Users and the file system in UBUNTU

The purpose of this document is to get you to speed with the Ubuntu filesystem. We will learn about:

a. How Ubuntu compares to Windows when it comes to files;
b. Where things can be found in the Ubuntu filesystem;
c. The basics of the users and permissions system that lies at the heart of Ubuntu;
d. The Nautilus file manager;

How Ubuntu handles files

Ubuntu differs from Windows in the following ways in accordance to paths:

Windows	Ubuntu
Drive letters like C:\	No drive letters. Identified by (/)
C:\Documents	/home/frank/Documents

Don't let this difference get to you. It will be way simpler in a moment.

Mounting

If there are no drive letters then how are other storage devices accessed, such as CD/DVD drives, or USB memory sticks?
They are mounted. Am sure by now you have come across this Linux survy term.

The mounting will be through a particular folder /media/~. The ~ replaced by the particular media for instance.

Mounting can be done automatically at boot-time or on attachment of the particular removable memory device.

File & folder names

File and folder names can contain spaces, as with Windows, but upper/lowercase letters are important in Linux. That is:

a. *Report.wps*
b. *REPORT.wps*
c. *report.wps*

} *are all looked as different files.*

The above is called case sensitivity.
Additionally, file and folder names under Ubuntu can contain practically any letter, number, or symbol, with the exception of the forward slash (/).
In Linux, we love to say *directories* instead of the conventional Windows *folders*.

Users

Each user on the system is given their own folder within the /home folder in which to save personal data.
That is : /home/caroagnes

Outside of the /home folder, the Ubuntu filesystem is a little more complicated than Windows, and it isn't quite a case of Program files being in one location, and system files in another.
A cursory rundown of the Ubuntu filesystem can be found in the table below:

Location	Details
/bin	Essential software, typically needed to get the system running
/boot	Files related to the boot menu/loader
/dev	Virtual files representing hardware devices
/etc	System (global) configuration files
/home	Users' personal folders
/lib	Support (library) files required by software
/media	Contains subfolders where storage devices can be mounted
/proc	Virtual folder containing files representing stats and settings
/root	Personal folder of the root user
/sbin	Essential software for system maintenance, usually used only by the root user
/tmp	Temporary files/folders
/usr	Essentially, subdirectories containing most software used on the system, including system libraries and documentation
/var	Data that is vital to the running of the system and that is constantly being updated

This is not essential knowledge and is provided largely for reference purposes.
Perhaps the most important locations for the majority of users are /home , as described above; /usr/bin , where practically all software is located; and /etc , where system configuration files are found.

NOTE: Like many versions of Linux, Ubuntu broadly follows the Filesystem Hierarchy Standard (FHS) to decide where things should go in the filesystem.

Hidden files and folders

Windows lets users hide files and folders by setting a file attribute.
In Linux a period (.) in front of a file/folder makes it invisible in the file listings.
That is: .report.doc is a hidden file. The same for folders.

Try pressing Ctrl+H to see the effect renaming the *file/folder*.

Warning: Don't play around with hidden files and folders already on the system unless you know what you are doing.

NOTE: Any file or folder that has a tilde(~) at the end of its filename(i.e. report.doc~) will be hidden in file listings provided by the Nautilus file manager, and on the desktop. They will be visible everywhere else, including at the command-line(in the Terminal).

File extensions

Generally speaking, the trend with Linux is not to use file extensions for system files. Executable programs under Ubuntu don't have a file extension, such as .exe , as with Windows.
Instead, the fact they are programs and not ordinary data files is indicated by the use of the executable file attribute.
Many files that are plain text have no file extension, in fact; the use of the .txt file extension is rare in the world of Linux. Program documentation files in the /usr/share/doc folder, for example, are plain text and have no file extensions.

NOTE : It isn't quite true that files in the /usr/share/doc folder have no file extensions because some program documentation files are compressed, so have a .gz file extension, but this is a minor point.

Personal file like documents, for example, have file extensions.

