SECURITY+ V4 LAB SERIES

Lab 20: Linux Account Management

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Material in this Lab Aligns to the Following	
CompTIA Security+ (SY0-601) Exam Objectives	3.7: Given a scenario, implement identity and account management controls
All-In-One CompTIA Security+ Sixth Edition ISBN-13: 978-1260464009 Chapters	23: Identity and Account Management Controls

Contents

Introduction

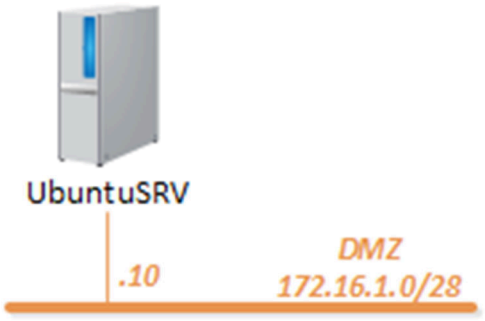
In this lab, you will be conducting host security practices using the Linux command line.

Objective

In this lab, you will perform the following tasks:

- Adding Groups, Users, and Passwords
- Symbolic Permissions
- Absolute Permissions

Lab Topology



Lab Settings

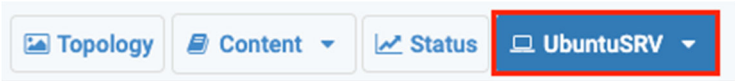
The information in the table below will be needed in order to complete the lab. The task sections below provide details on the use of this information.

Virtual Machine	**IP Address**	**Account** (if needed)	**Password** (if needed)
UbuntuSRV	172.16.1.10	sysadmin	**NDGlabpass123!**

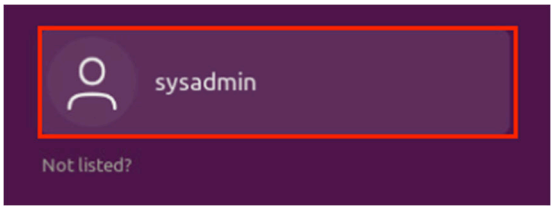
1 Adding Groups, Users, and Passwords in UbuntuSRV

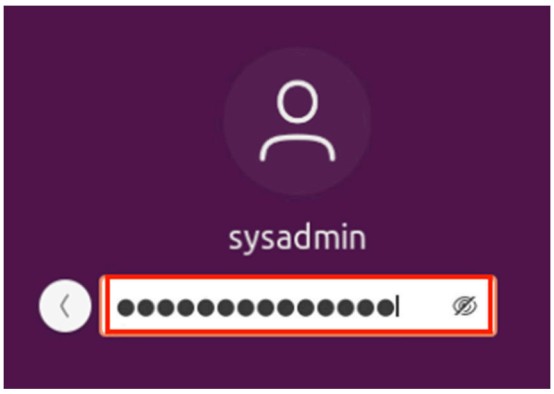
In this task, you will configure the *UbuntuSRV* system with users, passwords, and groups. Then you will configure permissions for these users and groups using multiple methods.

1. Launch the **UbuntuSRV** virtual machine to access the graphical login screen.



2. Log in as `sysadmin` with `NDGlabpass123!` as the password.

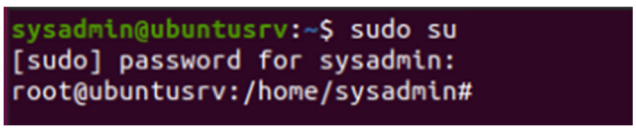




3. Open the *Terminal* by clicking on the **terminal** icon located on the left menu pane.

4. In the *Terminal* window, escalate to the root level by typing the command below, followed by pressing the **Enter** key. When prompted for a password, enter `NDGlabpass123!`.

```
sysadmin@ubuntusrv:~$ sudo su
```



5. Notice the prompt changes. Enter the command below to add a new group named **HR.**

```
root@ubuntusrv:/home/sysadmin# groupadd HR
```

```
root@ubuntusrv:/home/sysadmin# groupadd HR
root@ubuntusrv:/home/sysadmin#
```

6. Verify the new group is added to the group file list. Scroll down to the bottom of the list to see the newly added group.

```
root@ubuntusrv:/home/sysadmin# cat /etc/group
```

```
docker:x:133:
freerad:x:134:
HR:x:1001:
root@ubuntusrv:/home/sysadmin#
```

The new group *HR* will be added to the bottom of the */etc/group* file with a group *ID*. Your group ID maybe different from the screenshot.

