Introduction to Linux Concepts

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Agenda:

- What is Linux ?
- Linux Distributions
- Directory Structure
- Shell
- Linux Commands Syntax
  - ✓ File Handling Commands
  - ✓ Text Processing Commands
  - ✓ System Administration
  - ✓ Advanced Commands
- Text Editors
- Vi Editor
- Pattern Matching
- Shell Scripting
- Environment Variables

What is Linux ?

- FOSS - Free Open Source Software
- Unix-type operating system developed under the GNU General Public License
- Open source
- Popular
- Multi-user, Multitasking, Multiprocessor
- Why is it famous?
  - ✓ Linux Provides Security
  - ✓ Linux is Virus Free
  - ✓ Supports Multiple Hardware Platforms

Linux Distributions

- Ubuntu
- CentOS
- Red Hat
- Fedora
- Mandrake
- Debian
- Etc…

Kernel

- Core of an operating system
- Interacts with the hardware
- First program to get loaded when the system starts and runs till the session gets terminated

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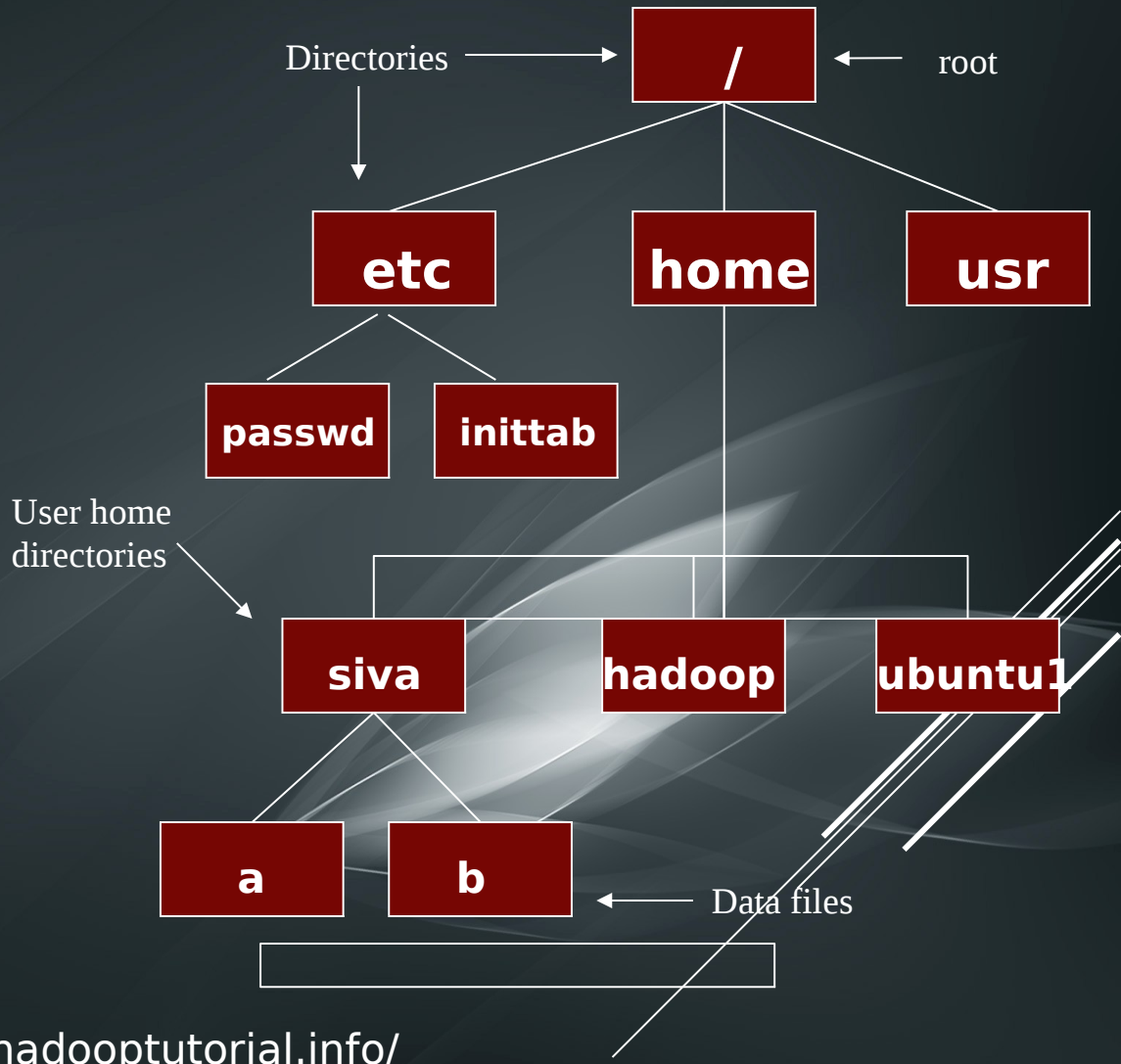
LFS Directory Structure

