Layered Architectures:
Android's Layered Architecture

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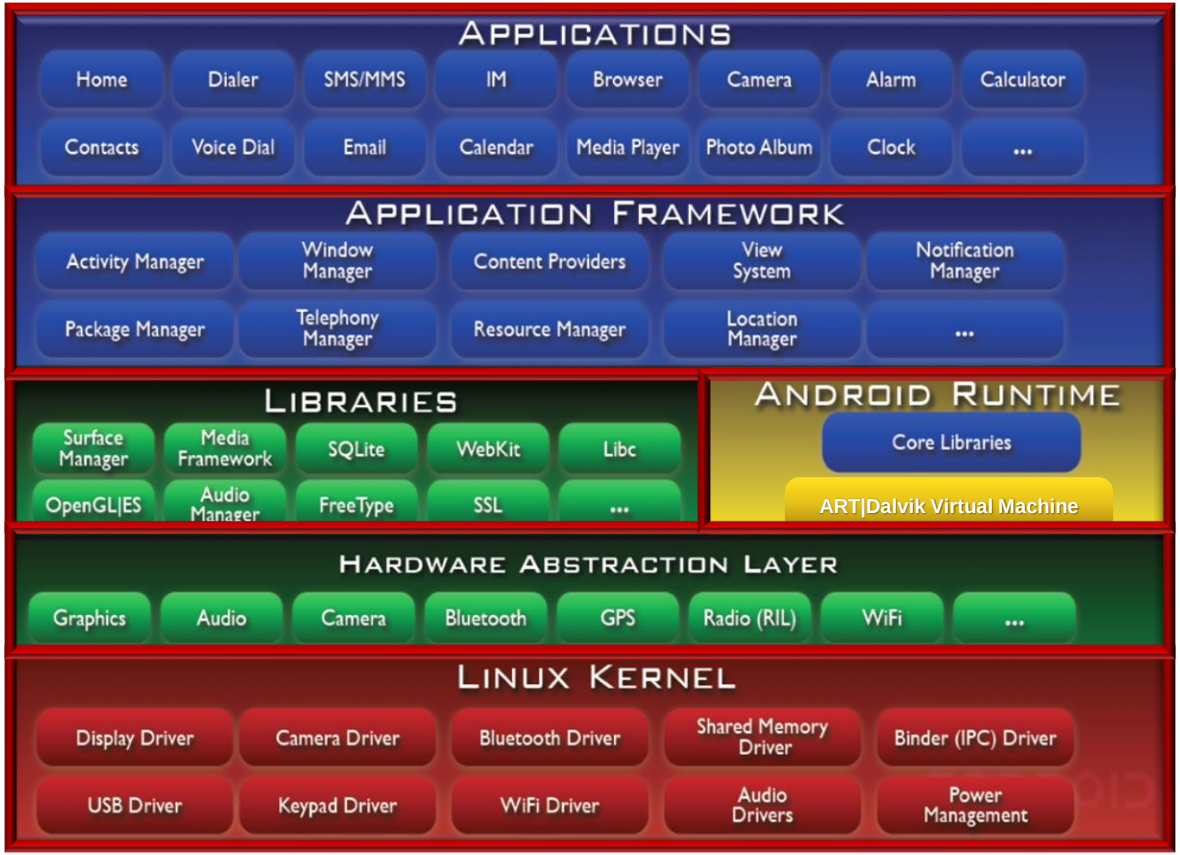
Learning Objectives in this Part of the Lesson

- Know what layered architectures are
- Understand the *Layers* architectural pattern
- Recognize the layers in Android's software stack



