**Linux Ubuntu Notes**

What is a distribution?

Debian one of first major Linux distributions.

RedHat and SUSE are also major distributions.

They are called Linux distros

A distribution is a process of delivering software from a developer to the end user.

A Linux distribution is an operating system made from a software collection that includes the Linux kernel.

A kernel is a system software that is part of the operating system. It is the core that provides basic services for all other parts of the Operating System.

* The kernel is the lowest level of the operating system.
  + It is responsible for translating user commands into machine language.
  + Provides interface between applications and hardware
  + Responsible for memory management, disk management, process management, and task management.
  + First program to load when operating system loads.
  + Translates between software and hardware

An Operating System manages all the software and hardware on the computer.

* Provides interface between user and hardware.
* First program to load when machine boots up.

Anything that changes system (i.e. installing and removing applications) requires administrative privileges.

* You have to use ‘sudo’ in the command line.

Files with .run files extensions can be run directly in the terminal by typing in the file name

* You must use ./ to indicate that the file/program you want to run is in the current directory.

GTK is the theming engine that Unity uses (the Desktop environment).

We can get different themes from gnome-look.org

NOTE: Always take snapshots of virtual machine when doing something risky.

apt-get is the program that installs, uninstalls, updates, and manages software packages

* Must run as administrator (use sudo)
* It connext to the Advanced Package Tool (APT) library

Unity-tweak-tool is used to change desktop and icon theme.

* sudo apt-get install gnome-tweaks

Any file or directory that begins with a ‘.’ Is a hidden file/directory.

* To access press control+H

To install new theme, we must create hidden directory

* Common practice names it ‘.themes’

K

/home is the root directory.

/usr contains users

* /usr/bin contains binary files that you can run
* /usr/share is used to store configuration files for binary applications
* /usr/share/applications contains all installed applications
  + Use .desktop file extension, but you cannot see file extension.
  + If you cannot find an installed application in your applications dashboard, you can go into this directory and find it there.

pwd (print workind directory) command allows you to print the current working directory you are in in terminal.

cd (change directory) allows you to navigate what working directory you’re in

* If you specify a directory starting with ‘/’ then this means that the path is an absolute path from the beginning of the hard disk/root directory.
* If you omit the ‘/’, this means you are using a relative path and you are going another level directory from the current directory you’re in.
* The ‘./’ character combination means the current working directory.
  + Cd next level And cd ./next level may have same result if they both start form the same directory.
* The ‘~’ character indicates the home directory
  + cd ~ will take you to the home directory.
* The ‘..’ character combination means the parent directory
  + cd .. will take you to parent directory

The ‘ls’ or ‘l’ command will list the files in the working directory in alphabetical order.

* ‘-l’ option means ‘long’ and allows you to list files in directory in a ‘long’ way. Lets you see
  + Permissions of a file or directory
  + The owners user account
  + The user group (default group is owners user name)
  + This will let you see the owners of files.
  + Shows date modified
  + Shows file name
* ‘-r’ option lists files and directory in working directory in reverse alphabetical order.\
* ‘-p’ option lists file types for files and directories.
  + ‘/ ‘ as a suffix denotes a directory
    - Blue color by default
  + ‘.file\_extension’ denotes a file.
    - White color usually
    - Binary files (I.e. a.out) are green
* ‘-s’ option lists and sorts files by size in a descending order.
* If you want to list the contents of a directory that is not the working directory you can provide the path to ls to print those contents. For example:
  + ‘ls /usr/share/applications’

You can use multiple options in the same ls command.

-- help option will give you more info on any command you are using such as what it does and available options

sudo command means ‘superuser do’.

* Allows you to perform administrative tasks
* Make changes to files

nano is text editor in terminal that allows you to edit files.

* To save changes you can press ‘ctrl + O’
* To exit file you can press ‘ctrl + X’

!! means to run the previous command.

su command means ‘switch user’

* You would write ‘su accountName’

sudo su will switch you to the root account

* Terminal will look like root@ComputerName, where root is the current user.
* This allows you to do administrative tasks without writing sudo
* Command ‘su username’ will switch you to other user.

You only have permission to edit files in ‘Home’ directory, any other directory requires administrative privileges – have to use sudo.

The package manager for Debian/Ubuntu is ‘Aptitude’ and we use it through program apt-get.

Program ‘apt-get’ is used to install/uninstall applications/packages from APT (Advanced Package Tool) library.

* The command ‘install’ means you want apt-get to install program.
* Command ‘remove’ means you want program removed.
* Command ‘upgrade’ will update any existing packages that are in system that have been updated in APT library

Must use sudo for anything that changes administrative directory content.

