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Applied Computing

Wales Institute of Science and Art (WISA)

Networks and Cybersecurity Essentials (ACCA4024)

Lab 6: Working with Ubuntu

Cisco | Networking Academy®
Mind Wide Open™

Objectives

Start working with your host machine. Create user credentials, authority and access rights as required.

Tasks

1. Configure User Management
    a. Create, verify and set Groups, Users and Permissions

Required Resources

- PC with Ubuntu 16.0.4 LTS installed in a VirtualBox or VMware virtual machine.

  Alternatively,

- Any Linux Platform

Task

➔ Login as User Cisco.
➔ Go to Terminal

Create Groups

Escalate privileges to the root level by entering the sudo su command. Enter the password password when prompted.

cisco@ubuntu:~$ sudo su

```
cisco@ubuntu:~$ sudo su
[sudo] password for cisco:
root@ubuntu:/home/cisco#
```

Add a new group named HR

root@ubuntu:/home/cisco# groupadd HR

```
root@ubuntu:/home/cisco# groupadd HR
root@ubuntu:/home/cisco#
```

Verify the created Groups

root@ubuntu:/home/cisco# cat /etc/group

```
root@ubuntu:/home/cisco# cat /etc/group
```

```
HR:x:1005:
```

The new group HR will be added to the bottom of the /etc/group file with a group ID of 1005.

Add the following groups and record your output

MGT

EMPGA

EMPGB

EMPGC

1. Record the command you used to create and verify Groups with the group ID.

Command to create a Group	groupadd [NAME]
Command to Verify the Group	cat /etc/group
Group ID for MGT	MGT : x : 1006
Group ID for EMPGA	EMPGA : x : 1007
Group ID for EMPGB	EMPGB : x : 1008
Group ID for EMPGC	EMPGB : x : 1009

Create Users

Escalate privileges to the root level by entering the sudo su command. Enter the password password when prompted.

cisco@ubuntu:~$ sudo su

Create new user and password

Username	Password	Group	Name	Room	Phone	Phone	Others
jenny	lasocial	HR	Jenny	101	2354	76698	
joe	tooth	HR	Joe	101	2354	76699	
roy	roy1	MGT	Roy	100	2355	76610	
jack	jac1	EMPGA	Jack	1011	2356	76601	
ethan	eth1	EMPGB	Ethan	103	2357	76602	
mac	mac1	EMPGC	Mac			76603	
david	dav1	EMPGC	David			76604	

root@ubuntu:/home/cisco# adduser jenny

When prompted for a new password, type lasocial. Press Enter.

When prompted again, type lasocial. Press Enter.

When prompted for a full name, type Jenny. Press Enter.

When prompted for other details, refer to the above table and enter the details.

If you don't have the details, press Enter without adding the details.

Type Y for yes and press Enter.

```
root@ubuntu:/home/cisco# adduser jenny
Adding user `jenny' ...
Adding new group `jenny' (1006) ...
Adding new user `jenny' (1005) with group `jenny' ...
Creating home directory `/home/jenny' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
Retype new UNIX 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
```

Repeat the same for all the other users listed in the table.

Place users to their respective groups

Place the user jenny in the HR group.

root@ubuntu:/home/cisco# usermod –G HR jenny

```
root@ubuntu:/home/cisco# usermod -G HR jenny
root@ubuntu:/home/cisco#
```

Verify users

Verify the newly created users in the passwd file.

root@ubuntu:/home/cisco# cat /etc/passwd

```
root@ubuntu:/home/cisco# cat /etc/passwd
root:x:0:0:root:/root:/bin/bash
jenny:x:1005:1006:Jenny,,,:/home/jenny:/bin/bash
joe:x:1006:1007:Joe,,,:/home/joe:/bin/bash
```

View the created users in the shadow file.

root@ubuntu:/home/cisco# cat /etc/shadow

2. Record the list of users.

in passwd file

Alice , Bob , Eve , Eric, jenny, joe, roy, jack,
ethan, mac, david.

in shadow file

Alice , Bob , Eve , Eric, jenny, joe, roy, jack,
ethan, mac, david.

Using Symbolic Permissions

Note: While on the Ubuntu system, press and hold the keys CTRL+ALT+F1 the screen changes to the tty1 Terminal. If you are unable to use tty1 terminal, return to graphical user interface (GUI) of the host by using CTRL+ALT+F7 (If CTRL+ALT+F7 did not work, try CTRL+ALT+F8) and open a terminal window in the GUI Ubuntu OS. At the prompt, enter su –l jenny at the prompt and enter the password lasocial. Proceed further.

```
Ubuntu 16.04 LTS ubuntu tty1

ubuntu login:
```

cisco@ubuntu:~$ su –l jenny

```
cisco@ubuntu:~$ su -l jenny
Password:
jenny@ubuntu:~$
```

Once on the Terminal login screen, type jenny and press Enter.When prompted for the password, type lasocial and press Enter. After a successful login, you will see the jenny@ubuntu:~$ prompt.

```
Ubuntu 16.04 LTS ubuntu tty1

ubuntu login: jenny
Password:
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

15 packages can be updated.
0 updates are security updates.


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

jenny@ubuntu:~$
```

Since we are not logged in as the root (superuser), we are presented with the dollar sign instead of the # if we were to be logged in as the user root.

