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Course/Section: CPE31S6	Date Submitted: September 7, 2023
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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.

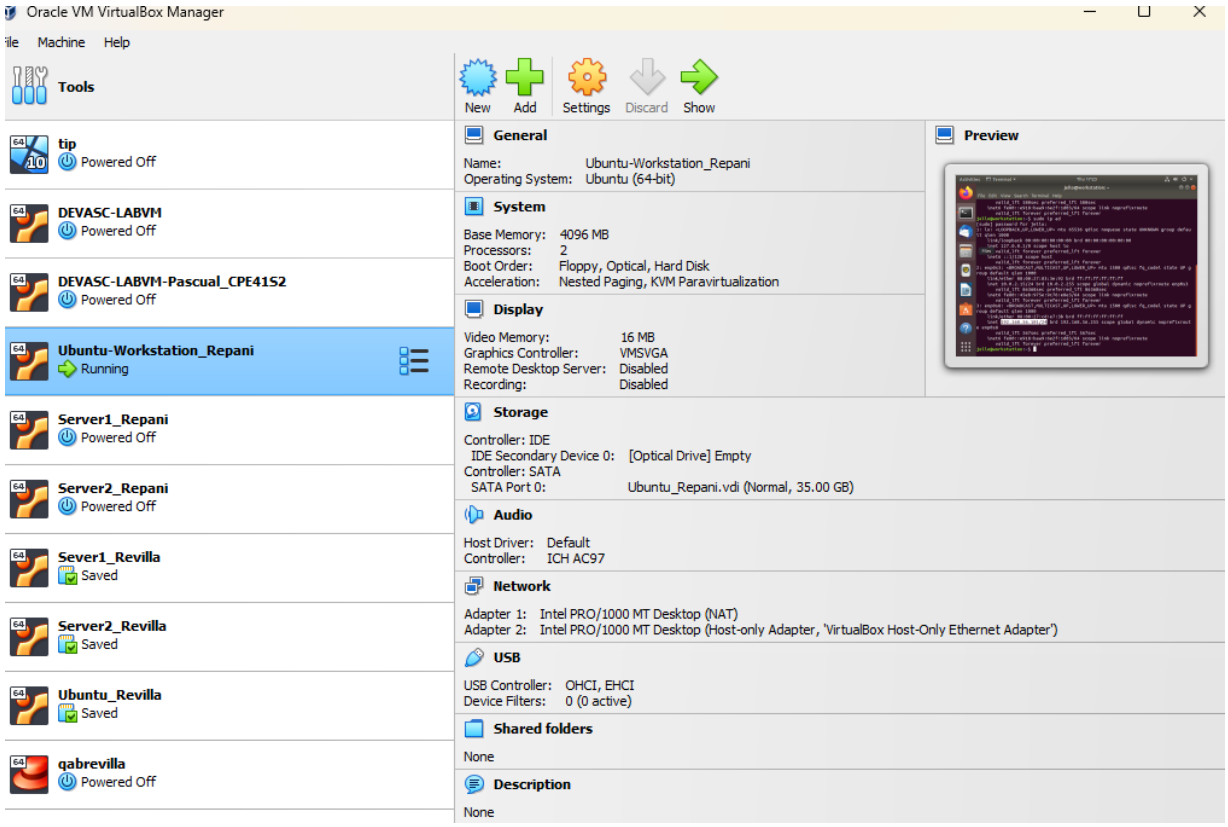
CentOS uses the RPM package format and YUM/DNF as the package manager.

