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Course/Section: CPE31S2	**Date Submitted: 9/13/2024**
Instructor: Mr. Robin Valenzuela	**Semester and SY: 1st semester/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.

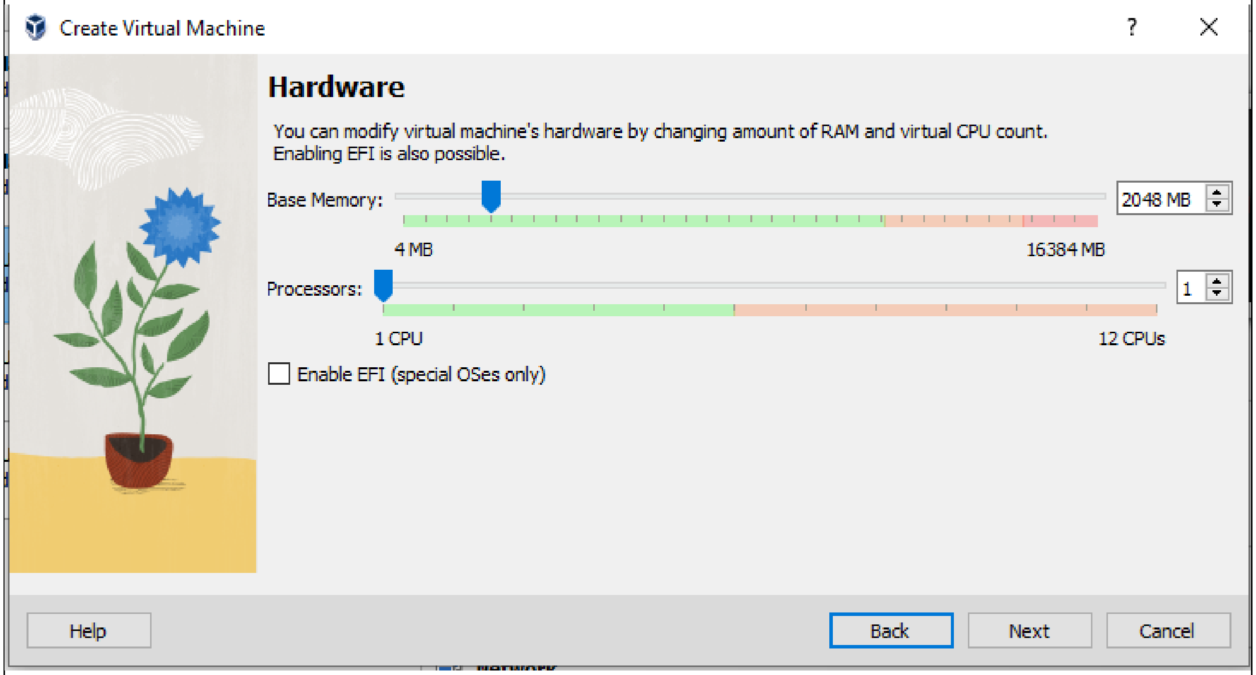
CentOS uses the RPM package format and YUM/DNF as the package manager.

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.



