LINUX NOTES

License and cost

- Linux stand for Linus Unix. Linux originally developed by ‘Linus Tarwalds of

Finland, who currently owns the Linux trademark. Linux is Free (as in beer [freedom]).

- Using the open source code of the Linux kernel, people have been developing OS based on the Linux Kernel. These are called “Linux Distributions”.
- You can download it from the Internet or redistribute it under GNU (General Public License) licenses. You will see the best community support for Linux.
- Most UNIX like operating systems are not free (but this is changing fast, for example Open Solaris UNIX). However, some Linux distributions such as Redhat / Novell

provides additional Linux support, consultancy, bug fixing, and training for additional fees.

History of Unix and Linux

- The Unix OS was implemented by Kem Thomson and Dennis Ritchie at AT & T Bell Laboratories in 1969 and first released in 1970.
- 1973, Rewrite UNIX with C.
- Linus Torvalds, who was then a student at the University Helsinki in Finland, developed Linux in 1991.
- He released it for free on the internet.
- Due to the far reach of the Free Software Foundation (FSF) and the GNU Project, Linux popularity increased rapidly.

Version	Code name	Release date	Kernel version
1	Mother's Day	12 November 1994	1.2.8
1.1	Mother's Day+0.1	1 August 1995	1.2.11
2.0	-	20 September 1995	1.2.13-2
2.1	Bluesky	23 November 1995	1.2.13
3.0.3	Picasso	1 May 1996	1.2.13
4.0	Colgate	3 October 1996	2.0.18
4.1	Vanderbilt	3 February 1997	2.0.27
4.2	Biltmore	19 May 1997	2.0.30-2
5.0	Hurricane	1 December 1997	2.0.32-2
5.1	Manhattan	22 May 1998	2.0.34-0.6
5.2	Apollo	2 November 1998	2.0.36-0.7
6.0	Hedwig	26 April 1999	2.2.5-15
6.1	Cartman	4 October 1999	2.2.12-20
6.2	Zoot	3 April 2000	2.2.14-5.0

KERNEL

- The Kernel is a program that constitutes the central core of a computer OS. It has complete control over everything that occurs in the system.
- The kernel is the first part of OS to load into memory during *booting* and it remains there for the entire duration of the computer session because its services are required continuously.
- The kernel code is usually loaded into a protected area of memory, which prevents it from being overwritten by other, less frequently used parts of the OS or by application program.
- Kernel perform its tasks in kernel space.
- Everything a user normally does, is done in *user space*.

Types of kernel

- Microkernel- A Microkernel takes the approach of only managing what it has to: CPU, Memory and IPC. Everything else in a computer can be seen as an accessory and can be handled in user mode.
- Monolithic Kernel- Monolithic kernels are the opposite of microkernels because they encompass not only the CPU, memory and IPC, but they also include things like device drivers file system management, and system server calls.
- Hybrid Kernel- Hybrid Kernel have the ability to pick and choose what they want to run in user mode and what the want to run in supervisor mode. Device driver and file system I/O will be run in user mode while IPC and server calls will be in the supervisor

Features of Linux

- Portable- Portability means software can works on different types of hardware in same way. Linux kernel and application programs supports their installation on any kind of hardware platform.
- Open source- Linux Source code is freely available and it is community based development project. Multiple teams work in collaboration to enhance the capability of Linux OS and it is continuously evolving.
- Multi-user- Linux is a multiuser system means multiple users can access system resources like memory/RAM/Application program at same time.
- Multiprogramming- Linux is a multiprogramming system means multiple application can run at same time.
- Hierarchical File system- Linux provides a standard file structure in which system files and users file are arranged.
- Shell- Shell is a user program or it's environment provided for user interaction. Shell is an command language interpreter that executes commands read from the standard input device (keyboard) or from a file. Shell is not part of system kernel, but uses the system kernel to execute programs, create files etc.
  - To find all available shells in your system type following command:
    $ cat /etc/shells [BASH (Bourne Again SHell, TSH, TCSH]
- Security- Linux provides user security using authentication features like password protection/controlled access to specific files encryption of data.

Daemon

- Daemons are processes that wait or run in the background performing various tasks. Generally, daemons start automatically at boot time and continue to run until shutdown or until they are manually stopped. By convention, the names of many daemon programs end in the letter “d”.

Boot Process

- Previously used boot process use LILO (Linux Loader) boot loader. Recently used in GRUB boot loader which we will be discussing.
- Steps for boot process-
- BIOS [Basic Input Output System]

The BIOS provides the lowest level interface to peripheral devices and controls the first of the boot process.

The BIOS looks for a MBR starting at the first sector on the first hard drive, load its content into memory, then passes control to it.

- GRUB [GRand Unified Boot Loader]

GRUB provide a true command-base, pre-OS environment on x86

- INIT