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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/
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.
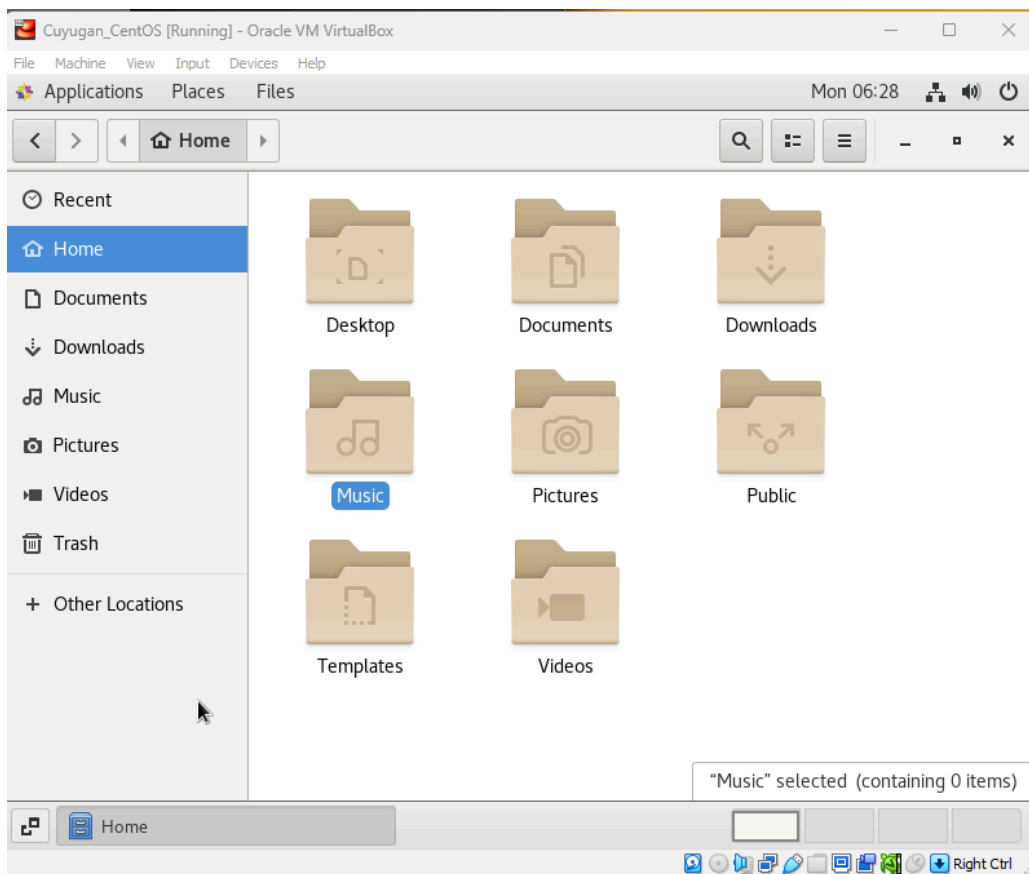
Task 2: Install the SSH server package *openssh*

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

emmancuyugan@localhost:/home/emmancuyugan   _ □ ✕

File Edit View Search Terminal Help

```
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Updating    : openssh-7.4p1-23.el7_9.x86_64                              1/6
  Updating    : openssh-clients-7.4p1-23.el7_9.x86_64                      2/6
  Updating    : openssh-server-7.4p1-23.el7_9.x86_64                       3/6
  Cleanup     : openssh-server-7.4p1-21.el7.x86_64                         4/6
  Cleanup     : openssh-clients-7.4p1-21.el7.x86_64                        5/6
  Cleanup     : openssh-7.4p1-21.el7.x86_64                                6/6
  Verifying   : openssh-7.4p1-23.el7_9.x86_64                              1/6
  Verifying   : openssh-clients-7.4p1-23.el7_9.x86_64                      2/6
  Verifying   : openssh-server-7.4p1-23.el7_9.x86_64                       3/6
  Verifying   : openssh-clients-7.4p1-21.el7.x86_64                        4/6
  Verifying   : openssh-7.4p1-21.el7.x86_64                                5/6
  Verifying   : openssh-server-7.4p1-21.el7.x86_64                         6/6

Updated:
  openssh-server.x86_64 0:7.4p1-23.el7_9

Dependency Updated:
  openssh.x86_64 0:7.4p1-23.el7_9          openssh-clients.x86_64 0:7.4p1-23.el7_9

Complete!
[root@localhost emmancuyugan]# ▮
```