Root user

On most Linux distros, two accounts are created during installation:

a. *standard user- normal day to day user.*
b. *root user- overall system supervising user.*

Ubuntu differs slightly from most Linuxes. Although the root account is there in the background, the user is discouraged from directly logging in as root. Instead, the user 'borrows' root powers to administer the system when necessary. The password is by default the standard user password. It is however recommended to be changed.

NOTE: When working at the command-line, any command needing administrative powers must be preceded by *sudo* (*gksu* should be used for GUI apps). I explain more later.

File permissions

Most operating system files are 'owner' by the root user, and have permissions so that only root can edit them.

This simple mechanism of protecting operating system files through root user ownership is how Linux enforces security and system protection. It's simple but highly effective, and has stood the test of time for many years.
This is the reason Windows is insecure. It logs in a standard user with administrative permissions. Making a virus infection very severe and distractively successful.

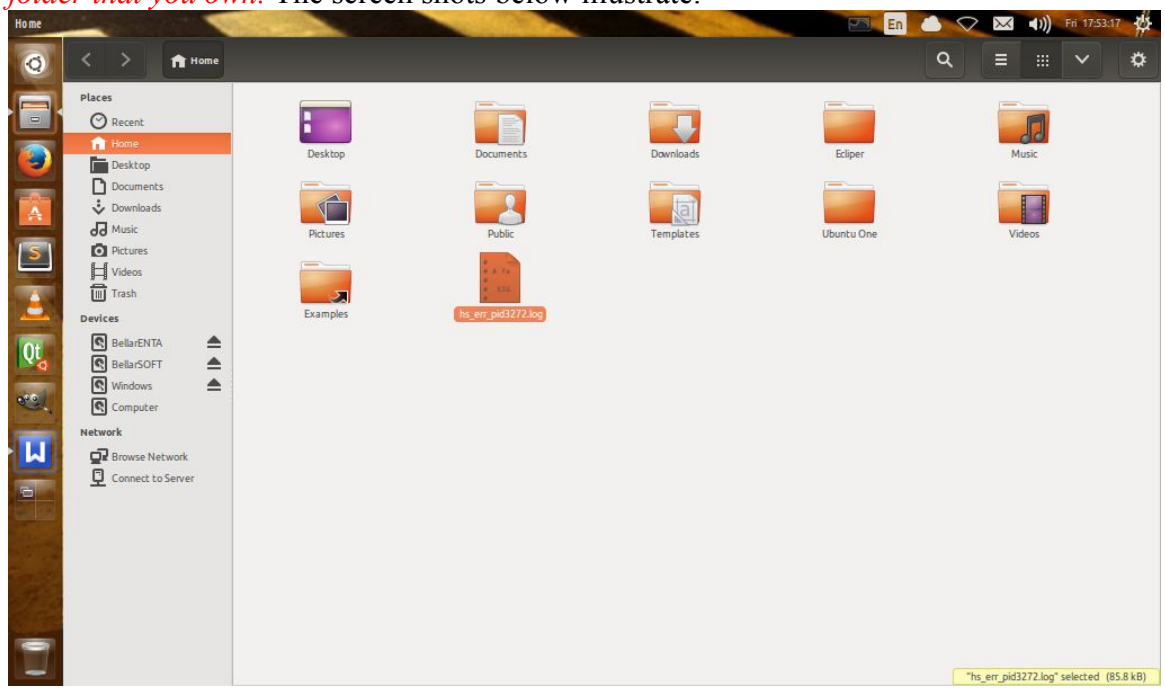
The owner of a file can set 3 separate sets of permissions:

