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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.

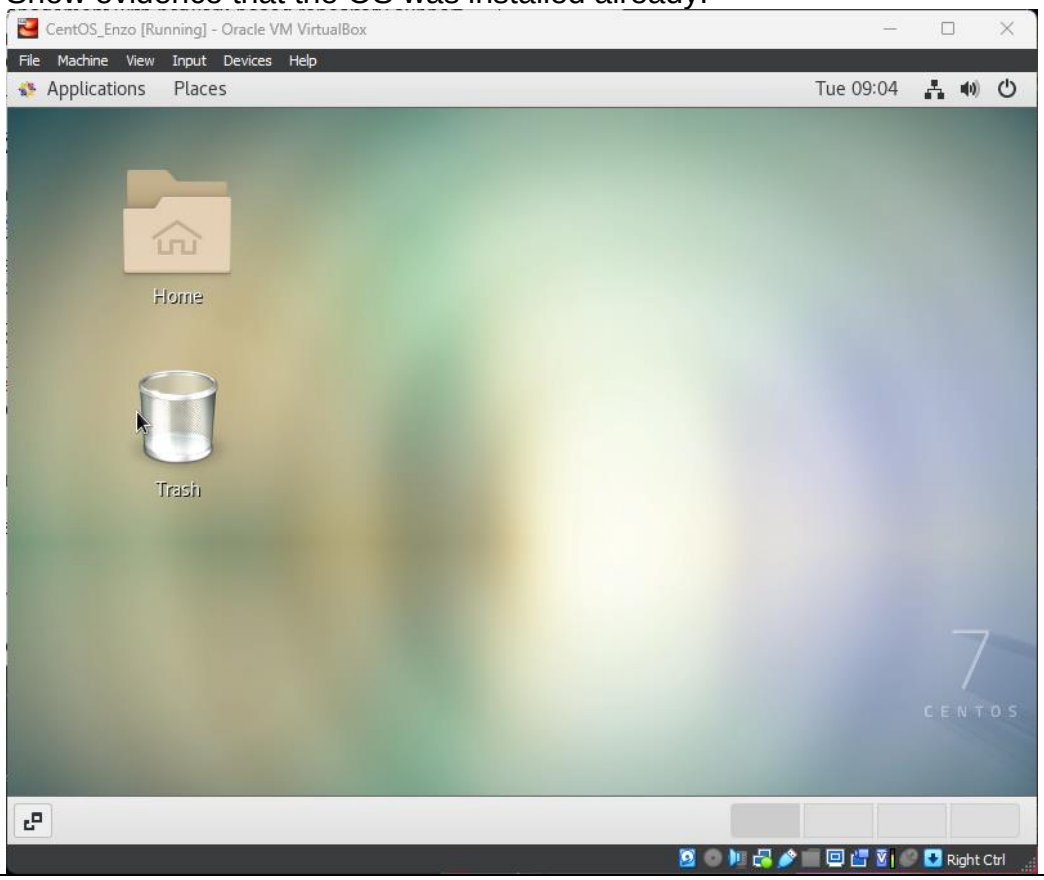
CentOS uses the RPM package format and YUM/DNF as the package manager.

