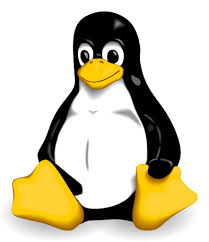
View the Lesson (Introduction to Linux)

What is Linux?

Linux is an operating system just like Windows, iOS, and Mac OS. In fact, Android, one of the world's most popular platforms, is operated by the Linux operating system. An operating system is a software that manages all of your desktop or laptop's hardware resources. To put it simply, the operating system manages the communication between your software and your hardware. The software would not operate without the operating system (OS).



## View the Lesson (Introduction to Linux)

### The History of Linux

Linus Torvalds invented Linux. While still a student at the University of Helsinki, he started developing Linux to create a system similar to MINIX, a UNIX operating system. In 1991 he released version 0.02; Version 1.0 of the Linux kernel, the core of the operating system, was released in 1994. At about the same time, American software developer Richard Stallman and the FSF made efforts to create an open-source UNIX-like operating system called GNU. In contrast to Torvalds, Stallman and the FSF started by creating utilities for the operating system first. These utilities were then added to the Linux kernel to create a complete system called GNU/Linux, or, less precisely, just Linux.

* Linus announces the kernel to the world (1991).
* Release of the first "major" Linux distributions (1993).
* Linux kernel hits 1.0 (1994).
* KDE (1996) / GNOME (1999) projects are released.
* First release of Linux-based Android (1998).
* Kernel development moves to Git (2005).
* Today Linux is everywhere. Supercomputers, smartphones, desktop, web servers, tablets, laptops and home appliances like washing machines, DVD players, routers, modems, cars, refrigerators, etc use Linux OS.

View the Lesson (Introduction to Linux)

The components of Linux

There are several components of the Linux operating system.

Hardware

Computer hardware is the physical components that a computer system requires to function. It encompasses everything with a circuit board that operates within a PC or laptop; including the motherboard, graphics card, CPU (Central Processing Unit), power supply, and so on.

Boot-loader

The software that manages the boot process of your computer.

Kernel

It is the core part of the operating system and manages the CPU, memory, and peripheral devices. çevre birimi aygıtları The kernel is the lowest level of the OS.

GNU Core

The GNU Core Utilities are the basic file, shell and text manipulation utilities of the GNU operating system. These are the core utilities that are expected to exist on every operating system.

X server

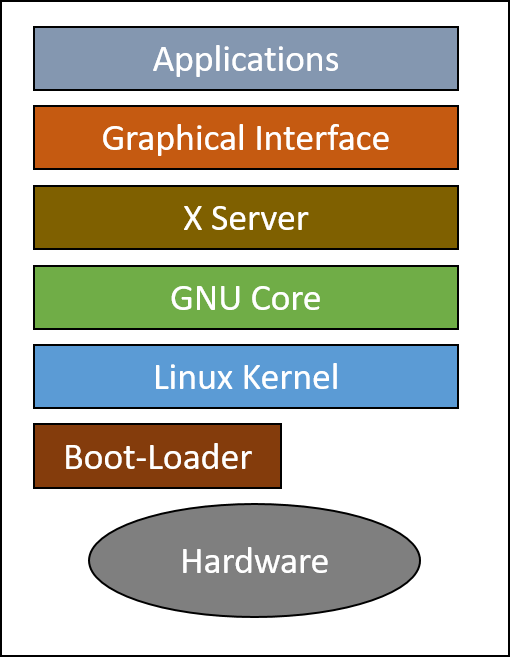
This is the sub-system that displays the graphics on your monitor. It is commonly referred to as the X server or just X.

Graphical User Interface

The Linux GUI is often referred to as a Desktop Environment. This is the piece that the users actually interact with. Several desktop environments are available to choose from (GNOME, Cinnamon, Mate, Pantheon, Enlightenment, KDE, Xfce, and so on).

Applications

Desktop environments do not have the full range of applications available. Just like Windows and macOS, Linux provides thousands upon thousands of software titles of high quality that can be easily found and installed.



## View the Lesson (Introduction to Linux)

### Popular Linux Distributions

Linux has a number of different versions to suit any type of user. These versions are called distributions (or, in the short form, “distros”).

## Linux Mint

Linux Mint is a community-driven Linux distribution based on Ubuntu or Debian that strives to be a "modern, elegant and comfortable operating system which is both powerful and easy to use." Linux Mint provides full out-of-the-box multimedia support by including some proprietary patentli tescilli software, such as multimedia codecs, and comes bundled with a variety of free and open-source applications.

