Name: Valencia, Mark Janssen	Date Performed: September 7, 2023
Course/Section: CPE31s6	Date Submitted: September 7, 2023
Instructor: Dr. Jonathan Taylar	Semester and SY: 1st Sem, 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.

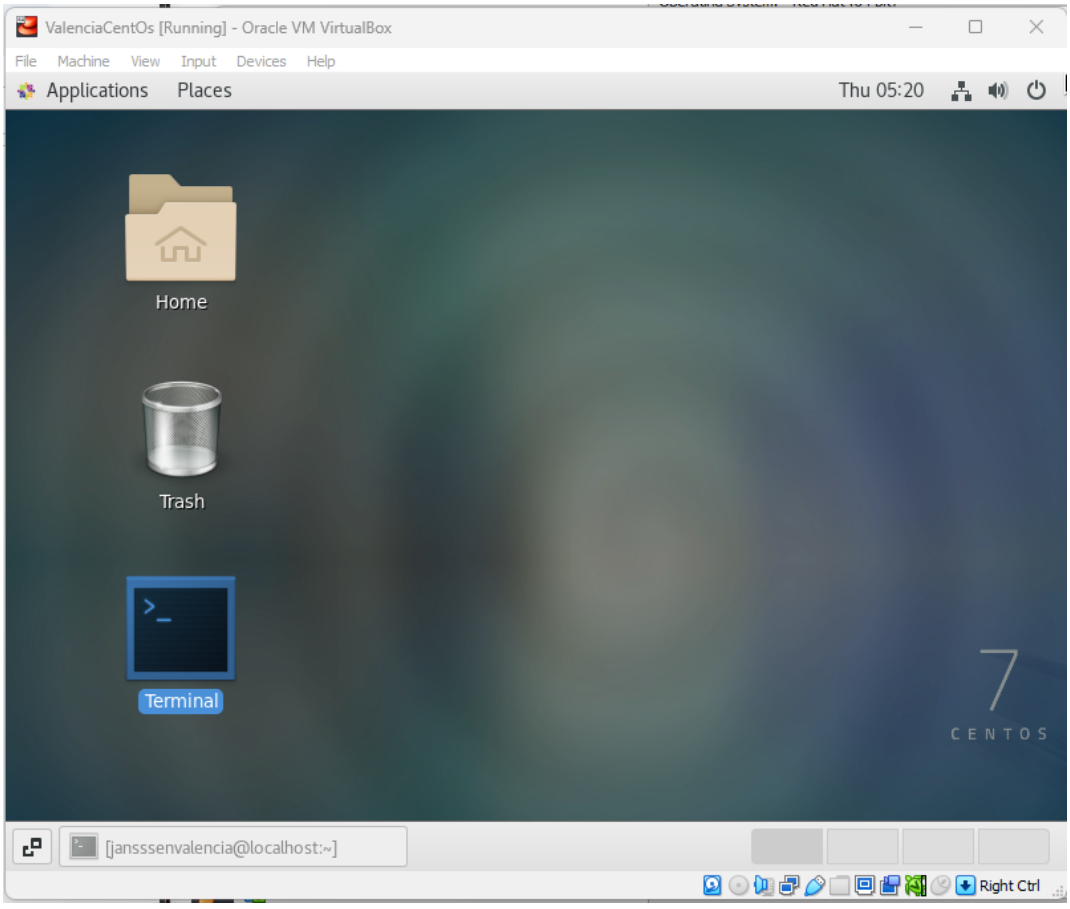
CentOS uses the RPM package format and YUM/DNF as the package manager.

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 2 Gb RAM and 20 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

```
[root@localhost janssenvalencia]# dnf install openssh-server
CentOS-7 - Base                                          1.9 MB/s |  10 MB     00:05
```

```
[janssenvalencia@localhost ~]$ sudo yum install dnf
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
 * base: mirror.xtom.com.hk
 * extras: mirror.xtom.com.hk
 * updates: mirror.xtom.com.hk
Resolving Dependencies
--> Running transaction check
---> Package dnf.noarch 0:4.0.9.2-2.el7_9 will be installed
--> Processing Dependency: python2-dnf = 4.0.9.2-2.el7_9 for package: dnf-4.0.9.2-2.el7
_9.noarch
```

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

```
[root@localhost janssenvalencia]# systemctl start sshd
[root@localhost janssenvalencia]# systemctl enable sshd
[root@localhost janssenvalencia]#
```

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

```
[root@localhost janssenvalencia]# 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 Thu 2023-09-07 06:41:57 EDT; 3min 54s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 1164 (sshd)
   CGroup: /system.slice/sshd.service
           └─1164 /usr/sbin/sshd -D

Sep 07 06:41:57 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 07 06:41:57 localhost.localdomain sshd[1164]: Server listening on 0.0.0.0 port 22.
Sep 07 06:41:57 localhost.localdomain sshd[1164]: Server listening on :: port 22.
Sep 07 06:41:57 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
```

