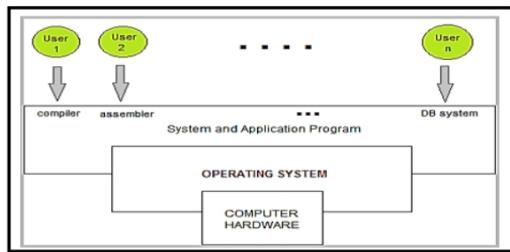


Introduction to OS



Operating systems (OS) provide the interface between a computer hardware and the applications that run on it



UNIX Fundamentals

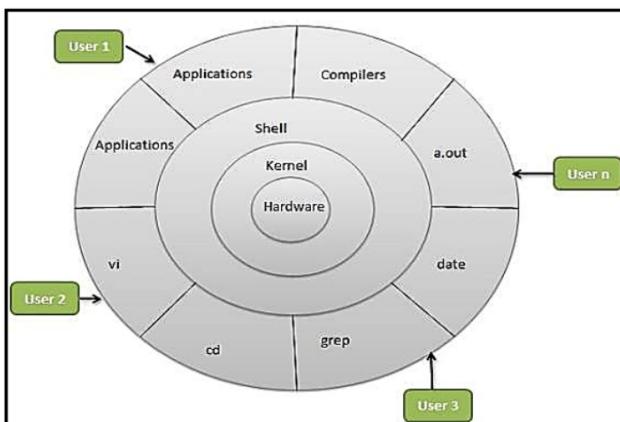


The UNIX System

- UNIX is a multi tasking and multi user Operating system
- It is more secured
- UNIX is distributed freely
- It is an open source software
- UNIX follows “Console - Terminal” architecture
 - Console has the processing capability and many ports
 - Terminals have monitors and keyboards but no processing capabilities
- The terminals are connected to the port of the console

UNIX Architecture

kernel- shell architecture



Kernel



It is the core of the operating system. It is a collection of routines mostly written in C, which is loaded into memory when system is booted

It communicates directly with the hardware

User programs that need to access the resources like hard disk or terminal uses the service provided by the kernel through functions called system calls

The kernel in turn communicates with the hardware

Features of Kernel



Manages the files on the disk

It manages processes (like scheduling, creation, termination) that may run on the system

It performs the memory management

It manages the system security

It manages the network

It manages the devices like I/O devices i.e. the monitor, keyboard, printer



Shell



It is the interface between the user and the kernel

It is a program written in C and Command interpreter

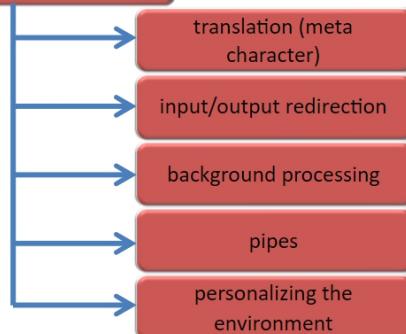
It is created when login authentication is successful and it executes until the login session is completed

It has programming capabilities

Shell



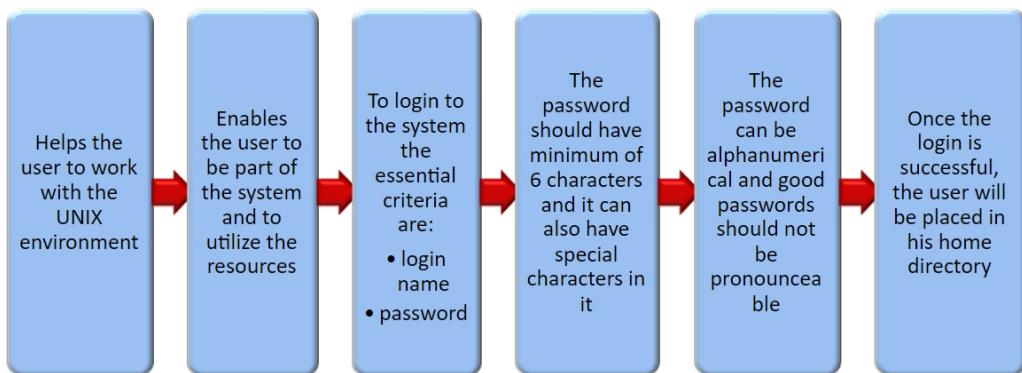
Services provided by shell:



Logging In and Out



Login:



Login



```
staff@MQSVR:~$ login as: staff
staff@192.168.100.181's password:
[staff@MQSVR ~]$
```

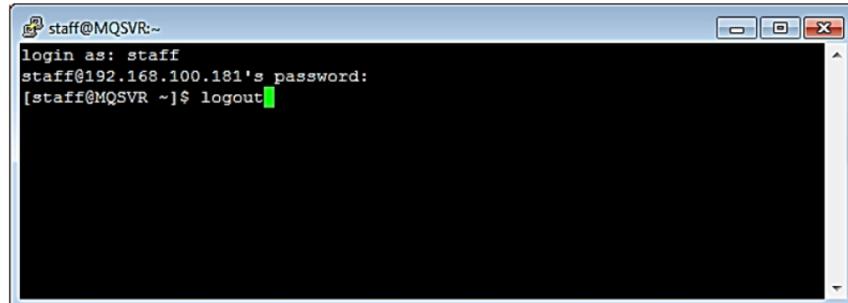
Once the login details are verified, the user is allowed to work in the system. When logged in, the user is presented with a prompt(\$ or #), which is the shell's way of requesting for a command

