Sessions in Linux

Contents

Overview

Linux is a multi-user system, meaning multiple people can be logged on to one system at any time.
Linux groups the processes being run by a user into sessions.

Logging In

Credentials

All users of a Linux system have a username and a password which they use to log in.
The usernames of each user are stored in `/etc/passwd` and their passwords are encrypted and stored in `/etc/shadow`.

User ID

Each user of a Linux system has a unique User ID (or UID) which they are assigned on login.
The UID is how the system recognises each user.
With the exception of the super user having a UID of 0. UIDs usually start at 1000 and increase by 1 for each user, this is because the UIDs less than 1000 are reserved for processes that are run by the system, so assigning users with UIDs less than 1000 can cause conflicts.
The UID for each user is also stored in `/etc/passwd`.

The Command Line

Shell

A shell is a program which provides a link between the user and the kernel.
A command line shell acts as an interface for the system, commands written in the shell will be performed by the system.

There are different types of shell which have different prompts:

- **bash shell** - the most commonly used Linux shell, it stands for `Bourne again shell` and is based on the Unix `Bourne shell`. The bash shell has the prompt `$`.
- **super user shell** - any shell which is run by the super user will have the prompt `#`, this makes it easy to see when you're working as the super user.

How the command line looks

Parts of the command line are separated by white space, an example command is as follows

```
$ ls -l --color /home/bobby <CR>
```

- `$` is the shell prompt, this lets the user know what type of shell they are using, and where to begin the command.
- `ls` is the command we want the system to run.
- `-l` is a short option, this is usually one or two characters which make the command more specific, they are preceded by a single `-`.
- `--color` is a long option, long options work the same as short options but they usually consist of full words and are preceded by a double `-`.
- `/home/bobby` is an object, multiple objects can be included in one command
- `<CR>` stands for 'carriage return', it means start a new line. All commands in Linux end when the user starts a new line by pressing 'enter' or 'return'.

Common Commands

Below are some basic fact finding commands which will be useful when using the command line for the first time.

```
ls          lists things in current directory
ps          shows currently active processes
echo        displays arguments on the screen (a console.log or println analogue)
who         lists users currently logged in to the system
uname       displays basic OS information
pwd         displays current working directory on the screen
```

Working with text files

There are also commands which are useful when working with text files

```
cat         displays content in a file, does not pause
grep        displays lines which contain a specified pattern, very useful with
regular expressions
wc          word count (use -l to count the lines in a file)
tail        shows the last few lines in a file (use -f to 'follow' the end of a
log file and -n to say how many lines it should fetch)
head        shows the first few lines in a file
more        like cat, but pauses after each screen
less        like more, but doesn't have to read the whole file into memory
(better on bigger files)
```

Getting help in Linux

CLI help

Linux has a few features that are very helpful if you don't quite understand what a command does.

The `man` command opens up the manual which is the documentation about the command you are inquiring. e.g.

```
man grep
```

This example would open up the manual for the `grep` command. You would be able to see the options available for the command as well as description.

The `--help` option will display the information from the documentation on the screen

```
python3 --help
```

In most cases using either `man` or `--help` would work, but it's good to know both just in case.

Online help

There are some websites that provide most, if not all, of the documentation for Linux.
The Linux Documentation Project (TLDP) is an online library of documentation for Linux, so if there is no local documentation for the command you wish to know about, TLDP will probably have some.

Other websites such as stack overflow often have solutions to common problems

Tutorial

The following questions will test the knowledge you have learned in this module.
Try to answer the questions as best you can, then check your answers against the solutions.
You may run commands if you wish.

What does the following command do?

```
ls -alh
```

▶ Show Solution

What is the default Linux shell?

▶ Show Solution

Which command(s) would be useful when working with log files?

▶ Show Solution

Exercises

There are no exercises for this module.