Core Java 8 and Development Tools

Lesson 17 : Introduction to Layered Architecture

Lesson Objectives

- After completing this lesson, participants will be able to
  - Understand the concept of Layered Architecture
  - Implement layers in Java applications

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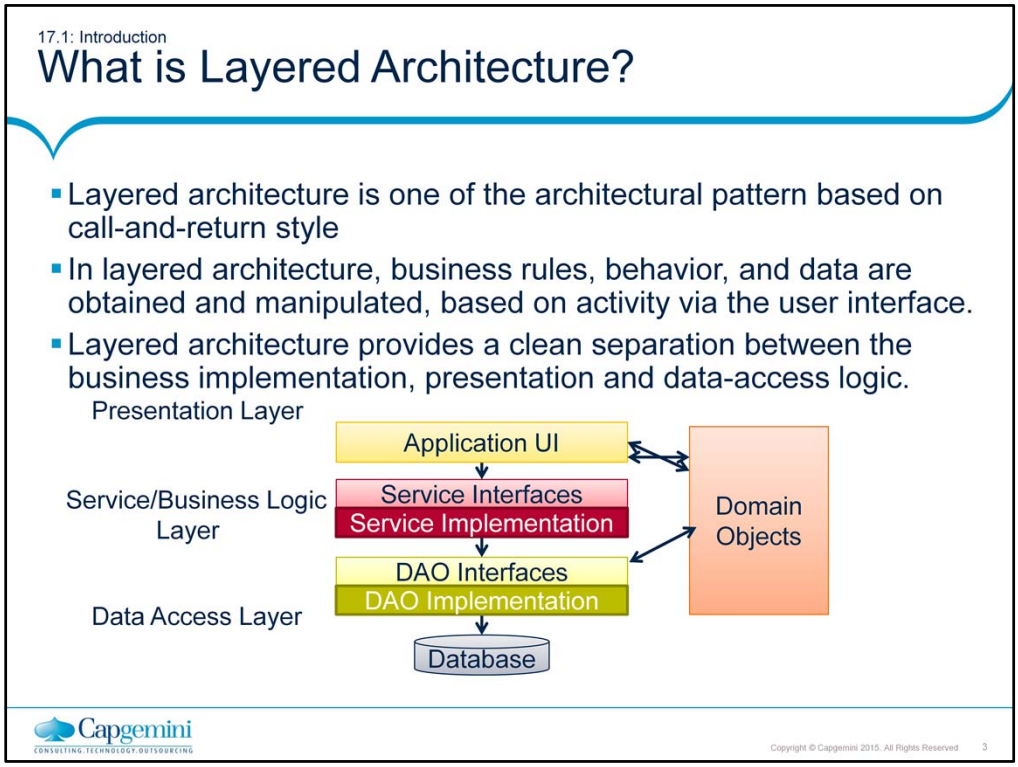
This lesson covers Layered architecture and advanced testing concepts.

Lesson outline:

17.1: Introduction
17.2: Layered Architecture



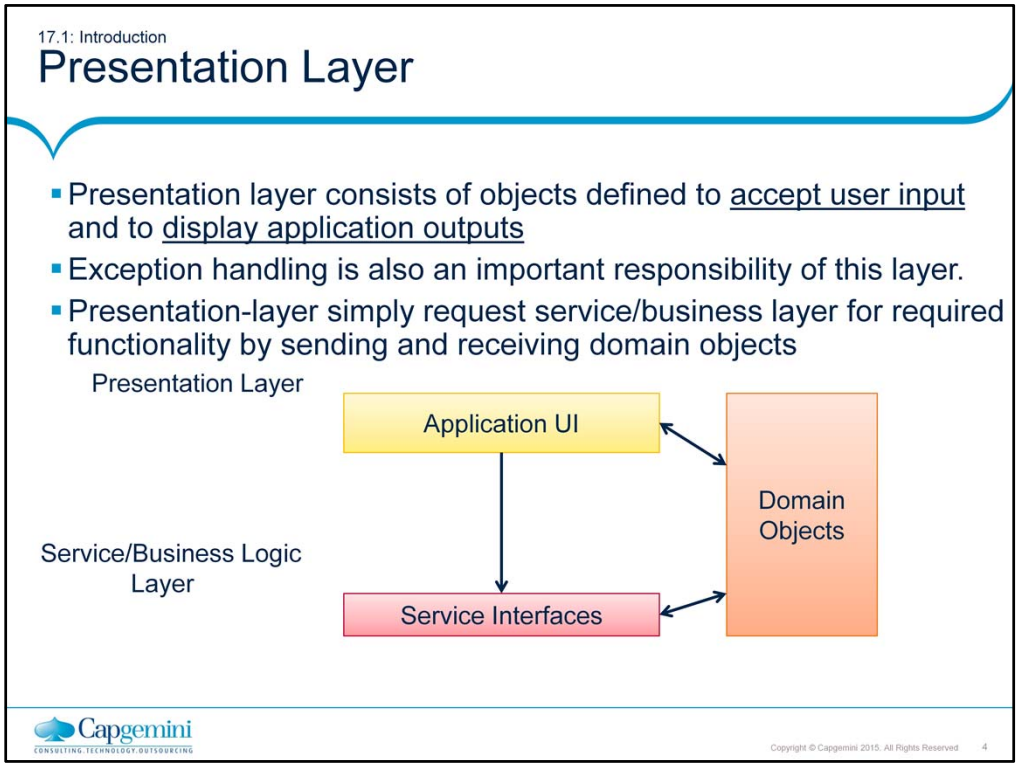
What is Layered Architecture?

