Android Introduction

Platform Overview

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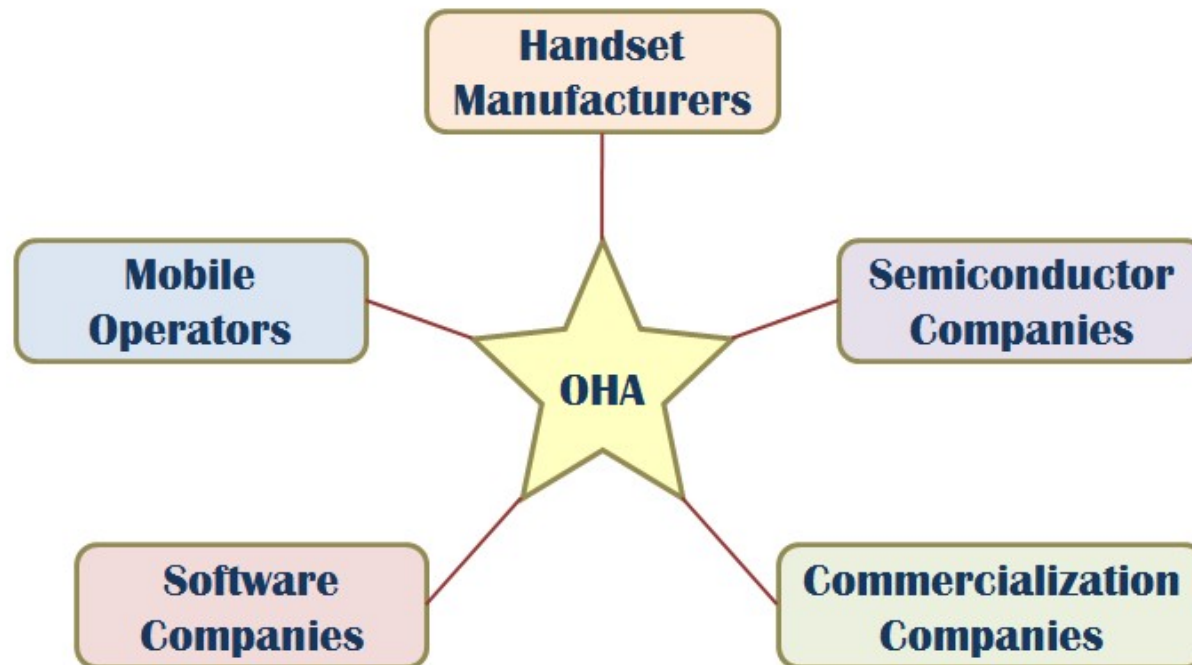# What is Android?

- Android is a software stack for mobile devices that includes an operating system, middleware and key applications.

OHA (Open Handset Alliance)

- A business alliance consisting of 47 companies to develop open standards for mobile devices

Phones

HTC G1,
Droid,
Tattoo

Motorola Droid (X)