- Linux files are stored in a single rooted, hierarchical file system
- Files are stored in directories (folders)
- If you omit the leading / then path name is relative to the current working directory

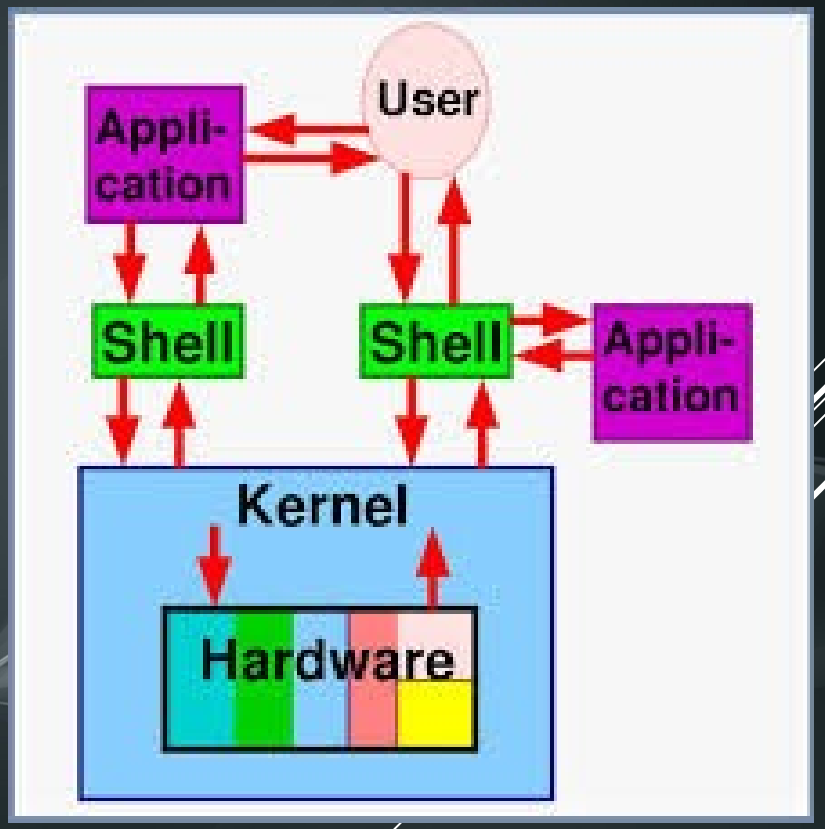


LFS Directory Structure (Contd…)

- **/bin** System binaries, including the command shell
- **/boot** Boot-up routines
- **/dev** Device files for all your peripherals
- **/etc** System configuration files
- **/home** User directories
- **/lib** Shared libraries and modules
- **/lost+found** Lost-cluster files, recovered from a disk-check
- **/mnt** Mounted file-systems
- **/opt** Optional software
- **/proc** Kernel-processes pseudo file-system
- **/root** Administrator’s home directory
- **/sbin** System administration binaries
- **/usr** User-oriented software
- **/var** Various other files: mail, spooling and logging

