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Spring Tutorials

The Spring Framework, created by Rod Johnson, provides a comprehensive programming and configuration model for modern Java-based enterprise applications – on any kind of deployment platform. A key element of Spring is infrastructural support at the application level: Spring focuses on the "plumbing" of enterprise applications so that teams can focus on application-level business logic, without unnecessary ties to specific deployment environments.

In this series of tutorials, we provide step by step examples on how to use the Spring framework.

Spring Quick Start

Quick start to understand the basic of Spring framework development.

- Set up a Spring 3 development environment
- Spring 3 Hello World Example
- Spring with Maven

Spring Configuration

Traditionally Spring configuration is being done through XML. Spring 3.0 supports JavaConfig, now you can use annotations to do the configuration in Spring.

- Spring 3 Java Config Example
- Spring 3 Java Config @Import Example
- Spring Java Configuration
- Spring 3.1 profiles and Tomcat configuration
- Swapping out Spring Bean Configuration at Runtime
- Spring Configurable Magic
- Spring 4 Conditional
- Spring: Make your java-based configuration more elegant

Spring Dependency Injection (DI)

This section explains how Spring utilizes dependency Injection (DI) to manage object dependencies.

- Spring 3 Dependency Injection via Constructor and Setter
- Spring 3: Type safe dependency injection
- Wire object dependencies outside a Spring Container
- Type Conversion in Spring

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Spring Integration for EAI
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Spring bean configuration file or via annotations.

- Spring 3 Bean Reference Example
- How to inject value into Bean properties in Spring
- Spring Inner Bean Example
- Spring Bean Scopes Example
- Spring Collections (List, Set, Map and Properties) Example
- Spring ListFactoryBean, SetFactoryBean and MapFactoryBean Example
- Spring Inject Date into Bean property with CustomDateEditor
- Spring PropertyPlaceholderConfigurer Example
- Spring Bean Configuration Inheritance Example
- Spring Dependency Checking Example
- Spring Property Placeholder Configurer – A few not so obvious options
- Spring Bean Lifecycle Example
- Spring Collection Merging
- Spring Framework: Three Spring Bean Lifecycle Techniques
- Dynamic Property Management in Spring
- Project Configuration with Spring
- Spring 3.1 – Loading Properties For XML Configuration From Database
- Properties with Spring
- Exposing a POJO as a JMX MBean with Spring
- JMX and Spring – Part 1
- JMX and Spring – Part 2
- JMX and Spring – Part 3
- Spring Remoting Support and Developing RMI Service
- Spring Remoting Support with Http Invoker
- Spring Thread Pool Services
- How to use Events in Spring 3.x
- Why I like Spring bean aliasing
- Optimising Your ApplicationContext
- Better error messages with Bean Validation 1.1 in Spring MVC application
- Using Spring managed Bean in non-managed object
- Spring from the Trenches: Injecting Property Values Into Configuration Beans

Spring Expression Language

Spring 3.0 introduces a powerful, featured rich, expression language known as Spring expression language or in short Spring EL.

- Spring Expression Language Example

Spring AutoWiring Bean

Spring "auto-wiring" modes to wire beans automatically, both in XML and annotation.

- Spring Autowire Example
- Spring 4 Autowire Example

Spring Aspect Oriented Programming (AOP)

Aspect-Oriented Programming (AOP) complements Object-Oriented Programming (OOP) by providing another way of thinking about program structure. The key unit of modularity in OOP is the class, whereas in AOP the unit of modularity is the aspect. Aspects enable the modularization of concerns such as transaction management that cut across multiple types and objects. While the Spring IoC container does not depend on AOP, meaning you do not need to use AOP if you don't want to, AOP complements Spring IoC to provide a very capable middleware solution.