An Overview of Android's Layered Architecture

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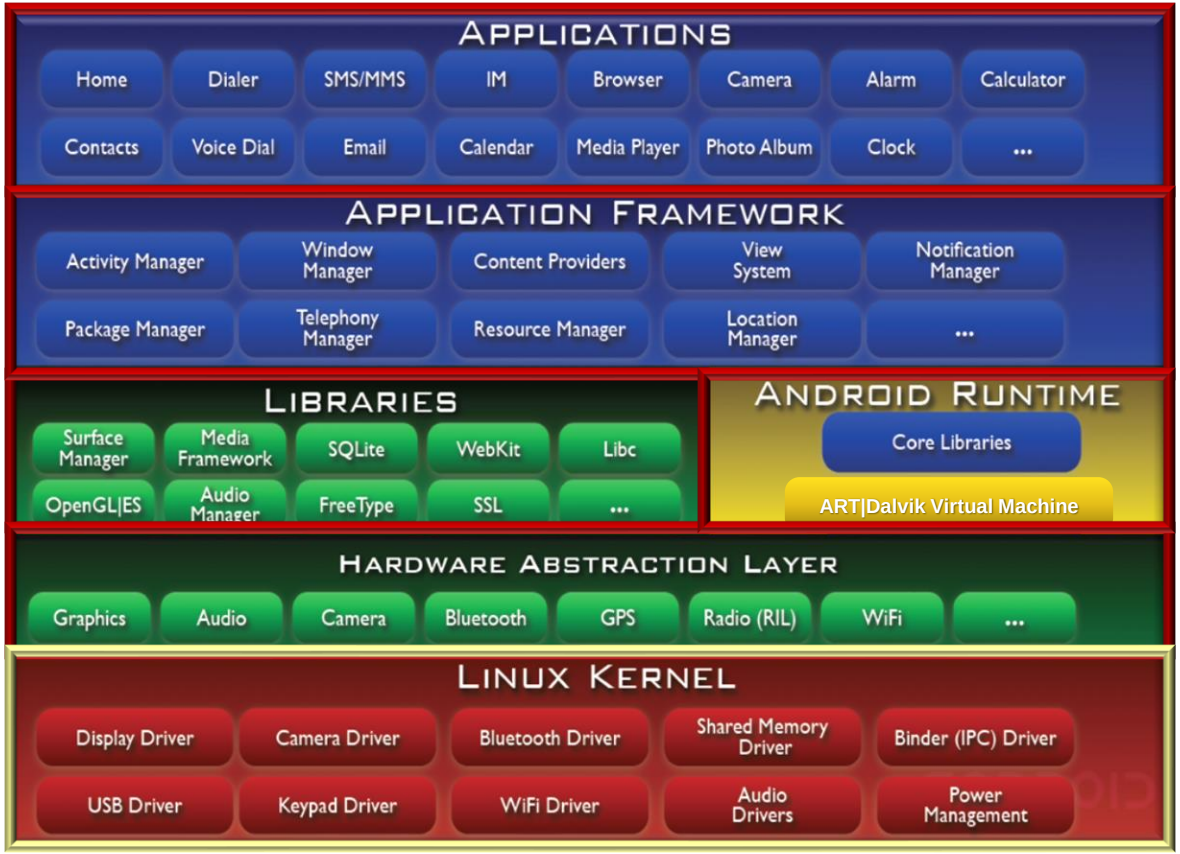
- Android's architecture is structured into multiple layers of abstraction



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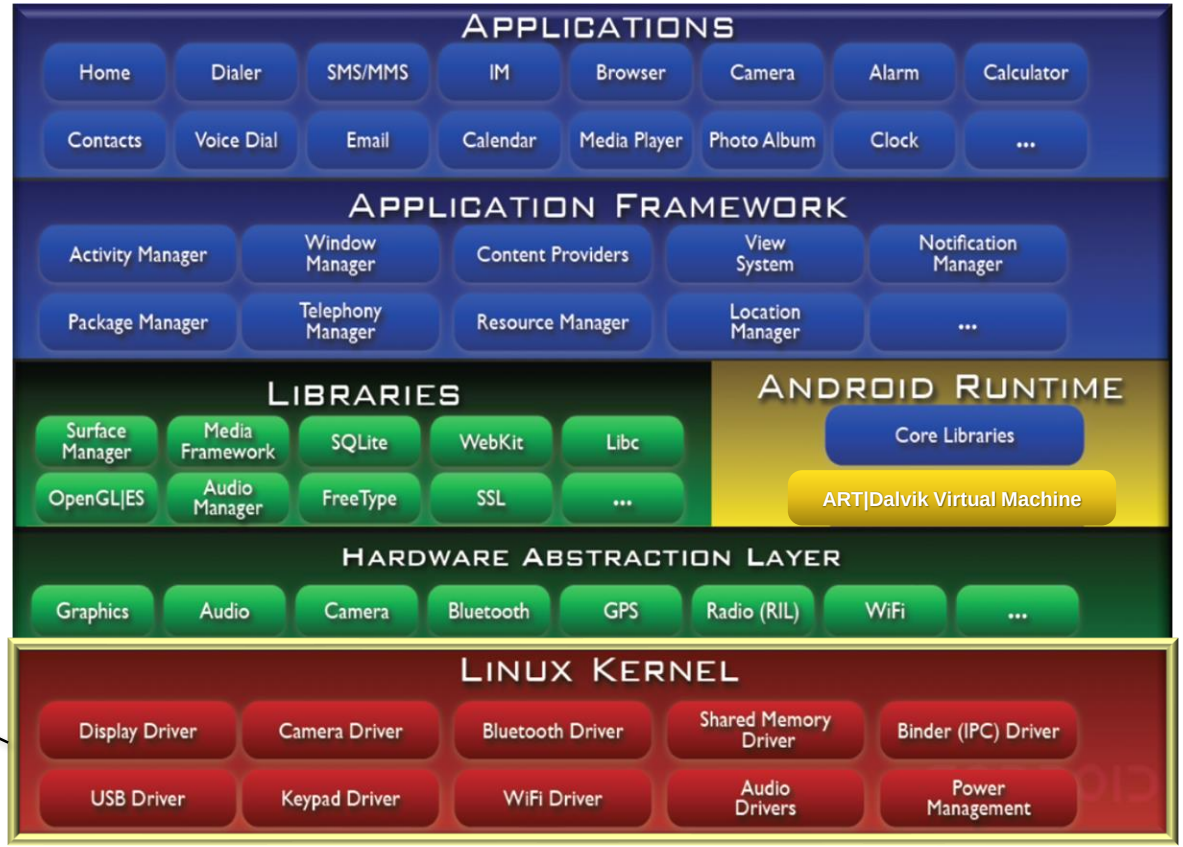
The Android Linux kernel controls hardware & manages system resources



