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.
An Overview of Android’s Layered Architecture

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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.
An intentional strategy for increasing productivity & improving software quality

An Overview of Android’s Layered Architecture

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

See [en.wikipedia.org/wiki/Code_reuse#Systematic_software_reuse](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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  - Enhance systematic software reuse
  - Enable “plug & play” replacement of certain layer implementations
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![Diagram of Android's layered architecture]

- Shield apps from inconsistent hardware APIs
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- Enhance systematic software reuse
- Enable “plug & play” replacement of certain layer implementations

Effects of updates can be confined to the layer whose implementation changes.
Layering is applied in complex systems like Android for several reasons, e.g.

- Enhance systematic software reuse
- Enable “plug & play” replacement of certain layer implementations
- Reduce the complexity of APIs that app developers must understand

See en.wikipedia.org/wiki/Facade_pattern
An Overview of Android’s Layered Architecture

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  - Enhance systematic software reuse
  - Enable “plug & play” replacement of certain layer implementations
  - Reduce the complexity of APIs that app developers must understand
  - Enable use of popular protocols, APIs, & programming languages
Layering is applied in complex systems like Android for several reasons, e.g.

- Enhance systematic software reuse
- Enable “plug & play” replacement of certain layer implementations
- 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