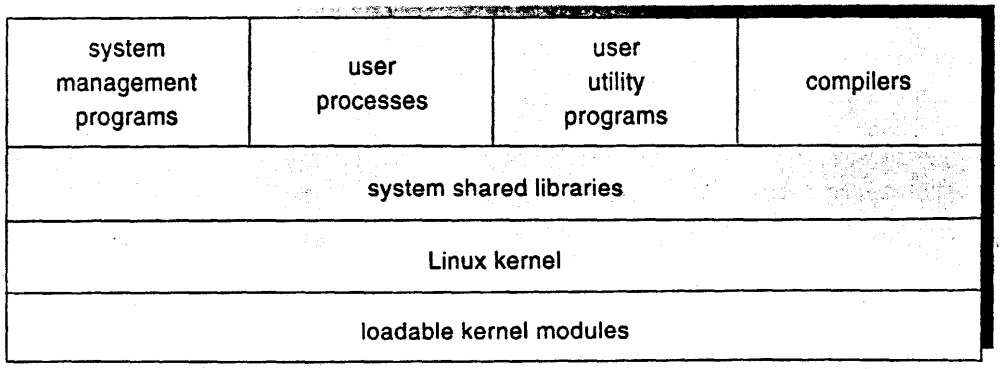
1.What is Linux

Linus Torvalds developed Linux in 1991. It was intended to be a free version of UNIX for Intel based PC platforms, and as such Linus released the source code to the computer community in March of 1992. Since then, Linux has grown to become the collective work of thousands of programmers worldwide, all of whom place their work under the GNU free usage license.

Linux system (fig.) is composed of three main parts of code: Kernel, system libraries, and system utilities (management tasks: NW connection or login request from terminals).



2.Important features of Linux that make it so unique

- Full multitasking, allowing multiple users to run many programs on the same system at once.
- The X Window System is a very powerful graphics interface, supporting many applications.
- TCP/IP (Transmission Control Protocol/Internet Protocol) support.
- Virtual memory and shared libraries. Linux can use a portion of your hard drive as virtual memory, expanding your total amount of available RAM. Linux utilizes all of your system's memory, without memory limits or segmentation through the use of a virtual memory manager. Linux also implements shared libraries, allowing programs that use standard subroutines to find the code for these subroutines in the libraries at runtime. This saves a large amount of space on your system; each application doesn't store its own copy of these common routines.
- Much of the software available for Linux is free. In fact, a large number of utilities in Linux are developed by the GNU project at the Free Software Foundation in Cambridge, Massachusetts.
- Virtual memory support. Linux utilizes all of your system's memory, without memory limits or segmentation through the use of a virtual memory manager.
- Built-in support for networking, multitasking, and other features. You'll see this touted as "New Technology" in systems such as Windows NT. In fact, UNIX (and now, Linux) has implemented this "new technology" for more than 15 years.
- Linux is cheaper to get than most commercially available UNIX systems If you have the patience and access to the Internet, the only price you pay for Linux is your time. Linux is

freely available on the Internet. You can save yourself some time and get CD-ROM or floppy-disk distributions from several commercial vendors.

- The most important advantage of using Linux is that you get to work with an honest-to-goodness kernel. All of the kernel source code is available for Linux, and you have the ability to modify it to suit your needs. Looking at the kernel code is an educational experience in itself.
- Disadvantage
  some of the hardware in your machine may not be supported by Linux. Again, your choices are to either write the driver software yourself or get it from somewhere else. You have to spend some time and effort managing your Linux machine.

Linux partitioning

There are two kinds of major partitions on a Linux system:

- *data partition*: normal Linux system data, including the *root partition* containing all the data to start up and run the system; and
- *Swap partition*: expansion of the computer's physical memory, extra memory on hard disk.

Main Linux directories

Directory	Content
/bin	Common programs, shared by the system, the system administrator and the users.
/boot	The startup files and the kernel, `vmlinuz`. In recent distributions also `grub` data. Grub is the GRand Unified Boot loader and is an attempt to get rid of the many different boot−loaders we know today.
/dev	Contains references to all the CPU peripheral hardware, which are represented as files with special properties.
/etc	Most important system configuration files are in `/etc`, this directory contains data similar to those in the Control Panel in Windows
/home	Home directories of the common users.
/initrd	(on some distributions) Information for booting. Do not remove!
/lib	Library files, includes files for all kinds of programs needed by the system and the users.
/lost+found	Every partition has a `lost+found` in its upper directory. Files that were saved during failures are here.
/misc	For miscellaneous purposes.
/mnt	Standard mount point for external file systems, e.g. a CD−ROM or a digital camera.
/net	Standard mount point for entire remote file systems
/opt	Typically contains extra and third party software.
/proc	A virtual file system containing information about system resources. More information about the meaning of the files in `proc` is obtained by entering the command **man proc** in a terminal window. The file proc.txt discusses the virtual file system in detail.
/root	The administrative user's home directory. Mind the difference between /, the root directory and /root, the home directory of the *root* user.
/sbin	Programs for use by the system and the system administrator.
/tmp	Temporary space for use by the system.
/usr	Programs, libraries, documentation etc. for all user−related programs.
/var	Storage for all variable files and temporary files created by users, such as log files, the mail queue, the print spooler area, space for temporary storage of files downloaded from the Internet, or to keep an image of a CD before burning it.

The most important files and directories

1. The kernel

The kernel is the heart of the system. It manages the communication between the underlying hardware and the peripherals. The kernel also makes sure that processes and daemons (server processes) are started and stopped at the exact right times. The kernel has a lot of other important tasks, so many that there is a special kernel-development mailing list on this subject only, where huge amounts of information are shared. It would lead us too far to discuss the kernel in detail. For now it suffices to know that the kernel is the most important file on the system.

