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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/

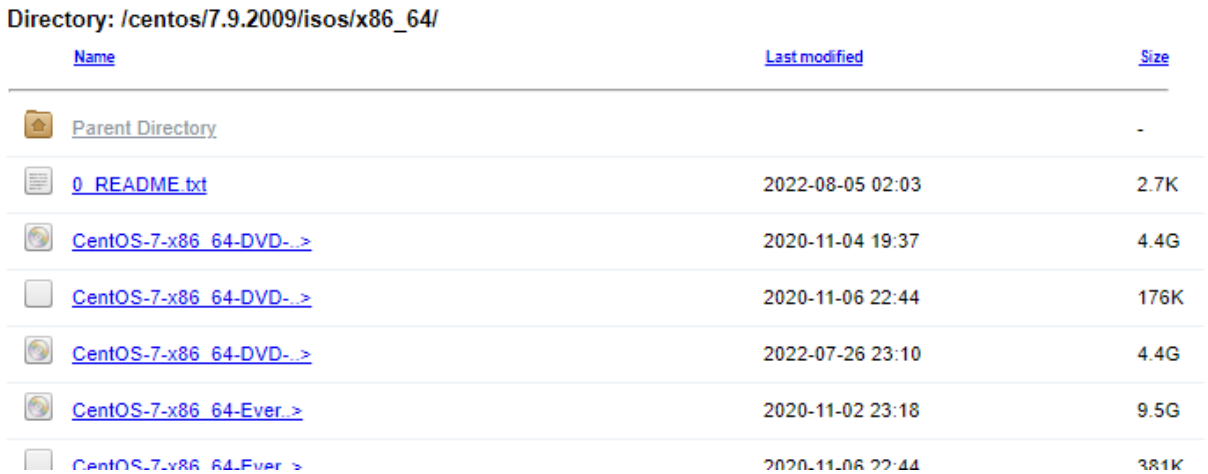

Figure 1.1 Downloading the CentOS iso

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

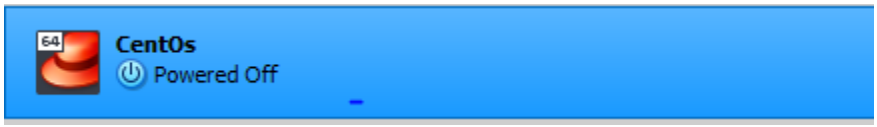

Figure 1.2 Created VM machine for CentOS

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

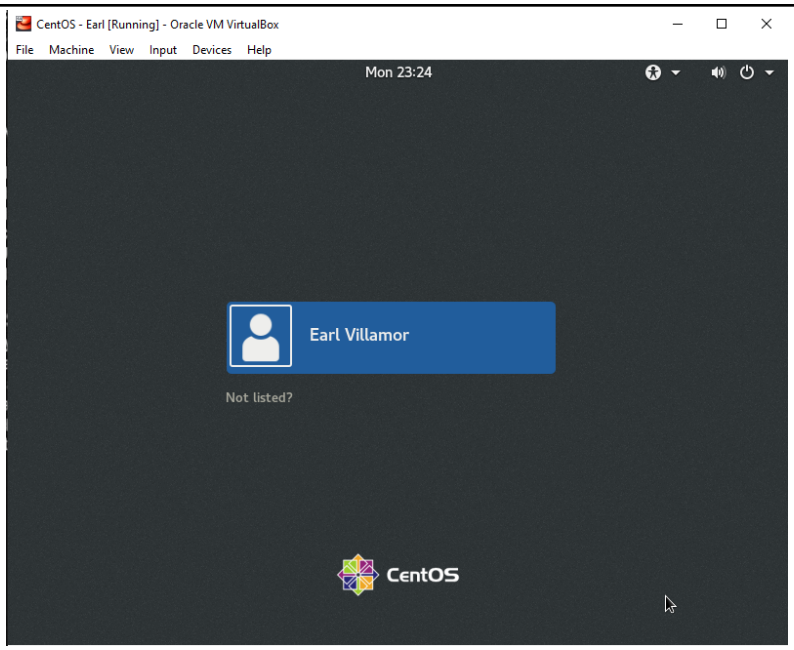

Figure 1.3 Finished installing CentOS

Task 2: Install the SSH server package *openssh*

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

```
[evillamor@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base                                  210 kB/s |  10 MB     00:49
CentOS-7 - Updates                               1.0 MB/s |  21 MB     00:20
CentOS-7 - Extras                                 38 kB/s | 331 kB     00:08
Package openssh-server-7.4p1-22.el7_9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[evillamor@localhost ~]$
```

