Enterprise Applications

Enterprise applications are large, complex business applications

- Commonly called Enterprise applications because they solve tasks required by large enterprises (corporations)

- Examples: The financial industry (banks, brokerage firms), e-commerce sites

Enterprise Applications

Enterprise Applications typically:

- Provide a variety of services to fulfill both business needs and legal requirements.
- Provide support for clients and internal users.
- Deal with Database systems to provide persistent storage
- Have security issues – different types of users have different levels of access to features in the application
- Interact with other Enterprise applications

Enterprise Applications

Tools/Software required by Enterprise Applications

- Web Server
- Database
- Database Connectivity/Query Services
- Transaction Manager
- Security Services
- Directory Services (locate named objects / network objects)
- Load Balancing
- Messaging Services (communication among various parts of the application)
- XML Support

Application Servers

Application Server

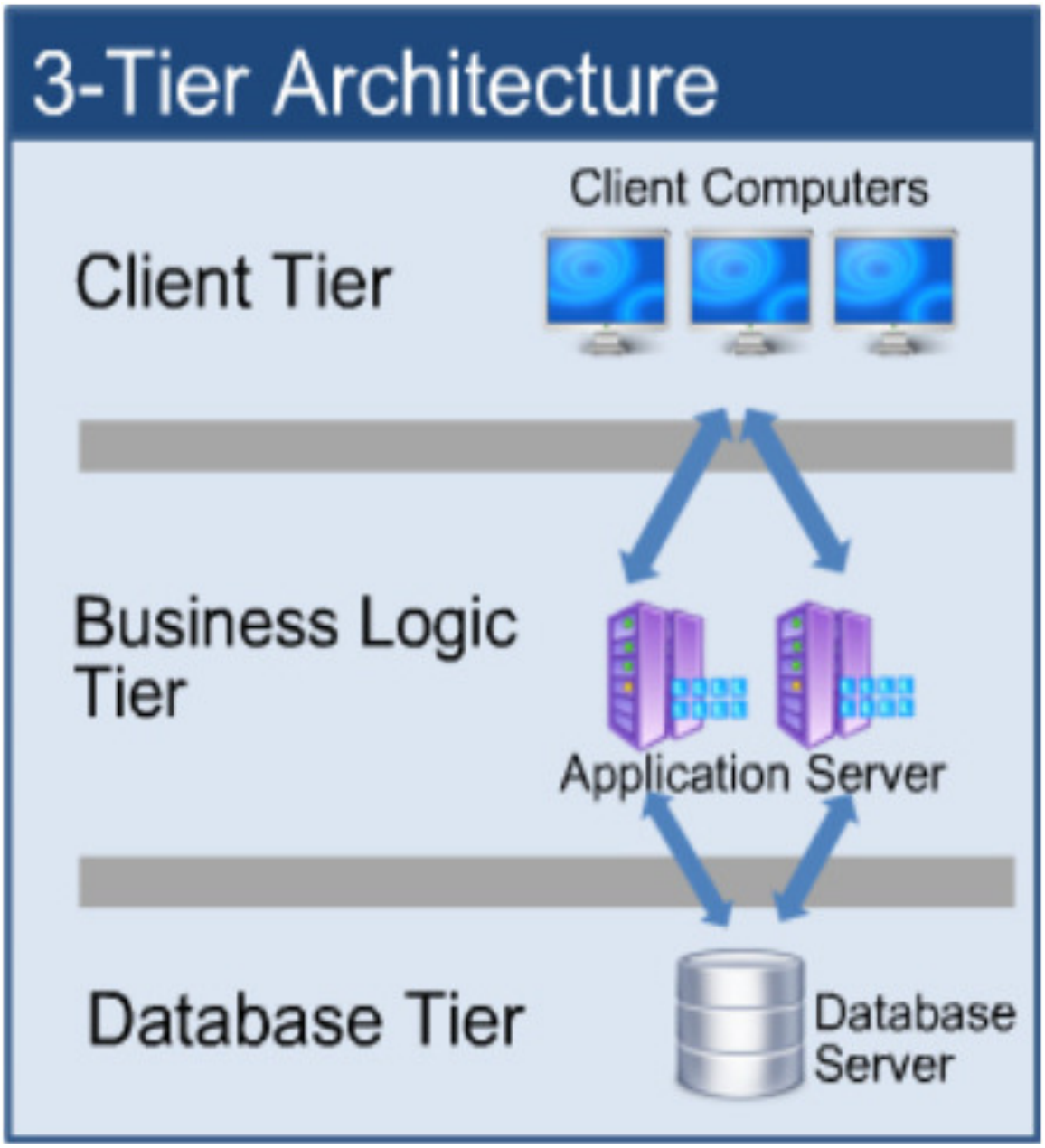
A software package that provides all the standard services for an application

J2EE (JEE) is a specification defining the set of "standard" services and the APIs that vendors provide for applications to access those services.

