

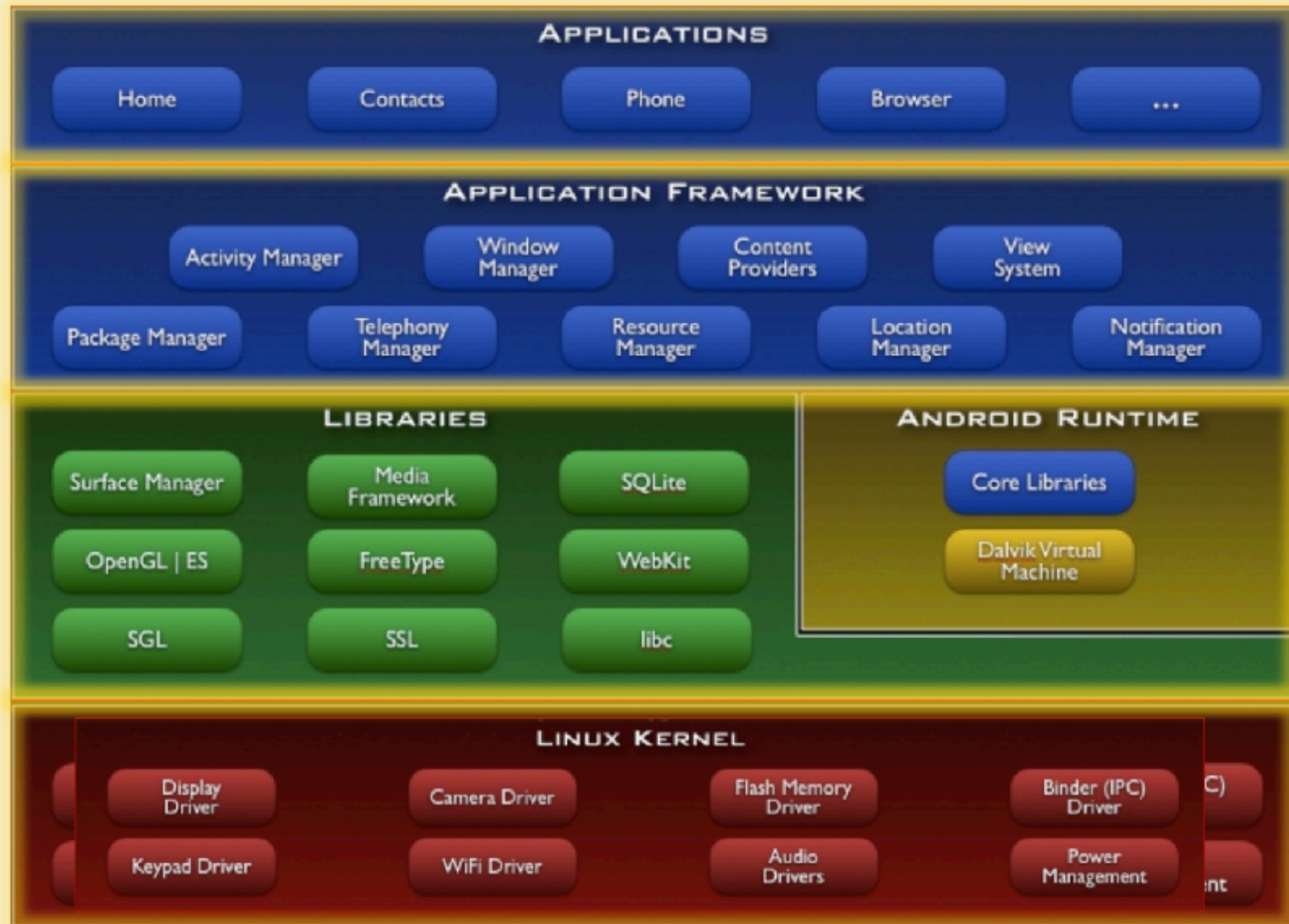
MOBILE APPLICATION DEVELOPMENT

ANDROID PLATFORM

THE ANDROID PLATFORM

- ▶ A software stack for mobile devices
 - ▶ OS Kernel, System libraries, Application Frameworks & Key apps
- ▶ Android SDK for creating APPS
 - ▶ Libraries & Development tools
 - ▶ Lots of DOCUMENTATION. Start Browsing Today!
 - ▶ <http://developer.android.com/training>

