

**MAPT**

# **Android Architecture**

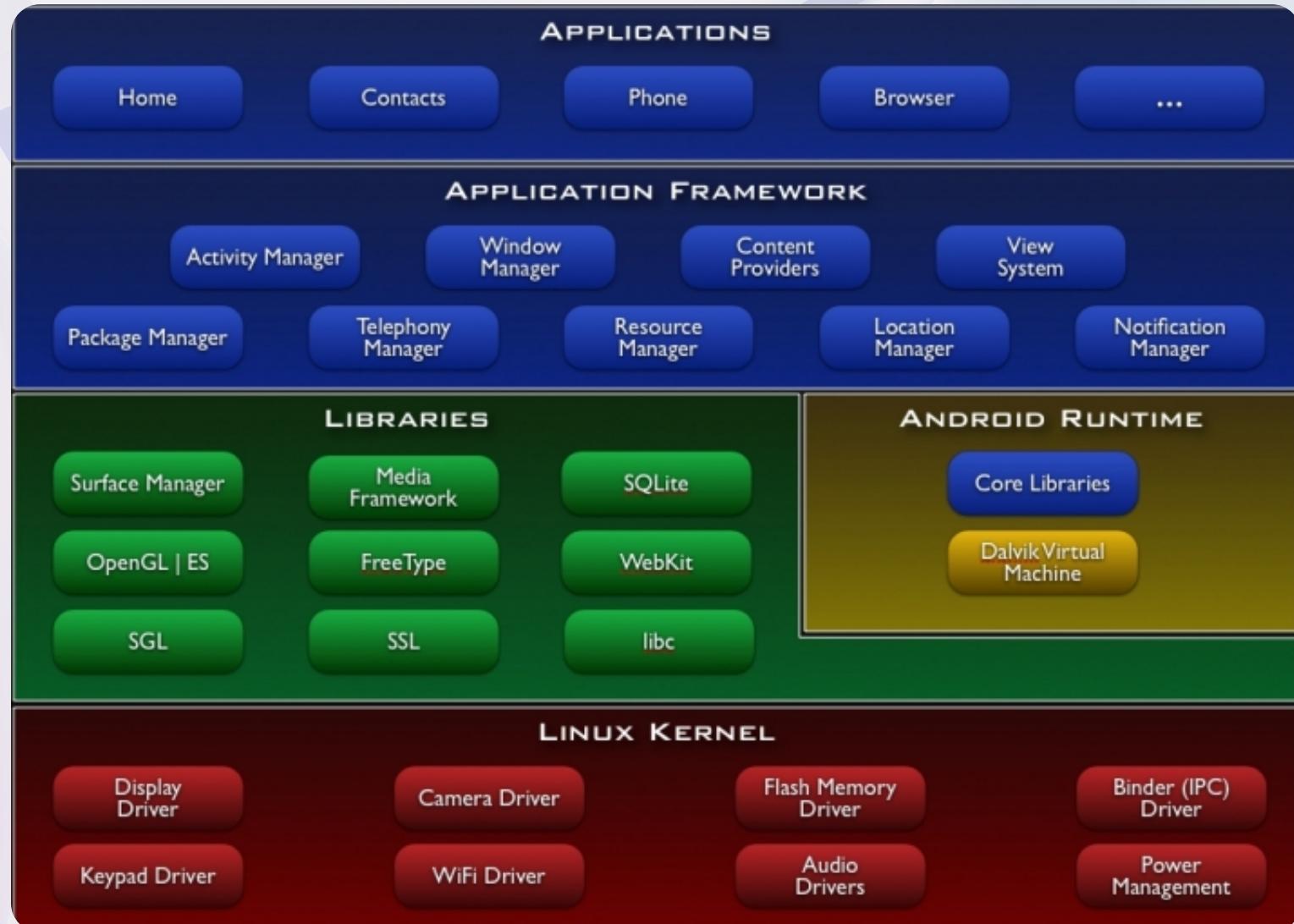
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# Android Architecture

The Android architecture is a layered structure that provides a framework for the development and execution of Android applications. It consists of four main components: the Linux kernel, the native libraries, the Android runtime, and the application framework. The Linux kernel serves as the foundation, providing drivers for hardware interactions. The native libraries include software components that are written in C or C++ and provide low-level services to the operating system.

# **Following are the different layers in the Android stack:**

- Linux Kernel Layer
- Native Layer
- Application Framework Layer
- Applications layer



# Linux Kernel

At the bottom of the Android stack is the Linux Kernel. It never really interacts with the users and developers, but is at the heart of the whole system. Its importance stems from the fact that it provides the following functions in the Android system:

- Hardware Abstraction
- Memory Management Programs
- Other Hardware Drivers (Drivers are programs that control hardware devices.)



# Native Libraries Layer

The next layer in the Android architecture includes **Android's native libraries**. Libraries carry a set of instructions to guide the device in handling different types of data. For instance, the playback and recording of various audio and video formats is guided by the Media Framework Library.

- SGL: 2D Graphics
- Open GL|ES: 3D Library
- Media Framework: Supports playbacks and recording of various audio, video and picture formats.
- Free Type: Font Rendering
- WebKit: Browser Engine
- libc (System C libraries)
- SQLite
- Open SSL

## ANDROID RUNTIME

Located on the same level as the libraries layer, the Android runtime layer includes a set of core Java libraries as well. Android application programmers build their apps using the Java programming language. It also includes the Dalvik Virtual Machine.

## WHAR IS DVM?

Dalvik is open-source software. Dan Bornstein, who named it after the fishing village of Dalvík in Eyjafjörður, Iceland, where some of his ancestors lived, originally wrote Dalvic VM. It is the software responsible for running apps on Android devices.

- It is a Register based Virtual Machine.
- It is optimized for low memory requirements.
- It has been designed to allow multiple VM instances to run at once.
- Relies on the underlying OS for process isolation, memory management and threading support.
- Operates on DEX files.



# Applications Framework

Our applications directly interact with these blocks of the Android architecture. These programs manage the basic functions of phone like resource management, voice call management etc.

- **Activity Manager:** Manages the activity life cycle of applications. To understand the Activity component in Android in detail.
- **Content Providers:** Manage the data sharing between applications. Our Post on Content Provider component describes this in greater detail
- **Telephony Manager:** Manages all voice calls. We use telephony manager if we want to access voice calls in our application.
- **Location Manager:** Location management, using GPS or cell tower
- **Resource Manager:** Manage the various types of resources we use in our Application



# APPLICATION LAYER

The top layer of the android architecture is **Applications**. The native and third-party applications like contacts, email, music, gallery, clock, games, etc. whatever we will build those will be installed on this layer only.

The application layer runs within the Android run time using the classes and services made available from the application framework.