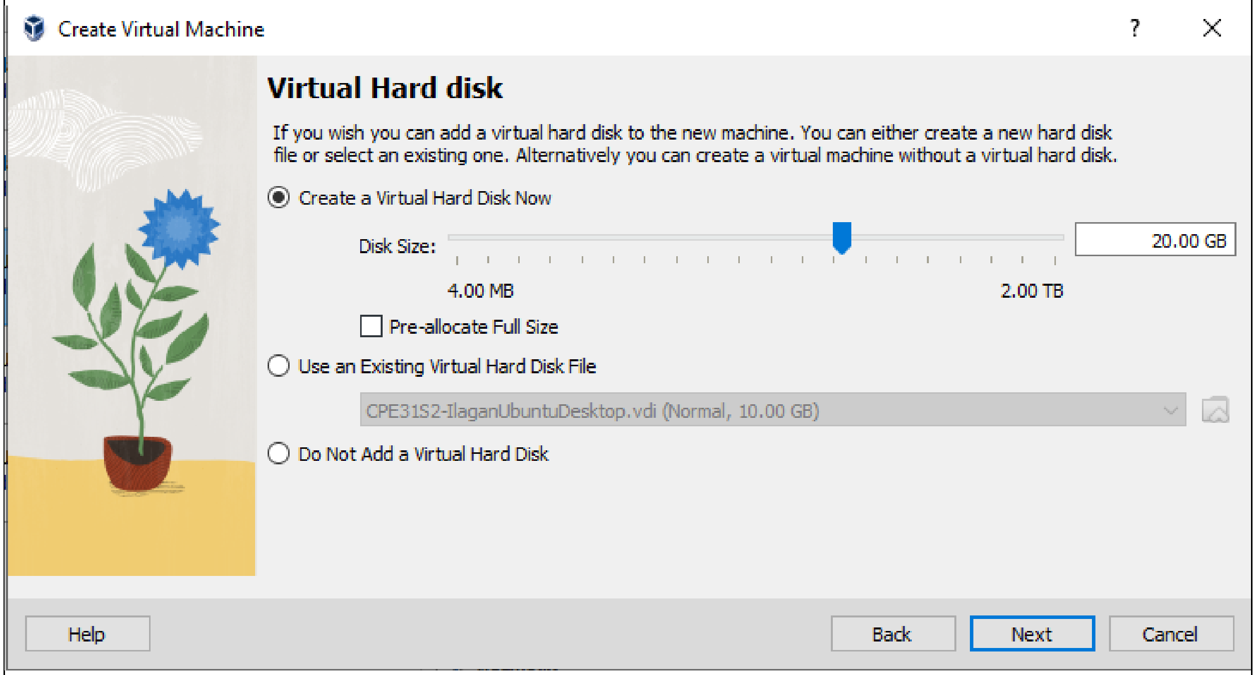
Hardware

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

Processors: 1

□ Enable EFI (special OSes only)



