Name: Yuri P. Nollan	**Date Performed:09/14/2023**
Course/Section: CPE31S6	**Date Submitted:09/14/2023**
Instructor: Dr. Jonathan Taylar	**Semester and SY: 1st Sem AY 2023-2024**

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.

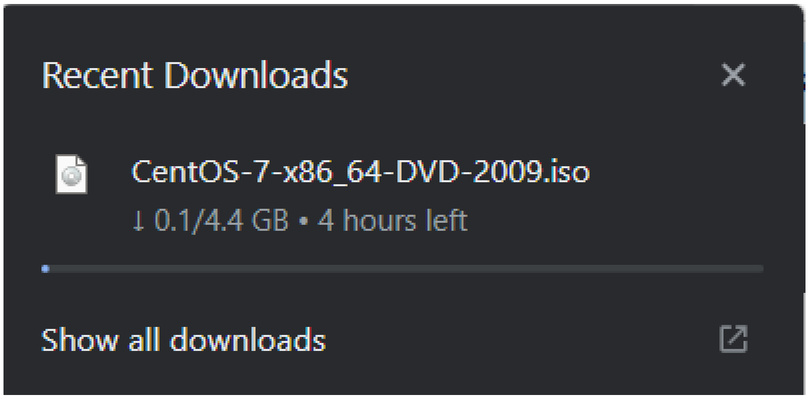
CentOS uses the RPM package format and YUM/DNF as the package manager.

