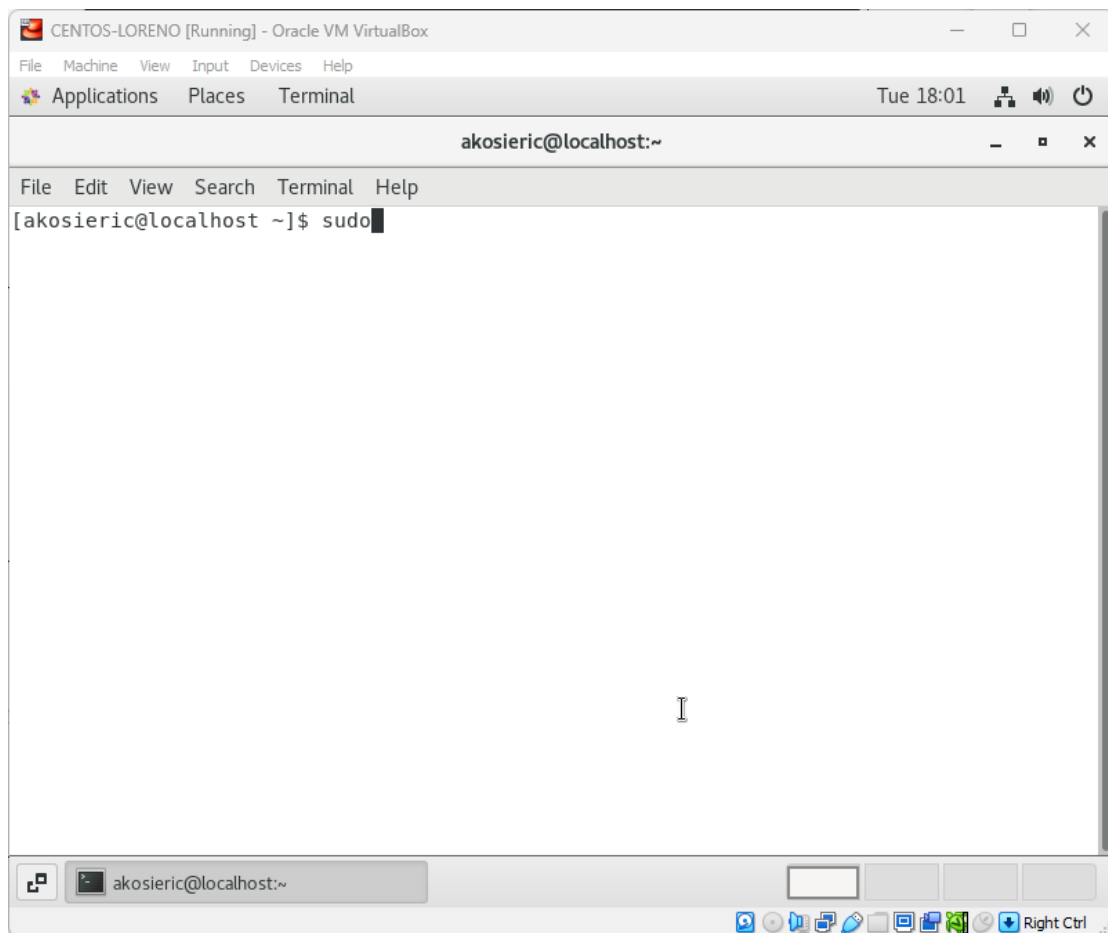


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Course/Section: CPE232-CPE31S4	Date Submitted: 08/29/23
Instructor: Dr. Jonathan V. Taylar	Semester and SY: 2023-2024
Activity 3: Install SSH server on CentOS or RHEL 8	
1. Objectives: 1.1 Install Community Enterprise OS or Red Hat Linux OS 1.2 Configure 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.

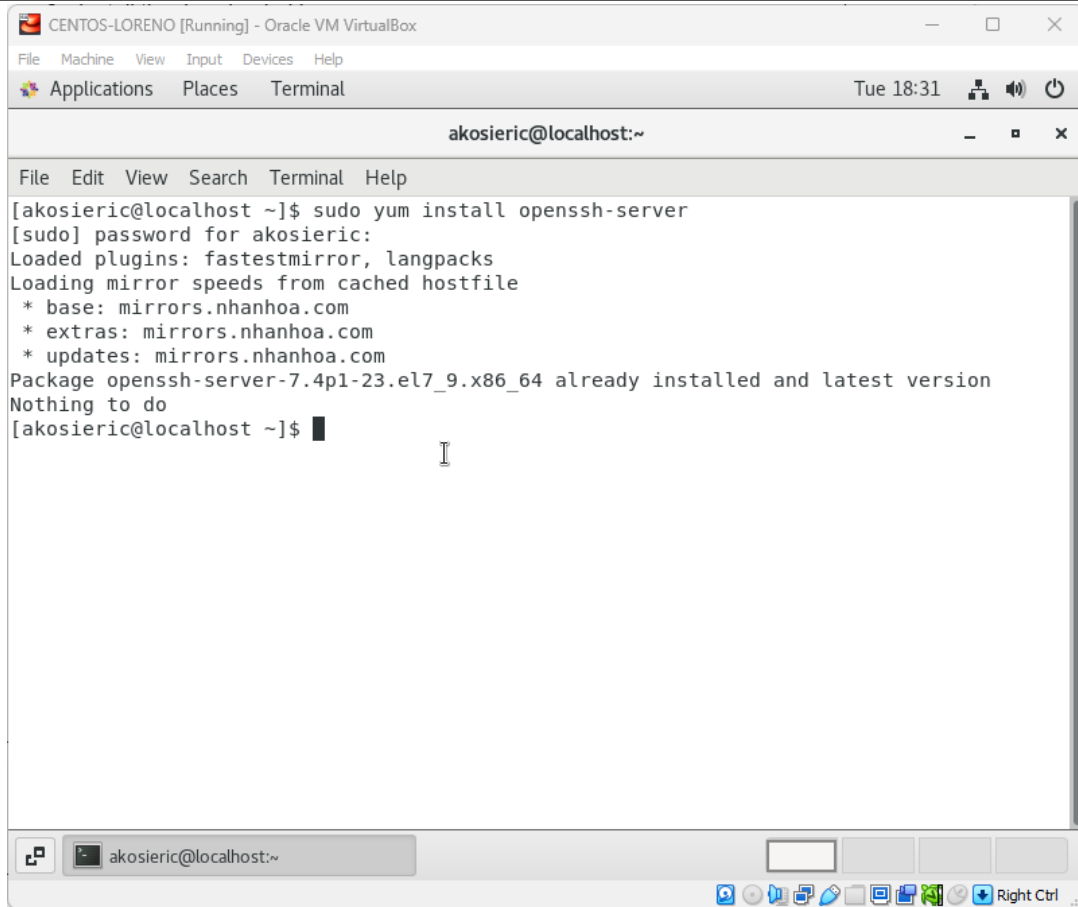
Task 1: Download the CentOS or RHEL-8 image (Create screenshots of the following)

