31S2	**Date Submitted: September 13, 2024**
Instructor: Sir Robin Valenzuela	**Semester and SY: 2024-2025**

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.

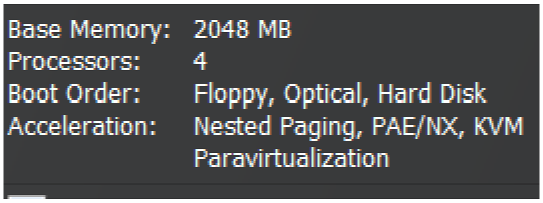
CentOS uses the RPM package format and YUM/DNF as the package manager.

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

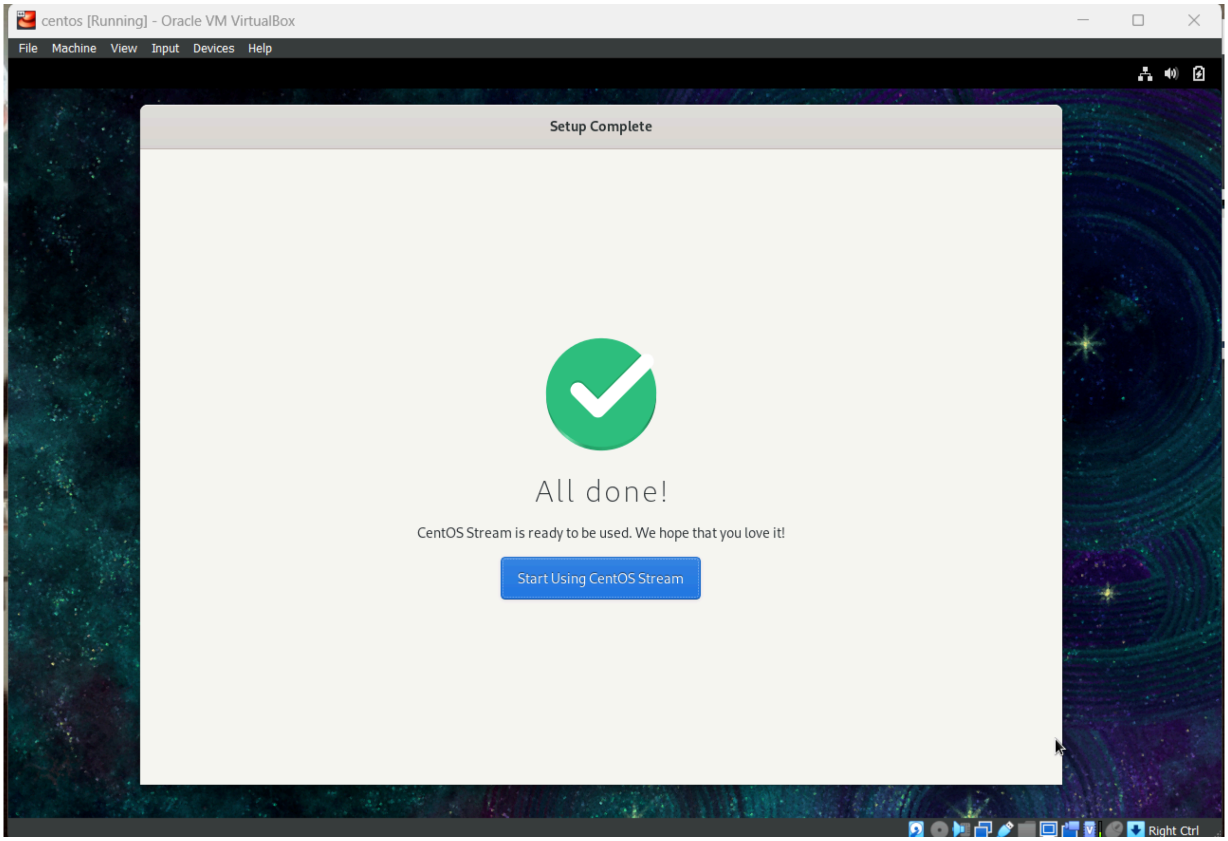
Both offer full-feature package management with network-based repository support, dependency checking and resolution, etc.. If you're familiar with one but not the other, you may have a little trouble switching over, but they're not overwhelmingly different. They both have similar features, just available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



Base Memory: 2048 MB
Processors: 4
Boot Order: Floppy, Optical, Hard Disk
Acceleration: Nested Paging, PAE/NX, KVM Paravirtualization