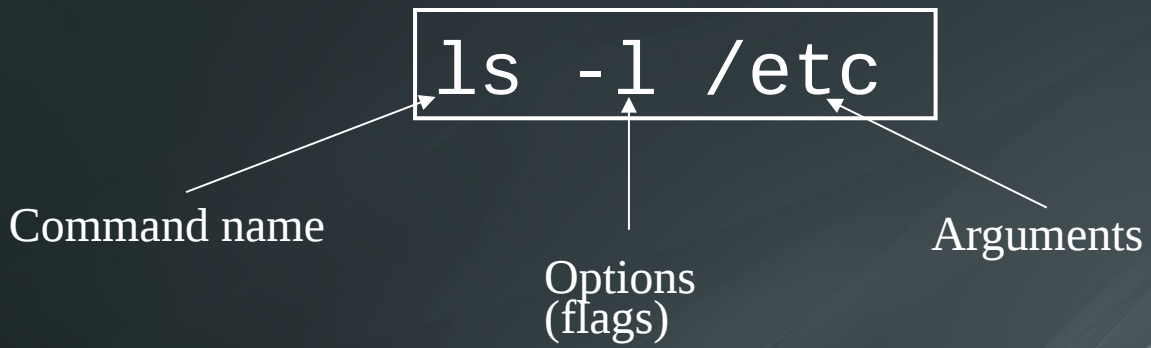
Shell

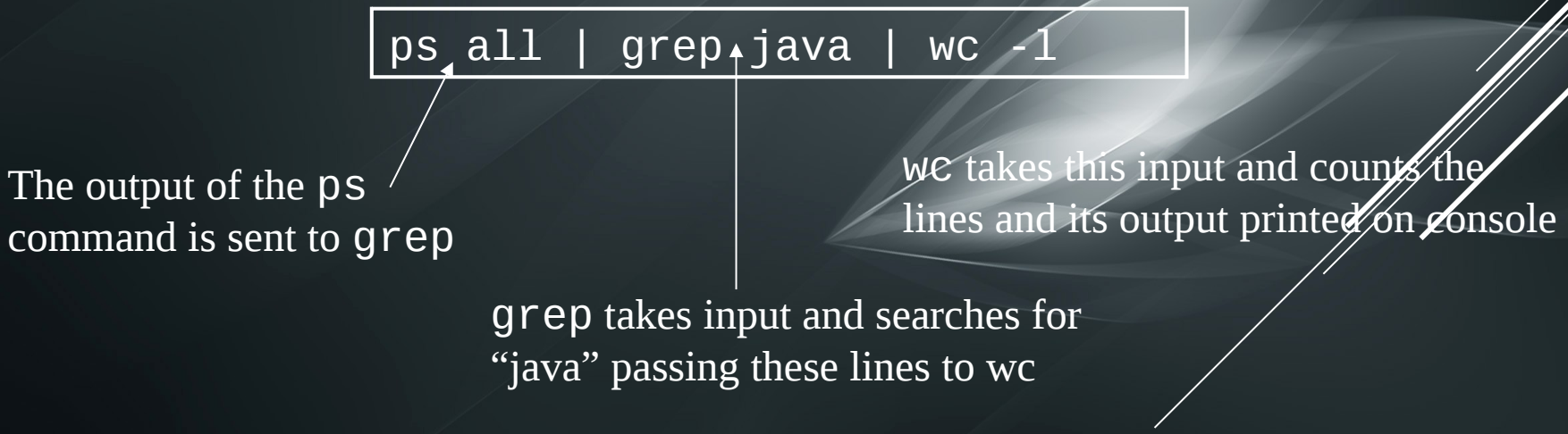
- Command Line Interpreter
- Bridge between kernel and the user
- Types
  - ✓ SH – Simple Shell
  - ✓ BASH – Bourne Again Shell
  - ✓ KSH – Korne Shell
  - ✓ CSH – C Shell
- Bash is the default Shell Type



Linux Command Basics

- To execute a command, type its name and arguments at the command line





Linux Commands Types

- File Handling
- Text Processing
- System Administration
- Process Management
- Archival
- Network
- File Systems
- Advanced Commands

File Handling Commands

- mkdir - creating directory
  - mkdir dirname
- rmdir – removing directory and its contents
  - rmdir dirname
- cd – Change directory
  - cd dirpath
- cp – Copying files
  - cp file1 file2
- mv – Moving or renaming files
  - mv oldfile newfile
- ls – list directory contents
  - ls –[altr] dir_path
    - ls – Lists all files in a directory
    - ls –a – Lists all files (including hidden files)
    - ls –l – Lists files in a directory along with owner information, permission etc
- ln – Creating links between files
  - ln file1 file2

File Handling commands (Contd…)

