

Summary of Android System

OUTLINE

- Android license
- Android architecture
- Application
- Wireless connection
- Application development

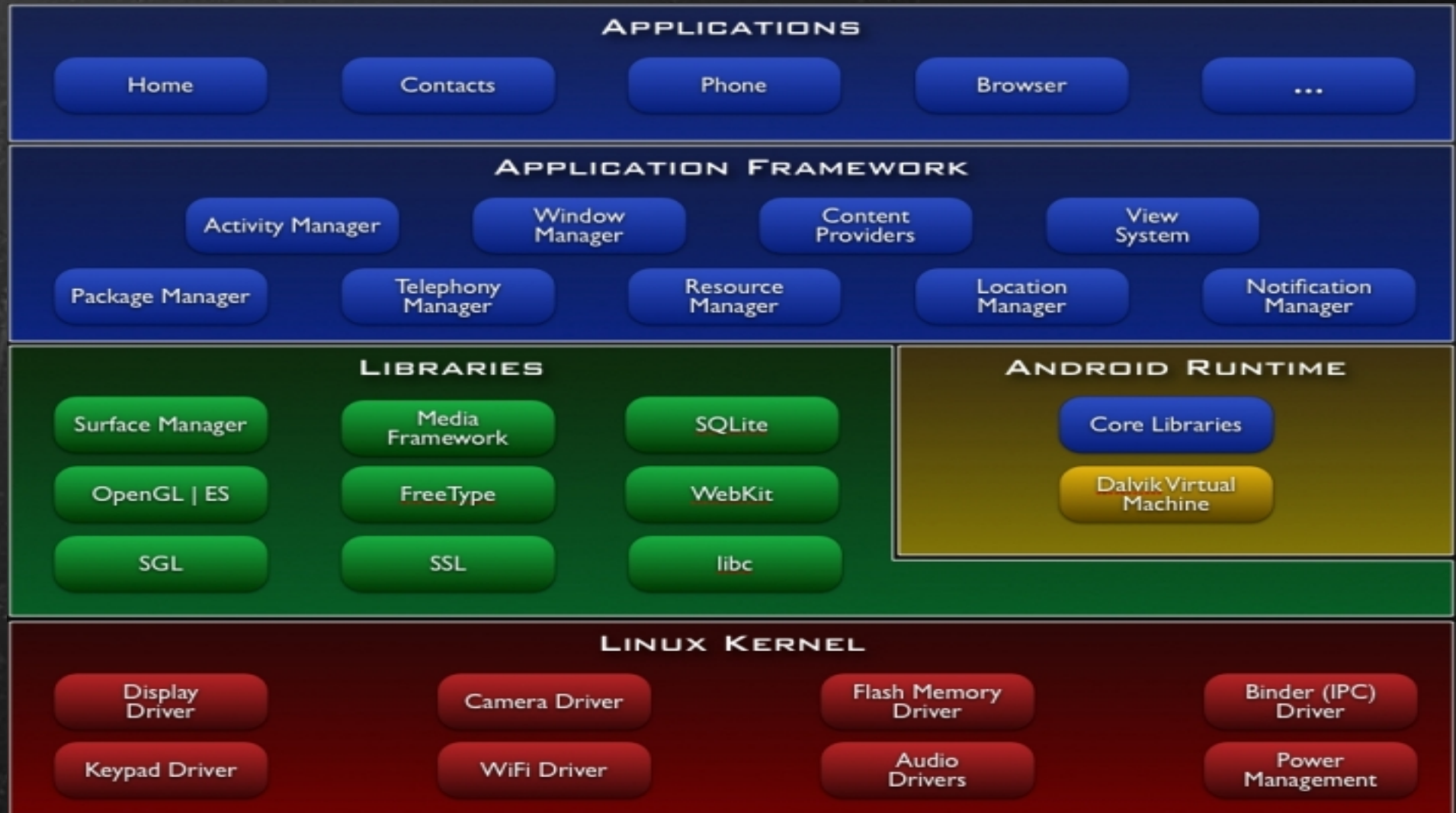
Android license

- open source
 - the entire source code including network and telephony stacks available
- under an Apache License