- Spring AOP Example
- Implementing Active Record Pattern with Spring AOP
- Spring – Adding AOP support
- Spring AOP in security – controlling creation of UI components via aspects
- Applying aspect oriented programming
- Spring 4: CGLIB-based proxy classes with no default constructor
- Aspect Oriented Programming with Spring

- Spring AOP AspectJ Example
- Aspect Oriented Programming with Spring AspectJ and Maven
- Auditing a Spring MVC Webapp with AspectJ. Part 1
- Auditing a Spring MVC Webapp with AspectJ. Part 2
- Spring Test Context Caching + AspectJ @Transactional + Ehcache pain
- How does Spring @Transactional Really Work?

Spring Object/XML Mapper

Spring Object to XML mapping Tool (OXM).

- Spring Object to XML Mapper

Spring JDBC Support

Spring provides many helper classes to simplify JDBC based database operations.

- Spring JdbcTemplate Example
- Adding C3PO Connection Pooling in Spring JDBC
- Getting started with Spring JDBC in a web application
- Spring Transaction Management Example with JDBC Example

Spring JPA/ORM Support

Spring comes with many handy classes to support JPA and ORM frameworks.

- JBoss 4.2.x Spring 3 JPA Hibernate Tutorial
- Spring Declarative Transactions Example
- The persistence layer with Spring 3.1 and Hibernate
- Simplifying the Data Access Layer with Spring and Java Generics
- The Persistence Layer with Spring 3.1 and JPA
- Transaction configuration with JPA and Spring 3.1
- Enabling JMX in Hibernate, EhCache, Quartz, DBCP and Spring
- Spring – Persistence layer – writing entities and configuring Hibernate
- Spring – DAO 1and Service layer
- Designing the domain model and the service layer
- Synchronizing transactions with asynchronous events in Spring
- Spring JpaRepository Example (In-Memory)
- Spring MVC 3 Controller for MyBatis CRUD operation
- Spring MVC + Hibernate + Maven: CRUD operations example
- MyBatis 3 – Spring integration tutorial
- Spring JPA Data + Hibernate + MySQL + Maven
- Spring Hibernate – MySql and Maven Showcase
- Spring Transactions Visibility
- Spring-injected Beans in JPA EntityListeners

Spring E-mail Support

Spring provides MailSender to send email via JavaMail API. This section also provides tutorials on how to integrate Spring with third party mail providers and their APIs.

- Sending e-mails in Java with Spring – GMail SMTP server example
- Spring, Quartz and JavaMail Integration Tutorial
- Spring E-Mail Support – GMail SMTP Server Example
- How to compose html emails in Java with Spring and Velocity

Spring Caching support

Spring provides a cache abstraction layer for caching frameworks to plug-in. You can utilize the cache for method calls, database interaction and distributes service execution.

- Spring 3.1 Cache Abstraction Tutorial
- Spring 3.1 Caching and @CacheEvict
- Spring 3.1: Caching and EhCache

- Simple Spring Memcached – Spring Caching Abstraction and Memcached
- @Cacheable overhead in Spring
- Distribute Spring Beans in Oracle Coherence
- Oracle Coherence: Distributed Data Management
- Coherence Event Processing by using Map Trigger Feature
- Hazelcast Distributed Execution with Spring
- Spring request-level memoization

Spring Scheduling Support

Spring has very good support for both JDK timers and the Quartz framework.

- Spring & Quartz Integration with Custom Annotation
- Spring & Quartz Integration with Custom Annotation, the SPANN way
- Spring and Quartz: Multi-Job Scheduling Service
- Configuring Quartz with JDBCJobStore in Spring
- Spring 3 Scheduler Example – JDK Timer and Quartz Showcase
- Spring 3 Scheduler Example – JDK Timer and Quartz Showcase
- Spring from the Trenches: Invoking a Secured Method from a Scheduled Job

Spring Web MVC framework

Spring Web Model-View-Controller (MVC) framework.