Layering partitions the functionality of an application into separate layers that are stacked vertically. As shown in the figure above, layered architecture enables developer to make changes on one layer without having any side effects on others.

Why Layered Architecture?

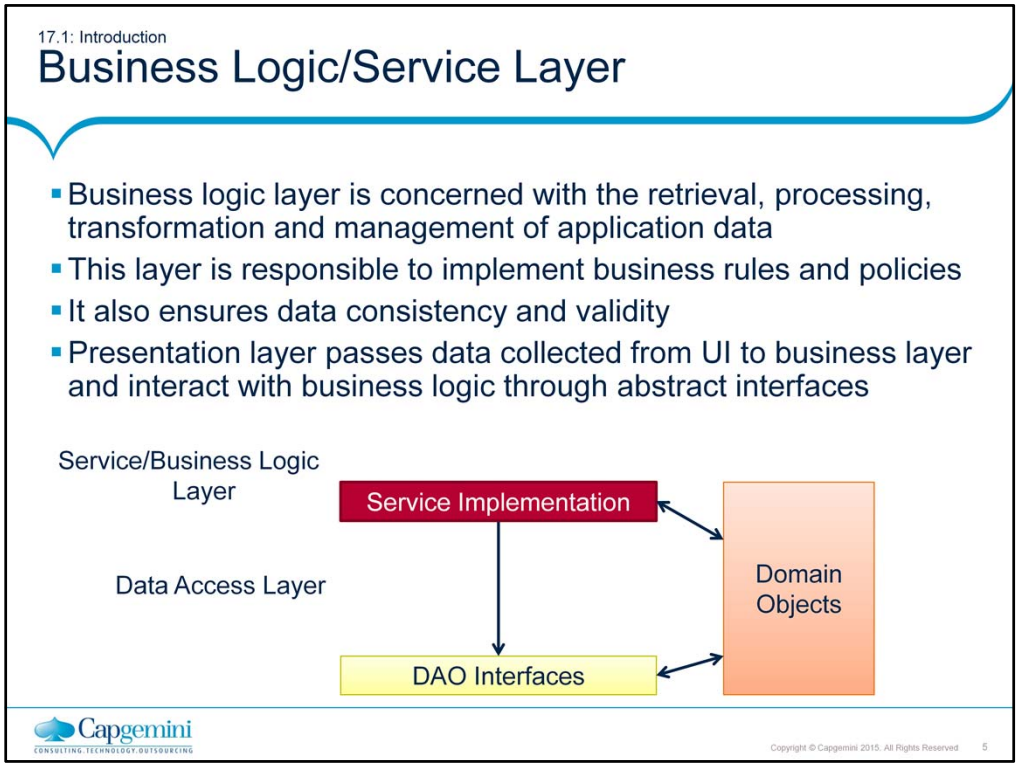
Object technology encouraged the abstraction and reuse of not only presentation logic but also business processes and data. Therefore, decoupling application logic from application presentation is encouraged.

With the explosion of the Internet and related technologies, requirements to scale, rapidly develop, deploy, and react to business changes have made the existence of layered application architecture imperative.