Setup Complete

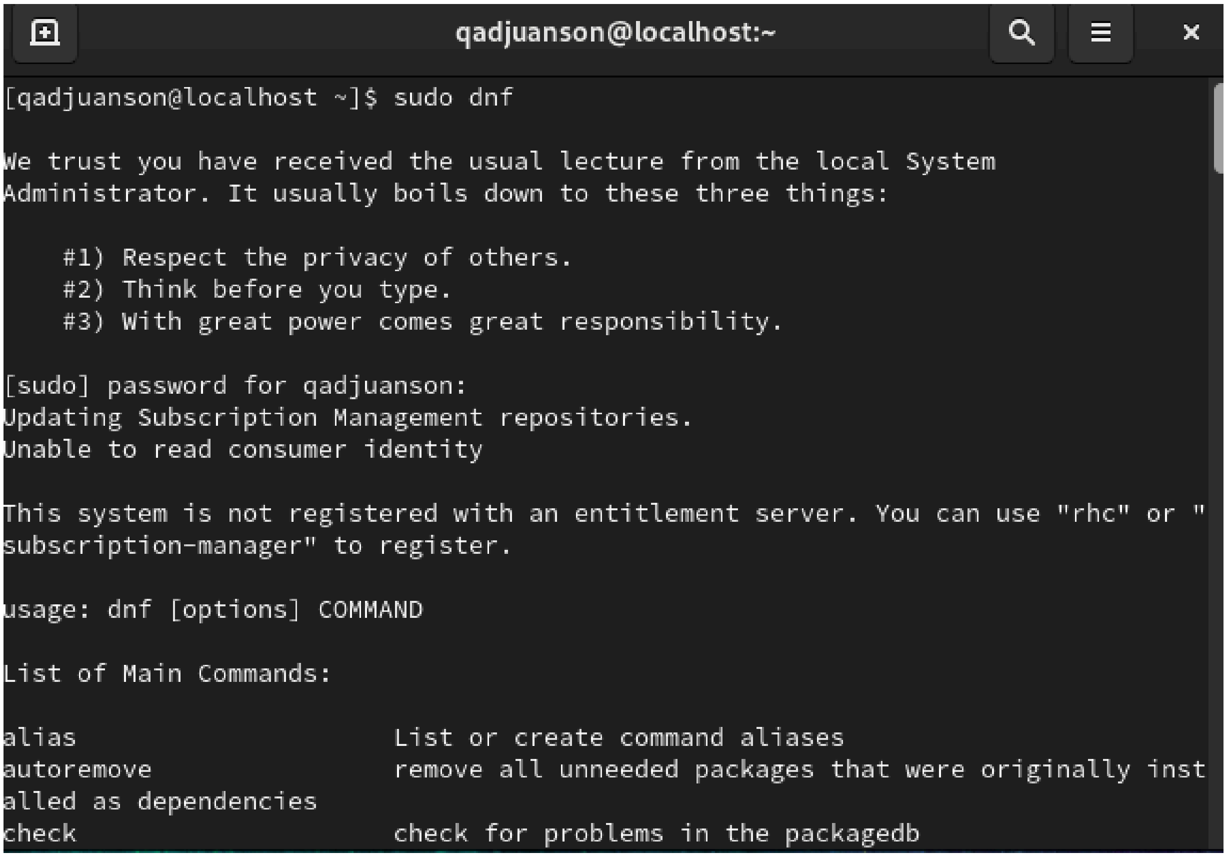
All done!

CentOS Stream is ready to be used. We hope that you love it!

centos [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Start Using CentOS Stream
Right Ctrl

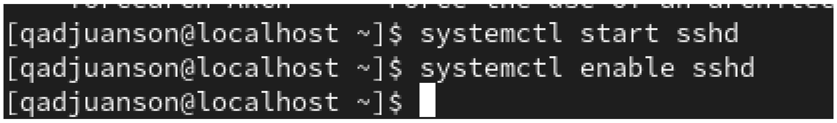
Task 2: Install the SSH server package *openssh*