- Spring MVC Hello World Example
- Spring MVC Handler Mapping Example
- Spring MVC Handler Interceptors Example
- Spring MVC Controller Example
- Spring MVC Exception Handling Example
- Spring MVC View Resolver Example
- Spring MVC Textbox Example
- Spring MVC Password Example
- A Guide To Authenticating Users With Mozilla Persona
- Spring MVC Development – Quick Tutorial
- Spring MVC Form Validation (With Annotations)
- Spring MVC Controller JUnit Testing
- Spring MVC Error Handling Example
- SpringMVC 3 Tiles 2.2.2 Integration Tutorial
- jqGrid, REST, AJAX and Spring MVC Integration
- Spring MVC Interceptors Example
- Spring MVC for Atom Feeds
- Spring 3 MVC Exception Handlers
- Ajax with Spring MVC 3 using Annotations and JQuery
- Spring MVC and JQuery for Ajax Form Validation
- Spring MVC Customized User Login Logout Implementation Example
- Spring – Adding Spring MVC – part 1
- Spring – Adding Spring MVC – part 2
- Spring MVC 3: Upload multiple files
- Spring MVC: form handling vol. 5 – select, option, options tags
- Spring MVC Form Validation (With Annotations)
- Spring MVC Session Tutorial
- Spring MVC Form Tutorial
- Simple Spring MVC Web Application using Gradle
- Spring MVC: Introduction in testing
- Spring MVC, Ajax and JSON Part 1 – Setting The Scene
- Spring MVC, Ajax and JSON Part 2 – The Server Side Code
- Spring MVC, Ajax and JSON Part 3 – The Client Side Code
- Spring MVC Tutorial
- Spring MVC: Validator and @InitBinder
- Spring MVC: Security with MySQL and Hibernate
- Spring MVC: form handling vol. 1

- Spring MVC: form handling vol. 4 – radiobuttons
- Spring MVC Error handling flow
- Spring MVC Custom Validation Annotations
- Spring MVC: Session advanced
- Spring MVC – Customizing RequestMappingHandlerMapping
- DeferredResult – asynchronous processing in Spring MVC
- Spring MVC: Creation of a simple Controller with Java based config
- Spring MVC: REST application with CNVR vol. 1
- Spring MVC: REST application with CNVR vol. 2
- Spring MVC: REST application with CNVR vol. 3
- Spring MVC – @RequestBody and @ResponseBody demystified
- Exception Handling with the Spring 3.2 @ControllerAdvice Annotation
- Spring MVC: Resources
- Long Polling with Spring 3.2's DeferredResult
- Understanding Spring Web Initialization
- Migrating Spring MVC RESTful web services to Spring 4
- Configure favicon.ico in Spring MVC based application
- Spring MVC Integration Testing: Assert the given model attribute(s) have global errors
- Validation groups in Spring MVC
- Customizing HttpMessageConverters with Spring Boot and Spring MVC
- Spring MVC: Ajax & JQuery
- Adding Social Sign In to a Spring MVC Web Application: Configuration
- Adding Social Sign In to a Spring MVC Web Application: Registration and Login
- Adding Social Sign In to a Spring MVC Web Application: Unit Testing
- Adding Social Sign In to a Spring MVC Web Application: Integration Testing
- SpringMVC4 + Spring Data JPA + SpringSecurity configuration using JavaConfig
- @ControllerAdvice improvements in Spring 4
- Spring MVC 4 Quickstart Maven Archetype Improved
- Web App Architecture – the Spring MVC – AngularJs stack
- Spring MVC login example

Spring REST Support

Spring supports exporting beans as REST services through its MVC framework. This section also provides tutorials on how to export Spring services over REST using popular third party tools.

- Spring 4 REST Hello World Example
- RESTful Web Services with RESTeasy JAX-RS on Tomcat 7 – Eclipse and Maven project
- Spring 3 RESTful Web Services
- Integrating Jersey with Spring
- Building a RESTful Web Service with Spring 3.1 and Java based Configuration, part 2
- RESTful Web Service Discoverability, part 4
- REST Service Discoverability with Spring, part 5
- REST Pagination in Spring
- RESTful Web Applications with Jersey and Spring
- Automatically generating WADL in Spring MVC REST application
- How to use RestTemplate with Basic Authentication in Spring
- REST CXF for Spring JPA2 backend
- ETags for REST with Spring
- Spring MVC – Easy REST-Based JSON Services with @ResponseBody
- Spring MVC REST Calls With Ajax
- Develop Restful web services using Spring MVC
- Spring MVC and REST at Google App Engine
- Spring from the Trenches: Adding Validation to a REST API
- Exception Handling for REST with Spring 3.2
- Bootstrap a Web Application with Spring 3
- Tutorial – REST API design and implementation in Java with Jersey and Spring
- Spring REST: Exception handling vol. 1
- Spring REST: Exception handling vol. 2
- Spring REST: Exception handling vol. 3

