PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David
SWANSEA - ABERTAWE

**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

Command to Verify the Group cat / etc/group

Group ID for MGT 1006

Group ID for EMPGA 1007

Group ID for EMPGB 1008

Group ID for EMPGC 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** | newly added:<br>jenny<br>joe<br>roy<br>jack<br>ethan<br>mac<br>david | There prior:<br>Alice<br>Bob<br>Eve<br>Eric |
| **in shadow file** | jenny<br>joe<br>roy<br>jack<br>ethan<br>mac<br>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)

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***