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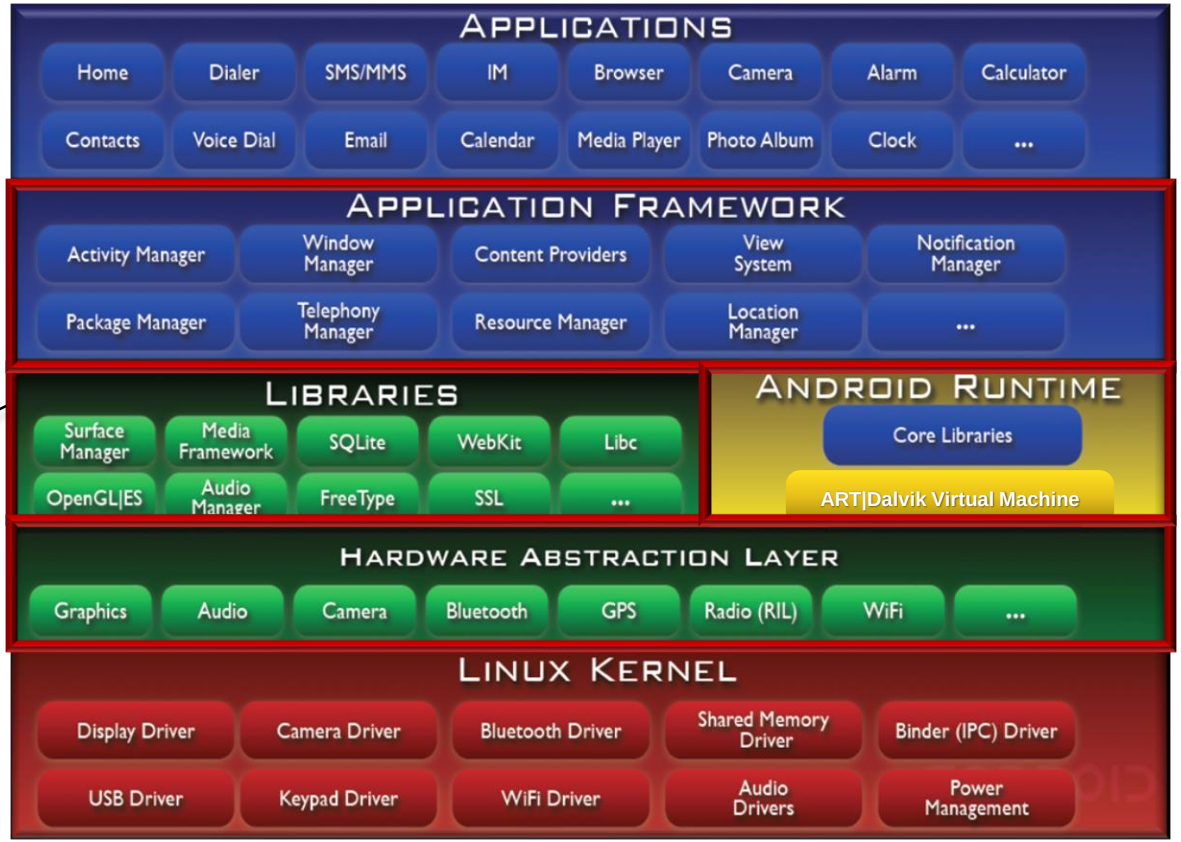