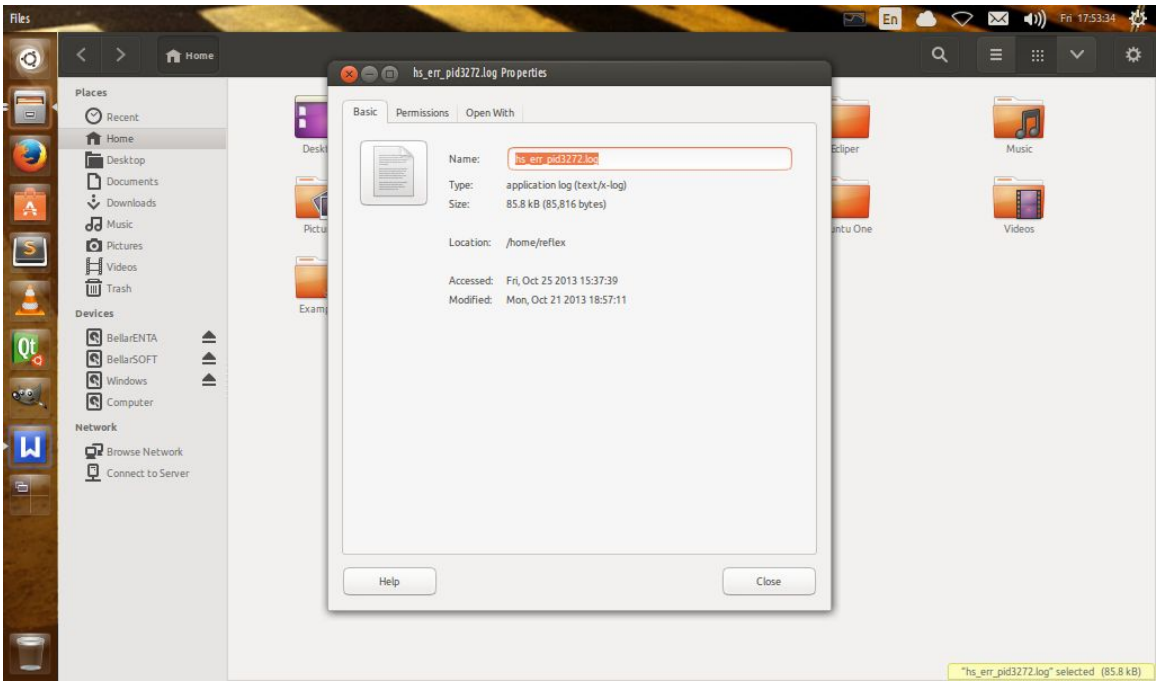
a. *Herself-the owner of the file.*
b. *Group-a particular set of users.*
c. *Others-users not file owners and not in any group.*

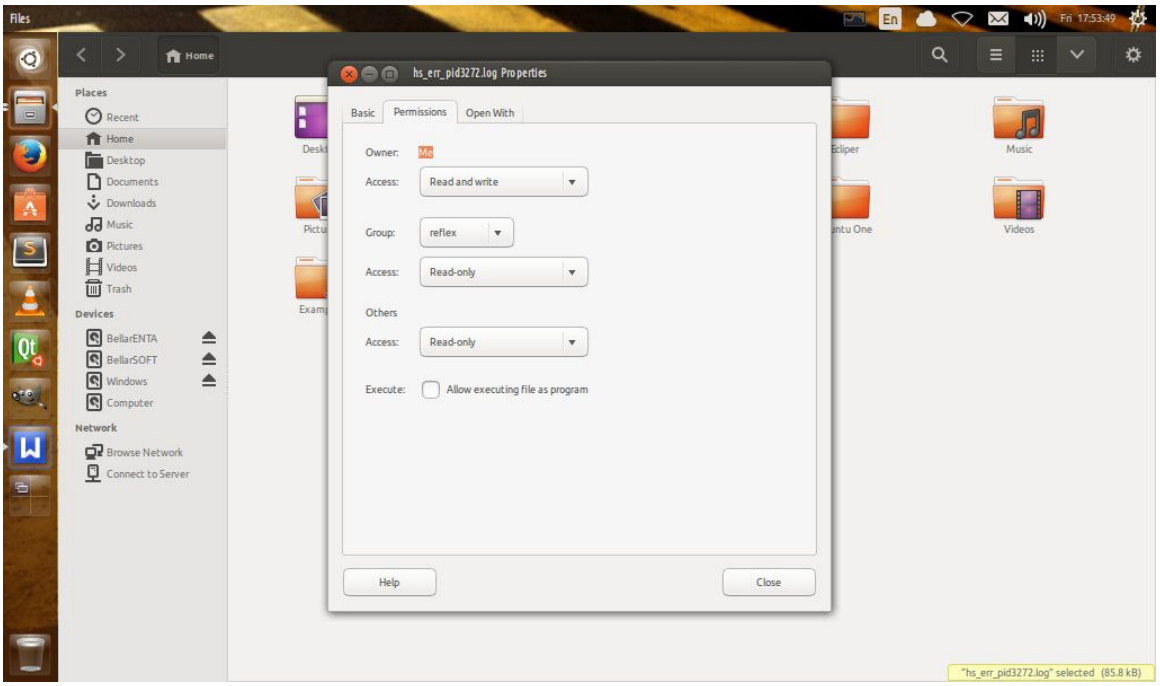
Remember, Linux is a clone of UNIX(a system designed to handle hundreds or even thousands of different users). That is to say that you can run Linux on a mainframe computer without any adaptation required.