Program ‘apt-cache’ is used to display information about packages inside APT’s internal database.

* Command ‘search’ of apt –get will search packages in APT db
  + I.e. Comannd ‘apt-cache search name\*’ will display all pacakages beginning with ‘name’.
* Command ‘policy’ will determine if certain package is installed or not.

If you want to install debian package that is not in APT library, you can download the file and then run ‘dpkg’ program with the ‘i’ or install command.

* For example, ‘sudo dpkg -I ./google-chrome.deb’ command will install google chrome debian package in current directory
* Must be debian package, e.g. ‘.rpm’ files not allowed
  + This is for Fedora and RedHat systems.

To create text file with administrative permissions, you must use sudo command and nano, I.e.:

‘sudo nano filename.txt’ command

If we type ls –l and list files, we will see ‘filename.txt’ is owned by ‘root’ user and a part of ‘root’ group.

If you want to allow this file to be edited by other users, you can change the user group to the user group you want to allow to write to the file, you can do this with the ‘chown’, I.e:

‘sudo chown user:group filename.txt’

* ‘chown’ means change owner and changes ownership of file/directory
* ‘group’ is the user group.
  + Note: /etc/group directory contains all groups defined in system
  + Note: you can use ‘groups’ command to find all groups you are a member of.
* And ‘user’ is the user who owns the file
* If you only want to change the user who owns the file you can use:
  + ‘sudo chown user filename.txt’

Then you must change the permissions of the file for the specific group you want to grant access to

* i.e. ‘sudo chmod 764 file.txt’
  + ‘chmod’ means change made and grants access permissions to specific users
  + This give rwx permissions to the user user
  + ‘rw’ permissions to the user group
  + And ‘r’ permissions to others
* The permissions of the file are indicated by the first 7 dashes after executing ls -l
  + i.e. -rw-r-- r--
    - The first '-’ indiciates the object is a file
      * If it were a directory it would be a ‘d’
    - ‘r’ means read
    - ‘w’ means write
    - ‘x’ means execute
  + The three dashes after first bit are the permissions for the user
  + The following three dashes are the permissions of the group
  + The last three dashes are the permissions for the world.
* You can change file permissions numerically, you must use: ‘sudo chmod XXX file.txt’
  + XXX is a 3 digit octal number
    - The first digit is the permissions for the user.
    - The second digit is the permissions for the group.
    - The third digit is the permissions for the world.
    - 0 – no permissions
    - 1 – execute
    - 2 – write
    - 3 – execute + write
    - 4 – read
    - 5 – read + execute
    - 6 – read + write
    - 7 – read+ write + execute
  + For example ‘sudo chmod 777 file.txt’ gives read, write, and execute permissions to all users of the file.
* You can change file permissions symbolically as well for individual owners
  + Letters represent the specific user(s)
    - ‘u’ is the user/owner
    - ‘g’ is the user group
    - ‘o’ is other/the world
    - ‘a’ is all owners
  + Mathematical symbols are used for a specific operation made to a file or directory
    - ‘+’ adds permission(s)
    - ‘-’ removes permission(s)
    - ‘=’ sets permission(s) and overrides previously set permissions
  + The permissions you can set are
    - ‘r’ - read
    - ‘w’ - write
    - ‘x’ - execute
  + For example:
    - ‘sudo chmod g+wx sudotemp.txt’
      * This adds write and execute permissions to ‘sudotemp.txt’.

Note:

* You cannot have nested groups
* One file/directory cannot belong to more than one group
* Execute permission on a directory means being able to enter it and its subdirectories

If you want to remove object such as file, directory, or symbolic link from directory, you can use the ‘rm’ command

* ‘rm’ means remove

‘mkdir’ command makes a directory, I.e.:

* ‘sudo mkdir mydir’
  + Will make a directory with administrative permissions.
  + All permissions are given to root user
  + User group only get ‘rx’
  + Other only gets ‘x’
  + ‘x’ or execute means they can enter the directory and its subdirectories

‘sudo nano ./mydir/file.txt’ will create file in mydir directory with administrative priveleges.

* As you can see, you can specify a path to nano text editor on where to create file.

‘chown’ and ‘chmod’ command has –R option which mean ‘recursive’, meaning it affects subdirectories and files as well, and their subdirectories and files, etc. For example:

* If we use 'chown’ on directory that means that not only will it affect the directory, but also all the files and subdirectories in it as well, including their subdirectories and file, etc., for example
  + ‘sudo chown –R dan:dan ./mydir’ will change the user and group of ./mydir and all the files and directories it contains, and their files and directories.