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



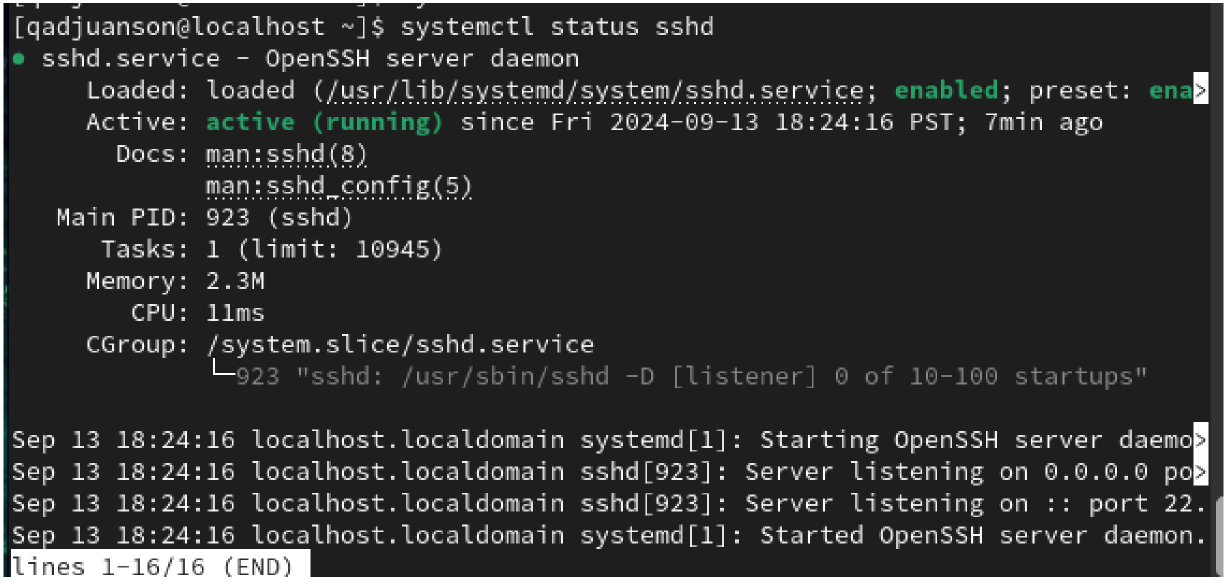
```
[qadjuanson@localhost ~]$ sudo dnf

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 qadjuanson:
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use "rhc" or "
subscription-manager" to register.

usage: dnf [options] COMMAND

List of Main Commands:

alias                     List or create command aliases
autoremove                remove all unneeded packages that were originally inst
alled as dependencies
check                     check for problems in the packagedb
```

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



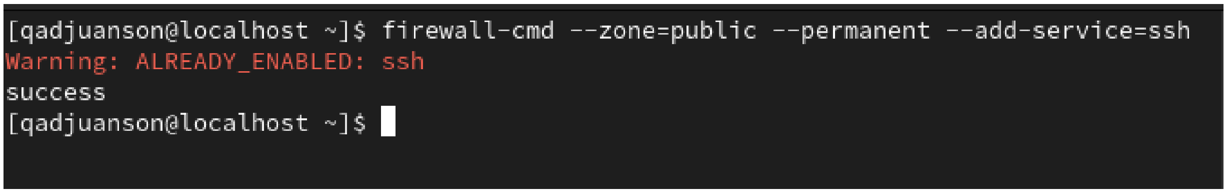
```
[qadjuanson@localhost ~]$ systemctl start sshd
[qadjuanson@localhost ~]$ systemctl enable sshd
[qadjuanson@localhost ~]$ 
```

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



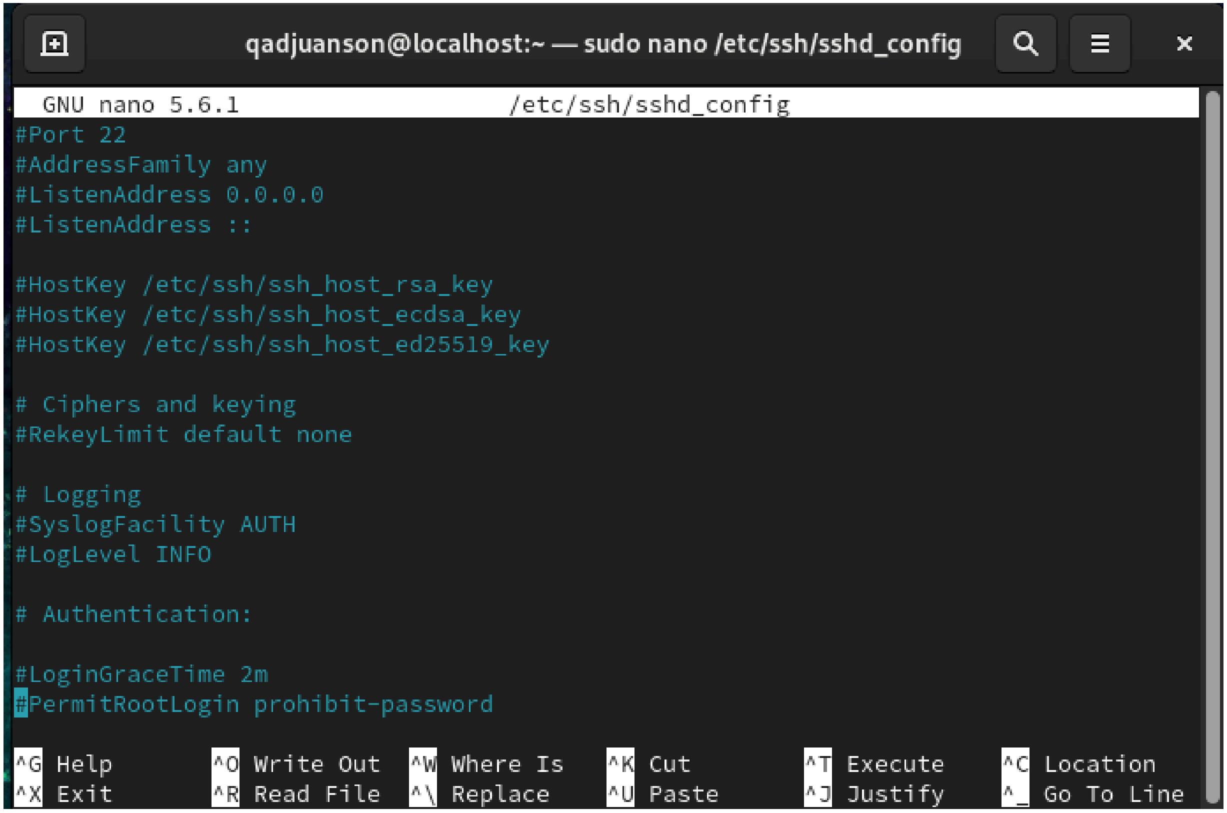
```
[qadjuanson@localhost ~]$ systemctl status sshd
● sshd.service - OpenSSH server daemon
     Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: ena>
     Active: active (running) since Fri 2024-09-13 18:24:16 PST; 7min ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 923 (sshd)
      Tasks: 1 (limit: 10945)
     Memory: 2.3M
        CPU: 11ms
     CGroup: /system.slice/sshd.service
             └─923 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Sep 13 18:24:16 localhost.localdomain systemd[1]: Starting OpenSSH server daemo>
Sep 13 18:24:16 localhost.localdomain sshd[923]: Server listening on 0.0.0.0 po>
Sep 13 18:24:16 localhost.localdomain sshd[923]: Server listening on :: port 22.
Sep 13 18:24:16 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
lines 1-16/16 (END)
```