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/

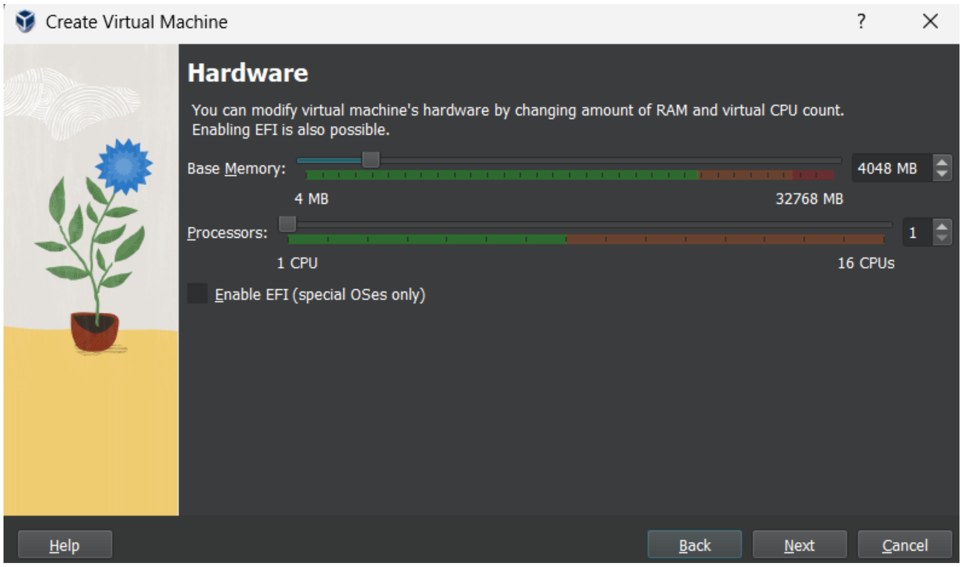


Recent Downloads

CentOS-7-x86_64-DVD-2009.iso

↓ 0.1/4.4 GB • 4 hours left

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



Create Virtual Machine

Hardware

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

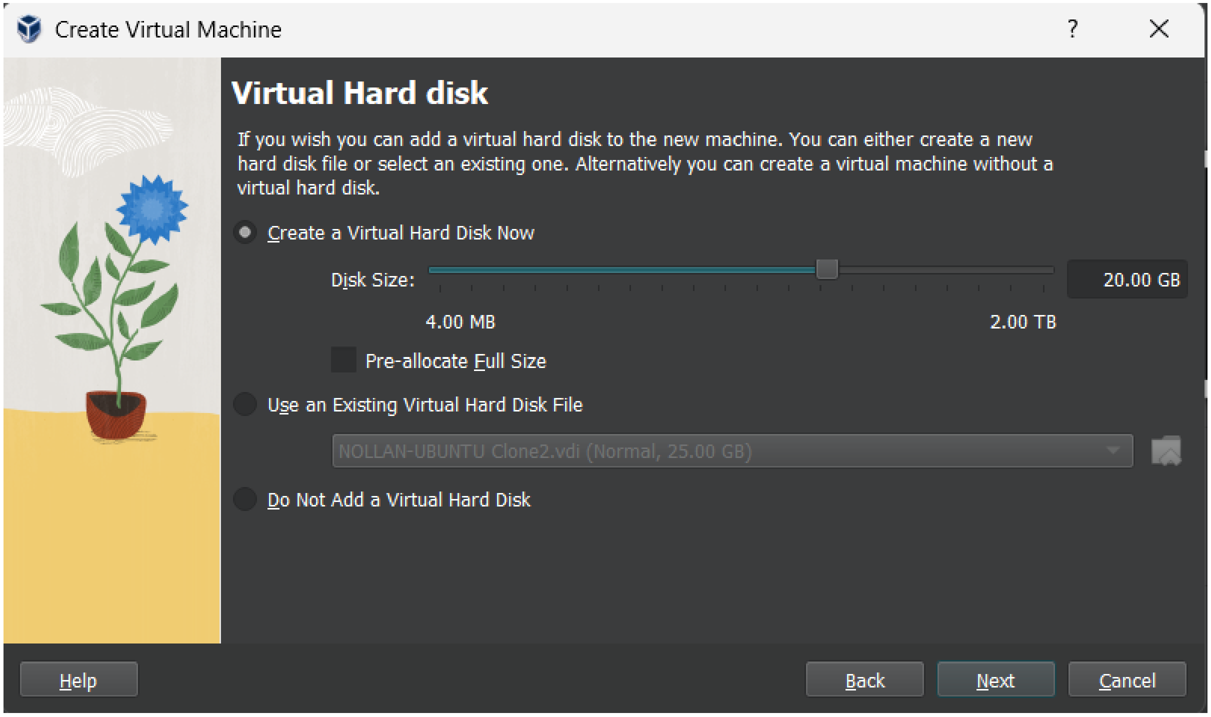
Base Memory: 4048 MB

4 MB 32768 MB

Processors: 1

1 CPU 16 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

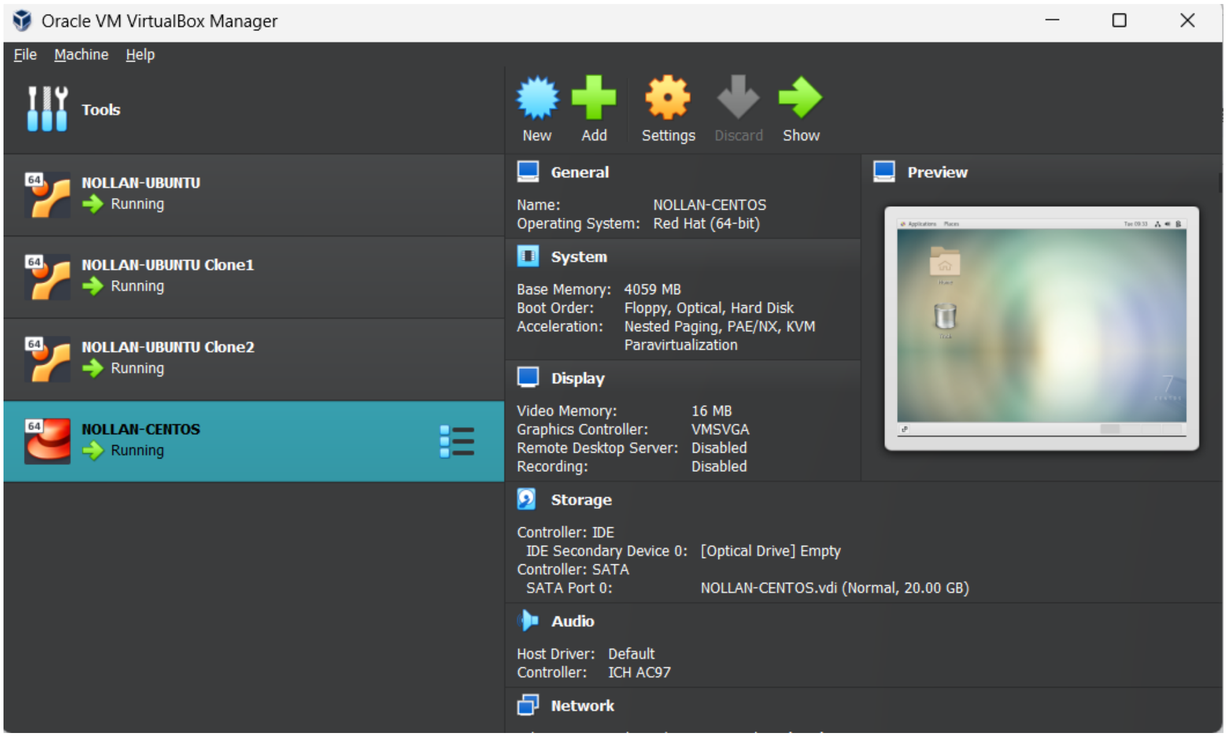
□ Pre-allocate Full Size

○ Use an Existing Virtual Hard Disk File

NOLLAN-UBUNTU Clone2.vdi (Normal, 25.00 GB)