## Debian

Debian is an independent Linux distribution that was started by the joint association of individuals with the desire to make a free Operating System available to the world. It is designed to be a computing powerhouse capable of running on different types of hardware especially when being used for development.

## Ubuntu

Ubuntu is one of the most popular, stable, and best fitted for the newcomers, which is a Debian based Linux distro. It has its own software repositories, which regularly synced with the Debian repository so that all the applications get stable and latest release.

## OpenSUSE

openSUSE is a professionally and community-supported Operating System designed to provide field experts with a reliable computing environment for their work. It is distributed in 2 versions, Leap – a Long Term Support (LTS) release, and Tumbleweed – a rolling release, and they both use the YaST package manager for delivering applications to users. openSUSE is an independent Linux distribution that is sponsored by SUSE Linux in collaboration with other companies and it aims to dramatically simplify the process of developing and packaging software for developers and vendors.

## Manjaro

Manjaro is an accessible, friendly, open-source Linux distribution and community. Based on Arch Linux, providing all the benefits of cutting-edge software combined with a focus on getting started quickly, automated tools to require less manual intervention, and help readily available when needed.

## Fedora

Fedora is a free and open-source Linux distribution built with the aim of encouraging cutting edge technologies by spearheading onculuk ederek innovation, working closely with Linux communities, and being amongst the first to integrate new technologies. It is sponsored by the Fedora Project and owned by Red Hat, developed independently of any other Linux distribution.

## Red Hat Enterprise Linux (RHEL)

Red Hat Enterprise Linux (RHEL) is a Linux-based operating system from Red Hat designed for businesses. RHEL can work on desktops, on servers, in hypervisors or in the cloud. Red Hat and its community-supported counterpart, Fedora, are among the most widely used Linux distributions in the world.

## View the Lesson (Introduction to Linux)

### Linux Embedded Systems

## Embedded System

An embedded system is a computer system that is dedicated to one or two specific functions. This system is embedded as part of a complete computer system including hardware such as mechanical and electrical components.

## Embedded Linux

Embedded Linux is a type of Linux operating system/kernel that is designed to be installed and used within embedded devices and appliances. It is a compact version of Linux that offers features and services in line with the operating and application requirement of the embedded system.

Android OS is a type of embedded Linux, customized to be used on smartphones. Many systems that use Linux embedded are:

* Smart TVs
* Tablet PCs
* Navigation devices
* Wireless routers
* Other industrial and consumer electronic equipment

## View the lesson (Open-Source Software and Licensing)

### What is open source?

Open-source software is software with source code that anyone can inspect, modify, and enhance.

"Source code" is the part of software that most computer users don't ever see; it's the code computer programmers can manipulate to change how a piece of software—a "program" or "application"—works. Programmers with access to the source code of a computer program can enhance the system by adding features to it or repairing sections that don't always work properly.

## How does open-source software vary from other types of software?

Most software has source code that can be changed only by the individual, team, or organization that developed it — and retains sole control over it. That type of software is called "proprietary" or "closed source" software.

Only the original authors of proprietary software can legally copy, inspect, and alter that software. And in order to use proprietary software, computer users must agree (usually by signing a license displayed the first time they run this software) that they will not do anything with the software that the software's authors have not expressly permitted. Microsoft Office and Adobe Photoshop are examples of proprietary software.

Open-source software is different. Its authors make its source code available to others who would like to view that code, copy it, learn from it, alter it, or share it. LibreOffice and the GNU Image Manipulation Program are examples of open-source software.

## View the lesson (Open-Source Software and Licensing)

### Open-source Licensing

Open source licenses are licenses that comply with the Open Source Definition — in brief, they allow the software to be freely used, modified, and shared. To be approved by the Open Source Initiative (also known as the OSI), a license must go through the Open Source Initiative's license review process.

## Types of open source license

There are generally two categories: permissive licenses and copyleft licenses.

