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Course/Section: CPE31S4	**Date Submitted: September 5, 2023**
Instructor: Dr. Taylar	**Semester and SY: 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.

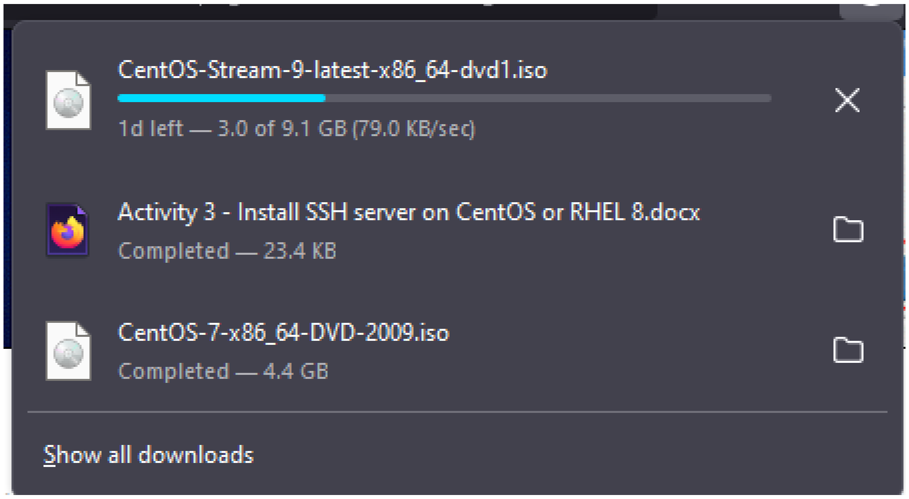
CentOS uses the RPM package format and YUM/DNF as the package manager.

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/



CentOS-Stream-9-latest-x86_64-dvd1.iso
1d left — 3.0 of 9.1 GB (79.0 KB/sec)

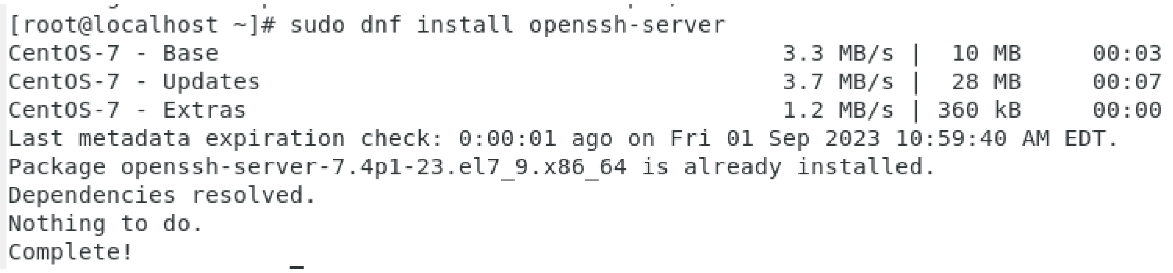
Activity 3 - Install SSH server on CentOS or RHEL 8.docx
Completed — 23.4 KB

CentOS-7-x86_64-DVD-2009.iso
Completed — 4.4 GB

2. Create a VM machine with 2(4) Gb RAM and 20(35) Gb HD.
3. Install the downloaded image.
4. Show evidence that the OS was installed already.

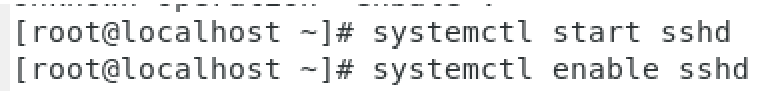
Task 2: Install the SSH server package *openssh*

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



```
[root@localhost ~]# sudo dnf install openssh-server
CentOS-7 - Base                                        3.3 MB/s |  10 MB     00:03
CentOS-7 - Updates                                     3.7 MB/s |  28 MB     00:07
CentOS-7 - Extras                                      1.2 MB/s | 360 kB     00:00
Last metadata expiration check: 0:00:01 ago on Fri 01 Sep 2023 10:59:40 AM EDT.
Package openssh-server-7.4p1-23.el7_9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
```