1. Download the image of the CentOS here:
http://mirror.rise.ph/centos/7.9.2009/isos/x86_64/
2. Create a VM machine with 4 Gb RAM and 35 Gb HD.
3. Install the downloaded image.
4. Show evidence that the OS was installed already.



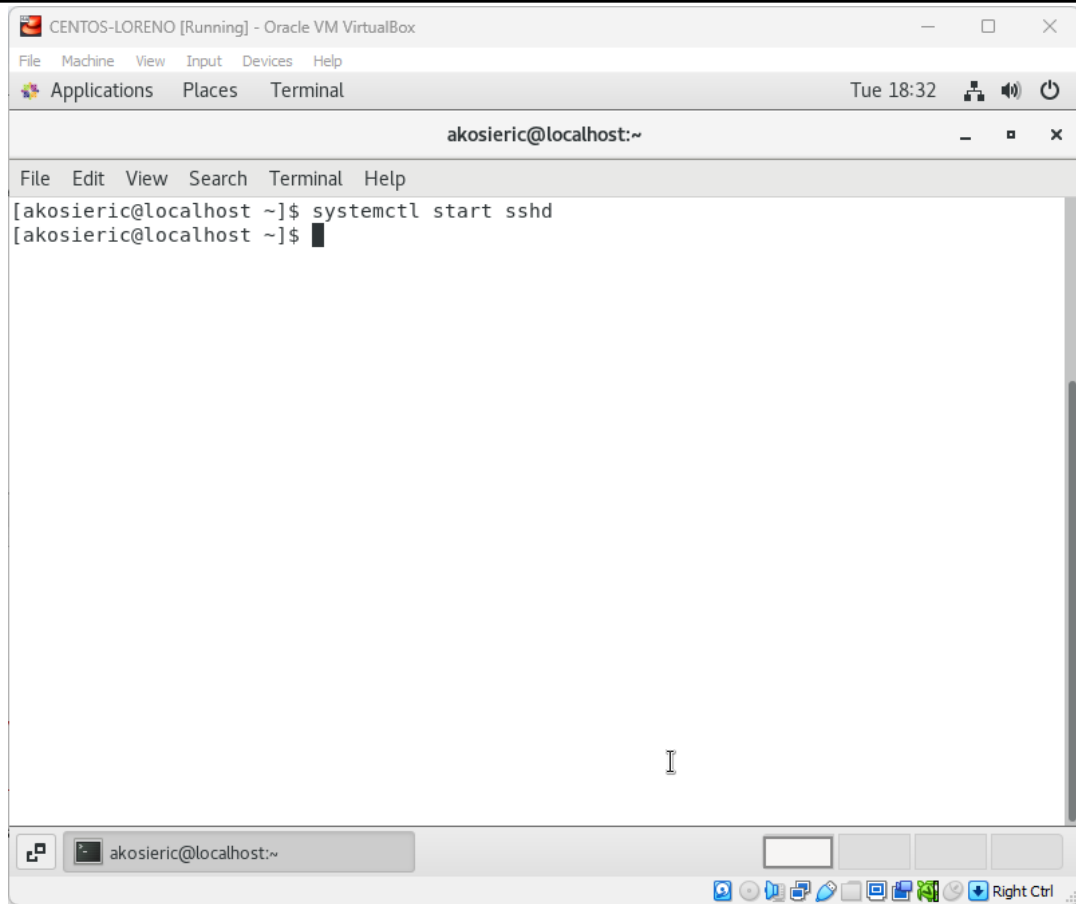
Task 2: Install the SSH server package *openssh*

