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| <b>Course/Section:</b> CPE 232 / CPE31S22  | <b>Date Submitted:</b> Sep 30, 2022 - 10:21 AM |
| <b>Instructor:</b> Dr. Jonathan Taylor   | <b>Semester and SY:</b> 1st Sem, 2022 - 2023   |
| <b>Activity 3: Install SSH server on CentOS or RHEL 8</b>  |  |
| <b>1. Objectives:</b><br>1.1 Install Community Enterprise OS or Red Hat Linux OS<br>1.2 Configure remote SSH connection from remote computer to CentOS/RHEL-8  |  |
| <b>2. Discussion:</b><br><br><b>CentOS vs. Debian: Overview</b><br><br>CentOS and Debian are Linux distributions that spawn from opposite ends of the candle.<br><br>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.<br><br>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.<br><br><b>CentOS vs. Debian: Architecture</b><br><br>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?<br><br>Both Debian and CentOS support AArch64/ARM64, armhf/armhfp, i386, ppc64el/ppc64le. (Note: armhf/armhfp and i386 are supported in CentOS 7 only.)<br><br>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.<br><br>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.<br><br><b>CentOS vs. Debian: Package Management</b><br><br>Most Linux distributions have some form of package manager nowadays, with some more complex and feature-rich than others.<br><br>CentOS uses the RPM package format and YUM/DNF as the package manager.<br><br>Debian uses the DEB package format and dpkg/APT as the package manager.<br><br>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/](http://mirror.rise.ph/centos/7.9.2009/isos/x86_64/)

#### SPEED TEST FILES:

16MB  
32MB  
64MB  
128MB  
256MB  
512MB  
1024MB  
2048MB  
4096MB



The [fastest internet](#) in the Philippines

WELCOME TO THE RISE MIRROR

Files can be downloaded using <http://mirror.rise.ph> and <ftp://mirror.rise.ph>  
Please Note: Mirror is currently undergoing maintenance so you may find some repositories are not up to date.

Directory: /centos/7.9.2009/isos/x86\_64/

| Name                   | Last modified    | Size |
|------------------------|------------------|------|
| Parent Directory       |                  | -    |
| 0_README.txt           | 2022-08-05 02:03 | 2.7K |
| CentOS-7-x86_64-DVD->  | 2020-11-04 19:37 | 4.4G |
| CentOS-7-x86_64-DVD->  | 2020-11-06 22:44 | 176K |
| CentOS-7-x86_64-DVD->  | 2022-07-26 23:10 | 4.4G |
| CentOS-7-x86_64-Ever-> | 2020-11-02 23:18 | 9.5G |
| CentOS-7-x86_64-Ever-> | 2020-11-06 22:44 | 381K |
| CentOS-7-x86_64-Ever-> | 2022-07-27 02:09 | 9.6G |
| CentOS-7-x86_64-Mini-> | 2020-11-03 22:55 | 1.0G |
| CentOS-7-x86_64-Mini-> | 2020-11-06 22:44 | 39K  |
| CentOS-7-x86_64-Mini-> | 2022-07-26 23:10 | 1.0G |
| CentOS-7-x86_64-Netl-> | 2020-10-27 00:26 | 575M |
| CentOS-7-x86_64-Netl-> | 2020-11-06 22:44 | 23K  |
| sha256sum.txt          | 2022-08-05 01:56 | 703  |
| sha256sum.txt.asc      | 2022-08-05 01:58 | 1.5K |

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

## ← Create Virtual Hard Disk

### File location and size

Please type the name of the new virtual hard disk file into the box below or click on the folder icon to select a different folder to create the file in.

C:\Users\TIPQC\VirtualBox VMs\CentOSA\CentOSA.vdi



Select the size of the virtual hard disk in megabytes. This size is the limit on the amount of file data that a virtual machine will be able to store on the hard disk.



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



CentOS [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1160.el7.x86_64 on an x86_64

localhost login: piolo
Password:
Last login: Tue Aug 30 08:07:40 on tty1
[piolo@localhost ~]$ _
```

## After Installation

### Updating the Repositories

```
[piolo@localhost ~]$ sudo yum update

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 piolo:
Loaded plugins: fastestmirror
Determining fastest mirrors
```

## Upgrading the Repositories

```
[piolo@localhost ~]$ sudo dnf upgrade
CentOS-7 - Base                                646 kB/s | 10 MB      00:16
CentOS-7 - Updates                             1.0 MB/s | 21 MB      00:20
CentOS-7 - Extras                             308 kB/s | 331 kB     00:01
Last metadata expiration check: 0:00:01 ago on Tue 30 Aug 2022 08:23:10 AM PST.
Dependencies resolved.
Nothing to do.
Complete!
```

**Note:** Since the dnf is not installed in the system, I used the command “sudo yum install dnf”.

## Task 2: Install the SSH server package *openssh*

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

*\$ dnf install openssh-server*

