

LINUX

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Roadmap

- What is Shell?
- What is kernel?
- Which Shell script?
- Fish vs. Fishing
- Basic Commands
- Vi and Emacs
- Q&A
- References

Linux Basics

Unix Architecture

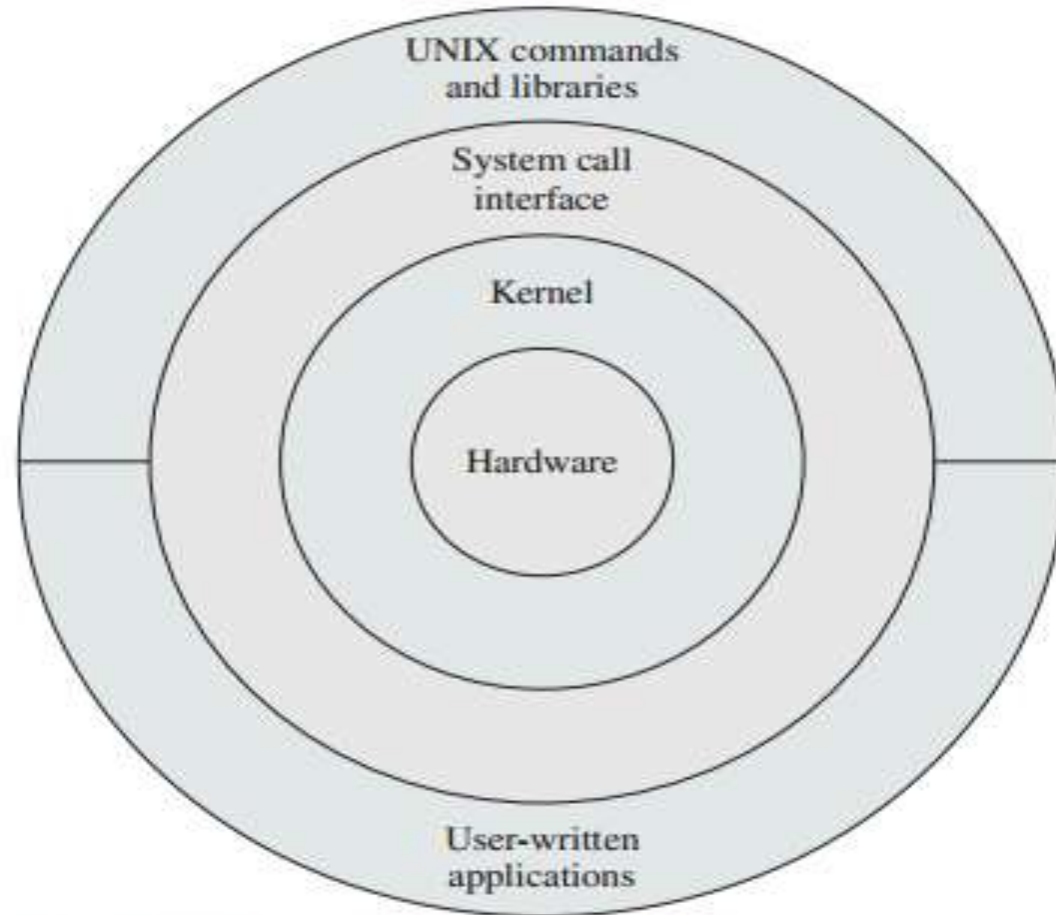


Figure 2.16 General UNIX Architecture

What is Linux ?

- Linux is a Unix-like operating system also called as A clone of Unix
- Linux is most-used open source operating system
- Developed in 1991 by Linus Torvalds.
- It was designed to provide personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive Unix systems.
- A multi-task and multi-user Operating System
- Consist of
 - Linux Kernel
 - GNU (GNU is Not Unix) Software
 - Software Package management
 - Others

Linux advantages

The main Advantages of Linux over other Operating system are

- Linux is an Open source operating systems
- Low cost
- Stability
- Performance. ...
- Flexibility. ...
- Compatibility. ...
- Security. ...
- Networking is efficient
- fast-performing system