Create Virtual Machine

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

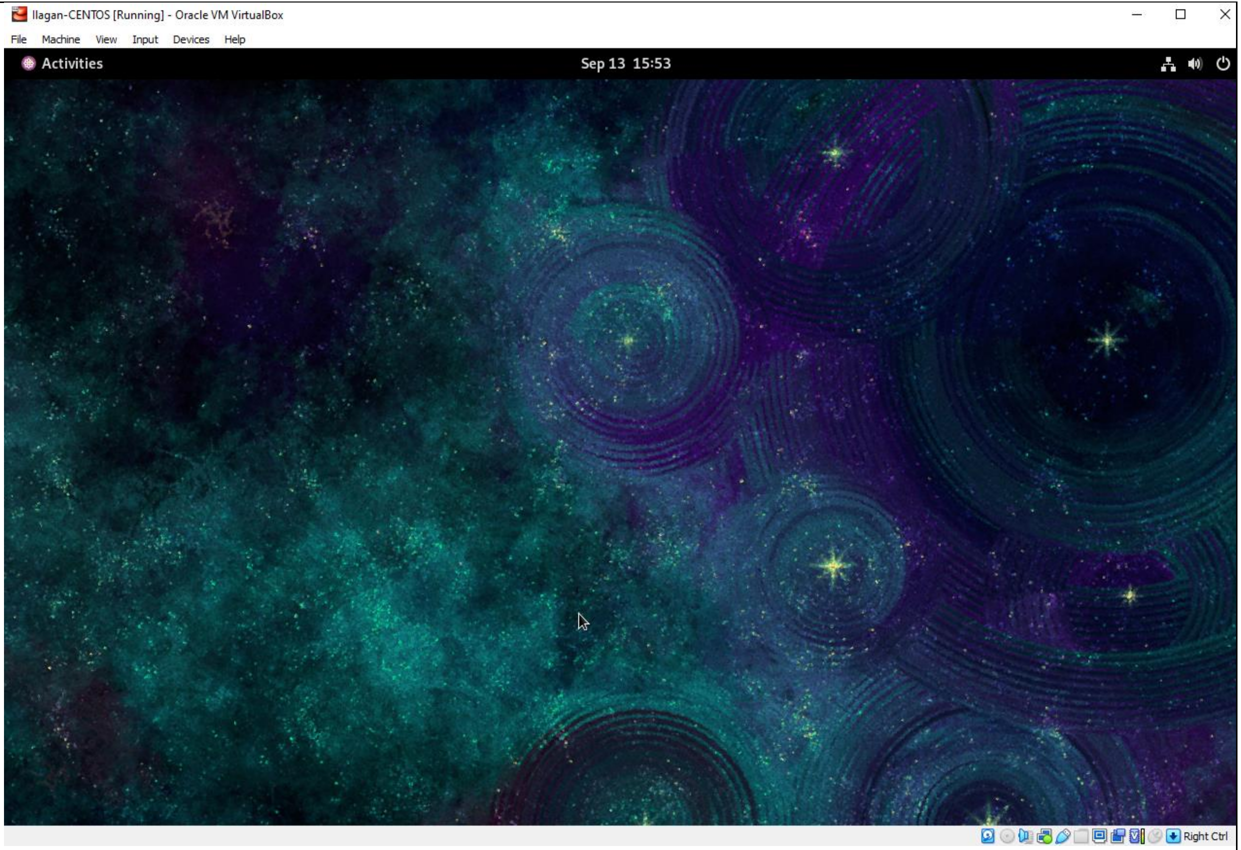
□ Pre-allocate Full Size

○ Use an Existing Virtual Hard Disk File

CPE31S2-IlaganUbuntuDesktop.vdi (Normal, 10.00 GB)