THE ANDROID ARCHITECTURE



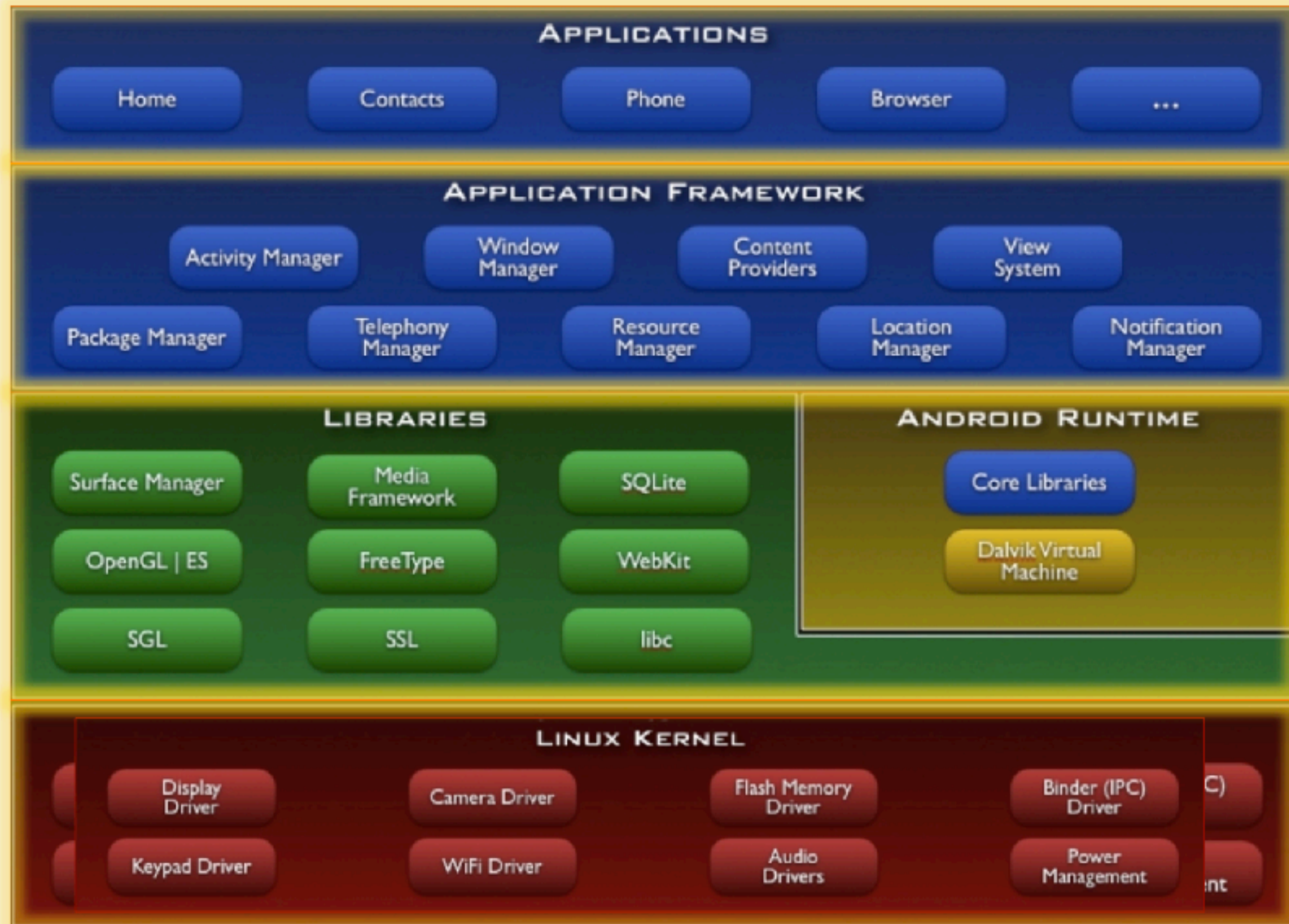
LINUX KERNEL – STANDARD SERVICES

- ▶ Security
- ▶ Memory & Process Management
- ▶ File & Network I/O
- ▶ Device Drivers

LINUX KERNEL – ANDROID SPECIFIC

- ▶ Power Management
- ▶ Android Shared Memory
- ▶ Low Memory Killer
- ▶ Interprocess Communication
- ▶ And much more