○ Do Not Add a Virtual Hard Disk

3. Install the downloaded image.



NOLLAN-UBUNTU
Running

NOLLAN-UBUNTU Clone1
Running

NOLLAN-UBUNTU Clone2
Running

NOLLAN-CENTOS
Running

General

Name: NOLLAN-CENTOS
Operating System: Red Hat (64-bit)

System

Base Memory: 4059 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: Nested Paging, PAE/NX, KVM Paravirtualization

Display

Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled

Storage

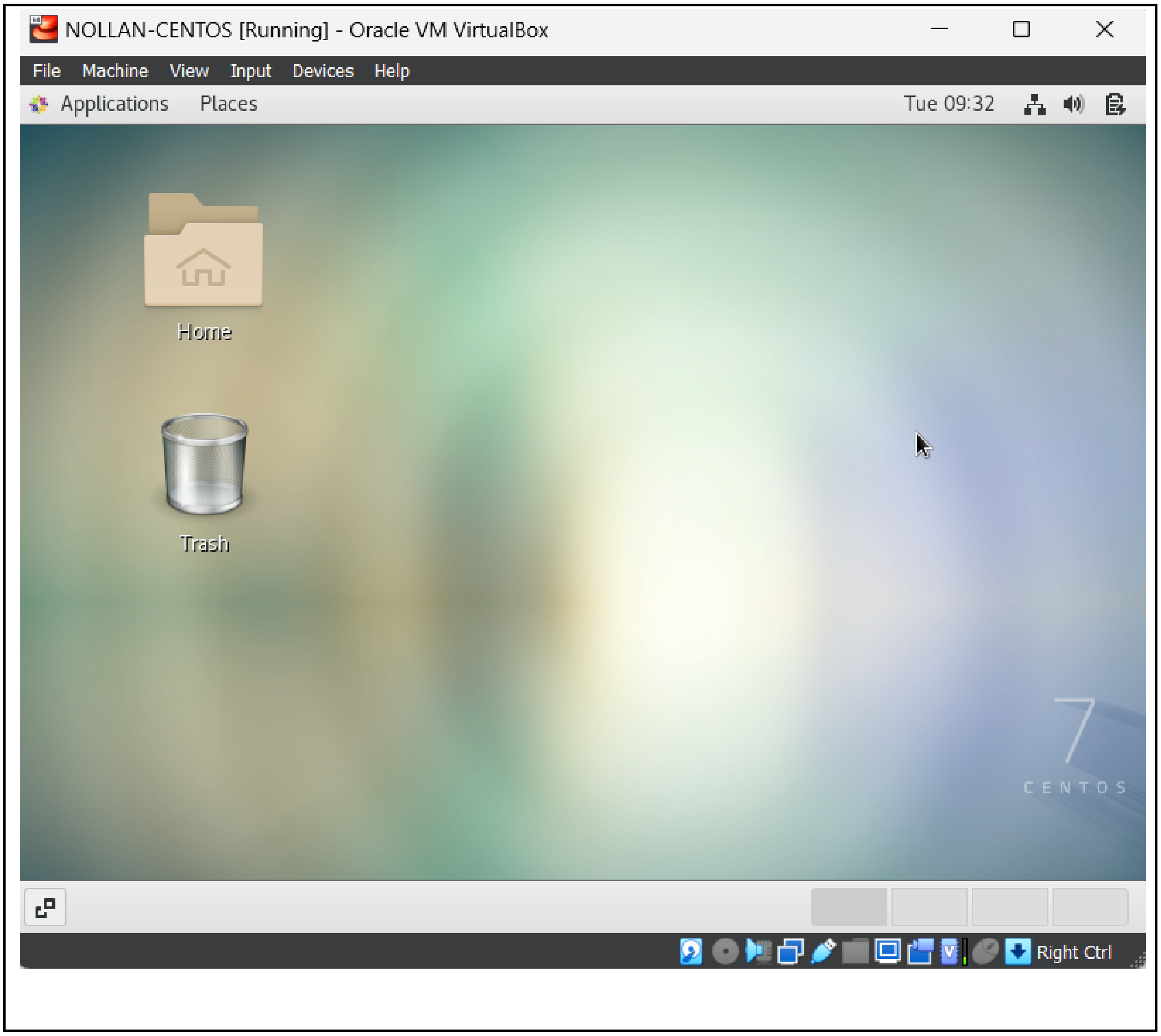
Controller: IDE
IDE Secondary Device 0: [Optical Drive] Empty
Controller: SATA
SATA Port 0: NOLLAN-CENTOS.vdi (Normal, 20.00 GB)