View your present directory.

jenny@ubuntu:~$ pwd

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

Go back one directory level to the /home directory.

jenny@ubuntu:~$ cd ..

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

List all directories and their permissions.

jenny@ubuntu:/home$ ls -l

```
jenny@ubuntu:/home$ ls -l
total 12
drwxr-xr-x 17 cisco cisco 4096 Jun 28 18:04 cisco
drwxr-xr-x  3 jenny jenny 4096 Jun 28 23:28 jenny
drwxr-xr-x  2 joe   joe   4096 Jun 28 19:18 joe
jenny@ubuntu:/home$
```

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

Enter Joe's folder as Jenny by typing the command cd joe.

jenny@ubuntu:/home$ cd joe

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

Notice that we are able to go into Joe's home folder.

jenny@ubuntu:/home/joe$ cd ..

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

Press and hold CTRL+ALT+F2 to switch to another Terminal session (tty2).

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: _
```

Login as the user root with the password secretpassword.

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: root
Password:
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

15 packages can be updated.
0 updates are security updates.
```

Note: If you are unable to use tty2 terminal, return to graphical user interface (GUI) of the host by using CTRL+ALT+F7 and open a terminal window in the GUI Ubuntu OS. At the prompt, enter sudo -i at the prompt and enter the password password.

```
cisco@ubuntu:~$ sudo -i
[sudo] password for cisco:
root@ubuntu:~#
```

Change to the /home directory.

root@ubuntu:~# cd /home

```
root@ubuntu:~# cd /home
root@ubuntu:/home#
```

Change the “other” permission on joe’s folder by making it non-executable.

root@ubuntu:/home# chmod o-x joe

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

List the directories once more with their respective permissions.

root@ubuntu:/home# ls -l

```
root@ubuntu:/home# ls -l
total 12
drwxr-xr-x 17 cisco cisco 4096 Jun 28 18:04 cisco
drwxr-xr-x  3 jenny jenny 4096 Jun 28 23:52 jenny
drwxr-xr--  2 joe   joe   4096 Jun 28 19:18 joe
root@ubuntu:/home#
```

Notice now that there are two dashes in the “others” field for joe’s folder.

Press and hold CTRL+ALT+F1 to switch back to the other Terminal session (tty1).

Make sure you are viewing the following command prompt: jenny@ubuntu:/home$.

Attempt to go into Joe’s folder once more.

jenny@ubuntu:/home$ cd joe

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

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

Type exit followed by pressing Enter to logout of the Terminal session.

Absolute Permissions

Login as the user joe with the password tooth while on tty1.

```
Ubuntu 16.04 LTS ubuntu tty1

ubuntu login: joe
Password:
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/
```

Print your current working directory.

3. joe@ubuntu:~$ pwd

Go back one directory level to the /home directory.

4. joe@ubuntu:~$ cd ..

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

5. joe@ubuntu:/home~$ ls -l

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

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

Modify the “others” field for Joe’s folder so that others will be able read and execute but not write while still maintaining the “user” field to read, write, and execute.

joe@ubuntu:/home$ chmod 705 joe

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

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

joe@ubuntu:/home$ ls -l

```
joe@ubuntu:/home$ ls -l
total 12
drwxr-xr-x 17 cisco cisco 4096 Jun 28 18:04 cisco
drwxr-xr-x  3 jenny jenny 4096 Jun 28 23:52 jenny
drwx---r-x  3 joe   joe   4096 Jun 29 00:12 joe
joe@ubuntu:/home$
```

Change to the /home/joe directory.

joe@ubuntu:/home$ cd joe

```
joe@ubuntu:/home$ cd joe
joe@ubuntu:~$
```

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

joe@ubuntu:~$ touch test.txt

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

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

While on the tty1 Terminal, log back in as jenny and enter the password lasocial. Press Enter.

```
Ubuntu 16.04 LTS ubuntu tty1

ubuntu login: jenny
Password:
```

Change to the /home directory.

jenny@ubuntu:~$ cd /home

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

List all directories with their respective permissions.

jenny@ubuntu:/home$ ls -l

```
jenny@ubuntu:/home$ ls -l
total 12
drwxr-xr-x 17 cisco cisco 4096 Jun 28 18:04 cisco
drwxr-xr-x  3 jenny jenny 4096 Jun 28 23:52 jenny
drwx---r-x  3 joe   joe   4096 Jun 29 00:32 joe
jenny@ubuntu:/home$
```