Several middleware layers provide higher-level reusable services to apps

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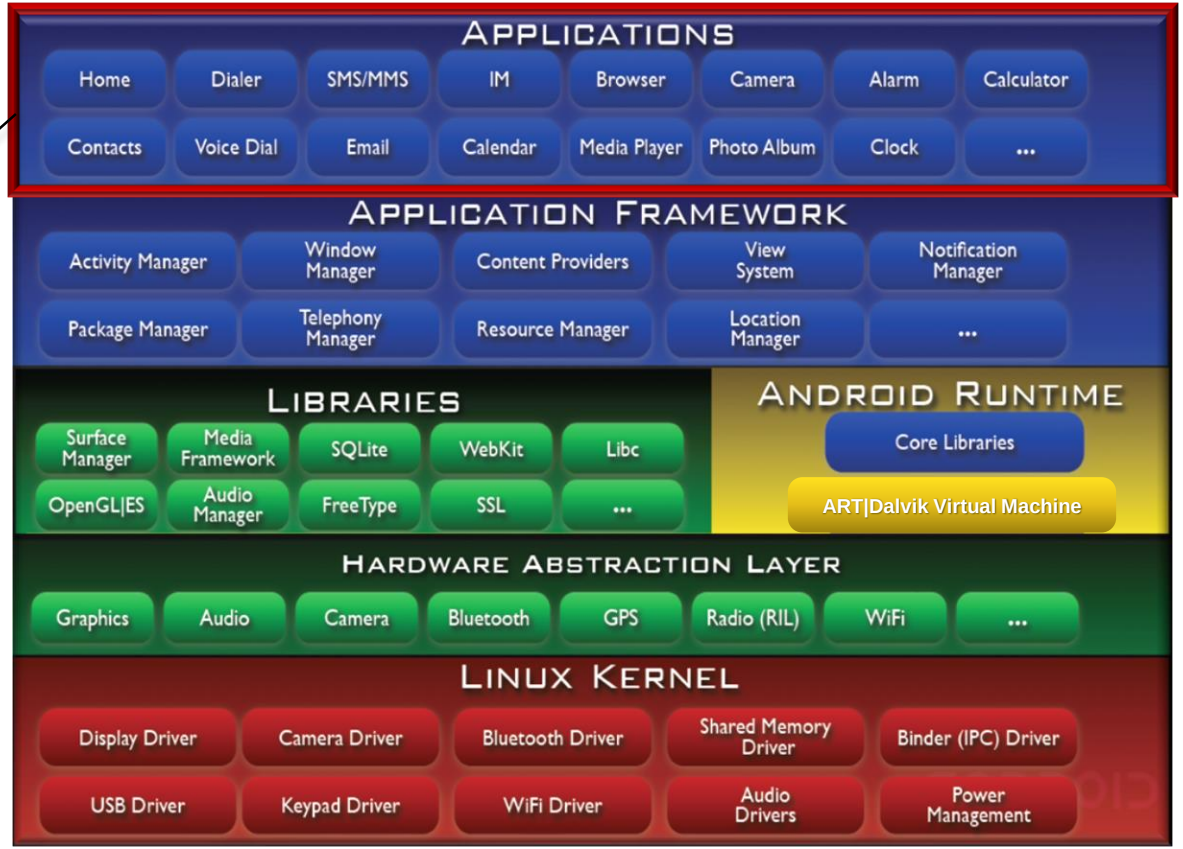
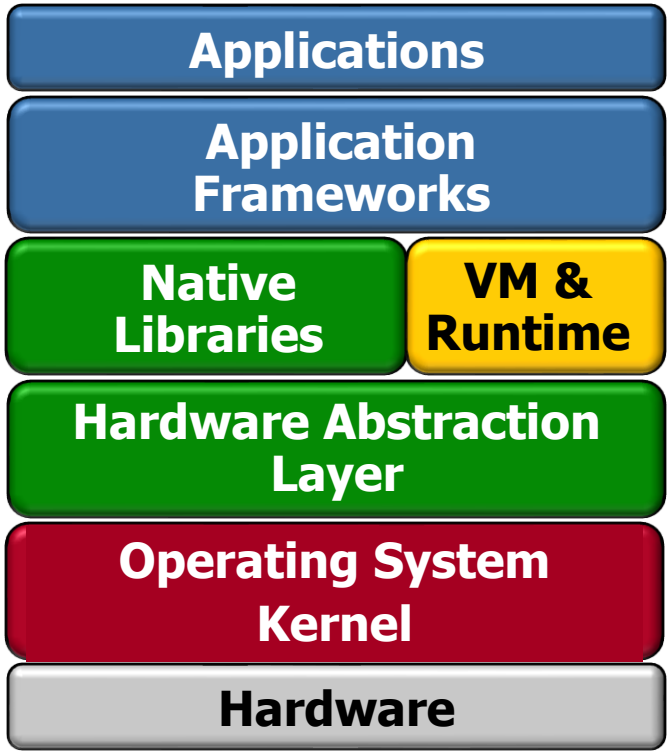
The application layer provides nicely packaged functionality to end-users