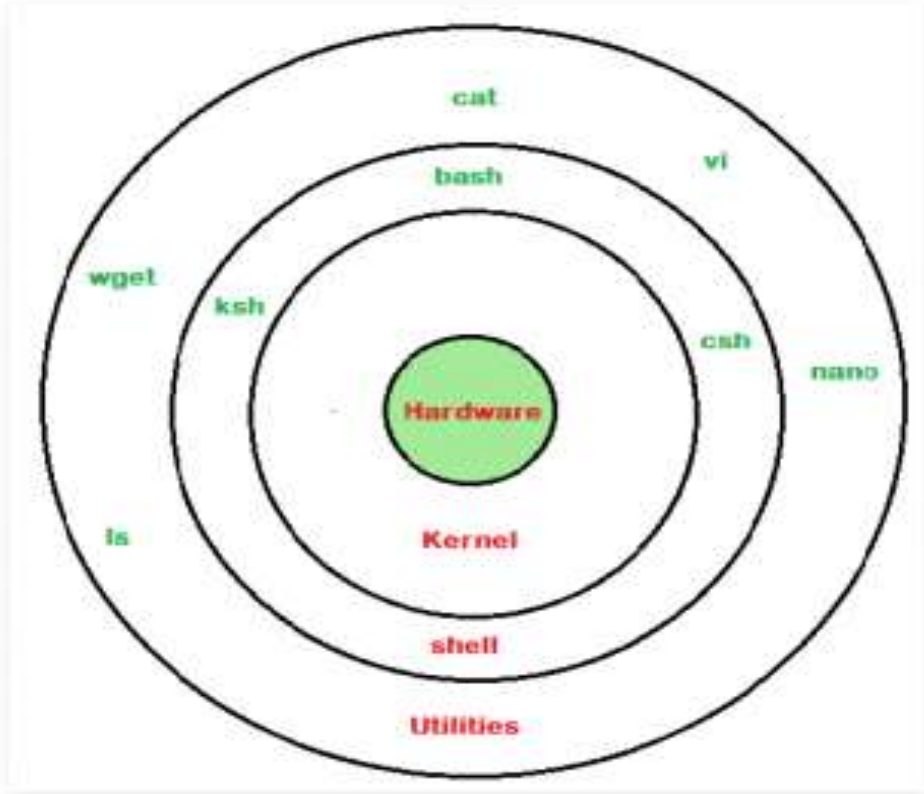
Linux disadvantages

- Its difficult to find applications to support your needs
- Finding Linux is drivers
- No standard desktop environment.
- Poor support for games.
- Desktop software is still rare.

SHELL

- A shell is special user program which provide an interface to user to use operating system services. Shell accept human readable commands from user and convert them into something which kernel can understand.
- It is a command language interpreter that execute commands read from input devices such as keyboards or from files.
- The shell gets started when the user logs in or start the terminal.
- Shell is broadly classified into two categories –
 - Command Line Shell
 - Graphical shell