Change to the /home/joe directory and list the content of the directory.

jenny@ubuntu:/home$ cd joe

jenny@ubuntu:/home/joe$ ls -l

```
jenny@ubuntu:/home$ cd joe
jenny@ubuntu:/home/joe$ ls -l
total 12
-rw-r--r-- 1 joe joe 8980 Jun 28 19:18 examples.desktop
-rw-rw-r-- 1 joe joe    0 Jun 29 00:22 test.txt
jenny@ubuntu:/home/joe$
```

Notice that we are able to enter Joe's folder and read the files within the directory. We are able to see the test.txt file.

Attempt to create a file.

jenny@ubuntu:/home/joe$ touch jenny.txt

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

Notice we do not have permission to create the file.

Complete the following and submit the lab document with all the directory details as required.

6. Make sure that, all the users listed below are created and assigned to various groups.

Username	Group	Filenames	File Contents
jenny	HR	file_jenny_c	This is Confidential HR Document
joe	HR	file_joe_g	This is a group Document
roy	MGT	file_roy	This is general Document
jack	EMPGA	file_jack	This is general Document
ethan	EMPGA	file_ethan_c	This is Confidential Employee Document
mac	EMPGA	file_mac_g	This is group Employee Document
david	EMPGA	file_dav_c	This is Confidential Employee Document

7. Create all the files as per the names from the stated users and input the contents in the file. Make sure that all the filenames ending with
   a. _c are confidential that only the owners of the file could access and other users could not access. (Record the evidence)
   b. _g are group files that only the owners and the group they belong to could access and other users could not access. (Record the evidence)
   c. File names without the above 2 notations are general files and could be accessed by all. (Record the evidence)

evidence recorded below

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: joe
Password:
Last login: Fri Nov 13 09:52:43 GMT 2020 on tty1
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

785 packages can be updated.
536 updates are security updates.

New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

joe@ubuntu:~$ cd /home
joe@ubuntu:/home$ ls -l
total 32
drwxr-xr-x 18 cisco cisco 4096 Nov 13 09:24 cisco
drwxr-xr-x  2 david david 4096 Nov 13 09:32 david
drwxr-xr-x  2 ethan ethan 4096 Nov 13 09:31 ethan
drwxr-xr-x  2 jack  jack  4096 Nov 13 09:30 jack
drwxr-xr-x  3 jenny jenny 4096 Nov 13 10:27 jenny
drwx---r-x  3 joe   joe   4096 Nov 13 10:00 joe
drwxr-xr-x  2 mac   mac   4096 Nov 13 09:32 mac
drwxr-xr-x  2 roy   roy   4096 Nov 13 09:30 roy
joe@ubuntu:/home$ cd jenny
joe@ubuntu:/home/jenny$
joe@ubuntu:/home/jenny$ ls -l
total 16
-rw-r--r-- 1 jenny jenny 8980 Nov 13 09:24 examples.desktop
-rwx------ 1 jenny jenny   33 Nov 13 10:35 file_jenny_c.txt
joe@ubuntu:/home/jenny$ cat file_jenny_c.txt
cat: file_jenny_c.txt: Permission denied
joe@ubuntu:/home/jenny$
```

```
jenny@ubuntu:/home$ cd ..
jenny@ubuntu:/$ touch file_jenny_c.txt
touch: cannot touch 'file_jenny_c.txt': Permission denied
jenny@ubuntu:/$ cd jenny
-bash: cd: jenny: No such file or directory
jenny@ubuntu:/$ cd /home
jenny@ubuntu:/home$ cd jenny
jenny@ubuntu:~$ touch file_jenny_c.txt
jenny@ubuntu:~$ echo "This is Condifential HR Document" >> file_jenny_c.txt
jenny@ubuntu:~$ chmod 700 file_jenny_c.txt
jenny@ubuntu:~$ cat file_jenny_c.txt
This is Condifential HR Document
jenny@ubuntu:~$ _
```

```
Ubuntu 16.04 LTS ubuntu tty1

ubuntu login: jack
Password:
Last login: Fri Nov 13 11:05:19 GMT 2020 on tty1
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

785 packages can be updated.
536 updates are security updates.