Audio

Host Driver: Default
Controller: ICH AC97

Network

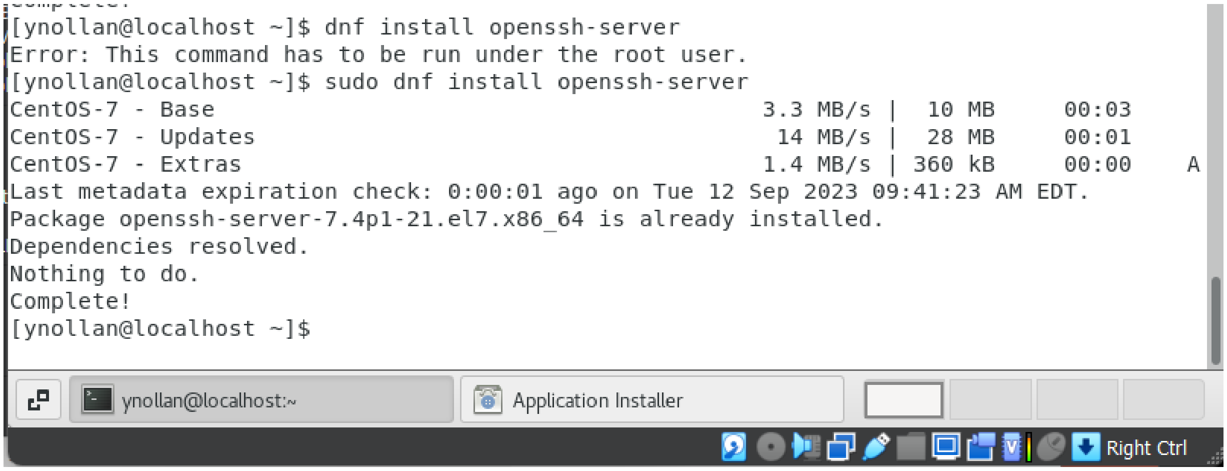
4. Show evidence that the OS was installed already.


NOLLAN-CENTOS [Running] - Oracle VM VirtualBox
File
Machine
View
Input
Devices
Help
Applications
Places
Tue 09:32
Home
Trash
7
CENTOS
Right Ctrl

Task 2: Install the SSH server package *openssh*

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

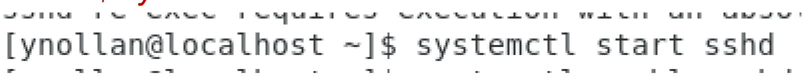
   $ dnf install openssh-server



```
[ynollan@localhost ~]$ dnf install openssh-server
Error: This command has to be run under the root user.
[ynollan@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base                                 3.3 MB/s |  10 MB     00:03
CentOS-7 - Updates                               14 MB/s |  28 MB     00:01
CentOS-7 - Extras                               1.4 MB/s | 360 kB     00:00    A
Last metadata expiration check: 0:00:01 ago on Tue 12 Sep 2023 09:41:23 AM EDT.
Package openssh-server-7.4p1-21.el7.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[ynollan@localhost ~]$
```

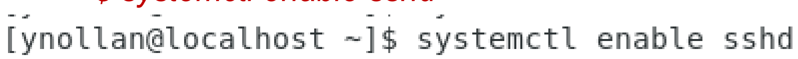
2. Start the *sshd* daemon and set to start after reboot:

