Spring Framework Overview & Tools

“Code with Passion!”

Topics

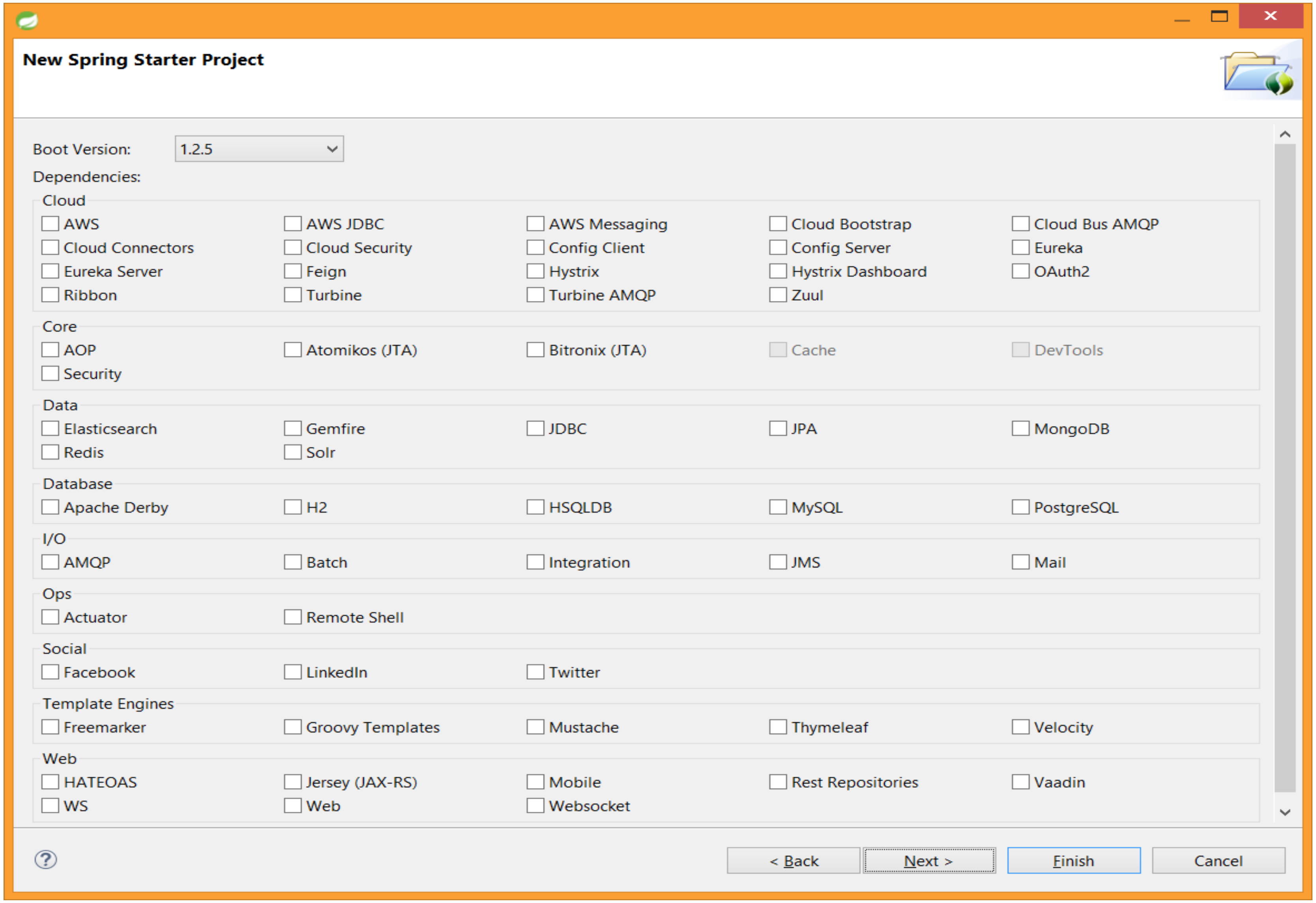
- What is Spring framework?
- Why Spring framework?
- Spring framework architecture
- Usage scenario
- Tools (we are going to use in this course)

What is Spring Framework?

What is Spring Framework?

