Linux 102

Workshop

What’s In It For Me

(WIIFM)

- Linux is a basic requirement
- Our application is running on Linux

Linux 101

Recap

- Filesystem
- Path
- Shortcut characters
- High Level Structure
- Command Line
- I/O Redirections

Commands

Recap

- pwd
- ls
- cd
- mkdir
- touch
- echo
- cat
- mv
- rm
- cp
- man

Agenda

- Files
- File Types
- Text Files
- File Globbing
- File Links
- Finding Files
- Pipeline
- Here Document
- File Permissions

Files

- Collection of binary data that represents information
  - Text - contents interpreted as characters
  - Binary - contents interpreted by software or hardware
- Organized into directories
- Case Sensitive

```
vagrant@ubuntu-xenial:~$ cat /bin/ls
vagrant@ubuntu-xenial:~$ cat .profile
```

Filesystem Hierarchy

Standard

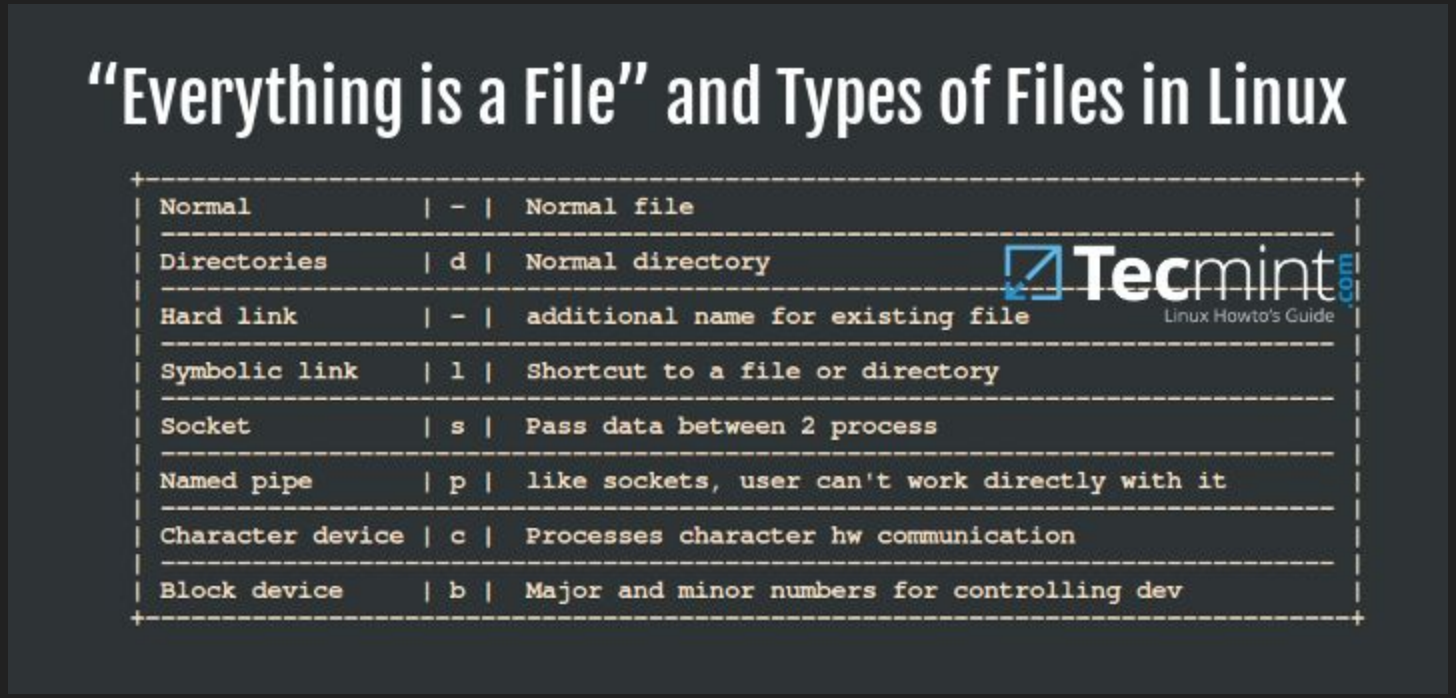
/ - root directory
/bin,/sbin - binary files and system programs
/boot - boot loader and kernel
/dev - device files
/etc - configuration files
/home - User home directories
/lib - library files
/media - temporarily mounted storage (CDs, etc.)
/opt - optional (installed) software
/proc - kernel and processes
/root - root user’s home directory
/run - information about running processes
/srv - files been served by services like NFS
/sys - system hardware
/tmp - temporary data (volatile)
/usr - unesstional installed software
/var - system writes data during running (logs)