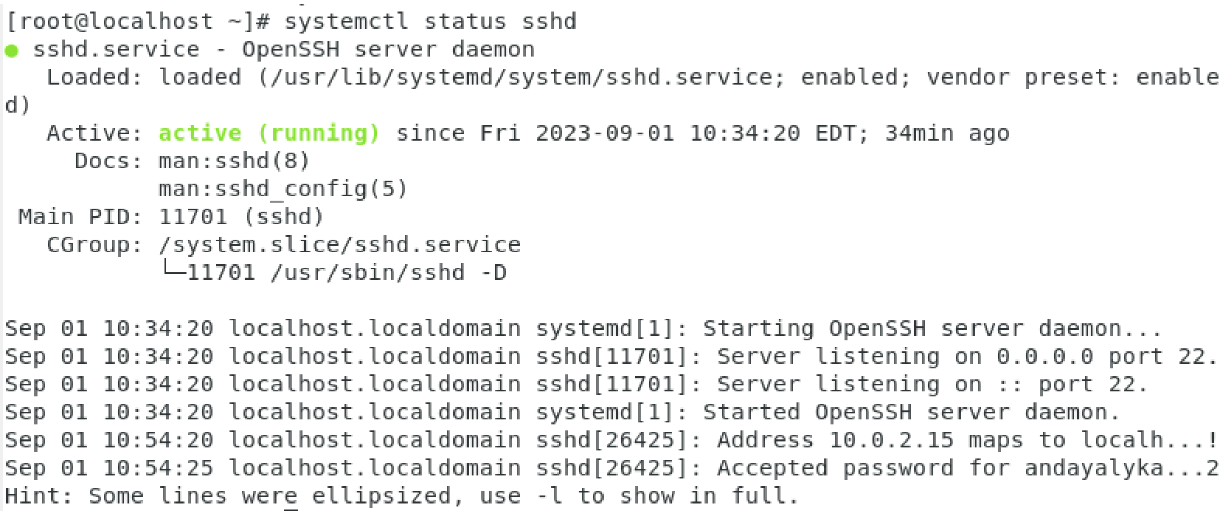
2. Start the *sshd* daemon and set to start after reboot:
   $ systemctl start sshd
   $ systemctl enable sshd



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

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

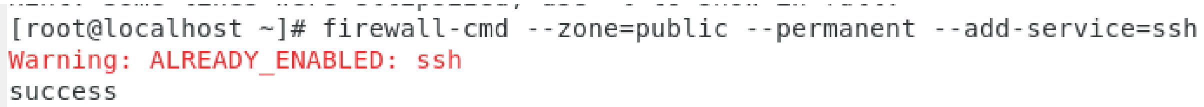
   $ systemctl status sshd



```
[root@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 Fri 2023-09-01 10:34:20 EDT; 34min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 11701 (sshd)
   CGroup: /system.slice/sshd.service
           └─11701 /usr/sbin/sshd -D

Sep 01 10:34:20 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 01 10:34:20 localhost.localdomain sshd[11701]: Server listening on 0.0.0.0 port 22.
Sep 01 10:34:20 localhost.localdomain sshd[11701]: Server listening on :: port 22.
Sep 01 10:34:20 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Sep 01 10:54:20 localhost.localdomain sshd[26425]: Address 10.0.2.15 maps to localh...!
Sep 01 10:54:25 localhost.localdomain sshd[26425]: Accepted password for andayalyka...2
Hint: Some lines were ellipsized, use -l to show in full.
```

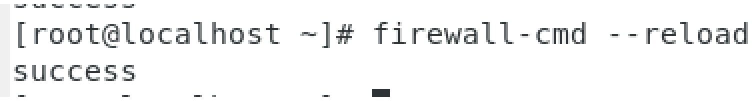
4. Open the SSH port 22 to allow incoming traffic:

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



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

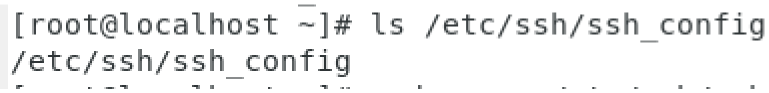
   $ firewall-cmd --reload



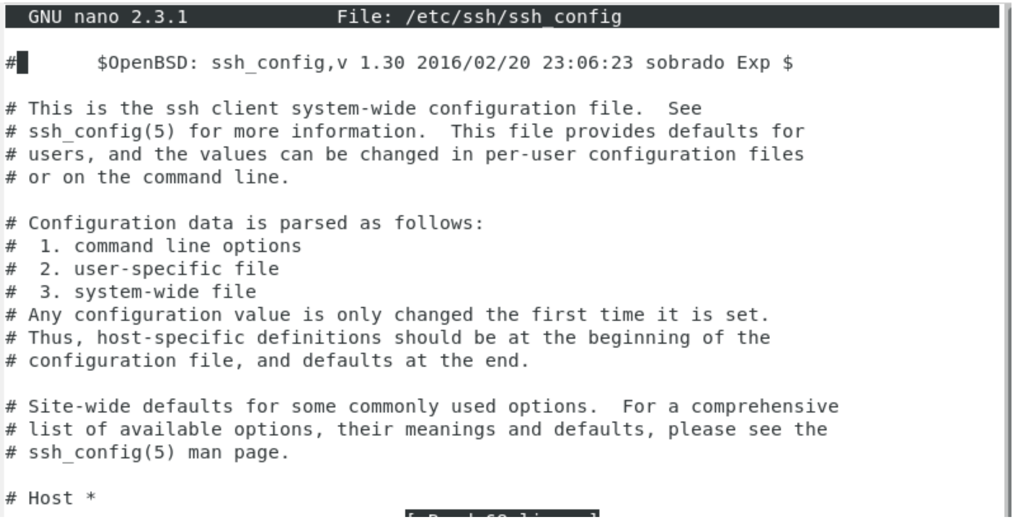
```
[root@localhost ~]# firewall-cmd --reload
success
```

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:

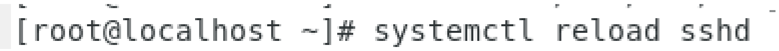
   $ systemctl reload sshd



```
[root@localhost ~]# ls /etc/ssh/ssh_config
/etc/ssh/ssh_config
```



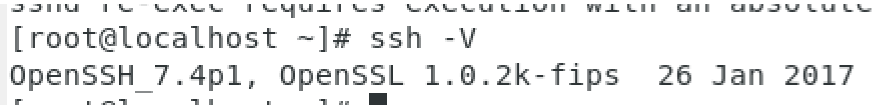
```
 GNU nano 2.3.1              File: /etc/ssh/ssh_config

#       $OpenBSD: ssh_config,v 1.30 2016/02/20 23:06:23 sobrado Exp $

# This is the ssh client system-wide configuration file.  See
# ssh_config(5) for more information.  This file provides defaults for
# users, and the values can be changed in per-user configuration files
# or on the command line.

# Configuration data is parsed as follows:
#  1. command line options
#  2. user-specific file
#  3. system-wide file
# Any configuration value is only changed the first time it is set.
# Thus, host-specific definitions should be at the beginning of the
# configuration file, and defaults at the end.

# Site-wide defaults for some commonly used options.  For a comprehensive
# list of available options, their meanings and defaults, please see the
# ssh_config(5) man page.

# Host *
```



```
[root@localhost ~]# systemctl reload sshd
```

