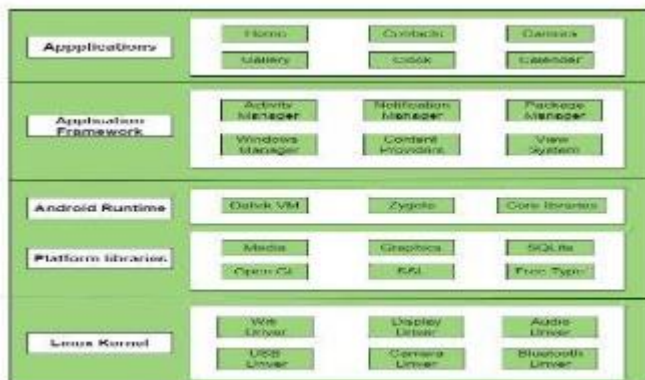


ANDROID APPLICATION ARCHITECTURE

Android operating system is a stack of software components which is roughly divided into five sections and four main layers as shown below in the architecture diagram.



The main components of android architecture are following:-

- Applications
- Application Framework
- Android Runtime
- Platform Libraries
- Linux Kernel

LINUX KERNEL

Linux Kernel is heart of the android architecture. It manages all the available drivers such as display drivers, camera drivers, Bluetooth drivers, audio drivers, memory drivers, etc. which are required during the runtime.

The Linux Kernel will provide an abstraction layer between the device hardware and the other components of android architecture. It is responsible for management of memory, power, devices etc.

The features of Linux kernel are:

- Security: The Linux kernel handles the security between the application and the system.
- Memory Management: It efficiently handles the memory management thereby providing the freedom to develop our apps.
- Process Management: It manages the process well, allocates resources to processes whenever they need them.
- Network Stack: It effectively handles the network communication.

- Driver Model: It ensures that the application works properly on the device and hardware manufacturers responsible for building their drivers into the Linux build

Platform libraries – The Platform Libraries includes various C/C++ core libraries and Java based libraries such as Media, Graphics, Surface Manager, OpenGL etc. to provide a support for android development.

- Media library provides support to play and record an audio and video formats.
- Surface manager responsible for managing access to the display subsystem.
- SGL and OpenGL both cross-language, cross-platform application program interface (API) are used for 2D and 3D computer graphics.
- SQLite provides database support and FreeType provides font support.
- Web-Kit This open source web browser engine provides all the functionality to display web content and to simplify page loading.
- SSL (Secure Sockets Layer) is security technology to establish an encrypted link between a web server and a web browser.

ANDROID LIBRARIES

This category encompasses those Java-based libraries that are specific to Android development.

- android.app – Provides access to the application model and is the cornerstone of all Android applications.
- android.content – Facilitates content access, publishing and messaging between applications and application components.
- android.database – Used to access data published by content providers and includes SQLite database management classes.
- android.opengl – A Java interface to the OpenGL ES 3D graphics rendering API.
- android.os – Provides applications with access to standard operating system services including messages, system services and inter-process communication.
- android.text – Used to render and manipulate text on a device display.
- android.view – The fundamental building blocks of application user interfaces.
- android.widget – A rich collection of pre-built user interface components such as buttons, labels, list views, layout managers, radio buttons etc.
- android.webkit – A set of classes intended to allow web-browsing capabilities to be built into applications.

Android runtime – Android Runtime environment is one of the most important part of Android. It contains components like core libraries and the Dalvik virtual machine(DVM). Mainly, it provides the base for the application framework and powers our application with the help of the core libraries.

Like Java Virtual Machine (JVM), Dalvik Virtual Machine (DVM) is a register-based virtual machine and specially

designed and optimized for android to ensure that a device can run multiple instances efficiently. It depends on the layer

Linux kernel for threading and low-level memory management. The core libraries enable us to implement android

applications using the standard JAVA or Kotlin programming languages.

Application framework – Application Framework provides several important classes which are used to create an Android application. It provides a generic abstraction for hardware access and also helps in managing the user interface with application resources.

Generally, it provides the services with the help of which we can create a particular class and make that class helpful for the Applications creation.

It includes different types of services .

- Activity Manager – Controls all aspects of the application lifecycle and activity stack.
- Content Providers – Allows applications to publish and share data with other applications.
- Resource Manager – Provides access to non-code embedded resources such as strings, color settings and user interface layouts.
- Notifications Manager – Allows applications to display alerts and notifications to the user.

View System – extensible set of views used to create application user interfaces

An Applications – Applications is the top layer of android architecture. The pre-installed applications like home, contacts, camera, gallery etc and third-party applications downloaded from the play store like chat applications, games etc. will be installed on this layer only.

It runs within the Android run time with the help of the classes and services provided by the application framework.