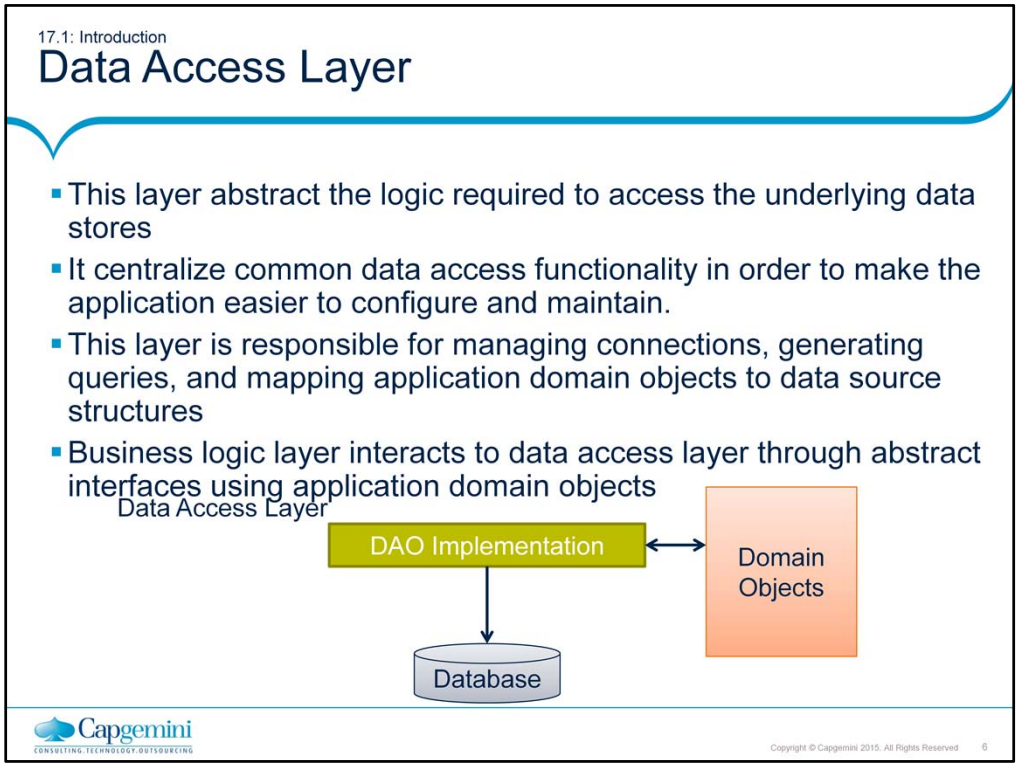
Presentation Layer:

The presentation layer contains the components that implement and display the user interface and manage user interaction. This layer includes controls for user input and display,



Business Logic/Service Layer:

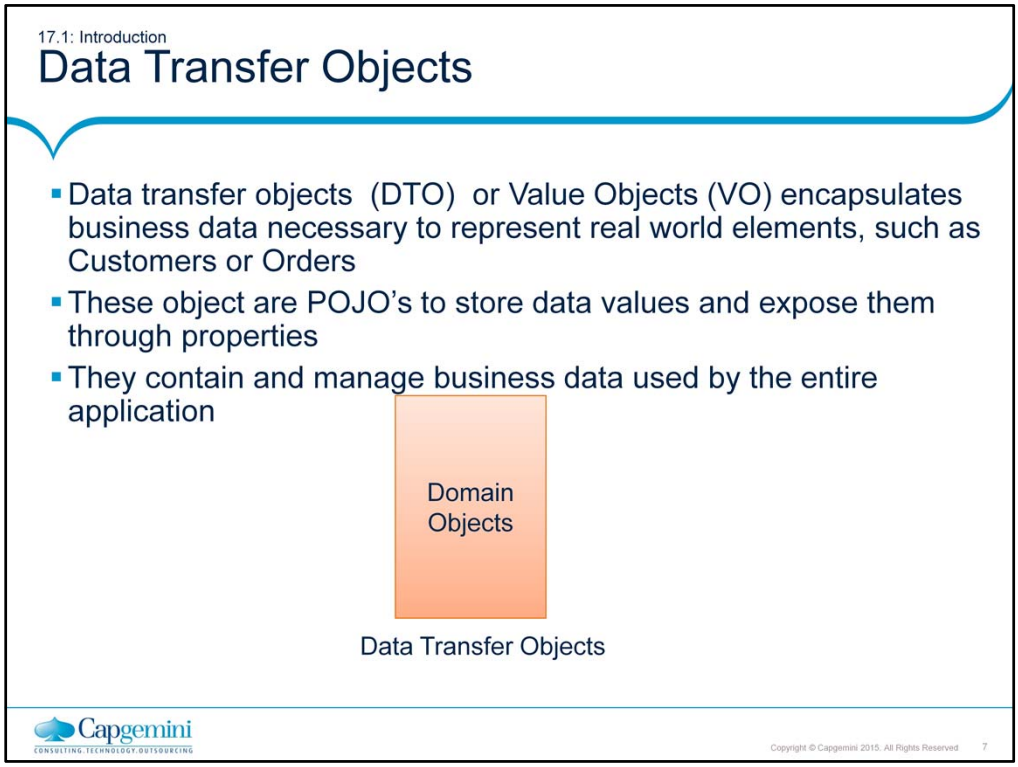
After the presentation layer collect the required data from the user and pass it to the business layer, the application can use this data to perform a business process. Use a business layer to centralize common business logic functions and promote reuse.