```
[piolo@localhost ~]$ sudo dnf install openssh-server
Last metadata expiration check: 0:01:19 ago on Tue 30 Aug 2022 08:23:10 AM PST.
Package openssh-server-7.4p1-22.el7_9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[piolo@localhost ~]$ _
```

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

*\$ systemctl start sshd*

*\$ systemctl enable sshd*

```
[piolo@localhost ~]$ sudo systemctl start sshd
[piolo@localhost ~]$ sudo systemctl enable sshd
[piolo@localhost ~]$ _
```

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

*\$ systemctl status sshd*

```
[piolo@localhost ~]$ systemctl status sshd
■ sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2022-08-30 08:17:51 PST; 8min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
  Main PID: 8992 (sshd)
    CGroup: /system.slice/ssh.service
            └─8992 /usr/sbin/sshd -D

Aug 30 08:17:50 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Aug 30 08:17:51 localhost.localdomain sshd[8992]: Server listening on 0.0.0.0 port 22.
Aug 30 08:17:51 localhost.localdomain sshd[8992]: Server listening on :: port 22.
Aug 30 08:17:51 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
[piolo@localhost ~]$ _
```

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

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

```
[piolo@localhost ~]$ firewall-cmd --zone=public --permanent --add-service=ssh
Authorization failed.
    Make sure polkit agent is running or run the application as superuser.
[piolo@localhost ~]$ sudo firewall-cmd --zone=public --permanent --add-service=ssh
Warning: ALREADY_ENABLED: ssh
success
[piolo@localhost ~]$ sudo firewall-cmd --reload
success
[piolo@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
```

```
[piolo@CentosServer ~]$ sudo systemctl reload sshd
[sudo] password for piolo:
[piolo@CentosServer ~]$ _
```

### Checking the sshd Daemon

```
[piolo@localhost ~]$ systemctl status sshd
■ sshd.service - OpenSSH server daemon
   Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; vendor preset: enabled)
   Active: active (running) since Tue 2022-08-30 08:17:51 PST; 10min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
  Process: 10804 ExecReload=/bin/kill -HUP $MAINPID (code=exited, status=0/SUCCESS)
    Main PID: 8992 (sshd)
    CGroup: /system.slice/ssh.service
            └─8992 /usr/sbin/sshd -D

Aug 30 08:17:50 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Aug 30 08:17:51 localhost.localdomain sshd[8992]: Server listening on 0.0.0.0 port 22.
Aug 30 08:17:51 localhost.localdomain sshd[8992]: Server listening on :: port 22.
Aug 30 08:17:51 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Aug 30 08:28:09 localhost.localdomain systemd[1]: Reloading OpenSSH server daemon.
Aug 30 08:28:09 localhost.localdomain sshd[8992]: Received SIGHUP; restarting.
Aug 30 08:28:09 localhost.localdomain systemd[1]: Reloaded OpenSSH server daemon.
Aug 30 08:28:09 localhost.localdomain sshd[8992]: Server listening on 0.0.0.0 port 22.
Aug 30 08:28:09 localhost.localdomain sshd[8992]: Server listening on :: port 22.
[piolo@localhost ~]$
```

### Task 3: Copy the Public Key to CentOS

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

```
[piolo@localhost ~]$ sudo dnf install openssh-server
Last metadata expiration check: 0:11:40 ago on Tue 30 Aug 2022 08:23:10 AM PST.
Package openssh-server-7.4p1-22.el7_9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[piolo@localhost ~]$
```

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

### Installing net-tools for viewing the IP address.

```
[piolo@localhost ~]$ ifconfig
-bash: ifconfig: command not found
[piolo@localhost ~]$ sudo dnf install net-tools
Last metadata expiration check: 0:17:58 ago on Tue 30 Aug 2022 08:23:10 AM PST.
Dependencies resolved.
=====
Package                Arch                Version              Repository           Size
=====
Installing:
net-tools               x86_64              2.0-0.25.20131004git.el7    base                306 k
Transaction Summary
=====
Install 1 Package

Total download size: 306 k
Installed size: 917 k
Is this ok [y/N]: y
Downloading Packages:
```

### Performing ifconfig to see the IP address of the server.