- Light-weight yet comprehensive framework for building various types of Java applications
  - Web applications
  - Enterprise applications
  - Standalone applications
  - Batch applications
  - Mobile applications
  - Big data applications
  - Event-driven applications
  - Micro-services
  - …

Things you can build with Spring



New Spring Starter Project

Boot Version: 1.2.5

Dependencies:

Cloud

☐ AWS	☐ AWS JDBC	☐ AWS Messaging	☐ Cloud Bootstrap	☐ Cloud Bus AMQP
☐ Cloud Connectors	☐ Cloud Security	☐ Config Client	☐ Config Server	☐ Eureka
☐ Eureka Server	☐ Feign	☐ Hystrix	☐ Hystrix Dashboard	☐ OAuth2
☐ Ribbon	☐ Turbine	☐ Turbine AMQP	☐ Zuul	

Core

☐ AOP	☐ Atomikos (JTA)	☐ Bitronix (JTA)	☐ Cache	☐ DevTools
☐ Security				

Data

☐ Elasticsearch	☐ Gemfire	☐ JDBC	☐ JPA	☐ MongoDB
☐ Redis	☐ Solr			

Database

☐ Apache Derby	☐ H2	☐ HSQLDB	☐ MySQL	☐ PostgreSQL

I/O

☐ AMQP	☐ Batch	☐ Integration	☐ JMS	☐ Mail

Ops

☐ Actuator	☐ Remote Shell

Social

☐ Facebook	☐ LinkedIn	☐ Twitter

Template Engines

☐ Freemarker	☐ Groovy Templates	☐ Mustache	☐ Thymeleaf	☐ Velocity

Web

☐ HATEOAS	☐ Jersey (JAX-RS)	☐ Mobile	☐ Rest Repositories	☐ Vaadin
☐ WS	☐ Web	☐ Websocket		

Key Features - DI

- Bean wiring is done through the Dependency Injection (DI)
  - This aims to eliminate manual wiring of beans
  - Enabled loose-coupling of beans
- A core bean factory, which is usable globally
  - Spring MVC uses it internally

Key Features - Persistence

- Comprehensive RDBMS support
  - Generic abstraction layer for database transaction management
  - Higher abstraction over JDBC
  - Integration with ORM frameworks such as Hibernate, JPA
- NoSQL support
  - MongoDB
  - Cassandra

Key Features - Web-Tier

- Spring MVC web application framework
  - Built on core Spring functionality
  - Supports many technologies for generating views, including Thymeleaf, Velocity, Freemarker, and JSP, etc
- Spring Web Flow
  - Navigation logic is externalized
- REST support
  - Simple to create RESTful service
- Default over configuration
  - Everything is configurable and customizable

Key Features - AOP

- Extensive aspect-oriented programming (AOP) framework for providing services such as transaction management, security support
- As with DI, this aims to improve the modularity of systems created using the framework

Key Features - Test

- Supports Unit testing and Integration testing of Spring components
- Supports both JUnit and TestNG
- Provides consistent loading of Spring ApplicationContexts and caching of those contexts
- Provides mock objects that you can use to test your code in isolation

Why Use
Spring Framework?

Why Use Spring?

- Wiring components (Beans) through Dependency Injection (DI)
  - Promotes de-coupling among the parts that make up an application
- Design to Java interfaces
  - Insulates a user of a functionality from implementation details
- Test-Driven Development (TDD)
  - POJO classes can be tested without being tied up with the framework

Why Use Spring? (Continued)

- Declarative programming through AOP
  - Transaction and security can be easily and declaratively configured
- Simplify use of popular technologies
  - Abstractions insulate application from specifics, eliminate redundant code
  - Underlying technology specifics still accessible
  - Handle common error conditions