   $ systemctl start sshd



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

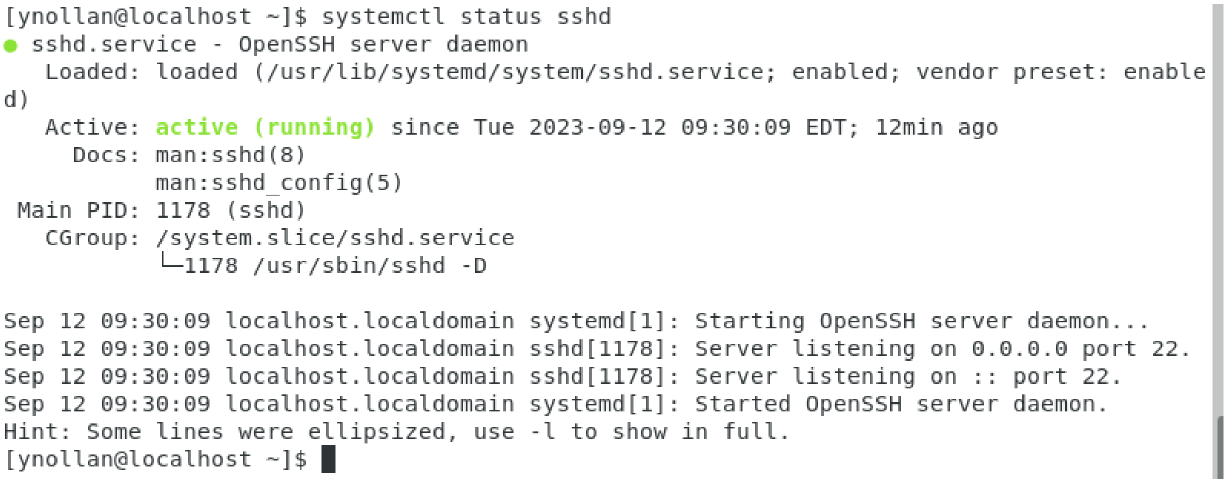
   $ systemctl enable sshd



```
[ynollan@localhost ~]$ systemctl enable sshd
```

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

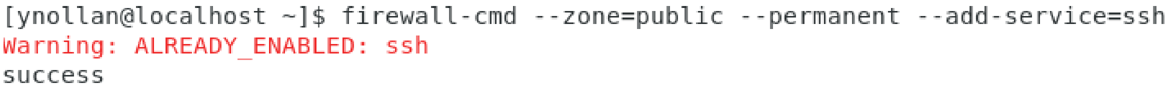
   $ systemctl status sshd



```
[ynollan@localhost ~]$ systemctl status sshd
● sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/sshd.service; enabled; vendor preset: enable
d)
   Active: active (running) since Tue 2023-09-12 09:30:09 EDT; 12min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 1178 (sshd)
   CGroup: /system.slice/sshd.service
           └─1178 /usr/sbin/sshd -D

Sep 12 09:30:09 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 12 09:30:09 localhost.localdomain sshd[1178]: Server listening on 0.0.0.0 port 22.
Sep 12 09:30:09 localhost.localdomain sshd[1178]: Server listening on :: port 22.
Sep 12 09:30:09 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[ynollan@localhost ~]$ █
```

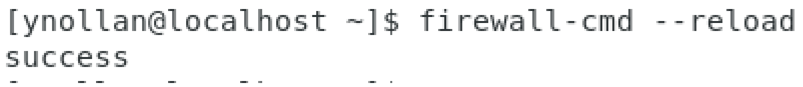
4. Open the SSH port 22 to allow incoming traffic:

