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Course/Section: CPE 212 - CPE31S2	**Date Submitted: Aug 27, 2025**
Instructor: Engr. Robin Valenzuela	**Semester and SY: 1st Sem S.Y 2025-2026**

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.

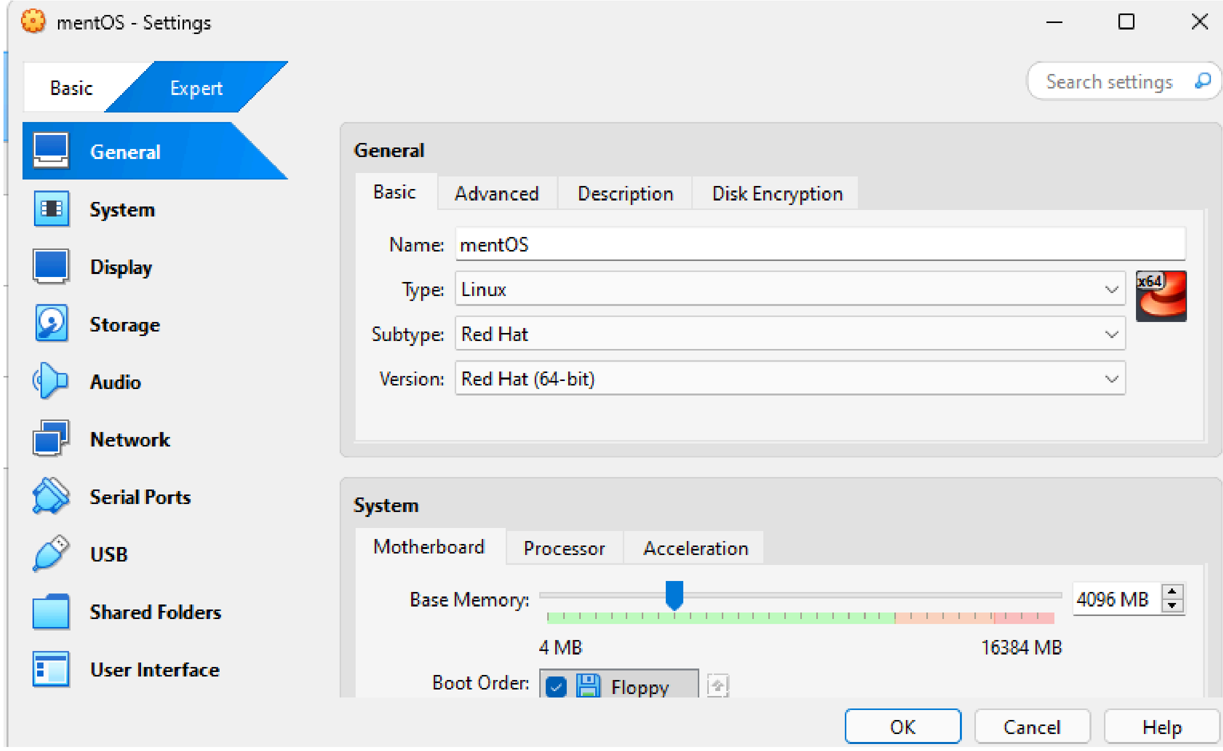
CentOS uses the RPM package format and YUM/DNF as the package manager.

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.