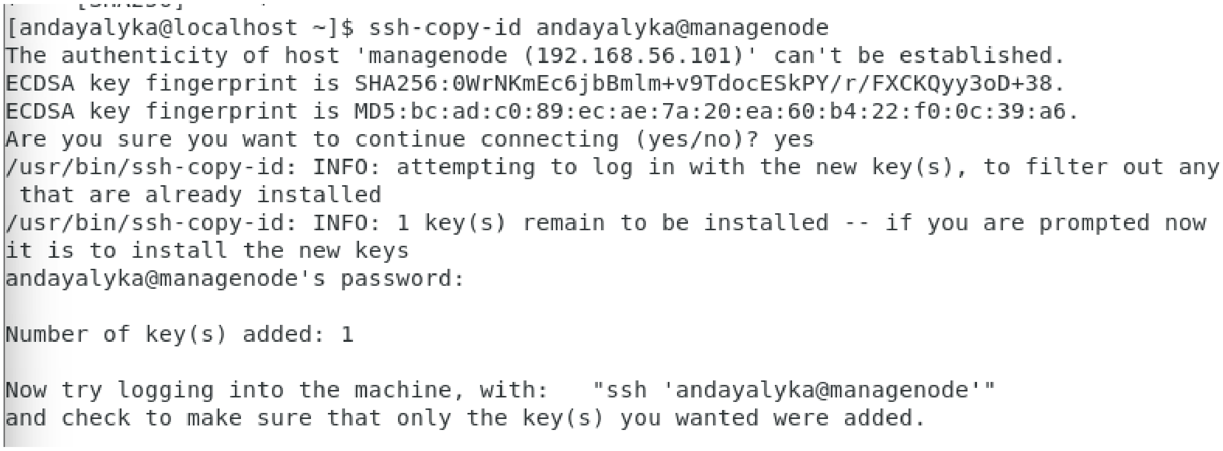
Task 3: Copy the Public Key to CentOS

1. Make sure that *ssh* is installed on the local machine.



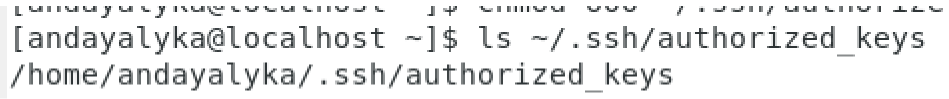
```
[root@localhost ~]# ssh -V
OpenSSH_7.4p1, OpenSSL 1.0.2k-fips  26 Jan 2017
```

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

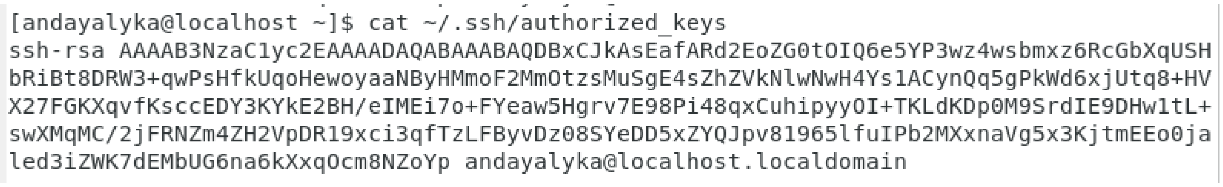


```
[andayalyka@localhost ~]$ ssh-copy-id andayalyka@managenode
The authenticity of host 'managenode (192.168.56.101)' can't be established.
ECDSA key fingerprint is SHA256:0WrNKmEc6jbBmlm+v9TdocESkPY/r/FXCKQyy3oD+38.
ECDSA key fingerprint is MD5:bc:ad:c0:89:ec:ae:7a:20:ea:60:b4:22:f0:0c:39:a6.
Are you 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 prompted now
it is to install the new keys
andayalyka@managenode's password:

Number of key(s) added: 1

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

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



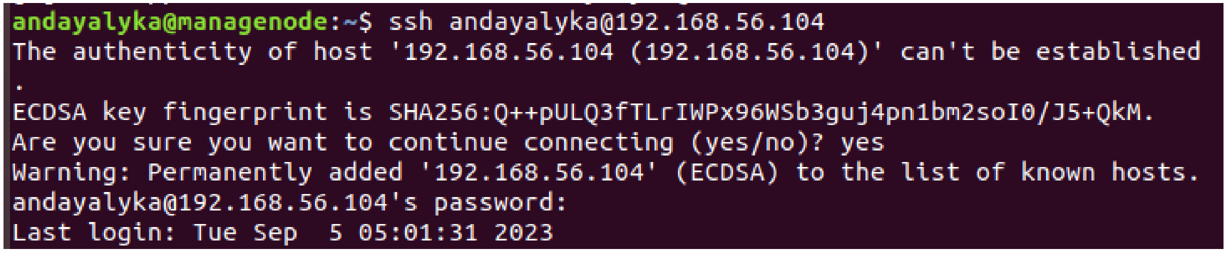
```
[andayalyka@localhost ~]$ ls ~/.ssh/authorized_keys
/home/andayalyka/.ssh/authorized_keys
```



