

The world of operating systems is majorly divided into three parts, the windows ones, the macintosh ones and the unix based ones. Such is the importance and popularity of unix.

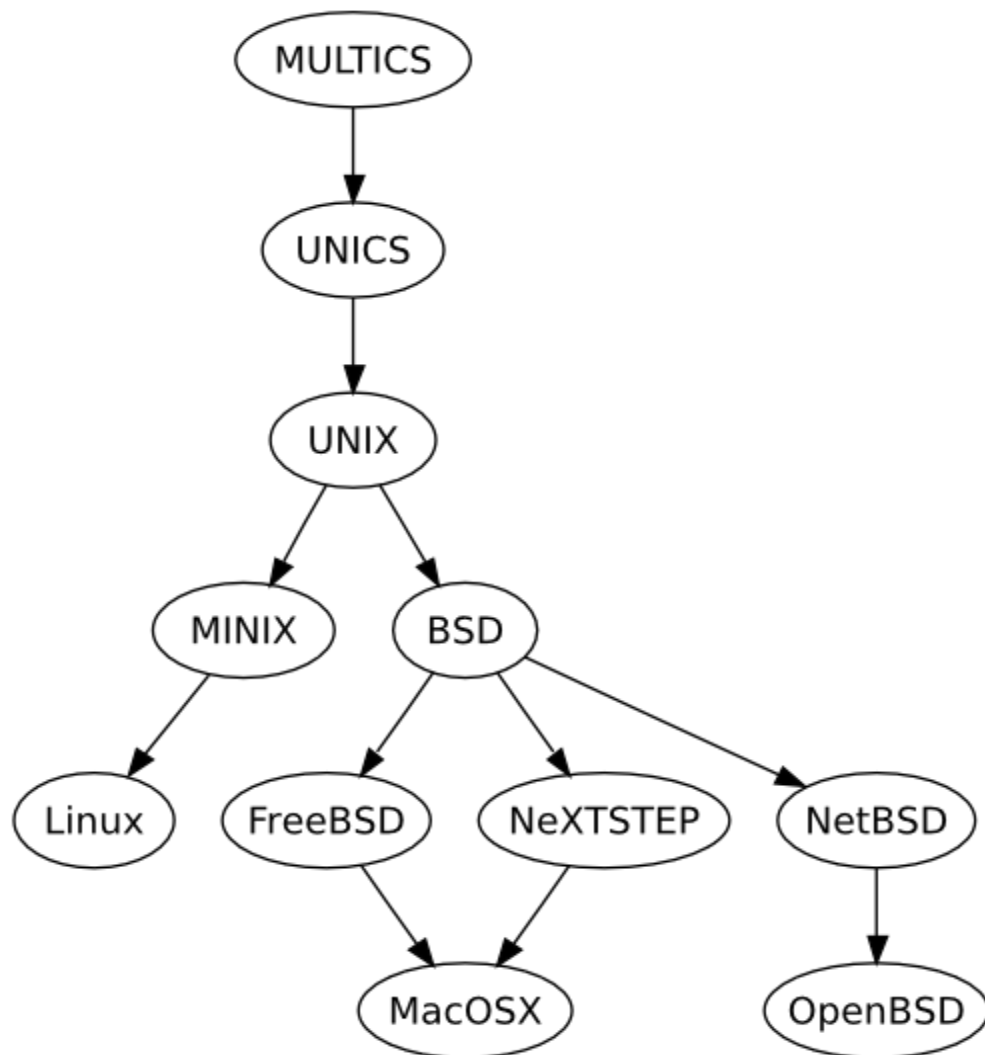
Unix is a portable, multitasking, multi user and time sharing operating system originally developed in 1969 by a group of employees at AT & T for using it internally in the facility. It was developed based on a philosophy that the power of the system comes from the relationships among the programs, rather than on the programs themselves. Ken Thompson, Dennis Ritchie, Brian Kernighan and Douglas McIlroy played the main role in development of the operating system.

HISTORY OF UNIX

In 1965 bell labs started a joint research operation to develop a perfect batch operating system with General Electric and MIT to create MultICS (Multiplexed Information Computing Service). In 1969 bell labs withdrew from the operation, but Ken Thompson along with Dennis Ritchie and a few others continued on with it until it became UNICS (Uniplexed Information and Computing Service). At the end of 1969 Unix was formally developed.

The first edition of Unix was released on November 3, 1971. And in 1973 the Unix which was previously written in assembly was completely rewritten in C language. In 1979 the seventh edition of Unix was released, the grandfather, that is from where all the current existent versions are derived. And from there various versions of Unix were developed

and released, with each version there was an addition of functionality and improvement in performance.



Unix was not designed to be portable or for multi tasking, it was basically designed for batch operating systems. But as the versions it increased it gained portability, time sharing and multi user capabilities. The Unix systems are characterized by a modular design called the "Unix philosophy".