7. Add a new user named **jenny.**

```
root@ubuntusrv:/home/sysadmin# adduser jenny
```

a. When prompted for a new password, type `secure`. Press **Enter**.
b. When prompted again, type `secure`. Press **Enter.**
c. When prompted for a full name, type `Jenny`. Press **Enter**.
d. Press **Enter** 4 times, until when asked *Is the information correct*.
e. Type Y for yes and press **Enter**.

```
root@ubuntusrv:/home/sysadmin# adduser jenny
Adding user `jenny' ...
Adding new group `jenny' (1002) ...
Adding new user `jenny' (1001) with group `jenny' ...
Creating home directory `/home/jenny' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for jenny
Enter the new value, or press ENTER for the default
        Full Name []: Jenny
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
root@ubuntusrv:/home/sysadmin#
```

8. Place the user *jenny* in the newly created *HR* group.

```
root@ubuntusrv:/home/sysadmin# usermod –G HR jenny
```

```
root@ubuntusrv:/home/sysadmin# usermod -G HR jenny
root@ubuntusrv:/home/sysadmin#
```

9. Add another new user named **joe**

```
root@ubuntusrv:/home/sysadmin# adduser joe
```

a. When prompted for a new password, type `secret`. Press **Enter**.
b. When prompted again, type `secret`. Press **Enter**
c. When prompted for a full name, type `Joe`. Press **Enter**.
d. Press **Enter** 4 times, until when asked *Is the information correct*.
e. Type Y for yes and press **Enter**

```
root@ubuntusrv:/home/sysadmin# adduser joe
Adding user `joe' ...
Adding new group `joe' (1003) ...
Adding new user `joe' (1002) with group `joe' ...
Creating home directory `/home/joe' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for joe
Enter the new value, or press ENTER for the default
        Full Name []: Joe
        Room Number []:
        Work Phone []:
        Home Phone []:
        Other []:
Is the information correct? [Y/n] y
```

Notice the capital **Y** in the pair of square brackets: [Y/n], it indicates the default option. If you agree with the default option, you can simply press **Enter.**

10. Place the user **joe** in the **HR** group.

```
root@ubuntusrv:/home/sysadmin# usermod –G HR joe
```

```
root@ubuntusrv:/home/sysadmin# usermod -G HR joe
root@ubuntusrv:/home/sysadmin#
```

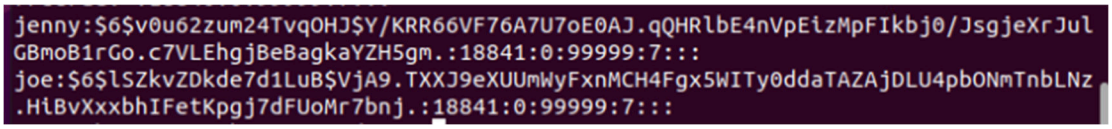
11. Verify the newly created users in the *passwd* file. Scroll towards the bottom of the list to locate the new user accounts.

```
root@ubuntusrv:/home/sysadmin# cat /etc/passwd
```

```
sshd:x:128:65534::/run/sshd:/usr/sbin/nologin
freerad:x:129:134::/etc/freeradius:/usr/sbin/nologin
jenny:x:1001:1002:Jenny,,,:/home/jenny:/bin/bash
joe:x:1002:1003:Joe,,,:/home/joe:/bin/bash
root@ubuntusrv:/home/sysadmin#
```

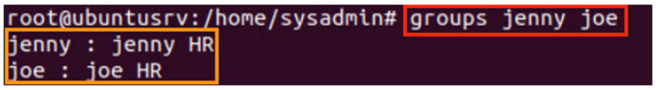
12. View the newly created users in the **shadow** file. Scroll towards the bottom of the list to locate the new user accounts.

```
root@ubuntusrv:/home/sysadmin# cat /etc/shadow
```