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



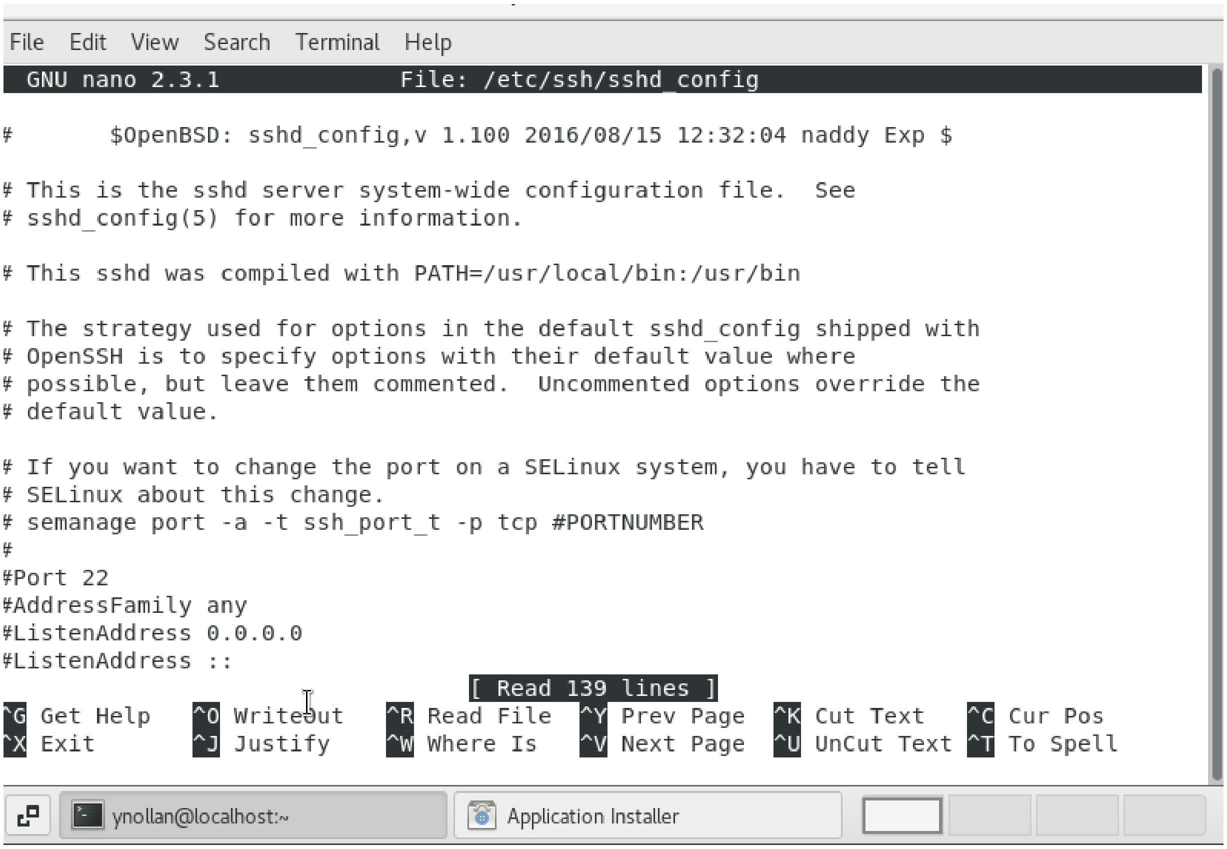
```
[ynollan@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
```

   $ firewall-cmd --reload

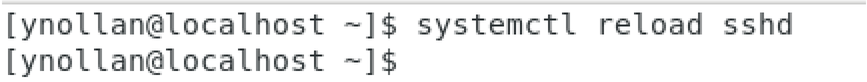


```
[ynollan@localhost ~]$ firewall-cmd --reload
success
```

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:
   $ systemctl reload sshd



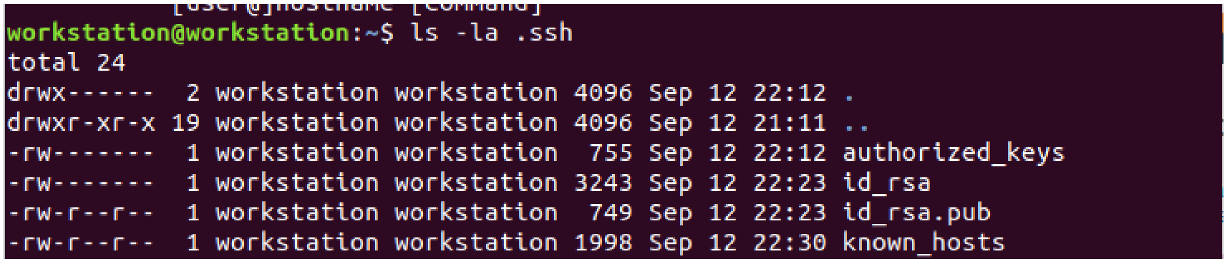
```
  GNU nano 2.3.1              File: /etc/ssh/sshd_config

#       $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 ::
                              [ Read 139 lines ]
^G Get Help    ^O WriteOut    ^R Read File   ^Y Prev Page   ^K Cut Text    ^C Cur Pos
^X Exit        ^J Justify     ^W Where Is    ^V Next Page   ^U UnCut Text  ^T To Spell
```