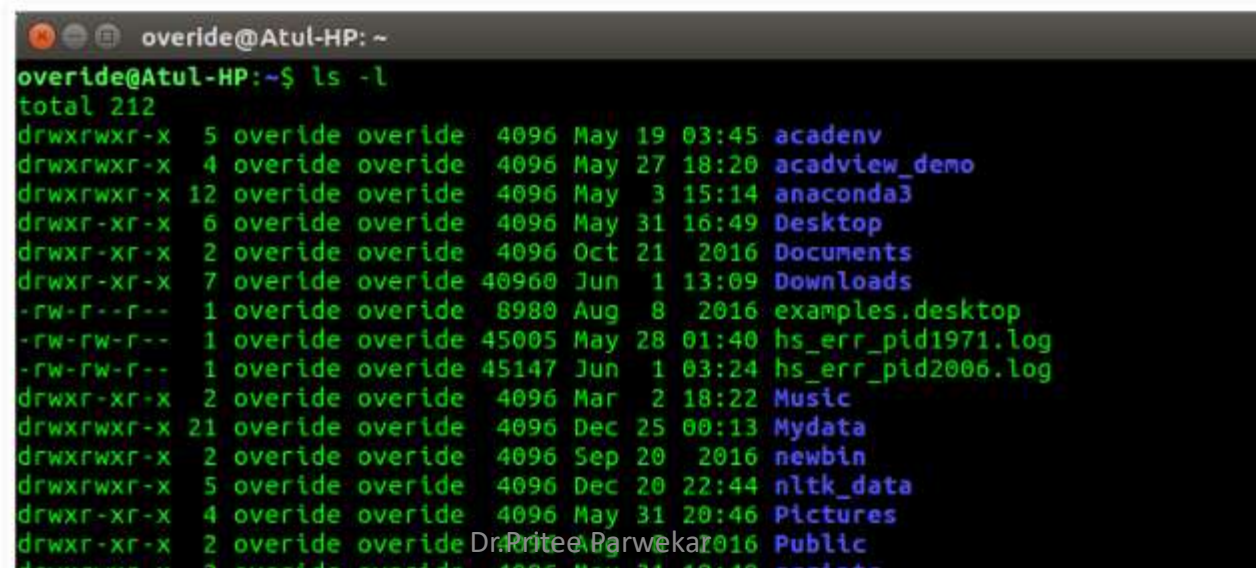
SHELL



linux shell

Command line Shell

- Shell can be accessed by user using a command line interface. A special program called **Terminal** in linux/macOS or **Command Prompt** in Windows OS is provided to type in the human readable commands such as “cat”, “ls” etc. and then it is being execute. The result is then displayed on the terminal to the user. A terminal in Ubuntu 16.4 system looks like this –



```
override@Atul-HP: ~  
override@Atul-HP:~$ ls -l  
total 212  
drwxrwxr-x  5 override override 4096 May 19 03:45 acadenv  
drwxrwxr-x  4 override override 4096 May 27 18:20 acadview_demo  
drwxrwxr-x 12 override override 4096 May  3 15:14 anaconda3  
drwxr-xr-x  6 override override 4096 May 31 16:49 Desktop  
drwxr-xr-x  2 override override 4096 Oct 21  2016 Documents  
drwxr-xr-x  7 override override 40960 Jun  1 13:09 Downloads  
-rw-r--r--  1 override override  8980 Aug  8  2016 examples.desktop  
-rw-rw-r--  1 override override 45005 May 28 01:40 hs_err_pid1971.log  
-rw-rw-r--  1 override override 45147 Jun  1 03:24 hs_err_pid2006.log  
drwxr-xr-x  2 override override  4096 Mar  2 18:22 Music  
drwxrwxr-x 21 override override  4096 Dec 25 00:13 Mydata  
drwxrwxr-x  2 override override  4096 Sep 20  2016 newbin  
drwxrwxr-x  5 override override  4096 Dec 20 22:44 nltk_data  
drwxr-xr-x  4 override override  4096 May 31 20:46 Pictures  
drwxr-xr-x  2 override override  4096 May 21 10:40 public
```

Graphical Shell

- Graphical shells provide means for manipulating programs based on graphical user interface (GUI), by allowing for operations such as opening, closing, moving and resizing windows, as well as switching focus between windows. Window OS or Ubuntu OS can be considered as good example which provide GUI to user for interacting with program. User do not need to type in command for every actions.

Shells in Linux

There are several shells available for Linux systems like –

- **BASH (Bourne Again SHell)** – It is most widely used shell in Linux systems. It is used as default login shell in Linux systems and in macOS. It can also be installed on Windows OS.
- **CSH (C SHell)** – The C shell's syntax and usage are very similar to the C programming language.
- **KSH (Korn SHell)** – The Korn Shell also was the base for the POSIX Shell standard specifications etc.

Each shell does the same job but understand different commands and provide different built in functions.

Shell Scripting

- Usually shells are interactive that mean, they accept command as input from users and execute them. However some time we want to execute a bunch of commands routinely, so we have type in all commands each time in terminal.
- As shell can also take commands as input from file we can write these commands in a file and can execute them in shell to avoid this repetitive work. These files are called Shell Scripts or Shell Programs. Shell scripts are similar to the batch file in MS-DOS. Each shell script is saved with .sh file extension eg. myscript.sh

A shell script comprises following elements –

- Shell Keywords – if, else, break etc.
- Shell commands – cd, ls, echo, pwd, touch etc.
- Functions
- Control flow – if..then..else, case and shell loops etc.

Why do we need shell scripts

- To avoid repetitive work and automation
- System admins use shell scripting for routine backups
- System monitoring
- Adding new functionality to the shell etc.

Advantages of shell scripts

- The command and syntax are exactly the same as those directly entered in command line, so programmer do not need to switch to entirely different syntax
- Writing shell scripts are much quicker
- Quick start
- Interactive debugging etc.

Disadvantages of shell scripts

- Prone to costly errors, a single mistake can change the command which might be harmful
- Slow execution speed
- Design flaws within the language syntax or implementation
- Not well suited for large and complex task
- Provide minimal data structure unlike other scripting languages. etc

KERNEL

The kernel is a computer program that is the core of a computer's operating system, with complete control over everything in the system. It manages following resources of the Linux system –

- File Management
- Process Management
- I/O Management
- Memory Management
- Device Management .. etc

Linus Torvalds has developed Linux kernel

Linux System = Kernel + GNU system utilities & Libraires + other Management scripts + installation scripts

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