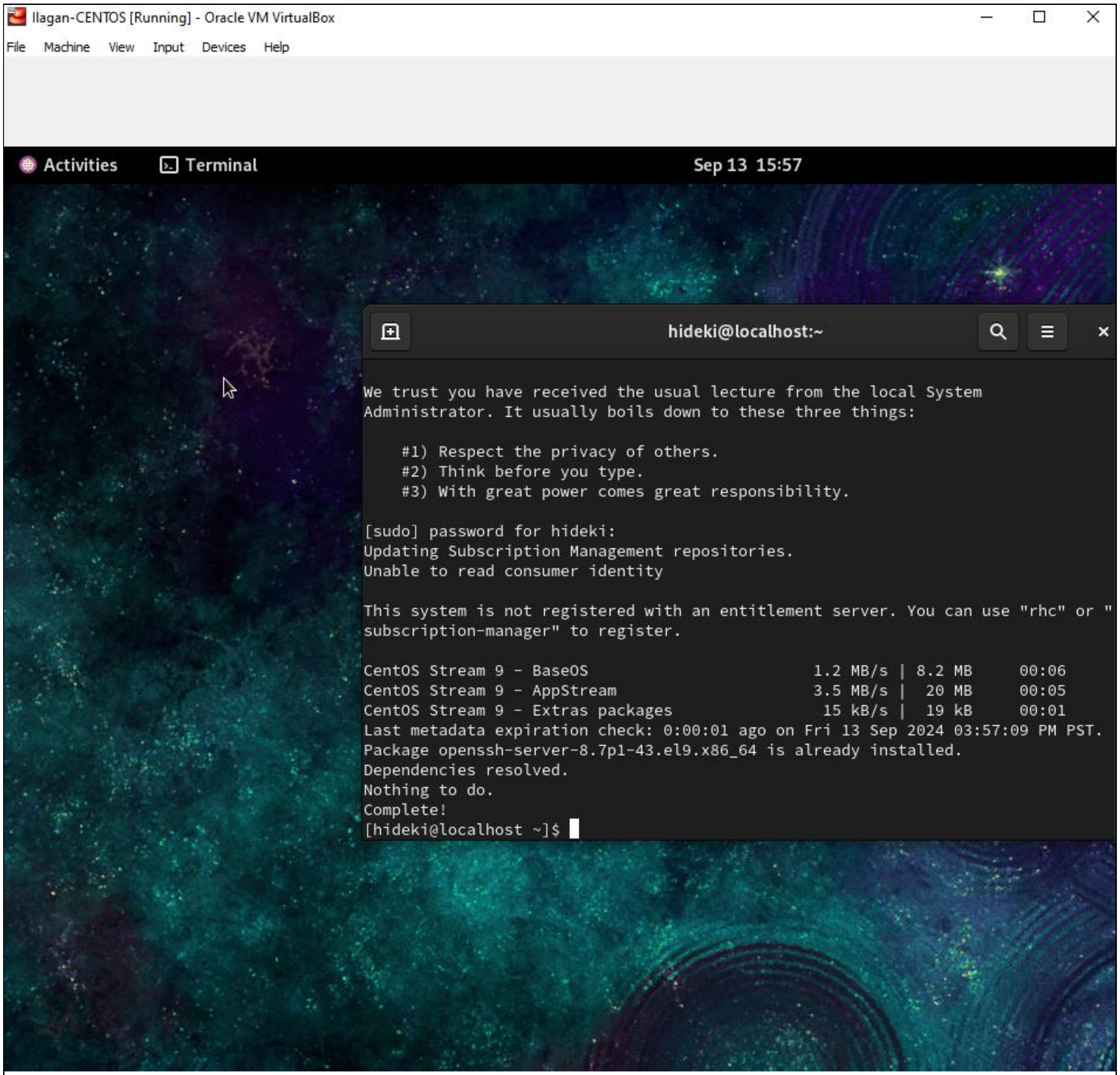
○ Do Not Add a Virtual Hard Disk

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



Task 2: Install the SSH server package *openssh*

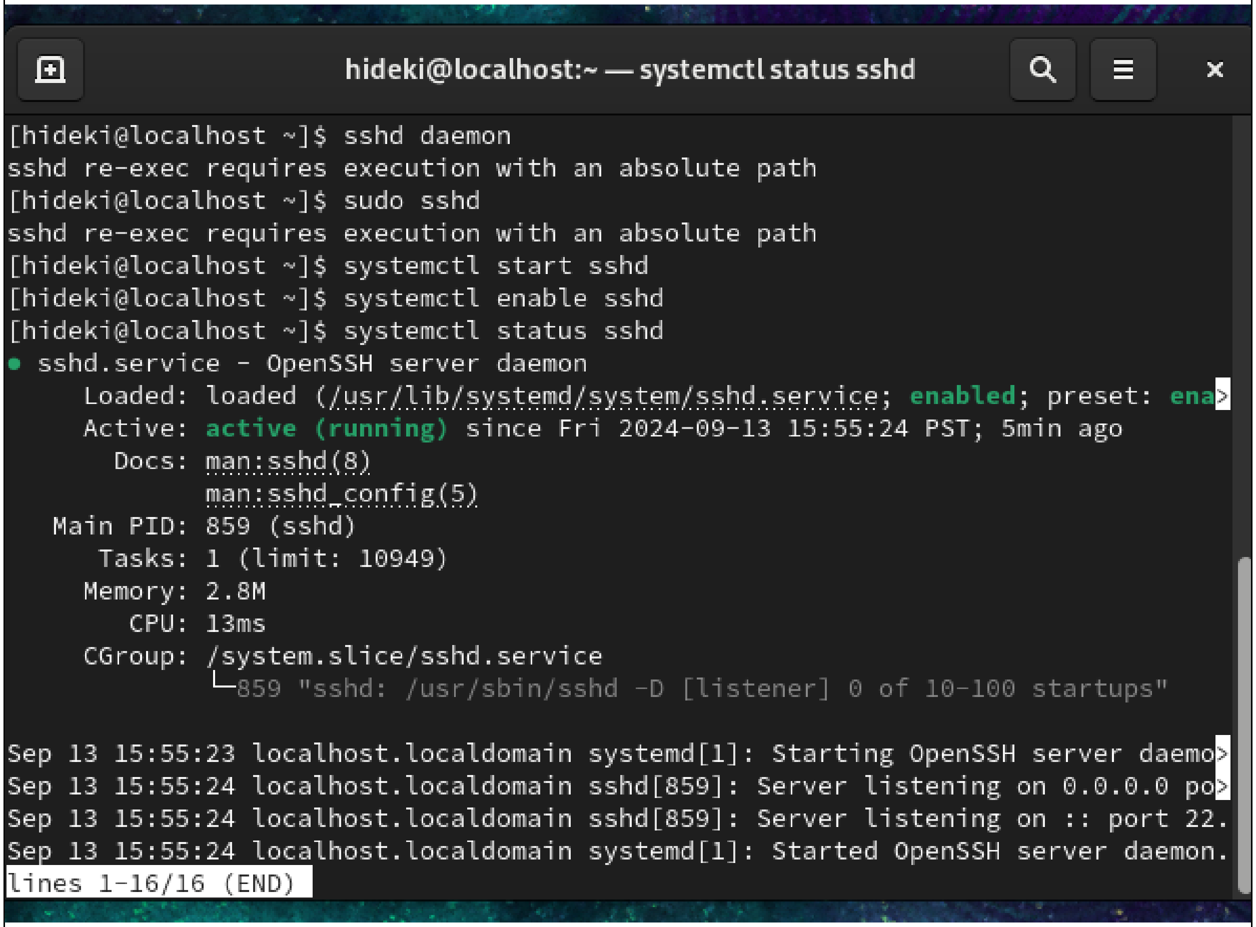
1. Install the ssh server package *openssh* by using the *dnf* command:
   $ dnf install openssh-server