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

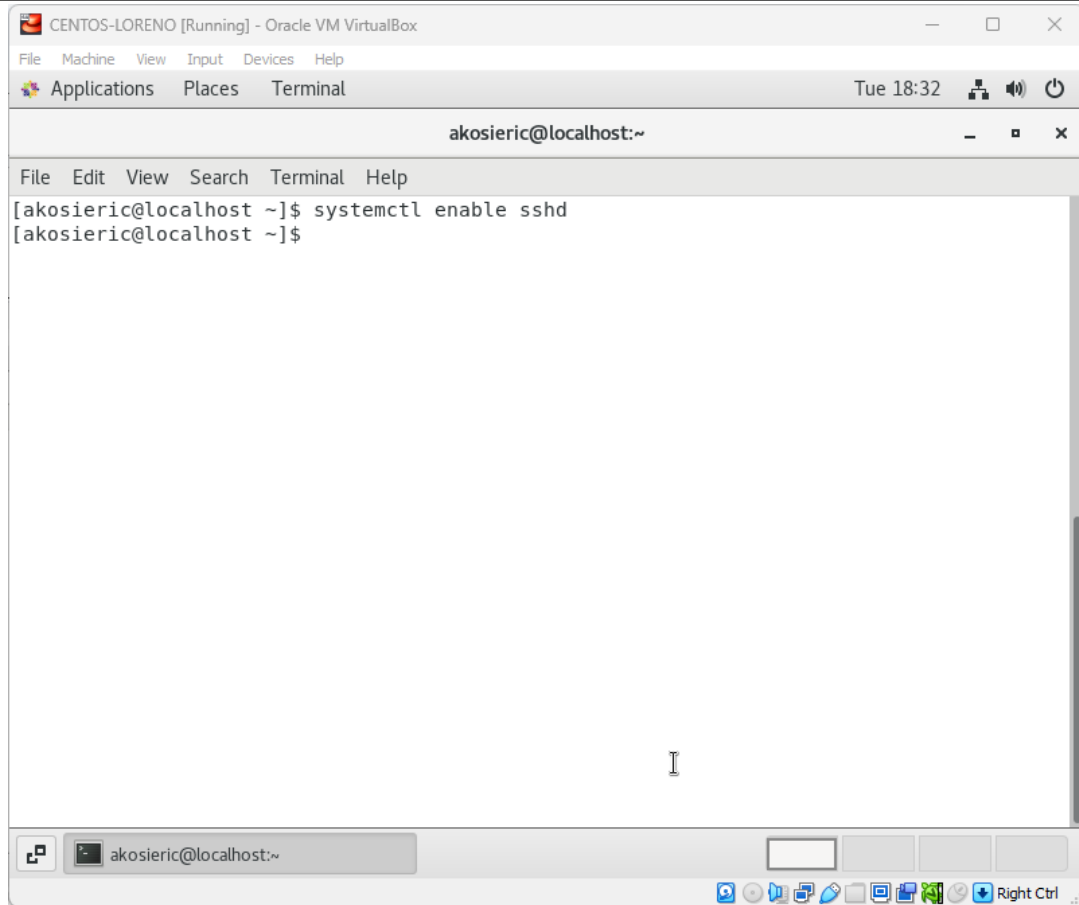


```
CENTOS-LORENO [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal Tue 18:31
akosieric@localhost:~
File Edit View Search Terminal Help
[akosieric@localhost ~]$ sudo yum install openssh-server
[sudo] password for akosieric:
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: mirrors.nhanhoa.com
* extras: mirrors.nhanhoa.com
* updates: mirrors.nhanhoa.com
Package openssh-server-7.4p1-23.el7_9.x86_64 already installed and latest version
Nothing to do
[akosieric@localhost ~]$
```