🖳 📋 Public   ▐ emmancuyugan@localhost:/home/...   ▭

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

```
[emmancuyugan@localhost ~]$ systemctl start sshd
[emmancuyugan@localhost ~]$ systemctl enable sshd
[emmancuyugan@localhost ~]$ ▮
```

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

```
[emmancuyugan@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 2024-01-29 06:34:11 EST; 1min 55s ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 11034 (sshd)
   CGroup: /system.slice/sshd.service
           └─11034 /usr/sbin/sshd -D

Jan 29 06:34:10 localhost.localdomain systemd[1]: Stopped OpenSSH server daemon.
Jan 29 06:34:10 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Jan 29 06:34:11 localhost.localdomain sshd[11034]: Server listening on 0.0.0.0 port 22.
Jan 29 06:34:11 localhost.localdomain sshd[11034]: Server listening on :: port 22.
Jan 29 06:34:11 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[emmancuyugan@localhost ~]$ ▮
```
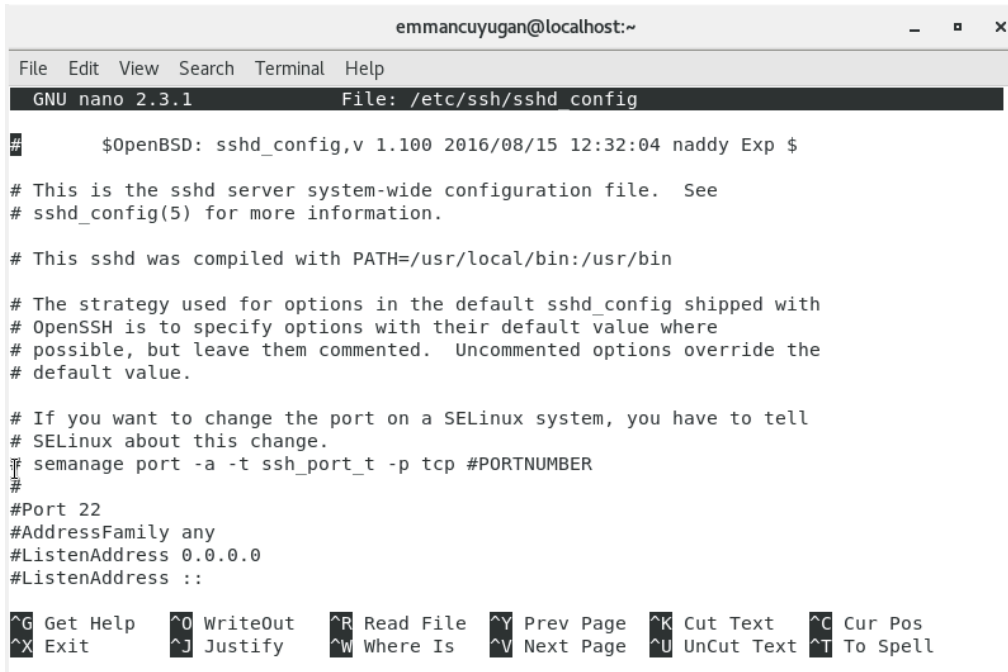
4. Open the SSH port 22 to allow incoming traffic:
    $ firewall-cmd --zone=public --permanent --add-service=ssh