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

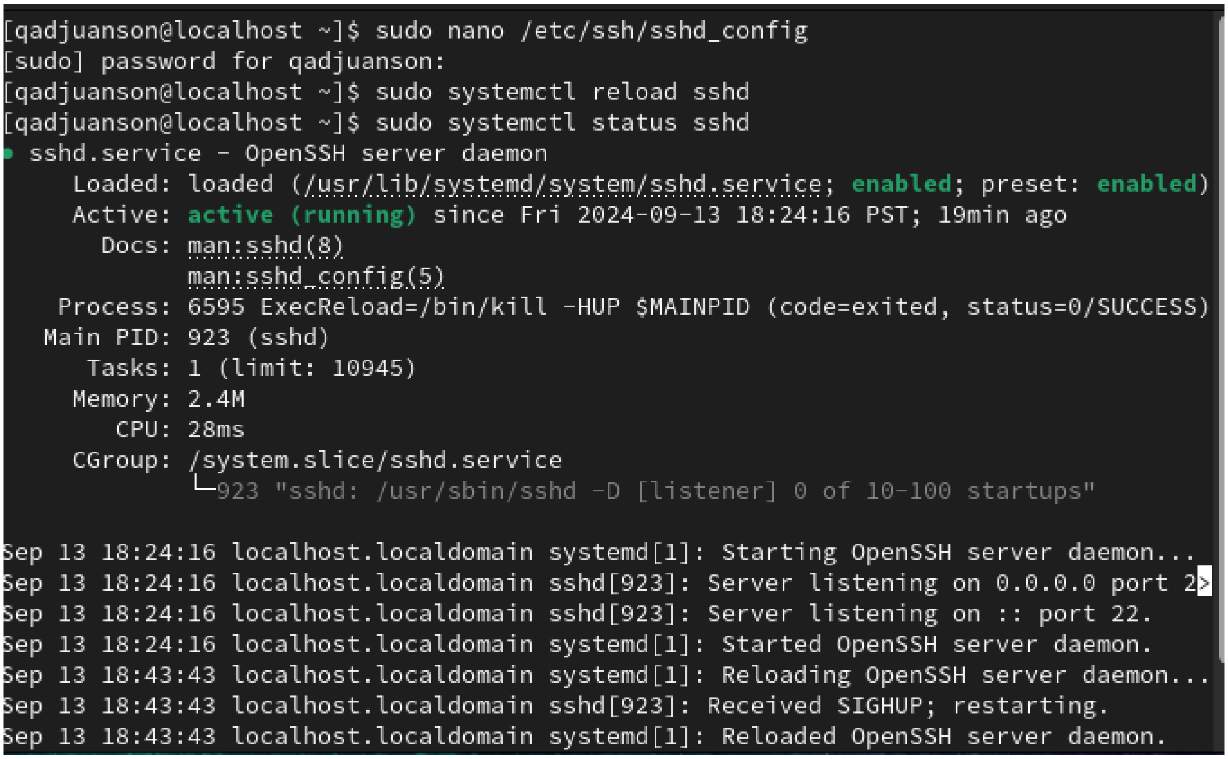


```
[qadjuanson@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
[qadjuanson@localhost ~]$ █
```