```
[andayalyka@localhost ~]$ cat ~/.ssh/authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABAQDBxCJkAsEafARd2EoZG0tOIQ6e5YP3wz4wsbmxz6RcGbXqUSH
bRiBt8DRW3+qwPsHfkUqoHewoyaaNByHMmoF2MmOtzsMuSgE4sZhZVkNlwNwH4Ys1ACynQq5gPkWd6xjUtq8+HV
X27FGKXqvfKsccEDY3KYkE2BH/eIMEi7o+FYeaw5Hgrv7E98Pi48qxCuhipyyOI+TKLdKDp0M9SrdIE9DHw1tL+
swXMqMC/2jFRNZm4ZH2VpDR19xci3qfTzLFByvDz08SYeDD5xZYQJpv81965lfuIPb2MXxnaVg5x3KjtmEEo0ja
led3iZWK7dEMbUG6na6kXxqOcm8NZoYp andayalyka@localhost.localdomain
```

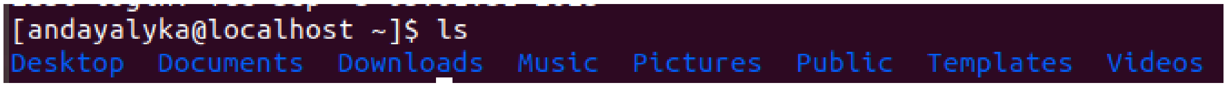
Task 4: Verify ssh remote connection

1. Using your local machine, connect to CentOS using ssh.

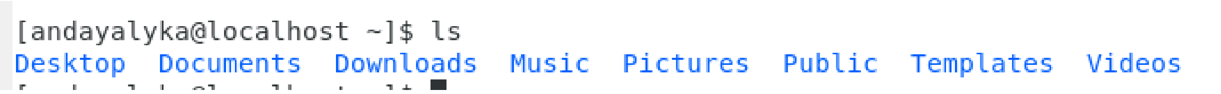


```
andayalyka@managenode:~$ ssh andayalyka@192.168.56.104
The authenticity of host '192.168.56.104 (192.168.56.104)' can't be established
.
ECDSA key fingerprint is SHA256:Q++pULQ3fTLrIWPx96WSb3guj4pn1bm2soI0/J5+QkM.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.56.104' (ECDSA) to the list of known hosts.
andayalyka@192.168.56.104's password:
Last login: Tue Sep  5 05:01:31 2023
```

2. Show evidence that you are connected.



```
[andayalyka@localhost ~]$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
```



```
[andayalyka@localhost ~]$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
```

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?

   - **Selecting between Debian and Red Hat Linux distributions relies on your individual needs, preferences, and intended uses. Each distribution has its unique strengths, making them suitable for distinct scenarios.**

     Intended Purpose: Evaluate the purpose of your Linux distribution. For critical server applications where stability is paramount, options like RHEL or its free counterpart CentOS are ideal. Debian Stable is also a solid choice for server environments. If you require more recent software for a desktop or development setting, Debian Testing or Fedora Workstation might be more suitable.

     Support and Maintenance: Red Hat offers paid support for RHEL, particularly beneficial for enterprises with mission-critical systems. Debian relies on a robust community and volunteer support, which may not be as comprehensive as Red Hat's paid support but often suffices for many use cases.

     Package Management: Debian employs the Debian package manager (APT), while Red Hat utilizes the Red Hat package manager (RPM) and YUM/DNF. Your familiarity with these package management systems could influence your decision.

     Licensing: Debian adheres strictly to free and open-source software principles. Red Hat offers free distributions like Fedora but also offers commercial editions with licensing fees.

Security: Both Debian and Red Hat prioritize security, issuing timely updates and maintaining dedicated security teams. RHEL, tailored for enterprise use, may incorporate more robust security features.

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

- **Debian and Red Hat Linux distributions have several key differences, stemming from their respective philosophies, development models, and target audiences.**

  Package Management:

  Debian: Debian uses the Debian package manager (APT) and Debian packages (.deb). It has a robust package management system known for its ease of use and dependency resolution.

  Red Hat: Red Hat uses the Red Hat Package Manager (RPM) and RPM packages (.rpm). YUM and DNF are the package management tools commonly associated with RPM-based distributions.

  Security and Certifications:

  Debian: Debian places a strong emphasis on security but may have fewer certifications compared to RHEL.

  Red Hat: RHEL is often chosen for environments requiring certifications such as Common Criteria or FIPS, making it a top choice for secure and regulated industries.

CONCLUSION:

Red Hat uses the Red Hat Package Manager (RPM) and RPM packages (.rpm). YUM and DNF are the package management tools commonly associated with RPM-based distribution. Red Hat prioritizes security, issuing timely updates and maintaining dedicated security teams. RHEL, tailored for enterprise use, may incorporate more robust security features. You can study a variety of skills related to Linux system administration and server management in CentOS and RHEL (Red Hat Enterprise Linux). Understanding CentOS and RHEL, which are frequently used in business environments, can lead to a variety of job opportunities in system administration and DevOps. Red Hat also provides certification programs (like RHCSA and RHCE) that can attest to your proficiency in various fields.