Data Access Layer

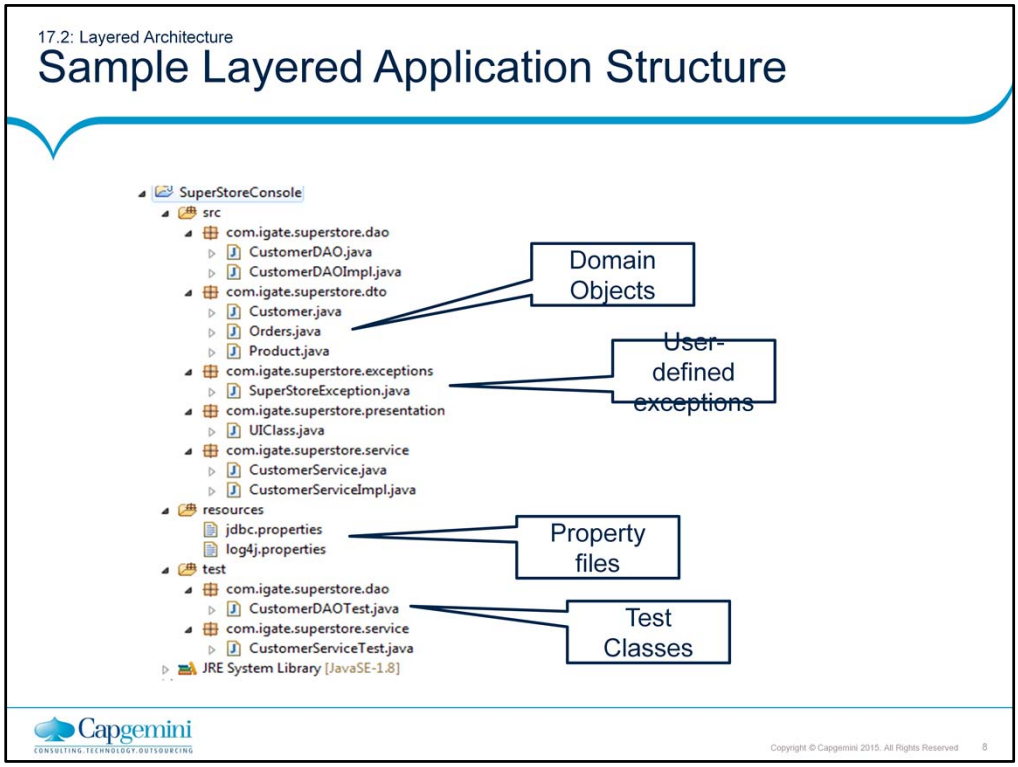
The data access layer should hide the details of data source access. It should be responsible for managing connections, generating queries, and mapping application domain objects to data source structures.

Consumers (Business logic layer) of the data access layer interact through abstract interfaces using application domain objects.



Data Transfer Objects

DTO's are simply POJO classes that represent application real world entities. These objects are meant to share data between layers of application. These object contains data values and expose them through properties.



Designing Layered Application:

Create separate packages for all the layers including presentation, business logic and data access layer. All POJO based domain object needs to be stored in separate package.

Application specific exceptions must be separated from layered classes as shown in the slide.

Ensure the test classes must be written for DAO layers. Many business processes involve multiple steps that must be performed in the correct order. To ensure correctness of such business process, its better to test business layer classes too.

Database specific properties like username, password, URL etc. must be stored in separate property file. All property files must be store in resources folder of application.

Lab

- Lab 12: Introduction to Layered Architecture

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Summary

- In this lesson, you have learnt:
  - Layered architecture for Java applications

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Review Question

- Question 1: _____ layer abstract the logic required to access the underlying data stores
  - Option 1: Service
  - Option 2: Data Access
  - Option 3: Presentation
- Question 2: Layered architecture is one of the architectural pattern based on call-wait-process pattern style
  - True / False

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