



spring

Spring Boot Roadmap

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What Is Spring & Spring Boot?

Spring Framework is an open-source Java framework that simplifies enterprise application development through Dependency Injection and Inversion of Control.

Spring Boot is build on top of Spring and it simplifies the development of Spring applications by providing auto-configuration and a set of pre-built libraries.



Why Spring?

- Dependency Injection: Simplifies code, boosts testability
- Modularity: Vast ecosystem of pick-and-choose libraries
- Integration: Seamless compatibility with Java ecosystem
- Scalability: From simple APIs to enterprise applications, with ease
- Productivity: Rapid development



Pre-Requisites

- OOP Concepts
- Java Fundamentals
- Build Tool (Maven/Gradle)

Ready To Master Spring?

This roadmap will guide you from novice to expert



Core Concepts

- Dependency Injection
- Inversion of Control (IoC)
- IoC Container
- Application Context
- Beans and bean scopes

Configuration

- XML based configuration
- Annotation based configuration
- @ComponentScan
- @Autowire and @Component



Spring Boot

- Spring Initializr
- Auto-Configuration
- Spring boot starters
- Embedded Servers
- Actuator
- Property configuration
- Profiles (environment specific config)



Spring MVC

- MVC architecture
- Dispatcher servlet
- Path variables & request parameters
- @Controller
- @RequestMapping annotations
- Data binding and validation
- View technologies (JSP, Thymeleaf)
- Filters and interceptors



RESTful Services

- REST principles
- REST API design
- HTTP methods (GET, POST, PUT, DELETE)
- @RestController
- Request and response marshalling
- Content type negotiation
- HATEOAS
- Swagger/OpenAPI documentation
- @ExceptionHandler @ControllerAdvice



Database Access

- JDBC
- Java Persistence API (JPA)
- Hibernate and other ORMs
- Entity mappings with annotations
- Repositories and CRUD operations
- Custom queries (SQL, HQL, JPQL)
- Transactional management
- Connection Pooling (HikariCP)
- Caching



Spring Security

- Authentication
- Authorization
- Security context
- Security filter chain
- Hashing and password encoding
- Method-level security
- JSON Web Token (JWT)
- OAuth2
- OpenID connect
- CSRF and CORS



Spring AOP

- Cross-Cutting Concerns
- Aspect
- Advice and advice types
- Pointcut expressions
- AOP Proxies

Testing

- Junit5
- Mocking with Mockito and Powermock
- Spring test framework



Microservices (Spring Cloud)

- Microservices architecture
- Spring cloud
- Service discovery
- API gateway and load balancing
- Resiliency Patterns
- Distributed configuration and tracing
- Distributed transactions
- Service mesh
- Event driven architecture



Other Topics

- Reactive programming (Webflux)
- Spring Batch
- Spring messaging (Kafka, RabbitMQ)
- Spring Integration



How Can You Improve?

- Understand the fundamentals
- Refer books and online resources
- Build projects with Spring
- Practice, practice, practice



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