Logout



Logout:

- \$ ctrl + d
- \$ exit
- \$ logout (any of the 3 ways can be used by the user to log out from the system)



```
staff@MQSVR:~  
login as: staff  
staff@192.168.100.181's password:  
[staff@MQSVR ~]$ logout
```

Command



Command is a program that performs a particular task

Commands are case and space sensitive

syntax:

- command [option] [argument]

option:

- used to customize the output
- they are preceded with + or -

argument:

- These are inputs given to the command

Basic Commands



date

- used to print or set the system date and time

syntax :

- date [-option] [+format] [argument]

example:

- \$date prints the current date and time
- Mon Nov 20 13:40:03 IST 2017
- \$ date +%d
- 06

Options and format to explore:

- -r, --date, %b, %B, %d, %D, %m, %F, %H

Basic Commands



passwd

used to set or change the password of a user

Syntax:

\$ passwd

Basic Commands



Example for setting a new password

```
staff@MQSVR:~$ login as: staff
staff@192.168.100.181's password:
Last login: Mon Apr 23 10:43:27 2018 from 192.168.100.115
[staff@MQSVR ~]$ passwd
Changing password for user staff.
Changing password for staff.
(current) UNIX password:
New password:
Retype new password:
passwd: all authentication tokens updated successfully.
[staff@MQSVR ~]$
```

Basic Commands



cal

displays the calendar of specific month or year

Syntax

cal [-smjy13] [[month] year]

example:

\$ cal (displays the current month's calendar)

```
[tsc@oracle ~]$ cal
July 2009
Su Mo Tu We Th Fr Sa
      1  2  3  4
 5  6  7  8  9 10 11
12 13 14 15 16 17 18
19 20 21 22 23 24 25
26 27 28 29 30 31
```

Basic Commands



\$ cal 2000

- displays the year 2000 calendar. When one argument is given it is treated as the year

\$ cal 7 2009

- displays the calendar of month July of the year 2009

\$ cal -m 7 2009

- Displays the calendar of month July of the year 2009 having Monday as the first day of the week
- -m is the option and 7, 2009 are arguments

options to explore:

- -s, -m, -j, -y, -1, -3

Basic Commands



bc

- basic calculator
- when given bc, the command expects the input from the keyboard and prints the result
- To quit from the bc command, ctrl+d or quit is used

Example

- \$ bc
- 20 + 40
- 60
- ctrl+d
- \$

Basic Commands



dc

- dc is a reverse-polish desk calculator, which supports unlimited precision arithmetic
- A reverse-polish calculator stores numbers on a stack
- Entering a number pushes it on the stack
- Arithmetic operations pop arguments off the stack and push the results

options:

- p prints the top value of stack
- q quits from dc command

To explore:

- n, P, f,

```
tsc@oracle:~]$ dc
2
3
4
+
p
7
q
[tsc@oracle ~]$
```

Basic Commands



who

- shows information about all the users who have logged in
- it displays the name, date, time and terminal number of a user
- **Syntax :**
 - \$ who[option]
- **Example:**
 - \$ who
 - user1 pts/6 Jul 20 12:27 (192.168.40.182)
 - tsc pts/2 Jul 20 17:48 (192.168.40.146)
- **options to explore**
 - -u, -q, -H

Basic Commands



finger

The finger displays information about the users who have logged in
It displays the Name, Tty, Idle, Login Time, Office, Office Phone

syntax:

\$ finger

Example:

Login	Name	Tty	Idle	Login Time	Office	Office Phone
User1		pts/6	1:49	Jul 20 12:27	(192.168.40.182)	
tsc		pts/2		Jul 20 17:48	(192.168.40.146)	

Basic Commands



whoami

Prints the user name associated with the current effective user id

Syntax

\$ whoami

Example:

- \$ whoami
- tsc

Basic Commands



who am i

- displays the information about the current user
- displays the real user name, date, time and terminal number of a user

Syntax:

```
$ who am i
```

Example:

- \$ who am i
tsc pts/5 Jul 6 14:04 (192.168.40.146)

Basic Commands



tty

used to know the terminal number in which the user is connected

Syntax:

```
$ tty
```

Example:

- \$ tty
- /dev/pts/5

Basic Commands



df:

df displays the amount of disk space available on the Filesystem containing the given file name argument

If no file name is given, the space available on all currently mounted Filesystems is shown

Syntax :

options to explore:

```
$ df [options] [filename]
```

-H, -i

Basic Commands



man

- It is an online manual page used as a help for the UNIX commands
- **syntax:**
 - \$ man <command>

info

- It is another manual page for command help
- **syntax:**
 - \$ info < command>

Review



- cal - It displays calendar
- date - It displays current date and time in system
- clear - It clears the terminal screen
- df - It displays number of free disk blocks and files
- who am i - It gives information about currently logged in user
- whoami - It displays effective current user name
- who - It lists currently logged in users in a system
- man - It displays manual reference page for commands