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

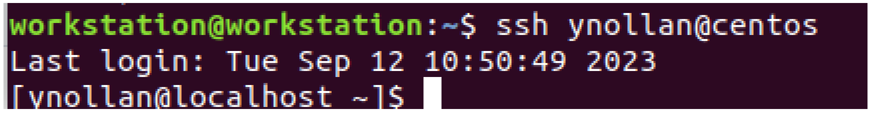
Task 3: Copy the Public Key to CentOS

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



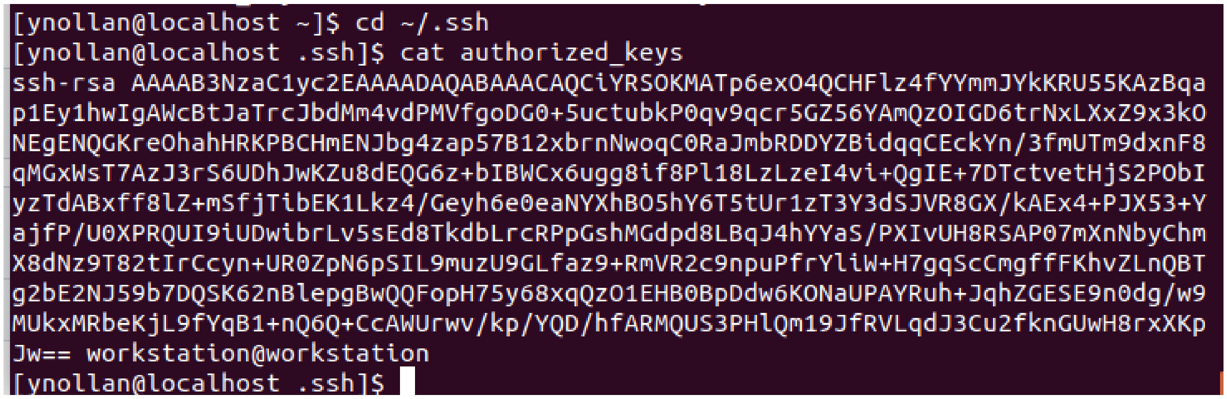
```
                    [user@]hostname [command]
workstation@workstation:~$ ls -la .ssh
total 24
drwx------  2 workstation workstation 4096 Sep 12 22:12 .
drwxr-xr-x 19 workstation workstation 4096 Sep 12 21:11 ..
-rw-------  1 workstation workstation  755 Sep 12 22:12 authorized_keys
-rw-------  1 workstation workstation 3243 Sep 12 22:23 id_rsa
-rw-r--r--  1 workstation workstation  749 Sep 12 22:23 id_rsa.pub
-rw-r--r--  1 workstation workstation 1998 Sep 12 22:30 known_hosts
```

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



```
workstation@workstation:~$ ssh ynollan@centos
Last login: Tue Sep 12 10:50:49 2023
[ynollan@localhost ~]$
```

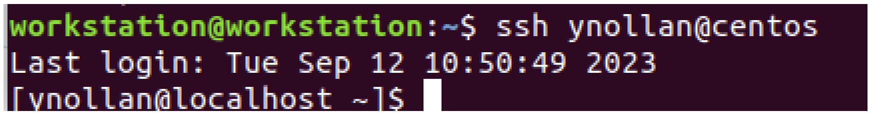
3. On CentOS, verify that you have the *authorized_keys*.



```
[ynollan@localhost ~]$ cd ~/.ssh
[ynollan@localhost .ssh]$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQCiYRSOKMATp6exO4QCHFlz4fYYmmJYkKRU55KAzBqa
p1Ey1hwIgAWcBtJaTrcJbdMm4vdPMVfgoDG0+5uctubkP0qv9qcr5GZ56YAmQzOIGD6trNxLXxZ9x3kO
NEgENQGKreOhahHRKPBCHmENJbg4zap57B12xbrnNwoqC0RaJmbRDDYZBidqqCEckYn/3fmUTm9dxnF8
qMGxWsT7AzJ3rS6UDhJwKZu8dEQG6z+bIBWCx6ugg8if8Pl18LzLzeI4vi+QgIE+7DTctvetHjS2PObI
yzTdABxff8lZ+mSfjTibEK1Lkz4/Geyh6e0eaNYXhBO5hY6T5tUr1zT3Y3dSJVR8GX/kAEx4+PJX53+Y
ajfP/U0XPRQUI9iUDwibrLv5sEd8TkdbLrcRPpGshMGdpd8LBqJ4hYYaS/PXIvUH8RSAP07mXnNbyChm
X8dNz9T82tIrCcyn+UR0ZpN6pSIL9muzU9GLfaz9+RmVR2c9npuPfrYliW+H7gqScCmgffFKhvZLnQBT
g2bE2NJ59b7DQSK62nBlepgBwQQFopH75y68xqQzO1EHB0BpDdw6KONaUPAYRuh+JqhZGESE9n0dg/w9
MUkxMRbeKjL9fYqB1+nQ6Q+CcAWUrwv/kp/YQD/hfARMQUS3PHlQm19JfRVLqdJ3Cu2fknGUwH8rxXKp
Jw== workstation@workstation
[ynollan@localhost .ssh]$
```