```

[piolo@CentosServer ~]$ ifconfig
enp0s3: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255
    inet6 fe80::d4be:191b:f6eb:93b0 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:fe:0d:80 txqueuelen 1000 (Ethernet)
    RX packets 11 bytes 1360 (1.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 21 bytes 1924 (1.8 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

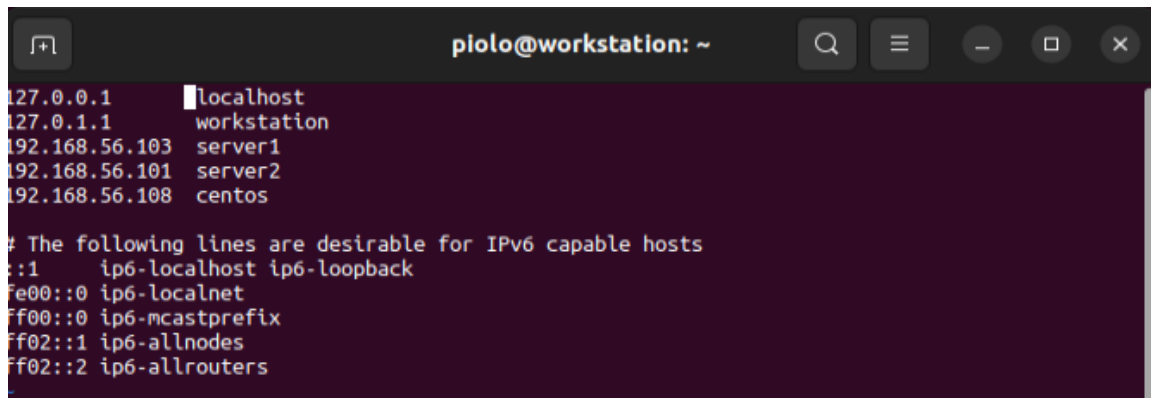
enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.56.108 netmask 255.255.255.0 broadcast 192.168.56.255
    inet6 fe80::3997:5894:98a1:9b39 prefixlen 64 scopeid 0x20<link>
    ether 08:00:27:79:96:d6 txqueuelen 1000 (Ethernet)
    RX packets 204 bytes 38147 (37.2 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 153 bytes 30170 (29.4 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 0 bytes 0 (0.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 0 bytes 0 (0.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[piolo@CentosServer ~]$

```

### Modifying /etc/hosts of Local Machine



```

127.0.0.1 localhost
127.0.1.1 workstation
192.168.56.103 server1
192.168.56.101 server2
192.168.56.108 centos

# The following lines are desirable for IPv6 capable hosts
::1 ip6-localhost ip6-loopback
fe00::0 ip6-localnet
ff00::0 ip6-mcastprefix
ff02::1 ip6-allnodes
ff02::2 ip6-allrouters

```

### Modifying /etc/hostname of CentOS



```

File Machine View Input Devices Help
GNU nano 2.3.1 File: /etc/hostname

CentosServer

```

### Copying SSH Public Key from Local Machine

```
piolo@workstation:~$ ssh-copy-id piolo@centos
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/piolo/.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
piolo@centos's password:
Number of key(s) added: 1

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

3. On CentOS, verify that you have the *authorized\_keys*.

```
[piolo@CentosServer ~]$ ll -a
total 20
drwx----- 3 piolo piolo 111 Aug 30 09:30 .
drwxr-xr-x 3 root root 19 Aug 30 08:01 ..
-rw----- 1 piolo piolo 729 Aug 30 09:11 .bash_history
-rw-r--r-- 1 piolo piolo 18 Apr 1 2020 .bash_logout
-rw-r--r-- 1 piolo piolo 193 Apr 1 2020 .bash_profile
-rw-r--r-- 1 piolo piolo 231 Apr 1 2020 .bashrc
-rw----- 1 piolo piolo 35 Aug 30 09:28 .lessht
drwx----- 2 piolo piolo 29 Aug 30 09:30 .ssh
[piolo@CentosServer ~]$ cd .ssh
[piolo@CentosServer .ssh]$ ll
total 4
-rw----- 1 piolo piolo 743 Aug 30 09:30 authorized_keys
[piolo@CentosServer .ssh]$ _
```

#### Task 4: Verify ssh remote connection

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

```
piolo@workstation:~$ ssh piolo@centos
```

2. Show evidence that you are connected.

#### Connecting to the CentOS

```
piolo@workstation:~$ ssh piolo@centos
Last failed login: Tue Aug 30 09:30:50 PST 2022 from 192.168.56.102 on ssh:notty
There was 1 failed login attempt since the last successful login.
Last login: Tue Aug 30 09:23:37 2022
[piolo@CentosServer ~]$ whoami
piolo
[piolo@CentosServer ~]$ █
```

#### 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?



- We should look into choosing the best distribution between Debian and RedHat because one of these distributions will suit your needs. It also depends on your preference between their different package managers.

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

- The main difference between Debian and RedHat is the package manager. Debian uses 'apt' and 'dpkg' while RedHat uses 'dnf' and 'yum'. Also, it is different when it comes to open sources usage because Debian offers free long term support for a server operating system while the RedHat offers free long term support like CentOS and also supports a paid server.

**Honor Pledge:**

“ I affirm that I will not give or receive any unauthorized help on this activity and that all work will be my own”