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

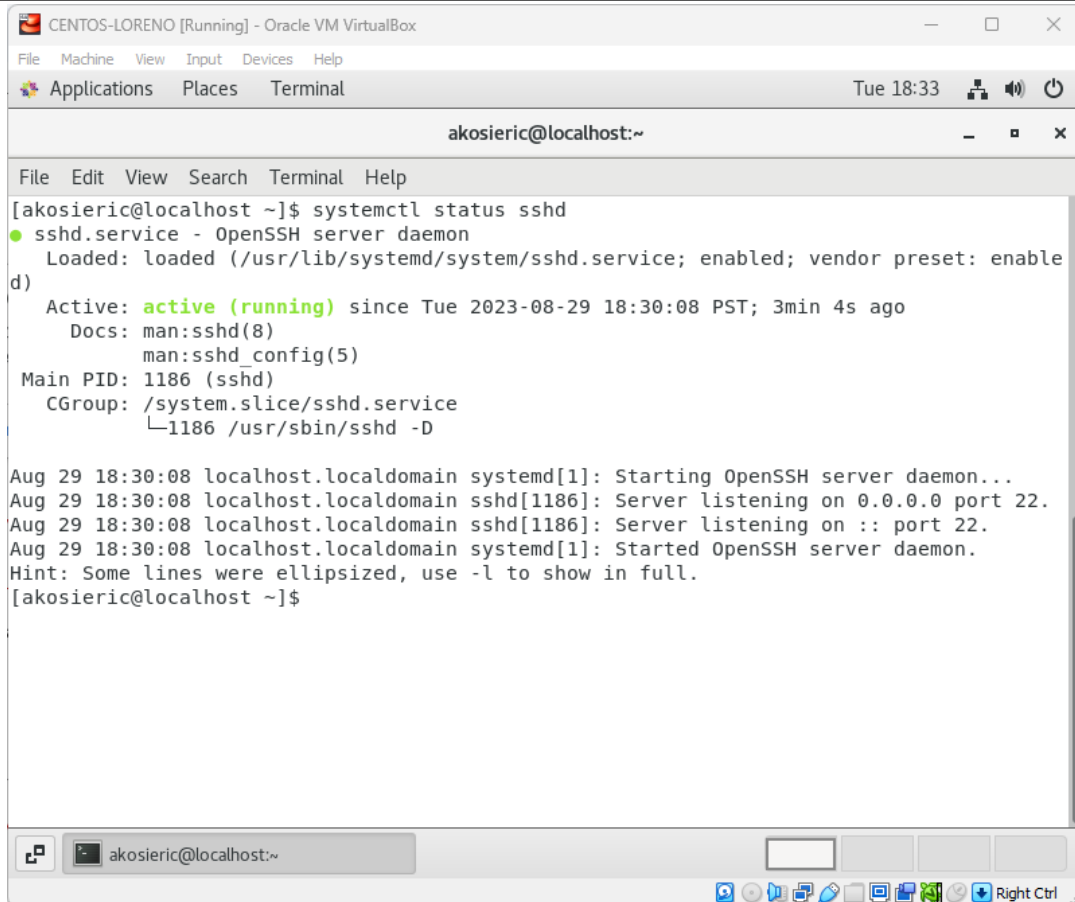


\$ systemctl enable sshd



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

\$ systemctl status sshd



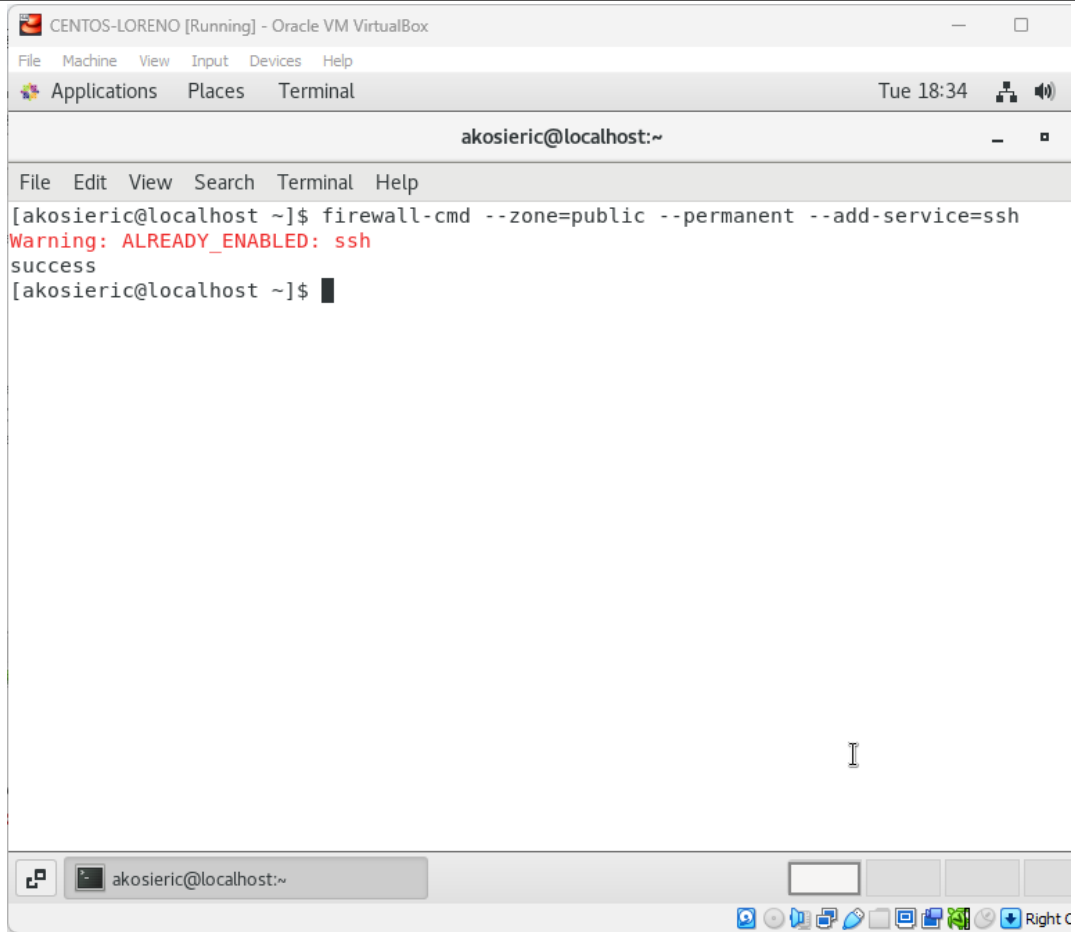
The screenshot shows a terminal window titled "CENTOS-LORENO [Running] - Oracle VM VirtualBox". The terminal displays the output of the command `systemctl status sshd`. The output indicates that the `sshd.service` is active and running. It also shows the service's configuration, including its main PID (1186) and the group it belongs to (`/system.slice/sshd.service`). The terminal also displays the logs for the service, showing that it started successfully on August 29, 2023, at 18:30:08 PST. The terminal