mentOS - Settings

General

Name: mentOS

Type: Linux

Subtype: Red Hat

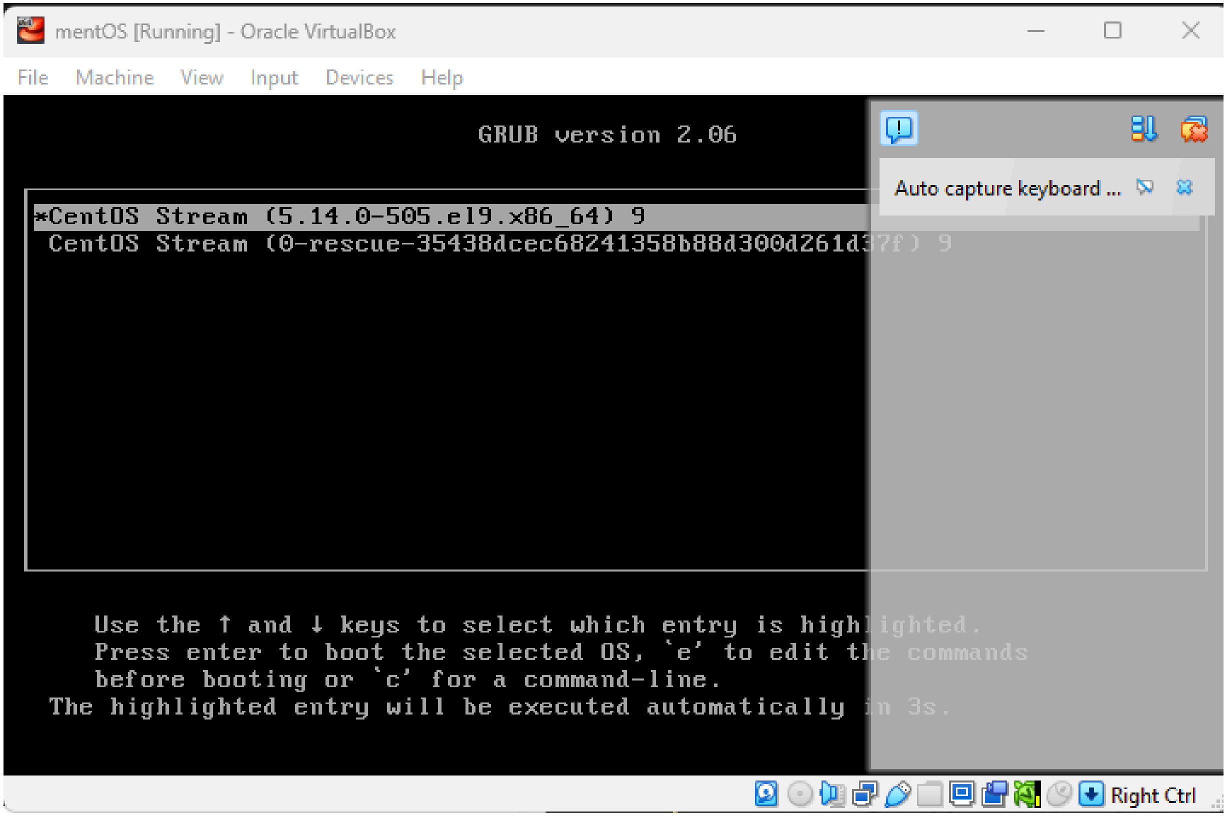
Version: Red Hat (64-bit)

