Overview of Android (Part 3): Application Framework & Apps Layers

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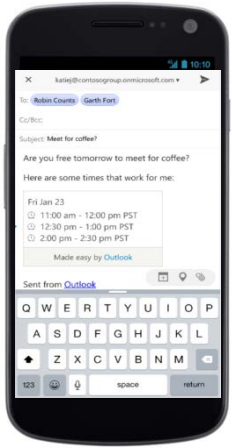
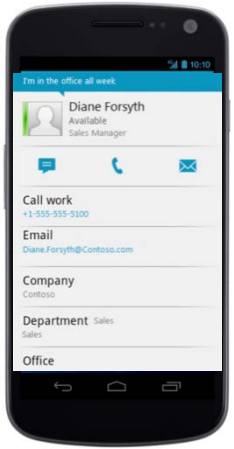
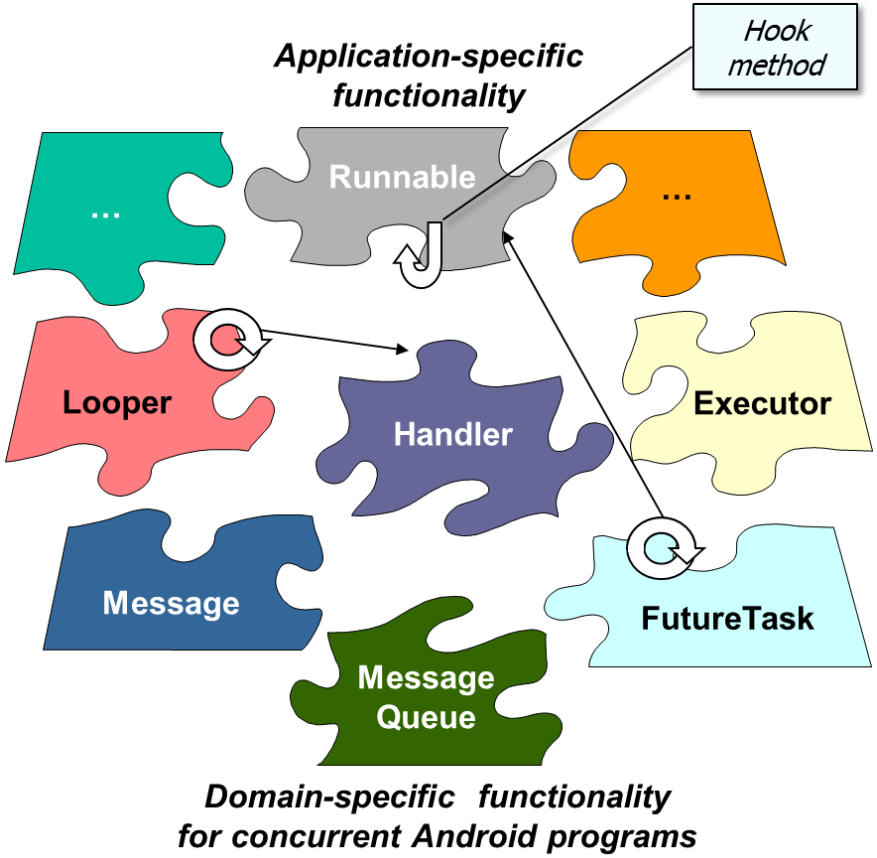
Learning Objectives in this Part of the Lesson

1. Understand what is an application framework & know why it's useful







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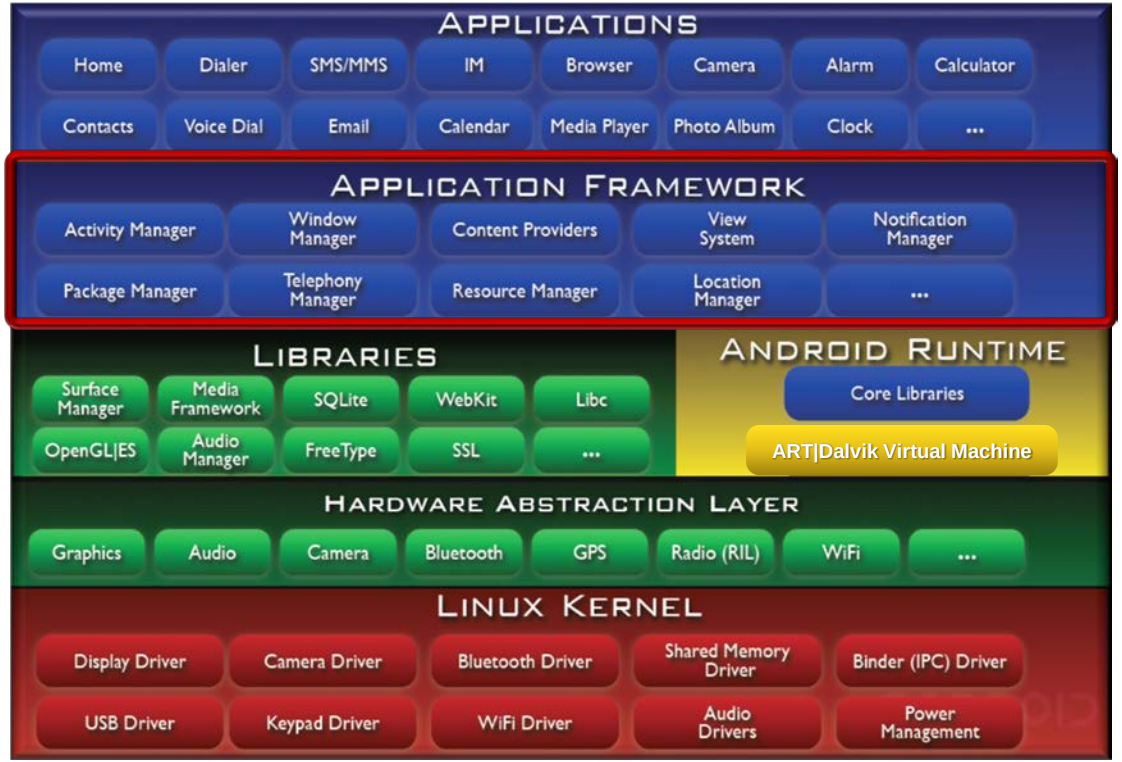
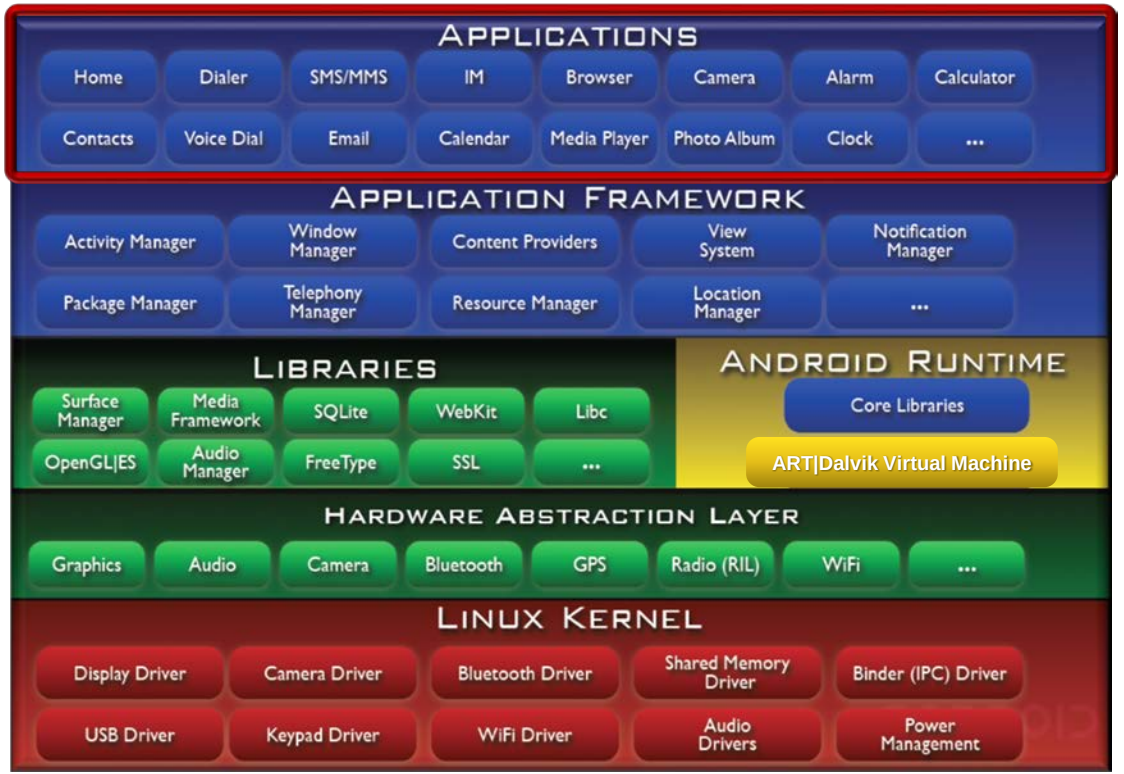
2. Recognize common system services in the Android Application Framework layer



