Mobile Computing - Mobile Platform & Applications

- **Mobile Platforms:** It allows software and services to be run on devices.
  - e.g palm, blackberry, iphone (ios), android & windows mobile.
- **Application Frameworks & Applications:**
  - **Application frameworks:** set of libraries to build applications
    - E.g Jave ME, Android SDK, WebKit
- **Mobile Application Development**
  - **Choosing platform:**
    - **Target users**
    - **Market share**
    - **Features**

Android Architecture

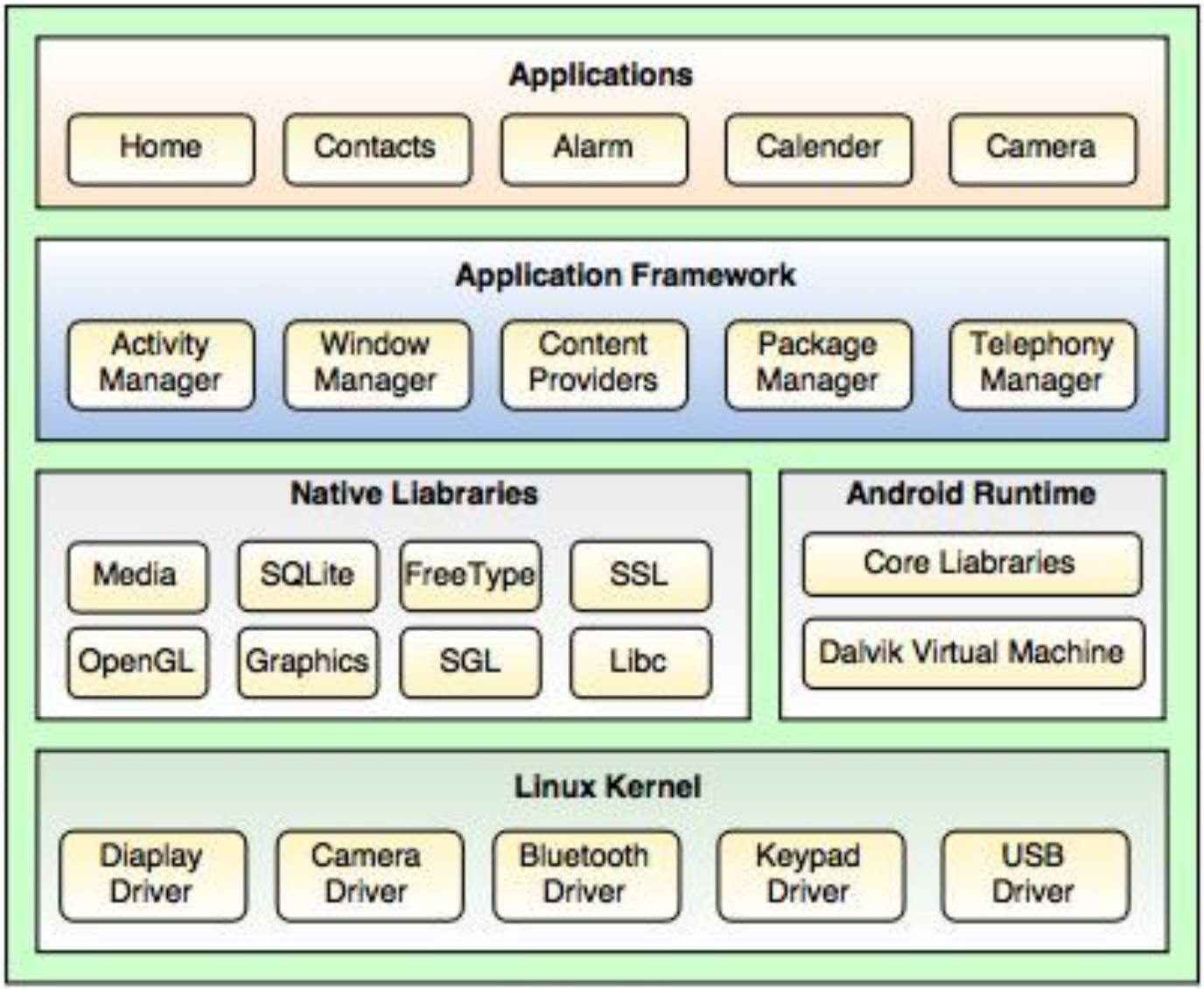

Fig. Android Architecture

Android Architecture

- It consists of 5 main sections spread over 4 layers
  - Linux Kernel
  - Libraries
  - Android Runtime
  - Application Framework
  - Applications

Linux Kernel & Libraries

- **Linux Kernel**
  - Linux-Linux 2.6 with 115 patches
  - Provides functionalities such as **process management, memory management, device management** like camera, keypad, display etc.
  - It also handles networking and vast array of device drivers
- **Libraries**
  - Set of libraries including open-source **web browser engine webkit, library libc.**
  - It consists of **SQLite database** – useful repository for storage and sharing of application data
  - Libraries to play & record audio & video
  - **SSL libraries** for Internet Security etc

Android Runtime

- It consists of key component called **Dalvik Virtual Machine**
  - It is kind of **Java Virtual Machine**, specially designed and optimized for Android
  - **Dalvik Virtual Machine** – makes use of Linux core features like **memory management and multi-threading**
    - It enables every Android application to run in its own process, with its own instance of the Dalvik Virtual Machine.
- It also provides a set of core libraries which enable Android application developers to write **Android applications using standard Java programming language.**

Application Framework & Applications

- **Application Framework**: provides many higher-level services or applications in the form of Java classes.

- **Applications:** Examples to be executed such as browser, games , etc

Applications Components

Components	Description
Activities	They dictate the UI and handle the user interaction to the smartphone screen
Services	They handle background processing associated with an application.
Broadcast Receivers	They handle communication between Android OS and applications.
Content Providers	They handle data and database management issues.

Mobile Applications

- **Vehicles**
- **Emergencies**
  - Medical, natural disasters
- **Web access**
- **Information services**
- **Entertainment**

Mobile Operating Systems - Constraints

- Memory Limitations
- Size of the device
- Hardware upgradation issues
- Network based challenges
- Physical threat

M Commerce

- It involves using wireless handheld devices for online transactions.
- Uses WAP technology
- Applications:
  - Mobile Banking
  - Mobile Ticketing & Booking
  - E-bills
  - Stock Market Reports

Advantages of M-Commerce

- Convenient and easy to use.
- Helps businesses target customers according to their location, service provider, etc.
- Low processing cost.

Disadvantages of M-Commerce

- Very expensive to set up m-commerce business.
- Networks and service providers not reliable.
- Issue of security.
- Safety of the customer's private information.
- Possibility of data leak.

Mobile Payment System – Security Issues

- Personal lost or stolen devices
- Using public & unsecured wifi
- Cyberthieves – spoofing
- Malware on mobile device
- Clone apps, services, etc
- Late security updates
- Phishing scams
- Weak passwords
- Fraudulent payment apps