Android license

- Apache license
 - in every licensed file, any original copyright, patent, trademark, and attribution notices in redistributed code must be preserved
 - in every licensed file changed, a notification must be added stating that changes have been made to that file

Architecture



Linux Kernel

- Android relies on Linux version 2.6 for core system services
- security, memory management, process management, network stack, and driver model

Libraries

- **System C library**
 - a BSD-derived implementation of the standard C system library
- **Media Libraries**
 - based on PacketVideo's OpenCORE
 - support playback and recording of many popular audio and video formats
- **Surface Manager**
 - manages access to the display subsystem
 - seamlessly composites 2D and 3D graphic layers from multiple applications

Library (cont)

- **LibWebCore**
 - a modern web browser engine
- **SGL**
 - the underlying 2D graphics engine
- **FreeType**
 - bitmap and vector font rendering
- **SQLite**
 - a powerful and lightweight relational database engine

Android Runtime

- core libraries
 - provides most of the functionality available in the core libraries of the Java programming language
- Dalvik virtual machine
 - Every process runs on its own Dalvik virtual machine

Application Framework

- Developers have full access to the same framework APIs used by the core application
- View
 - build lists, grids, text boxes, buttons, embeddable web browser
- Content Providers
 - enable applications to access data from other applications

Application Framework (cont)

- Resource Manager
 - provides access to non-code resources such as localized strings, graphics, and layout files
- Notification Manager
 - enables all applications to display custom alerts
- Activity Manager
 - manages the lifecycle of applications
 - provides a common navigation back stack

Application

- email client, SMS program, calendar, maps, browser, contacts...
- characters
 - be written using the Java programming language
 - every application runs in its own Linux process
 - each application is assigned a unique Linux user ID
 - one application can make use of elements of other applications

Application Components

- Activities
 - present a visual user interface for one focused endeavor the user can undertake
- Services
 - do not have a visual user interface
 - run in the background
- Broadcast receivers
 - receive and react to broadcast announcements
- Content providers
 - make a specific set of the application's data available to other applications

Application Components (cont)

- Activating components: intents
 - active activities, services, and broadcast receivers when they're targeted by a request from a `ContentResolver`
- Shutting down components
 - shut down activities

Wireless connection

- Bluetooth
 - Package: `android.bluetooth`
 - Bluetooth functions provided
 - Scan for other Bluetooth device
 - Query the local Bluetooth adapter for paired Bluetooth devices
 - Establish RFCOMM channels/sockets
 - Connect to specified sockets on other devices
 - Transfer data to and from other devices

Wireless connection (cont)

- Bluetooth
 - classes needed to manage Bluetooth functions
 - BluetoothAdapter
 - BluetoothDevice
 - BluetoothSocket
 - BluetoothServerSocket
 - BluetoothClass
 - Bluetooth permissions needed to be declared
 - BLUETOOTH
 - BLUETOOTH_ADMIN.

Wireless connection (cont)

- Wi-Fi
 - Package: `android.net.wifi`
 - applications communicate with the lower-level wireless stack that provides Wi-Fi network access through Wi-Fi APIs
 - almost all information from the device supplicant is available

Wireless connection (cont)

