



Linux basics

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Agenda

- History
- Linux vs. Windows
- The Kernel
- Console
- Filesystem & FHS
- Path
- Commands
- Permissions
- Vi editor

History

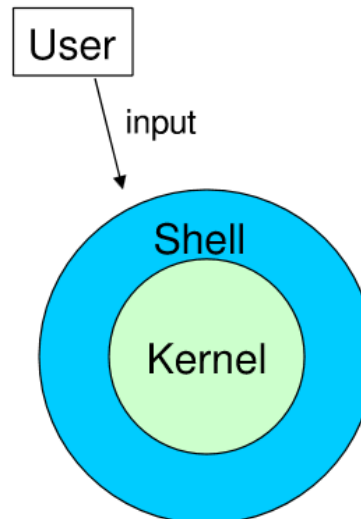
- First version of Unix was created in Bell Labs in 1969
- Thereafter many Unix flavors emerged with its new name, IBM – AIX, HP-UX etc..
- Linus Torvald, a Finnish college student in 1991 created Linux kernel
- And when Linux kernel combined with GNU applications, complete free UNIX-like OS possible
- It is open source development model – Free software!
- Various Linux distribution – RHEL, Fedora, CentOS, SUSE, Ubuntu, Debian, Kali Linux

Linux vs. Windows

- Practical differences
 - Directory structure
 - Case sensitivity
 - Backslashes vs. Forward slashes
 - No Drive letters – Its all under /
 - You can delete or modify open files
- Comparison chart available on - http://www.diffen.com/difference/Linux_vs_Windows

The Kernel

- The primary part of Operating system
- Most important responsibilities – Process/Memory/File/IO Management
- On hard disk, it is represented by file /vmlinuz
- Kernel & Shell



Linux Distribution

- A Linux distribution (often abbreviated as distro) is an operating system made from a software collection, which is based upon the Linux kernel and, often, a package management system.
- **Fedora** is the main project, and it's a community-based, free distro focused on quick releases of new features and functionality.
- **Redhat** is the corporate version based on the progress of that project, and it has slower releases, comes with support, and isn't free.
- **CentOS** is basically the community version of Redhat. So it's pretty much identical, but it is free and support comes from the community as opposed to Redhat itself.

Linux Distribution



- Run by Redhat (company)
- Community driven
- Focused on quick releases (~6 Months)
- Stresses features and functionality
- Free



- Based on Fedora
- Run by Redhat (company)
- Released corporately by Redhat
- Focused on long releases for stability
- Stresses stability over features
- Commercial (non-free)



- Based off of commercial releases of Redhat (distro)
- Run by the community
- Basically Redhat without the cost or support