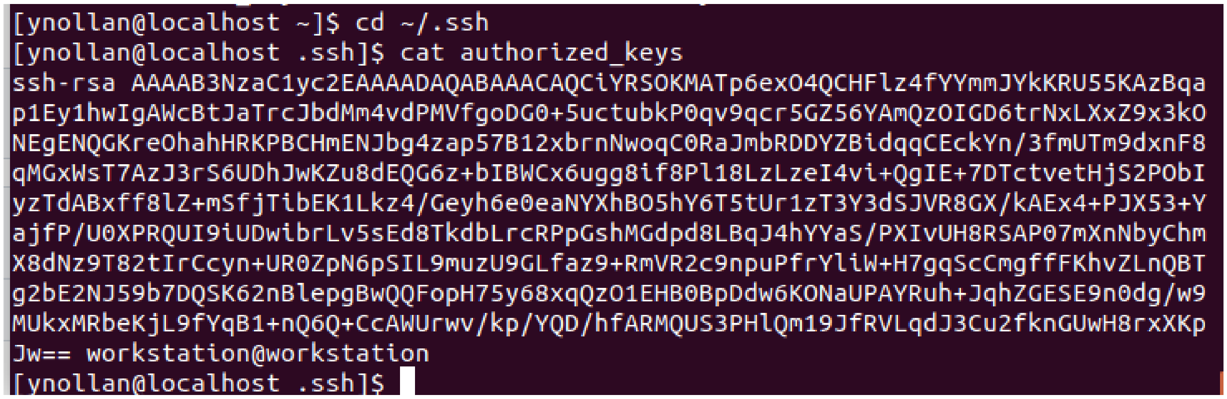
Task 4: Verify ssh remote connection

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



```
workstation@workstation:~$ ssh ynollan@centos
Last login: Tue Sep 12 10:50:49 2023
[ynollan@localhost ~]$
```

2. Show evidence that you are connected.



```
[ynollan@localhost ~]$ cd ~/.ssh
[ynollan@localhost .ssh]$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQCiYRSOKMATp6exO4QCHFlz4fYYmmJYkKRU55KAzBqa
p1Ey1hwIgAWcBtJaTrcJbdMm4vdPMVfgoDG0+5uctubkP0qv9qcr5GZ56YAmQzOIGD6trNxLXxZ9x3kO
NEgENQGKreOhahHRKPBCHmENJbg4zap57B12xbrnNwoqC0RaJmbRDDYZBidqqCEckYn/3fmUTm9dxnF8
qMGxWsT7AzJ3rS6UDhJwKZu8dEQG6z+bIBWCx6ugg8if8Pl18LzLzeI4vi+QgIE+7DTctvetHjS2PObI
yzTdABxff8lZ+mSfjTibEK1Lkz4/Geyh6e0eaNYXhBO5hY6T5tUr1zT3Y3dSJVR8GX/kAEx4+PJX53+Y
ajfP/U0XPRQUI9iUDwibrLv5sEd8TkdbLrcRPpGshMGdpd8LBqJ4hYYaS/PXIvUH8RSAP07mXnNbyChm
X8dNz9T82tIrCcyn+UR0ZpN6pSIL9muzU9GLfaz9+RmVR2c9npuPfrYliW+H7gqScCmgffFKhvZLnQBT
g2bE2NJ59b7DQSK62nBlepgBwQQFopH75y68xqQzO1EHB0BpDdw6KONaUPAYRuh+JqhZGESE9n0dg/w9
MUkxMRbeKjL9fYqB1+nQ6Q+CcAWUrwv/kp/YQD/hfARMQUS3PHlQm19JfRVLqdJ3Cu2fknGUwH8rxXKp
Jw== workstation@workstation
[ynollan@localhost .ssh]$
```

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?
   - it depends on the specific needs, preferences and use cases. If you want stability and reliability, Debian is the one you are looking for. When you need support and documentation, Red hat offers support through Red Hat Enterprise Linux (RHEL). Ultimately, the choice between Debian and RedHat/CentOS should be based on your specific use case, organization's requirements, and your familiarity with the distribution.

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

    - The main difference between Debian and Red Hat Linux is their package. Debian uses the apt command or Advanced Package Tool which simplifies the installation management of software packages while Red Hat or CentOS on the other hand uses yum or dnf for the package management.

Summary and Conclusions

Install Community Enterprise OS or Red Hat Linux OS

- Configure remote SSH connection from remote computer to CentOS/RHEL-8

- Based on this activity, I have successfully installed the Red Hat Linux or what others call CentOS. I have also learned how to configure the SSH connection from my remote computer or workstation to CentOS. Lastly, I was able to successfully configure and connect my remote computer to CentOS. Overall, this activity helped me discover new servers in linux and enhance my skills in the Linux OS.