- find – search for files in a directory hierarchy
  - find . -name "*.java“
- rmdir – removing directory and its contents
  - rmdir dirname
- rm – remove files
- history – prints recently used commands
- pwd – prints name of current working directory
- Viewing users, processes
  - who – List all Users
  - who am I – List the current user
  - pstree – displays all processes running in the system in tree format
  - ps – displays processes owned by the current user
- Help commands
  - man, pinfo, info (man <cmd name>)

Text Processing

- cat – concatenate files and print on the standard output
  - cat file1.txt file2.txt
- echo – display a line of text
  - echo “I like Hadoop”
- grep - prints lines matching a pattern
  - grep PATTERN FILE
- wc - prints the number of newlines, words, and bytes in files
  - wc – l □ no of lines
  - wc – w □ no of words
  - wc – c □ no of characters

System Administration

- chmod – change file access permissions
  - chmod 744 calculate.sh
  - $chmod u+x file.txt – Gives execution permission to the owner of the file

Owner/user – Who creates a file
Group – Collection of users
Others – Apart from the user and the users in a group

Permissions	Value
Read	4
Write	2
Execute	1

-rwxrwxrwx – All permissions given for a file
drwxrwxrwx – All permissions given for a directory

chmod 777 file //gives all permission (r,w,x) for a file

- chown – change file owner and group
  - chown siva myfile.txt

Advanced Commands

- su – change user ID or become super user
  - su siva, su
- passwd – update a user's authentication tokens(s)
  - su siva, su
  - passwd
- who – show who is logged on
- df (display filesystem): Displays how much disk space on every mounted partition that is occupied.
  - df -h uses MB and GB instead of blocks
- du (directory usage): Displays how much space a given directory plus all of its subdirectories uses.
- reboot – reboot the system
- poweroff – power off the system
- uname -a: Prints all information about your system
- ctrl+R - search for previously entered commands
- clear: Clear terminal screen
- export: Set an environment variable

Advanced Commands (Contd…)

- head: Output the first part of file
- tail: Output the last part of files
- touch: Change file timestamps
- tr: Translate, squeeze, and/or delete characters
- ifconfig: Configure a network interface
- kill: Stop a process from running
- netstat: Networking information
- scp: Secure copy (remote file copy)
- ssh: Secure Shell client (remote login program)
- wget: Retrieve web pages or files via HTTP, HTTPS or FTP
- which: Search the user's $path for a program file

Text Editors

- Vi
- Vim
- nano
- gEdit
- kWrite
- TextPad
- Emacs
- And more…

VI Editor

- Popular text editor
- Just type vi <<filename>> at the prompt and hit enter
- A new file will be opened
- Type the contents needed and save
- To save, press the Esc Key and then press : (colon) wq and then enter
- To quit with out saving Esc + : + q and then enter
- Navigation
  - Left - h
  - Down - j
  - Up - k
  - Right - l
  - Top of the screen – H (shift + h) //caps lock will not work
  - Middle of the screen – M (shift + m)
  - Bottom of the screen – L (shift + l)
  - $ - End Key, 0 – Home Key

Pattern Matching

- grep – GNU Regular Expression Processor
- Finds the words / patterns matching with the search and displays the line containing the patterns.
- Search is limited to a file

grep abc hello.txt

Finds the occurance of abc in hello.txt and displays the line in the screen

grep –i abc hello.txt – Ignores case. Will find Abc, ABC, aBc, aBC etc
grep –c abc hello.txt – Displays the count of matches
grep –n abc hello.txt – Displays the matching lines along with line number
grep –v abc hello.txt – Displays the lines that donot have t
abc

^a – Starts with a
a$ - Ends with a
a* - a followed by any number of characters
a..b – a separated by 2 characters and then followed by b

Shell Scripting

- Open a file with extension .sh using any editor
- We can type any number of commands
- Save the file
- Execute the file
  - sh file.sh
  - ./file.sh
- For Loop

```
for (( i=0; i<5; i++ ))
do
      Body of the loop
done
```

- If else condition

```
if [ condn ]
    then
elif [ condn ]
    then
else
fi
```

Environment variables

- The set command will display all the global functions written by the user
- The env command displays only the variables and not the functions
- We can reassign values for the variables either temporarily or permanently
- Temporary
  - export varname=value at the command prompt
- Permanent
  - export varname=value in .bashrc file at the root directory


Thank you...