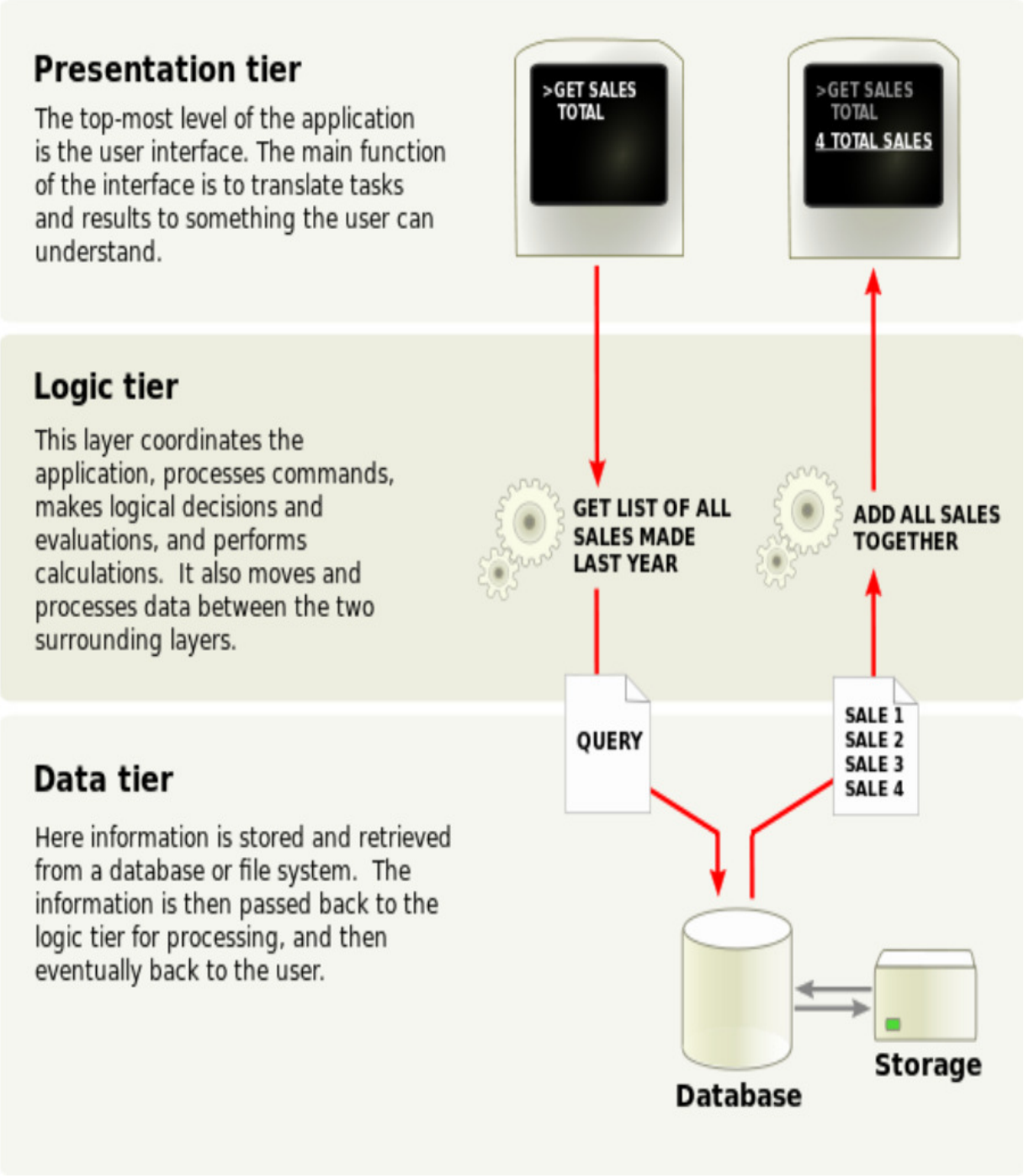
Examples of service APIs

- Servlets / JSP (web services)
- JDBC (database connectivity)
- JTA (Transaction Management)
- JMS (Java Messaging Service)
- JNDI (Naming and Directory Services)
- JAX (XML Services)