window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The status bar at the bottom shows the current time as "Tue 18:33" and the user as "akosieric@localhost:~".

```
[akosieric@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 2023-08-29 18:30:08 PST; 3min 4s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
    Main PID: 1186 (sshd)
      CGroup: /system.slice/sshd.service
              └─1186 /usr/sbin/sshd -D

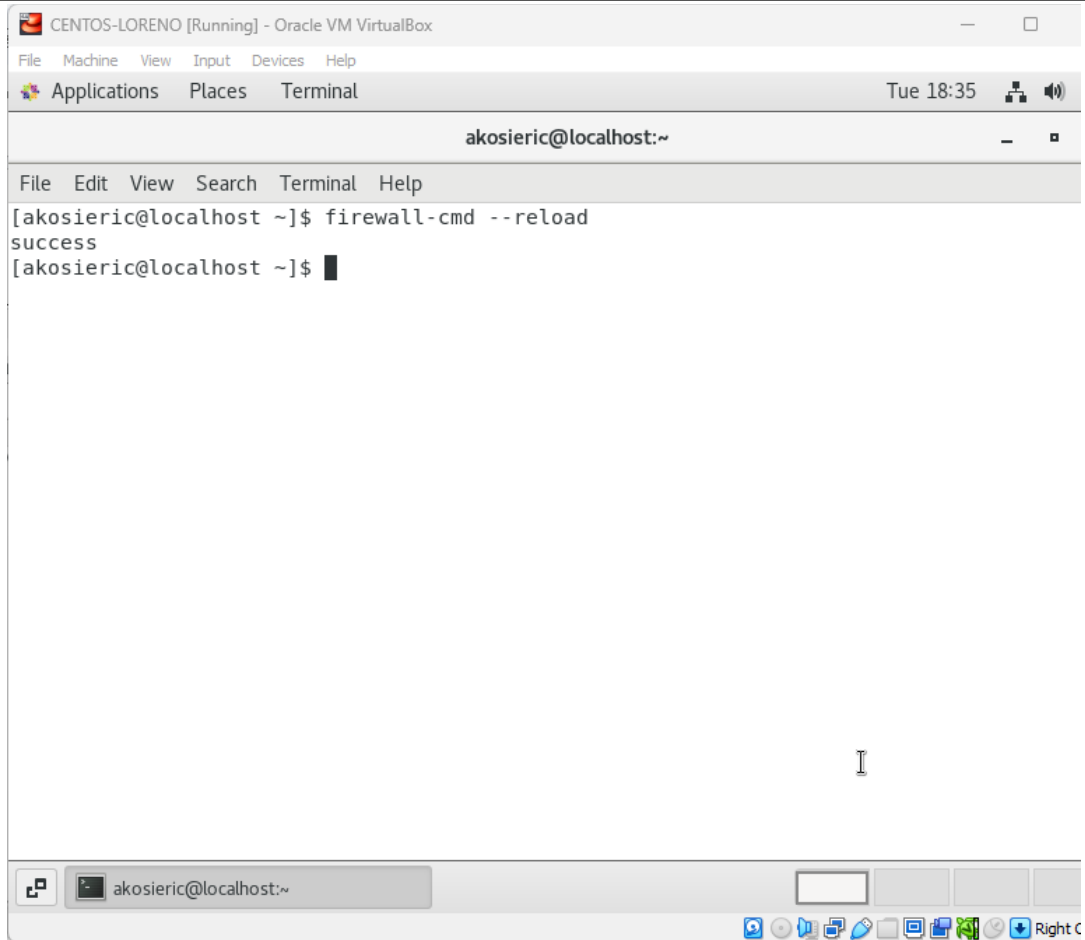
Aug 29 18:30:08 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Aug 29 18:30:08 localhost.localdomain sshd[1186]: Server listening on 0.0.0.0 port 22.
Aug 29 18:30:08 localhost.localdomain sshd[1186]: Server listening on :: port 22.
Aug 29 18:30:08 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[akosieric@localhost ~]$
```

