Multics - Multi-plexed Information and Computer Service

UNICS - Uniplexed Information and Computer Service

JMS

Unit - V 7. Linux Operating System

Rise of Linux 1990-Prod

History of Linux

In 1960, a special OS Multics was developed at AT and T laboratories, then in 1969 ken Thompson & Dennis Ritchie developed UNIX OS by wing features of Multics OS. In 1973, it was rewritten by Dennis in C. The first version freely distributed to Berkeley & California University Barkeley, after making some changes, released own version by BSD. After it UNIX gone through many changes and new version released.

Multi user - Multi tasking

Andrew Tanenbaum developed educational version of Unix called Minimx and distributed it among students. Then it modified by LINUS Troralds make pc version of minim and named LINUX. Its basic services are email, networking, web browser etc.

History of Unix

In early 1960, when researches from General Electric carried out special projects of OS, Multics. It was multiuser time sharing OS. Ken Thompson and Dennis Ritchie developed Unix OS based on Multics in 1969. It was distributed free to computer science deptt. It generates a lot of interest in world. Educational version of Unix called minix was developed. Basic feature, email, networking etc.

SLIP - Serial Line Internet Protocol
PPP - Point to Point Protocol

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Overview of Linux (Characteristics)

The main features of Linux are as follows:-

i> Full Multitasking:- It is a multitasking system, allows many users to run many programs simultaneously.

ii> X Window System:- It is de facto industry standard graphics system for Unix.

iii> TCP/IP Support:- It is a set of protocol that links millions of university and businesses into as Internet.

iv> Virtual Memory and Shared Libraries:- It uses the portion of drive as virtual memory to expand available size of RAM and also implement shared libraries.

Disad.
i) Not user friendly
ii) Not easy to learn
iii) No standard official

v> GNU Software Support:- It supports a wide range of free software written by GNU project.

vi> Cheaper:- It is free available on Internet.

vii> Performance:- It provides high performance on networks and workstation.

viii> Security:- It is flexible file access prevent it by unwanted viruses.

Structures of Linux

Linux can devided into three basic components :-

i> Kernal :- It is the core of OS. It is the main program in the system that helps to run applications and manage hardware. When the system is booted and is loaded into memory, communicates directly with hardware. The application program to access the kernal through system calls.

iv> Shell (interface b/w user & kernal)
v> File System
vi> User Space (applicat, user command)
vii> Hardware

ii> System Libraries :- It defines a standard set of functions through which applications can interact with kernal which implement OS functionality.

iii> System Utilities :- The programs that performs individual and specialized management tasks. Some utilities invoked once and others may run permanently. The Linux system uses a variety of mode programs like system utilities and user utilities.
Ex- file managent & system managent utility.

Linux Releases

It is a set of files for a complete Linux system. There are identified by numbers. These numbers are in form of X.YY.ZZ, where X lies between 0 to 9, YY & ZZ in 0 to 99. The higher the number the newer is the release.

A release consists of different components called series of disk. Each series is reffered by its names.

Some of releases of Linux are:-

i> The Red Hat software Inc. Release

ii> Slackware

iii> The softlanding Linux system Release

iv> Trans- Ameritech

v> Yaggdrasil Plug and play Linux

Linux System Requirements

The following hardware requirements to install Linux on computer:-

i> Processor:- It supports all versions of Pentium processor.

ii> Mother Board:- It supports all standard buses.

iii> RAM:- It need 16MB of RAM for better performance

iv> Hard Disk:- It requires only 250MB of free disk space

v> Network Adapter:- In client-server architecture, it needs for server and client.

Linux Comands and Filters

i> pwd:- The print working directory command prints the current location on which works executed.

Syntax:
pwd

ii) cd :- The change directory command changes the current directory.

Syntax

cd <dirname>

iii) mkdir :- The make directory command makes a new directory in the system.

Syntax

mkdir <dirname>

iv) rmdir :- This command is used to delete directory. (remove)

Syntax

rmdir <dirname>

v) ls :- The list command shows full list of directory.

Syntax

ls

vi) rm :- The remove command is used to remove a file, permanently.

Syntax

rm <filename>

vii) cp :- The copy command is used to copy a file or directory.

Syntax

cp <existing file name> <new file name>

viii) mv :- The move command moves directory on file system.

Syntax

mv [options] [-T] source destination

File & Directory Commands

ix) head :- The head command displays starting content of file.

10 line

Syntax

head <file name>

x) tail :- The tail commands displays last line of file.

line

Syntax

tail < filename>

xi) cat :- The cat command displays content of file.