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



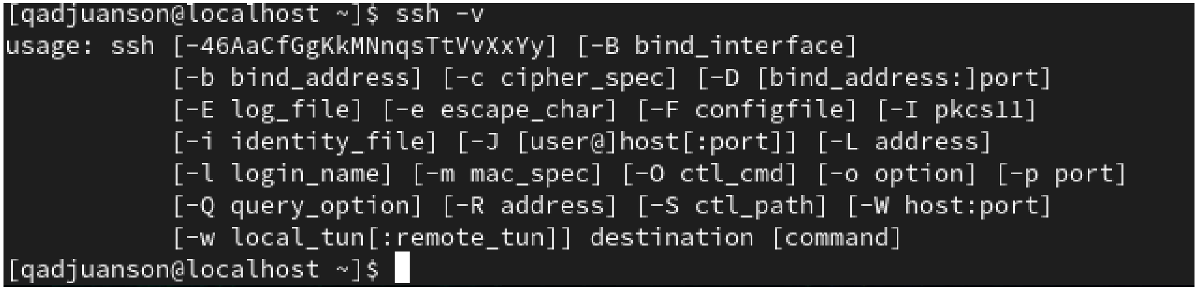
```
  GNU nano 5.6.1                   /etc/ssh/sshd_config
#Port 22
#AddressFamily any
#ListenAddress 0.0.0.0
#ListenAddress ::

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

# Ciphers and keying
#RekeyLimit default none

# Logging
#SyslogFacility AUTH
#LogLevel INFO

# Authentication:

#LoginGraceTime 2m
#PermitRootLogin prohibit-password

^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location
^X Exit        ^R Read File   ^\ Replace     ^U Paste       ^J Justify     ^_ Go To Line
```



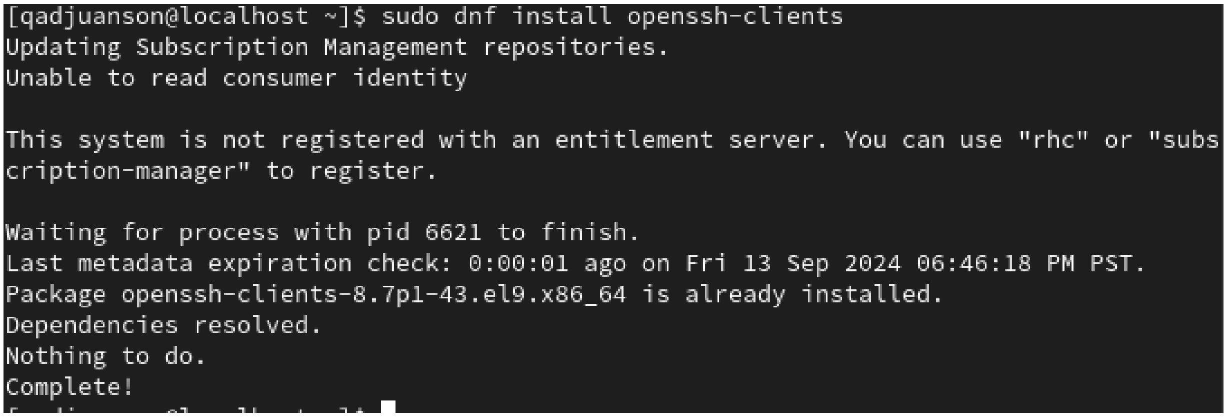
```
[qadjuanson@localhost ~]$ sudo nano /etc/ssh/sshd_config
[sudo] password for qadjuanson:
[qadjuanson@localhost ~]$ sudo systemctl reload sshd
[qadjuanson@localhost ~]$ sudo systemctl status sshd
● sshd.service - OpenSSH server daemon
     Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: enabled)
     Active: active (running) since Fri 2024-09-13 18:24:16 PST; 19min ago
       Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 6595 ExecReload=/bin/kill -HUP $MAINPID (code=exited, status=0/SUCCESS)
   Main PID: 923 (sshd)
      Tasks: 1 (limit: 10945)
     Memory: 2.4M
        CPU: 28ms
     CGroup: /system.slice/sshd.service
             └─923 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Sep 13 18:24:16 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 13 18:24:16 localhost.localdomain sshd[923]: Server listening on 0.0.0.0 port 2>
Sep 13 18:24:16 localhost.localdomain sshd[923]: Server listening on :: port 22.
Sep 13 18:24:16 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Sep 13 18:43:43 localhost.localdomain systemd[1]: Reloading OpenSSH server daemon...
Sep 13 18:43:43 localhost.localdomain sshd[923]: Received SIGHUP; restarting.
Sep 13 18:43:43 localhost.localdomain systemd[1]: Reloaded OpenSSH server daemon.
```