2. The shell

What is a shell?

"A shell manages the interaction between the system and its users". A shell is much more than that. A shell can best be compared with a way of talking to the computer, a language. Most users do know that other language, the click-and-point language of the desktop. But in that language the user is treated as a baby, asked to pick from what is presented to him.

The shell, on the other hand, is an advanced way of communicating with the system, because it allows for conversation and taking initiative. Both partners in the communication are equal, so new ideas can be tested.

Linux installation (Red hat)

- Setting up your hard disk

Linux prefers to have two partitions: one for the Linux swap space, and one for the Linux software file system itself. The swap space is used as an extension of your machine's physical RAM and can be quite small. The Linux file-system partition tends to be quite large, as it must hold all the Linux software.

Hard disk drivers the first is: /dev/hda and the second /dev/hdb.
Ex: partition /dev/hda2 (the second primary partition on the first HDD)

- LILO boot loader

LILO (which means LInux LOader) is a bit tricky to use if you are not familiar with it and its purpose. You need to install the LILO program, which changes the boot sector of your hard drive to allow you to choose between a DOS and a Linux partition as the boot source partition.

Linux Login

On command line prompts the **#** character usually specifically indicates that you're logged in as root, and the **$** sign is used for regular user.

Linux Basic Commands

Command	Example	Description
cat		Sends file contents to standard output. This is a way to list the contents of short files to the screen. It works well with piping.
	cat .bashrc	Sends the contents of the ".bashrc" file to the screen.
cd		Change directory
	cd /home	Change the current working directory to /home. The '/' indicates relative to root, and no matter what directory you are in when you execute this command, the directory will be changed to "/home".
	cd httpd	Change the current working directory to httpd, relative to the current location which is "/home". The full path of the new working directory is "/home/httpd".
	cd ..	Move to the parent directory of the current directory. This command will make the current working directory "/home.
	cd ~	Move to the user's home directory which is "/home/username". The '~' indicates the users home directory.
cp		Copy files
	cp myfile yourfile	Copy the files "myfile" to the file "yourfile" in the current working directory. This command will create the file "yourfile" if it doesn't exist. It will normally overwrite it without warning if it exists.
	cp -i myfile yourfile	With the "-i" option, if the file "yourfile" exists, you will be prompted before it is overwritten.
	cp -i /data/myfile .	Copy the file "/data/myfile" to the current working directory and name it "myfile". Prompt before overwriting the file.
	cp -dpr srcdir destdir	Copy all files from the directory "srcdir" to the directory "destdir" preserving links (-p option), file attributes (-p option), and copy recursively (-r option). With these options, a directory and all it contents can be copied to another directory.
dd	dd if=/dev/hdb1 of=/backup/	Disk duplicate. The man page says this command is to "Convert and copy a file", but although used by more advanced users, it can be a very handy command. The "if" means input file, "of" means output file.
df		Show the amount of disk space used on each mounted filesystem.
less	less textfile	Similar to the more command, but the user can page up and down through the file. The example displays the contents of textfile.
ln		Creates a symbolic link to a file.
	ln -s test symlink	Creates a symbolic link named symlink that points to the file test Typing "ls -i test symlink" will show the two files are different with different inodes. Typing "ls -l test symlink" will show that symlink points to the file test.

locate		A fast database driven file locator.
	slocate -u	This command builds the slocate database. It will take several minutes to complete this command. This command must be used before searching for files, however cron runs this command periodically on most systems.
	locate whereis	Lists all files whose names contain the string "whereis".
logout		Logs the current user off the system.
ls		List files
	ls	List files in the current working directory except those starting with. And only show the file name.
	ls -al	List all files in the current working directory in long listing format showing permissions, ownership, size, and time and date stamp
more		Allows file contents or piped output to be sent to the screen one page at a time.
	more /etc/profile	Lists the contents of the "/etc/profile" file to the screen one page at a time.
	ls -al |more	Performs a directory listing of all files and pipes the output of the listing through more. If the directory listing is longer than a page, it will be listed one page at a time.
mv		Move or rename files
	mv -i myfile yourfile	Move the file from "myfile" to "yourfile". This effectively changes the name of "myfile" to "yourfile".
	mv -i /data/myfile .	Move the file from "myfile" from the directory "/data" to the current working directory.
pwd		Show the name of the current working directory
	more /etc/profile	Lists the contents of the "/etc/profile" file to the screen one page at a time.
shutdown		Shuts the system down.
	shutdown -h now	Shuts the system down to halt immediately.
	shutdown -r now	Shuts the system down immediately and the system reboots.
whereis		Show where the binary, source and manual page files are for a command
	whereis ls	Locates binaries and manual pages for the ls command.

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 commands

cat - Concatenate and display a file
chmod - Change the permissions mode of a file
chown - Change the owner and/or group of a file
cp - Copy a file
diff - Display differences between pairs of text files
grep - Search a file for a specific text string
mv - Move or rename a file
rm - Remove a file

Display commands

date - Print the date and time
finger - Display information about a user
head - Display the first few lines of a file
less - Browse a text file
ls - List the contents of a directory
man - Display a reference manual page
more - Display a text file
pwd - Display the working directory pathname
tail - Display the end of a file
who - Display who is on the system

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

See http://cdsmith.twu.net/professional/osdesign.html for more information about OS as a subject, and a quick survey of its benefits and jobs.