Linux Essentials

For Raspberry Pi Users

Things I wish I knew when I started

– Bill AA6BD

MagPi Essentials Bash

Google this to get this free handbook

Bash: The command line interpreter
There are others
MANY variants in Linux-land

What is Linux?

Linux is a version of Unix operating system

. There are many variations of Linux

. This is the Raspberry Pi Desktop, a version of Debian Raspberry Pi OS for Intel and AMD

. Mostly identical

. Watch 32 bit vs 64 bit

Debian

.Debian versions are named after characters from Toy Story

. To see the version, use Terminal:

- **$ cat /*etc*/os-release**
- **DON'T TYPE $**

Linux vs. Windows

THINGS ARE DIFFERENT
LibreOffice Impress != Microsoft Powerpoint
They are not better or worse, but are different

File separator
/ Linux
\ Windows

Manage screens: start > preferences > screen configuration

Linux on Windows

Windows Subsystem for Linux
.Commands are the same
.Device support is different
.Program binary versions must match processor
.Watch for 32 vs 64 bit
.Windows has compatibility layer
.Linux? You must install

GUI vs Command Line

. GUI Graphical User Interface
. like Windows
. Command line: Terminal
. Like Windows command prompt
. Many things are easier to do with the Command Line
. Usually you can use either

Let's explore the GUI (LXDE)

Start >

Logout: To end your session and shutdown

System notifications area

To move a window: place mouse in window, press alt and move
Useful if window does not all fit in visible space

Different distros of Linux have different GUI's

Command basics

All Linux commands are case sensitive
. Cat != cat
.Commands are cryptic abbreviations
User prompt shows essential information
. pi@raspberry:~ $
. pi == user
. In Pi OS, pi was default user, but you can now change it
. raspberry == hostname
. ~ == directory relative to home/pi

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Configuration

Hostname == name for this computer
Start > Preferences > Raspberry Pi Configuration

$ sudo raspi-config

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Directory structure

https://linuxhandbook.com/linux-directory-structure/

Root
– home
– lots of others

Demo File Manager GUI

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Where am I?

$ pwd print working directory

$ man pwd find out more about this command

$ pwd – - help to get help on this command

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General command structure

$ Command <options> <file>

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Directory navigation

$ ls list files
$ ls -a list all files
$ ls -l list file details
Switch modifies the default command, like -a or -l

$ cd change directory
<tab> will autocomplete name
Relative to current directory
Leading / changes to: relative to root
$ cd .. go up one level in directory

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Create directories and files

$ mkdir

$ cp copy files
. 'just here'
* wildcard
? single character wildcard

$ rm remove (delete) file
$ rm -r remove directory and its contents

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Move and copy files

$ mv move files to new location

$ cp copy files to new location

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View file contents

$ cat <filename> concatenate (show) file, oldest first
$ tac <filename> shows newest first, good for log files
$ head show first part of file
$ tail show last part of file

$ less see beginning of file
Use space bar to see next screen
Press q to exit

Useful cat commands

$ cat /*etc*/os-release
$ cat /*proc*/cpuinfo
$ cat /*proc*/meminfo

$ df how much space is used
$ free memory usage

Search with grep

$ grep <word> <file>
Or
$ cat <file> | grep -i <word>
| pipe output of one command to input of another command
-i insensitive to case
<word> or regular expression
EXAMPLES:
$ cat /*etc*/os-release
$ cat /*etc*/os-release | grep bull

Where are applications

$ whereis <options> <app>
$ whereis python

$ which python which python is opened by default

$ locate <filename>
May need to install:
$ sudo apt install locate

more

If you want to see output more slowly, use

$ dpkg --help
$ dpkg --help | more output a page at a time, use space to advance

Update your system

$ apt Advanced package tool
$ sudo super user do

$ sudo apt-get update update the package directory
$ sudo apt-get upgrade update installed software
Do this before you install any new packages
This may take a w-h-i-l-e

$ sudo apt-get install <package>

Search for package

$ apt-cache search <package>
$ apt-cache search firefox

Helps to identify package name
Use firefox-esr to install firefox
$ sudo apt install firefox-esp

Package vs. compile and install

Package is great if available but may not be most current version
You may have to build from source

$ curl to download
$ make to compile
$ sudo make install to install

Commands are usually provided with code
You may need to download dependencies

Let's install and run an application: HamClock

cd
sudo apt install curl make g++ xorg-dev libx11-dev
rm -fr ESPHamClock
curl -O https://www.clearskyinstitute.com/ham/HamClock/ESPHamClock.zip
unzip ESPHamClock.zip
cd ESPHamClock
make -j 4 hamclock-800x480
sudo make install

And run

Run hamclock:
$ hamclock &
(& means to run it and return right away)

Or
$ cd ~/ESPHamClock
$ make -j 4 hamclock-1600x960 for larger clock
$ sudo make install

Hamclock information

https://clearskyinstitute.com/ham/HamClock

Installing software from the GUI

Not available on Linux other than Raspberry Pi OS

Start > Preferences > Recommended Software

Start > Preferences > Add / Remove Software

Ham Radio software: Build-a-Pi or 73Linux
github.com/km4ack

What's next

Arduino clocks: NTP, GPS, WWV, Realtime

Basics of Raspberry Pi

Ham radio on Raspberry Pi: Build-a-Pi

NanoVNA – antenna analyzer and more