



Capstone Courseware, LLC

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117. Introduction to Spring

Version 2.5

This course enables the experienced Java developer to use the Spring application framework to manage objects in a lightweight "IoC" (inversion-of-control) container. Spring is a far-reaching framework that aims to facilitate all sorts of Java development, including every level of multi-tier distributed systems. Here we focus on the "Core" module of the framework, developing facility in instantiating, configuring, and assembling Spring beans for various purposes.

The Core module gives the developer declarative control over object creation and assembly; this is useful for any tier of any Java application. So is Spring's validation framework, and so we study not only the assembly of object graphs, but also how to apply validation logic to those objects and to report errors to the user or to another software component.

Prerequisites

- Java programming -- Course 103 is excellent preparation.
- Basic knowledge of XML -- Course 501.



Learning Objectives

- Understand the scope, purpose, and architecture of Spring
- Use Spring's bean factories and application contexts to declare application components, rather than hard-coding their states and lifecycles
- Use dependency injection to further control object relationships from outside the Java code base
- Use annotations to take advantage of Spring post-processors for automated bean instantiation and wiring
- Create validators for business objects, and associate them for application-level and unit-testing uses

Timeline: 2 days.

IDE Support: SpringIDE 2.2

In addition to the primary lab files, an optional overlay is available that adds support for SpringIDE 2.2. Students can code, build, deploy, and test all exercises from within Eclipse, and take advantage of SpringIDE's built-in editors and wizards for Spring configuration files. An appendix in the coursebook introduces SpringIDE features. See also our orientation to Using Capstone's Eclipse Overlays, and please be advised that this is an optional feature; it is not a separate version of the course, and the course itself does not contain explicit Eclipse-specific lab instructions.





Chapter 1. Overview of Spring

- Java EE: The Good, The Bad, and the Ugly
- Enter the Framework
- Spring Value Proposition
- The Spring Container
- Web Applications
- Persistence Support
- Aspect-Oriented Programming
- The Java EE Module(s)
- Integrating Other Frameworks

Chapter 2. The Container

- JavaBeans, Reconsidered
- The Factory Pattern
- Inversion of Control
- XML View: Declaring Beans
- Java View: Using Beans
- Singletons and Prototypes

Chapter 3. Instantiation and Configuration

- Configuring Through Properties
- Configuration Namespaces
- The p: Notation
- Bean (Configuration) Inheritance
- Configuring Through Constructors
- Bean Post-Processors
- Lifecycle Hooks
- Integrating Existing Factory Code

Chapter 4. Dependency Injection

- Complex Systems
- Assembling Object Graphs
- Dependency Injection
- Single and Multiple Relationships
- The Utility Schema
- Bean Aliases
- Inner Beans
- Autowiring
- Auto-Detecting Beans





@Autowired Properties
Best Practices with Spring 2.5 Annotations

Chapter 5. Assembling Object Models

Collections and Maps
Support for Generics
The Spring Utility Schema (util:)
Autowiring to Multiple Beans
Order of Instantiation
Bean Factory vs. Application Context

Chapter 6. Validation

Validators
The Errors Object
ValidationUtils
Error Messages and Localization
Nested Property Paths

Appendix A. Spring IDE

- Installing Spring IDE
- Navigation Features
- Auto-Completes
- Validation
- Support for Spring WebFlow

Appendix B. Learning Resources

System Requirements

Hardware Requirements (Minimum)	1.0 GHz, 256 meg RAM, 500 meg disk space.
Hardware Requirements (Recommended)	1.5 GHz, 512 meg RAM, 1 gig disk space.
Operating System	Tested on Windows XP Professional. Course software should be viable on all systems which support a J2SE 5.0 JDK.
Network and Security	Limited privileges required -- please see our standard security requirements at http://capcourse.com/Guides/Security.html .
Software Requirements	All free downloadable tools.