Suno S880

Samsung Galaxy

Sony Ericsson

Tablets

Velocity Micro Cruz

Gome FlyTouch

Acer beTouch

Dawa D7

Toshiba Android SmartBook

Cisco Android Tablet
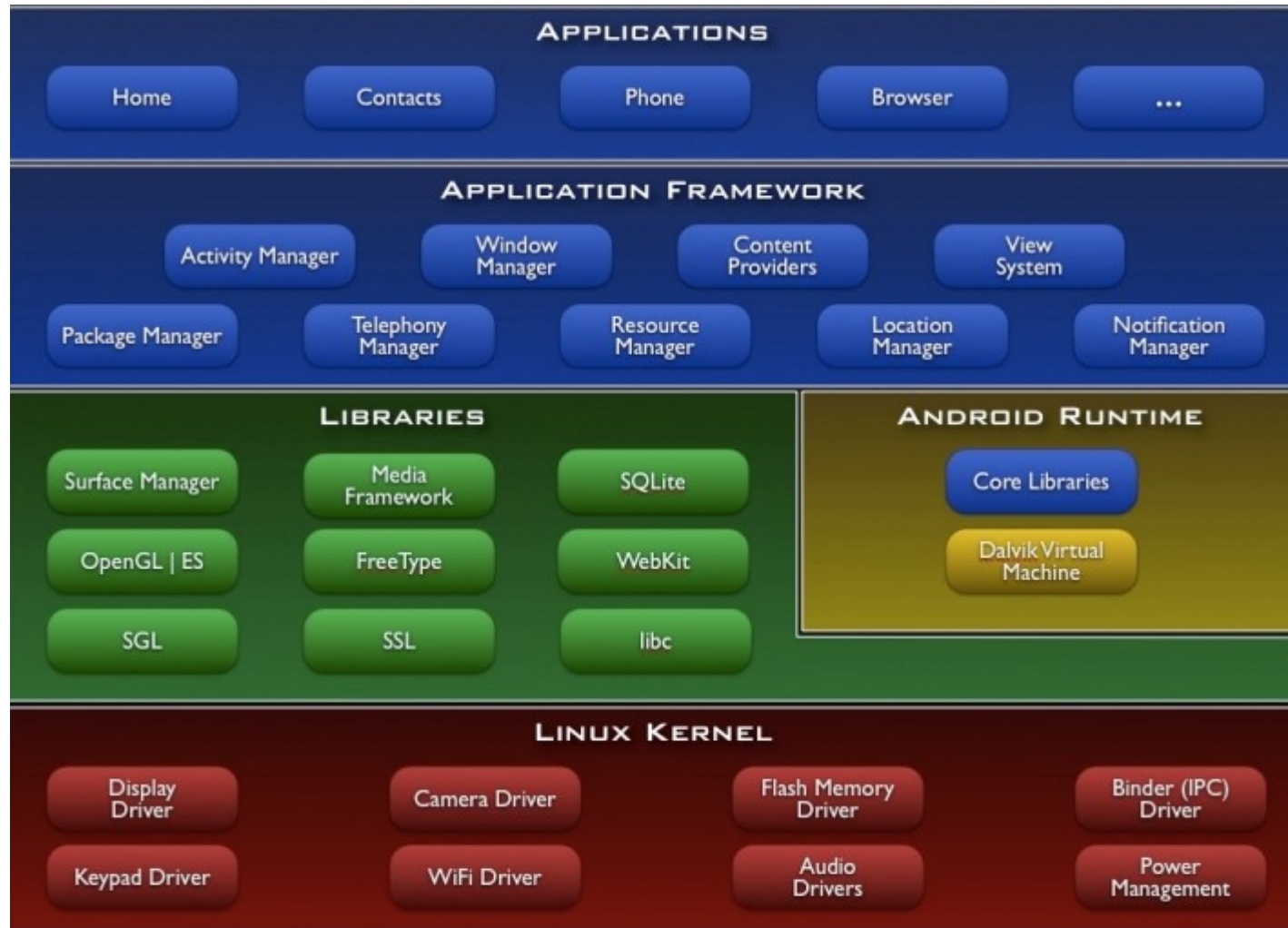
MarketShare

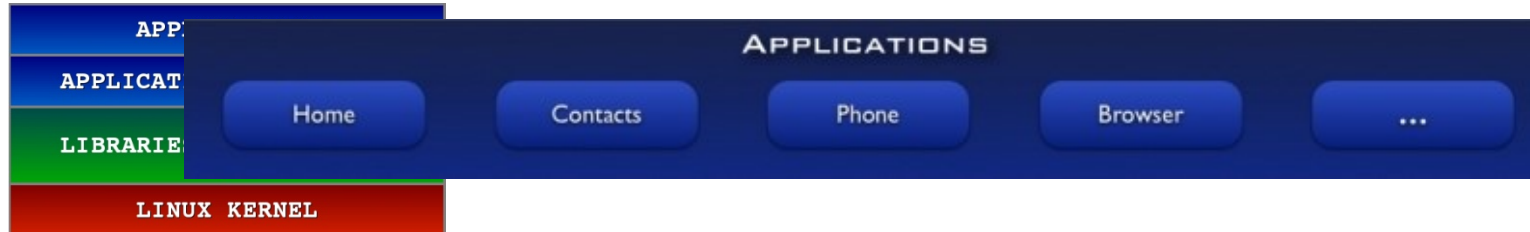|	Feb'10	May'10	Apr'11
RIM	42.1%	41.7%	29%
Apple	25.4%	24.4%	25%
Google	9%	13%	33%
Microsoft	15.1%	13.2%	7.7%
Palm	5.4%	4.8%	2.9%

Architecture

Android S/W Stack - Application

- ☐ Android provides a set of core applications:
  - ✓ Email Client
  - ✓ SMS Program
  - ✓ Calendar
  - ✓ Maps
  - ✓ Browser
  - ✓ Contacts
  - ✓ Etc

- ☐ All applications are written using the Java language.