Learning Objectives in this Part of the Lesson

1. Understand what is an application framework & know why it's useful
2. Recognize common system services in the Android Application Framework layer
3. Recognize common apps that are available on an Android device



Overview of Application Frameworks

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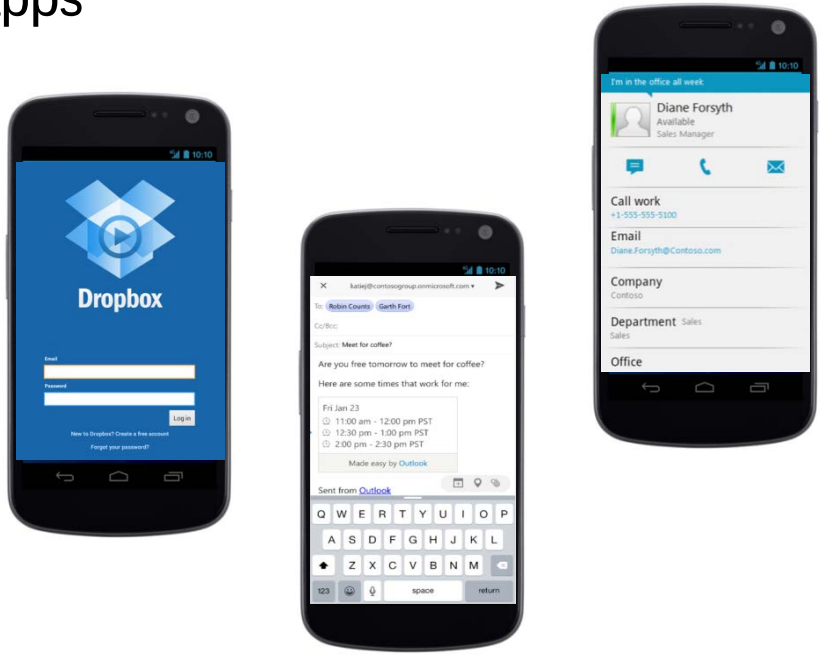
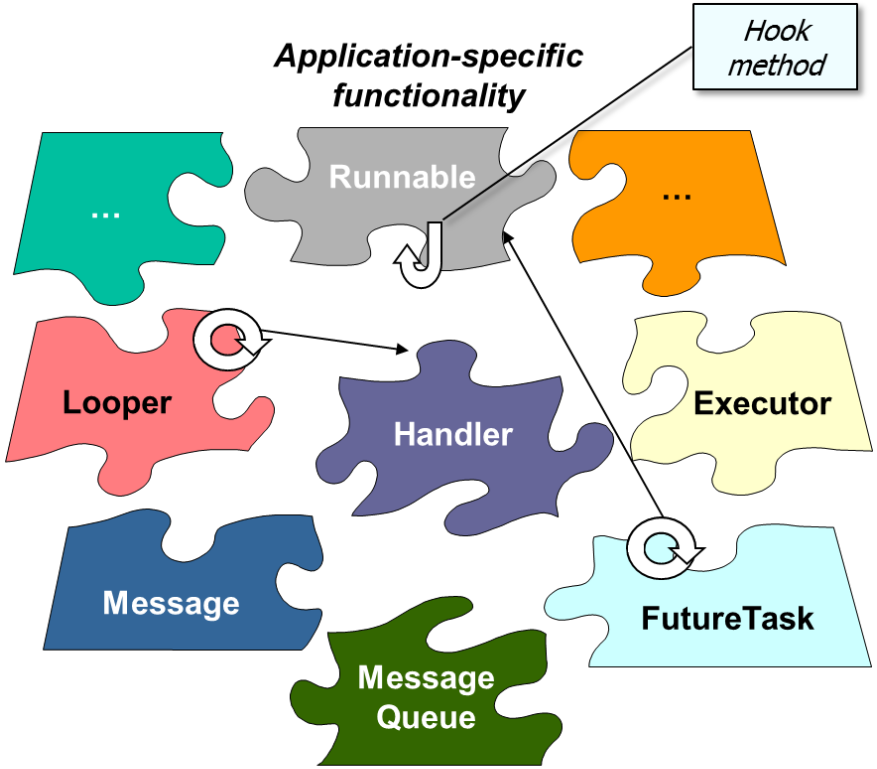
- A framework is an integrated set of components that provide a reusable architecture for a family of related apps

