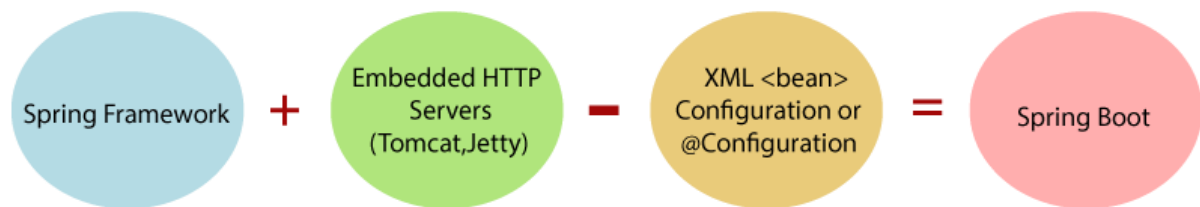


Spring Boot is a Spring module that provides the RAD (Rapid Application Development) feature to the Spring framework.

## What is Spring Boot

Spring Boot is a project that is built on the top of the Spring Framework. It provides an easier and faster way to set up, configure, and run both simple and web-based applications.

It is a Spring module that provides the **RAD (Rapid Application Development)** feature to the Spring Framework. It is used to create a stand-alone Spring-based application that you can just run because it needs minimal Spring configuration.



In short, Spring Boot is the combination of **Spring Framework** and **Embedded Servers**.

In Spring Boot, there is no requirement for XML configuration (deployment descriptor). It uses convention over configuration software design paradigm that means it decreases the effort of the developer.

We can use Spring **STS IDE** or **Spring Initializr** to develop Spring Boot Java applications.

### Why should we use Spring Boot Framework?

We should use Spring Boot Framework because:

- The dependency injection approach is used in Spring Boot.
- It contains powerful database transaction management capabilities.
- It simplifies integration with other Java frameworks like JPA/Hibernate ORM, Struts, etc.
- It reduces the cost and development time of the application.

Along with the Spring Boot Framework, many other Spring sister projects help to build applications addressing modern business needs. There are the following Spring sister projects are as follows:

- **Spring Data:** It simplifies data access from the relational and **NoSQL** databases.
- **Spring Batch:** It provides powerful **batch** processing.

- **Spring Security:** It is a security framework that provides robust **security** to applications.
- **Spring Social:** It supports integration with **social networking** like LinkedIn.
- **Spring Integration:** It is an implementation of Enterprise Integration Patterns. It facilitates integration with other **enterprise applications** using lightweight messaging and declarative adapters.

## Advantages of Spring Boot

- It creates **stand-alone** Spring applications that can be started using Java **-jar**.
- It tests web applications easily with the help of different **Embedded** HTTP servers such as **Tomcat, Jetty**, etc. We don't need to deploy WAR files.
- It provides opinionated '**starter**' POMs to simplify our Maven configuration.
- It provides **production-ready** features such as **metrics, health checks**, and **externalized configuration**.
- There is no requirement for **XML** configuration.
- It offers a **CLI** tool for developing and testing the Spring Boot application.
- It offers the number of **plug-ins**.
- It also minimizes writing multiple **boilerplate codes** (the code that has to be included in many places with little or no alteration), XML configuration, and annotations.
- It **increases productivity** and reduces development time.

## Limitations of Spring Boot

Spring Boot can use dependencies that are not going to be used in the application. These dependencies increase the size of the application.

## Goals of Spring Boot

The main goal of Spring Boot is to reduce **development, unit test**, and **integration test** time.

- Provides Opinionated Development approach
- Avoids defining more Annotation Configuration
- Avoids writing lots of import statements
- Avoids XML Configuration.

By providing or avoiding the above points, Spring Boot Framework reduces **Development time, Developer Effort**, and **increases productivity**.

## Prerequisite of Spring Boot

To create a Spring Boot application, following are the prerequisites. In this tutorial, we will use **Spring Tool Suite (STS)** IDE.