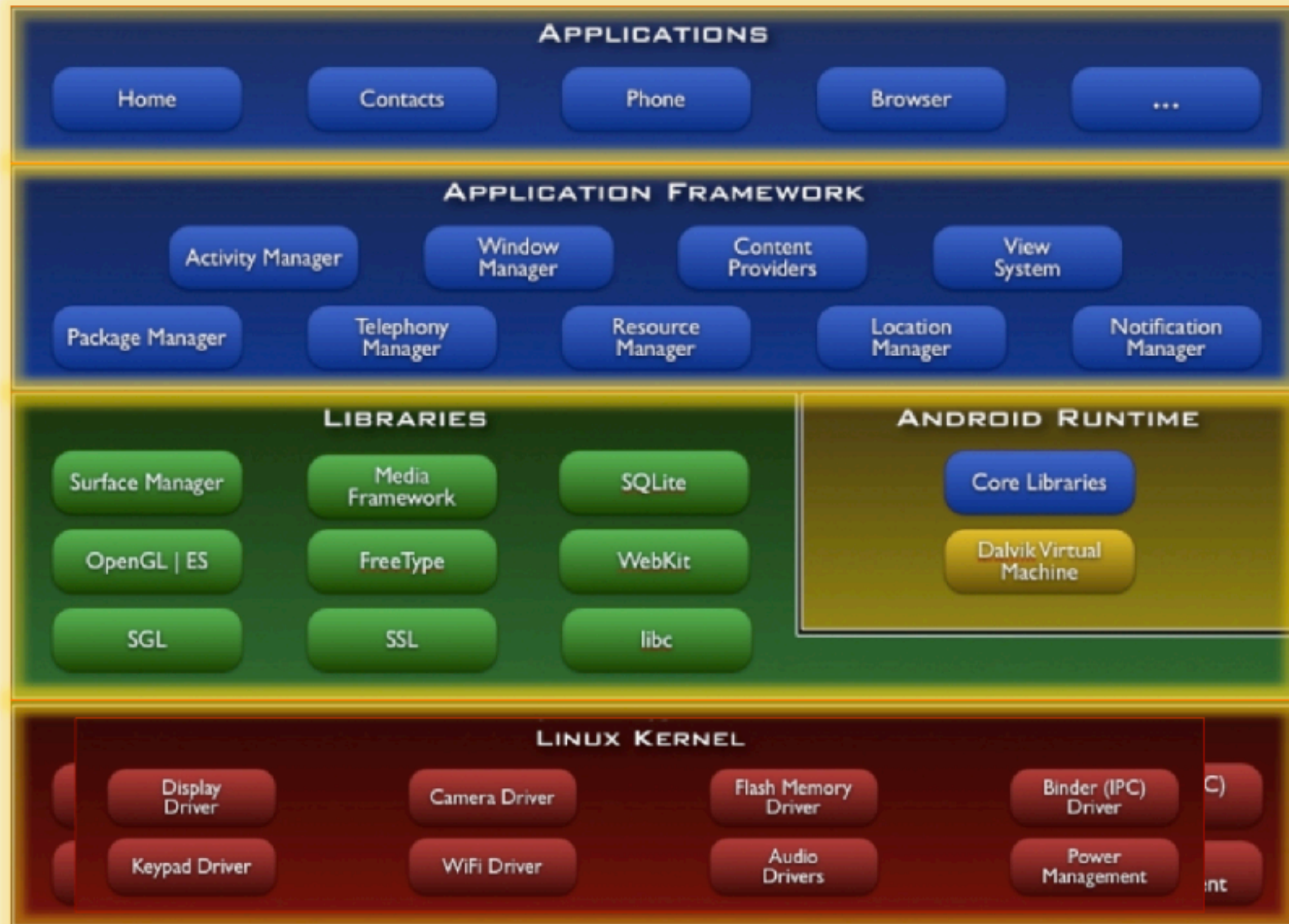
THE ANDROID ARCHITECTURE



LIBRARIES

- ▶ System C Library - Bionic Libc
- ▶ Surface MGR - Display, Management
- ▶ Media Framework - Audio/Video
- ▶ Webkit - Browser Engine
- ▶ OpenGL - Graphics Engines
- ▶ SQLite - Relational Database Engine

THE ANDROID ARCHITECTURE



ANDROID RUNTIME

- ▶ Two Main Components
 - ▶ Core Java Libraries
 - ▶ Dalvik Virtual Machine

CORE JAVA LIBRARIES

- ▶ Basic Java Classes – Java.* , Javax.*
- ▶ App Lifecycle – Android.*
- ▶ Internet / Web services – org.*
- ▶ Unit Testing – JUnit.*

DALVIK VIRTUAL MACHINE

- ▶ Apps are executed by the Dalvik Virtual Machine.

TYPICAL WORKFLOW

- ▶ App written in Java
- ▶ Compiled to Java bytecode files
- ▶ DX Converts Java bytecode files to a single Dex bytecode file (classes.dex)
- ▶ Dalvik executes Dex bytecode file

DALVIK VIRTUAL MACHINE

- ▶ Designed for Resource - Constrained Environment
 - ▶ Slower CPU
 - ▶ Less RAM
 - ▶ Limited Battery Life

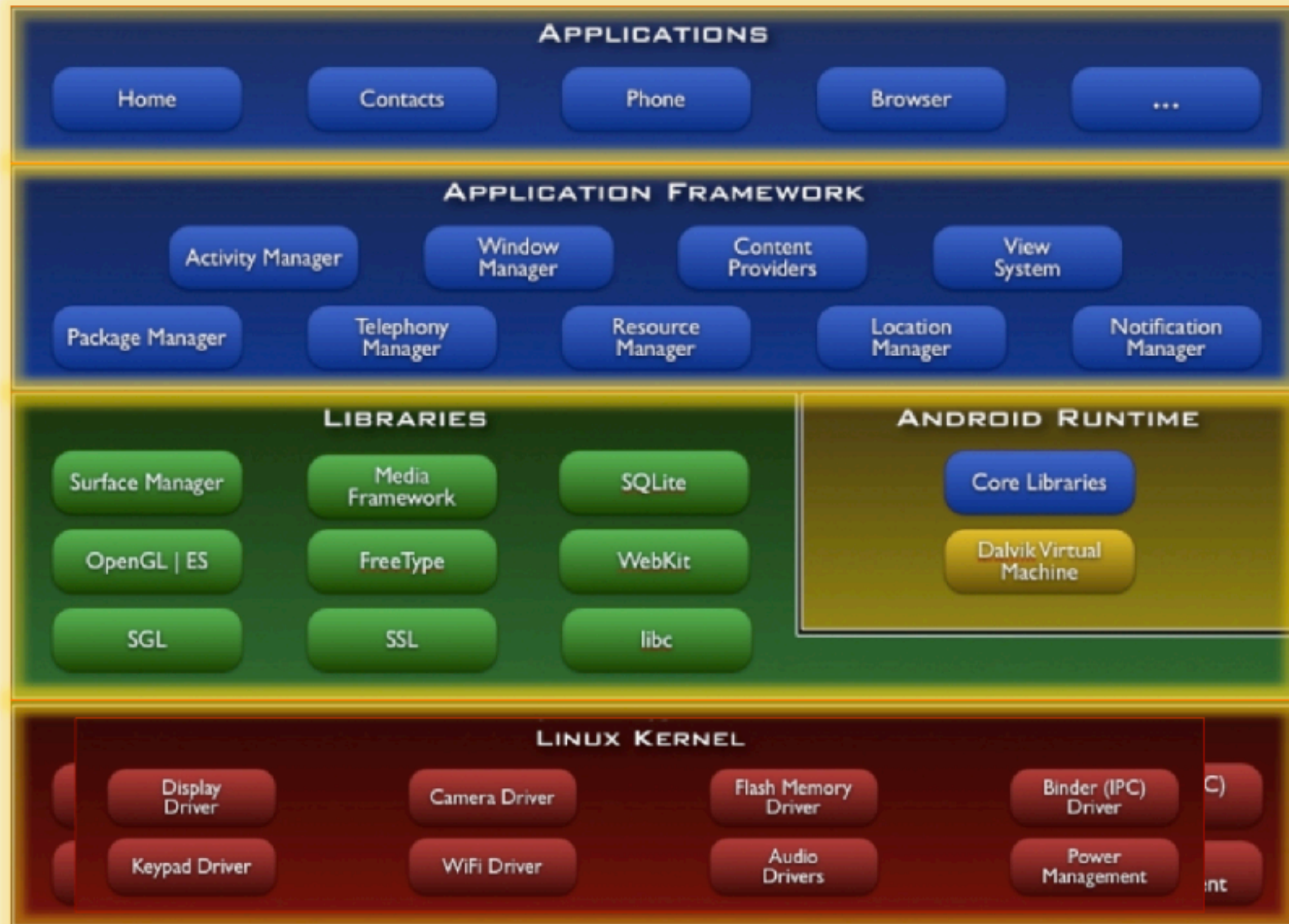
DALVIK VIRTUAL MACHINE

▶ See

▶ Dalvik VM Internals by Dan Bornstein

▶ [Http://www.youtube.com/watch? v=ptjedOZEXPM](http://www.youtube.com/watch?v=ptjedOZEXPM)