UNIX PHILOSOPHY

The unix philosophy was originated by Ken Thompson, and it is a set of cultural norms and philosophical approach to minimalist, modular software development. It is based on the experience of leading developers of the Unix Operating System. Early Unix developers were important in bringing the concepts of modularity and reusability into software engineering, over time these concepts and norms became as important as the technology of Unix itself. And then it was termed as the Unix philosophy.

It emphasizes building simple, short, clear, modular and extensible code that can be maintained easily and repurposed whenever required.

The Unix philosophy originated because of the origination of the unix operating system, and it exists only because of the unix operating system.

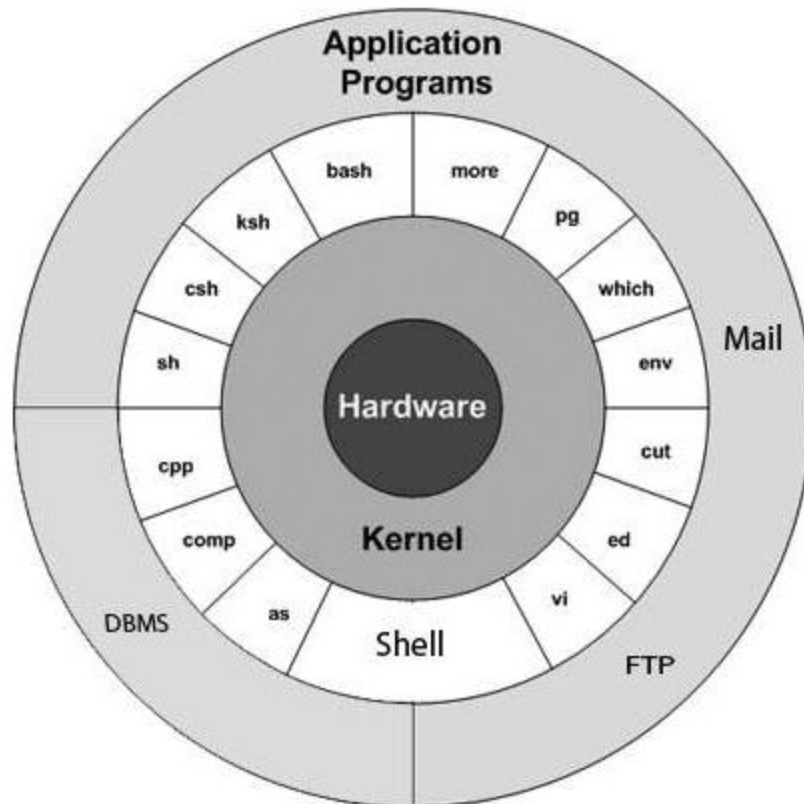
CHARACTERIZATION OF UNIX.

The unix developers focused on modularity, simplicity, portability and clarity in design. Along with the unix philosophy, unix can be characterized by

- 1.The use of files for data storage.
- 2.Using a hierarchical file system.
- 3.A large number of small programs, strung together through a command line interpreter.
- 4.Usage of shell scripts.
- 5.Avoiding captive user interfaces.
- 6.Usage of high level languages for operating systems.
- 7.Providing the facility of pipes and filters.
- 8.Existence of large number of utility programs.

ARCHITECTURE OF UNIX OPERATING SYSTEM.

The architecture of Unix operating system is divided into four layers. These are the 'Hardware', 'kernel', 'Shell' and 'application programs'.



HARDWARE: The hardware includes all the parts of the computer including clocks, timers, devices and parts. The task of the O.S is also to manage the hardware resources efficiently, the hardware section constitutes these parts.

KERNEL: The kernel could be called as the heart of the operating system, it interacts directly with the hardware. The kernel has a special device that

maintains a connection between the operating system and the system hardware. The kernel contains utilities along with the master control program. Kernel program has the power to start or stop a program and even handle the file system. The various tasks performed by the Kernel are...

- 1.Memory management.
- 2.Controlling access to the computer.
- 3.Maintaining the file system.
- 4.Handling interrupts.
- 5.Handling errors.
- 6.Performing input and output services.
- 7.Allocate the resources of the computer among the users.

The kernel could be called the main part of the operating system.

SHELL: The shell is a software program that acts as a mediator between the kernel and the user. It reads the commands, interprets them and sends a request to execute a program. The shell can also be called as the command interpreter. It contains nearly 100 system calls. System calls tell the kernel to carry out various tasks of the program, some of those are.