Ilagan-CENTOS [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Terminal
Sep 13 15:57
hideki@localhost:~

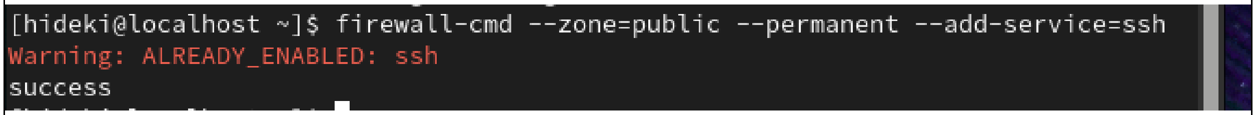
```
We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

    #1) Respect the privacy of others.
    #2) Think before you type.
    #3) With great power comes great responsibility.

[sudo] password for hideki:
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                        1.2 MB/s | 8.2 MB     00:06
CentOS Stream 9 - AppStream                     3.5 MB/s |  20 MB     00:05
CentOS Stream 9 - Extras packages                15 kB/s |  19 kB     00:01
Last metadata expiration check: 0:00:01 ago on Fri 13 Sep 2024 03:57:09 PM PST.
Package openssh-server-8.7p1-43.el9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[hideki@localhost ~]$
```

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



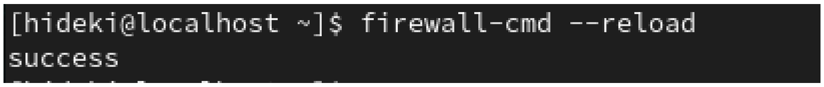
```
[hideki@localhost ~]$ sshd daemon
sshd re-exec requires execution with an absolute path
[hideki@localhost ~]$ sudo sshd
sshd re-exec requires execution with an absolute path
[hideki@localhost ~]$ systemctl start sshd
[hideki@localhost ~]$ systemctl enable sshd
[hideki@localhost ~]$ systemctl status 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 15:55:24 PST; 5min ago
       Docs: man:sshd(8)
             man:sshd_config(5)
   Main PID: 859 (sshd)
      Tasks: 1 (limit: 10949)
     Memory: 2.8M
        CPU: 13ms
     CGroup: /system.slice/sshd.service
             └─859 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Sep 13 15:55:23 localhost.localdomain systemd[1]: Starting OpenSSH server daemo>
Sep 13 15:55:24 localhost.localdomain sshd[859]: Server listening on 0.0.0.0 po>
Sep 13 15:55:24 localhost.localdomain sshd[859]: Server listening on :: port 22.
Sep 13 15:55:24 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
lines 1-16/16 (END)
```