Task 3: Copy the Public Key to CentOS

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

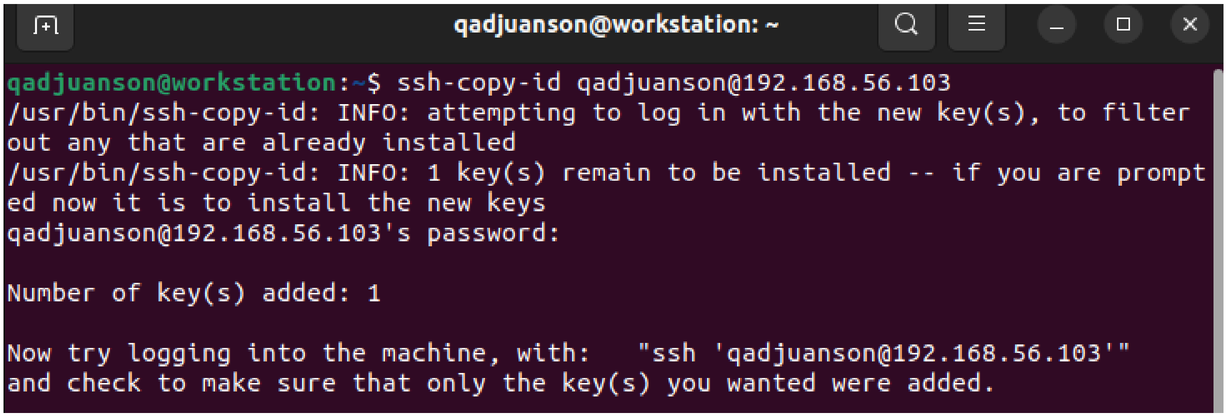


```
[qadjuanson@localhost ~]$ ssh -v
usage: ssh [-46AaCfGgKkMNnqsTtVvXxYy] [-B bind_interface]
           [-b bind_address] [-c cipher_spec] [-D [bind_address:]port]
           [-E log_file] [-e escape_char] [-F configfile] [-I pkcs11]
           [-i identity_file] [-J [user@]host[:port]] [-L address]
           [-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]] destination [command]
[qadjuanson@localhost ~]$
```



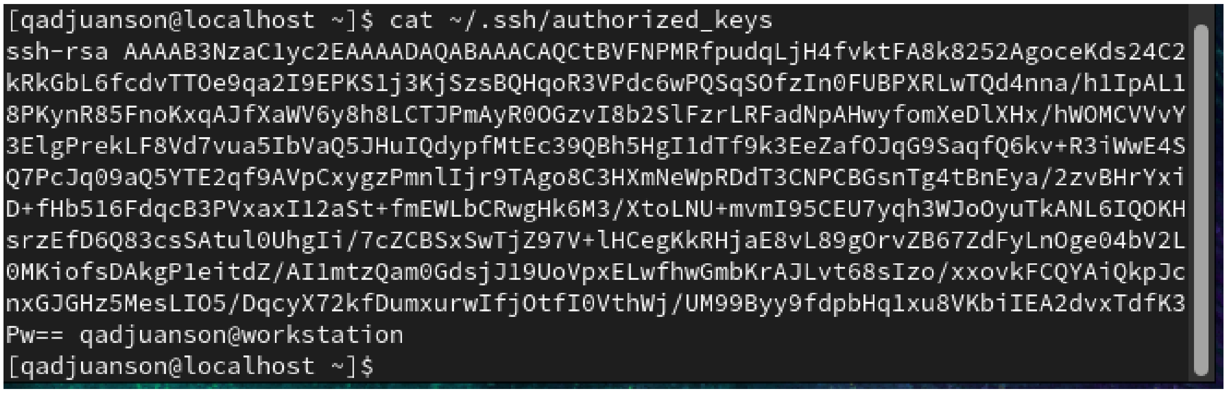
```
[qadjuanson@localhost ~]$ sudo dnf install openssh-clients
Updating Subscription Management repositories.
Unable to read consumer identity

This system is not registered with an entitlement server. You can use "rhc" or "subs
cription-manager" to register.

Waiting for process with pid 6621 to finish.
Last metadata expiration check: 0:00:01 ago on Fri 13 Sep 2024 06:46:18 PM PST.
Package openssh-clients-8.7p1-43.el9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
```

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



```
qadjuanson@workstation:~$ ssh-copy-id qadjuanson@192.168.56.103
/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 prompt
ed now it is to install the new keys
qadjuanson@192.168.56.103's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'qadjuanson@192.168.56.103'"
and check to make sure that only the key(s) you wanted were added.
```