13. Verify the users are in the HR group using the following command:

```
root@ubuntusrv:/home/systemadmin# groups jenny joe
```

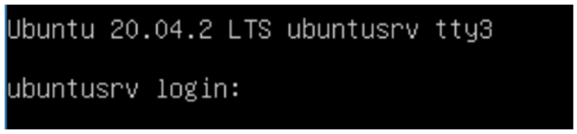


14. Leave the *UbuntuSRV* window open to continue with the next task.

2 Symbolic Permissions

2.1 Using Symbolic Permissions

1. While on the *UbuntuSRV* system, press and hold the keys **CTRL+ALT+F3** until the screen changes to the *tty3 terminal*.



2. At the login prompt screen, type `jenny` and press **Enter.** When prompted for the password, type `secure` and press **Enter**.

```
jenny@ubuntusrv:~$
```

Since we are not logged in as the *root* (*superuser*), we are presented with the dollar sign ($) instead of the (*#).*

3. Identify the current working directory by entering the command below.

```
jenny@ubuntusrv:~$ pwd
```

```
jenny@ubuntusrv:~$ pwd
/home/jenny
jenny@ubuntusrv:~$
```

4. Go back one directory level to the **/home** directory.

```
jenny@ubuntusrv:~$ cd ..
```

```
jenny@ubuntusrv:~$ cd ..
jenny@ubuntusrv:/home$
```

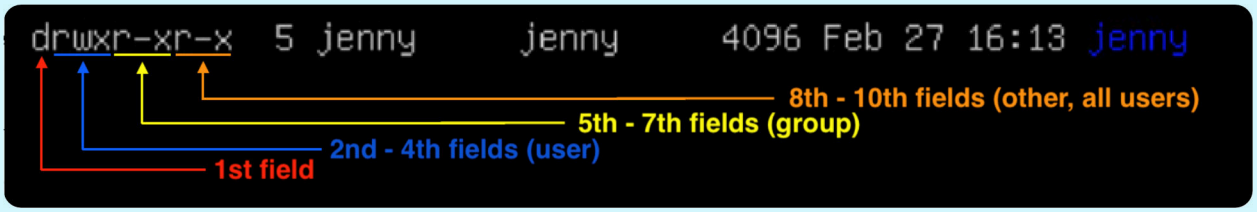
5. List all directories and their permissions.

```
jenny@ubuntusrv:/home$ ls -l
```

```
jenny@ubuntusrv:/home$ ls -l
total 28
drwxr-xr-x  2 iredadmin iredadmin 4096 Aug  4  2021 iredadmin
drwxr-xr-x  2 iredapd   iredapd   4096 Aug  4  2021 iredapd
drwxr-xr-x  5 jenny     jenny     4096 Feb 27 16:13 jenny
drwxr-xr-x  2 joe       joe       4096 Feb 27 16:03 joe
drwxr-xr-x  2 netdata   netdata   4096 Aug  4  2021 netdata
drwxr-xr-x 22 sysadmin  sysadmin  4096 Jan  5 04:08 sysadmin
drwxr-xr-x  2 vmail     vmail     4096 Aug  4  2021 vmail
```

The *Linux* operating system has a total of 10 letters or dashes in the permissions fields:

- The first field: a dash (-) for a file or a (d) for a directory
- The 2nd through 4th fields are for the user's permissions
- The 5th through 7th fields are for the group's permissions
- The 8th through 10th fields are for others (accounts other than those in the group)



6. Enter *Joe's home folder* as *Jenny* by entering the command below.

```
jenny@ubuntusrv:/home$ cd joe
```

```
jenny@ubuntusrv:/home$ cd joe
jenny@ubuntusrv:/home/joe$ _
```

Notice you can navigate into another user's home folder.