THE ANDROID ARCHITECTURE



PACKAGE MANAGER

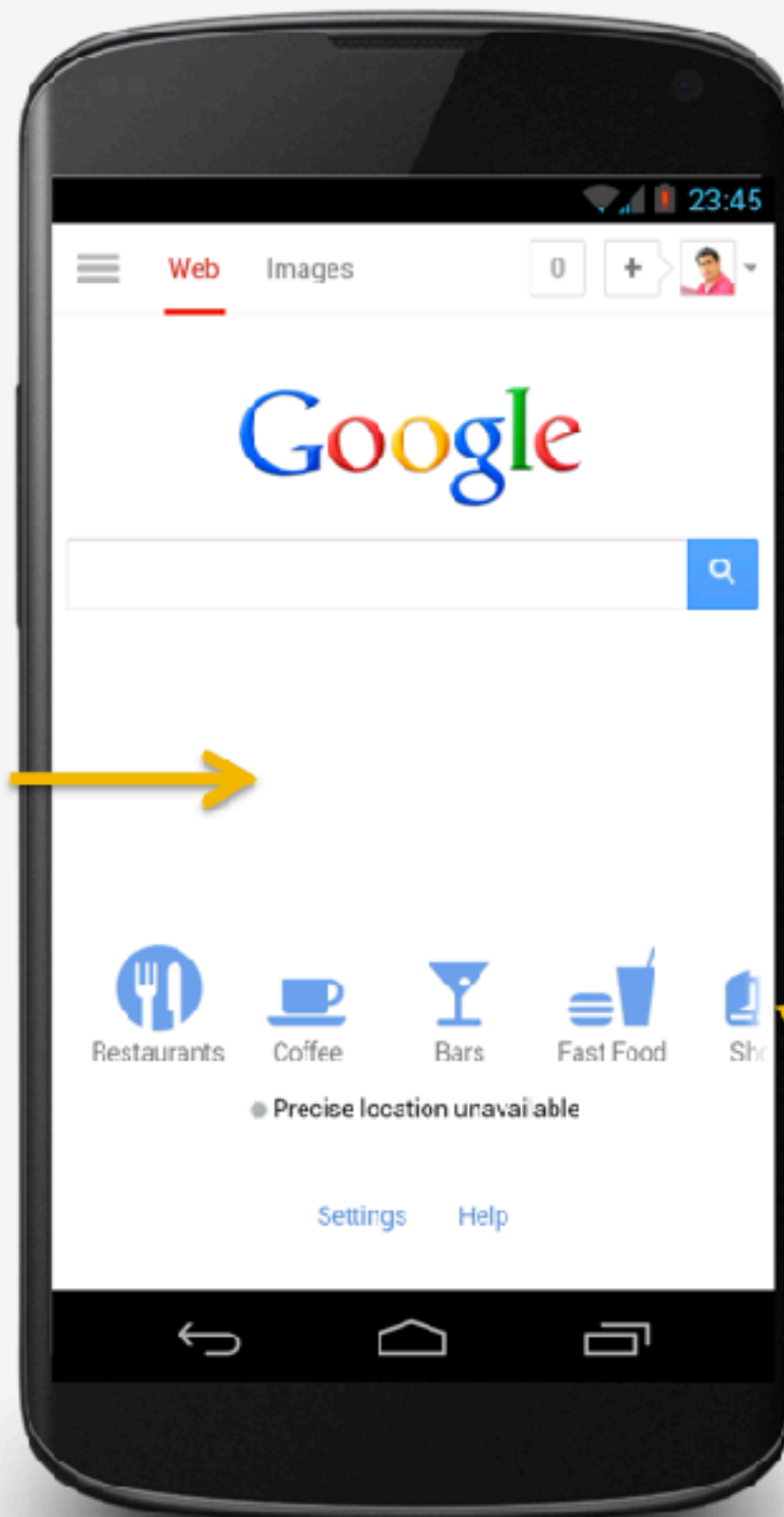
- ▶ Keeps track of APP packages on Device