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



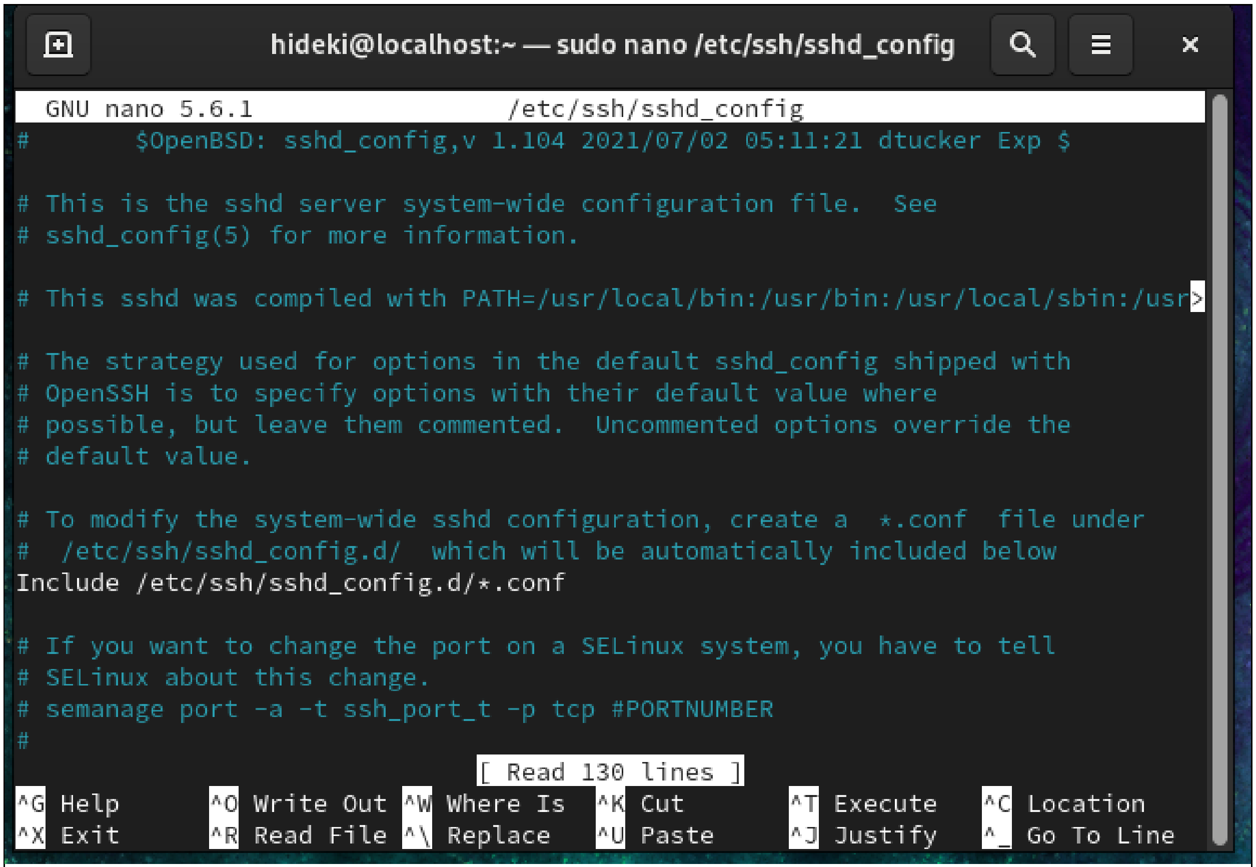
```
[hideki@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
```