Android S/W Stack – App Framework

- ❑ Enabling and simplifying the reuse of components
  - ✓ Developers have full access to the same framework APIs used by the core applications.
  - ✓ Users are allowed to replace components.

Android S/W Stack – App Framework (Cont)

- **Features**

| Feature	Role
View System	Used to build an application, including lists, grids, text boxes, buttons, and embedded web browser
Content Provider	Enabling applications to access data from other applications or to share their own data
Resource Manager	Providing access to non-code resources (localized strings, graphics, and layout files)
Notification Manager	Enabling all applications to display customer alerts in the status bar
Activity Manager	Managing the lifecycle of applications and providing a common navigation backstack

Android S/W Stack - Libraries

□ Including a set of C/C++ libraries used by components of the Android system

□ Exposed to developers through the Android application framework

Android S/W Stack - Runtime
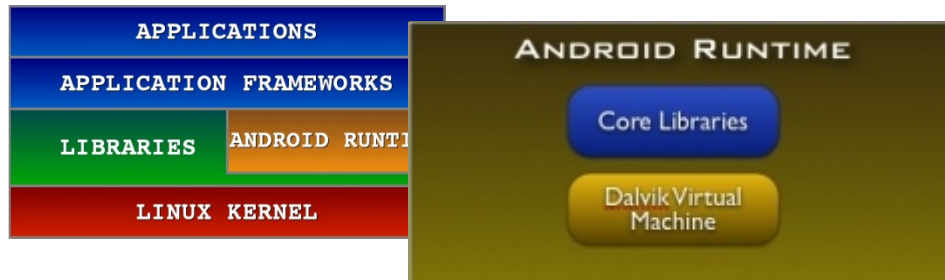
□ **Core Libraries**

✓ Providing most of the functionality available in the core libraries of the Java language

✓ APIs

➢ Data Structures

➢ Utilities

➢ File Access

➢ Network Access

➢ Graphics

➢ Etc

Android S/W Stack – Runtime (Cont)

- **Dalvik Virtual Machine**
  - ✓ Providing environment on which every Android application runs
    - ➢ Each Android application runs in its own process, with its own instance of the Dalvik VM.
    - ➢ Dalvik has been written such that a device can run multiple VMs efficiently.

  - ✓ Register-based virtual machine

Android S/W Stack – Runtime (Cont)

- **Dalvik Virtual Machine (Cont)**
  - ✓ Executing the Dalvik Executable (.dex) format
    - ➢ .dex format is optimized for minimal memory footprint.
    - ➢ Compilation
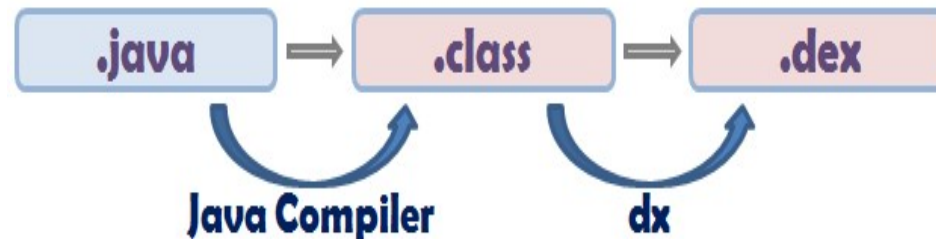
  - ✓ Relying on the Linux Kernel for:
    - ➢ Threading
    - ➢ Low-level memory management

Android S/W Stack – Linux Kernel

- Relying on Linux Kernel 2.6 for core system services

  ✓ Memory and Process Management

  ✓ Network Stack

  ✓ Driver Model

  ✓ Security

- Providing an abstraction layer between the H/W and the rest of the S/W stack