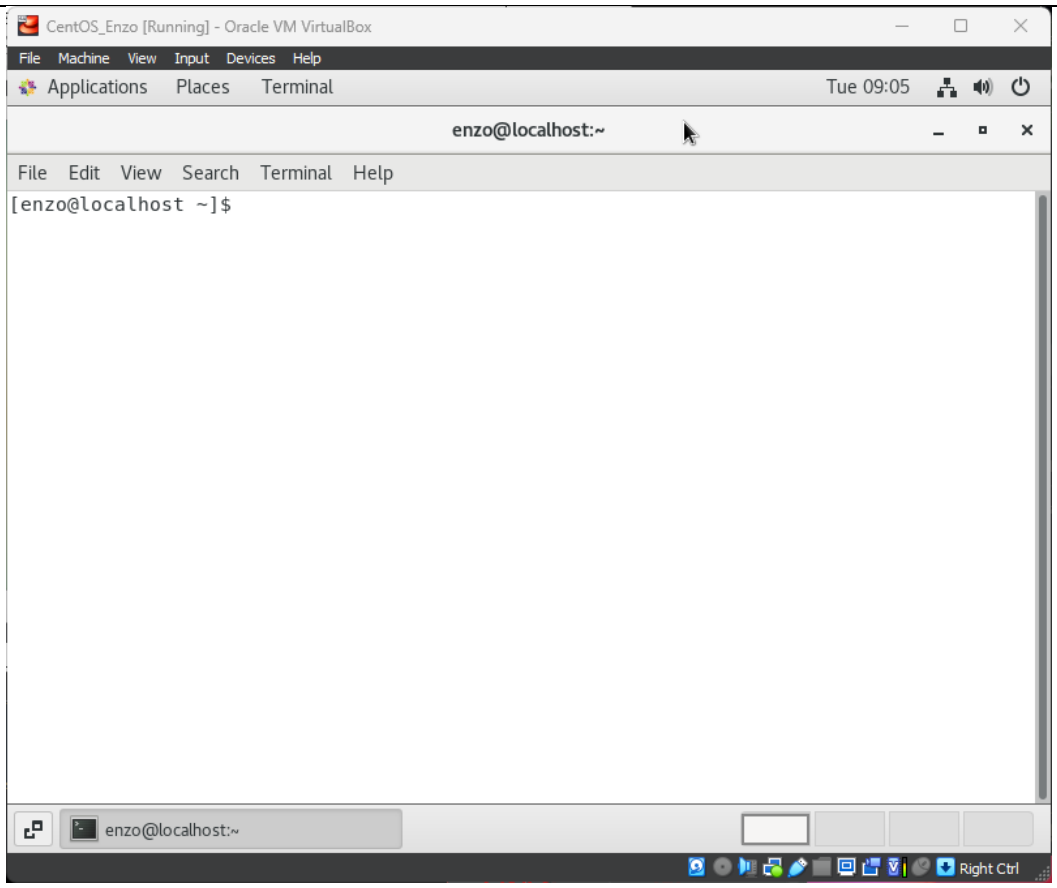
Debian uses the DEB package format and dpkg/APT as the package manager.

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*

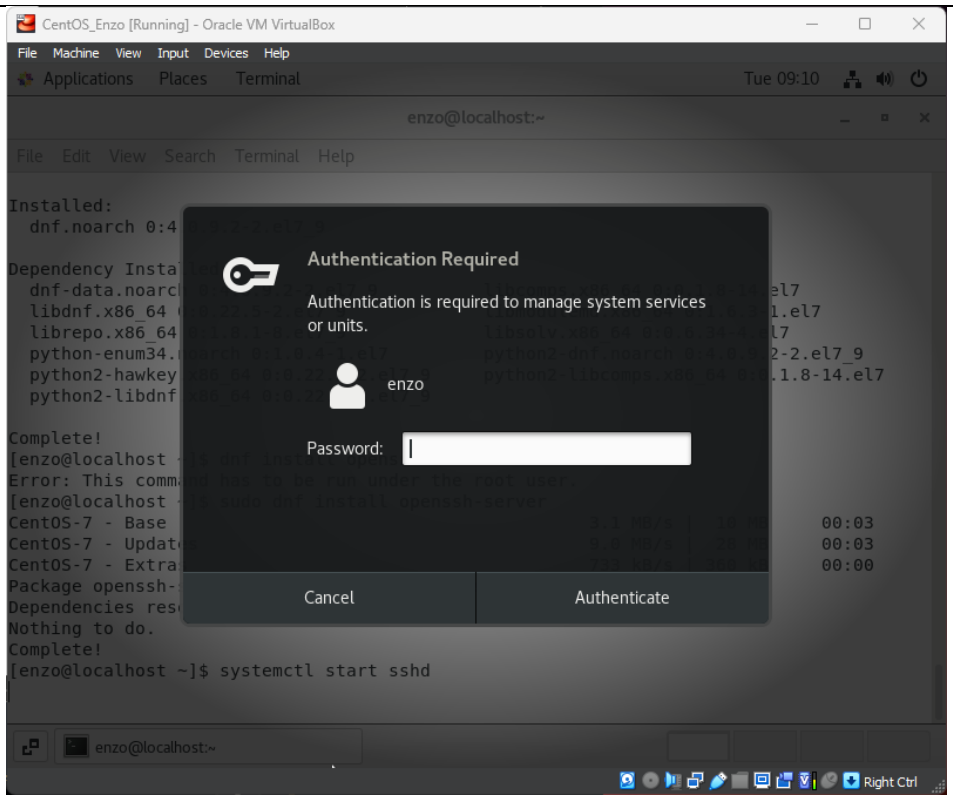
1. Install the ssh server package *openssh* by using the *dnf* command:
   $ dnf install openssh-server

```
[enzo@localhost ~]$ sudo yum install dnf

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 enzo:
Loaded plugins: fastestmirror, langpacks
Existing lock /var/run/yum.pid: another copy is running as pid 10273.
Another app is currently holding the yum lock; waiting for it to exit...
  The other application is: PackageKit
    Memory : 163 M RSS (582 MB VSZ)
    Started: Tue Sep  5 09:03:47 2023 - 02:36 ago
    State  : Sleeping, pid: 10273
Another app is currently holding the yum lock; waiting for it to exit...
  The other application is: PackageKit
    Memory : 163 M RSS (582 MB VSZ)
    Started: Tue Sep  5 09:03:47 2023 - 02:38 ago
    State  : Sleeping, pid: 10273
Another app is currently holding the yum lock; waiting for it to exit...
  The other application is: PackageKit
    Memory : 177 M RSS (595 MB VSZ)
    Started: Tue Sep  5 09:03:47 2023 - 02:40 ago
```