Syntax

cat <file name>

xii) cut :- The cut command selects a specific column of file.

view
edit

Syntax

cut -d (delimiter) -f (column Number) < filename>

xiii) grep :- The global regular expression print command filters the content of file.

Syntax

grep [options] [search term] filename

xiv) wc :- The word count commands helps in counting words, lines in a file.

Syntax

wc < filename>

xv) sort :- The sort command sorts the file content in alphabetical order.

Syntax sort < filename>

xvii) date :- The date command displays time and date.

Syntax

date

xviii) who :- The who command gives information about users logged on to system.

Syntax

who

xviii) pr :- This command paginates files for printing.

Syntax:

pr [option] .. [file] ...

xix) paste :- The paste command pastes the corresponds lines from each file.

Syntax

paste [option] .. [file] ..

xx) nl :- The number line commands numbers the line in file.

Syntax

nl [option] .. [file] ..

Ordinary

File ~~Search~~ Commands

x) Find :- The find commands is used for searching files.

Syntax:

find <pathname>

ii> Locate :- The locate command is used to search files quickly based on index.

Syntax:

locate <filename>

iii> Which :- The 'which' command is used to find path of a command.

Syntax:

which <ls>

Process Management Command

i> ps: The 'ps' comand shows the running process.

Syntax

ps

ii> top: The 'top' command shows real-time usage of resource

Syntax

top

iii> kill :- The 'kill' command terminates process by its ID

Syntax

kill <process ID>

iv> bg :- The 'bg' command resumes a suspended job in background.

Syntax

bg <%1>

v> fg :- The 'fg' command bring a background job to foreground.

Syntax

fg <%1>

VI - Editor

VI, emacs are the editors

The 'Visual Editor' is a powerful, terminal based text editor used on Unix or Linux system. It allows you to create, edit and modify text files directly from command line. It is fast, effecient and available by default on every Linux or Unix system.

Basic Concept of VI

It has two main concept:-

i) Normal Mode (default mode): It is default mode where you can move around the text and deleting or copying text.

'i' for insert

'Esc' for return

ii) Insert Mode: It is the mode where typing and editing of text is done.

How to Start VI

To open a file in VI, type

bash
copy code
vi filename

Basic commands in VI

Navigation in Normal Mode

- Arrow key: Move the cursor up, down etc.
- h: Move cursor ~~down~~ left
- J: Move cursor ~~up~~ down
- K: Move cursor up
- l: Move cursor right
- gg: Go to begning of file.

Editing Text (Insert Mode)

- i - Switch to insert mode before cursor
- I - Switch to insert at begning of current line.
- a - Switch to insert mode after cursor
- A - Switch to insert at end of current line
- o - Open a new line below the current line.
- O - open a new line above current line.

Saving and Editing

- Save the file
- or ZZ: Save and exit file
- Quit
- !: Quiz without saving change
- Save and Quit

Deleting Text

- x: Delete character under cursor
- dd: Delete entire current line
- d+movement: Delete text from curser's position up to specified movement.

Copying and Pasting Text

- yy: Copy the current line
- yw: Copy the current word
- p: Paste copied text after cursor
- P: Paste copied text before cursor

Undo and Redo

- u: Undo the last action
- Ctrl+r: Redo the last undone action

Uses of VI

- Fast and Efficient: It works entirely in the system so, it is fast and efficient.
- Powerful: It has many commands that allows for complex editing task.
- Always available: It's pre-installed on most Unix and Linux system so it's reliable.

Shell Script

A shell script is a file that contains a series of commands that are executed by a shell (Bash, Zshell). It allows to automate tasks in Unix and Linux system

It is a way to write a sequence of instructions for computer to follow. It is useful for task that need to be repeated or for automating complex processes.

Why Use Shell Scripts

i) Automation: Commands can write in a script and run at once.

ii) Efficiency: It saves time with re-use of commands.

iii) Task Scheduling: Run the script periodically for using 'cron' jobs.

iv) Customization: Writing scripts for managing file, system monitoring or software installation.

Q. Write a shell program to find average of three numbers

```
#!/bin/bash
echo "Enter three integers"
read a
read b
read c
sum=`expr $a + $b + $c`
avg=`expr $sum/3`
dec=`expr \($dec \* 1000\)/3`
echo "Sum= $sum"
echo "Average =$avg.$dec"
```

Output

```
Enter three integers
10
20
30
Sum = 60
Average = 20
```

Pipe :- The pipe is generally a connection between two or more process that are inter-related to each other.

It is a way used for Inter Process Communication using message passing. With the help of pipes, one process can easily send information such as output of one program which works as input to other.

Communication may be-

i> Single way or, ii> double way.