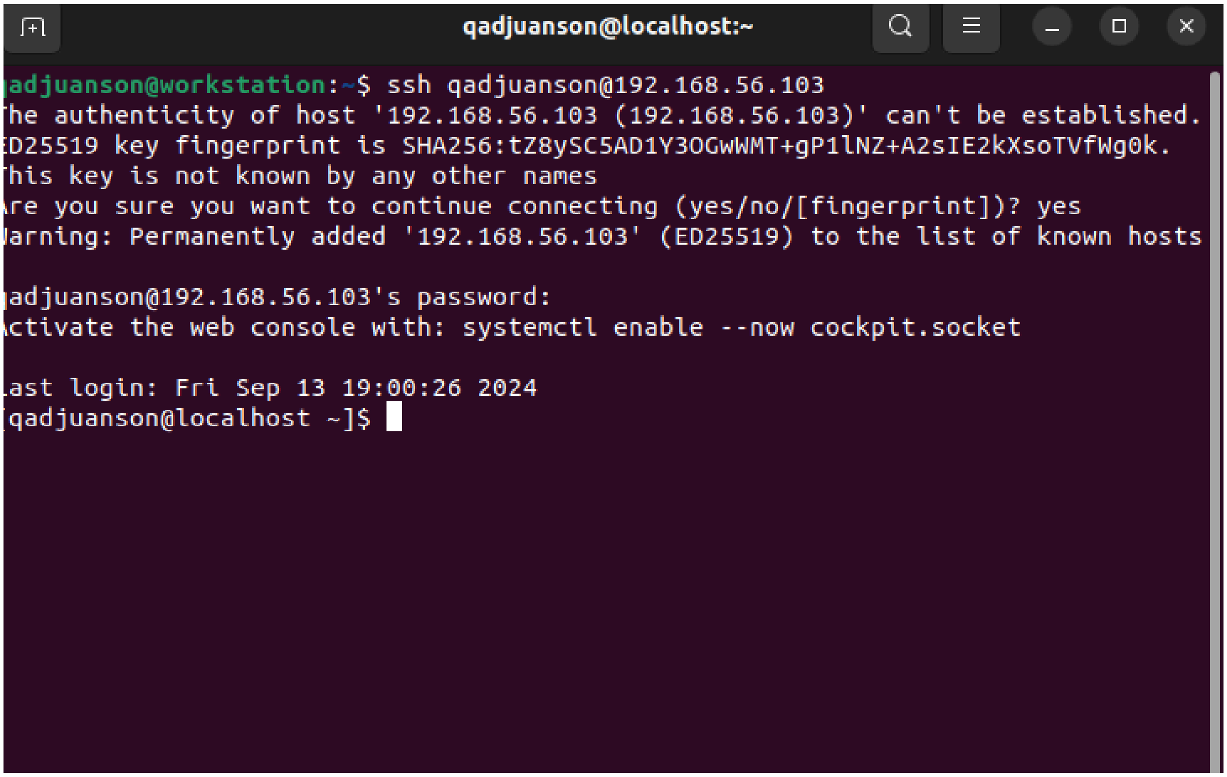
3. On CentOS, verify that you have the *authorized_keys*.



```
[qadjuanson@localhost ~]$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQCtBVFNPMRfpudqLjH4fvktFA8k8252AgoceKds24C2
kRkGbL6fcdvTTOe9qa2I9EPKS1j3KjSzsBQHqoR3VPdc6wPQSqSOfzIn0FUBPXRLwTQd4nna/h1IpAL1
8PKynR85FnoKxqAJfXaWV6y8h8LCTJPmAyR0OGzvI8b2SlFzrLRFadNpAHwyfomXeDlXHx/hWOMCVVvY
3ElgPrekLF8Vd7vua5IbVaQ5JHuIQdypfMtEc39QBh5HgI1dTf9k3EeZafOJqG9SaqfQ6kv+R3iWwE4S
Q7PcJq09aQ5YTE2qf9AVpCxygzPmnlIjr9TAgo8C3HXmNeWpRDdT3CNPCBGsnTg4tBnEya/2zvBHrYxi
D+fHb516FdqcB3PVxaxI12aSt+fmEWLbCRwgHk6M3/XtoLNU+mvmI95CEU7yqh3WJoOyuTkANL6IQOKH
srzEfD6Q83csSAtul0UhgIi/7cZCBSxSwTjZ97V+lHCegKkRHjaE8vL89gOrvZB67ZdFyLnOge04bV2L
0MKiofsDAkgP1eitdZ/AI1mtzQam0GdsjJ19UoVpxELwfhwGmbKrAJLvt68sIzo/xxovkFCQYAiQkpJc
nxGJGHz5MesLIO5/DqcyX72kfDumxurwIfjOtfI0VthWj/UM99Byy9fdpbHq1xu8VKbiIEA2dvxTdfK3
Pw== qadjuanson@workstation
[qadjuanson@localhost ~]$
```