How to deal with these permissions

You can view and edit file permissions for any file or folder by right-clicking it and selecting Properties from the menu. In the dialog box
that appears, click the Permissions tab. *You can only change permissions for a file or folder that you own.* The screen shots below illustrate:

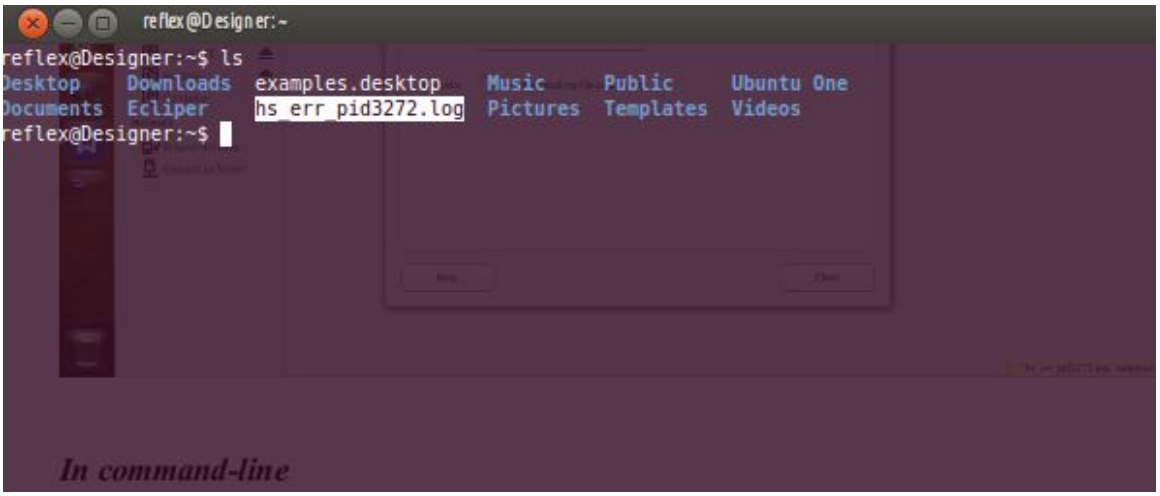



Files
Home
Places
Recent
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
Devices
BellarENTA
BellarSOFT
Windows
Computer
Network
Browse Network
Connect to Server
hs_err_pid3272.log Properties
Basic
Permissions
Open With
Name:
hs_err_pid3272.log
Type:
application log (text/x-log)
Size:
85.8 kB (85,816 bytes)
Location:
/home/reflex
Accessed:
Fri, Oct 25 2013 15:37:39
Modified:
Mon, Oct 21 2013 18:57:11
Help
Close
"hs_err_pid3272.log" selected (85.8 kB)