7. Change back up one directory level.

```
jenny@ubuntusrv:/home/joe$ cd ..
```

```
jenny@ubuntusrv:/home/joe$ cd ..
jenny@ubuntusrv:/home$
```

8. Press and hold **CTRL+ALT+F4** to switch to another *terminal* session (*tty4)*

```
Ubuntu 20.04.2 LTS ubuntusrv tty4

ubuntusrv login:
```

9. Log in as the user **sysadmin** with the password **NDGlabpass123!**.

```
Ubuntu 20.04.2 LTS ubuntusrv.netlab.local tty4

ubuntusrv login: sysadmin
Password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.4.0-80-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Sun 27 Feb 2022 04:15:57 PM UTC

  System load:  0.0               Processes:               377
  Usage of /:   38.0% of 38.26GB  Users logged in:         2
  Memory usage: 65%               IPv4 address for docker0: 172.17.0.1
  Swap usage:   0%                IPv4 address for ens160:  172.16.1.10

 * Super-optimized for small spaces - read how we shrank the memory
   footprint of MicroK8s to make it the smallest full K8s around.

   https://ubuntu.com/blog/microk8s-memory-optimisation

0 updates can be applied immediately.


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Wed Jul 28 05:50:38 UTC 2021 on tty1
sysadmin@ubuntusrv:~$ _
```

10. Change to the **/home** directory

```
sysadmin@ubuntusrv:~$ cd /home
```

```
sysadmin@ubuntusrv:~$ cd /home
sysadmin@ubuntusrv:/home$
```

11. List all current directories with their permissions.

```
sysadmin@ubuntusrv:/home$ ls -l
```

```
sysadmin@ubuntusrv:/home$ ls -l
total 28
drwxr-xr-x  2 iredadmin iredadmin 4096 Aug  4  2021 iredadmin
drwxr-xr-x  2 iredapd   iredapd   4096 Aug  4  2021 iredapd
drwxr-xr-x  5 jenny     jenny     4096 Feb 27 16:13 jenny
drwxr-xr-x  2 joe       joe       4096 Feb 27 16:03 joe
drwxr-xr-x  2 netdata   netdata   4096 Aug  4  2021 netdata
drwxr-xr-x 22 sysadmin  sysadmin  4096 Jan  5 04:08 sysadmin
drwxr-xr-x  2 vmail     vmail     4096 Aug  4  2021 vmail
```

Take note of the "*other*" field for Joe's folder, notice that it is currently set with an *x*, which makes it available to execute for "*other*" users.

12. We'll make some changes to the permission of the file. Let's switch to the root account first by entering the following command. When prompted for a password, enter **NDGlabpass123!** .

```
syadmin@ubuntusrv:/home$ sudo su
```

```
sysadmin@ubuntusrv:/home$ sudo su
[sudo] password for sysadmin:
root@ubuntusrv:/home# _
```

13. Change the "*other*" permission on Joe's folder by making it *non-executable.*

```
root@ubuntusrv:/home# chmod o-x joe
```

```
root@ubuntusrv:/home# chmod o-x joe
root@ubuntusrv:/home# _
```

14. List the directories once more with their respective permissions.

```
root@ubuntusrv:/home# ls -l
total 12
drwxr-xr-x  5 jenny    jenny    4096 Aug  2 14:07 jenny
drwxr-xr-- 2 joe      joe      4096 Aug  2 13:51 joe
drwxr-xr-x 17 sysadmin sysadmin 4096 Aug  1 16:09 sysadmin
root@ubuntusrv:/home# _
```

Notice now that there are two dashes in the "*others*" field for Joe's folder.

15. Press and hold **CTRL+ALT+F3** to switch back to jenny's *Terminal* session (*tty3*). Make sure you are viewing the following command prompt:

```
jenny@ubuntusrv:/home$
```

16. Now that we switched to Jenny's *Terminal* session, attempt to go into Joe's folder once more.

```
jenny@ubuntusrv:/home$ cd joe
```

```
jenny@ubuntusrv:/home$ cd joe
-bash: cd: joe: Permission denied
```

Notice that we do not have the permissions to do so.