Spring WEB Services

Spring Web Services (Spring-WS) is a product of the Spring community focused on creating document-driven Web services. Spring Web Services aims to facilitate contract-first SOAP service development, allowing for the creation of flexible web services using one of the many ways to manipulate XML payloads.

- JAX-WS with Spring and Maven Tutorial
- Spring 3, Spring Web Services 2 & LDAP Security
- JAX-WS Spring Integration Example
- Building a SOAP Webservices Proxy Module using Spring Webservices

Spring Unit Test Support

Spring integrates with many popular unit test frameworks to test its services.

- Spring 3 Testing with JUnit 4 – ContextConfiguration and AbstractTransactionalJUnit4SpringContextTests
- Enhancing Spring Test Framework with beforeClass and afterClass setup
- Integration testing scoped beans in CDI 1.0 and Spring 3.1
- Spring Testing Support with TestNG
- Spring Testing Support and Context caching
- Unit Testing of Spring MVC Controllers: Configuration
- Getting Started With Spring's MVC Test Framework – Part 1
- Getting Started With Spring's MVC Test Framework – Part 2
- Testing Spring Data Neo4j Applications with NoSQLUnit
- Unit Testing of Spring MVC Controllers: REST API
- Maven Integration Testing And Spring Restful Services
- DBUnit, Spring and Annotations for Database testing
- Spring JUnit Test Example

Spring JMS Support

Spring provides a JMS integration framework that simplifies the use of the JMS API and shields the user from differences between the JMS 1.0.2 and 1.1 APIs. This section also provides tutorials on how to integrate Spring with popular third party JMS providers.

- Spring 3 HornetQ 2.1 Integration Tutorial
- JMS and Spring: Small Things Sometimes Matter
- Spring JMS, message automatic conversion, JMS template
- Spring JMS: Processing messages within transactions

Spring Data

Spring Data makes it easier to build Spring-powered applications that use new data access technologies such as non-relational databases, map-reduce frameworks, and cloud based data services as well as provide improved support for relational database technologies.

- The Persistence Layer with Spring Data JPA
- Spring Data JDBC generic DAO implementation – most lightweight ORM ever
- Domain modeling with Spring Data Neo4j
- Testing Spring Data Neo4j Applications with NoSQLUnit
- Spring Data Solr Tutorial: Introduction to Solr
- Spring Data Solr Tutorial: Configuration

- Spring Data Solr Tutorial: Adding Custom Methods to a Single Repository
- Spring Data Solr Tutorial: Pagination
- Spring Data Solr Tutorial: Sorting
- Spring Data Solr Tutorial: Dynamic Queries
- Spring Data Solr Tutorial: Adding Custom Methods to All Repositories
- Auditing entities in Spring Data MongoDB
- Caching with Spring Data Redis
- Spring Data JPA and pagination
- Implement Bootstrap Pagination With Spring Data And Thymeleaf
- Using Redis with Spring
- Redis pub/sub using Spring
- Getting started with Spring Data Solr
- Spring Data MongoDB cascade save on DBRef objects
- Spring Data JPA Tutorial: Introduction
- Spring Data JPA Tutorial: Getting the Required Dependencies
- Spring data tutorial for beginners
- Spring Data Gemfire Example
- Spring Data Cassandra Example
- Spring Data Redis Example
- Spring Data MongoDB REST Example
- Spring Data Solr Example
- Spring Data MongoDB Example
- Spring Data Rest Example

Spring Security

Spring Security is a powerful and highly customizable authentication and access-control framework. It is the de-facto standard for securing Spring-based applications.