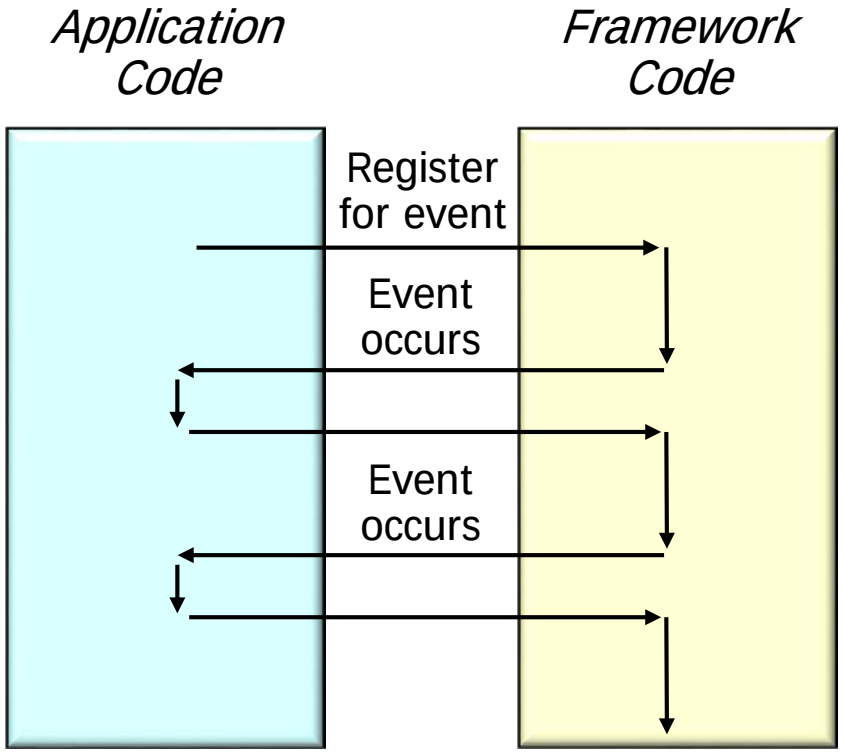




See www.dre.vanderbilt.edu/~schmidt/frameworks.html

Overview of Application Frameworks

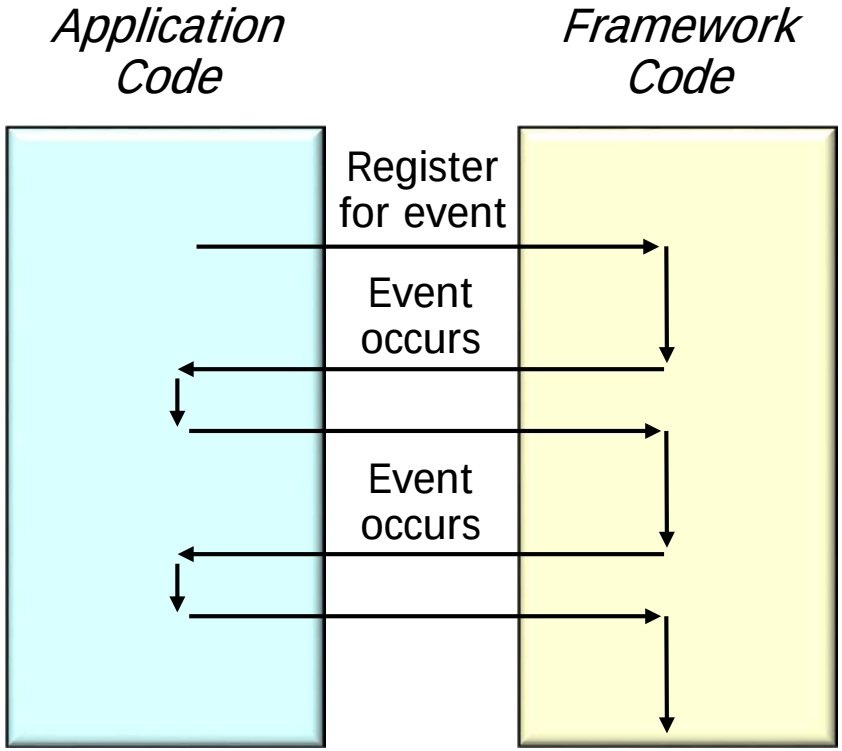
- Frameworks use an event-driven programming model to plug app code into them



See en.wikipedia.org/wiki/Event-driven_programming

Overview of Application Frameworks

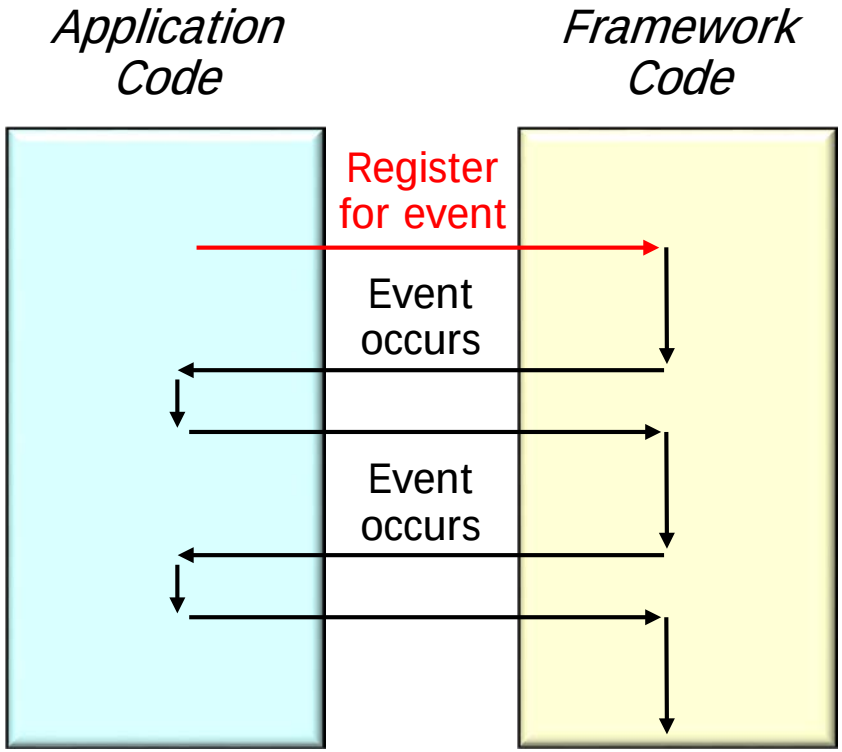
- Frameworks use an event-driven programming model to plug app code into them
  - They enhance systematic reuse by providing canonical structure & functionality to apps



See en.wikipedia.org/wiki/Code_reuse#Systematic_software_reuse

Overview of Application Frameworks

- An app registers callbacks for specific types of events that can occur within the framework



See en.wikipedia.org/wiki/Callback_(computer_programming)

Overview of Application Frameworks

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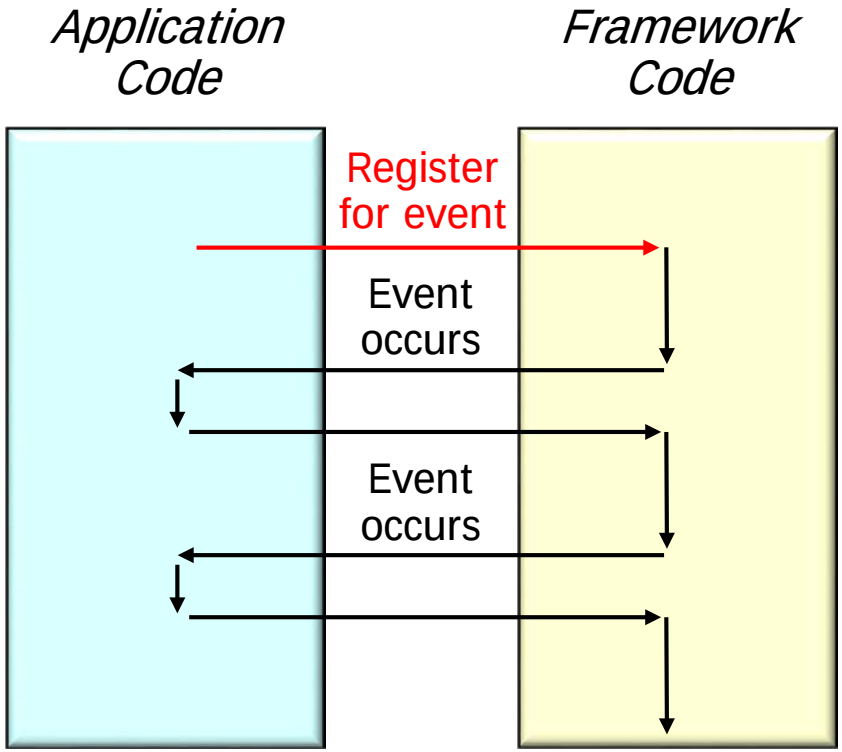
  - A callback is an object passed as an argument to a framework



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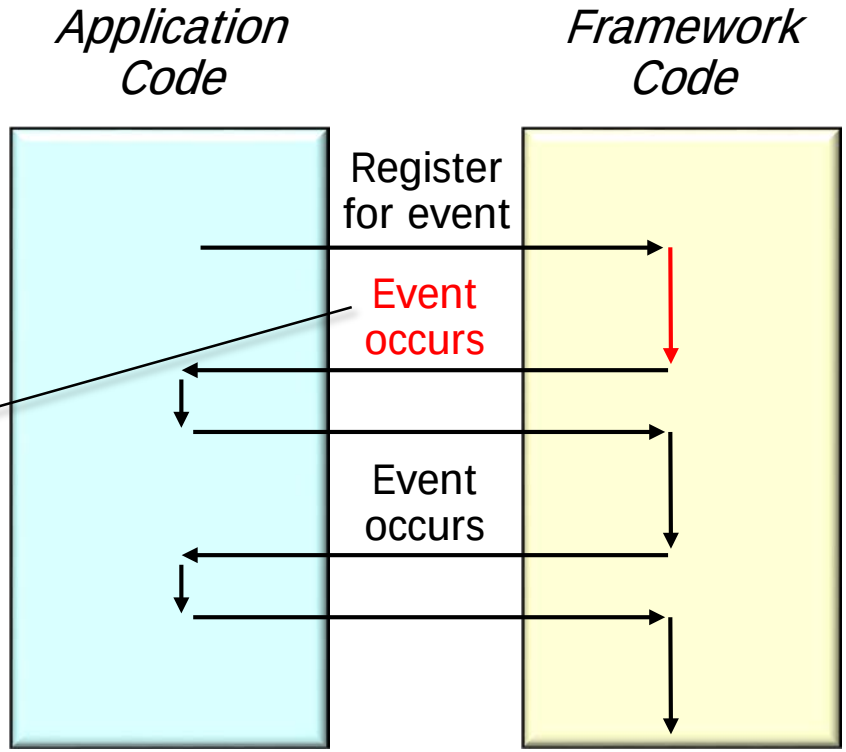
Overview of Application Frameworks

