Linux Basics

Useful Linux Commands

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What is Linux?

- Linux is an Operating System(OS), just like Windows is an Operating System.
- Linux is Open Source which makes it "Free" where Windows is not.
- What is Open Source Software?
  - Open source software is a software with source code that is available for free and may be modified and redistributed by anyone who wants to inspect the software or enhance it.

Linux Distributions

- Linux **Distributions** or Linux "**Distros**" as it's known, are different versions or flavors of Linux that are compiled and distributed by different vendors.

- The three **Distros** that we are concerned about in this lesson are:

  - **Red Hat** Enterprise **Linux** (**RHEL**) or simply **Red Hat** is a **Linux** distribution developed by **Red Hat** and targeted toward the commercial market.

  - **CentOS** is from (**C**ommunity **Ent**erprise **O**perating **S**ystem) and is a **Linux** distribution that provide a free, enterprise-class OS which is compatible with **Red Hat.** Some say it's a Red Hat Clone.

  - **Ubuntu** is another free distro that has it's own desktop environment. It is named after the Southern African philosophy of **Ubuntu** ("humanity towards others").

What is root?

- root is the user name or account that by default has access to all commands and files on a Linux operating system. It is also referred to as the root account, root user and the superuser.

- The root directory is the top level directory on Linux operating system, i.e., the directory that contains all other directories and their subdirectories.

To become root or sign as root user, type **sudo su** and give password. It is not recommended to sign as root when you are doing normal tasks. Instead use **sudo** before executing any command that requires admin privileges to be safe. Example **sudo yum update -y**

System Info

We will be using the terminal or the **(CLI) Command Line Interface** to type these commands.

- **date** = show the current date and time
- **cal** = show this month's calendar
- **uptime** = show current uptime
- **w** = display who is online
- **whoami** = who you are logged in as
- **man *command*** = show the manual for *command*
- **df** = show disk usage

File Commands

- **ls** = directory listing
- **ls -l** = formatted listing
- **ls -a** or **ls –al** = list all files including hidden files
- **mkdir** = create a directory, example **mkdir testdir & mkdir testdir1**
- **cd** = change directory, example **cd testdir**
- **pwd** = print or show current directory
- **touch** = create a blank file, example **touch testfile.txt & testfile1.txt**
- **rm** = delete file, example **rm testfile.txt**
- **rm -r** = delete directory, example **rm -r testrdir**
- **cp** = copy file, example **cp testfile1.txt testfile2.txt**
- **cp -r** = copy directory, example **cp -r testdir1 testdir2**

- **mv** = move file or directory to a different directory, you can also use mv same as **cp** to copy file to another file. This removes the original file or directory, where copy keeps the original.
- Make 2 directories **dir1** and **dir2**, then move dir1 to dir2
  - **mv** dir1 dir2, check if it's moved type ls and see if the dir1 still there
- Another way of creating a file with input
  - **cat > testfile3.txt**
  - **vi** filename = will create an empty new file, example **vi testfile3.txt**
  - **nano** filename = will create an empty new file, example **nano testfile3.txt**
  - **vi** and **nano** are text editors
- **cat** = to print or display file content on screen

File Permissions

- Type **ls -l** to list files and directories with its permissions

  Notice each file and directory has three user based permission groups:

- **owner** - The Owner permissions apply only to the owner of the file or directory, they will not impact the actions of other users.

- **group** - The Group permissions apply only to the group that has been assigned to the file or directory, they will not effect the actions of other users.

- **other** - The other permissions apply to all other users on the system, this is the permission group that you want to **watch** the most. Any users that are not part of the *user* or *group* classes belong to this class.

How to define Permissions

- To define permissions you need to use or reference Permission **Group** and Permission **Types**.

  - Permission Groups used are:
    - **u** - Owner
    - **g** - Group
    - **o** - Others
    - **a** - All users

⊙The Permission Types that are used are:

⊙**r** - Read

⊙**w** - Write

⊙**x** - Execute

For example when you take a look at a file let's say testfile1.txt you'll see **rwx-rwx-rwx** the first charachter **r** is **read** the second char **w** is **write** the third char **x** is **execute**

⊙Each permission type has a numerical value "octal"

The values are:

⊙*r = 4*

⊙*w = 2*

⊙*x = 1*

so **rwx-rwx-rwx** equals **777**

or **rw-r-r** equals **644**

⊙**chmod** = to change file or directory permission we use the command **chmod** "change mode"

For example let's change testfile.txt permission to

rwx-r-x-r-x (4+2+1=7)-(4+1=5)-(4+1=5) equals **755**

Type **chmod 755 testfile.txt**

Type **ls -l** to see if the permission changed

⊙**chown** = to change owner and group assignments, the syntax is ***chown owner:group filename***

Users

Adding a user

- **useradd** = to add a user, syntax = **useradd username** example **useradd sami**

After creating the user you must assign a password to user

- **passwd** = to assign or alter a user password, **passwd username**, example **passwd sami**

Use this command **cat /etc/passwd** to see user list

Use this command **ls /home or cd /home** to see users in the home directory

Groups

You create groups in linux the same way as you create or add a user.

groupadd = to add a new group to the system, example **groupadd accounting**

usermod = to add user to an existing group.

Now let's add user **sami** to the group we just created "**accounting**" syntax **usermod -aG group username**, example, **usermod -aG accounting sami**

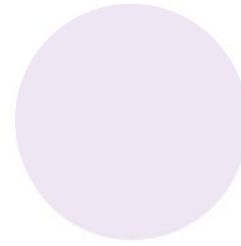Useful commands: **ifconfig** or **ip address** to check network status and the assigned ip address.
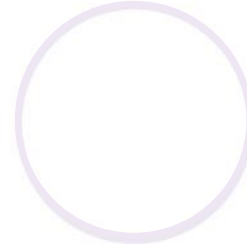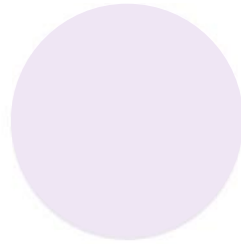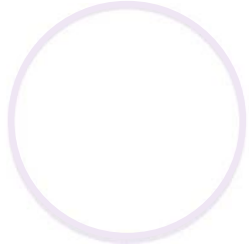
tar = to create a tar file or to decompress a tar file

To create = **tar cf file.tar files**, to decompress = **tar -xvf file.tar**

Linux Directory Structure

Please read the following to get an idea about the linux directory structure

- **/** This directory is called superuser home directory.It is the top of file system structure.All other directory are mounted under it.

- **/boot** This directory contain the kernal image file.This also contain the files related to booting the system such as bootloader.

- **/etc** It contain the whole system configuration file.

- **/home** This is the all users home directory.

- **/mnt** This is a generic mount point under which you mount your filesystems such as cdrom,floppy.

- **/proc** It is not a real file system, it is a virtual file system. This directory is empty until the proc file system is mounted.

- **/sys** Modern Linux distributions include a /sys directory as a virtual filesystem (sysfs, comparable to /proc, which is a procfs), which stores and allows modification of the devices connected to the system.

- **/dev** This directory contain the devices nodes through which the operating system can access hardware and software devices on the system.

- **/bin** This directory contain the command used by superuser and normal user.

- **/sbin** This directory contain the command used by superuser only.

- **/lib** It contain the library required for running the additional application and running the linux kernal.It also contain the library essential for binaries in /bin and /sbin.

Thank you!