System

Base Memory: 4096 MB

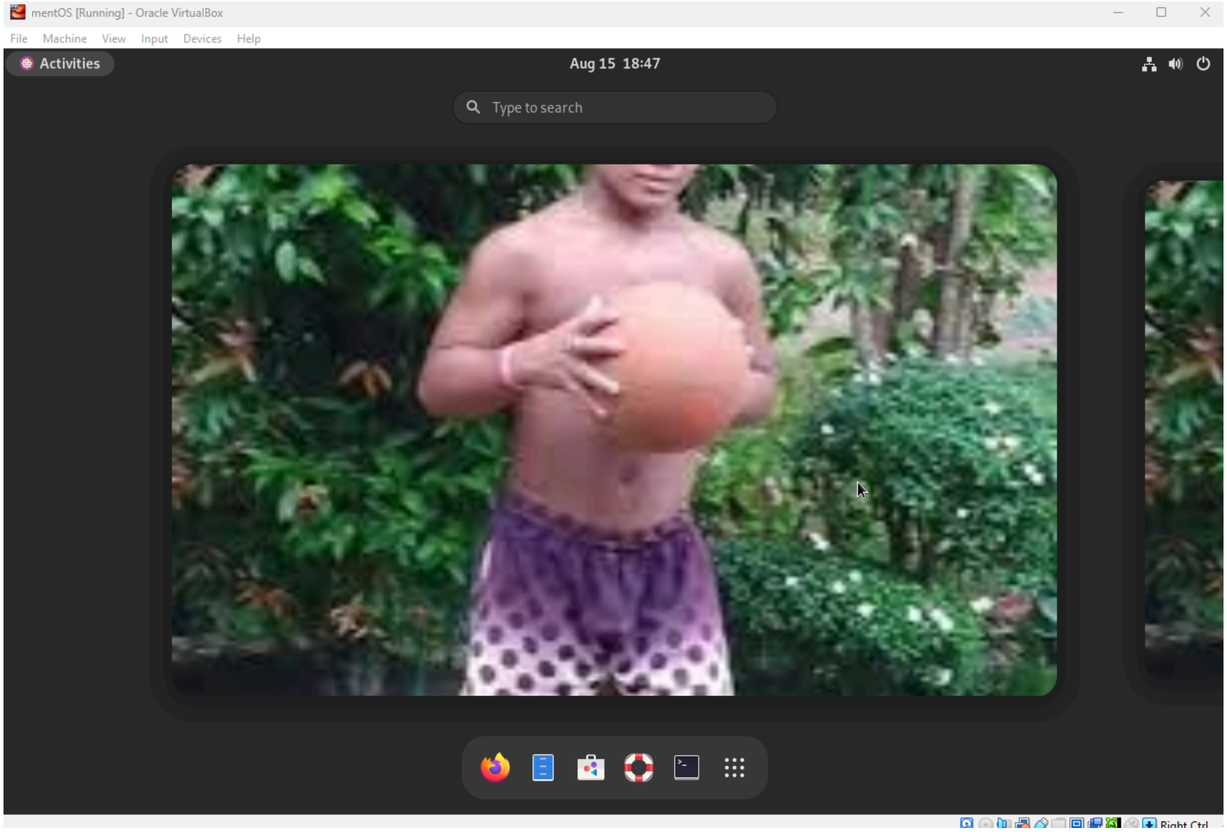
Boot Order: Floppy

3. Install the downloaded image.


mentOS [Running] - Oracle VirtualBox
File
Machine
View
Input
Devices
Help
Auto capture keyboard ...
Right Ctrl