WINDOW MANAGER

- ▶ Manages the windows comprising an App

SUBWINDOW



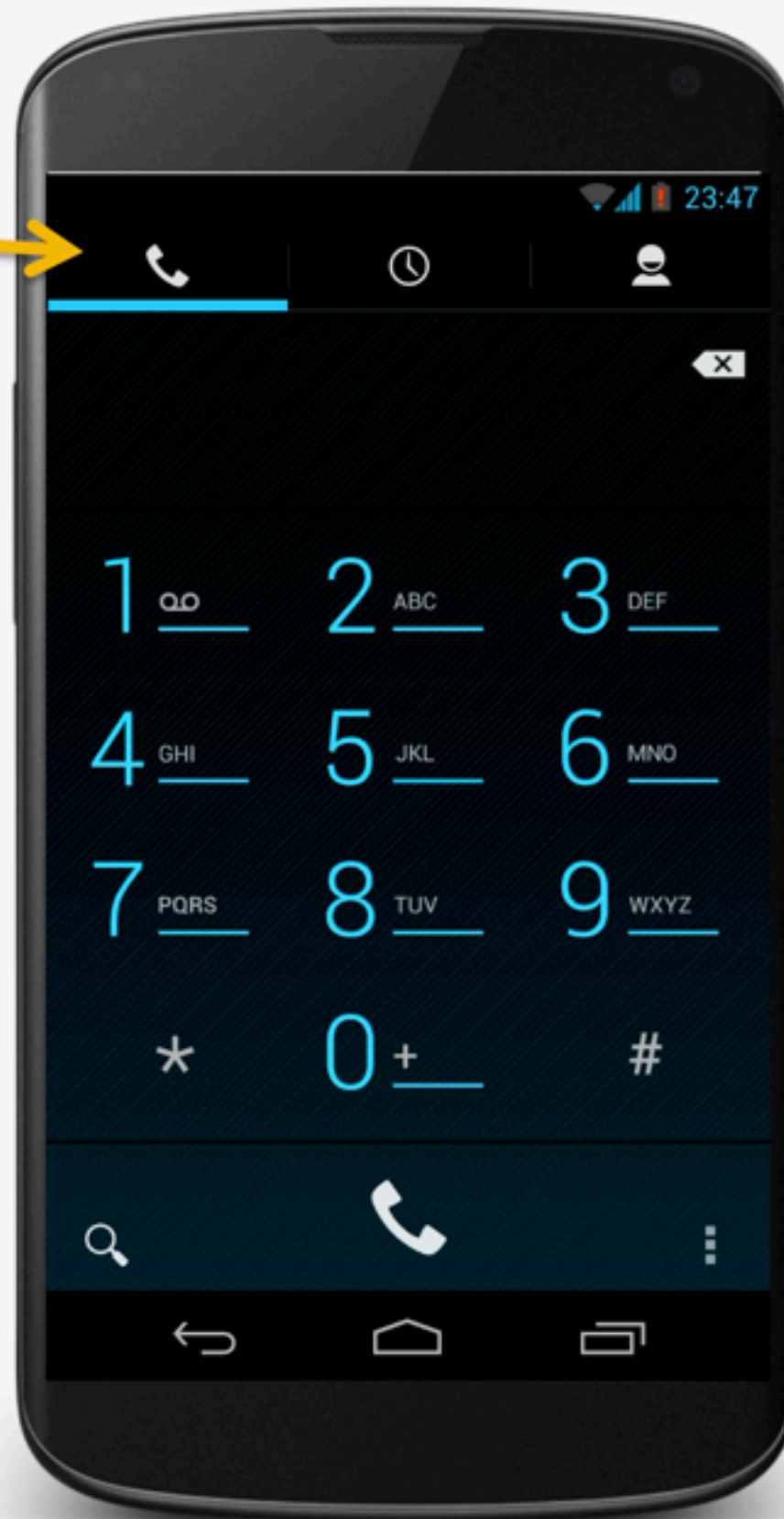
NOTIFICATION
BAR

MAIN
WINDOW

VIEW SYSTEM

- ▶ Provides Common User Interface Elements
 - ▶ Icons, Text Entry Boxes, Buttons and more...