Typical Web Architecture



Application Flow



Beginning of J2EE

- **1997** Sun Microsystems introduces the Servlet API starting Java's entry into web application development

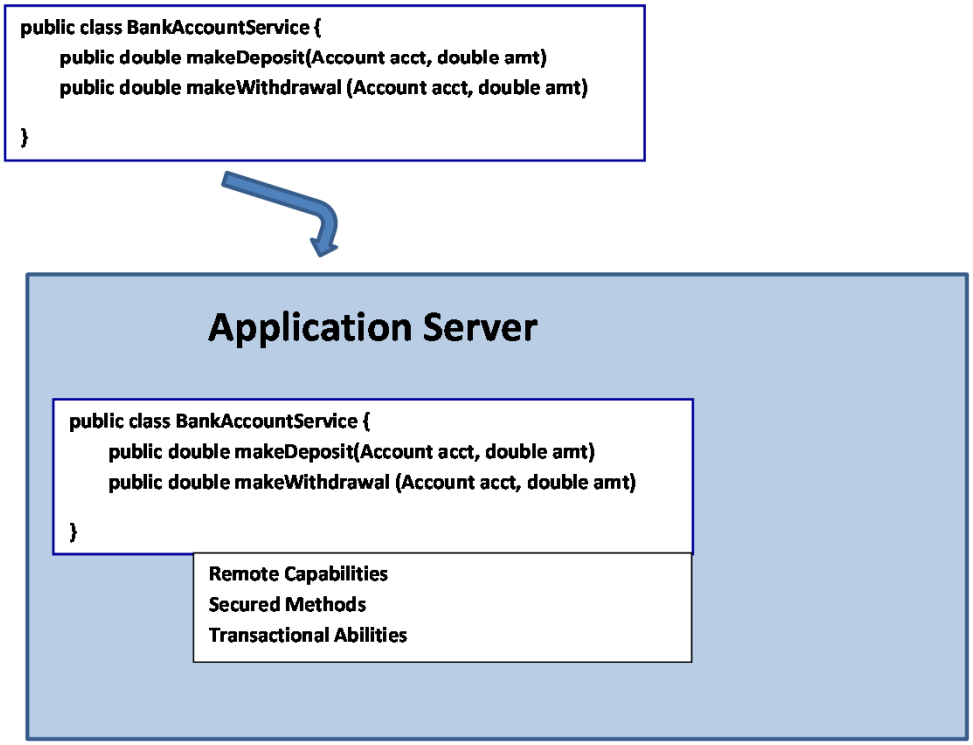
- **2000** Sun rolls out J2EE to support the middle tier of enterprise applications

- **2000** Sun turns J2EE over to the **Java Community Process** (**JCP**) --a committee supported by tool vendors -- for future development