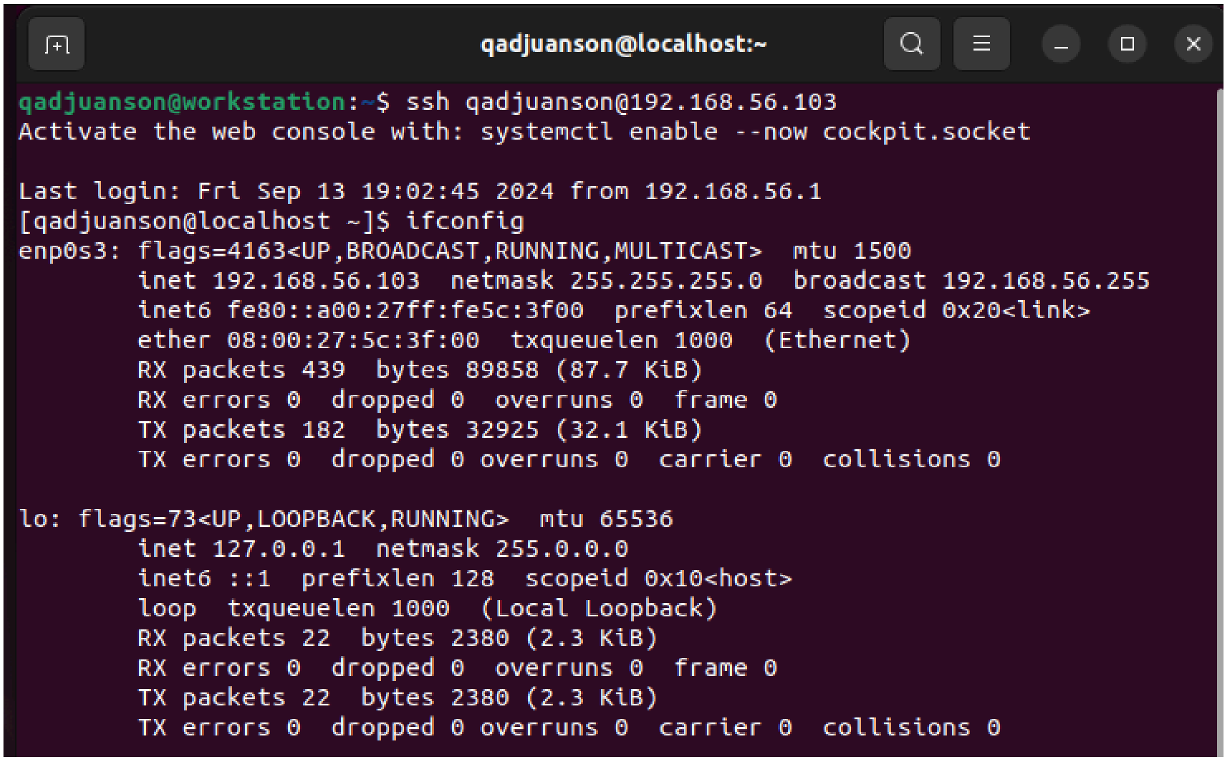
Task 4: Verify ssh remote connection

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



```
adjuanson@workstation:~$ ssh qadjuanson@192.168.56.103
he authenticity of host '192.168.56.103 (192.168.56.103)' can't be established.
D25519 key fingerprint is SHA256:tZ8ySC5AD1Y3OGwWMT+gP1lNZ+A2sIE2kXsoTVfWg0k.
his key is not known by any other names
re you sure you want to continue connecting (yes/no/[fingerprint])? yes
arning: Permanently added '192.168.56.103' (ED25519) to the list of known hosts

adjuanson@192.168.56.103's password:
ctivate the web console with: systemctl enable --now cockpit.socket

ast login: Fri Sep 13 19:00:26 2024
qadjuanson@localhost ~]$
```

2. Show evidence that you are connected.



```
qadjuanson@workstation:~$ ssh qadjuanson@192.168.56.103
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Fri Sep 13 19:02:45 2024 from 192.168.56.1
[qadjuanson@localhost ~]$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.56.103  netmask 255.255.255.0  broadcast 192.168.56.255
        inet6 fe80::a00:27ff:fe5c:3f00  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:5c:3f:00  txqueuelen 1000  (Ethernet)
        RX packets 439  bytes 89858 (87.7 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 182  bytes 32925 (32.1 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 22  bytes 2380 (2.3 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 22  bytes 2380 (2.3 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

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?
    - Choosing between Debian and Red Hat depends on what you need. Debian is good for personal use or developers because it’s flexible, free, and has lots of software.While on the other hand, Red Hat is better for businesses because it’s more secure, stable, and comes with professional support. It’s designed for companies that need reliable, long-term systems, especially for servers or cloud environments. So, use Debian if you want flexibility and free software, and Red Hat if you need strong support and security for business purposes.
2. What are the main diffence between Debian and Red Hat Linux distributions?
    - Debian is focused on providing open-source software and is more customizable.
    - Red hat is designed for corporate environments that need reliable and secure systems.