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
An Overview of the Layers Architectural Pattern

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

See [www.dre.vanderbilt.edu/~schmidt/POSA](http://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
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• provides a set of predefined subsystems
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An Overview of the Layers Architectural Pattern

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“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](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
  - Partitions an overall system architecture into groups of subtasks

![Diagram of Layers Pattern]

- Layer A
- Layer B
- Layer C

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
An Overview of the Layers Architectural Pattern

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

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- 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
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
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