Operating Systems 1
lecture 1

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Course Introduction

- In this course we will study the Linux Operating System from a user and sysadmin perspective
- As a user we will learn how to install and operate Linux, create files, folders, install software, manage users and groups.
- As a sysadmin we will learn some of the basics of system administration tasks such as remote access, cron jobs, monitoring, security and automation.

What is an OS?

- The operating system consists of a kernel and system calls.
- The kernel is the most important component, it directly interacts with the hardware and provide services to other components.
- The system calls are used to allow user space applications to use the kernel functions. e.g. the read syscall is used to read a file….
- User applications do not use kernel functions directly, they use syscalls instead.

File system and Shell

- Shell can be used as an interface between the user and the kernel.
- It allows the user to send commands to be executed using the kernel.
- Bash is the most widely used shell, others include csh, sh, rbash etc..
- File system acts as an interface between the user and storage devices, it defines how files are stored, accessed etc…
- Examples: NTFS, FAT, ext2, ext3, ext4

Boot Process

- POST (Power On Self Test) this program stored in ROM tests computer hardware to make sure they are running correctly.
- After that the boot loader is loaded into memory and it starts running.
- The boot loader searches for the OS kernel, loads it into memory and starts it.
- The kernel starts by identifying all the hardware devices connected to the system with a process called autoprobing.

Boot Process

- After that the kernel starts the init process which runs some daemons (background processes) used to manage system resources and avoid conflicts.
- The next step is to run the X Server which is used to manage display, keyboard and mouse.
- It displays the login screen generated by a program called the display manager.

Unix

- Unix was created by Kenneth thompson and Dennis Retchie and otheres in 1969-1970.
- In 1972-1973 it was rewritten in C.
- In 1979 The seventh edition (V7) of Unix was released, the grandfather of all unix systems.
- Berkeley developed a variant of Unix called Berkeley Software Distribution (BSD).
- At&T continued developing Unix and created what is called System V.

Linux

- In 1984 Rechard Stallman’s free software foundation started GNU project to create a free version of Unix.
- They created a C compiler (GCC), a text editor (EMACS) but without a kernel their dream cannot be achieved.
- In 1991 Linus Torvalds started developing and Operating System Kernel called Linux that is free and open source.

Distributions

- Many organizations around the world have combined the available components differently creating what is called distributions.
- These organizations are called distributors e.g. Red Hat, Mandarke, SuSe, Caldera, Corel and Debian.
- All these distributions are based on the Linux kernel and the C library glibc.

Ubuntu

- Ubuntu is a derivate from the Debian distribution.
- It is the one of the most widely used Linux distribution in server and desktop environments.
- It is created by the South African Company called Canonical.
- The Chinese version of Ubuntu is used on the Chinese most powerful super computer.