A license that is permissive is simple and the most basic form of open source license. It allows you to do whatever you want with the software, as long as you abide by the requirements for notification. Permissive licenses provide the software as-is, with no warranties. So permissive licenses can be summarized as follows:

* Do whatever you want with the code
* Use at your own risk
* Acknowledge the author/contributor

Copyleft licenses add requirements to the permissive license. In addition to the requirements listed above, copyleft licenses also require that:

* If you distribute binaries, you must make the source code for those binaries available
* The source code must be available under the same copyleft terms under which you got the code
* You cannot place additional restrictions on the licensee's exercise of the license

## Popular Licenses

The following OSI-approved licenses are popular, widely used, or have strong communities:

* Apache License 2.0
* BSD 3-Clause "New" or "Revised" license
* BSD 2-Clause "Simplified" or "FreeBSD" license
* GNU General Public License (GPL)
* GNU Library or "Lesser" General Public License (LGPL)
* MIT license
* Mozilla Public License 2.0
* Common Development and Distribution License
* Eclipse Public License version 2.0

## View the lesson (Open-Source Software and Licensing)

### FSF and OSI

## Free Software Foundation (FSF)

The Free Software Foundation (FSF) is a nonprofit with a worldwide mission to promote computer user freedom. Free software is about having control over the technology we use in our homes, schools, and businesses, where computers work for our individual and communal benefit, not for proprietary software companies or governments who might seek to restrict and monitor us. The Free Software Foundation exclusively uses free software to perform its work.

The Free Software Foundation is working to secure freedom for computer users by promoting the development and use of free (as in freedom) software and documentation—particularly the GNU operating system—and by campaigning against threats to computer user freedom like Digital Restrictions Management (DRM) and software patents.

## Open Source Initiative (OSI)

The Open Source Initiative (OSI) is a non-profit organization dedicated to the promotion of open-source software. OSI was founded in 1998 by Bruce Perens and Eric Raymond. OSI is quite distinct from the Free Software Foundation (FSF) led by Richard Stallman. Although they have similar history and motivation, OSI considers its ends as more pragmatic and business-driven, while FSF is based on anti-establishment and moralistic viewpoints. The OSI is actively engaged in building open source community, public advocacy, education, and promoting awareness regarding the significance of non-proprietary or open-source software. In order to establish an open-source environment around the world, OSI preserves and supports the Open Source Definition and also provides the OSI-Certified Open Source Software Certification Program. To achieve this OSI certification, the software should be distributed using a license that ensures the legal right to freely read, use, modify, and re-distribute the software.

## View the Lesson (Major Open-Source Applications)

### Desktop Applications

## Firefox

Mozilla Firefox, also known as the Firefox browser, or simply Firefox, is a free and open-source web browser developed by the Mozilla Foundation and its subsidiary, Mozilla Corporation. It is introduced in 2004 as part of the Mozilla Application Suite. Firefox included almost all the features offered by other browsers at that time, as well as a number of new features, including a bookmarks toolbar and tabbed browsing.

## Thunderbird

Thunderbird is a free and open-source email, newsfeed, chat, and calendaring client, that’s easy to set up and customize.

## LibreOffice

LibreOffice is community-driven and developed software, and is a project of the not-for-profit organization, The Document Foundation. LibreOffice is free and open-source software, originally based on OpenOffice.org (commonly known as OpenOffice), and is the most actively developed OpenOffice.org successor project. LibreOffice includes several applications that make it the most versatile Free and Open Source office suite on the market:

* Writer (word processing)
* Calc (spreadsheets)
* Impress (presentations)
* Draw (vector graphics and flowcharts)
* Base (databases)
* Math (formula editing)

## GIMP

GIMP is an acronym kısaltma for GNU Image Manipulation Program. It is a freely distributed program for such tasks as photo retouching, image composition, and image authoring.

## View the Lesson (Major Open-Source Applications)

### Server Applications

## Apache Web Server

Apache Web Server is an open-source web server creation, deployment, and management software. Initially developed by a group of software programmers, it is now maintained by the Apache Software Foundation. Apache Web Server is designed to create web servers that can host one or more HTTP-based websites. Notable features include the ability to support multiple programming languages, server-side scripting, an authentication mechanism, and database support. Apache Web Server can be enhanced by manipulating the code base or adding multiple extensions/add-ons.

## NGINX

NGINX is open-source software for web serving, reverse proxying, caching, load balancing, media streaming, and more. It started as a web server designed for maximum performance and stability. In addition to its HTTP server capabilities, NGINX can also function as a proxy server for email (IMAP, POP3, and SMTP) and a reverse proxy and load balancer for HTTP, TCP, and UDP servers.

