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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.
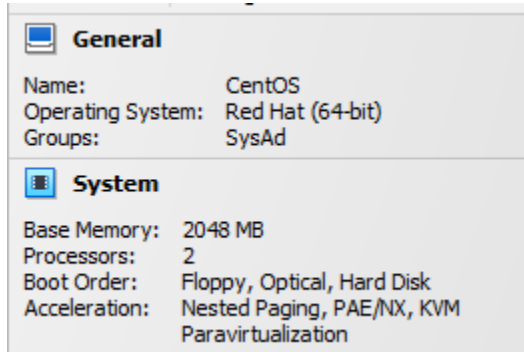
Task 1: Download the CentOS or RHEL-8 image (Create screenshots of the following)
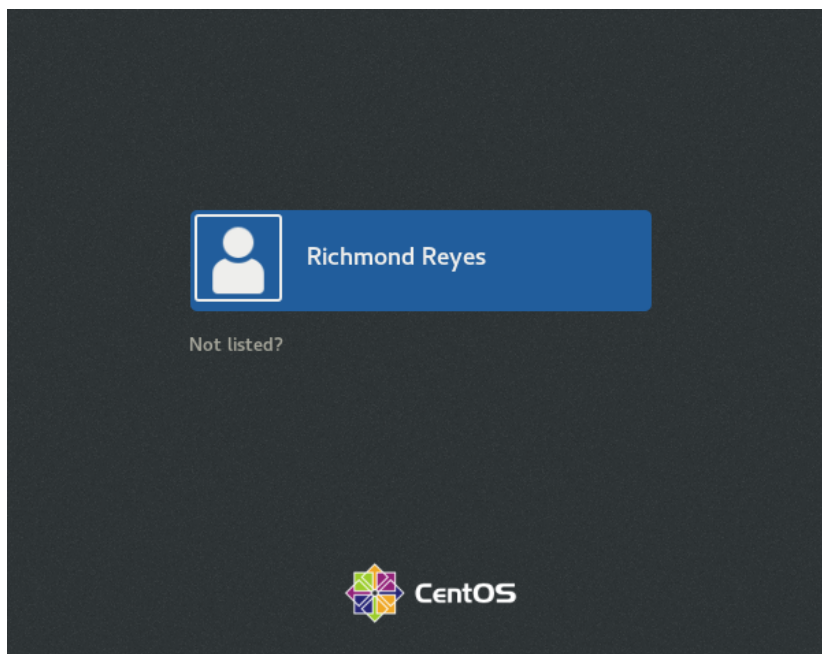
1. Download the image of the CentOS here:
   http://mirror.rise.ph/centos/7.9.2009/isos/x86_64/

   CentOS-7-x86_64-DVD-2009.iso
   2.0 MB/s - 563 MB of 4.4 GB, 32 mins left
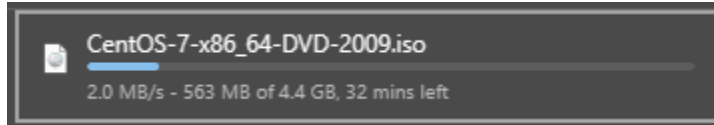
2. Create a VM machine with 2 Gb RAM and 20 Gb HD.

   General
   Name: CentOS
   Operating System: Red Hat (64-bit)
   Groups: SysAd

   System
   Base Memory: 2048 MB
   Processors: 2
   Boot Order: Floppy, Optical, Hard Disk
   Acceleration: Nested Paging, PAE/NX, KVM
                  Paravirtualization

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

   Richmond Reyes

   Not listed?

   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

   ```
   [rreyes@localhost ~]$ sudo yum install openssh-server
   Loaded plugins: fastestmirror, langpacks
   Loading mirror speeds from cached hostfile
    * base: mirror-hk.koddos.net
    * extras: mirror-hk.koddos.net
    * updates: mirror-hk.koddos.net
   Package openssh-server-7.4p1-23.el7_9.x86_64 already installed and latest version
   Nothing to do
   ```

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

   ```
   [rreyes@localhost ~]$ systemctl start sshd
   [rreyes@localhost ~]$ systemctl enable sshd
   [rreyes@localhost ~]$ █
   ```