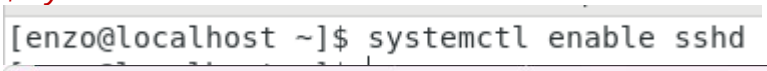
```
  Verifying  : dnf-4.0.9.2-2.el7_9.noarch                                   2/12
  Verifying  : librepo-1.8.1-8.el7_9.x86_64                                 3/12
  Verifying  : python2-hawkey-0.22.5-2.el7_9.x86_64                         4/12
  Verifying  : libmodulemd-1.6.3-1.el7.x86_64                               5/12
  Verifying  : dnf-data-4.0.9.2-2.el7_9.noarch                              6/12
  Verifying  : libdnf-0.22.5-2.el7_9.x86_64                                 7/12
  Verifying  : python-enum34-1.0.4-1.el7.noarch                             8/12
  Verifying  : python2-dnf-4.0.9.2-2.el7_9.noarch                           9/12
  Verifying  : libcomps-0.1.8-14.el7.x86_64                                10/12
  Verifying  : libsolv-0.6.34-4.el7.x86_64                                 11/12
  Verifying  : python2-libdnf-0.22.5-2.el7_9.x86_64                        12/12

Installed:
  dnf.noarch 0:4.0.9.2-2.el7_9

Dependency Installed:
  dnf-data.noarch 0:4.0.9.2-2.el7_9          libcomps.x86_64 0:0.1.8-14.el7
  libdnf.x86_64 0:0.22.5-2.el7_9             libmodulemd.x86_64 0:1.6.3-1.el7
  librepo.x86_64 0:1.8.1-8.el7_9             libsolv.x86_64 0:0.6.34-4.el7
  python-enum34.noarch 0:1.0.4-1.el7         python2-dnf.noarch 0:4.0.9.2-2.el7_9
  python2-hawkey.x86_64 0:0.22.5-2.el7_9     python2-libcomps.x86_64 0:0.1.8-14.el7
  python2-libdnf.x86_64 0:0.22.5-2.el7_9

Complete!
[enzo@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base                                          3.1 MB/s |  10 MB     00:03
CentOS-7 - Updates       28% [======                  ] 1.6 MB/s | 7.8 MB     00:12 ETA

[enzo@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base                                          3.1 MB/s |  10 MB     00:03
CentOS-7 - Updates                                       9.0 MB/s |  28 MB     00:03
CentOS-7 - Extras                                        733 kB/s | 360 kB     00:00
Package openssh-server-7.4p1-21.el7.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
```