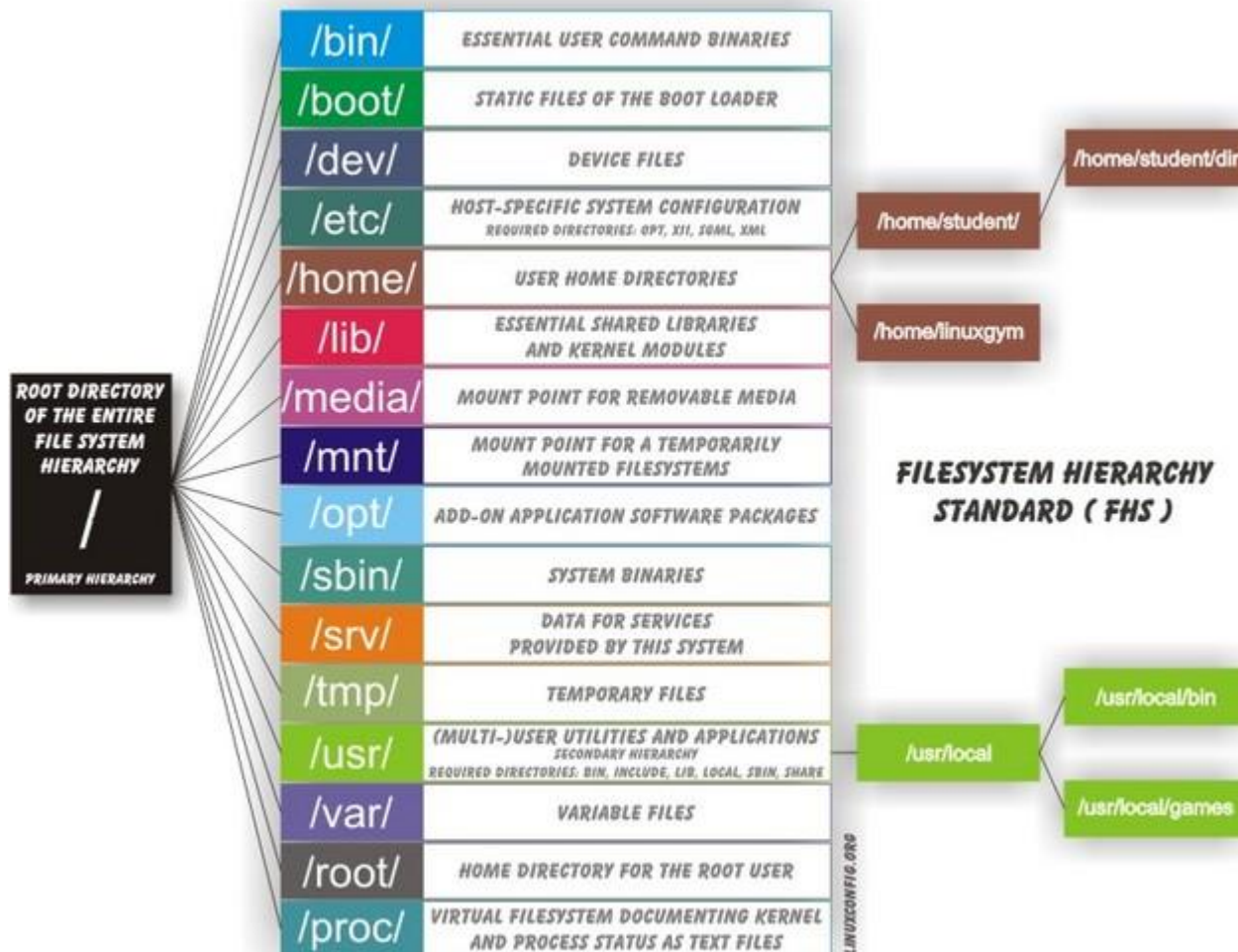
Console

- In simple term – Where we see boot messages and login prompt
- Multiple virtual consoles
 - tty1
 - tty2
 - tty3
 - tty4..

Filesystem

- Used to control how data is stored and retrieved
- Linux file system – ext2, ext3
- Windows filesystem – FAT, FAT32, NTFS
- Network filesystem – Samba, NFS
- Filesystem Hierarchy Standard (FHS)
 - Defines main directories and their contents in most Linux based systems

Linux FHS



Few Commands

- Linux commands syntax – <command> [options] [arguments]
- Getting help in Linux – man, info, <cmd> --help
- File handling cmds – ls, cd, mkdir, pwd, cp, mv, rm find, history, cat, less, head, tail
- System administration cmds – chmod, chown, su, useradd, passwd
- Network cmds – ping, ifconfig, service, ssh, scp
- Miscellaneous cmds – ps, kill, tar, zip, unzip, mount, umount, du, df, reboot, shutdown

Grep Command

- Linux like operating system provides a searching tool known as grep (global regular expression print).
- grep command is useful for searching the content of one more files based on the pattern.
- A pattern may be a single character, bunch of characters, single word or a sentence..