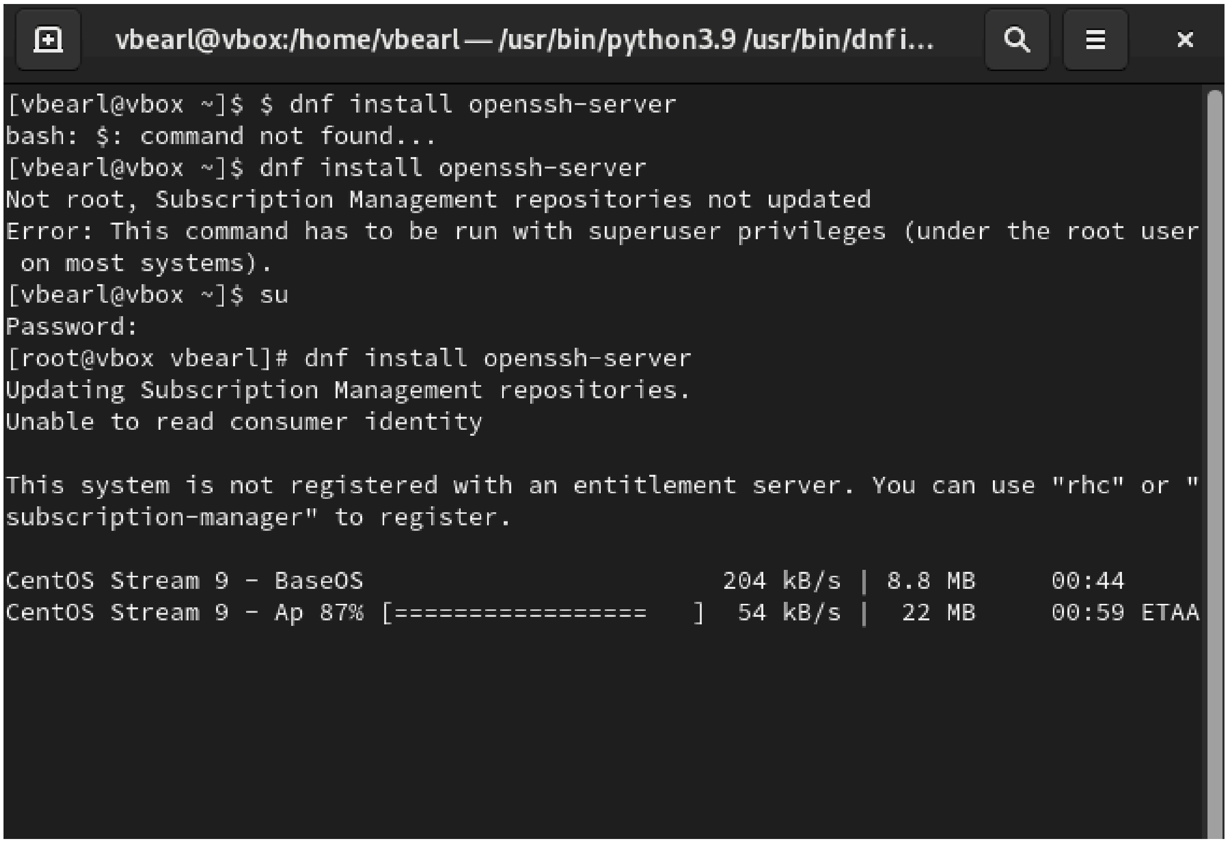
```
                      GRUB version 2.06

 *CentOS Stream (5.14.0-505.el9.x86_64) 9
  CentOS Stream (0-rescue-35438dcec68241358b88d300d261d37f) 9

     Use the ↑ and ↓ keys to select which entry is highlighted.
     Press enter to boot the selected OS, `e' to edit the commands
     before booting or `c' for a command-line.
  The highlighted entry will be executed automatically in 3s.
```

4. Show evidence that the OS was installed already.



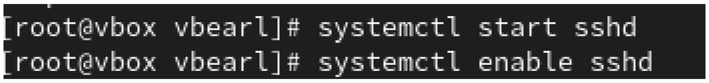
Task 2: Install the SSH server package *openssh*

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


vbearl@vbox:/home/vbearl — /usr/bin/python3.9 /usr/bin/dnf i...