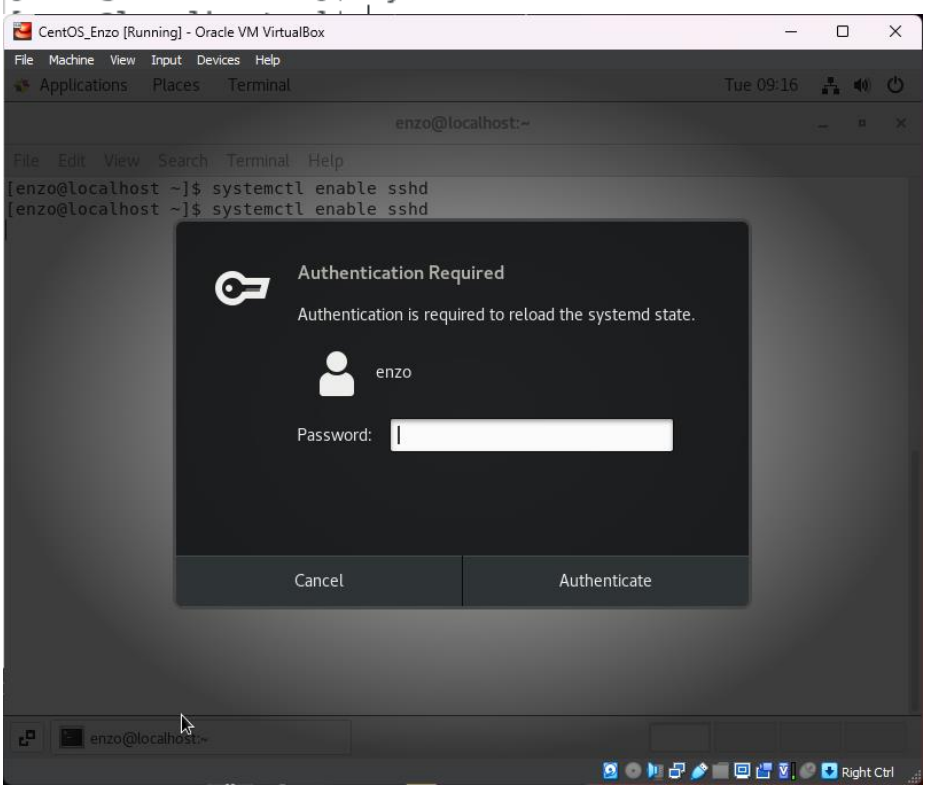
2. Start the *sshd* daemon and set to start after reboot:
   $ systemctl start sshd

```
[enzo@localhost ~]$ systemctl start sshd
```