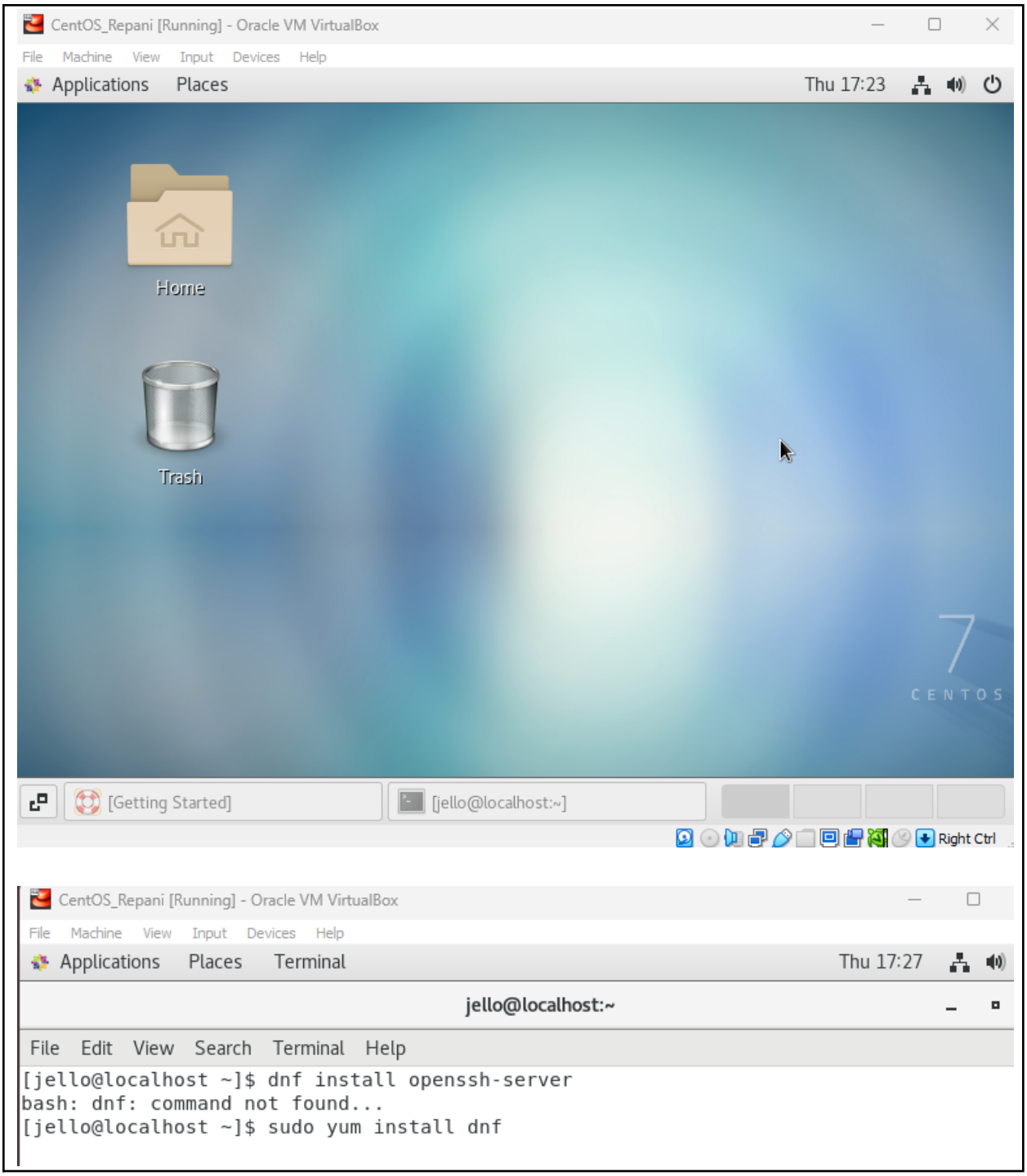
Debian uses the DEB package format and dpkg/APT as the package manager.

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.




CentOS_Repani [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places
Thu 17:23
Home
Trash
7
CENTOS
[Getting Started]
[jello@localhost:~]
Right Ctrl
CentOS_Repani [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Applications Places Terminal
Thu 17:27
jello@localhost:~
File Edit View Search Terminal Help
[jello@localhost ~]$ dnf install openssh-server
bash: dnf: command not found...
[jello@localhost ~]$ sudo yum install dnf

```
  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!
[jello@localhost ~]$
```

Task 2: Install the SSH server package *openssh*
(CentOS VM)

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

```
[jello@localhost ~]$ sudo dnf install openssh-server
CentOS-7 - Base                                  969 kB/s |  10 MB     00:10
CentOS-7 - Updates                               2.1 MB/s |  28 MB     00:13
CentOS-7 - Extras                                765 kB/s | 360 kB     00:00
Package openssh-server-7.4p1-21.el7.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[jello@localhost ~]$
```

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

```
[jello@localhost ~]$ sudo systemctl start sshd
[jello@localhost ~]$ sudo systemctl enable sshd
[jello@localhost ~]$
```