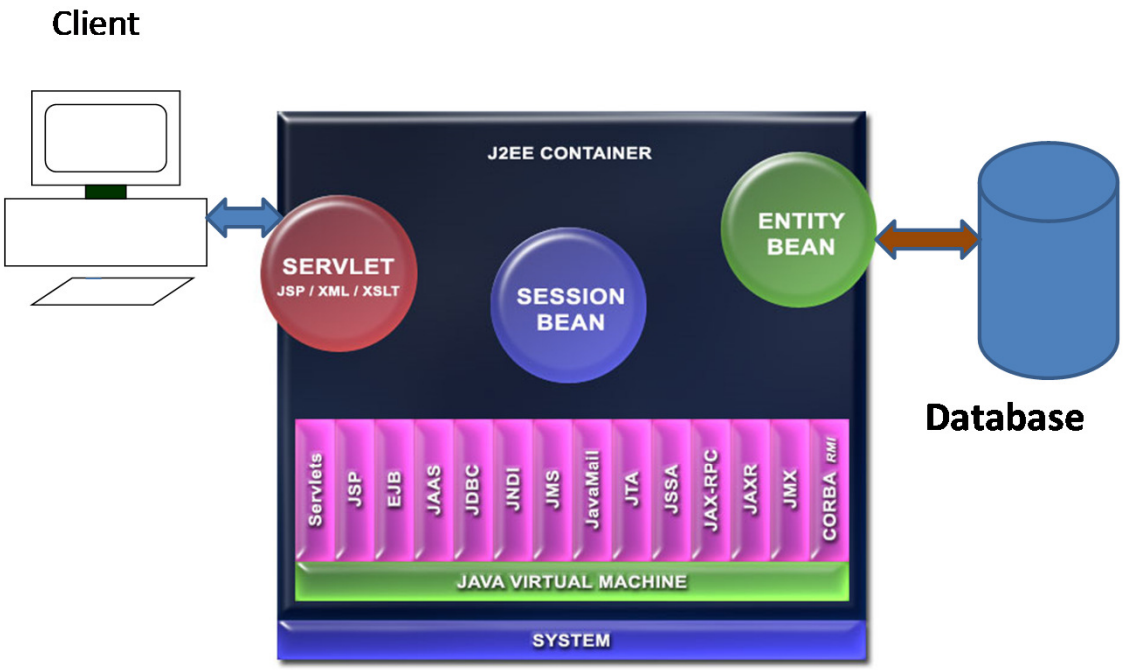
Key Idea of J2EE: EJBs

- The J2EE APIs are fairly low level and require a fair amount of code to take advantage of them in the business logic objects

- **Enterprise Java Beans** (EJBs) in theory let you write regular Java classes, but when loaded in an Application Server, they acquire additional capabilities(such as Remote capabilities and Transactional behavior). And the methods of the class would be secured by the Application Server.



J2EE Application Server



- **Servlets handle client requests and post results back to the client**
- **Session Beans (a type of EJB) handle the business logic**
- **Entity Beans (a type of EJB now deprecated) handled persistence**

Example Application Servers

- **JBoss** Open Source (RedHat)
- **Glassfish** Open Source (Oracle)
- **WebLogic** (Oracle)
- **WebSphere** (IBM)
- **Geronimo** Open Source (Apache)

Limitations of J2EE

- Complicated to write
  - In practice **each** EJB required additional methods, interfaces, and long XML deployment descriptors
- Limited ability to test
  - EJBs could not be tested outside the Application Server, making it difficult to test EJB services individually (such as unit tests)
- Extra work for services not required
  - Inability to provide only required services – all services were required to be supported creating extra work
- Limited Persistence Strategy
  - Entity Beans difficult to work with and performance issues

A Different Approach?

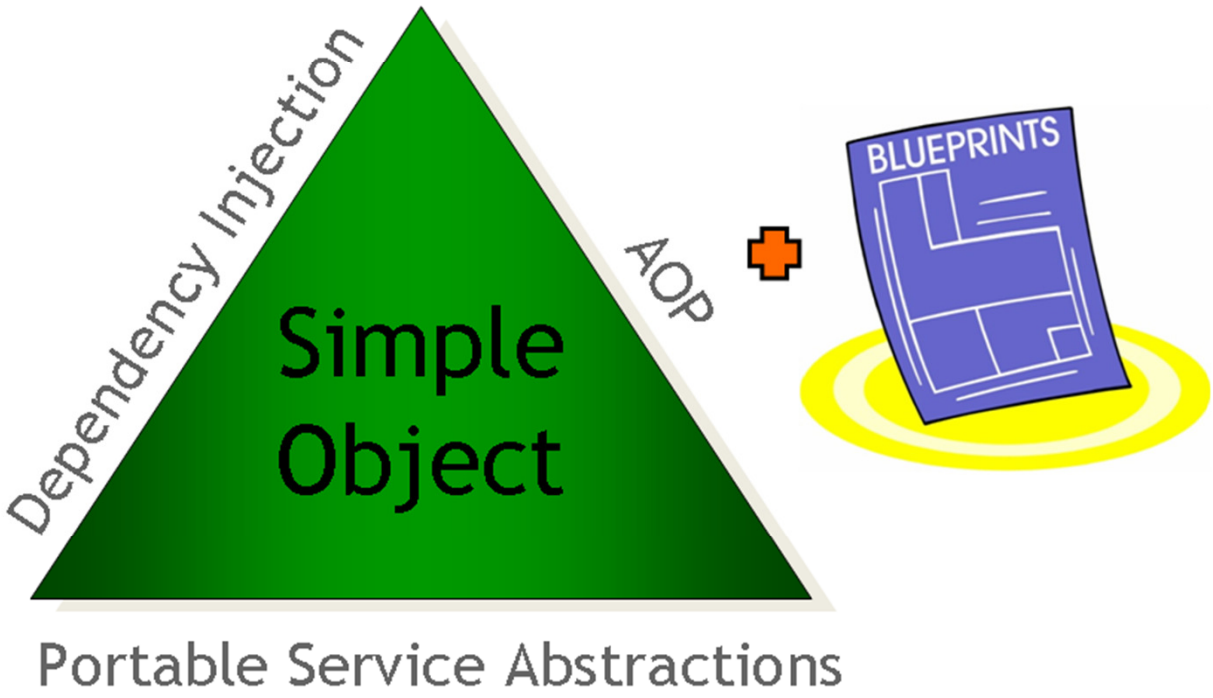
- Rod Johnson, an Enterprise Programmer proposed a new approach in 2002 that removed the "heavyweight", complex approach of EJBs
- His approach led to an Open Source Framework that simplifes enterprise development and solves many of the difficulties of EJBs