$ systemctl enable sshd





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

$ systemctl status sshd

```
[enzo@localhost ~]$ systemctl status sshd
[enzo@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 Tue 2023-09-05 08:54:29 EDT; 22min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 1130 (sshd)
   CGroup: /system.slice/sshd.service
           └─1130 /usr/sbin/sshd -D

Sep 05 08:54:29 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 05 08:54:29 localhost.localdomain sshd[1130]: Server listening on 0.0.0.0 port 22.
Sep 05 08:54:29 localhost.localdomain sshd[1130]: Server listening on :: port 22.
Sep 05 08:54:29 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:

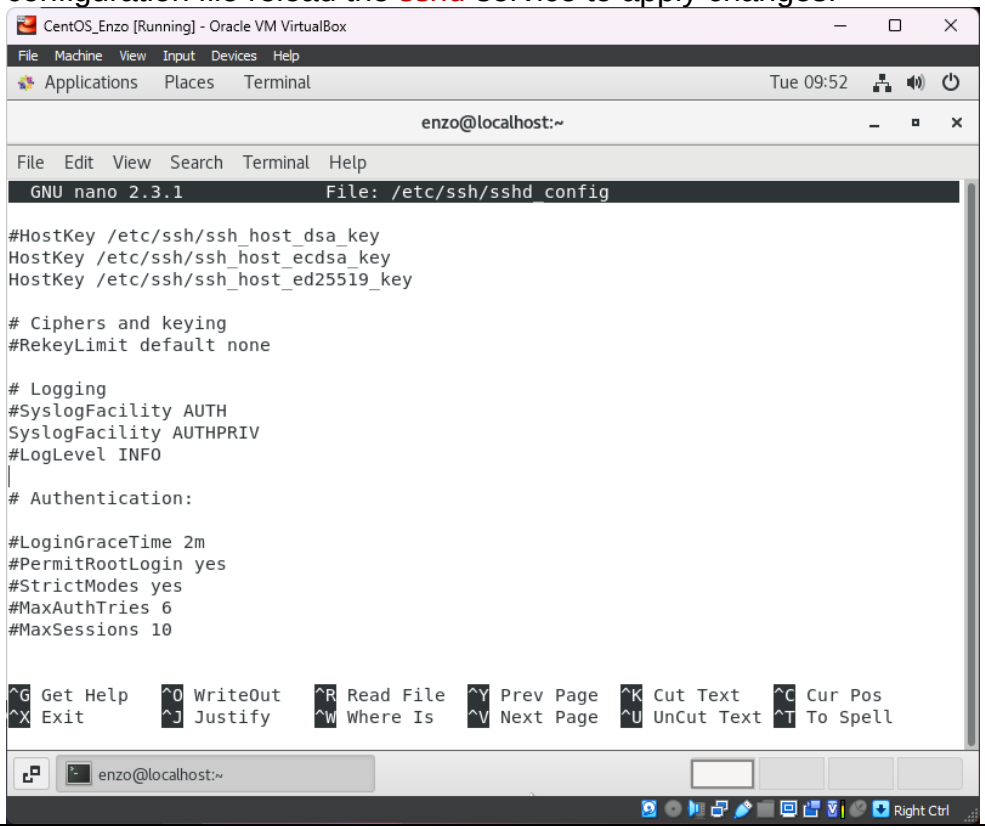
$ firewall-cmd --zone=public --permanent --add-service=ssh

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

$ firewall-cmd –reload

```
success
[enzo@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:



$ systemctl reload sshd

```
[enzo@localhost ~]$ 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.
3. On CentOS, verify that you have the *authorized_keys*.

```
enzo@LocalMachine:~$ ssh enzo@hehepogi_CentOS
The authenticity of host 'hehepogi_centos (192.168.56.104)' can't be established
.
ED25519 key fingerprint is SHA256:LhcsigXmp+rQenmVfJX0zi9uM9EhgeDNxjkzG5L3teM.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'hehepogi_centos' (ED25519) to the list of known host
s.
enzo@hehepogi_centos's password:
Permission denied, please try again.
enzo@hehepogi_centos's password:
Last login: Tue Sep  5 10:02:43 2023
[enzo@hehepogi_CentOS ~]$ ssh-keygen -t rsa -b 4096
Generating public/private rsa key pair.
Enter file in which to save the key (/home/enzo/.ssh/id_rsa):
Created directory '/home/enzo/.ssh'.
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/enzo/.ssh/id_rsa.
Your identification has been saved in /home/enzo/.ssh/id_rsa.
Your public key has been saved in /home/enzo/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:C8mVynjt5tDyALpRtj0bONd7jL410+2NoF4oLWpqfeo enzo@hehepogi_CentOS
The key's randomart image is:
+---[RSA 4096]----+
|                 |
|         .       |
|        o        |
|     + =         |
|    = B S        |
|   + * = o o .   |
|  o +.O Oo* + .  |
|   o.oo%o=o= o o |
|  ...+E+*+o   o .|
+----[SHA256]-----+
[enzo@hehepogi_CentOS ~]$ ssh-copy-id -i ~/.ssh/id_rsa enzo@hehepogi_CentOS
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/enzo/.ssh/i
d_rsa.pub"
```