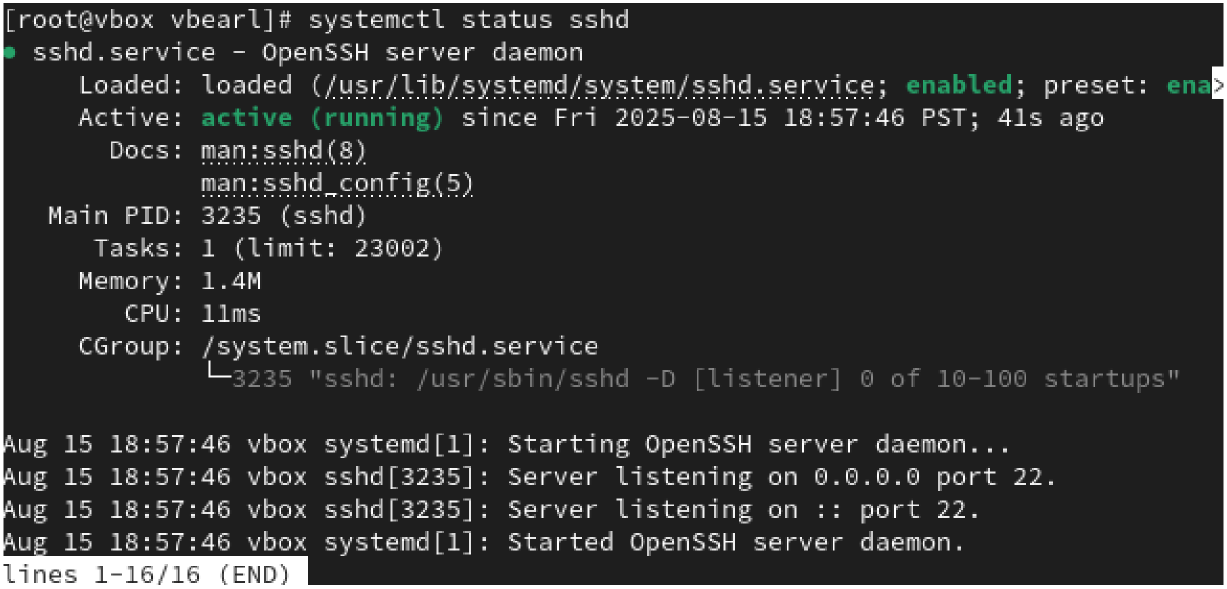
```
[vbearl@vbox ~]$ $ dnf install openssh-server
bash: $: command not found...
[vbearl@vbox ~]$ dnf install openssh-server
Not root, Subscription Management repositories not updated
Error: This command has to be run with superuser privileges (under the root user
 on most systems).
[vbearl@vbox ~]$ su
Password:
[root@vbox vbearl]# dnf install openssh-server
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.

CentOS Stream 9 - BaseOS                        204 kB/s | 8.8 MB     00:44
CentOS Stream 9 - Ap 87% [=================   ]  54 kB/s |  22 MB     00:59 ETAA
```

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



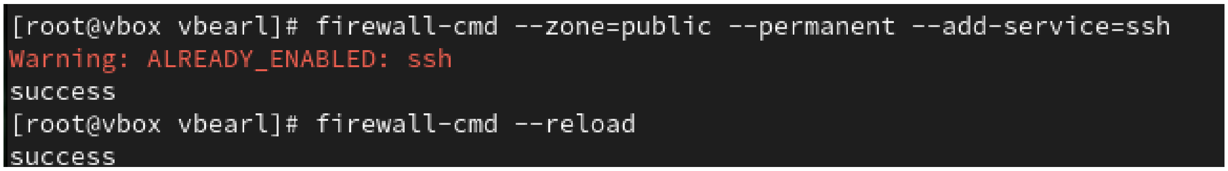
```
[root@vbox vbearl]# systemctl start sshd
[root@vbox vbearl]# systemctl enable sshd
```

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



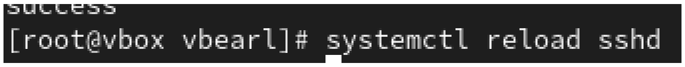
```
[root@vbox vbearl]# systemctl status sshd
● sshd.service - OpenSSH server daemon
     Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; preset: ena>
     Active: active (running) since Fri 2025-08-15 18:57:46 PST; 41s ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 3235 (sshd)
      Tasks: 1 (limit: 23002)
     Memory: 1.4M
        CPU: 11ms
     CGroup: /system.slice/sshd.service
             └─3235 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 15 18:57:46 vbox systemd[1]: Starting OpenSSH server daemon...
Aug 15 18:57:46 vbox sshd[3235]: Server listening on 0.0.0.0 port 22.
Aug 15 18:57:46 vbox sshd[3235]: Server listening on :: port 22.
Aug 15 18:57:46 vbox 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



