Parts of Unix System
(Kernel), (Shell), (Tools and Apps)

UNIX Operating System

Submitted To:
RAMESH

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Contents

History

1970s

In the 1970s Brian Kernighan coined the project name *Unics* as a **play** on *Mastics*, (Multiplexed Information and Computing Service). Unics could eventually support multiple simultaneous users, and it was renamed *Unix*

History

1980s

AT&T licensed *UNIX System III*, based largely on Version 7, for commercial use, the first version launching in 1982. This also included support for the VAX. AT&T continued to issue licenses for older Unix versions. To end the confusion between all its differing internal versions, AT&T combined them into *UNIX System V* Release 1. This introduced a few features such as the *vi* editor and *curses* from the *Berkeley Software Distribution* of Unix developed at the *University of California, Berkeley*. This also included support for the *Western Electric 3B series* of machines.

History

1990s

In 1990, the **Open Software Foundation** released OSF/1, their standard Unix implementation, based on **Mach** and BSD. The Foundation was started in 1988 and was funded by several Unix-related companies that wished to counteract the collaboration of AT&T and Sun on SVR4. Subsequently, AT&T and another group of licensees formed the group "**UNIX International**" in order to counteract OSF. This escalation of conflict between competing vendors gave rise again to the phrase "Unix wars".

(Brief) History

2000s

In 2000, **SCO** sold its entire UNIX business and assets to Caldera Systems, which later on changed its name to **The SCO Group.**

The **dot-com bubble** (2001–2003) led to significant consolidation of versions of Unix. Of the many commercial variants of Unix that were born in the 1980s, only **Solaris, HP-UX**, and **AIX** were still doing relatively well in the market, though SGI's **IRIX** persisted for quite some time. Of these, Solaris had the largest market share in 2005

What is UNIX?

- The UNIX Operating System (OS) is a large program (mostly coded in C) that turns the computer into a useable machine.

- It provides a number of facilities:
  - management of hardware resources
  - directory and file system
  - loading / execution / suspension of programs

Commands

Directory commands

    cd   Change the working directory

    find   Find a file by name or by other characteristics

    mkdir   Make a directory

    rmdir   Remove a directory

File manipulation

    commandscat Concatenate and display a file

    cp   Copy a file

    grep   Search a file for a specific text string

    mv   Move or rename a file

    rm   Remove a file

Commands

Display commands

    date   Print the date and time

    ls   List the contents of a directory

    pwd   Display the working directory pathname

    tail   Display the end of a file

Process commands

    exit   Terminate a process

    kill   Terminate or send a signal to a process

    passwd Create or change a password

    ps   Display the status of a process

    telnet   Connect to a remote system using the Telnet protocol

The UNIX File System

1. An upside-down Tree

2. Some System Directories

3. Pathnames

4 Commands and Pathnames

1.An upside-down Tree

- **A simplified UNIX directory/file system:**

2.Some System Directories

- /   *root* directory

- /bin   commands

- /etc   system data files
                                 (e.g. /etc/passwd)

- /dev   files representing I/O devices

3.Pathnames

- A *pathname* is a sequence of directory names (separated by /'s) which identifies the location of a directory.

- There are two sorts of pathnames
  - absolute pathnames
  - relative pathname

3.1Absolute Pathnames

- The sequence of directory names between the top of the tree (the *root*) and the directory of interest.

- For example:

  /bin

  /etc/terminfo

  /export/user/home/ad

  /export/user/home/s3910120/proj1

3.2Relative Pathnames

- The sequence of directory names below the directory where you are now to the directory of interest.

- If you are interested in the directory `proj1`:

`proj1`	if you are in `s3910120`
`s3910120/proj1`	if you are in `home`
`home/s3910120/proj1`	if you are in `user`

4.Commands and Pathnames

- Commands often use pathnames.

- For example:
  ```
  /usr/games/fortune
  cat /etc/passwd        List the password file
  ```

Memory Management

Memory

*Primary memory is a precious resource that frequently cannot contain all active processes in the system

*The memory management system decides which processes should reside (at least partially) in main memory

*It monitors the amount of available primary memory and may periodically write processes to a secondary device called the swap device to provide more space in primary memory

*At a later time, the kernel reads the data from swap device back to main memory

Memory Management

UNIX Memory Management Policies

- Swapping
  - Easy to implement
  - Less system overhead

- Demand Paging
  - Greater flexibility

Memory Management

Swapping

- The swap device is a block device in a configurable section of a disk

- Kernel allocates contiguous space on the swap device without fragmentation

- It maintains free space of the swap device in an in-core table, called **map**

- The kernel treats each unit of the swap map as group of disk blocks

- As kernel allocates and frees resources, it updates the map accordingly

Memory Management

Demand Paging

- Not all page of process resides in memory

- Locality

- When a process accesses a page that is not part of its working set, it incurs a page fault.

- The kernel suspends the execution of the process until it reads the page into memory and makes it accessible to the process

Interrupts

Interrupt

When a process terminates abnormally it usually tries to send a signal indicating what went wrong. C programs (and UNIX) can trap these for diagnostics. Also user specified communication can take place in this way.

Interrupts

Signals are software generated interrupts that are sent to a process when a event happens. Each signal has a default action which is one of the following:

1 The signal is discarded after being received

2 The process is terminated after the signal is received

3 A core file is written, then the process is terminated

4 Stop the process after the signal is received

Interrupts

Each signal defined by the system falls into one of five classes:

1 **Hardware conditions**

2 Software conditions

3 Input/output notification

4 Process control

5 Resource control

Why Use UNIX?

- multi-tasking / multi-user

- lots of software

- networking capability

- graphical (with command line)

- easy to program

- portable (PCs, mainframes, super-computers)

Applications

Storage Consultancy

- Expert advice on all forms of storage technologies.

- Storage management software.

- Solutions that can grow and evolve as your business does.

- Experienced fully trained and accredited consultants.

- Independent recommendations on storage technologies.

- Full project management to implement storage technologies.

Applications

Backup & Recovery Consulting

- Identify inefficiencies with your current backup and recovery environment that may be costing you time and money.

- Ensure your backup and recovery architecture meets your changing production environment and SLAs.

- Configure and optimize all aspects of your backup and recovery environment.

Applications

Middleware & Database Administration

- Installation and configuration of Web Logic and Web sphere application servers in highly available clustering environment.

- Understanding the complexities of infrastructure design and maintenance, analyze architecture and security issues Hardening productions environments.

- Assisting clients in aspects of deploying J2EE applications and connecting to back end resources.

- Providing development and production environments. Finding performance bottlenecks and tuning of existing Web sphere or Web Logic applications servers.