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

```
                              emmancuyugan@localhost:~              _  ▫  ✕

 File  Edit  View  Search  Terminal  Help
  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 ::

^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
```

$ systemctl reload sshd

```
[emmancuyugan@localhost ~]$ sudo nano /etc/ssh/sshd_config
[emmancuyugan@localhost ~]$ systemctl reload sshd
[emmancuyugan@localhost ~]$ █
```

Task 3: Copy the Public Key to CentOS
   1. Make sure that *ssh* is installed on the local machine.

```
emncuygn@workstation:~$ sudo apt install ssh
[sudo] password for emncuygn:
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following package was automatically installed and is no longer required:
  libllvm7
Use 'sudo apt autoremove' to remove it.
The following NEW packages will be installed:
  ssh
0 upgraded, 1 newly installed, 0 to remove and 0 not upgraded.
Need to get 5,192 B of archives.
After this operation, 108 kB of additional disk space will be used.
Get:1 http://ph.archive.ubuntu.com/ubuntu bionic-updates/main amd64 ssh all 1:7
.6p1-4ubuntu0.7 [5,192 B]
Fetched 5,192 B in 0s (33.9 kB/s)
Selecting previously unselected package ssh.
(Reading database ... 166139 files and directories currently installed.)
Preparing to unpack .../ssh_1%3a7.6p1-4ubuntu0.7_all.deb ...
Unpacking ssh (1:7.6p1-4ubuntu0.7) ...
Setting up ssh (1:7.6p1-4ubuntu0.7) ...
```

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

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

```
[emmancuyugan@localhost ~]$ cd ~/.ssh
[emmancuyugan@localhost .ssh]$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQDFLchzP9qqx7b/2LC82ULbP2qA3kOv2835gp1XsGitmSfiIKA
OJjD1TpXEBGz/e17AFgYUH22mPcMMOEAj+WVaU6z4hsNLiEybD2owQ8I4icjapbK3/KILo7YW7Ne8fW1xY7JwAZ
kwDJYfm/MuYQFTKePfikfIfBPCtfLzjm8qKItoloTbzCCiWEW0PqP21MKGzdcSmcBKArDBueqXuDglWWaVdOD0r
2oHdx7fYzLl8+Pa/ZJbcQZ/pvsmtrSG5RlRDOz4bS93XH6v8V2hx/QHgJatcP4g+WEd1O/AcdI+O0vwLrb3p5Bz
xNpKKYI1tdf8Yw4SnD8d40KpHkwNBvjy7d5++NHf6EE86tJpInwxPHRao1m0uyiM6Y1xPOpK3WET+o3c2CzvIPO
dG8nE72QA1WquQO37FzSiwWcJS8zqTmnDHepfQukaEJc94u36ucVDPC+nHh0HoTnZpeEfQQWnYfWGid5moCVQ+g
JnuZtoUPYHuuZEKIy8bPra4deO/OqWZTWMWFb2aaGOGYiglCNhcPPPgk3MPrjvTQ/itCzN7d+0xolf+8e3Rqw8f
dvqVRkc5MJfEhF1yyPqoJjBxjagT2XZfUXKXm16U77MdQUczWVbod+95BDZ0rKXJhHDg4PRFLrmKSmns8i4heYG
Fn71wKyoi2VwLOmGaG+j8K6Jcw== emncuygn@workstation
```

Task 4: Verify ssh remote connection
1. Using your local machine, connect to CentOS using ssh.
2. Show evidence that you are connected.

```
emncuygn@workstation:~$ ssh emmancuyugan@192.168.56.112
Last login: Mon Jan 29 07:07:09 2024
[emmancuyugan@localhost ~]$
```

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?

   - Red Hat Linux requires a subscription while Debian releases of Linux are free and open-source. Debian also offers more software packages than Red Hat Linux distributions. Lastly, platform support, Red Hat supports fewer platforms than Debian

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

   - Red Hat needs a license while Debian releases don't because they're open source and free.