```
[root@vbox vbearl]# firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
[root@vbox vbearl]# firewall-cmd --reload
success
```

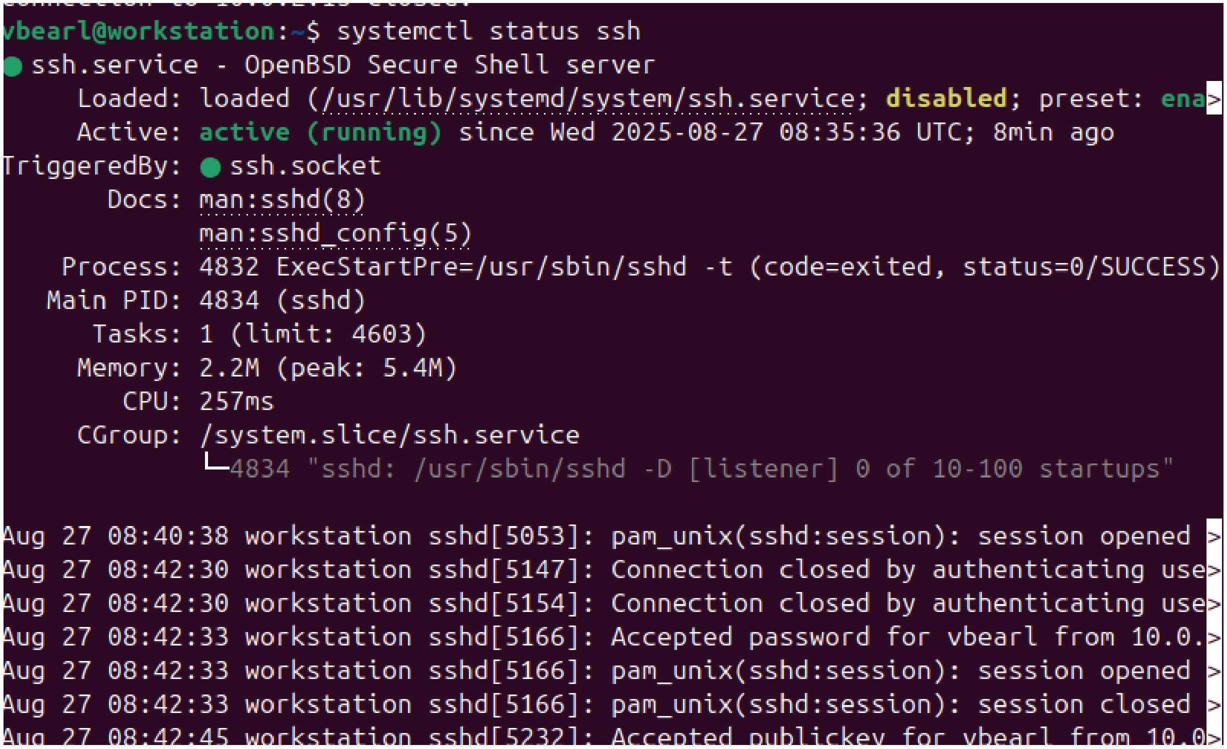
5. Locate the ssh server man config file /*etc/ssh/sshd_config* and perform custom configuration. Every time you make any change to the /*etc/ssh/sshd-config* configuration file reload the *sshd* service to apply changes:
   $ systemctl reload sshd