- An app registers callbacks for specific types of events that can occur within the framework
  - A callback is an object passed as an argument to a framework
  - The framework monitors event sources for activity of interest

e.g., arrival of network messages, clicks on GUI components, etc.



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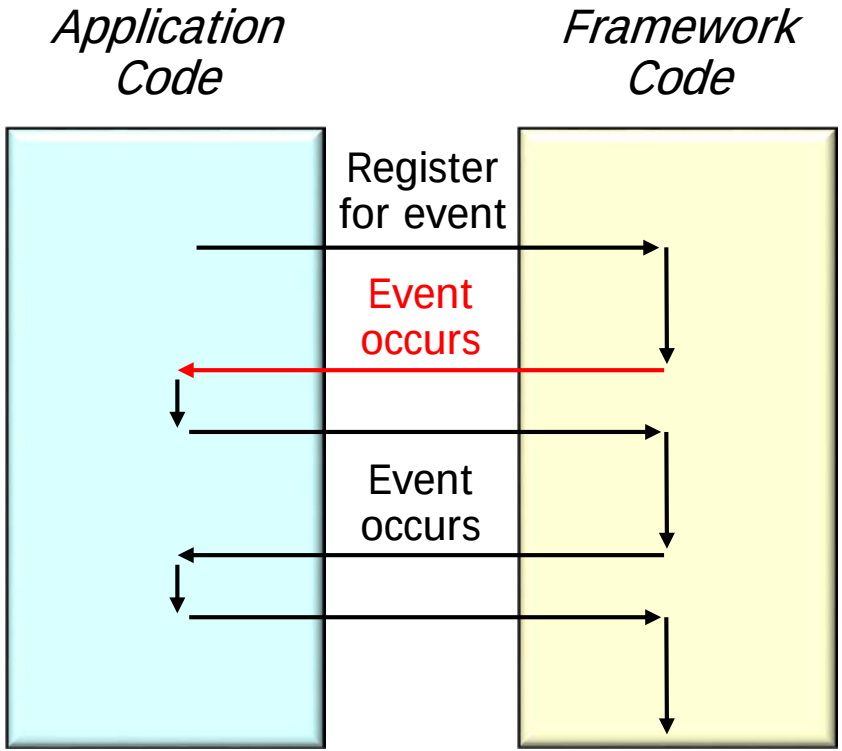

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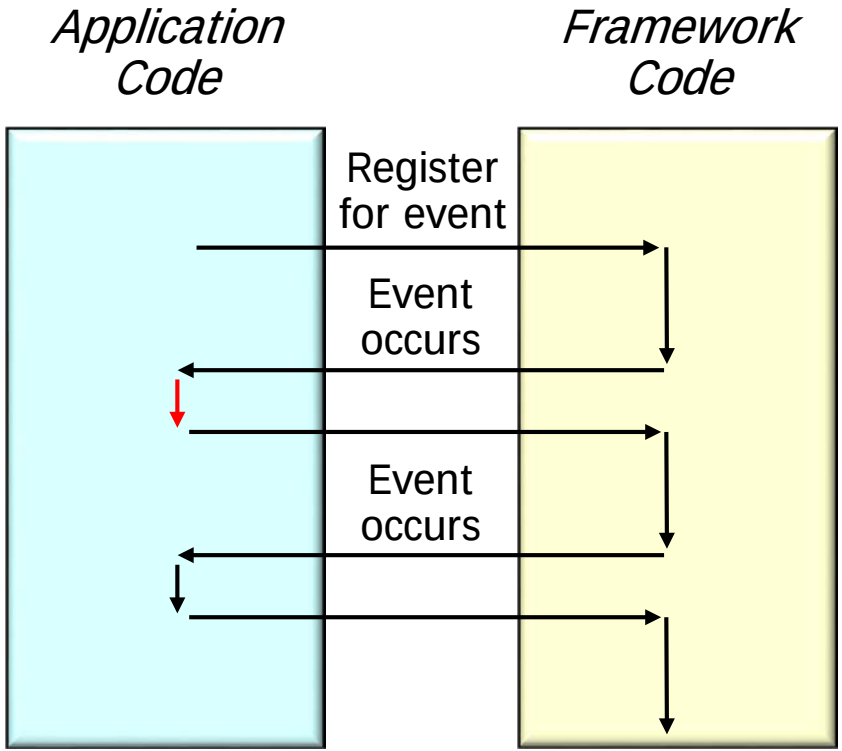
    - The app processing occurs in context of framework thread(s)



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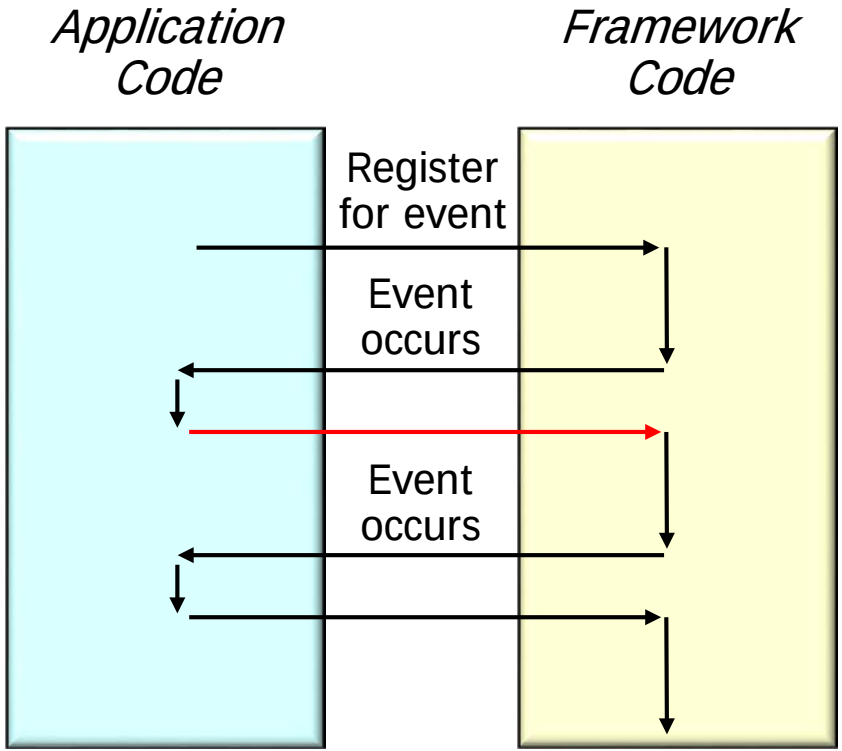
- When app callback is done control returns to the framework, where it waits for the next event to occur