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

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



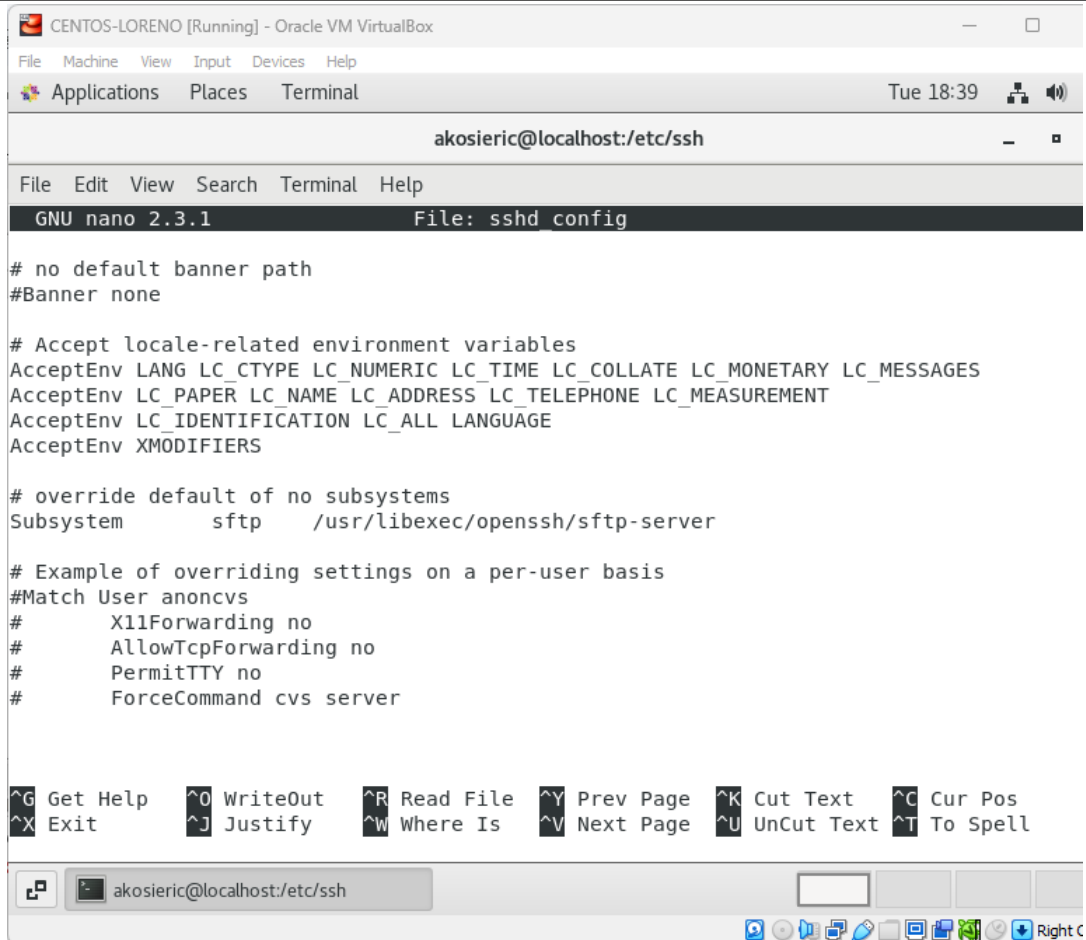
\$ firewall-cmd --reload



The screenshot shows a terminal window titled "CENTOS-LORENO [Running] - Oracle VM VirtualBox". The window has a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". Below the menu bar is a toolbar with "Applications", "Places", and "Terminal". The terminal itself has a title bar "akosieric@localhost:~" and a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the command `firewall-cmd --reload` being executed, resulting in the output `success`. The prompt `[akosieric@localhost ~]$` is visible at the end of the line. The window's status bar at the bottom shows the time "Tue 18:35" and some system icons.

```
CENTOS-LORENO [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal Tue 18:35
akosieric@localhost:~
File Edit View Search Terminal Help
[akosieric@localhost ~]$ firewall-cmd --reload
success
[akosieric@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`



```
CENTOS-LORENO [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal Tue 18:39
akosieric@localhost:/etc/ssh
File Edit View Search Terminal Help
GNU nano 2.3.1 File: sshd config

# no default banner path
#Banner none

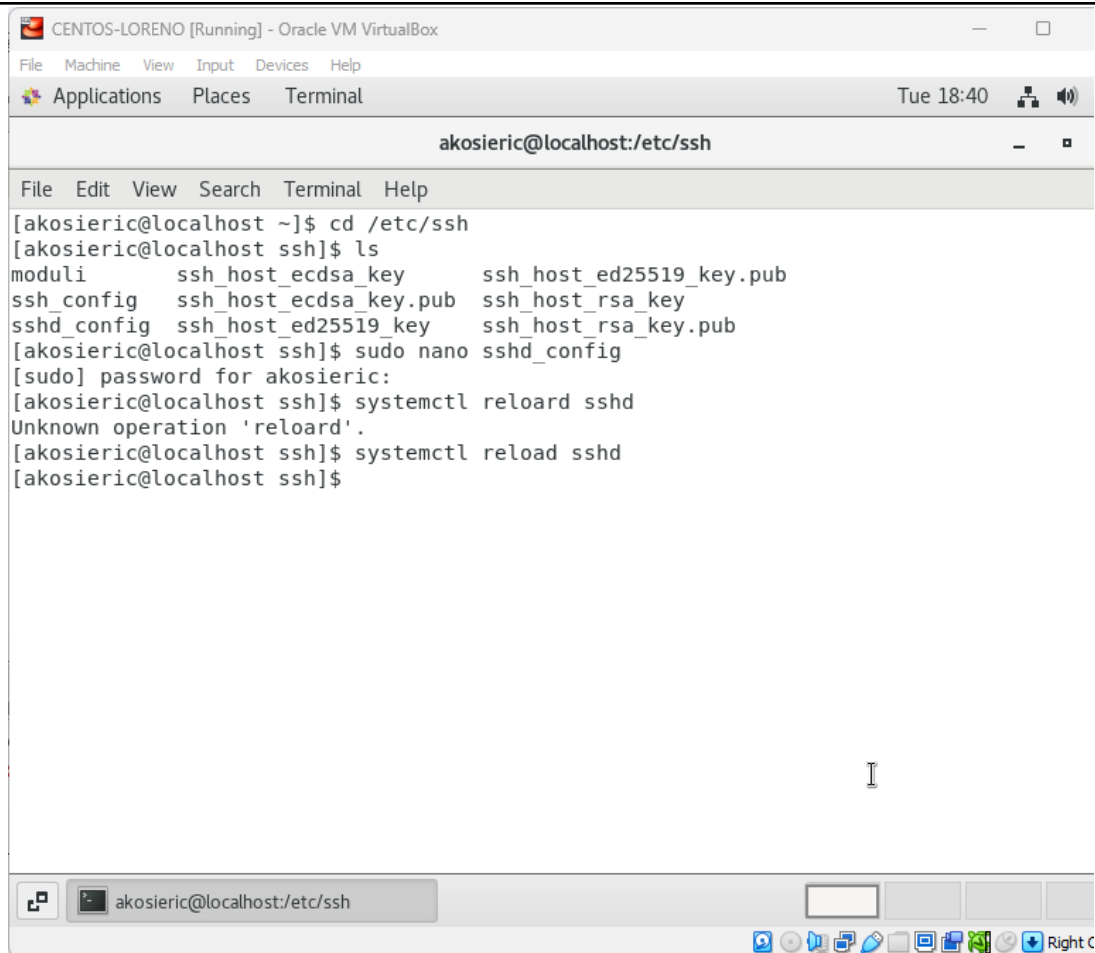
# Accept locale-related environment variables
AcceptEnv LANG LC_CTYPE LC_NUMERIC LC_TIME LC_COLLATE LC_MONETARY LC_MESSAGES
AcceptEnv LC_PAPER LC_NAME LC_ADDRESS LC_TELEPHONE LC_MEASUREMENT
AcceptEnv LC_IDENTIFICATION LC_ALL LANGUAGE
AcceptEnv XMODIFIERS

# override default of no subsystems
Subsystem sftp /usr/libexec/openssh/sftp-server

# Example of overriding settings on a per-user basis
#Match User anoncvs
#    X11Forwarding no
#    AllowTcpForwarding no
#    PermitTTY no
#    ForceCommand cvs server

^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

akosieric@localhost:/etc/ssh
```



The screenshot shows a terminal window titled "CENTOS-LORENO [Running] - Oracle VM VirtualBox". The terminal session is for user "akosieric" at "localhost" in the directory "/etc/ssh". The user navigates to the "/etc/ssh" directory and lists the files, showing various SSH configuration and key files. They then use "sudo nano sshd_config" to edit the configuration, enter their password, and attempt to reload the SSH service using "systemctl reload sshd". The command results in an "Unknown operation 'reload'" error.