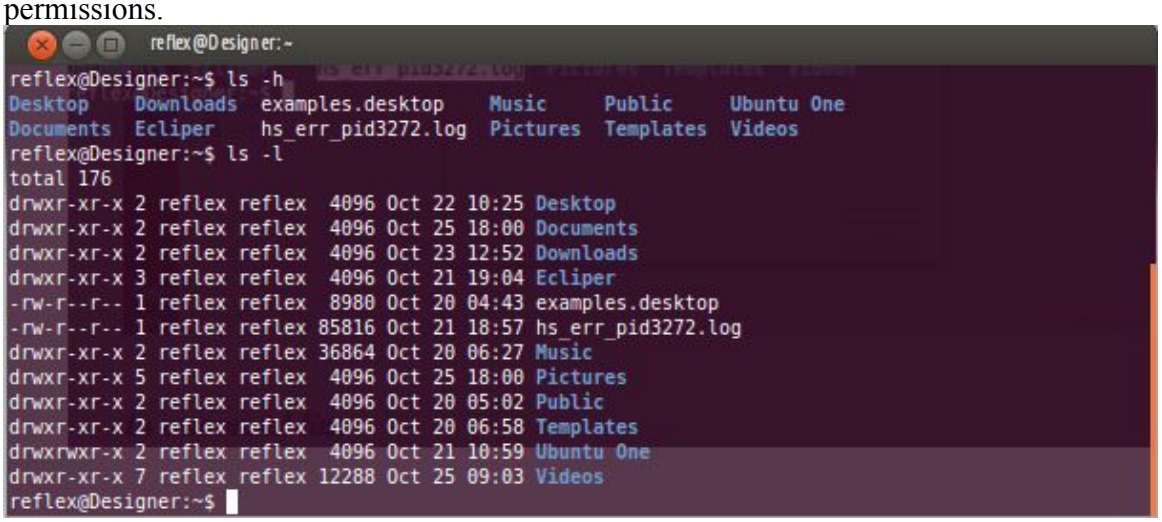

Files
Home
Places
Recent
Home
Desktop
Documents
Downloads
Music
Pictures
Videos
Trash
Devices
BellarENTA
BellarSOFT
Windows
Computer
Network
Browse Network
Connect to Server
hs_err_pid3272.log Properties
Basic
Permissions
Open With
Owner:
Me
Access:
Read and write
Group:
reflex
Access:
Read-only
Others
Access:
Read-only
Execute:
Allow executing file as program
Help
Close
"hs_err_pid3272.log" selected (85.8 kB)

In command-line

The current user is reflex, so, opening the terminal



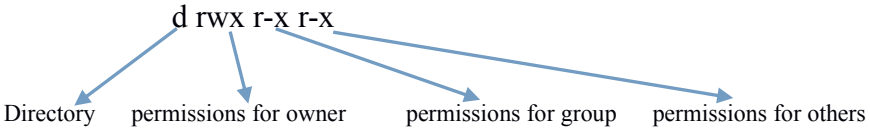
Notice the *ls* command to list contents in /home/reflex folder
Also notice file hs_err_pid3272.log highlighted. Now lets see the permissions assigned to the file from the command-line. Now use command *ls -l* to list files and folders with their permissions.



Lets see what the permission structure says. But first, what the letters mean.

a. *d: means directory*
b. *r: means read*
c. *w: means write*
d. *x: means execute*
e. *-: means no permmision(when used within the permission i.e.* drwxr-xr-x*) or file(when used at the beginning i.e.* -rw-r--r--*)*

Now the structure:



Nautilus: An overview

The file browsing program provided with Ubuntu is called Nautilus. It's a staple of the Gnome desktop environment and is extremely powerful, yet also user-friendly.

This is the program you see when you are looking for files on your hard-drive or whatever memory device.