TABS



TEXTVIEW



(555) 555-5555



+ Add to contacts

1 CD

2 ABC

3 DEF

4 GHI

5 JKL

6 MNO

7 PQRS

8 TUV

9 WXYZ

*

0 +

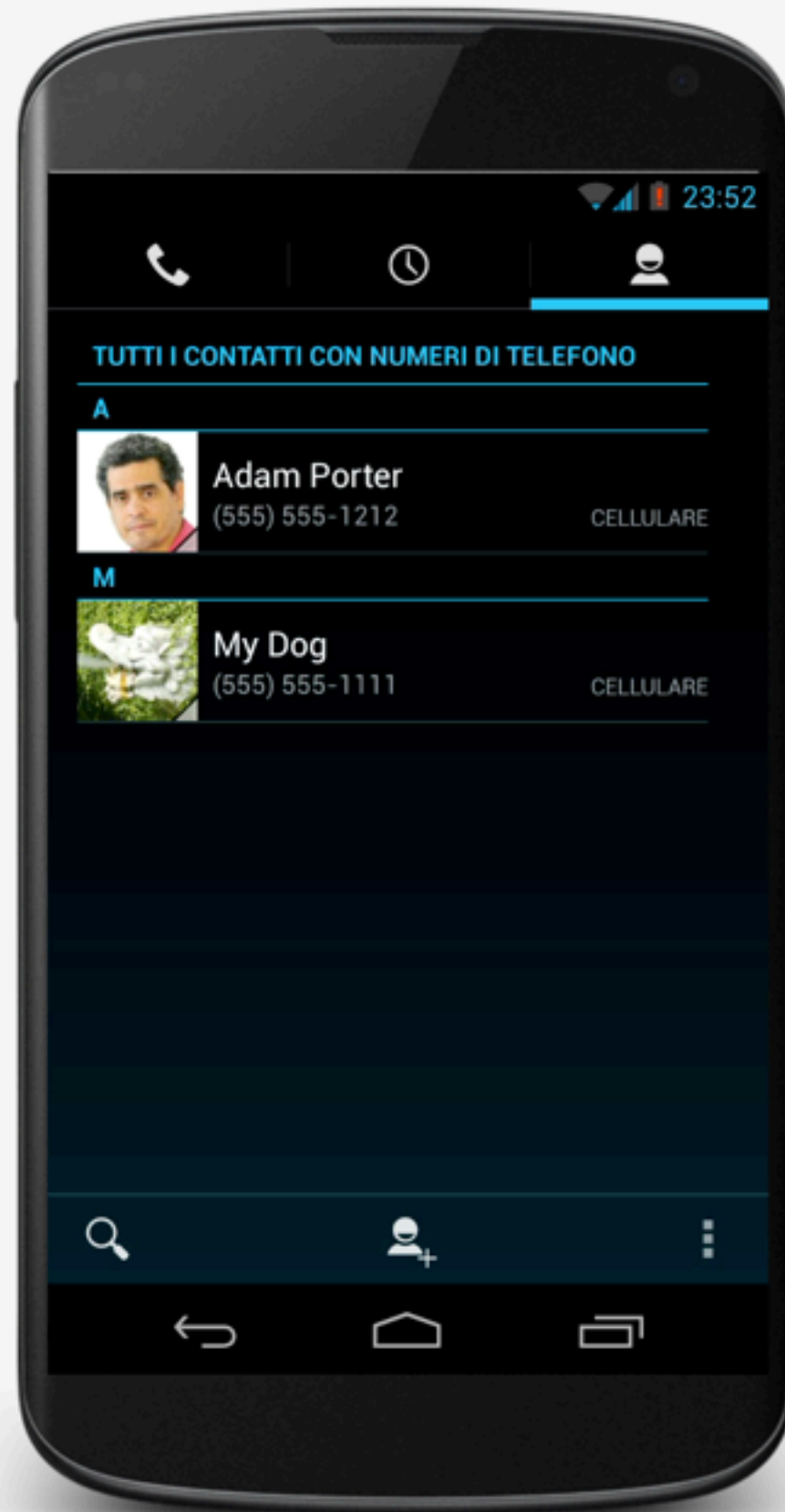
#

BUTTONS



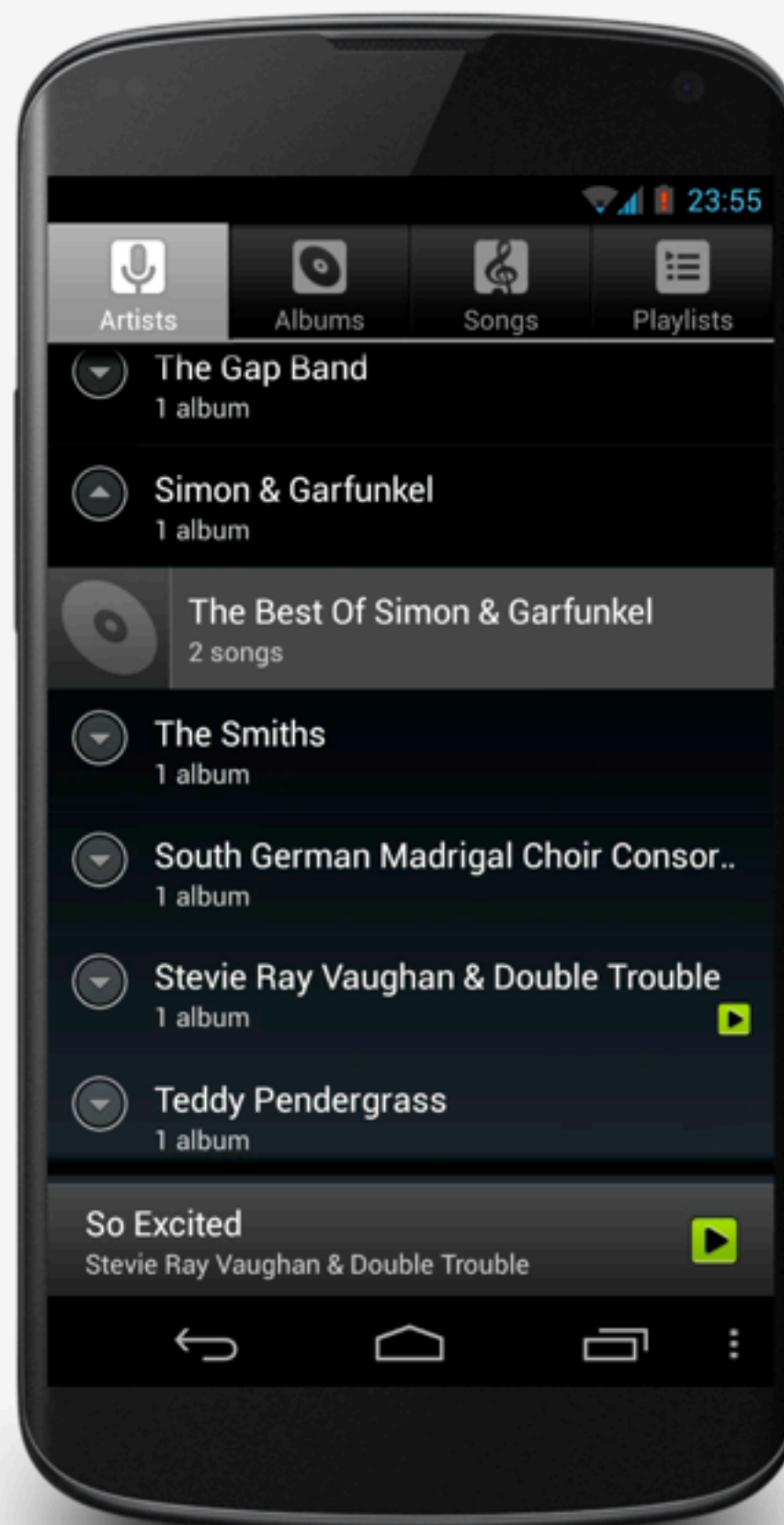
RESOURCE MANAGER

- ▶ Manages Non-Compiled Resources
 - ▶ e.g., Strings, Graphics, and Layout Files