Figure 2.1 Installing the openssh-server

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

```
[evillamor@localhost ~]$ systemctl start sshd
[evillamor@localhost ~]$ systemctl enable sshd
[evillamor@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 Mon 2022-08-29 23:53:29 EDT; 15min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 11189 (sshd)
   CGroup: /system.slice/sshd.service
           └─11189 /usr/sbin/sshd -D

Aug 29 23:53:29 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Aug 29 23:53:29 localhost.localdomain sshd[11189]: Server listening on 0.0.0.0 port 22.
Aug 29 23:53:29 localhost.localdomain sshd[11189]: Server listening on :: port 22.
Aug 29 23:53:29 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[evillamor@localhost ~]$
```

Figure 2.2 Implementing the systemctl commands

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

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

Figure 2.3 opening firewall on ssh port 22

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

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

Figure 2.4 Configuring the said command and refreshing

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.

```
TIPQC@Q5202-30 MINGW64 ~
$ ssh-copy-id evillamor@192.168.56.109
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be instal
lled: "/c/Users/TIPQC/.ssh/id_rsa.pub"
The authenticity of host '192.168.56.109 (192.168.56.109
)' can't be established.
ED25519 key fingerprint is SHA256:6ycFcI6hoWWOWvRVhljB5W
xyqOOJhxQrODJcCpdMUeA.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fi
ngerprint])? yes
/usr/bin/ssh-copy-id: INFO: attempting to log in with th
e new key(s), to filter out any that are already install
ed
/usr/bin/ssh-copy-id: INFO: 1 key(s) remain to be instal
led -- if you are prompted now it is to install the new
keys
evillamor@192.168.56.109's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'evillamo
r@192.168.56.109'"
and check to make sure that only the key(s) you wanted w
ere added.
```

Figure 3.1 Copying the public key from Git bash to CentOS

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

```
[evillamor@localhost ~]$ cd .shh
bash: cd: .shh: No such file or directory
[evillamor@localhost ~]$ cd .ssh
[evillamor@localhost .ssh]$ ls
authorized_keys
[evillamor@localhost .ssh]$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDED8TnQLUcT2n0spaek7LtHbg/pR8K2ALs1oellJlyaq/cCQl
PQuNShVo7kJtSWY5dgt6Wbnr3/jlndIyKnaIdP89mBOnmm968cqn17EnoxJ4EH926+uTbVKFF6GKenbi55QPWe/
iIJ7cdegkWw+0zFTy3SDyxkAOIbhPy/So9vIfAda543qxa/mFXjvoi6DNG0taU6aTBfZar+zuHVhShUVwO/aiyX
vRnMDRtql3p02rqE7uoZp5ha8hQP6fvqTKhYgFnSN1KNZke/cCV1KAQjqGOxsLWrkItpZbG2utNXJYlH+yftjnm
kr0/aOcciHIVc5vL9Ea6n2lFTfjWVgvUNSTBbAOA4OcuxIN2vote4hUFMYOb20GLtgsfvrAD7AUYzXPeDclcaf3
/L2Syi44pn8m47bJAd1hacdGSwkdlhi18KXUTCgNgazJDL4+EpMjGTcmCFKNSqJvVbTg5XCI3iyHQE6gE5w0hJ2
qawHYHKs5zfWA3sV7l96HlnDNCtOE= TIPQC@Q5202-30
[evillamor@localhost .ssh]$
```

Figure 3.2 Verifying the copied public key

Task 4: Verify ssh remote connection

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

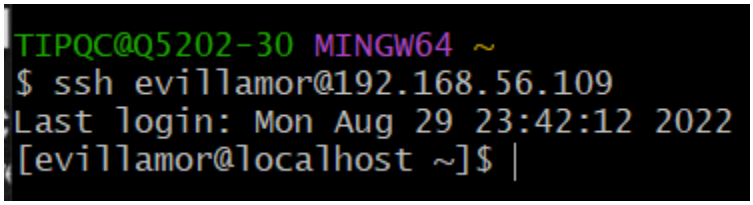

Figure 4.1 Accessing the CentOS using the local machine

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?
   - In my opinion, anyone can access the licensed applications provided by the Debian by Debian initiative with no restrictions on the functionalities that can be accessed. Debian distributes free software, whereas RedHat sells commercial distributions of goods like Linux. In other words, Debian distribution software is more advisable to use in general.

2. What are the main differences between Debian and Red Hat Linux distributions?
   - One of the few differences of RedHat and Debian are; their software licenses, since RedHat is an open source which can mostly be modified and is a commercial Linux Distribution , while Debian is a free software and a non-commercial Linux Distribution. Debian is also implemented and compatible with various platforms, although RedHat software offers more features than Debrian. In terms of commands, RedHat uses “yum”, while Debian uses “apt-get” dependency resolvers. The only similarities between the two is their kernel type which uses Monolithic.