New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

jack@ubuntu:~$ cd /home
jack@ubuntu:/home$ ls -l
total 32
drwxr-xr-x 18 cisco cisco 4096 Nov 13 09:24 cisco
drwxr-xr-x  3 david david 4096 Nov 13 11:11 david
drwxr-xr-x  3 ethan ethan 4096 Nov 13 11:08 ethan
drwxr-xr-x  3 jack  jack  4096 Nov 13 11:05 jack
drwxr-xr-x  3 jenny jenny 4096 Nov 13 10:27 jenny
drwx---r-x  3 joe   joe   4096 Nov 13 10:53 joe
drwxr-xr-x  3 mac   mac   4096 Nov 13 11:10 mac
drwxr-xr-x  3 roy   roy   4096 Nov 13 11:04 roy
jack@ubuntu:/home$ cd roy
jack@ubuntu:/home/roy$ ls -l
total 16
-rw-r--r-- 1 roy roy 8980 Nov 13 09:30 examples.desktop
-rw-rw-r-- 1 roy roy   25 Nov 13 11:05 file_roy.txt
jack@ubuntu:/home/roy$ cat file_roy.txt
This is general Document
jack@ubuntu:/home/roy$
```

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: roy
Password:
Last login: Fri Nov 13 11:04:31 GMT 2020 on tty1
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

785 packages can be updated.
536 updates are security updates.

New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

roy@ubuntu:~$ ls -l
total 16
-rw-r--r-- 1 roy roy 8980 Nov 13 09:30 examples.desktop
-rw-rw-r-- 1 roy roy   25 Nov 13 11:05 file_roy.txt
roy@ubuntu:~$ cat file_roy.txt
This is general Document
roy@ubuntu:~$
```

```
 * Documentation:  https://help.ubuntu.com/

785 packages can be updated.
536 updates are security updates.

New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.


The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

roy@ubuntu:~$ cd /home
roy@ubuntu:/home$ ls -l
total 32
drwxr-xr-x 18 cisco cisco 4096 Nov 13 09:24 cisco
drwxr-xr-x  2 david david 4096 Nov 13 09:32 david
drwxr-xr-x  2 ethan ethan 4096 Nov 13 09:31 ethan
drwxr-xr-x  2 jack  jack  4096 Nov 13 09:30 jack
drwxr-xr-x  3 jenny jenny 4096 Nov 13 10:27 jenny
drwx---r-x  3 joe   joe   4096 Nov 13 10:53 joe
drwxr-xr-x  2 mac   mac   4096 Nov 13 09:32 mac
drwxr-xr-x  3 roy   roy   4096 Nov 13 11:03 roy
roy@ubuntu:/home$ cd joe
roy@ubuntu:/home/joe$ ls -l
total 16
-rw-r--r-- 1 joe joe 8980 Nov 13 09:29 examples.desktop
-rwxrwx--- 1 joe joe   25 Nov 13 10:54 file_joe_g.txt
-rw-rw-r-- 1 joe joe    0 Nov 13 10:00 test.txt
roy@ubuntu:/home/joe$ cat file_joe_g.txt
cat: file_joe_g.txt: Permission denied
roy@ubuntu:/home/joe$ _
```

```
Ubuntu 16.04 LTS ubuntu tty2

ubuntu login: joe
Password:
Last login: Fri Nov 13 10:49:57 GMT 2020 on tty2
Welcome to Ubuntu 16.04 LTS (GNU/Linux 4.4.0-24-generic x86_64)

 * Documentation:  https://help.ubuntu.com/

785 packages can be updated.
536 updates are security updates.

New release '18.04.5 LTS' available.
Run 'do-release-upgrade' to upgrade to it.

joe@ubuntu:~$ touch file_joe_g.txt
joe@ubuntu:~$ echo "This is a group Document" >> file_joe_g.txt
joe@ubuntu:~$ chmod 770 file_joe_g.txt
joe@ubuntu:~$ cat file_joe_g.txt
This is a group Document
joe@ubuntu:~$ :
```

Learnings from tutorials so far:

Part 1 (Packet Tracer, Host Machines)

- ✓ ***Build a home Network***
- ✓ ***Understand and configure IP Address***
- ✓ ***Use Ping/ Trace route Utility to check the connection status***
- ✓ ***Use ipconfig /all command to determine the MAC address of a Windows computer on an Ethernet network.***
- ✓ ***Analyze a MAC address to determine the manufacturer.***
- ✓ ***Analyze the Wired and Wireless Network connection.***
- ✓ ***Analyze Address Resolution Protocol (ARP).***
- ✓ ***Connect to a Wireless Router and configure the basic settings in a wireless router and add security features.***
- ✓ ***Use nslookup command to understand the url to ip conversion.***
- ✓ ***Configure basic connectivity settings in Intermediate devices (Switch/ Router).***
- ✓ ***Work with SBA Packet Tracer Files/ environment***
- ✓ ***Configure ftp, web, email, dns, ntp and aaa Servers***

Part 2

- ✓ ***Set up a virtual lab environment***
- ✓ ***Troubleshooting the virtual lab environment***
- ✓ ***Working with virtual machines***
- ✓ ***Authentication, Authorization and Accounting***