

GNU/Linux

A Gentle Introduction

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What is Linux?

- Wait, is it called “GNU/Linux” or “Linux”?
- Let’s take a brief look at operating systems and you decide for yourself!

Operating Systems

- Making different kinds of hardware do what you want to do is difficult.
- Making it do several things at once is even more difficult.
- At the most primitive level, an OS is a “multiplexer” for computer hardware.

Kernel vs. Userland

- Application programmers don't like working directly with hardware.
- A Kernel is designed to provide an "API" to access hardware resources securely.
- Applications are then written using that API, forming the "Userland".

The GNU Project

- Forms the bulk of any GNU/Linux's Userland.
- All the core system commands, the C/C++ compiler, File utilities etc. are part of the GNU project.
- You decide whether to call it Linux, or GNU/Linux...

Why Linux?

- It's free!
- It's free!
- It's portable
- It's secure
- It's reliable

Why not Linux?

- It's not Windows.
- There are too many distributions out there, can get perplexing to choose one.

The Boot Process

- BIOS selects Device.
- Master Boot Record of device selects partition.
- Bootloader (LILO/GRUB) loads kernel.
- Kernel initializes, start first process: INIT.
- INIT executes startup items, presents login.

Now What?

- Console and Graphics (X11) modes.
- We'll deal with the console, and consequently our "shell" for this session.
- BASH is the default on most systems.

Moving Around

- `ls`
- `cd`
- `pwd`
- `mv`
- `rm`
- `exit`

Need Help?

- Please read the man pages!
- `man <command>`, `whatis <command>`
- Want to search? `apropos`
- Manual divided into 9 sections: User Commands, System Calls, Libraries, Devices, File formats, Games, Misc., Sysadmin, Kernel

The Filesystem

- “In UNIX, everything is a file. If something is not a file, it’s a process”
- Directories, Devices, Links, Sockets, Pipes.
- `ls -l: -, d, c, l, s, p, b`

Partitions

- Boot
- Root
- Swap

The / Directory

- /bin, /sbin,
- /dev, /proc
- /home, /root
- /mnt, /tmp
- /etc, /lib, /boot
- /opt, /usr, /var

File Storage

- Owner, Group owner.
- File type.
- Permissions.
- Date and time of creation, modification.
- Number of links to the file.
- File size & Physical location.

Permissions

- File-level permissions.
- Every file has an owner and group associated to it.
- Permission parameters are read, write & execute.
- Permute with Owner, Group and World.

Permission Modification

- `chmod`
- `chown`
- `chgrp`
- `umask`

Environment Variables

- The Shell's way of remembering things.
- \$PATH
- \$HOME
- \$SHELL
- \$USER
- \$EDITOR

Path Finding

- Use the `which` command to see which executable you're running.
- Relative & Absolute paths.
- `find` and `locate`

More Tools!

- file
- grep
- less & more
- head & tail

Processes

- Interactive
- Automatic
- Daemons
- Process ID, Parent Process ID, Niceness, TTY, Owner and Group
- `ps`, `top`, `pstree`

Coming Up

Advanced Linux Usage

Text Editing

Installation & Configuration

Deploying a LAMP stack

Web Development Tutorials

<http://foss.mnit.ac.in/>

Thank You!