Overview of Application Frameworks

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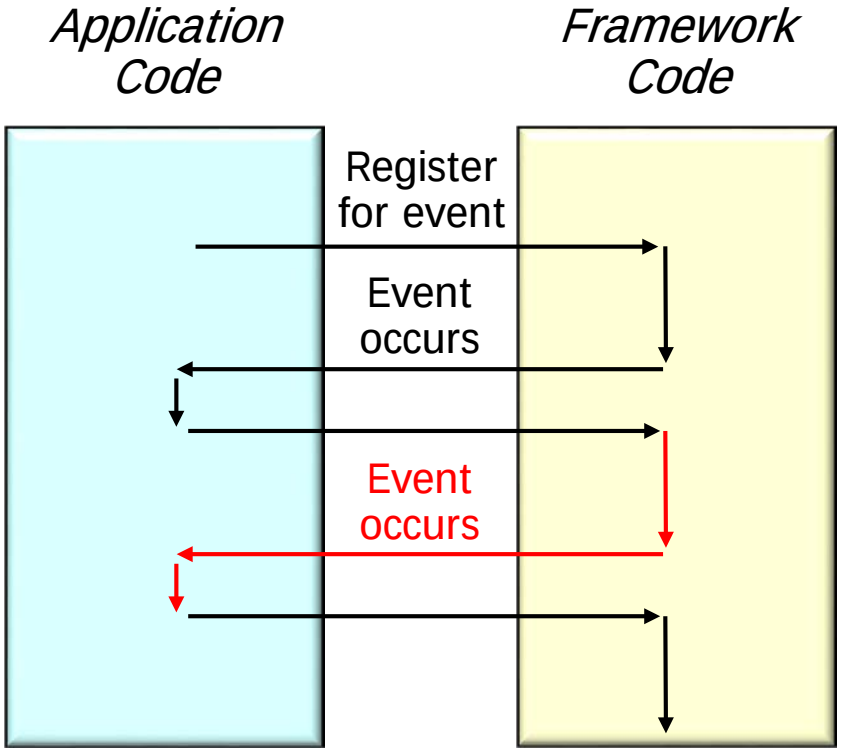
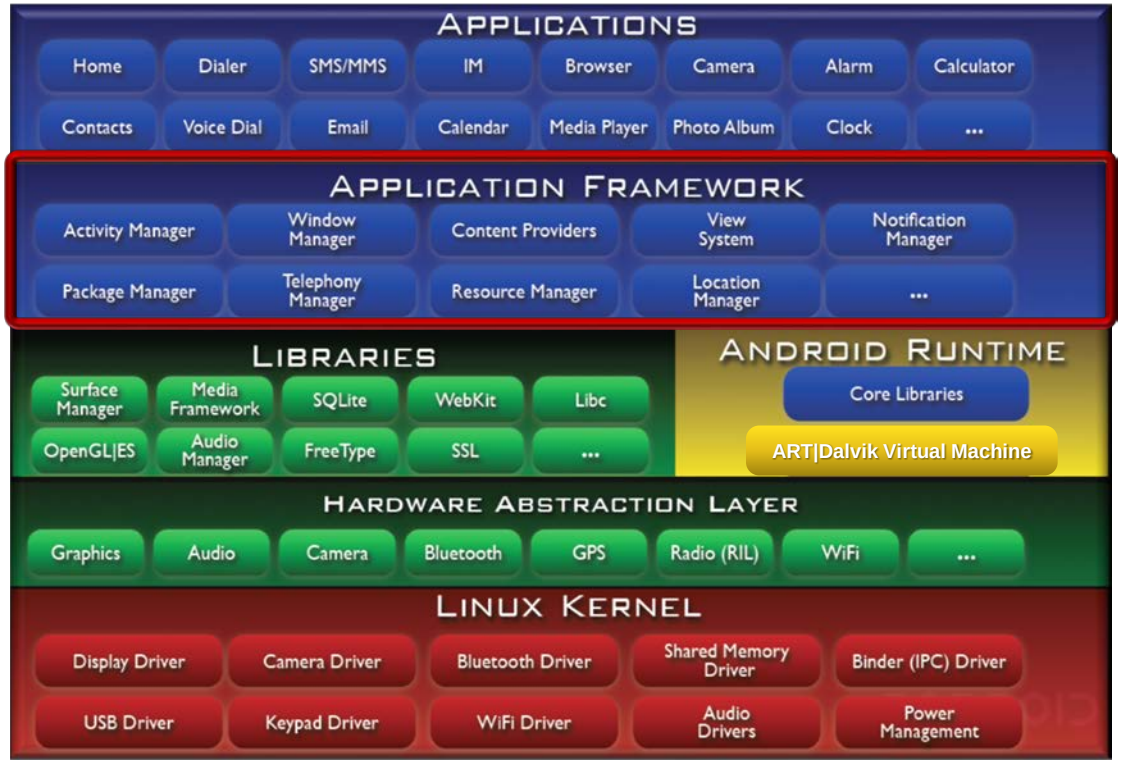
  - Lather, rinse, repeat until app is done ...



Overview of the Android Application Framework & Apps Layers

Overview of Android: Application Framework & Apps Layers

- The *Application framework* layer contains system services that provide apps with the capabilities & info they need to do their work



See opensourceforu.efytimes.com/2013/12/birds-eye-view-android-system-services

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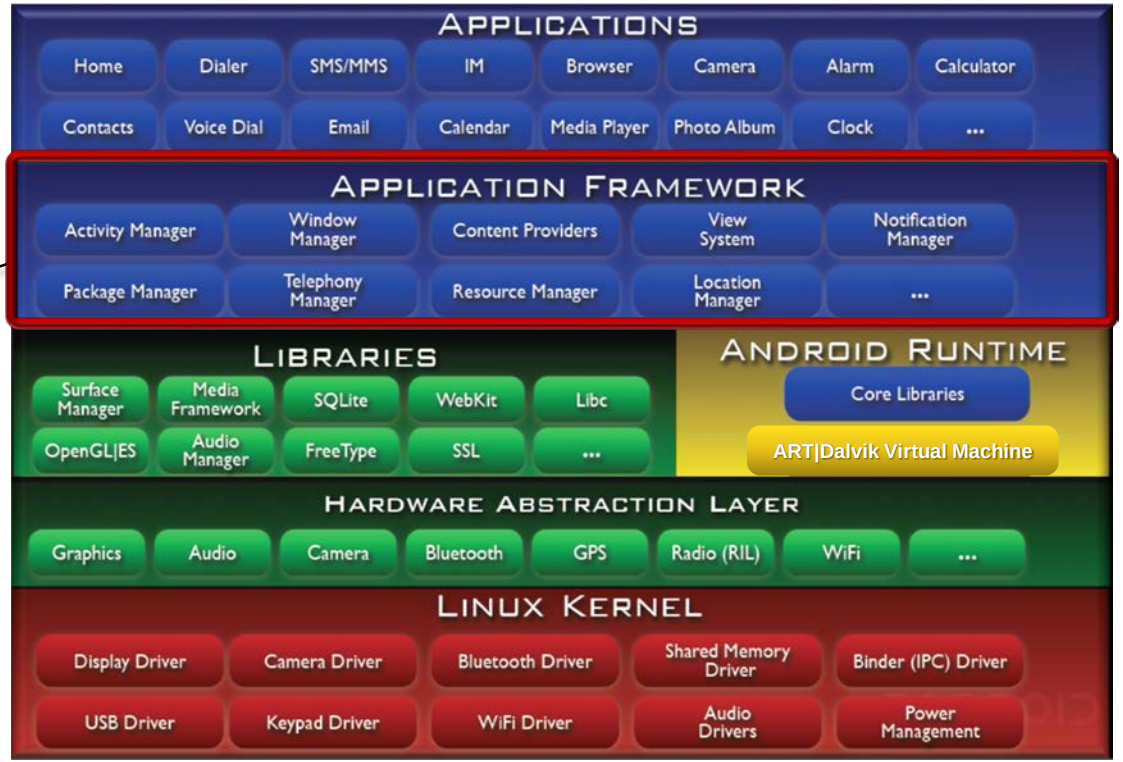