First book in 2002 proposed the ideas and provided some downloadable code.

This book in 2004 introduced the open source Spring Framework.

Spring Overview

- The Spring Framework
- Inversion of Control (Dependency Injection)
- The Spring Container



What is a Framework?

- A large library of prewritten code intended for problems in a specific domain
- Brings together different technologies to solve common problems
- Provides a skeleton on which the application will be built
  - Common tasks handled for you, add your custom logic
- Encourages use of a standard set of design patterns
- Simplifies the solution
- Commonly manages components you write
  - Framework objects call your objects
    Hollywood Model – Don't call us, we'll call you

Examples of Frameworks

- Common Frameworks in the Enterprise Domain
  - Spring
  - JEE EJBs
  - Struts
  - JavaServer Faces
  - Hibernate
  - Servlet

- Examples of Framework Object Management
  - **GUI Framework** where listener objects are called when an event occurs
  - **Servlet Framework** – your servlets contained and managed by servlet container

Spring Key Benefits

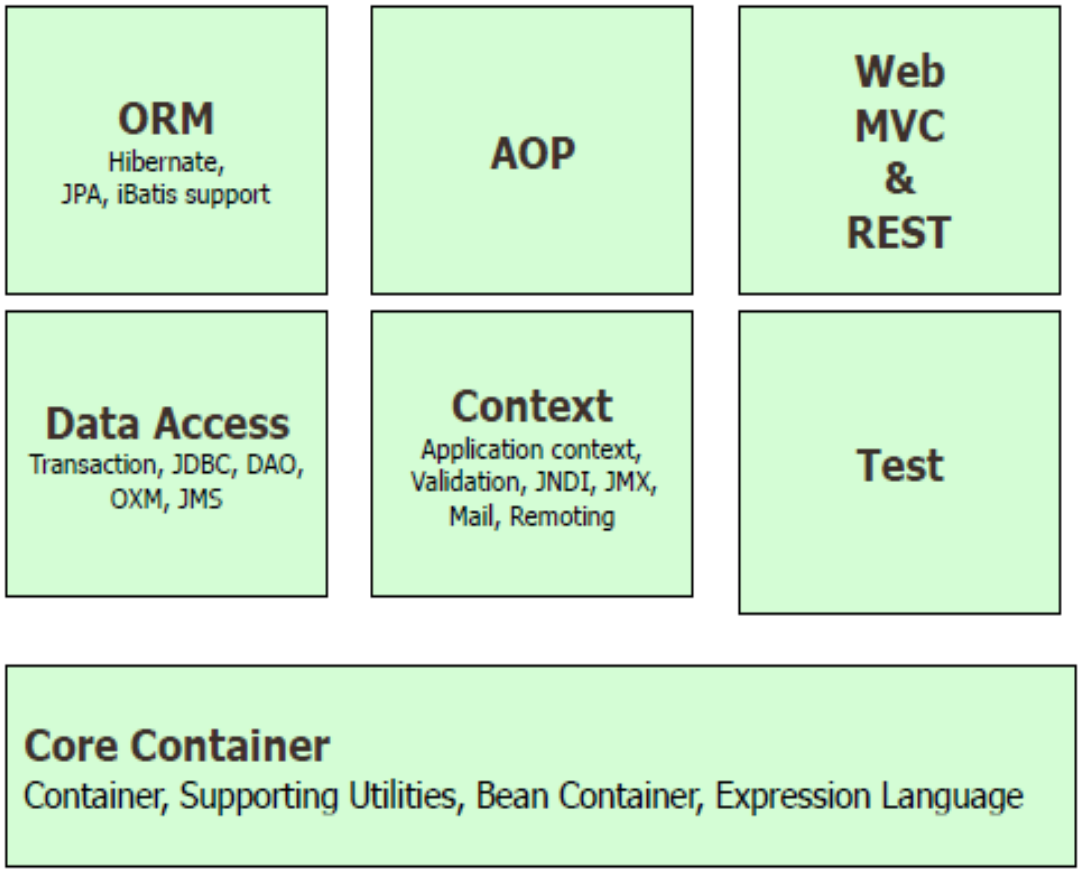
- **Modularity**
  - Write POJOs without adding special code to obtain Spring services
  - **Non-Invasive** -- Doesn't "lock you in" to the Spring Framework so easy to replace with non-Spring modules
  - New types of modules being added all the time – security, social, messaging, data access, etc.

