Chapter 01
Introduction

Introduction

- Linux is the *kernel* of the system.
- The kernel and suite of tools that are packaged with it is called a *distribution*.

Three Main OS Components

- **Kernel** – manages operation of the computer.
- **Shell** – provides for interaction between the user and the computer.
- **Filesystem** – provides a way to organize and manage all information on a computer's disk(s).

Role of the Kernel

- Linux means the *kernel* of the system, which is the main program loaded at startup that manages the operation of the computer.
  - Manages devices, memory and processes
  - Handles switching of applications

- Similar to an air traffic controller at an airport.

Applications

- Applications make requests to the kernel and receive resources, such as memory, CPU, and disk, in return.

- Applications should follow the kernel's *Application Programming Interface (API)*.

Linux is Open Source

- Historically, most software has been issued under a closed-source license.
- This means that you may have the right to use the executable program or machine code, but cannot see the source code.
- The development of Linux closely parallels the rise of *open source software*.
- One tenet of open source philosophy is that you have a right to access the source code and to modify it as you wish.

Linux Distributions

- Recall, a *distribution* refers to the Linux kernel, tools, and suite of applications that come bundled together.
- There are distributions suited to every imaginable purpose.
- There are distributions that focus on running servers, desktops, or even industry-specific tools like electronics design or statistical computing.

Hardware Platforms

x86

- Linux first ran on a computer similar to it's inventor's: a 386 with a specific hard drive controller.
- The types of hardware grew from the humble Intel chip to eventually support even supercomputers.
- Eventually, cellular phones and tablets adopted Linux.
- Aside from phones and tablets, Linux can be found in many consumer devices such as wireless routers.

The Shell

is a working space

- The shell is a program that allows the user to type commands, options, and arguments.
- Two most common types of interfaces are the Graphical User Interface (GUI) and Command Line Interface (CLI).

good for repeately work

- Advantages to using a CLI, include:
  - Command repetition
  - Command flexibility
  - Resources
  - Scripting
  - Remote Access
  - Development

Bash Shell

- Many shell programs exist.
- Most popular shell is the “Bash” (Bourne Again Shell).
- Users interact with a system by executing *commands* which are interpreted by the shell and transformed into actions by the kernel.

```
sysadmin@localhost:~$ ls
Desktop Documents Downloads Music Pictures Public Templates Videos
```

- The Bash shell has numerous built-in commands and features including: aliases, re-executing commands, wildcard matching, input/output redirection, pipes and background processing.

Bash Shell

- Features include:
  - Built-in shell commands internal command
  - Binary commands stored in files
  - Aliases
  - Functions
  - Scripts

Accessing the Shell

- From a Graphical User Interface (GUI)
  - Open a terminal program
- From a Command Line Interface (CLI)

Filesystem

- A hierarchy of directories and files with the root / directory at the top of the directory tree.

- A structure created on a disk partition that organizes directories, subdirectories and files.