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

```
[jello@localhost ~]$ sudo 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 17:08:00 PST; 24min ago
     Docs: man:sshd(8)
           man:sshd_config(5)
 Main PID: 1172 (sshd)
   CGroup: /system.slice/sshd.service
           └─1172 /usr/sbin/sshd -D

Sep 07 17:07:59 localhost.localdomain systemd[1]: Starting OpenSSH server daemon...
Sep 07 17:08:00 localhost.localdomain sshd[1172]: Server listening on 0.0.0.0 port 22.
Sep 07 17:08:00 localhost.localdomain sshd[1172]: Server listening on :: port 22.
Sep 07 17:08:00 localhost.localdomain systemd[1]: Started OpenSSH server daemon.
Hint: Some lines were ellipsized, use -l to show in full.
[jello@localhost ~]$
```

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

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

$ firewall-cmd --reload

```
[jello@localhost ~]$ firewall-cmd --reload
success
[jello@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

```
[jello@localhost ~]$ systemctl reload sshd
[jello@localhost ~]$
```

Task 3: Copy the Public Key to CentOS (Ubuntu VM)

1. Make sure that *ssh* is installed on the local machine.
2. Using the command *ssh-copy-id*, connect your local machine to CentOS.

```
jello@workstation:~$ cd .ssh
jello@workstation:~/.ssh$ ssh-copy-id -i ~/.ssh/id_rsa jello@192.168.56.104
/usr/bin/ssh-copy-id: INFO: Source of key(s) to be installed: "/home/jello/.ssh
/id_rsa.pub"
The authenticity of host '192.168.56.104 (192.168.56.104)' can't be established
.
ECDSA key fingerprint is SHA256:qkU1LA653qTci2Ul26lYw7OtFfUdRmPjCvQtVd28RNs.
Are you sure you want to continue connecting (yes/no)? y
Please type 'yes' or '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

yes
jello@192.168.56.104's password:

Number of key(s) added: 1

Now try logging into the machine, with:   "ssh 'jello@192.168.56.104'"
and check to make sure that only the key(s) you wanted were added.

jello@workstation:~/.ssh$
```

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

```
[jello@localhost ~]$ ls
Desktop  Documents  Downloads  Music  Pictures  Public  Templates  Videos
[jello@localhost ~]$ ls -a
.              .bash_profile  .config  Documents  .ICEauthority  Music     .ssh
..             .bashrc        .dbus    Downloads  .local         Pictures  Templat
.bash_logout   .cache         Desktop  .esd_auth  .mozilla       Public    Videos
[jello@localhost ~]$ cd .ssh
[jello@localhost .ssh]$ ls -a
.  ..  authorized_keys
[jello@localhost .ssh]$ cat authorized_keys
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAACAQDibLS1OsJS3as9uYJavC2caLO3QSpdwgFyYpbVOwXpx
1uEEBiMJCuKc3jBnS6QPS/oe1tcgeT7vgMgogQohsdeAo+aRnIzEuFjYs7qohTcaOxPSfgamzdijgQYBK
GH6wELheb7u2noq9WGbMpw53II+7uTVfsU38C2BOSDj0DOwwRJWt2Z9Qg1bM6U6ogE7MpULjME9EguM/o
UhBeTrBeLfNepT6mYW/6mOJisG1+zouUKJCFJ0pKQaF2njErgBq/6/eKaN78VzxfxIeIBsRWIyx+ev5A7
0eepQNi7dvGWEEaxYiPqIEMSRJooR8ejcKp5FIMnrAT6hee3OktbJHGU6Xs8365rT5AR3/UbqwF/UYmL2
fWzYKzd6gTfMWAfWyl5zKKVwwV6nq4tb/7REBNenC4UcKOetk5z6n+AAtwLgXiKHhw/cqLWqZKVt1Jadz
gSUW99vhatzjuLY68z1OAA1VcUHysC9WG5wcUdiHRS/5PXtKXk+yJ8A0htg03x2culHIJhDv6PlawIs5C
j/6fiK0uMRhANIOlDruPkfh5aJMJNJ9N+SMbfnHdW5fnMwZbmiFFumFfaZcWFrXMqJbxM25cctqWSYkuT
w60mKfyq/s7ciBo1bxhsjcICCw== jello@workstation
[jello@localhost .ssh]$
```

Task 4: Verify ssh remote connection

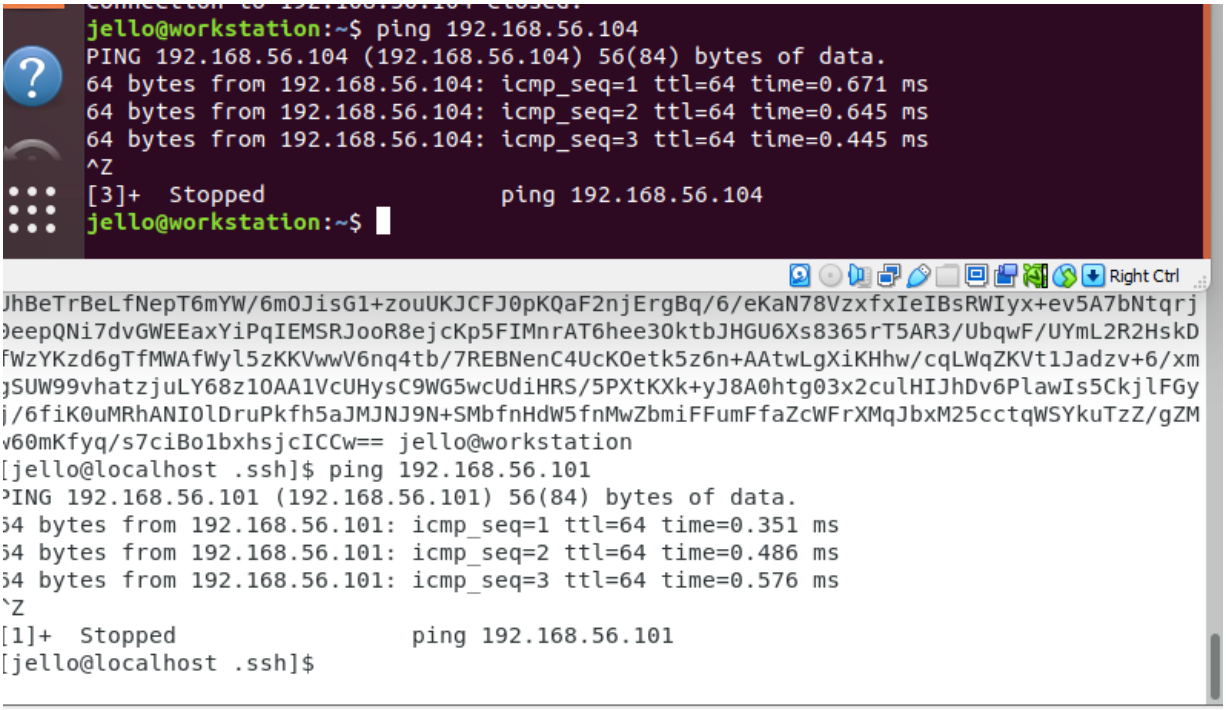
1. Using your local machine, connect to CentOS using ssh.