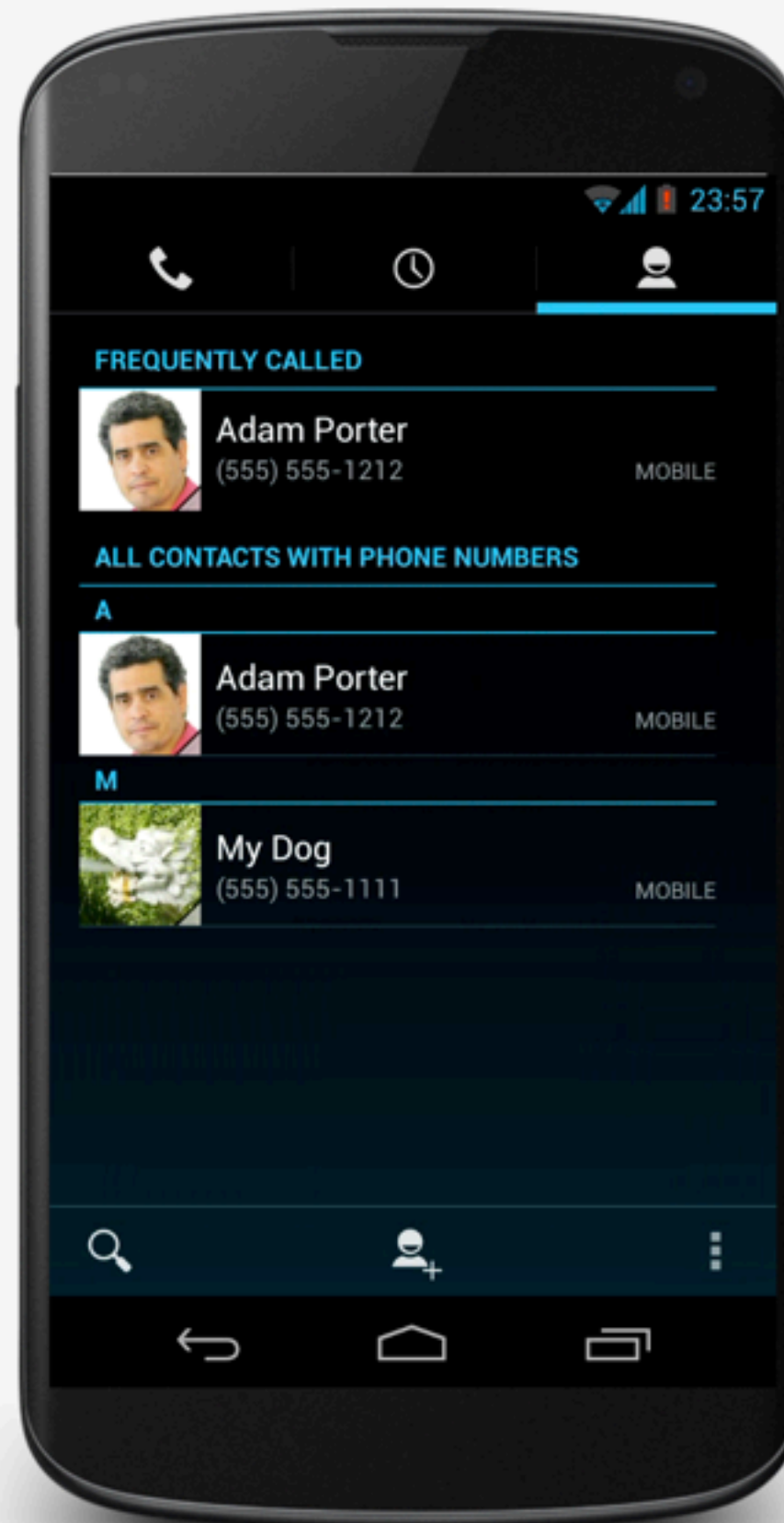
ACTIVITY MANAGER

- ▶ Manages App Lifecycle And Navigation Stack



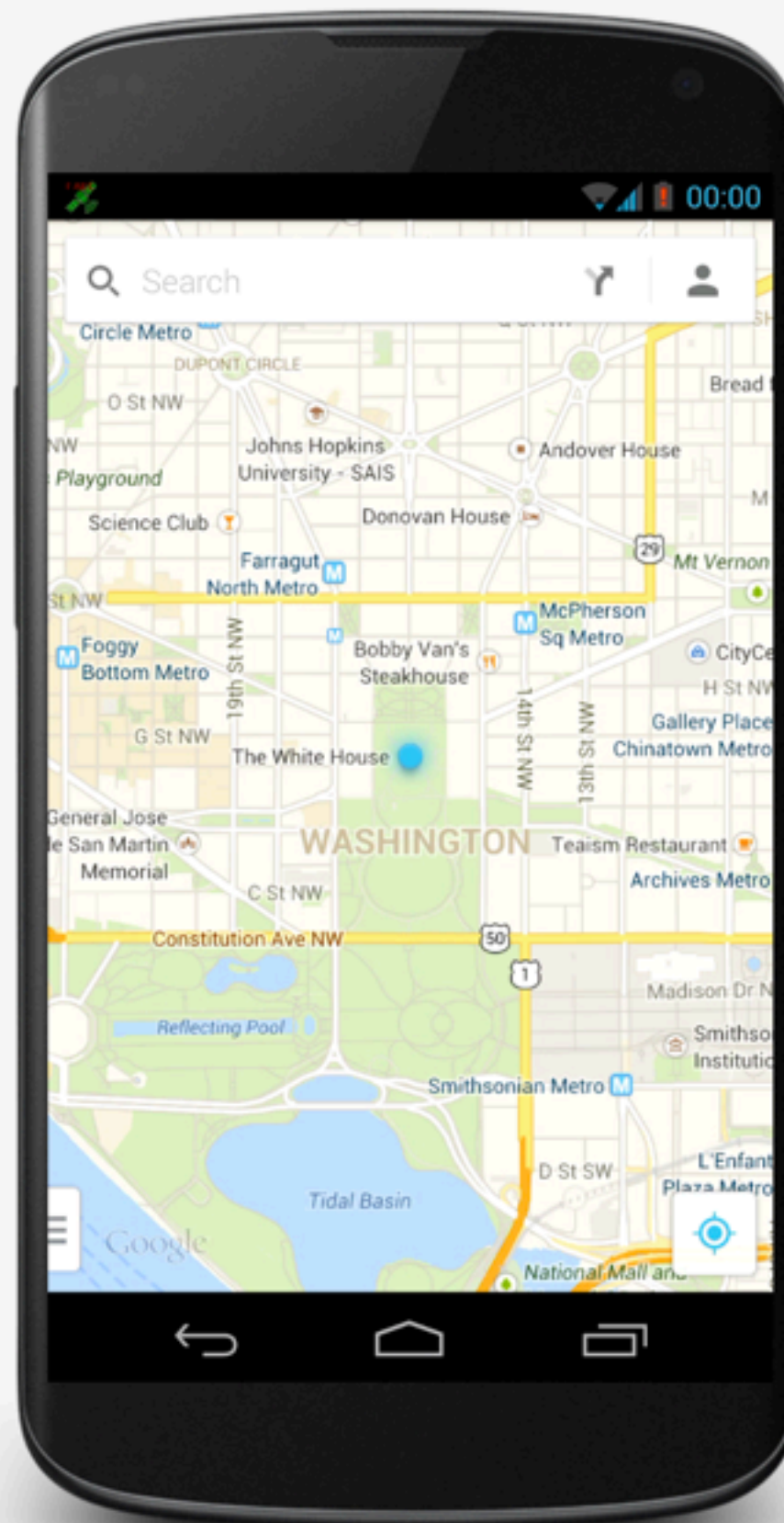
CONTENT PROVIDER

- ▶ Inter – Application Data Sharing



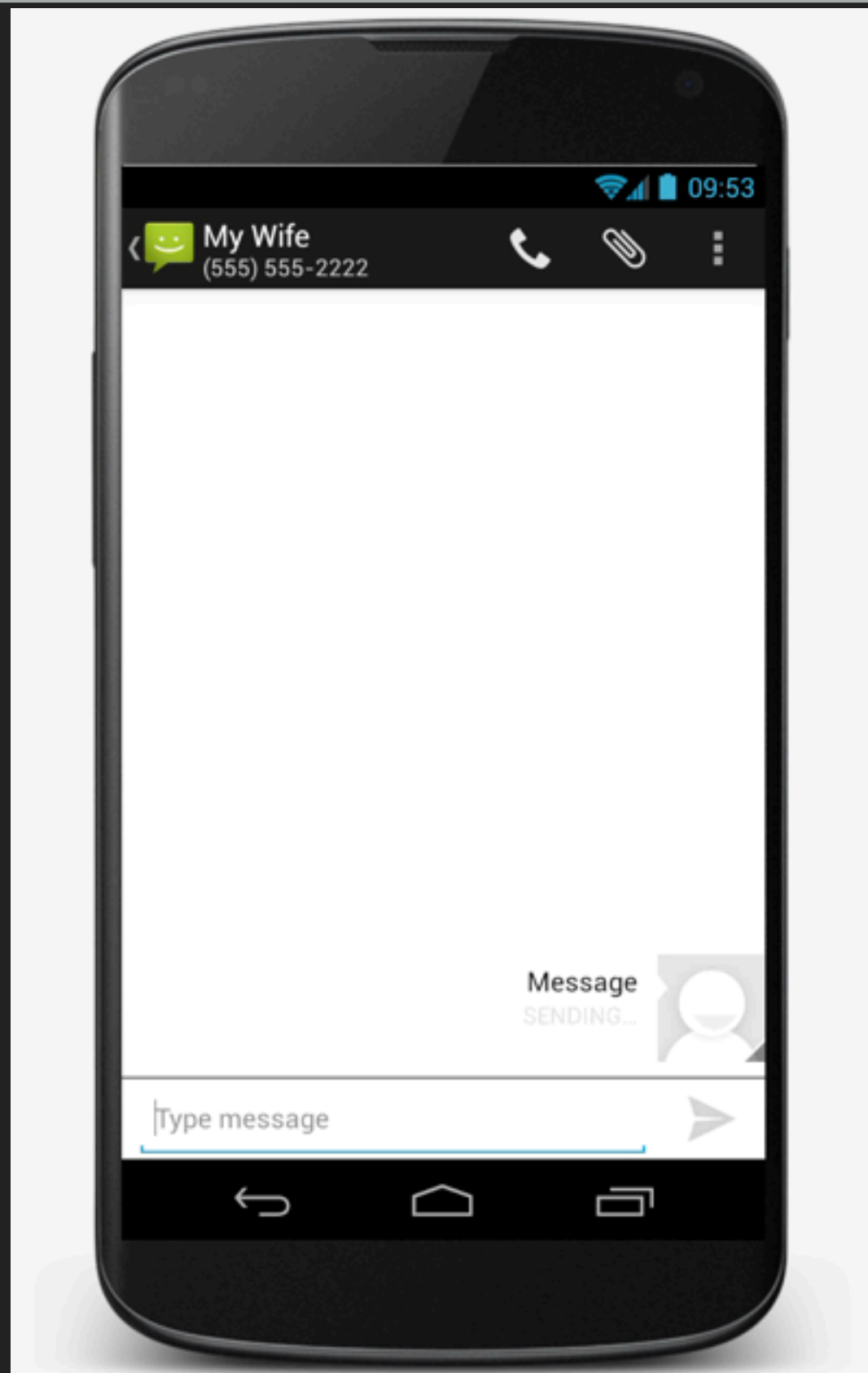
LOCATION MANAGER

- ▶ Provides Location & Movement Information



NOTIFICATION MANAGER

- ▶ Place Notification Icons in the status bar when important events occur



APPLICATIONS

- ▶ Standard Apps Include:
 - ▶ Home – Main Screen
 - ▶ Contacts – Contacts Database
 - ▶ Phone – Dial Phone Numbers
 - ▶ Browser – View Web Pages
 - ▶ Email Reader - Compose & Read Email Messages

APPLICATIONS

- ▶ Nothing Special About These Apps
- ▶ You can substitute your own or 3rd party app for any of them