- Securing GWT apps with Spring Security
- Spring Security: Prevent brute force attack
- Securing your Tomcat app with SSL and Spring Security
- OAuth with Spring Security
- Securing a RESTful Web Service with Spring Security 3.1, part 3
- Basic and Digest authentication for a RESTful Service with Spring Security 3.1, part 6
- Authentication against a RESTful Service with Spring Security
- Spring Security Part 1 – Simple Login application with database
- Spring Security Part 2 – Password Encryption, Customize 404 and 403 error page
- Spring Security Login
- Add RememberMe Authentication With Spring Security
- Spring Security Misconfiguration
- Secure REST services using Spring Security
- Stateless Spring Security Part 1: Stateless CSRF protection
- Stateless Spring Security Part 2: Stateless Authentication
- Spring Security – Behind the scenes
- How to secure Jersey REST services with Spring Security and Basic authentication

Spring Social is an extension of the Spring Framework that allows you to connect your applications with Software-as-a-Service (SaaS) providers such as Facebook and Twitter.

- Getting Started with Spring Social
- Getting Started with Spring Social – Part 2
- Spring Social Twitter Setup
- Tweeting StackExchange Questions with Spring Social
- Tweeting StackExchange with Spring Social – part 1
- Spring social example on spring boot or how I stopped worrying and loved autoconfiguration

Spring Integration

Spring Integration provides an extension of the Spring programming model to support the well-known Enterprise Integration Patterns. It enables lightweight messaging within Spring-based applications and supports integration with external systems via declarative adapters. Those adapters provide a higher-level of abstraction over Spring’s support for remoting, messaging, and scheduling.

- Spring Integration with reCAPTCHA
- Rube Goldberg Spring Integration
- Spring Integration File Polling and Tests
- Aggregating async results using Spring Integration
- Spring Integration – Robust Splitter Aggregator
- Spring Integration – Application from scratch, Part 1
- Spring Integration – Application from scratch, Part 2
- Spring Integration: A lightweight integration Approach
- Spring Integration – Using RMI Channel Adapters
- How error handling works in Spring Integration
- Spring Integration Standalone application with Spring Boot
- Spring Integration 4.0: A complete XML-free example
- Spring Integration Java DSL sample
- Creating a REST API with Spring Boot and MongoDB
- Getting started with Jersey and Spring Boot
- High Available AMQP Backed Message Channels via Spring Integration and RabbitMQ
- Spring rest template example
- Spring struts integration example

Spring Batch

Spring Batch is a lightweight, comprehensive batch framework designed to enable the development of robust batch applications vital for the daily operations of enterprise systems.

- Chunk Oriented Processing in Spring Batch
- TaskletStep Oriented Processing in Spring Batch
- Spring Batch Tutorial with Spring Boot and Java Configuration
- Scaling Spring Batch – Step Partitioning
- Spring Boot and Spring Data REST – exposing repositories over REST
- Spring Batch Tasklet Example
- Spring Batch Job Example
- Spring Batch Quartz Example
- Spring Batch Scheduler Example
- Spring Batch JobRepository Example
- Spring Batch Partitioning Example

Spring Roo

Spring Roo is a next-generation rapid application development tool for Java developers. It focuses on higher productivity, stock-standard Java APIs, high usability, avoiding engineering trade-offs.

- Proof-of-Concept Using Spring Roo

Spring Boot

Spring Boot makes it easy to create stand-alone, production-grade Spring based Applications that can you can "just run". We take an opinionated view of the Spring platform and third-party libraries so you can get started with minimum fuss. Most Spring Boot applications need very little Spring configuration.

- Spring Boot: Fast MVC start
- Testing mail code in Spring Boot application
- Deploying a Spring boot application to Cloud Foundry with Spring-Cloud
- Using @ConfigurationProperties in Spring Boot

- Creating a REST API with Spring Boot and MongoDB
- Configure a Spring JMS application with Spring Boot and annotation support

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