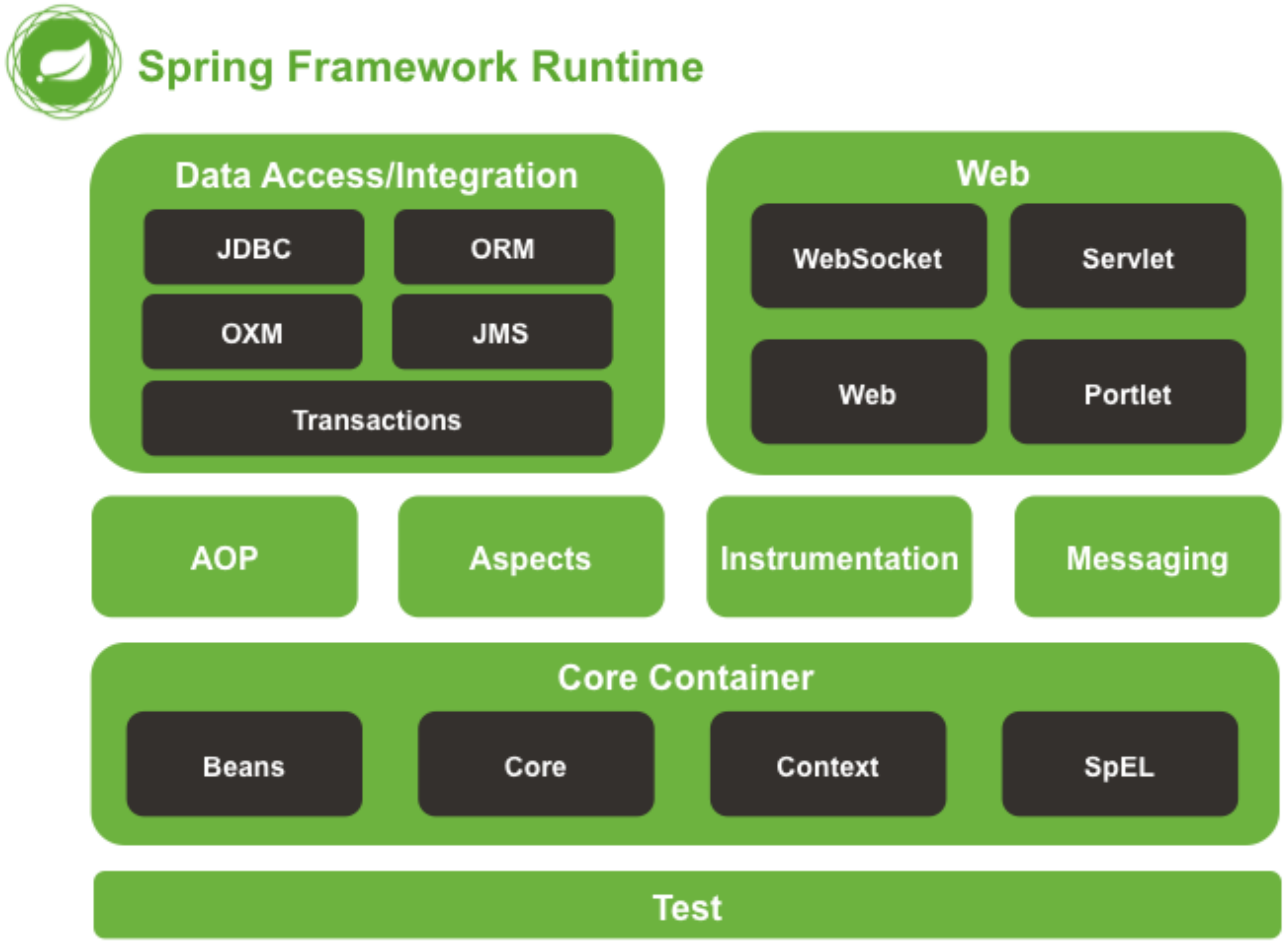
Why Use Spring? (Continued)

- Conversion of checked exceptions to unchecked
  - (Or is this a reason not to use it?)
- Not an all-or-nothing solution
  - Extremely modular and flexible
- Well designed
  - Easy to extend
  - Many reusable classes

Why Use Spring? (Continued)

- Integration with other technologies
  - JPA, Hibernate, JDBC, NoSQL (for data access)
  - Thymeleaf, Velocity, etc. (for presentation)
  - JSF, Wicket, Struts, etc (For web)
  - React, Angular, JavaScript (for front-end UI)
  - ActiveMQ, AMQP (for messaging)
  - ...