An Overview of Android's Layered Architecture

- Layering is applied in complex systems like Android for several reasons



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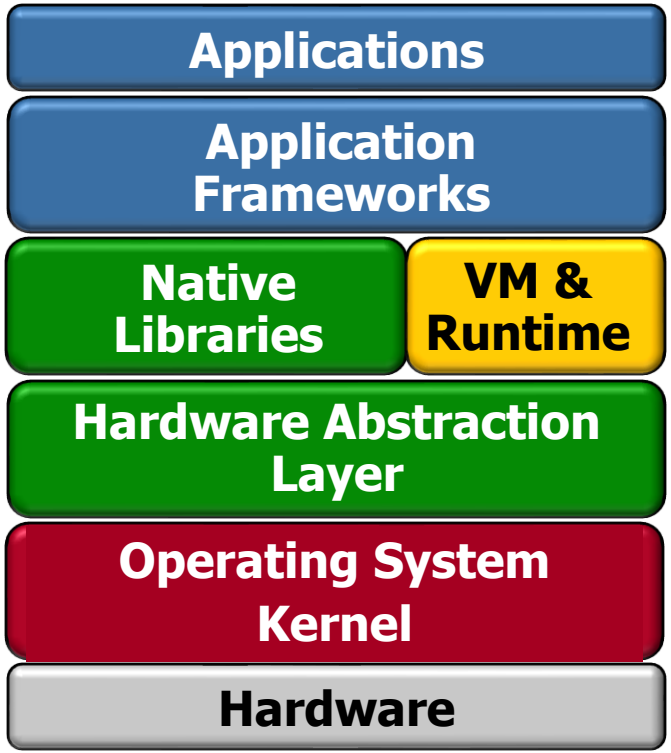
- Layering is applied in complex systems like Android for several reasons, e.g.
  - Enhance systematic software reuse

An intentional strategy for increasing productivity & improving software quality



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

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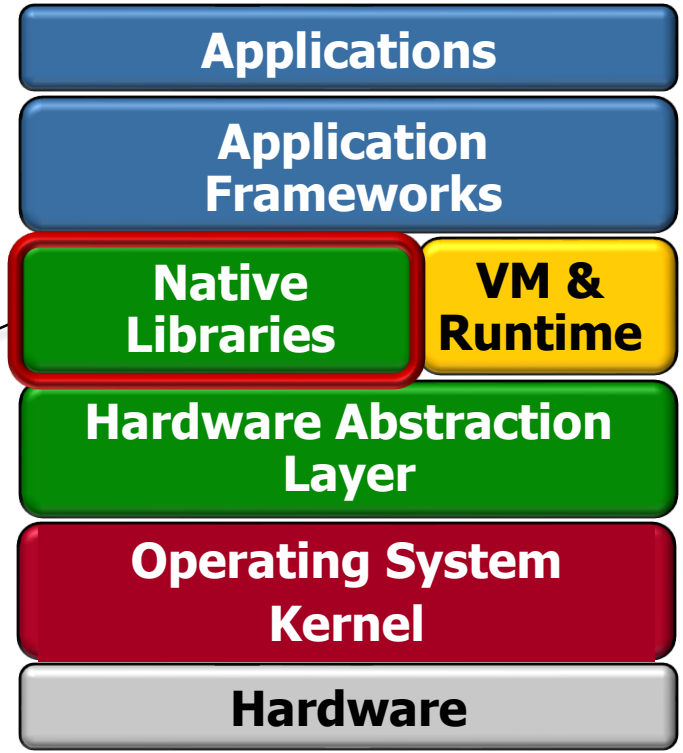
libC provides a common API for accessing OS kernel capabilities