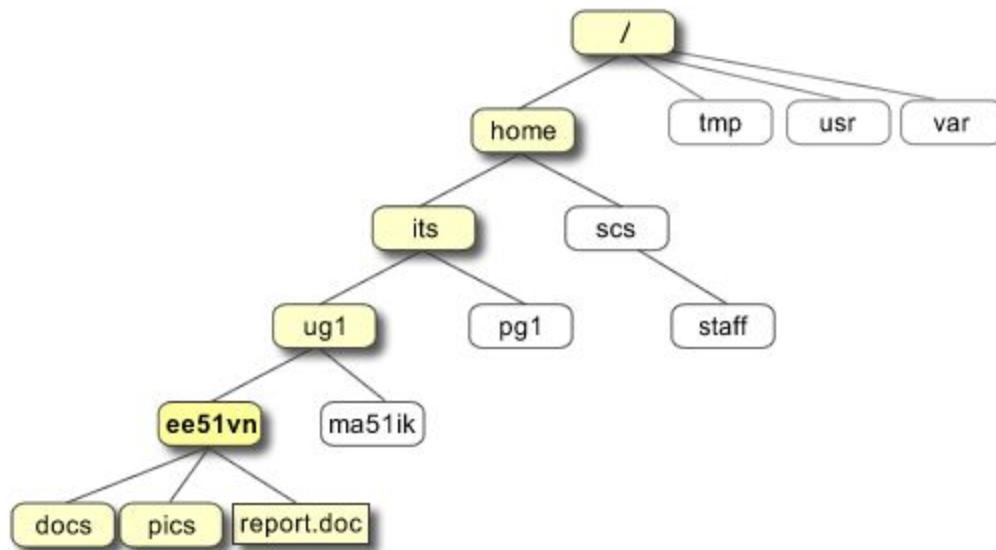
- 1.Opening a file.
- 2.Obtaining information about a file.
- 3.Executing programs.
- 4.Terminating programs.
- 5.Changing the priority of processes.
- 6.Getting the time and date.

The shell uses standard syntax for all commands. C shell, Bourne Shell and Korn Shell are some of the most famous shells available in Unix variants.

APPLICATION PROGRAMS/LIBRARIES: This layer includes user-written applications and libraries of Unix containing files and directories.

The directories in unix have name, path, files and folders. The rules of operation are as same as those of files. And these are stored in the up-side down hierarchical tree structure.

The files contain data, text and program instructions. They store user information like an image drawn or some content written, files are mostly stored under a directory.



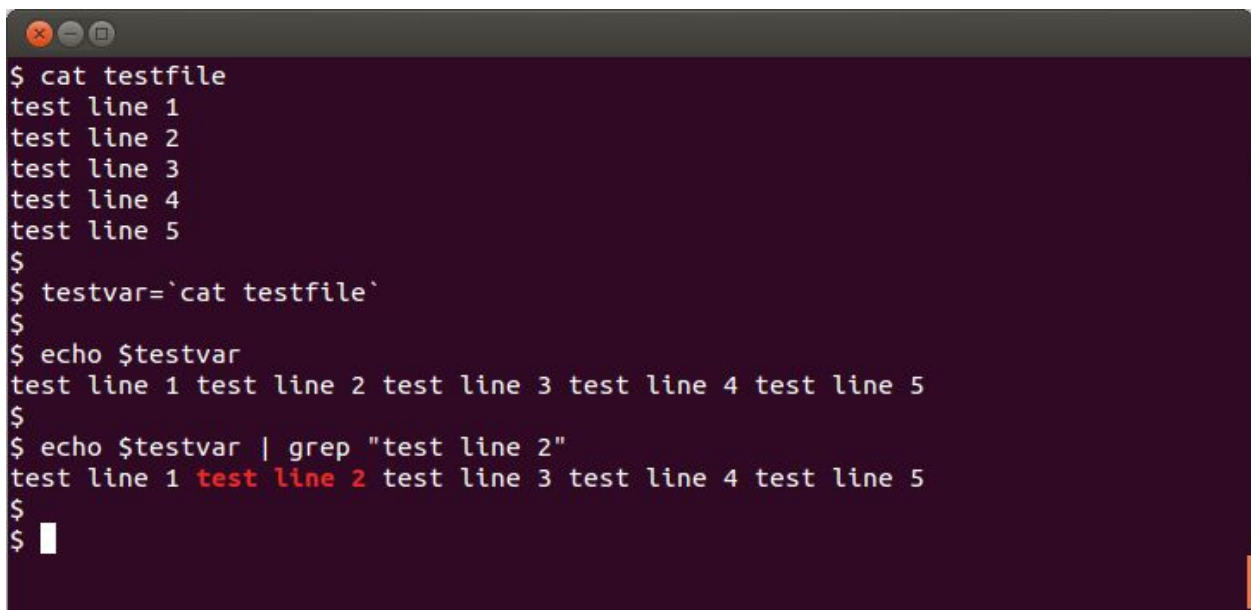
UNIX DIRECTORY STRUCTURE

In the overall operating system the kernel can be said as the heart of the operating system and it makes Unix more secure than the windows operating system.