- **Productivity**
  - Repetitive tasks handled by Spring
  - Promotes good programming practices
  - Only support services you need

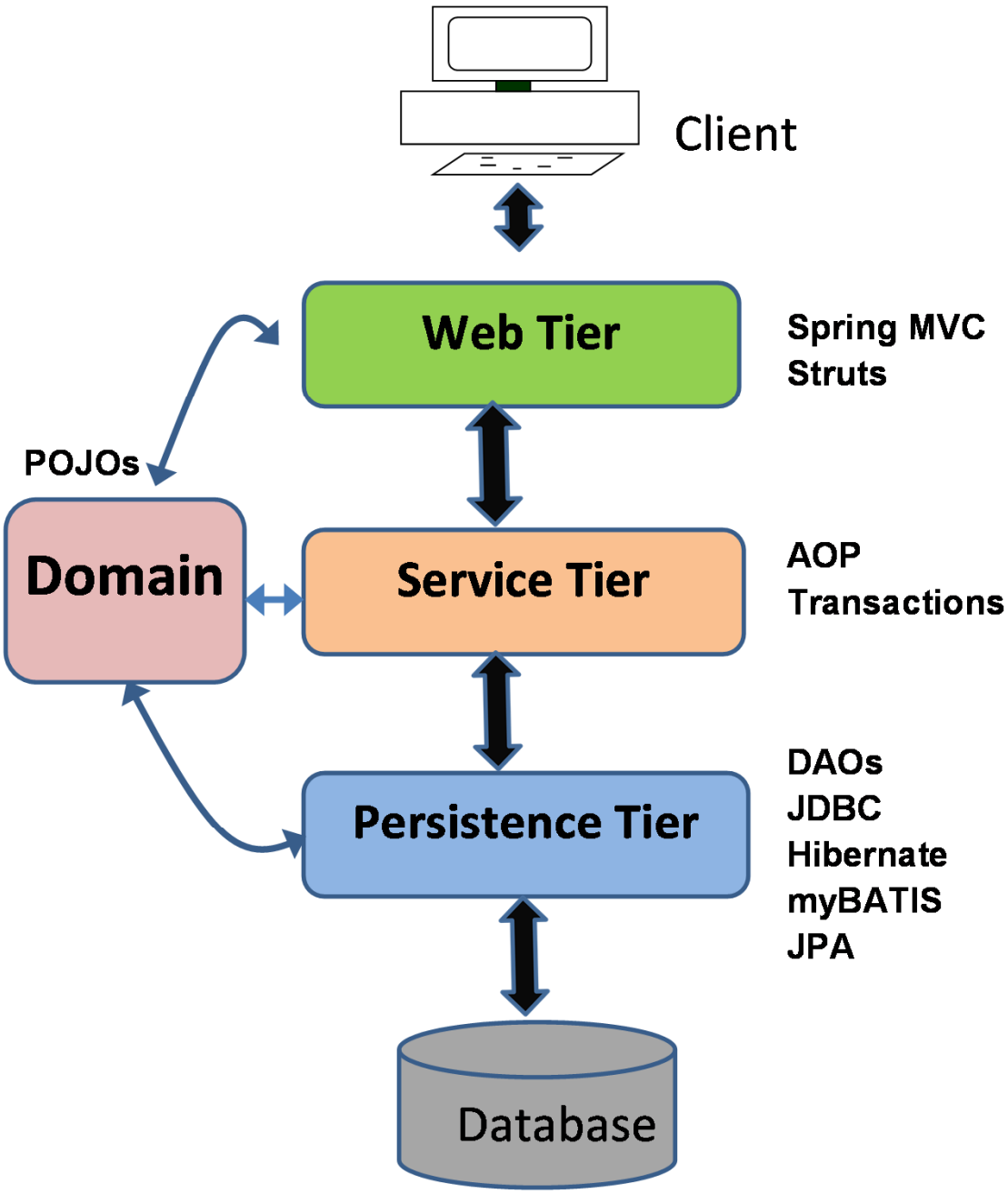
- **Portability**
  - Run stand-alone, or in Tomcat, JEE Application Servers, etc.