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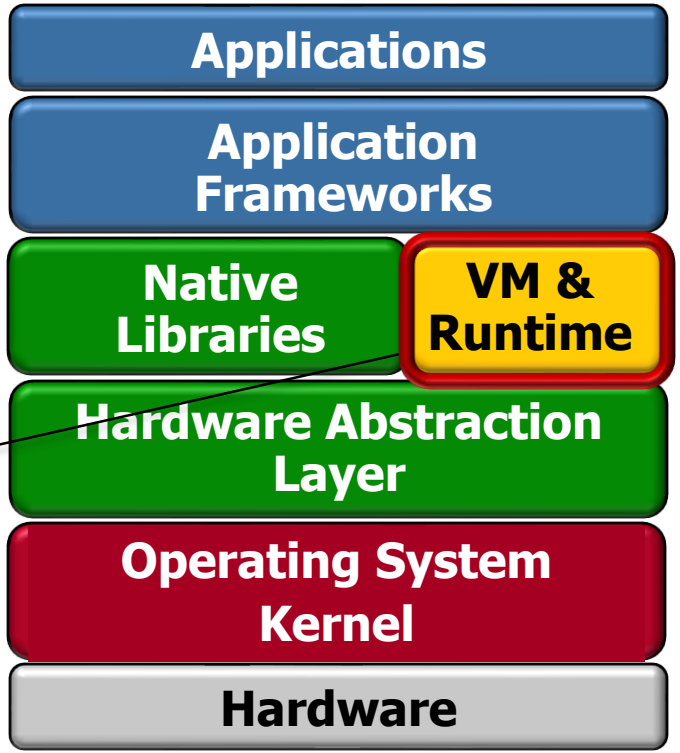
Enable apps to run concurrently over various types of multi-core hardware



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- Layering is applied in complex systems like Android for several reasons, e.g.
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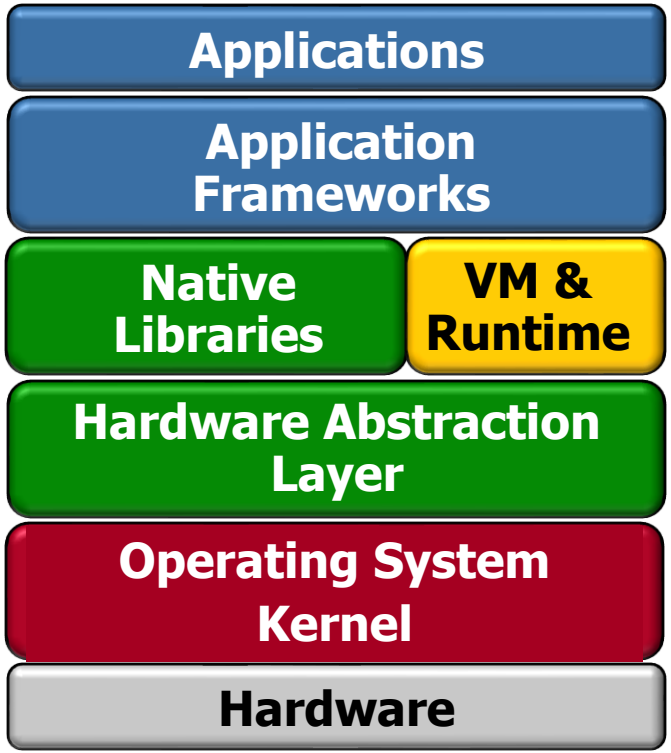
  - Enable "plug & play" replacement of certain layer implementations



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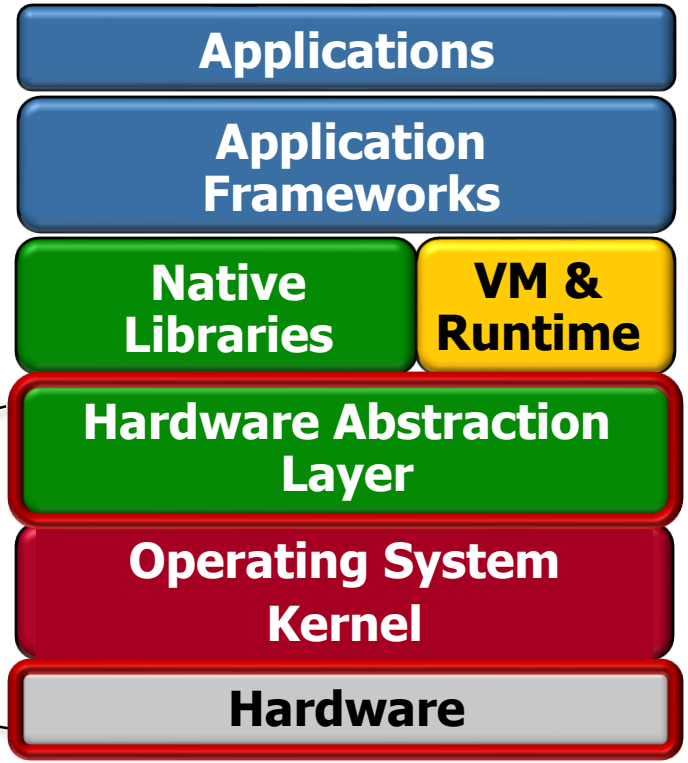
Shield apps from inconsistent hardware APIs