```
CENTOS-LORENO [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal Tue 18:40

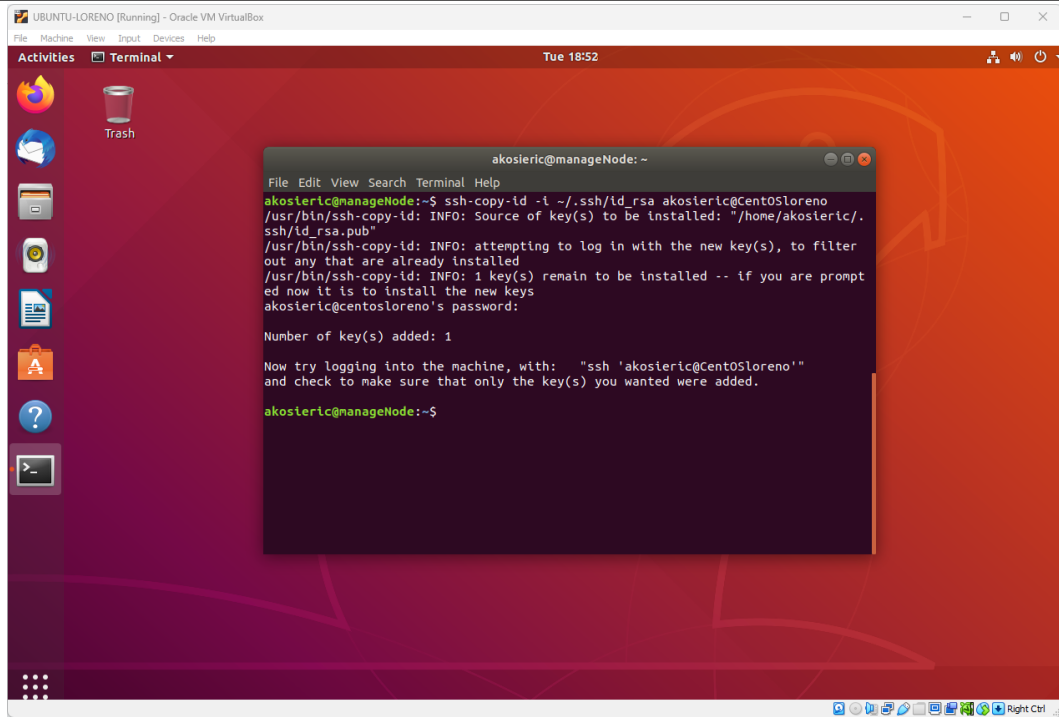
akosieric@localhost:/etc/ssh

File Edit View Search Terminal Help

[akosieric@localhost ~]$ cd /etc/ssh
[akosieric@localhost ssh]$ ls
moduli          ssh_host_ecdsa_key      ssh_host_ed25519_key.pub
ssh_config      ssh_host_ecdsa_key.pub  ssh_host_rsa_key
sshd_config     ssh_host_ed25519_key    ssh_host_rsa_key.pub
[akosieric@localhost ssh]$ sudo nano sshd_config
[sudo] password for akosieric:
[akosieric@localhost ssh]$ systemctl reload sshd
Unknown operation 'reload'.
[akosieric@localhost ssh]$ systemctl reload sshd
[akosieric@localhost ssh]$
```

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.



```
akosieric@manageNode: ~  
File Edit View Search Terminal Help  
akosieric@manageNode:~$ ssh-copy-id -i ~/.ssh/id_rsa akosieric@CentOSloreno  
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/akosieric/.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 prompted now it is to install the new keys  
akosieric@centosloreno's password:  
  
Number of key(s) added: 1  
  
Now try logging into the machine, with: "ssh 'akosieric@CentOSloreno'" and check to make sure that only the key(s) you wanted were added.  
akosieric@manageNode:~$
```

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

```
CENTOS-LORENO [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal Tue 18