- **Testability**
  - Much easier unit and integration testing
  - Can use standard test tools such as **JUnit**

Spring Modules

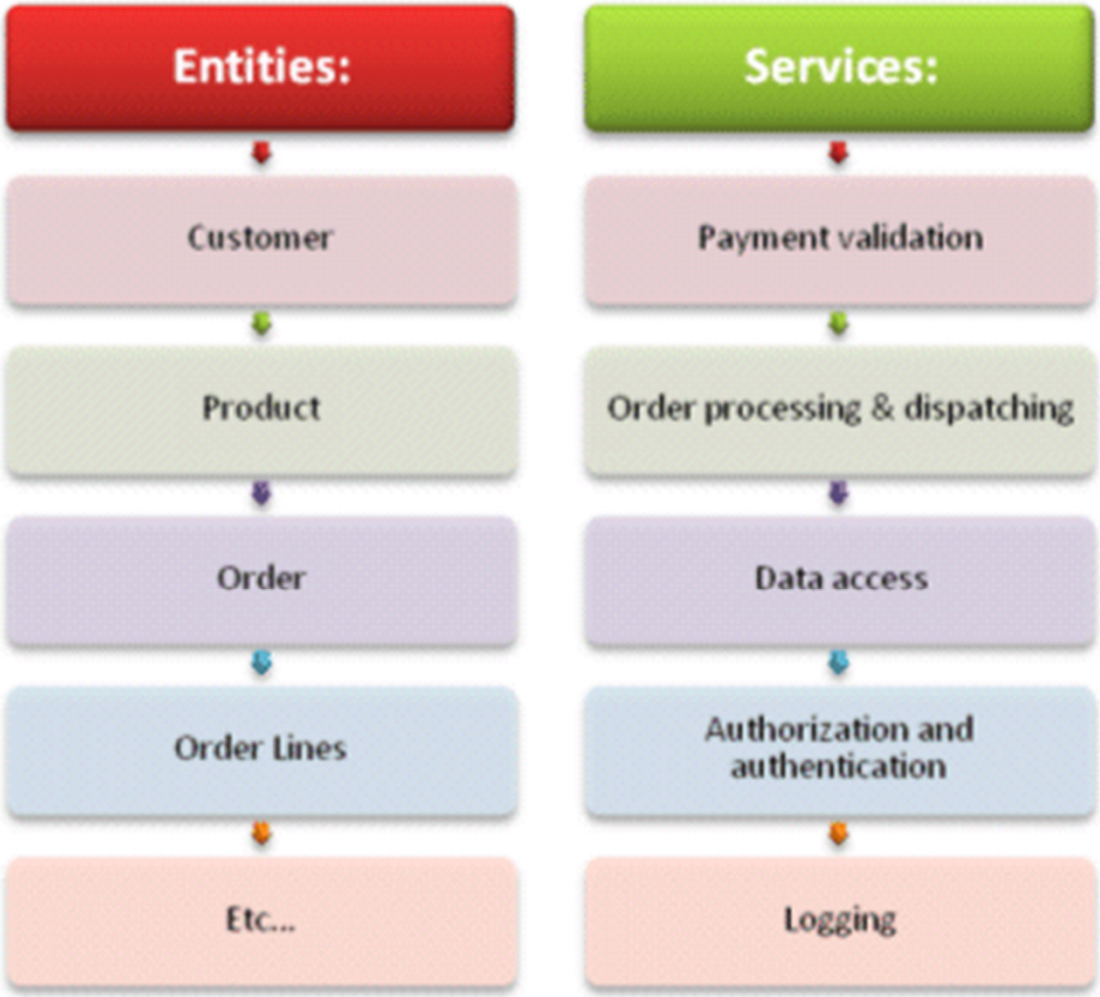


Using Spring in a Web Flow



Business Logic

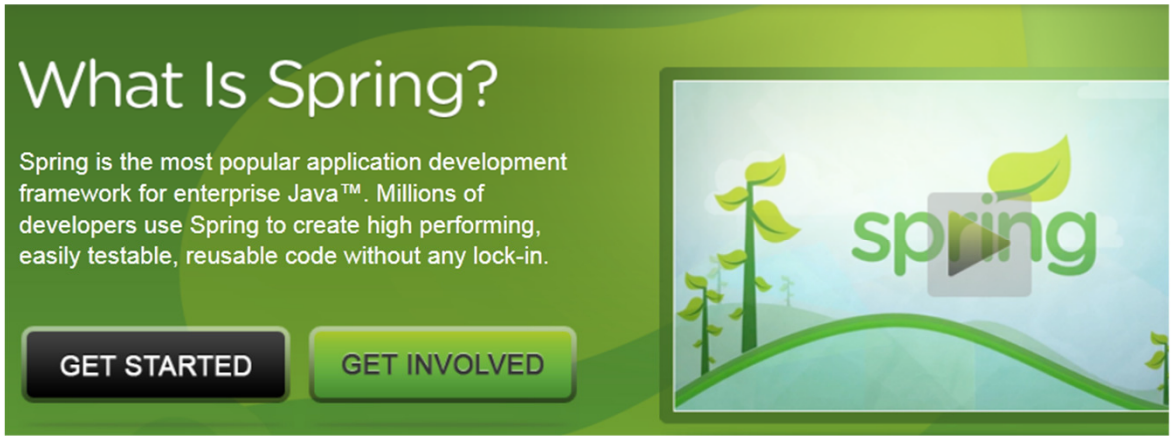
- The middle layer performs the business logic as a combination of Domain objects and Service objects



Spring's Home

- **Documentation, .jar files, Tutorials found at:**

  www.SpringSource.org



Start a Tutorial

If you are new to Spring or need to learn about a new feature, our tutorials explain key concepts simply and provide step by step instructions on how to accomplish specific tasks. With screencasts, example code and expert tips, you can master Spring at your own pace.
Go to Tutorials...

Grab a Code Sample

Spring code samples give you precise code that you can use directly in your applications. Samples written by the Spring experts and make sure that your applications are the following best practices.
Go to Samples...

Read the Documentation

Spring documentation covers every aspect of the platform in exacting detail. If you need to find specific information about the APIs or understand how Spring works internally, then search through our comprehensive and deep technical publications.
Go to Documentation...

Ask a Question (Forums)

Have a question? The Spring forums are a vibrant resource with thousands of users asking and answering questions every day.
Go to the Forums...

Take a Class (Training)