```
success
[root@vbox vbearl]# systemctl reload sshd
```

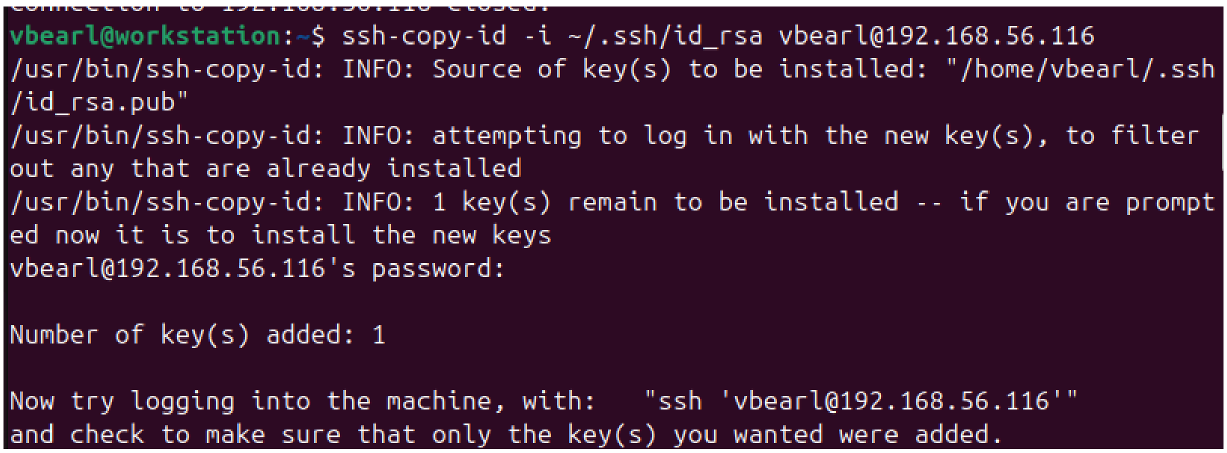
Task 3: Copy the Public Key to CentOS

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



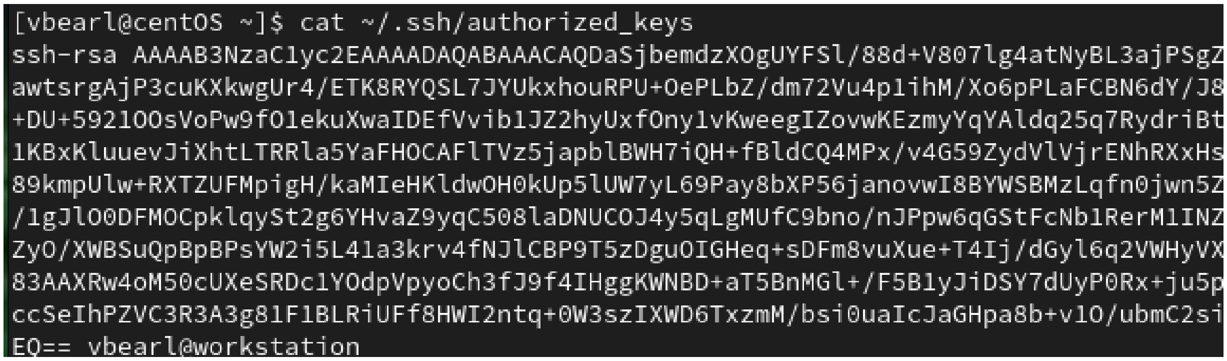
```
vbearl@workstation:~$ systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
     Loaded: loaded (/usr/lib/systemd/system/ssh.service; disabled; preset: ena>
     Active: active (running) since Wed 2025-08-27 08:35:36 UTC; 8min ago
TriggeredBy: ● ssh.socket
       Docs: man:sshd(8)
             man:sshd_config(5)
    Process: 4832 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
   Main PID: 4834 (sshd)
      Tasks: 1 (limit: 4603)
     Memory: 2.2M (peak: 5.4M)
        CPU: 257ms
     CGroup: /system.slice/ssh.service
             └─4834 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Aug 27 08:40:38 workstation sshd[5053]: pam_unix(sshd:session): session opened >
Aug 27 08:42:30 workstation sshd[5147]: Connection closed by authenticating use>
Aug 27 08:42:30 workstation sshd[5154]: Connection closed by authenticating use>
Aug 27 08:42:33 workstation sshd[5166]: Accepted password for vbearl from 10.0.>
Aug 27 08:42:33 workstation sshd[5166]: pam_unix(sshd:session): session opened >
Aug 27 08:42:33 workstation sshd[5166]: pam_unix(sshd:session): session closed >
Aug 27 08:42:45 workstation sshd[5232]: Accepted publickey for vbearl from 10.0>
```

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



```
vbearl@workstation:~$ ssh-copy-id -i ~/.ssh/id_rsa vbearl@192.168.56.116
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/vbearl/.ssh
/id_rsa.pub"
/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
vbearl@192.168.56.116's password: 

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'vbearl@192.168.56.116'"
and check to make sure that only the key(s) you wanted were added.
```

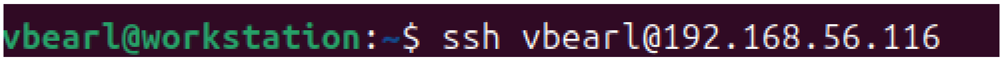
3. On CentOS, verify that you have the *authorized_keys*.