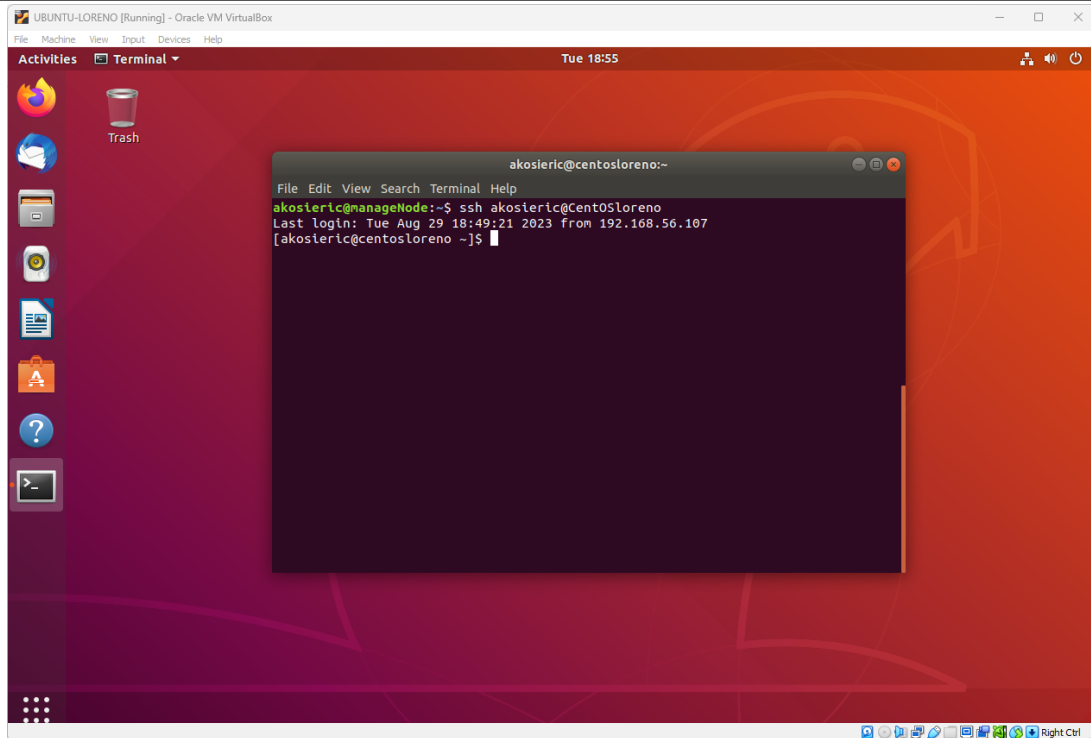
akosieric@localhost:~/.ssh

File Edit View Search Terminal Help

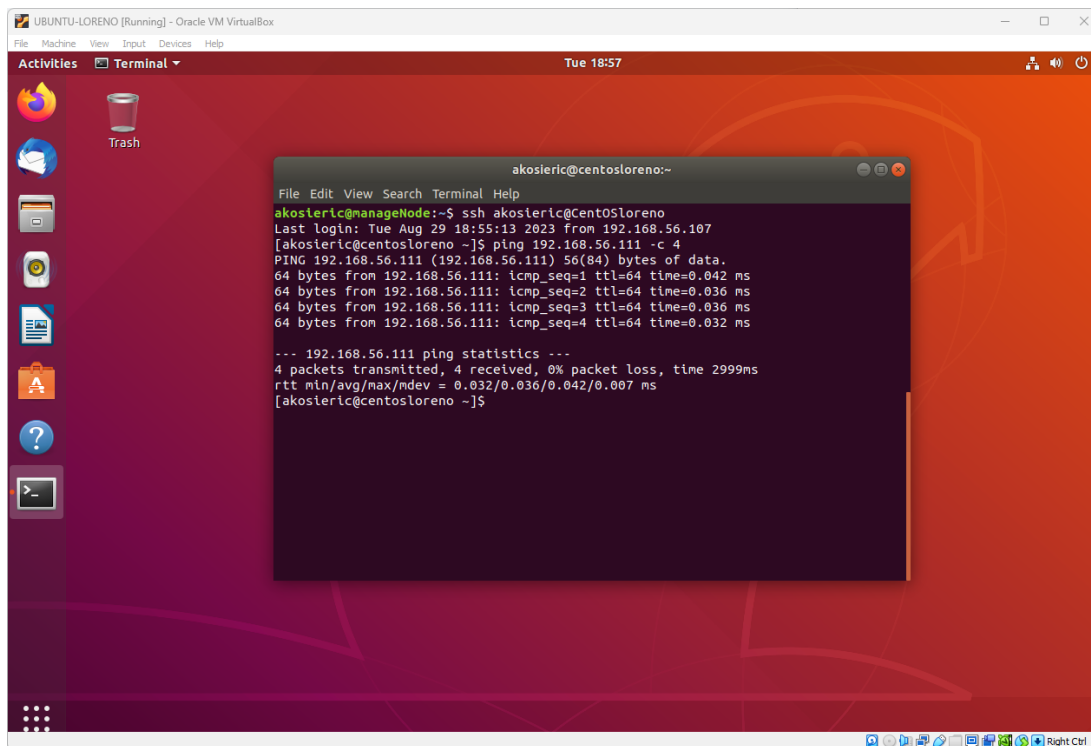
[akosieric@localhost ~]$ cd ~/.ssh
[akosieric@localhost .ssh]$ ls -a
. .. authorized_keys
[akosieric@localhost .ssh]$
```

Task 4: Verify ssh remote connection

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



2. Show evidence that you are connected.



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?
 - ***When choosing between Debian and Red Hat Linux distributions, consider factors such as your familiarity with the package management systems (APT or Debian, RPM for Red Hat), community support, software availability, and enterprise-level features. Debian tends to prioritize stability and software freedom, making it suitable for a wide range of use cases. Red Hat distributions, such as CentOS and Fedora, often cater to enterprise needs with strong support, documentation, and commercial options.***
2. What are the main difference between Debian and Red Hat Linux distributions?
 - ***Debian and Red Hat Linux distributions differ in their package management systems (APT vs. RPM), release cycles (Debian's stability-focused vs. Red Hat's mix of shorter and longer cycles), community involvement (Debian's community-driven vs. Red Hat's mix of community and commercial offerings), licensing philosophies (Debian's strict open-source stance vs. Red Hat's inclusion of proprietary elements), software repositories (Debian's extensive selection vs. Red Hat's curated approach), and ecosystem/community focus (Debian's diverse global community vs. Red Hat's enterprise-oriented support options).***