Syntax:

The syntax for the grep command is:

```
grep [options] pattern [files]
```

Options of Grep

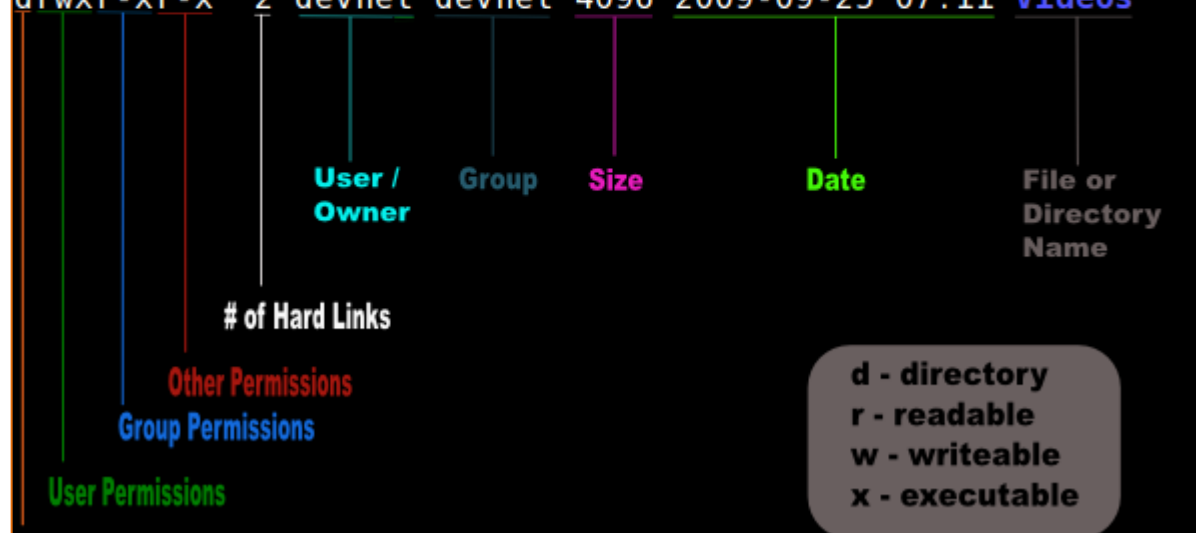
Option	Description
-b	Display the block number at the beginning of each line.
-c	Display the number of matched lines.
-h	Display the matched lines, but do not display the filenames.
-i	Ignore case sensitivity.
-l	Display the filenames, but do not display the matched lines.
-n	Display the matched lines and their line numbers.
-s	Silent mode.
-v	Display all lines that do NOT match.
-w	Match whole word.

File Operations

- We can perform number of operations on files in linux, few of which are stated as below:
- mkdir : use to make a directory.
- rm: Remove/delete a file(s) or directories(s).
- rmdir: Remove an empty directory
- mv: Move a file or a directory to a new location or rename a file/directory.
- touch: This command is used to create empty files, simply do touch file_name. It is also used to update the timestamps on files
- cp: Copy a file
- file: Attempts to find out what type of file it is

Permissions

```
devnet@lostlap ~ $ ls -l
total 32
drwxr-xr-x  4 devnet devnet 4096 2009-09-28 05:13 Desktop
drwxr-xr-x  6 devnet devnet 4096 2009-09-25 07:23 Documents
drwxr-xr-x 49 devnet devnet 4096 2009-09-25 07:23 Music
drwxr-xr-x  2 devnet devnet 4096 2009-09-25 07:11 Network
drwxr-xr-x  2 devnet devnet 4096 2009-09-25 07:04 Pictures
drwxr-xr-x  2 devnet devnet 4096 2009-09-25 07:11 Public
drwxr-xr-x  2 devnet devnet 4096 2009-09-25 07:11 Templates
drwxr-xr-x  2 devnet devnet 4096 2009-09-25 07:11 Videos
```