   $ firewall-cmd –reload



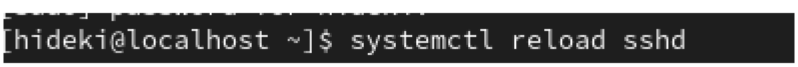
```
[hideki@localhost ~]$ firewall-cmd --reload
success
```

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:



```
  GNU nano 5.6.1                    /etc/ssh/sshd_config
#       $OpenBSD: sshd_config,v 1.104 2021/07/02 05:11:21 dtucker 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:/usr/local/sbin:/usr>

# 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.

# To modify the system-wide sshd configuration, create a  *.conf  file under
#  /etc/ssh/sshd_config.d/  which will be automatically included below
Include /etc/ssh/sshd_config.d/*.conf

# 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
#
                               [ Read 130 lines ]
^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
```

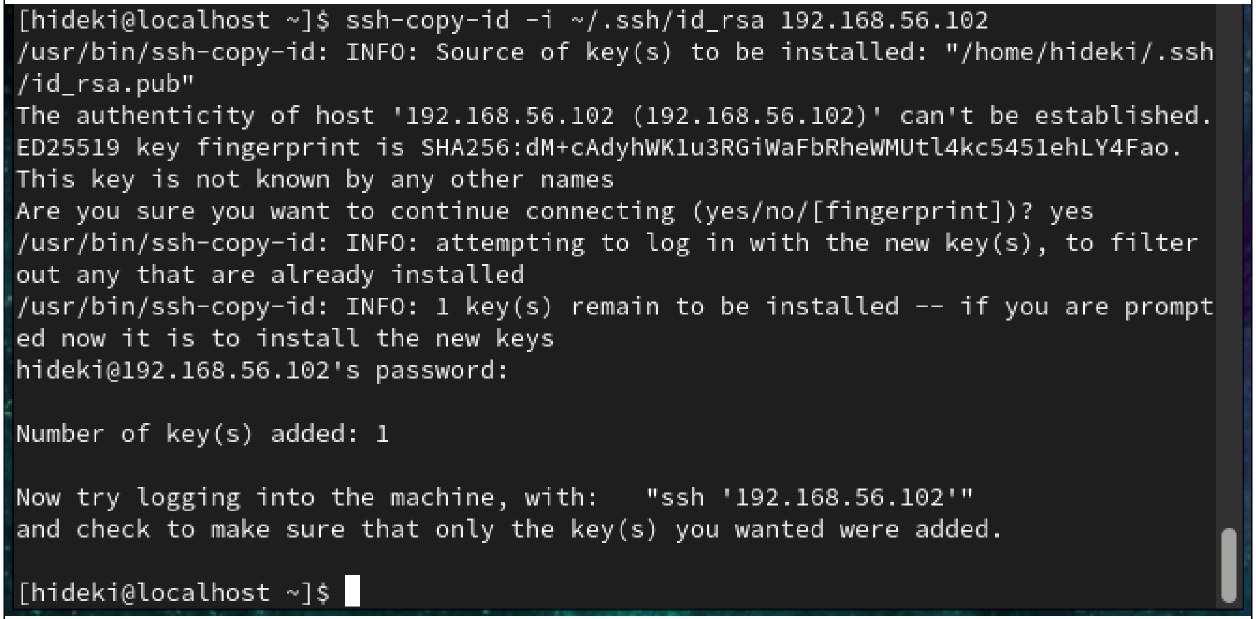
$ systemctl reload sshd



```
[hideki@localhost ~]$ systemctl reload sshd
```

