Linux OS Laboratory COMP311

by
Alaa' Omar

02/08/2023

—

Lab1 Notes

—

Computer science department

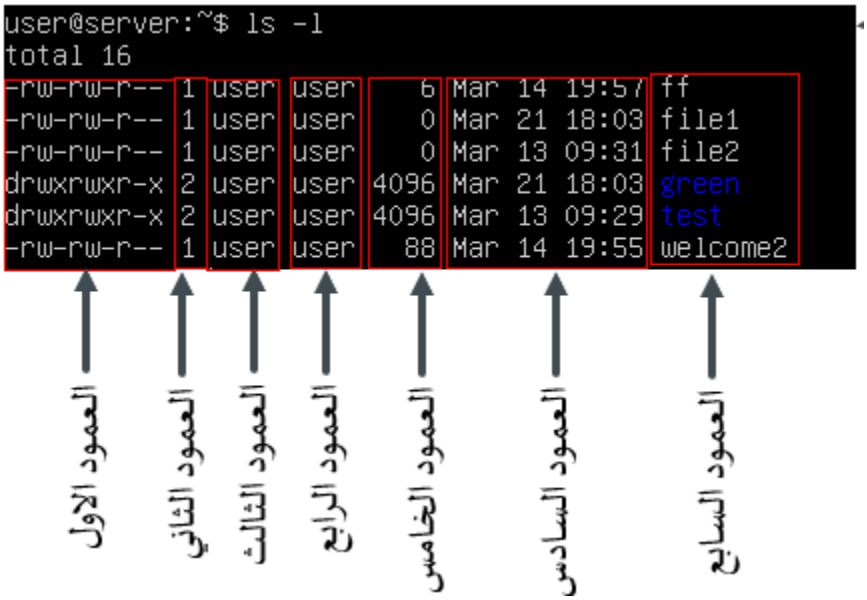
What is a shell?

The shell is a program that takes commands from the keyboard and gives them to the operating system to perform.

What's a Terminal?

It's a program called a terminal emulator. This is a program that opens a window and lets you interact with the shell.

Command ls -l output explanation:



- **Column 1: File permissions**. This column shows the file type and the permissions set for the owner, group, and others. In the example above, the file is a regular file (-), and the owner has read and write permissions (rw-), while the group and others have only read permissions (r--).
- **Column 2: Number of hard links**. This column shows the number of hard links to the file or directory. A hard link is a reference to a file or directory in the file system, and multiple hard links can refer to the same file or directory.
- **Column 3: Owner**. This column shows the username of the file or directory owner.
- **Column 4: Group**. This column shows the group that owns the file or directory.
- **Column 5: File size**. This column shows the size of the file in bytes. For directories, this column shows the size of the directory metadata.

- **Column 6: Date and time of last modification**. This column shows the date and time when the file or directory was last modified.
- **Column 7: File or directory name.** This column shows the name of the file or directory.

In the example below, the file file.txt has the following properties:

-rw-r--r-- 1 username group 1024 Mar 31 12:00 file.txt

- It is a regular file.
- It has one hard link.
- It is owned by the user username.
- It is part of the group group.
- Its size is 1024 bytes.
- It was last modified on March 31 at 12:00.
- Its name is file.txt.

- العمود الاول: هو الصلاحيات الممنوحة للملف مثل: –rw-rw-r--
- العمود الثاني: عدد الروابط للملف او الدليل التي ترتبط بالدليل الرئيسي
- العمود الثالث: يُظهر من يمتلك ذلك الملف او الدليل من المستخدمين كما يظهر اسم المستخدم user
- العمود الرابع: يُظهر المجموعة التي تمتلك ذلك الملف او الدليل
- العمود الخامس: حجم الملف او الدليل في البايت
- العمود السادس: تاريخ التعديل الاخير
- العمود السابع: اسم الملف او الدليل

When we use ls -l command, a total with a number is shown at the beginning, what is this total refer to?

```
alaa@Ubuntu:~/Desktop$ ls -l
total 20
-rw-rw-r-- 1 alaa alaa   12 Mar 31 11:58 destfile
drwxrwxr-x 3 alaa alaa 4096 Mar 31 11:59 f2
drwxrwxr-x 2 alaa alaa 4096 Mar 31 11:58 f3
drwxrwxr-x 2 alaa alaa 4096 Mar 31 11:58 f4
-rw-rw-r-- 1 alaa alaa    0 Mar 31 11:58 file2
-rw-rw-r-- 1 alaa alaa   12 Mar 31 11:56 srcfile
```

When you use the ls -l command, the first line of output shows the total block count of the files listed in the directory. This total block count is the sum of the block counts for all files in the directory.

A "block" is the smallest unit of storage on a filesystem and is typically 512 bytes in size. The block count for a file is the number of blocks that the file occupies on the filesystem.

The ls -l command calculates the total block count by adding up the block counts for all files in the directory and then dividing the total by 2 to get the number of kilobytes used by the files. This number is displayed as the "total" value at the top of the output.

For example, if the ls -l command shows a total of 20, this means that the files listed in the directory use a total of 10 kilobytes (since 20 divided by 2 is 10).

The total block count is mainly used for informational purposes and can help you quickly determine the size of a directory and the amount of disk space that the files in the directory are using.