command - which

Where tool or program is stored

```
vagrant@ubuntu-xenial:~$ which ls
/bin/ls
```

File Types


"Everything is a File" and Types of Files in Linux
Normal | - | Normal file
Directories | d | Normal directory
Hard link | - | additional name for existing file
Symbolic link | l | Shortcut to a file or directory
Socket | s | Pass data between 2 process
Named pipe | p | like sockets, user can't work directly with it
Character device | c | Processes character hw communication
Block device | b | Major and minor numbers for controlling dev
Tecmint.com
Linux Howto's Guide

command - file

What kind of file something is

```
vagrant@ubuntu-xenial:~$ file /bin/ls
vagrant@ubuntu-xenial:~$ file .profile
```

command - stat

A lot more information about the file

```
vagrant@ubuntu-xenial:~$ stat /bin/ls
vagrant@ubuntu-xenial:~$ stat .profile
```

Exercise

1. List files in root, /bin and /dev directories in long format
2. Observe the file types
3. What kind of file is /?
4. What kind of file is file?

Text Files

- Text Editors
  - Graphical - gedit, etc…
  - Command Line - Vim (Vi), nano

source

File Globbing

- Use patterns to match file or directory names
  - * - matches zero or more of any character
  - ? - matches one of any character
- man 7 glob

```
vagrant@ubuntu-xenial:~$ touch aaa aab aac aba aca abacus acacia
vagrant@ubuntu-xenial:~$ ls a*
aaa aab aac aba aca abacus acacia
vagrant@ubuntu-xenial:~$ ls a*a
aaa aba aca acacia
vagrant@ubuntu-xenial:~$ ls ???
aaa aab aac aba aca
vagrant@ubuntu-xenial:~$ ls ?a?
```

command - clear

Clear the screen

```
vagrant@ubuntu-xenial:~$ clear
```

Exercise

1. List all files which ends with the character “a”
2. Remove all files which starts with the character “a”

File Links

- File type is l
- A reference to a file in a different place (shortcut)
- Hard Links and Soft (Symbolic) Links

Command: ln

```
vagrant@ubuntu-xenial:~$ echo “Yaara Arie Liora” > users.txt
vagrant@ubuntu-xenial:~$ ln -s /home/vagrant/users.txt Documents/susers.txt
vagrant@ubuntu-xenial:~$ ln /home/vagrant/users.txt Documents/husers.txt
```

Exercise

1. Find out which file is executed when running vi
2. Find out which file is executed when running vim

Command: truncate

Create a file in a certain size

```
vagrant@ubuntu-xenial:~$ truncate -s 1MB file1
vagrant@ubuntu-xenial:~$ truncate -s 10MB file2
vagrant@ubuntu-xenial:~$ truncate -s 100MB file3
vagrant@ubuntu-xenial:~$ ls -l
```

Command: find

Finding files

Useful options:

- -name
- -size
- -type <file type>
- -atime
- -ctime

```
vagrant@ubuntu-xenial:~$ touch apple pineapple lemon pear
vagrant@ubuntu-xenial:~$ ls -l
vagrant@ubuntu-xenial:~$ find . -name apple
vagrant@ubuntu-xenial:~$ find . -name “*apple”
vagrant@ubuntu-xenial:~$ find . -size -10M
vagrant@ubuntu-xenial:~$ find . -size +10M
```

Exercise

1. Use the find command to find the following files only: file2 and file3
2. Use the find command to find only the file lemon
3. Use the find command to find only the directory Documents/lemon