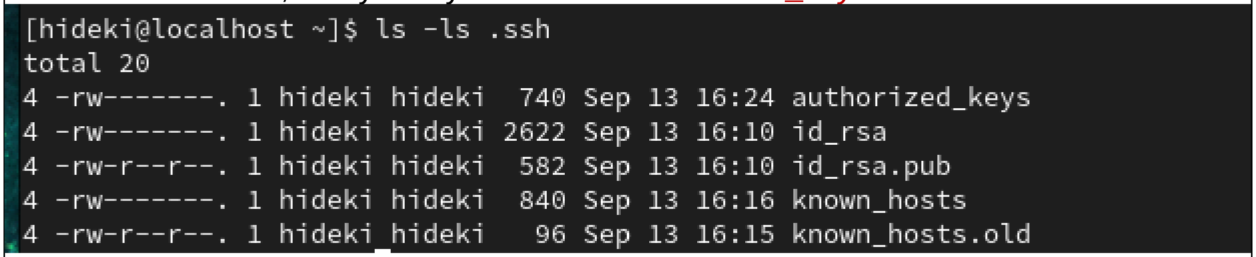
Task 3: Copy the Public Key to CentOS

1. Make sure that *ssh* is installed on the local machine.
2. Using the command *ssh-copy-id*, connect your local machine to CentOS.



```
[hideki@localhost ~]$ ssh-copy-id -i ~/.ssh/id_rsa 192.168.56.102
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/hideki/.ssh
/id_rsa.pub"
The authenticity of host '192.168.56.102 (192.168.56.102)' can't be established.
ED25519 key fingerprint is SHA256:dM+cAdyhWK1u3RGiWaFbRheWMUtl4kc5451ehLY4Fao.
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 prompt
ed now it is to install the new keys
hideki@192.168.56.102's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh '192.168.56.102'"
and check to make sure that only the key(s) you wanted were added.

[hideki@localhost ~]$ 
```

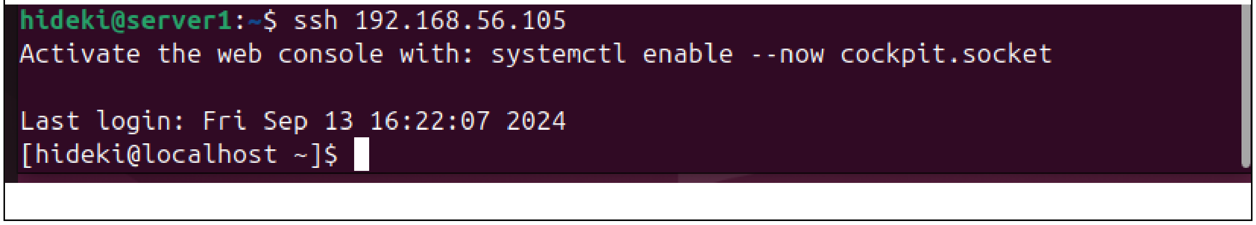
3. On CentOS, verify that you have the *authorized_keys*.



```
[hideki@localhost ~]$ ls -ls .ssh
total 20
4 -rw-------. 1 hideki hideki  740 Sep 13 16:24 authorized_keys
4 -rw-------. 1 hideki hideki 2622 Sep 13 16:10 id_rsa
4 -rw-r--r--. 1 hideki hideki  582 Sep 13 16:10 id_rsa.pub
4 -rw-------. 1 hideki hideki  840 Sep 13 16:16 known_hosts
4 -rw-r--r--. 1 hideki hideki   96 Sep 13 16:15 known_hosts.old
```

Task 4: Verify ssh remote connection

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



```
hideki@server1:~$ ssh 192.168.56.105
Activate the web console with: systemctl enable --now cockpit.socket

Last login: Fri Sep 13 16:22:07 2024
[hideki@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?
   - There are various factors that an administrator should consider before choosing between the two distributions. Some of the factors are its security, support from the distributors
2. What are the main difference between Debian and Red Hat Linux distributions?

   Debian is flexible distribution, an open-source software, and mostly ran by community. While the Red Hat Linux is designed for enterprise environment developed by Red Hat itself which promotes a more secure and long term support Operating system.