To show this number in a human readable format you can use the option –h besides the option -l such as the following example which is shown in the following picture:

```
alaa@Ubuntu:~/Desktop$ ls -lh
total 20K
-rw-rw-r-- 1 alaa alaa   12 Mar 31 11:58 destfile
drwxrwxr-x 3 alaa alaa 4.0K Mar 31 11:59 f2
drwxrwxr-x 2 alaa alaa 4.0K Mar 31 11:58 f3
drwxrwxr-x 2 alaa alaa 4.0K Mar 31 11:58 f4
-rw-rw-r-- 1 alaa alaa    0 Mar 31 11:58 file2
-rw-rw-r-- 1 alaa alaa   12 Mar 31 11:56 srcfile
alaa@Ubuntu:~/Desktop$
```

What are the . and .. that are shown when using the option -a in the ls command?

```
alaa@DESKTOP-CEO72GJ:~$ ls -al
total 12
drwxr-x--- 1 alaa alaa 4096 Apr  1 13:12 .    current directory
drwxr-xr-x 1 root root 4096 Mar 30 20:18 ..   parent directory
-rw------- 1 alaa alaa  365 Apr  1 13:12 .bash_history
-rw-r--r-- 1 alaa alaa  220 Mar 30 20:18 .bash_logout
-rw-r--r-- 1 alaa alaa 3771 Mar 30 20:18 .bashrc        hidden files aks
-rw------- 1 alaa alaa   20 Mar 31 16:33 .lesshst       dotfiles in linux
-rw-r--r-- 1 alaa alaa    0 Apr  2 11:31 .motd_shown
-rw-r--r-- 1 alaa alaa  807 Mar 30 20:18 .profile
-rw-r--r-- 1 alaa alaa    0 Mar 30 20:20 .sudo_as_admin_successful
-rw------- 1 alaa alaa 1984 Mar 30 23:32 .viminfo
-rw-r--r-- 1 alaa alaa   11 Mar 30 23:31 file
-rw-r--r-- 1 alaa alaa   33 Mar 30 23:32 file1
drwxr-xr-x 1 alaa alaa 4096 Apr  1 13:12 folder
```

In Linux and Unix-like operating systems, **.** and **..** are special directory entries that refer to the current directory and the parent directory, respectively.

The **.** entry refers to the current directory, which is the directory that you are currently in. This can be useful for running commands that operate on files in the current directory, such as **ls .** to list the contents of the current directory.

The **..** entry refers to the parent directory, which is the directory that contains the current directory. This can be useful for navigating up the directory tree, such as **cd ..** to move up to the parent directory or **ls ../** to list the contents of the parent directory.

When you use the ls -a command, both **.** and **..** are included in the output, along with any other hidden files or directories in the current directory. Hidden files and directories are files and directories whose names begin with a period (e.g. **.bashrc**).

Where do you think the finger command gets the information it displays about users?

The finger command retrieves information about users from the system's user database. The exact location of the user database may vary depending on the operating system, but it is typically stored in the /etc/passwd file on Unix and Unix-like systems.

This file contains a list of user accounts on the system, along with information such as the user's login name, home directory, and default shell. When you run the finger command followed by a username, the command looks up the corresponding entry in the /etc/passwd file and displays the relevant information.

It's worth noting that the finger command is considered somewhat outdated, and many modern systems may not have it installed by default. In its place, you might use other commands like who, w, or last to obtain information about logged-in users on the system.

Explain the output of the command (more /etc/group): students:x:66:ahmad,u123456.

The line "students:x:66:ahmad,u123456" in the /etc/group file indicates that there is a group named "students" on the system, with a group ID (GID) of 66.

The "x" in the second field indicates that the group password is stored in a separate file (typically /etc/gshadow) and is not shown in the /etc/group file.

The third field "66" is the GID, which is a unique numeric identifier assigned to the group.

The fourth field "ahmad,u123456" lists the usernames of the group members, separated by commas. In this case, the group has two members: "ahmad" and "u123456". These users are allowed access to any files or directories that have been assigned to the "students" group

Where does the command who/ finger get information?

The who command obtains the information about logged-in users by reading the system's list of active login sessions, typically stored in the **/var/run/utmp** file on Unix and Unix-like systems. This file is updated by the login process each time a user logs in or logs out of the system.

The finger command retrieves information about users from the system's user database, typically stored in the **/etc/passwd** file on Unix and Unix-like systems. This file contains a list of user

accounts on the system, along with information such as the user's full name, home directory, and default shell.

explain the result of the following command: alaa@DESKTOP-CEO72GJ:~$ passwd -S
alaa P 03/31/2023 0 99999 7 -1

The command **passwd -S** is used to display the status of a user's password. When you run this command, it will display information about the password for the current user (in this case, "alaa").

> Using -S option based on the manual pages will display account status information. The status information consists of 7 fields. The first field is the user's login name. The second field indicates if the user account has a locked password (L), has no password (NP), or has a usable password (P). The third field gives the date of the last password change. The next four fields are the minimum age, maximum age, warning period, and inactivity period for the password. These ages are expressed in days.
>
> Overall, the output of the passwd -S command provides information about the status and expiration of a user's password, as well as the date when the password was last changed.