```
[enzo@hehepogi_CentOS ~]$ ssh-copy-id -i ~/.ssh/id_rsa enzo@hehepogi_CentOS
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/enzo/.ssh/i
d_rsa.pub"
The authenticity of host 'hehepogi_centos (127.0.0.1)' can't be established.
ECDSA key fingerprint is SHA256:v7KGcc1GcMKhhkFOzKKg9bF8YboAVLrq5xNh04WpPfk.
ECDSA key fingerprint is MD5:0c:29:10:c7:d0:7a:90:13:a1:24:ff:93:40:90:7f:a7.
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 prompt
ed now it is to install the new keys
enzo@hehepogi_centos's password:

Number of key(s) added: 1

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

[enzo@hehepogi_CentOS ~]$ logout
Connection to hehepogi_centos closed.
```

```
[enzo@hehepogi_CentOS ~]$ ls -la .ssh
total 20
drwx------.  2 enzo enzo   80 Sep  5 10:13 .
drwx------. 16 enzo enzo 4096 Sep  5 10:13 ..
-rw-------.  1 enzo enzo  746 Sep  5 10:13 authorized_keys
-rw-------.  1 enzo enzo 3247 Sep  5 10:11 id_rsa
-rw-r--r--.  1 enzo enzo  746 Sep  5 10:11 id_rsa.pub
-rw-r--r--.  1 enzo enzo  177 Sep  5 10:13 known_hosts
```

Task 4: Verify ssh remote connection

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

```
enzo@LocalMachine:~$ ssh hehepogi_CentOS
enzo@hehepogi_centos's password:
Last login: Tue Sep  5 10:16:19 2023 from 192.168.56.101
[enzo@hehepogi_CentOS ~]$
```

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?

   When deciding between Debian and RedHat as the distribution there are several important factors to consider. First think about your use case. Debian is known for its stability making it a great choice, for servers and workstations. On the hand RedHat is often preferred in enterprise environments. Next consider the package management system used by each distribution. Debian relies on APT while RedHat uses RPM. It's essential to think about your familiarity with these systems. How well they align with your needs. Additionally consider the level of support you require. Debian has a community that provides support while RedHat offers support and certifications through their Red Hat Enterprise Linux (RHEL) platform. Furthermore, think about your preference for stability versus access to cutting edge software.

Debian prioritizes stability over having the software updates whereas RedHat focuses on providing stability in enterprise settings. It's also worth considering the release cycles of both distributions. Debian has a release cycle compared to RedHats long term support and predictable release schedules. Moreover, take into account your hardware architecture requirements. Debian supports a range of architectures while RedHat primarily focuses on x86_64 architecture, for RHEL. Lastly examine your licensing preferences well. Debian strictly adheres to an open-source policy while offering licenses options; meanwhile RedHat takes an approach. Ultimately choosing between Debian and RedHat depends on your needs and expertise to make a decision.

2. What is the main difference between Debian and Red Hat Linux distributions?
   One of the first Linux distributions created, Debian is absolutely consumer-maintained and would not require or have commercial backing. because of its stability, dependability, protection, and the relatively diverse user community, Debian is favored by way of users. while red Hat employer Linux supply code is available for most people to use and alter, CentOS is likewise a dependable, predictable, plausible, and replicable platform. Debian is a Linus distribution that is modified, developed, and maintained by way of the Debian consumer community. into time goes on, it nonetheless keeps exchanging, adapt, and strengthen right into a greater powerful, solid, and tried-and-genuine operating system. notwithstanding the fact that CentOS is a community-supported undertaking as properly, its distribution is primarily based on red Hat Inc.'s open supply red warm enterprise Linux, and pink Hat Inc. can also provide CentOS with third-birthday celebration commercial assistance if enough massive reviews are obtained. Debian, conversely, balances stability with modern-day software program through its strong, checking out, and unstable branches. Supported by using a devoted community, Debian affords flexibility in software choice, accommodating numerous preferences. Its normal release cycle ensures steady updates and keeps safety. CentOS, with backing from pink Hat, gives business assist options, whereas Debian relies broadly speaking on network assist. bundle choices additionally fluctuate; CentOS prioritizes tested balance, whilst Debian presents users a broader variety of software program alternatives for customizing installations.