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

```
[root@localhost janssenvalencia]# firewall-cmd --zone=public --permanent --add-service=
ssh
Warning: ALREADY_ENABLED: ssh
success
[root@localhost janssenvalencia]# 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

```
success
[root@localhost janssenvalencia]# 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.

```
janssenvalencia@Workstation:~$ ssh-copy-id -i ~/.ssh/id_rsa janssenvalencia@192
.168.56.108
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/janssenval
encia/.ssh/id_rsa.pub"
The authenticity of host '192.168.56.108 (192.168.56.108)' can't be established
.
ECDSA key fingerprint is SHA256:QCcruCerbngj6dW3xaQ/h+y1ZvXI2Khe7nfR0dYC89M.
Are you sure you want to continue connecting (yes/no)? 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 promp
ted now it is to install the new keys
janssenvalencia@192.168.56.108's password:
Permission denied, please try again.
janssenvalencia@192.168.56.108's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'janssenvalencia@192.168.56.108'
"
and check to make sure that only the key(s) you wanted were added.
```

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

```
[janssenvalencia@localhost ~]$ cat .ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQCq7w5IafCkKzi6vLBmNKlawtUl/tKoPUO6r6P7nQMRZ/EvZV/
ExIJ5YO/VdhrALdfLB9sMvGdL0vmXthadFE6mAuSEx0NrpjOWUTt6+OqCsEYwXaI8C0l6bYOAHZynSQ6n/ijbEL
NayF9TfB1PPcwwSOUrhKdu4Dj4eH/Bycv0U7GpKGfPmlO33mtaAbGKGybgHjFpdY9AmzsW5FsQlsp+aUJSTp8g5
J3HjPuQosOqw/oIjQJV9WEAv3NH/IoAs+a7PssSIu3ZDW9yHJwINBQb5H/JNOc/YXKj84JJlutcBS2xQrgFfXHE
mTaCvNYTrPArpGHt5x31z+bkHU8W/8DAanaY4HXgOX5KD8F5EqrHbhff2uJr7S7lVoLkbS/cxcRx/PTfsnJfQy3
NtEF1LiyjjIp5ow6KGWPtDtRc8LjjpuH9plOCPH4p1Jp/QW9RabmEin35acJ5sckBQEcyVsZXOjhpEp9Be6ldZn
xDAQXCbW28q3XU9NvtycuQa1f1mDEAgzIrp/pTDT7yvqQHYlB9r3uqmV7JgjRVFA0HavDjTgioSeGMeTiD5iMNd
Z9XB0bEW1bKNM0WS9YebvP74bXAujk7G19h/Dlaetxs+/CVXhDUtUkrux5qUr8qe7YYsTCAbb3jGAZ+Umd0xxNI
BoRPEHdSs9Cl7r2dyJxvUsxu9Q== janssenvalencia@Workstation
```

Task 4: Verify ssh remote connection

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

```
janssenvalencia@Workstation:~$ ssh janssenvalencia@192.168.56.108
Last failed login: Thu Sep  7 06:48:24 EDT 2023 from 192.168.56.106 on ssh:nott
y
There was 1 failed login attempt since the last successful login.
Last login: Thu Sep  7 06:42:22 2023
[janssenvalencia@localhost ~]$ exit
logout
Connection to 192.168.56.108 closed.
janssenvalencia@Workstation:~$
```

```
janssenvalencia@Workstation:~$ ssh janssenvalencia@centos
The authenticity of host 'centos (192.168.56.108)' can't be established.
ECDSA key fingerprint is SHA256:QCcruCerbngj6dW3xaQ/h+y1ZvXI2Khe7nfR0dYC89M.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'centos' (ECDSA) to the list of known hosts.
Last login: Thu Sep  7 06:48:59 2023 from 192.168.56.106
[janssenvalencia@localhost ~]$
```

Reflections:

1. **What do you think we should look for in choosing the best distribution between Debian and Red Hat Linux distributions?**
   - When looking for the best distribution regardless of any operating system we should always check the different criteria such as cost, support, stability, customization availability, and use cases. The best Linux distribution to use will depend on the needs and preferences of the users.

2. **What are the main differences between Debian and Red Hat Linux distributions?**
   - There are numerous differences in between Debian and Redhat Linux distributions mainly the cost, support, stability, customization, availability, management system, desktop environment, and their target audiences, Debian is free and open source while Redhat requires a paid subscription, since Debian is free it has a large active community of users and developers compared to redhat. Debian uses the .deb package format from the apt package while Rhel uses the .rpm package format.

Conclusion:

- For this hands-on activity we have installed and configured CentOs and have configured it with an SSH connection to our Ubuntu local machine using the lessons we have learned in the previous hands-on activity connecting machines via SSH connection. The CentOs use a slightly different syntax format compared to Ubuntu which was an unexplored area for us but all in all, I was able to remotely access two different virtual machines having two different operating systems. The new skills and knowledge that I have learned from this activity will surely be used in future and upcoming activities in this course as well as in the future as an aspiring future computer engineer.