SpringSource University is your ultimate source for developer-focused education. You can take our open-source classes in a classroom setting or live, online to get a better understanding of the Spring Framework, Apache Tomcat and other open source projects and get Spring Certified.
Go to Training...

Video Instruction

The SpringSourceDev YouTube channel provides a complete video archive of Spring presentations and technical screencasts. These recordings by Spring experts give you development guides and tips for all skill levels.
Go to the Channel...

Spring Development Tool

- **Eclipse based Spring IDE**

  www.springsource.org/sts

THE BEST DEVELOPMENT TOOL FOR ENTERPRISE JAVA

springtoolsuite

The Spring Tool Suite™ (STS) provides the best Eclipse-powered development environment for building Spring-powered enterprise applications. STS supplies tools for all of the latest enterprise Java and Spring, and comes on top of the latest Eclipse releases.

Included with STS is the developer edition of vFabric tc Server, the drop-in replacement for Apache Tomcat that's optimized for Spring. With its Spring Insight console, tc Server Developer Edition provides a graphical real-time view of application performance metrics that lets developers identify and diagnose problems from their desktops.

STS supports application targeting to local, virtual and cloud-based servers. It is freely available for development and internal business operations use with no time limits.

Favorite this @ Eclipse Marketplace

DOWNLOAD

OR

Install STS for Eclipse

NEWSLETTER SUBSCRIPTION

Our monthly newsletter is packed full of techniques, tutorials, tips and tricks to get you on your way to Spring nirvana. View Archive

First Name | Last Name

Email | Subscribe