Layered Architectures: the Layers

Architecture Pattern

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Learning Objectives in this Part of the Lesson

- Know what layered architectures are
- Understand the *Layers* architectural pattern
Overview of the Layers
Architectural Pattern
The concept of layering has been expressed as an architectural pattern.

See www.dre.vanderbilt.edu/~schmidt/POSA
The concept of layering has been expressed as an architectural pattern:

- A structural organization schema for software systems that
  - provides a set of predefined subsystems
  - specifies their responsibilities &
  - includes rules & guidelines for organizing the relationships between these roles

See [en.wikipedia.org/wiki/Architectural_pattern](en.wikipedia.org/wiki/Architectural_pattern)
The concept of layering has been expressed as an architectural pattern. A structural organization schema for software systems that:

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The concept of layering has been expressed as an *architectural pattern*

"a structural organization schema for software systems that

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See [en.wikipedia.org/wiki/Architectural_pattern](en.wikipedia.org/wiki/Architectural_pattern)
An Overview of the Layers Architectural Pattern

- The *Layers* architectural pattern has been described in various publications.

See [en.wikipedia.org/wiki/Multilayered_architecture](en.wikipedia.org/wiki/Multilayered_architecture)
An Overview of the Layers Architectural Pattern

• The *Layers* pattern structures software apps & infrastructure in several ways

See posa1.blogspot.com/2008/05/layered-architecture-pattern.html
An Overview of the Layers Architectural Pattern

- The *Layers* pattern structures software apps & infrastructure in several ways
  a. Partitions an overall system architecture into groups of subtasks

![Diagram of Layers Architectural Pattern]

Layer C

Layer B

Layer A

Layer interface

Layer implementation
An Overview of the Layers Architectural Pattern

- The *Layers* pattern structures software apps & infrastructure in several ways
  
  a. Partitions an overall system architecture into groups of subtasks
  
  b. Decomposes groups of subtasks into levels of abstraction

![Diagram of Layer Architectural Pattern](image-url)
An Overview of the Layers Architectural Pattern

- The *Layers* pattern helps to simplify software development & evolution
An Overview of the Layers Architectural Pattern

• The *Layers* pattern helps to simplify software development & evolution
• e.g., it replaces tightly coupled “big balls of mud”...

See en.wikipedia.org/wiki/Big_ball_of_mud
An Overview of the Layers Architectural Pattern

- The *Layers* pattern helps to simplify software development & evolution
- e.g., it replaces tightly coupled “big balls of mud”... with modular solutions that can be extended & contracted more easily

See [www.dre.vanderbilt.edu/~schmidt/family.pdf](http://www.dre.vanderbilt.edu/~schmidt/family.pdf)
An Overview of the Layers Architectural Pattern

- Be careful when implementing a layered architecture to avoid unnecessary overhead when exchanging data between the layers

See [www.dre.vanderbilt.edu/~schmidt/PDF/p96-van_renesse.pdf](http://www.dre.vanderbilt.edu/~schmidt/PDF/p96-van_renesse.pdf)
An Overview of the Layers Architectural Pattern

- Be careful when implementing a layered architecture to avoid unnecessary overhead when exchanging data between the layers
  - e.g., minimize context switching, synchronization, & data copying overhead

End of Layered Architectures: The Layers Architecture Pattern