Linux

The file system

LILLEBAELT ACADEMY OF
PROFESSIONAL HIGHER EDUCATION

Author
Martin Grønholdt
mart80c7@edu.eal.dk

Saturday 22 April 2017

Table of Contents

Introduction

The answers to all assignments in the Linux course are available on my GitHub account as they are finished. The URL is:

https://github.com/deadbok/eal_linux

1. Creating a directory

To create a new directory use the ‘mkdir’ command.

```
drwxr-xr-x   4 root root  4096 apr 22 17:06 home
```

Permissions of the /home directory.

Since the home directory is owned by root and no other user has write permission, this has to be done as root preferably using ‘su’ or ‘sudo’ to become root.

```
oblivion@gangstin:/$ cd /home/
oblivion@gangstin:/home$ sudo deleteme
[sudo] adgangskode for oblivion:
sudo: deleteme: Kommando ikke fundet
oblivion@gangstin:/home$ sudo mkdir deleteme
oblivion@gangstin:/home$ ls -ld deleteme
drwxr-xr-x 2 root root 4096 apr 22 17:20 deleteme
oblivion@gangstin:/home$ sudo rmdir deleteme
```

Creating the directory ‘deleteme’ in the /home directory (and deleting it).

Above sudo is used to become the root user, as the directory is created as root it is owned by root, when created. ‘rmdir’ is used to delete the directory again to keep things clean.

2. User directory and permissions

```
oblivion@gangstin:/home$ ls -ld deleteme
drwxr-xr-x 2 root root 4096 apr 22 17:20 deleteme
```

The permissions of the created directory.

As touched upon in the last chapter the owner of the created directory is root, the group that the directory belongs to is also root, as seen in the ‘root root’ part of the ls output above. The permissions set on the directory is the ‘drwxr-xr-x’ part.

- ‘d’ - means that this is a directory, – means a file.
- ‘rwx’- means that the user (root) has read (r), write (w), and execute (x) permissions.
- ‘r-x’ - means the group (root) has read and execute permissions.
- ‘r-x’ - means the everybody else has read and execute permissions.

3. My home directory

My home directory exists and I have a long standing way of organising it, what I will show here is the basic skeleton that I use on all my machines, since listening the whole structure and describing them exactly would take a huge amount of time. The specific structure on each machine may very depending on use, but these are almost always present at least on desktop machines.

Full path	**Remarks**	**Description**
/home/oblivion/bin		Custom helper scripts and binaries.
/home/oblivion/Desktop		Files for the desktop of the window environment
/home/oblivion/Desktop/install		Source an binaries that are evaluated for possible later installation goes here.
/home/oblivion/Documents/	This is a dynamic link to a directory on an NTFS partition, to be able to share this with Windows.	Documents (and pictures).
/home/oblivion/Downloads/		Downloaded files.
/home/oblivion/src		Self-authored source code source code and projects that are local to this computer.
/home/oblivion/sync-src		Self-authored source and projects. This directory is synchronised with all my other desktop machines and a storage server.

The basic structure of my home directory.

The ‘src’ and ‘sync-src’ directories are further split by programming language, framework, and name. A project written in Python using the Flask framework called Spam would reside in the path ‘/oblivion/home/sync-src/python/flask/spam/’.

4. Creating a directory in my home directory

Since the home directory has permission that allows its user to read, write, and execute, directories can be created when logged in as this user (here: oblivion).

```
oblivion@gangstin:~$ cd /
oblivion@gangstin:/$ cd ~
oblivion@gangstin:~$ pwd
/home/oblivion
oblivion@gangstin:~$ mkdir pythonprog
oblivion@gangstin:~$ ls -ld pythonprog
drwxr-xr-x 2 oblivion oblivion 4096 apr 22 18:26 pythonprog
```

Creating a directory in my home directory.

The ~ (tilde) character is used to change in to the current users home directory. The ‘pwd’ command is issued to show that we are in fact in the current users directory. Then the directory ‘pythonprog’ is created using mkdir as earlier. Using ls we can see that the permission are the same as the ones, where the directory was created by root, except this time the user and the group is ‘oblivion’.

5. Moving files in the home directory

To move the python source file ‘christmas_tree.py’, located in my home directory, to the directory created in the last chapter, use the ‘mv’ command followed by the source and destination.

```
oblivion@gangstin:~$ ls -l christmas_tree.py
-rwxr-x--- 1 oblivion oblivion 5879 apr 22 18:34 christmas_tree.py
oblivion@gangstin:~$ mv christmas_tree.py pythonprog/.
oblivion@gangstin:~$ ls pythonprog/ -l
totalt 8
-rwxr-x--- 1 oblivion oblivion 5879 apr 22 18:34 christmas_tree.py
```

Moving a Pyton source file into the pythonprog directory.

6. Run a Python program

To run the christmas_tree.py program use the ‘python3’ (the program is written in Python 3 syntax, had it been written in Python 2 syntax, the command would have been ‘python’), followed by the source file name.

```
oblivion@gangstin:~$ python3 ./pythonprog/christmas_tree.py
Input the height of the christmas tree: 5
    *
   ###
  #####
 Oi*OV##
#####Vi##
    #

Type |   Nr.   |  Percent
-------------------------
 i   |      2  |   8.00%
 V   |      2  |   8.00%
 O   |      2  |   8.00%
 *   |      2  |   8.00%
 #   |     17  |  68.00%
-------------------------
     |     25  | 100.00%

oblivion@gangstin:~$ cd pythonprog/
oblivion@gangstin:~/pythonprog$ python3 christmas_tree.py
Input the height of the christmas tree: 5
    *
   #i#
  V####
 #O####O
i#V###*##
    #

Type |   Nr.   |  Percent
-------------------------
 O   |      2  |   8.00%
 V   |      2  |   8.00%
 #   |     17  |  68.00%
 *   |      2  |   8.00%
 i   |      2  |   8.00%
-------------------------
     |     25  | 100.00%
```

Running the Christmas tree Python program.

The example illustrates running the Christmas tree both from the directory where the file is stored, and my home directory.

7. Permissions

The ‘ls’ command called with the argument ‘-l’ will list files in long format, which includes permission and owner information in the output. An explanation of these parts of the ls output is given in the first chapter.