The chart below shows examples of other ways the *chmod* command can be used

chmod command	Results
chmod u+rwx	Adds read, write and execute permissions for the user
chmod u+rw	Adds read and write permission for the user
chmod o+r	Adds read permission for others
chmod g-rwx	Removes read, write and execute permissions for the group

17. Type `exit` followed by pressing **Enter** to log out of the *terminal* session.

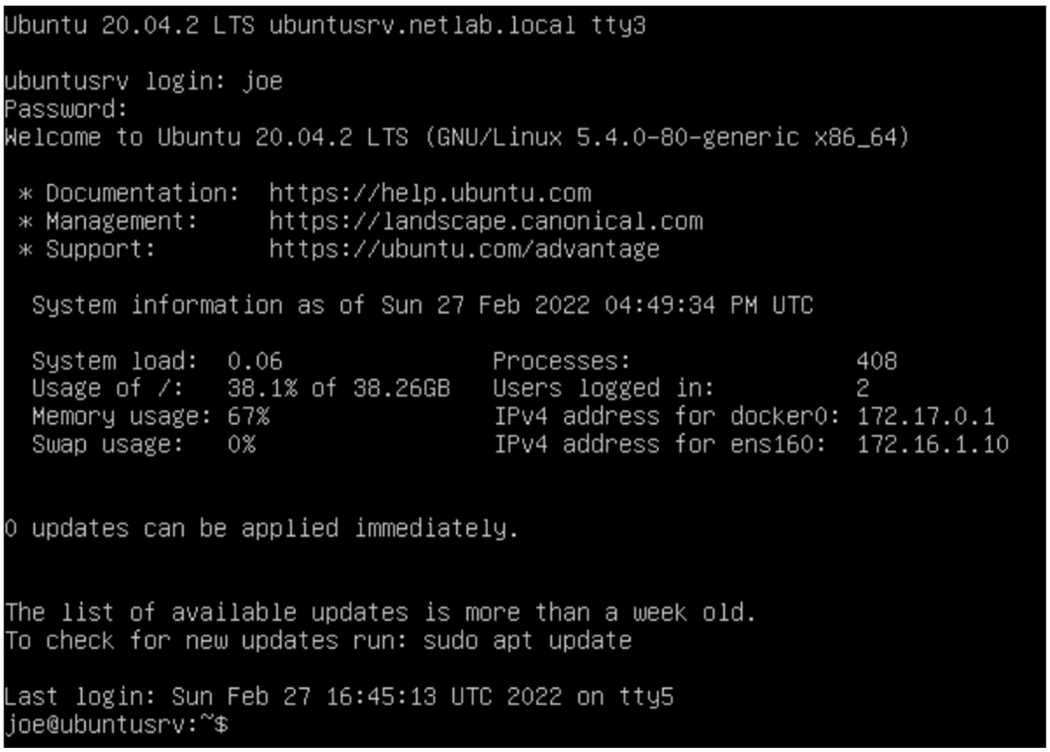
```
jenny@ubuntusrv:/home$ exit_
```

18. Leave the *UbuntuSRV* window open to continue with the next task.

3 Absolute Permissions

3.1 Using Absolute Permissions

1. While on the *tty3 terminal*, log in as **joe** and enter the password **secret.** Press **Enter.**



2. Print the current working directory.

```
joe@ubuntusrv:~$ pwd
```

3. Go back one directory level to the **/home** directory.

```
joe@ubuntusrv:~$ cd ..
```

4. List all directories and their permissions in the current working directory.

```
joe@ubuntusrv:/home$ ls -l
```

Notice that Joe's folder is set so that "*others*" are not able to access the folder.

```
joe@ubuntusrv:/home$ ls -l
total 28
drwxr-xr-x  2 iredadmin iredadmin 4096 Aug  4  2021 iredadmin
drwxr-xr-x  2 iredapd   iredapd   4096 Aug  4  2021 iredapd
drwxr-xr-x  5 jenny     jenny     4096 Feb 27 16:49 jenny
drwxr-xr-x  5 joe       joe       4096 Feb 27 16:45 joe
drwxr-xr-x  2 netdata   netdata   4096 Aug  4  2021 netdata
```

The other way of assigning permissions besides using symbolic permissions is the use of absolute permissions. Absolute permissions use a three-digit octal number to represent the permissions for owner, group and other. The table below outlines each absolute value and its corresponding permissions:

Number	Permissions
7	Read, Write and Execute
6	Read and Write
5	Read and Execute
4	Read
3	Write and Execute
2	Write
1	Execute
0	None

By typing the command, *chmod 764 <examplefile>*, the *examplefile* will be assigned the follow permissions:

- The user will get Read, Write and Execute permissions
- The group will get Read and Write permissions
- Others will get Read Access

Breakdown of how 764 represents these permissions:

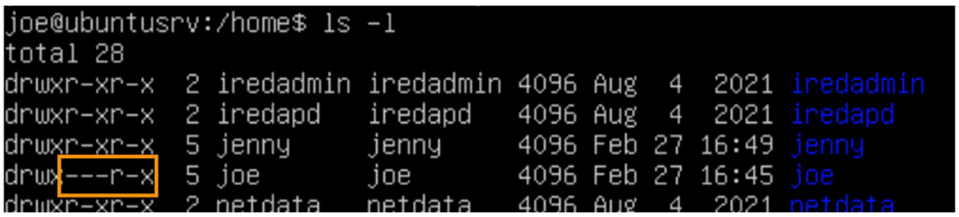
Digit	Binary Equivalent	Permission
7 (user)	111	1-Read 1-Write 1-Execute
6 (group)	110	1-Read 1-Write 0-No Execute
4 (others)	100	1-Read 0-No Write 0-No Execute

5. Modify the "*others*" field for Joe's folder so that others will be able to read and execute but not write while still maintaining the "*user*" field to read, write, and execute.

```
joe@ubuntusrv:/home$ chmod 705 joe
```

6. List the file permissions of the current directory to see that the absolute changes were made.

```
joe@ubuntusrv:/home$ ls -l
```



7. Navigate to the **/home/joe** directory.

```
joe@ubuntusrv:/home$ cd joe
```

8. Create a simple text file named **test.txt** using *touch.*

```
joe@ubuntusrv:~$ touch test.txt
```

9. Type **exit** followed by pressing **Enter** to log out of Joe's session.

10. While on the *tty3 terminal*, log back in as **jenny** and enter the password **secure.** Press **Enter**

```
Ubuntu 20.04.2 LTS ubuntusrv.netlab.local tty3

ubuntusrv login: jenny
Password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.4.0-80-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  System information as of Sun 27 Feb 2022 04:54:37 PM UTC

  System load:  0.17              Processes:               374
  Usage of /:   38.1% of 38.26GB  Users logged in:         2
  Memory usage: 66%               IPv4 address for docker0: 172.17.0.1
  Swap usage:   0%                IPv4 address for ens160:  172.16.1.10


0 updates can be applied immediately.


The list of available updates is more than a week old.
To check for new updates run: sudo apt update

Last login: Sun Feb 27 16:13:31 UTC 2022 on tty3
jenny@ubuntusrv:~$ _
```

11. Change to the **/home** directory.

```
jenny@ubuntusrv:~$ cd /home
```

```
jenny@ubuntusrv:~$ cd /home
jenny@ubuntusrv:/home$ _
```

12. List all directories with their respective permissions.

```
jenny@ubuntusrv:/home$ ls -l
```

```
jenny@ubuntusrv:/home$ ls -l
total 28
drwxr-xr-x  2 iredadmin iredadmin 4096 Aug  4  2021 iredadmin
drwxr-xr-x  2 iredapd   iredapd   4096 Aug  4  2021 iredapd
drwxr-xr-x  5 jenny     jenny     4096 Feb 27 16:49 jenny
drwx---r-x  5 joe       joe       4096 Feb 27 16:54 joe
drwxr-xr-x  2 netdata   netdata   4096 Aug  4  2021 netdata
```

13. Change to the **/home/joe** directory.

```
jenny@ubuntusrv:/home$ cd joe
```

```
jenny@ubuntusrv:/home$ cd joe
jenny@ubuntusrv:/home/joe$ _
```

14. List all files in the current directory.

```
jenny@ubuntusrv:/home/joe$ ls -l
```

```
jenny@ubuntusrv:/home/joe$ ls -l
total 0
-rw-rw-r-- 1 joe joe 0 Aug  2 14:54 test.txt
```

Notice that you can navigate into Joe's folder and list the files within the directory as another user. Notice you can see the *test.txt* file.

15. Attempt to create a file.

```
jenny@ubuntusrv:/home/joe$ touch jenny.txt
```

```
jenny@ubuntusrv:/home/joe$ touch jenny.txt
touch: cannot touch 'jenny.txt': Permission denied
```

Notice you do not have permission to create a file.

16. The lab is now complete; you may end the reservation.