- *Expose hardware & Linux OS kernel capabilities to apps*
- *Run continuously during system operation*
- *Control flow is driven by various events & callbacks*

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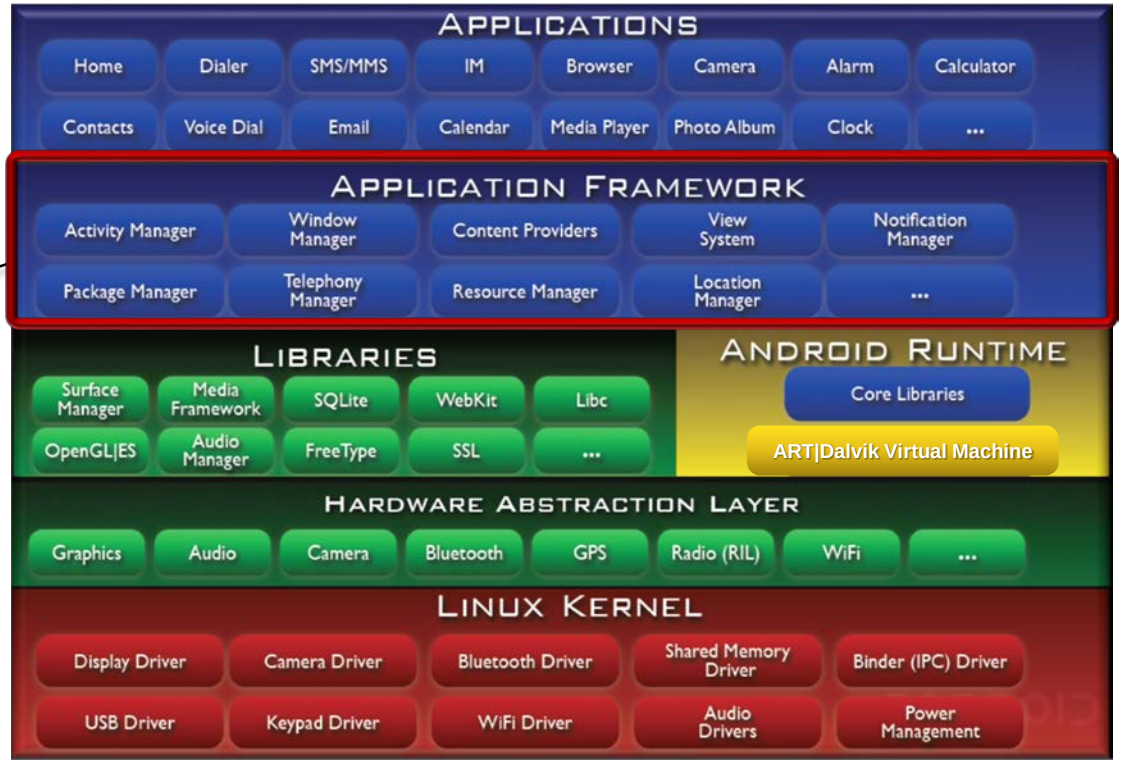

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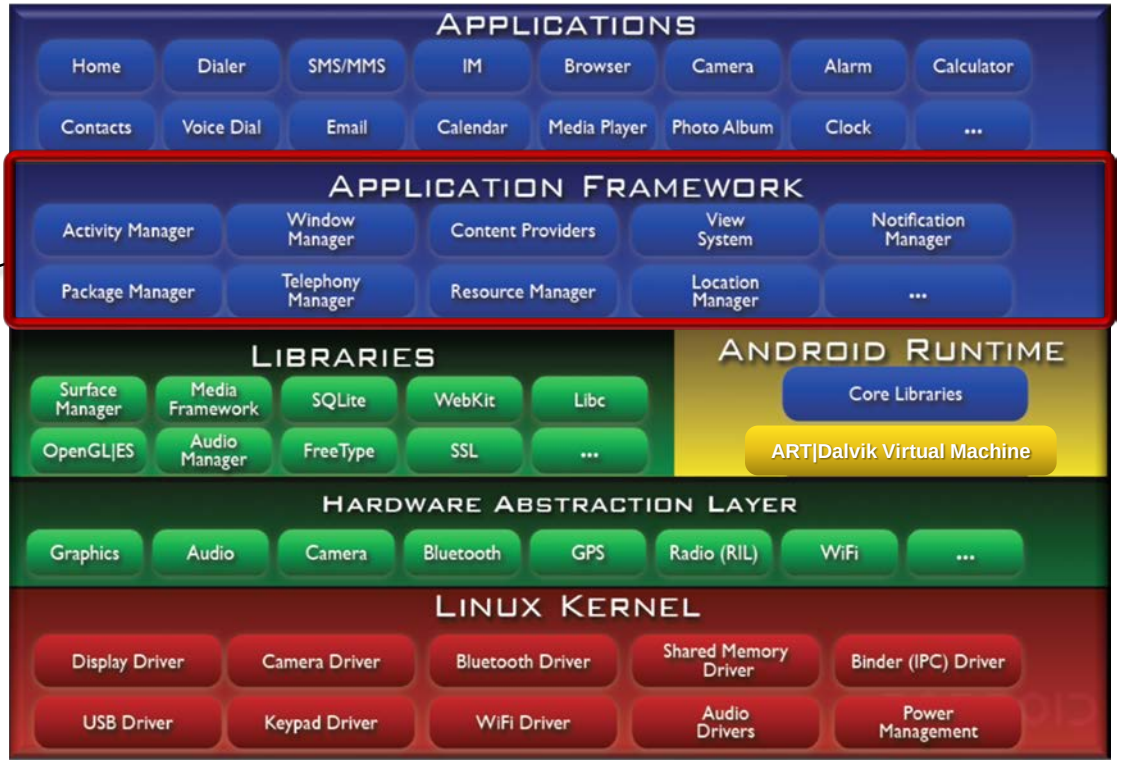

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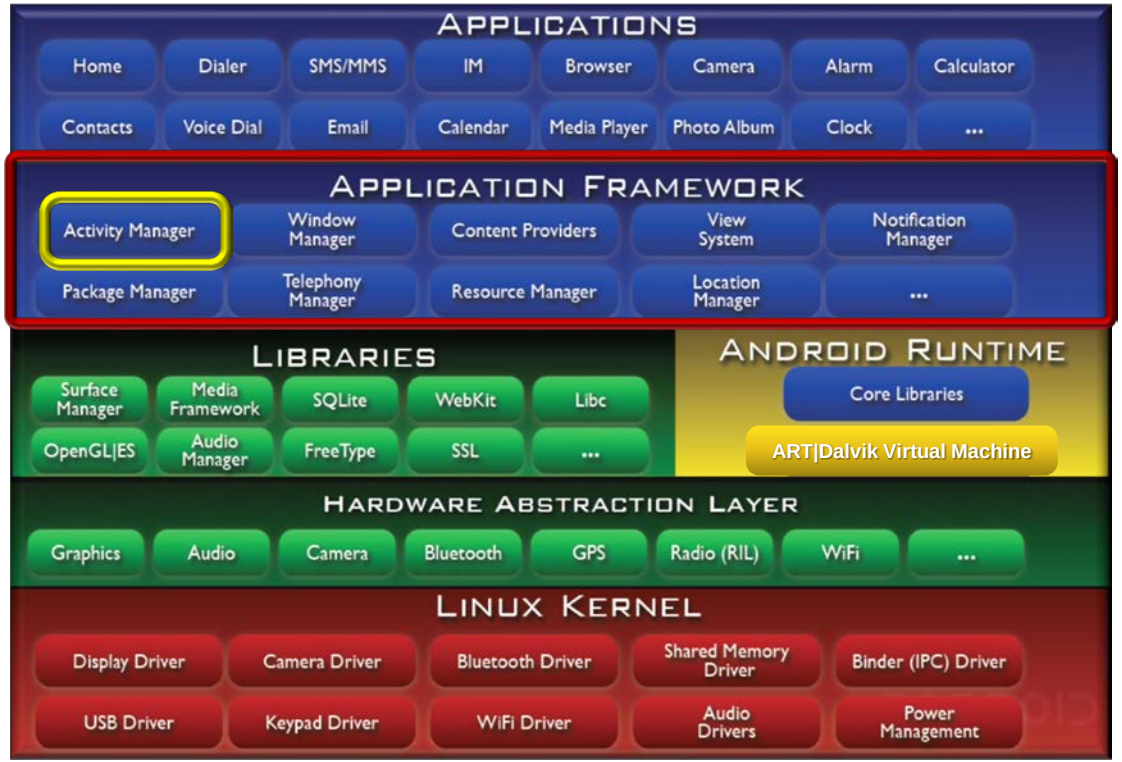