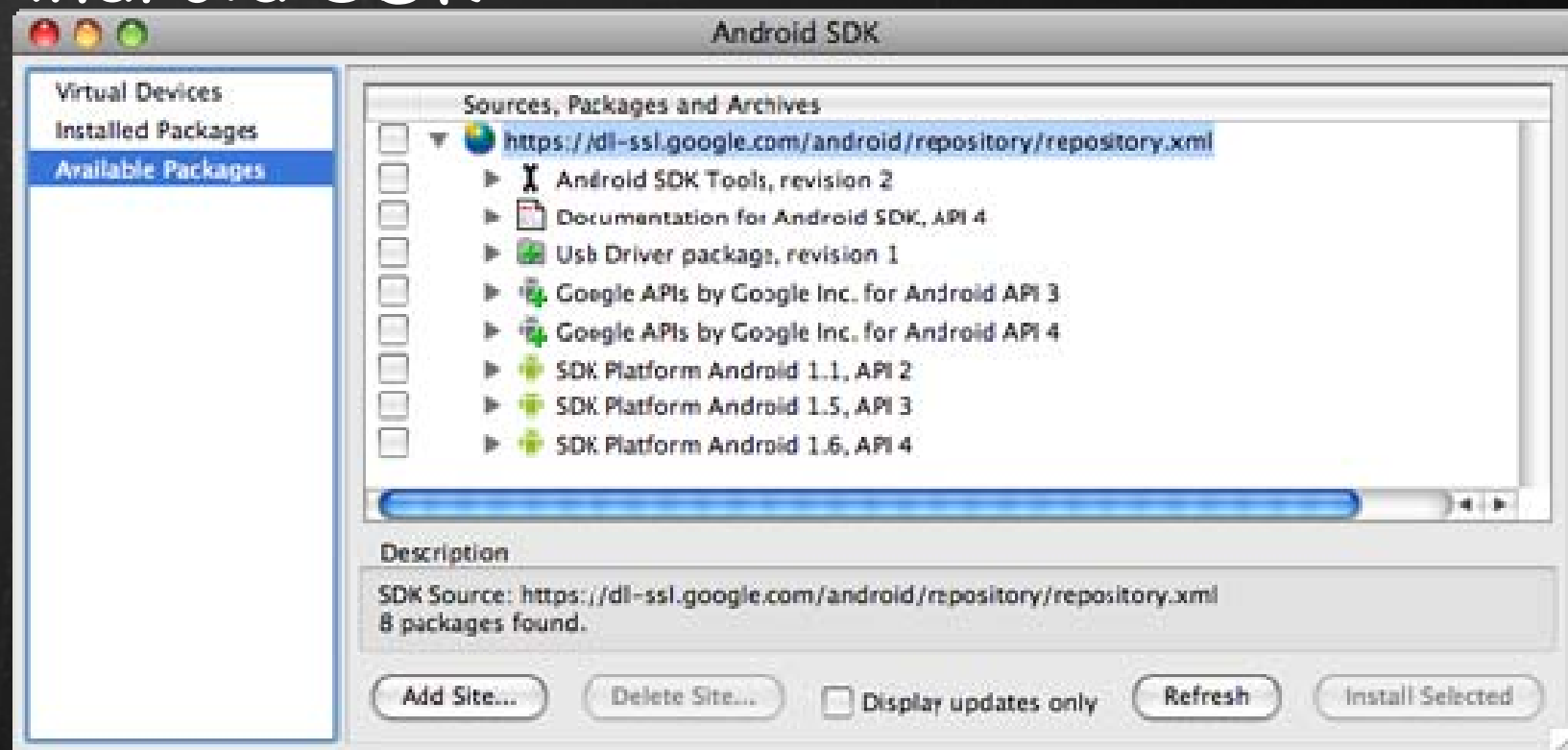
- Wi-Fi
 - Classes
 - ScanResult
 - WifiConfiguration
 - WifiConfiguration.AuthAlgorithm
 - WifiConfiguration.Status
 - WifiManager
 - WifiInfo
 - ...

Application development

- Android SDK
 - provides the tools and APIs necessary to begin developing applications on the Android platform
 - Components:
 - debugger
 - libraries
 - handset emulator (based on QEMU),
 - documentation, sample code, and tutorials

Application development (cont)

- Android SDK



A sample picture of SDK components