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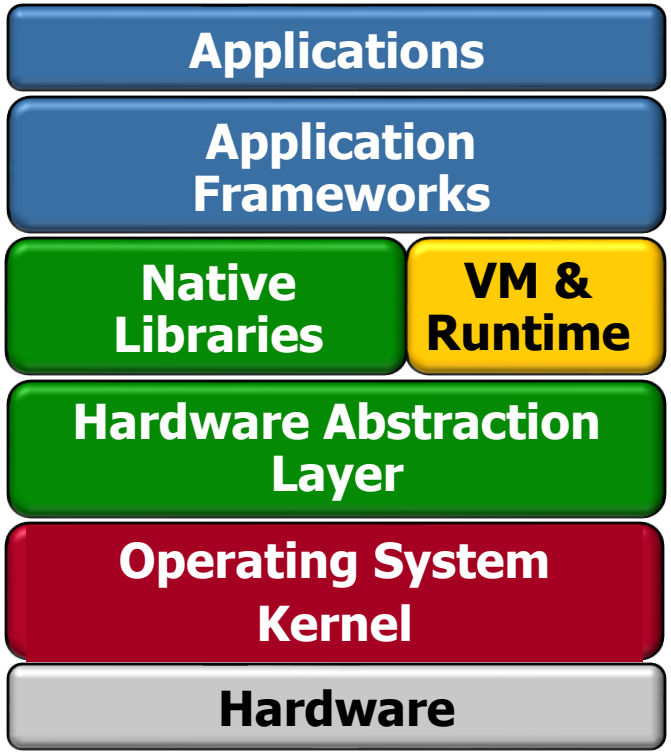

Effects of updates can be confined to the layer whose implementation changes

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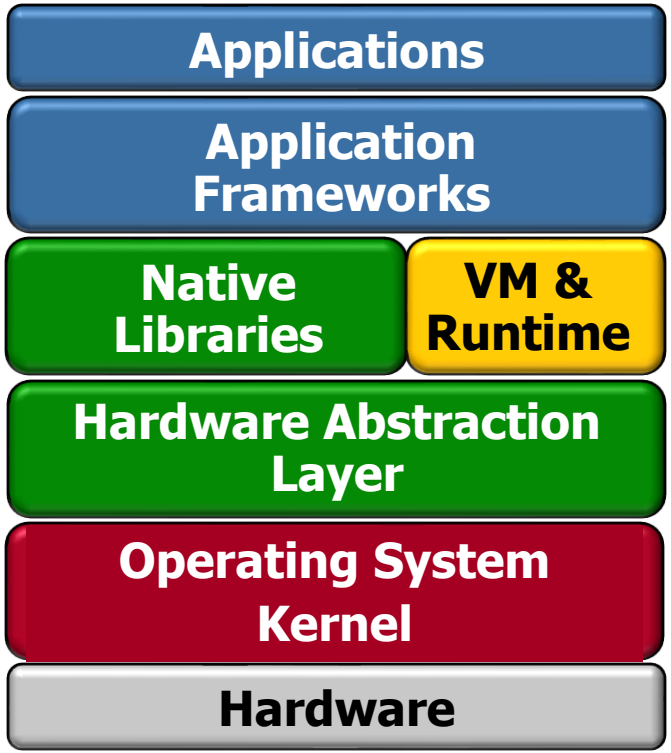