## MySQL

MySQL was a free-software database engine originally developed and first released in 1995. It was originally produced under the GNU General Public License, in which source code is made freely available.

MySQL is very popular for Web-hosting applications because of its plethora of Web-optimized features like HTML data types, and because it's available for free. It is part of the Linux, Apache, MySQL, PHP (LAMP) architecture, a combination of platforms that are frequently used to deliver and support advanced Web applications. MySQL runs the back-end databases of some famous websites, including Wikipedia, Google, and Facebook- a testament to its stability and robustness.

## Samba

Samba is an open-source software suite that runs on Unix/Linux based platforms but can communicate with Windows clients like a native application. So Samba can provide this service by employing the Common Internet File System (CIFS). At the heart of this CIFS is the Server Message Block (SMB) protocol.  
Samba performs:

* File & print services
* Authentication and Authorization
* Name resolution
* Service announcement (browsing)

## ownCloud

ownCloud is a client-server suite of applications for creating and using file hosting service. The functionality of ownCloud is similar to dropbox. However, your files are stored on your connected hardware.

## View the Lesson (Major Open-Source Applications)

### Development Languages

## Shell

Shell is a command language interpreter that executes commands read from the standard input device such as a keyboard or from a file. A shell script is a list of commands in a computer program that is run by the Unix shell. The most common Linux shell is named Bash. The name is an acronym for Bourne-again shell. Bash (like many other shells) has the ability to run an entire script of commands, known as a "Bash shell script" (or "script").

## C

C is a high-level and general-purpose programming language used for a wide range of applications from Operating systems like Windows and iOS to software that is used for creating 3D movies.

## Java

Java is a high-level programming language originally developed by Sun Microsystems and released in 1995. Java runs on a variety of platforms, such as Windows, Mac OS, and the various versions of UNIX. Java is Platform Independent, portable, robust, and dynamic, with the ability to fit the needs of virtually any type of application.

## JavaScript

JavaScript is a high-level, cross-platform, object-oriented computer programming language. It is also one of the core technologies of the web, along with HTML and CSS. JavaScript is used to create client-side dynamic web pages. Java and javascript are completely different and distinct languages.

## Perl

Perl is a highly capable, feature-rich programming language with over 30 years of development. Perl runs on over 100 platforms from portables to mainframes and is suitable for both rapid prototyping and large scale development projects.

## Python

Python is a high-level programming language, with applications in numerous areas, including web programming, scripting, scientific computing, and artificial intelligence. Python has extensive object-oriented programming support with a clean and consistent syntax.

## PHP

PHP is a popular general-purpose scripting language that is especially suited to web development. Fast, flexible and pragmatic, PHP powers everything from your blog to the most popular websites in the world.

## View the Lesson (Major Open-Source Applications)

### Package Management Tools

Contemporary distributions of Linux-based operating systems install software in pre-compiled packages, which are archives that contain binaries of software, configuration files, and information about dependencies. Furthermore, package management tools keep track of updates and upgrades so that the user doesn’t have to hunt down information about bug and security fixes. Without package management, users must ensure that all of the required dependencies for a piece of software are installed and up-to-date, compile the software from the source code (which takes time and introduces compiler-based variations from system to system), and manage configuration for each piece of software. Without package management, application files are located in the standard locations for the system to which the developers are accustomed, regardless of which system they’re using.

Package management systems attempt to solve these problems and are the tools through which developers attempt to increase the overall quality and coherence of a Linux-based operating system.

## dpkg

On Linux operating systems that use Debian package management, the dpkg command queries, installs, removes, and maintains Debian software packages and their dependencies.

## apt-get

APT stands for the Advanced Packaging Tool. apt-get is a command-line tool that helps in handling packages in Linux. Its main task is to retrieve the information and packages from the authenticated sources for installation, upgrade and removal of packages along with their dependencies.

## rpm: Red Hat Package Manager

RPM Package Manager (also known simply as RPM), originally called the Red-hat Package Manager, is a program for installing, uninstalling, and managing software packages in Linux. It is an open packaging system, which runs on Red Hat Enterprise Linux as well as other Linux and UNIX systems.

## yum: yellowdog updater modified

Yum is an automatic updater and package installer/remover for rpm systems. It automatically computes dependencies and figures out what things should occur to install packages. It makes it easier to maintain groups of machines without having to manually update each one using rpm. Yum has a plugin interface for adding simple features. Yum can also be used from other python programs via its module interface.