```
[vbearl@centOS ~]$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQDaSjbemdzXOgUYFSl/88d+V807lg4atNyBL3ajPSgZ
awtsrgAjP3cuKXkwgUr4/ETK8RYQSL7JYUkxhouRPU+OePLbZ/dm72Vu4plihM/Xo6pPLaFCBN6dY/J8
+DU+592lOOsVoPw9fO1ekuXwaIDEfVvib1JZ2hyUxfOny1vKweegIZovwKEzmyYqYAldq25q7RydriBt
1KBxKluuevJiXhtLTRRla5YaFHOCAFlTVz5japblBWH7iQH+fBldCQ4MPx/v4G59ZydVlVjrENhRXxHs
89kmpUlw+RXTZUFMpigH/kaMIeHKldwOH0kUp5lUW7yL69Pay8bXP56janovwI8BYWSBMzLqfn0jwn5Z
/1gJlO0DFMOCpklqySt2g6YHvaZ9yqC508laDNUCOJ4y5qLgMUfC9bno/nJPpw6qGStFcNb1RerM1INZ
ZyO/XWBSuQpBpBPsYW2i5L41a3krv4fNJlCBP9T5zDguOIGHeq+sDFm8vuXue+T4Ij/dGyl6q2VWHyVX
83AAXRw4oM50cUXeSRDc1YOdpVpyoCh3fJ9f4IHggKWNBD+aT5BnMGl+/F5B1yJiDSY7dUyP0Rx+ju5p
ccSeIhPZVC3R3A3g81F1BLRiUFf8HWI2ntq+0W3szIXWD6TxzmM/bsi0uaIcJaGHpa8b+v1O/ubmC2si
EQ== vbearl@workstation
```

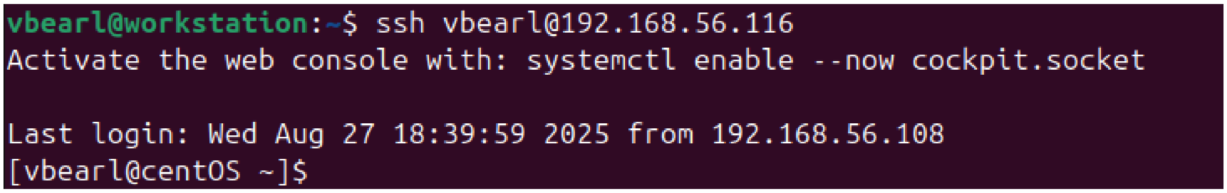
Task 4: Verify ssh remote connection

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



```
vbearl@workstation:~$ ssh vbearl@192.168.56.116
```

2. Show evidence that you are connected.



```
vbearl@workstation:~$ ssh vbearl@192.168.56.116
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Wed Aug 27 18:39:59 2025 from 192.168.56.108
[vbearl@centOS ~]$
```

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?
   - Debian is known for being very stable, open-source, and great for people who want full control and flexibility, especially on servers or personal use. Red Hat (and its variants like CentOS or AlmaLinux) is often used in businesses because it offers strong support, security updates, and tools for managing large systems. So, if you want something free and community-driven, Debian might be better. If you need professional support and tools for enterprise use, go with Red Hat.
2. What are the main differences between Debian and Red Hat Linux distributions?
   - The main differences between Debian and Red Hat Linux distributions are in their package management, support, and target users. Debian uses .deb packages with the APT tool, while Red Hat uses .rpm packages with YUM or DNF. Debian is fully community-driven and focused on free software, making it popular with advanced users and developers. Red Hat, on the other hand, is backed by a company and offers paid support, making it a top choice for businesses. Also, Red Hat systems often focus more on stability and long-term support in enterprise environments.