```
jello@workstation:~$ ssh jello@192.168.56.104

Last login: Thu Sep  7 17:08:16 2023

[jello@localhost ~]$
[jello@localhost ~]$
```

2. Show evidence that you are connected.



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?
   - In choosing the correct distribution of Linux to use, whether Debian or Red Hat, it is important to know first what the function or purpose you will be using the system for such as server, network administration options, and the preferred file system to be used.

2. What are the main difference between Debian and Red Hat Linux distributions?
   - For these systems, there is a difference between architecture on which systems it can use. though overall both systems support the architectures within its fields equally. The filesystems for Debian uses EXT4 and the CentOS supports the XFS file system, though overall the CentOS does not support some of the filesystems that Debian has. In terms of upgrades, CentOS can be better because its major versions support minor version upgrades such as CentOS 7.8 going to CentOS 7.9, while debian can update from one stable release to another such as Debian 9 Stretch going to Debian 10 Buster. And lastly, in terms of support, the CentOS is community supported but Red Hat accepts bug reports submitted by end users, the commercial support is not provided directly but is done by 3rd parties. The Debian support is primarily community supported which includes a bug tracker and offers a list of independent consultants who can be hired to help resolve issues.

CONCLUSION

In this hands-on activity 3, the task is to install the CentOS operating system by creating a new profile in VirtualBox and then creating a connection between this VM to the Ubuntu workstation VM. This is done with the use of the SSH. First the CentOS is installed as a server with GUI and then the basic set-up steps are done. After this, the dnf command is installed in CentOS so that the system can install SSH which will be used to connect it to the Ubuntu workstation. From the Ubuntu workstation the command ssh-copy-id is used in order to copy the public key to the CentOS machine, this creates a connection between the Ubuntu workstation and the CentOS server. Once the public key is copied to the server, the Ubuntu workstation can now access the CentOS server through ssh without having to physically use the CentOS machine. Overall, this activity makes use of new knowledge as well as the previous knowledge earned.

HONOR PLEDGE

“I affirm that I have not given or received any unauthorized help on this assignment, and that this work is my own.”