COMMAND LINE INTERFACE OF UNIX:

Unix was basically developed as a command line interfaced operating system. In the later years it was modified to Graphical User Interface. Although there are a lot of versions of Unix that support graphical user interfaces, if we want to get the most of the Unix operating system the best way is to use a terminal.

In Unix the command line interface refers to a terminal. In Unix the terminal is the shell. When the shell is opened it provides you with a \$ sign prompt. This prompt means that the user can now enter the commands and get processed operations for each of them.

A screenshot of a Unix terminal window with a dark purple background. The window has standard Linux window controls (close, minimize, maximize) in the top-left corner. The terminal shows a series of commands and their outputs. The first command is 'cat testfile', which outputs five lines of 'test line' text. The second command is 'testvar=`cat testfile`', which assigns the output of 'cat testfile' to the variable 'testvar'. The third command is 'echo \$testvar', which outputs the contents of 'testvar'. The fourth command is 'echo \$testvar | grep "test line 2"', which uses 'grep' to filter the output of 'echo \$testvar' for the string 'test line 2'. The output shows 'test line 1 test line 2 test line 3 test line 4 test line 5' on the first line, and 'test line 1 test line 2 test line 3 test line 4 test line 5' on the second line, with 'test line 2' highlighted in red. The prompt '\$' is visible at the end of each line of input and output.

```
$ cat testfile
test line 1
test line 2
test line 3
test line 4
test line 5
$
$ testvar=`cat testfile`
$
$ echo $testvar
test line 1 test line 2 test line 3 test line 4 test line 5
$
$ echo $testvar | grep "test line 2"
test line 1 test line 2 test line 3 test line 4 test line 5
$
$
```

Some of the major and most used commands in Unix are...

- 1.Date- used to display the date.
- 2.Cd.. - move up one directory.
- 3.Cd directory - change to the sub directory of the current directory.
- 4.Cat file - display a file without stopping.

- 5.Chmod +w dir - changes permission of directory to allow others to write into it.
- 6.Df -k - shows the amount of room left on the hard drive.
- 7.Ls - lists files in the current directory.
- 8.Ls-a - lists files including hidden files.
- 9.Ls-l - lists files along with size, date, ownership and permissions.
10. Mkdir - creates a new directory.

Even though there are a number of GUI plugins available to get the maximum out of the operating system usage of the CLI is the best way.

DISTRIBUTIONS OF UNIX.

Unix was first developed in 1969 as a command line interface with astounding features for that generation. Due to its major security, functioning features, and high level code it stood different from others.

And the unix philosophy paved way for a world where operating systems are divided as unix based and non unix operating systems.

There are a number of operating systems that were developed with Unix as the base. That is Unix is the parent for a many major operating systems in today's world. Some of these Unix based operating systems are...

- 1.Solaris- by oracle corporation.
- 2.Darwin- by Apple inc and open source community.
- 3.AIX- by IBM corporation.
- 4.HP-UX- by Hewlett packard company.
- 5.FreeBSD- open source and FreeBSD license.
- 6.Xenix- Microsoft corporation.

7.macOS- Apple Inc.

A number of child operating systems were developed from the Unix operating system, the most famous of them

being the Macintosh, developed by the Apple Inc., the Macintosh today rules over half the digital world through its macOS and iOS, specifically for the Apple products.

UNIX AS A STANDARD.

Unix is simply not the name of an operating system. From the time it was released Unix was not only used to refer to an operating system. Unix had become a standard. The "Single Unix Specification" is a standard that was born from Unix, and even today it is used to measure the potentiality and power of other Unix distributions. The Unix standard includes a rich feature set, and its core volumes are simultaneously the IEEE Portable Operating System Interface (POSIX) Standard and the ISO/IEC 9945 standard. The latest version of the certification standard is UNIX V7, aligned with the Single UNIX specification Version 7, 2018 edition.

The Open Group Governing Board UNIX Systems Work Group sets the strategy and influences the direction for the evolution of the Single UNIX Specification.

UNIX-DRIVING INNOVATION TODAY

The Unix Operating System plays a big role in the current market landscape and is an enabler of technologies such as cloud computing, security,

virtualisation , mobility and more. It has proven a track record of adoption by Global 100 and Fortune 100 companies. The UNIX OS is a strong choice for verticals such as telecommunication, manufacturing, pharmaceuticals, financial services, government, healthcare, defense and more. For these end-user enterprises, procuring certified UNIX systems and software ensures the highest level of availability, scalability and maintainability.

CONCLUSION

As read so far UNIX is much more than a single operating system that is focussing on pushing the technological world forward with all its might, and communities. We conclude that UNIX is one of the most secure, powerful operating systems available and it has the potential to turn the world around if efficiently used.