See en.wikipedia.org/wiki/Facade_pattern

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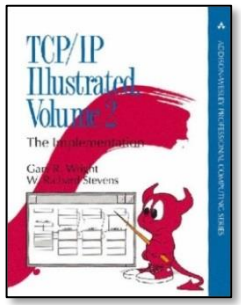
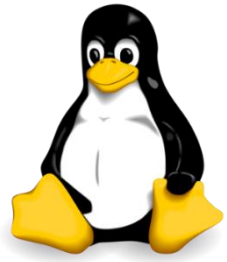
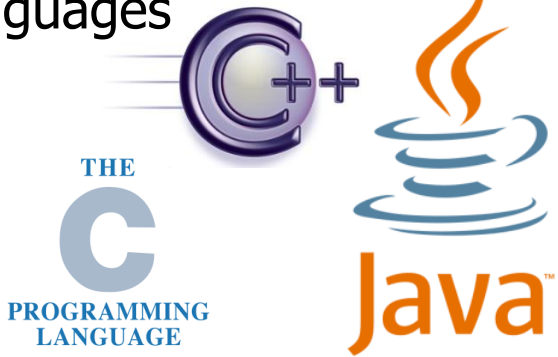
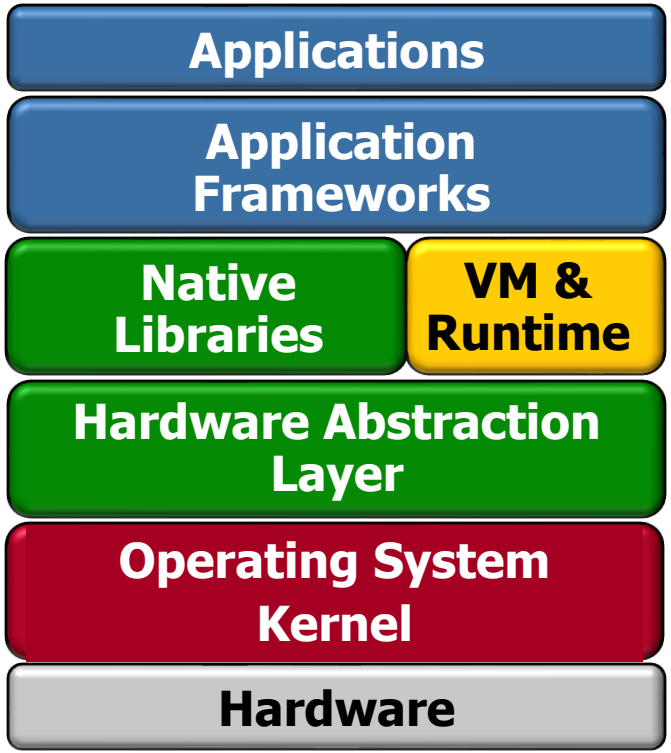
  - Reduce the complexity of APIs that app developers must understand
  - Enable use of popular protocols, APIs, & programming languages









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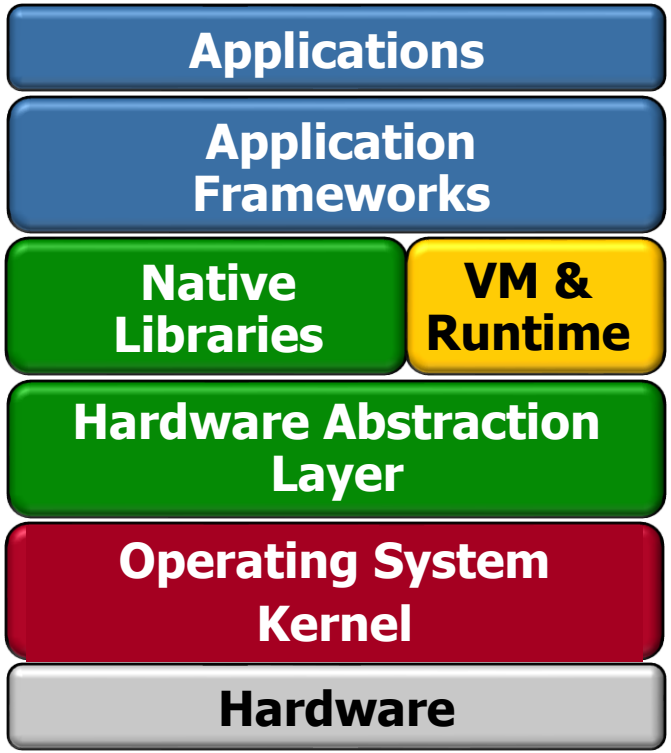
  - Reduce the complexity of APIs that app developers must understand
  - Enable use of popular protocols, APIs, & programming languages
    - These popular protocols & APIs are available in open-source form



See source.android.com & source.android.com/source/building-kernels.html

End of Layered Architectures: Android's Layered Architecture