Pipeline

Redirection stdout of one command to stdin of a second command

<command> | <command>

Command: wc

Word count. How many lines, words, bytes in the input.

```
vagrant@ubuntu-xenial:~$ ls | wc
vagrant@ubuntu-xenial:~$ ls > homedir.txt
vagrant@ubuntu-xenial:~$ wc < homedir.txt
```

Here Document

A type of redirection which tells the shell to read input from the current source (HERE) until a line containing only word (HERE) is seen

```
vagrant@ubuntu-xenial:~$ wc << EOF
> line1 line1 line1
> line2
> line3
> EOF
```

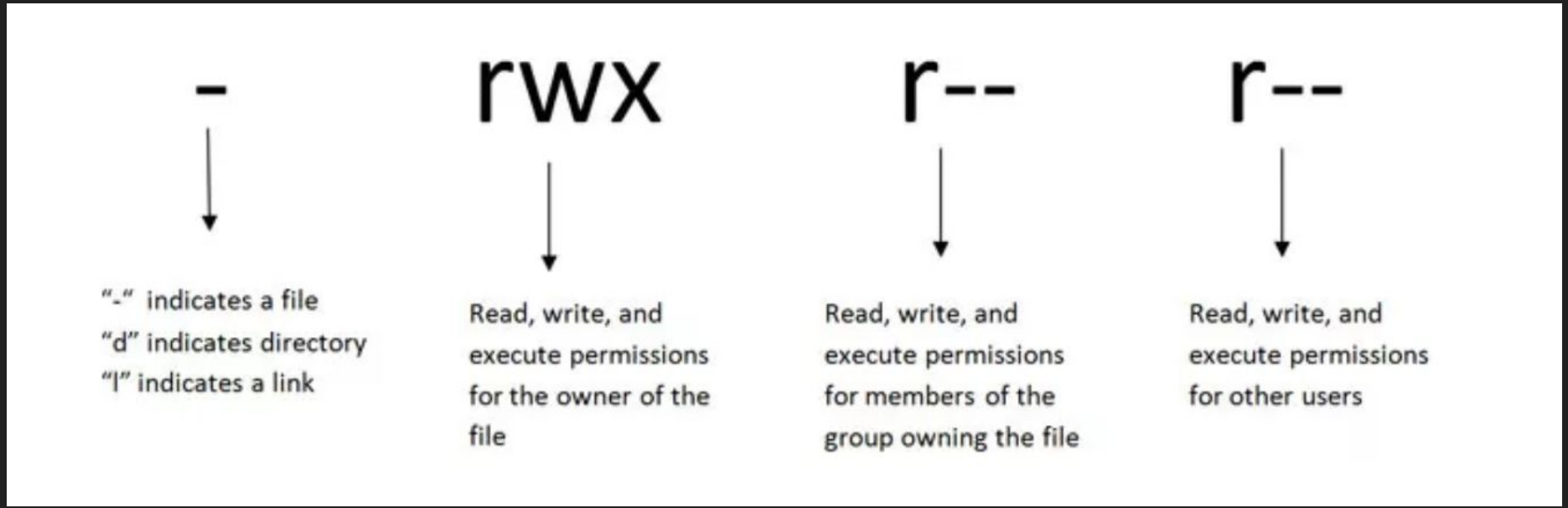
File Permissions

- Define which users and groups access a file
- Describe the actions users and groups can take

```
vagrant@ubuntu-xenial:~$ ls -l
```

Additional information on files

- Every file is owned by a user and associated with a group
- Access to a file or directory is determined by read, write and execute permission for its user and group ownership and for “others”
- File permissions can be viewed by: ‘ls -l’
- File type and file access permissions are symbolized by a 10-character string


-
rwx
r--
r--
"-" indicates a file
"d" indicates directory
"l" indicates a link
Read, write, and execute permissions for the owner of the file
Read, write, and execute permissions for members of the group owning the file
Read, write, and execute permissions for other users

Home Exercises

1. Find files or folders names “home” from root
2. Redirect stderr to the file error.txt and stdout to output.txt
3. What is the content of the files error.txt and output.txt
4. How many lines in each one of the files
5. What are the permissions of the files