File Type

User / Owner

Group

Size

Date

File or Directory Name

of Hard Links

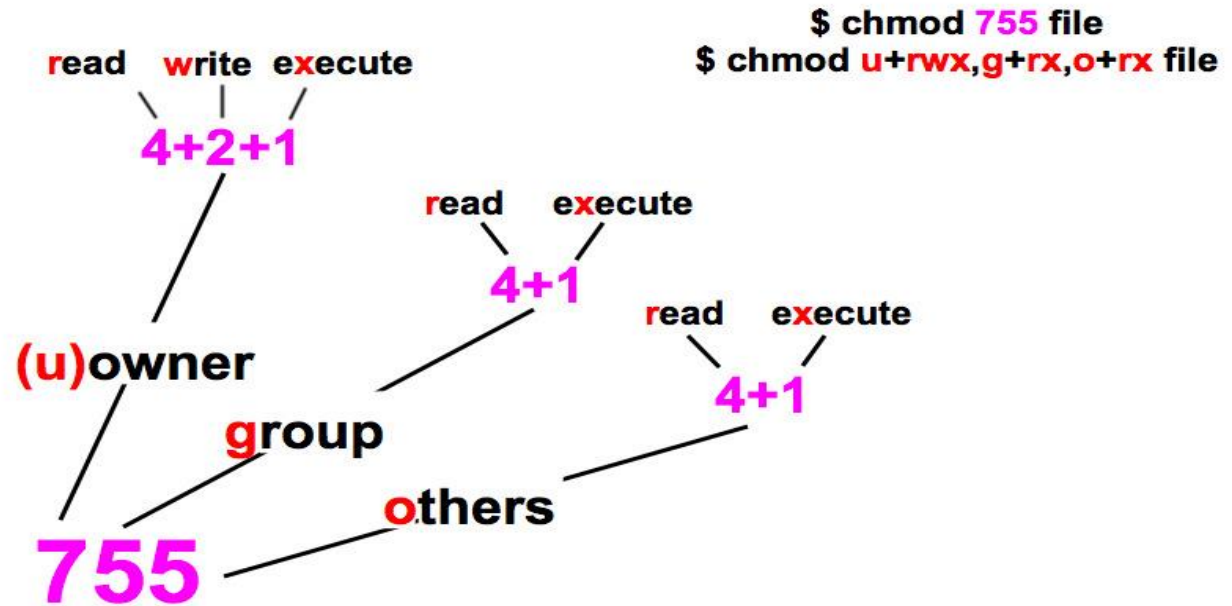
User Permissions

Group Permissions

Other Permissions

d - directory
r - readable
w - writeable
x - executable

Permissions..



Vi Editor

- vi is a “visual editor”, standard Linux and Unix editor
- vim: the “vi improved” editor
- vi command invokes vim
- To start vim: vi <filename>
- file will be opened, if it exists
- vi creates file when the edits are saved for the first time, if it doesn't exist

Three modes of Vi

- Command mode
 - Cursor movement
 - Change, delete, yank, put, search
- Insert mode
 - Type in new text
 - Return to command mode with <ESC>
- ex mode
 - Configuring, exiting, saving
 - Search and replace

Command Mode

- Cursor Movement : Use arrow keys or

H	L	K	J
Left	Right	Up	Down

- Change, delete and copy (yank)

	Change	Delete	Copy
Line	cc	dd	yy
Letter	cl	dl	yl
Word	cw	dw	yw

Put (paste) & Undoing Changes

- Use p or P to put (paste)
- For line oriented data:
 - p puts the data below the current line
 - P puts the data above the current line
- For character oriented data:
 - p puts the data after the cursor
 - P puts the data before the cursor
- u undo most recent change
- U undo all changes to the current line since the cursor landed on the line
- <Ctrl-r> redo last “undone” change

Searching for Text & Some Tricks

- `/<keyword>` search downwards for “<keyword>”
- `? <keyword>` search upwards for “<keyword>”
- `n` continue search in the same direction
- `N` continue search in the opposite direction
- `dts` delete from cursor to the letter s (it does not span lines)
- `2dd` delete two lines
- `x` delete a character
- `rx` replace a character with x
- `R` replace character-for-character until <esc>
- `G` End of file
- `10G` 10th line of file

Insert Mode

- a append after the cursor
- i insert before the cursor
- o open a line below
- A append to end of line
- I insert at beginning of line
- O open a line above
- <Esc> Leaving Insert Mode

Saving and Exiting: ex mode

	Save changes	Abandon changes
Exit	:wq	:q or q!
Do not exit	:w	:e!
Forcing changes		
Exit	:wq!	
Do not exit	:w!	

A close-up photograph of two people shaking hands. The person on the right is wearing a white shirt and a silver metal watch. The background is blurred, showing what appears to be an office setting with orange and white elements.

Thank you!