Spring Framework Architecture

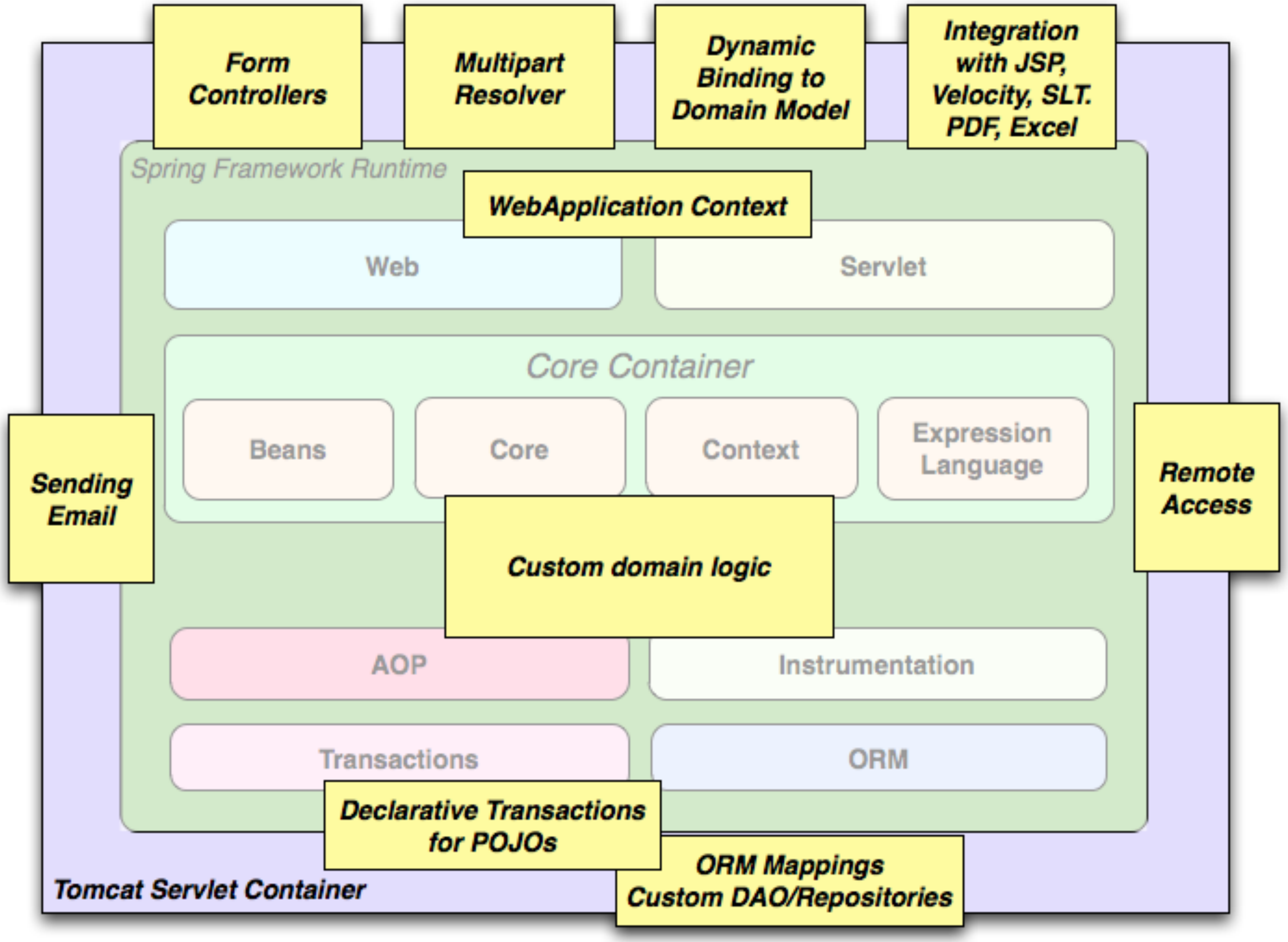

Spring Framework Runtime
Data Access/Integration
JDBC
ORM
OXM
JMS
Transactions
Web
WebSocket
Servlet
Web
Portlet
AOP
Aspects
Instrumentation
Messaging
Core Container
Beans
Core
Context
SpEL
Test

Usage Scenarios

Usage Scenarios

- You can use Spring in all sorts of scenarios, from applets up to fully-fledged enterprise applications using Spring's transaction management functionality and web framework integration

Typical Full-fledged Spring Web Application



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