These system services are largely written in Java, with some C/C++ native code

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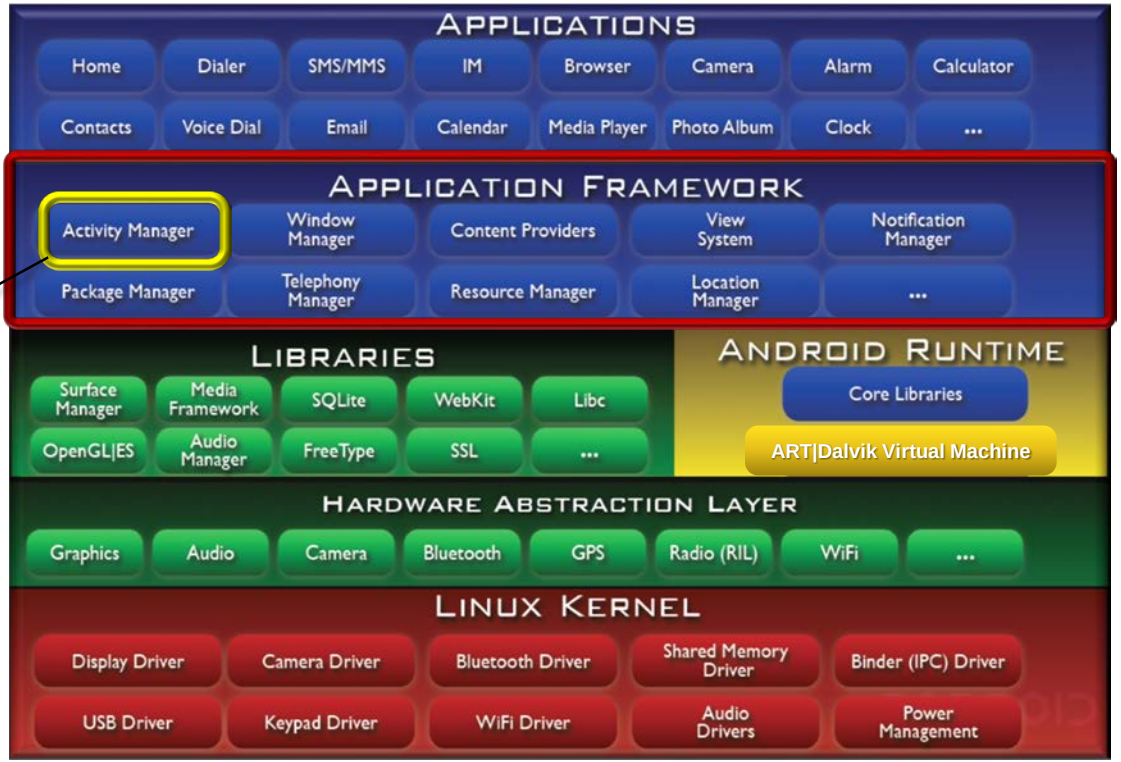
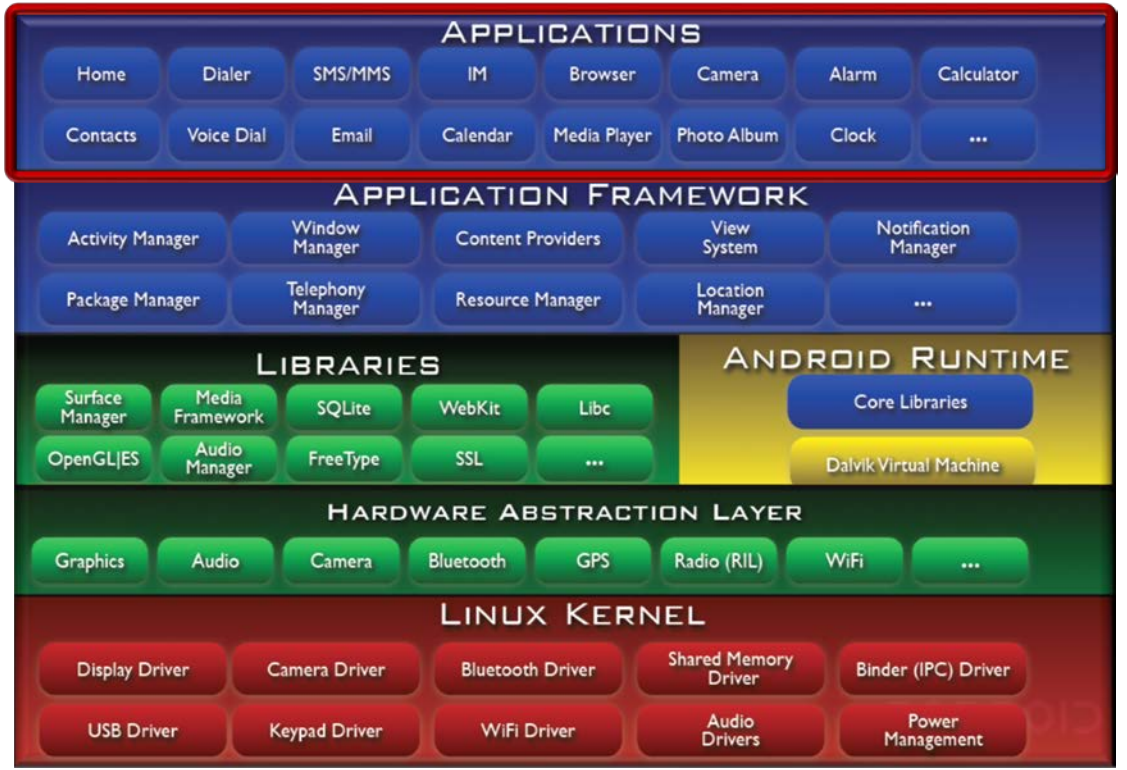