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

   ```
   [rreyes@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 Wed 2023-08-30 01:29:36 PST; 36min ago
        Docs: man:sshd(8)
              man:sshd_config(5)
    Main PID: 19017 (sshd)
      CGroup: /system.slice/sshd.service
              └─19017 /usr/sbin/sshd -D

   Aug 30 01:29:36 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
   Aug 30 01:29:36 localhost.localdomain sshd[19017]: Server listening on 0.0.0.0 port 22.
   Aug 30 01:29:36 localhost.localdomain sshd[19017]: Server listening on :: port 22.
   Aug 30 01:29:36 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

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

```
                              rreyes@localhost:~                    _  □  ×

File  Edit  View  Search  Terminal  Help
  GNU nano 2.3.1              File: /etc/ssh/sshd_config              Modified

#        $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 ::
                            [ Read 139 lines ]
^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
```

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

```
richmond@manageNode:~$ ssh -V
OpenSSH_8.9p1 Ubuntu-3ubuntu0.3, OpenSSL 3.0.2 15 Mar 2022
```

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

```
richmond@manageNode:~$ ssh-copy-id -i ~/.ssh/id_rsa rreyes@192.168.56.107
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/richmond/.
ssh/id_rsa.pub"
The authenticity of host '192.168.56.107 (192.168.56.107)' can't be established
.
ED25519 key fingerprint is SHA256:DygkOOrVJvGwcEpIxoItID/n65cxqSiega0yTp9R3NE.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? 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
rreyes@192.168.56.107's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'rreyes@192.168.56.107'"
and check to make sure that only the key(s) you wanted were added.
```

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

```
[rreyes@localhost ~]$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDbq9YmC2a+gJMoWgFOrxq1zz0XAH78gJ0FxXN5CZPKZmzLC9r
XEZh5Z77cxFE2ASBukJV1ublg1I4s/3X5zqCsbaKs2PmEoqXjjZjhmwDV6EUHxpIybTbZga8E5UV1BMZxFKLCAS
bYCR26NEleyvoTSvtdcictaQzJPxWbs+YNZ6H1TMRG14lGWeHIjmbg/exfmceemboL3pGZqlS3etsHU8StpC4S3
nPO4OxUkR9uT6utBSjZllmUZkNO3rzgyYIYZBbg6SQX2pR/+KoQ7jRvTfatKxnmmg5KoC1LpBovMzL0FBtnzuTj
wxtKXkgOXsziw8iAzTpKpoGf9+hwcHHfBJvMdvMGSuICb61hEzsjjJEsuOchaAXhPqK65L3wcLU/enLxrDj9ZaA
Lnbulbv5P8eRsXWXpFlHi0aln+RLsWMnu0CfyYDA7Nk31op217ZmfeofrQFs7TBRRqgc5bRo6EE817nMOwMsp5z
F3ZIGzUSqboDyXUmo+YWQ6If4aIT0= richmond@manageNode
```

Task 4: Verify ssh remote connection
1. Using your local machine, connect to CentOS using ssh.

```
richmond@manageNode:~$ ssh rreyes@192.168.56.107
Last login: Sun Sep  3 07:32:04 2023
[rreyes@localhost ~]$
```

2. Show evidence that you are connected.

```
[rreyes@localhost ~]$ 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::30d8:1576:3b7c:6f75  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:f6:c5:5e  txqueuelen 1000  (Ethernet)
        RX packets 1479  bytes 2012353 (1.9 MiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 326  bytes 27440 (26.7 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

enp0s8: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.56.107  netmask 255.255.255.0  broadcast 192.168.56.255
```

The ip of the CentOS is 192.168.56.107 and is shown in the control node.

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?
   - It depends on the user on how he/she will use the system. Debian is an open source operating system where it is supported by thousands of programmers worldwide. While Red Hat is mainly used in the commercial data center which is used more in the enterprise environment. So it depends on the user's preferences.

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

   - The main difference between Debian and Red Hat is that in Debian it is an open source known for its stability and reliability, the only downside of it is the release cycle where it is dependent on the community volunteers. The Red Hat on the other hand, is a commercial Linux that is a subscription based model and it is mostly used in the enterprise environment. Its distribution updates came from the distributors.

Conclusion:

- In this activity, I learned and discovered the use of Red Hat Linux distribution as I encountered and interacted with it today. There is no much of a difference in the GUI and like in Debian, I can use the SSH server package in it to use the servers remotely in the future.