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Spring Boot

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# **1. Introduction to Spring Boot**

*Spring Boot is an opinionated framework built on top of the Spring Framework to simplify application development by:*

* Eliminating boilerplate configurations
* Providing default behaviors (auto-configuration)
* Embedding web servers (like Tomcat)
* Enabling production-ready features out-of-the-box

"**Opinionated**" means Spring Boot makes smart decisions for you (e.g., which configurations to use) so you can get started quickly and only override when needed.

## 🔹 **Important Features of Spring Boot**

**1. Auto-Configuration:**

Based on classpath scanning, it configures your app automatically. Behind the scenes, it uses @EnableAutoConfiguration and conditionals like @ConditionalOnClass, @ConditionalOnMissingBean.

Example: If you have spring-boot-starter-data-jpa and H2 in your classpath, it automatically configures: DataSource, EntityManager, Hibernate dialect ,H2 Console

@SpringBootApplication = @Configuration + @EnableAutoConfiguration + @ComponentScan

Reads from:

* META-INF/spring.factories
* Checks conditions using @Conditional\* annotations

**2. Embedded Web Servers:**

Runs apps directly using embedded servers. No need for WAR or external server deployment.

**3. Spring Initializer:**

Scaffold a new project instantly: Visit: <https://start.spring.io/> . Instantly sets up project with correct directory structure and config.

**4. Starter Dependencies:**

Reduces complexity by bundling compatible dependencies together.

<!--Instead of this-->  
<dependency>spring-core</dependency>  
<dependency>spring-context</dependency>  
<dependency>spring-webmvc</dependency>

<!--Use this:-->  
<dependency>  
<groupId>org.springframework.boot</groupId>  
<artifactId>spring-boot-starter-web</artifactId>  
</dependency>

**5. Spring Boot Actuator:**

Enables health checks, metrics, env info etc.

**6. Spring Boot DevTools:**

Live reload and automatic restarts during development.

**7. External Configuration via application.yml or application.properties:**

Supports multiple environments like:

# application-dev.yml  
server:  
 port: 8081  
spring:  
 datasource:  
 url: jdbc:h2:mem:testdb

## 🔹 **Spring Boot Vs Spring**

| **Feature** | **Spring Framework** | **Spring Boot** |
| --- | --- | --- |
| Setup | Manual (XML or Java) | Auto-config via starters |
| Web Server | External (Tomcat) | Embedded |
| Deployment | WAR file | Executable JAR |
| Config | Verbose, scattered | Centralized (application.yml) |
| Dependency Management | Manual | Starter POMs |
| Monitoring Tools | Custom setup | Built-in via Actuator |
| Learning Curve | Steep | Gentle (opinionated defaults) |
| Productivity | Medium | Very high |