We focus on the Activity Manager Service throughout this course

This services interacts with activities, services, & broadcast receivers

Overview of Android: Application Framework & Apps Layers

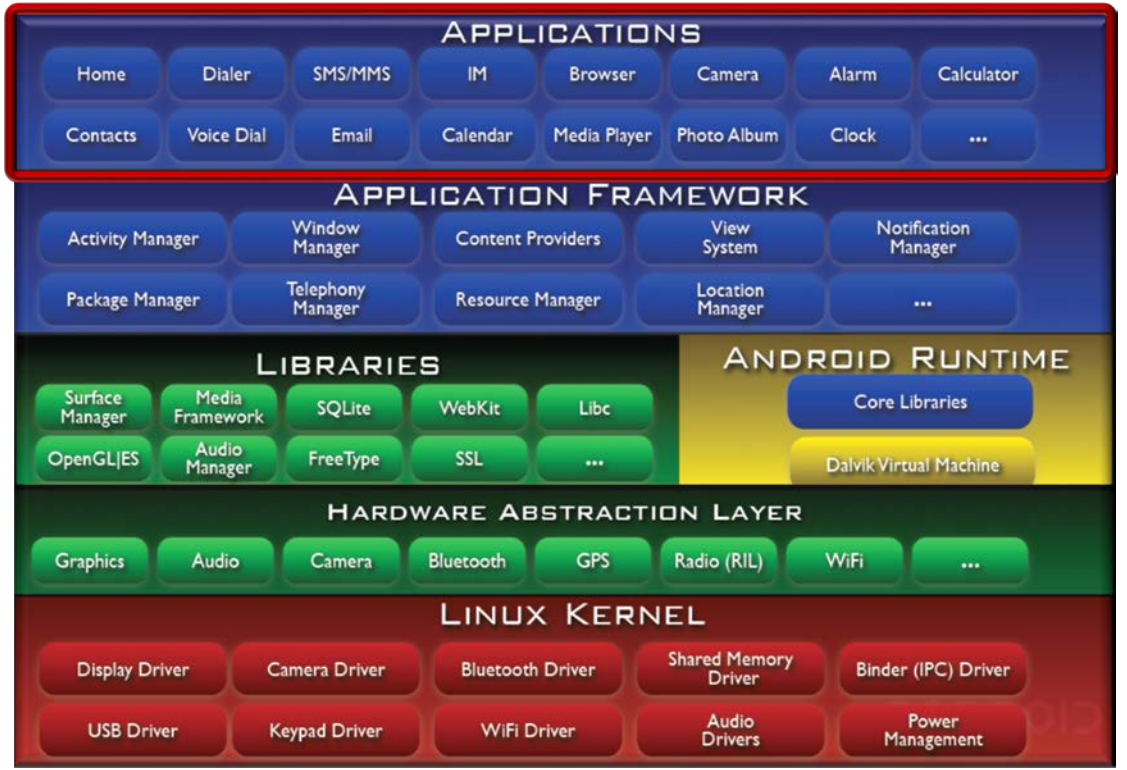
- Atop Android's software stack are apps used every day



See android.googlesource.com/platform/packages/apps

Overview of Android: Application Framework & Apps Layers

- Atop Android's software stack are apps used every day
  - The bulk of these apps are written in Java



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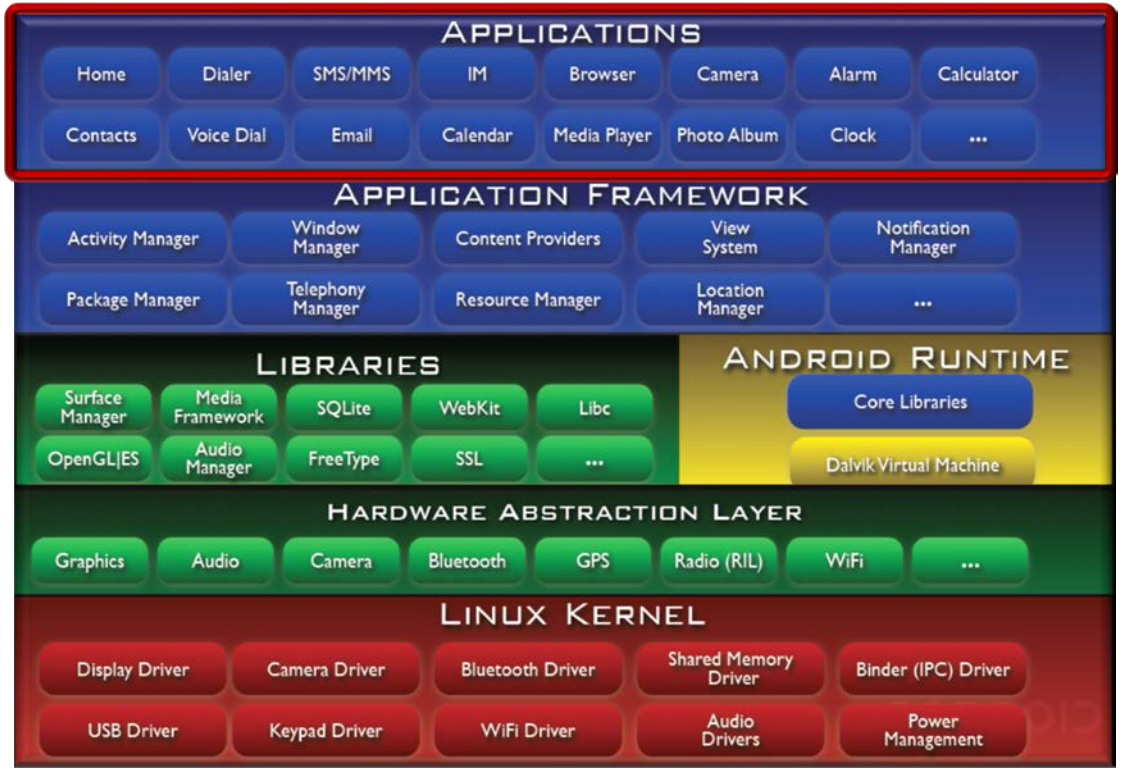
  - It's also possible to write apps in C/C++



See developer.android.com/ndk

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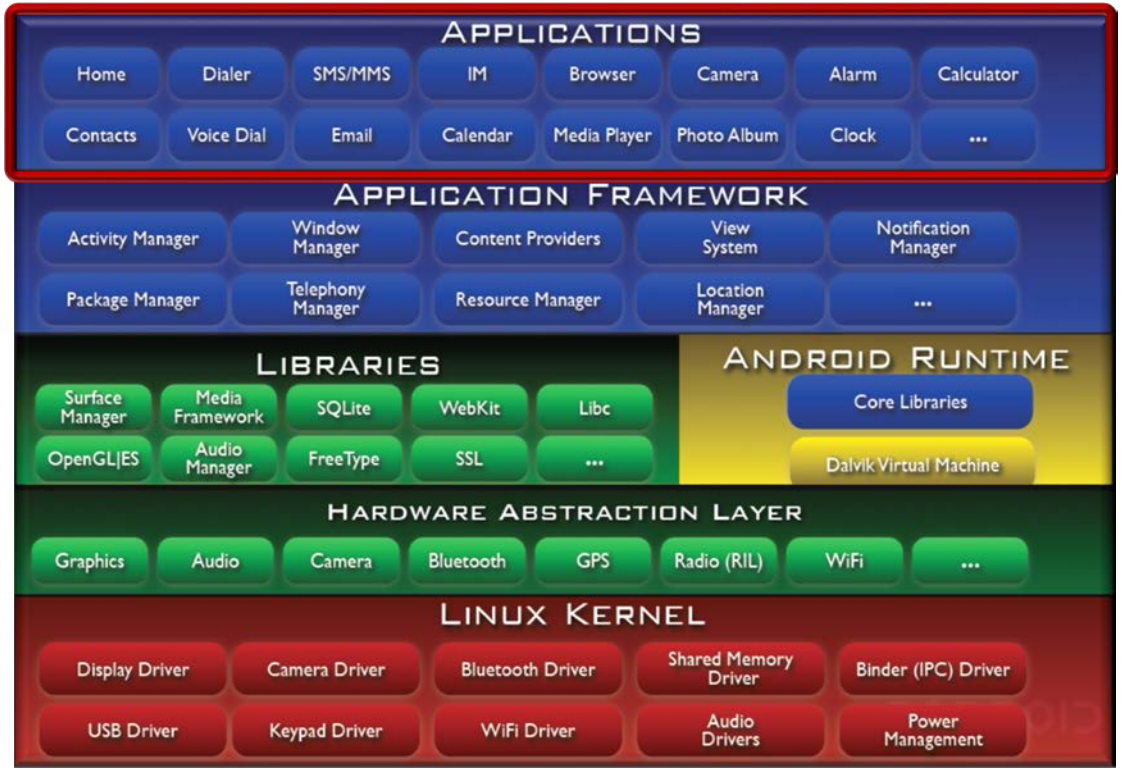
  - It's also possible to write apps in C/C++
  - As well as Kotlin!



See developer.android.com/kotlin

End of the Overview of Android (Part 3): Application Framework & Apps