- Java 1.8
- Maven 3.0+
- Spring Framework 5.0.0.BUILD-SNAPSHOT
- An IDE (Spring Tool Suite) is recommended.

# Spring Boot Features

- Web Development
- SpringApplication
- Application events and listeners
- Admin features
- Externalized Configuration
- Properties Files
- YAML Support
- Type-safe Configuration
- Logging
- Security

## Web Development

It is a well-suited Spring module for web application development. We can easily create a self-contained HTTP application that uses embedded servers like **Tomcat**, **Jetty**, or **Undertow**. We can use the **spring-boot-starter-web** module to start and run the application quickly.

## SpringApplication

The SpringApplication is a class that provides a convenient way to bootstrap a Spring application. It can be started from the main method. We can call the application just by calling a static run() method.

1. public static void main(String[] args)
2. {
3. SpringApplication.run(ClassName.class, args);
4. }

## Application Events and Listeners

Spring Boot uses events to handle the variety of tasks. It allows us to create factories file that is used to add listeners. We can refer it to using the **ApplicationListener** key.

Always create factories file in META-INF folder like **META-INF/spring.factories**.

## Admin Support

Spring Boot provides the facility to enable admin-related features for the application. It is used to access and manage applications remotely. We can enable it in the Spring Boot application by using **spring.application.admin.enabled** property.

## Externalized Configuration

Spring Boot allows us to externalize our configuration so that we can work with the same application in different environments. The application uses YAML files to externalize configuration.

## Properties Files

Spring Boot provides a rich set of **Application Properties**. So, we can use that in the properties file of our project. The properties file is used to set properties like **server-port=8082** and many others. It helps to organize application properties.

## YAML Support

It provides a convenient way of specifying the hierarchical configuration. It is a superset of JSON. The SpringApplication class automatically supports YAML. It is an alternative of properties file.

## Type-safe Configuration

The strong type-safe configuration is provided to govern and validate the configuration of the application. Application configuration is always a crucial task which should be type-safe. We can also use annotation provided by this library.

## Logging

Spring Boot uses Common logging for all internal logging. Logging dependencies are managed by default. We should not change logging dependencies if no customization is needed.

## Security

Spring Boot applications are spring bases web applications. So, it is secure by default with basic authentication on all HTTP endpoints. A rich set of Endpoints is available to develop a secure Spring Boot application.

## Spring Boot Version

The latest version of Spring Boot is **2.0**. It introduces a lot of new features along with some modifications and replacement.

## Spring Boot 2.0

Let's have a sneak peek at Spring Boot 2.0.

- **What's New**
  - Infrastructure Upgrade
  - Spring Framework 5
- **What's Changed**
  - Configuration Properties

- Gradle Plugin
  - Actuators endpoints
- **What's Evolving**
  - Security
  - Metrics

The pivotal team has upgraded the **infrastructure** in which the following tools are involved:

- Supports **Java 8** or above versions
- Supports Apache **Tomcat 8** or above versions
- Supports **Thymeleaf 3**
- Supports **Hibernate 5.2**

In **Spring Framework 5**, the Pivotal team upgraded the following:

- Reactive Spring
  - i. Servlet stack
    1. Servlet Container
    2. Servlet API
    3. Spring MVC
  - ii. **Reactive Stack**
    1. Netty, Servlet 3.1, Undertow
    2. Reactive HTTP Layer
    3. Spring WebFlux
- Functional API
- Kotlin Support

The latest version of Spring Boot is 2.2.1. This release of Spring Boot includes 110 fixes, dependency upgrades, and improvements.

In the Spring Boot v2.2.1, the annotation **@ConfigurationProperties** scanning is now disabled by default. We need to be explicitly opted into by adding the **@ConfigurationPropertiesScan** annotation.

## New Features

- Support constructor binding for property nested inside a JavaBean
- Add config property for `CodecConfigurer.maxInMemorySize` in WebFlux
- Make test slices' type exclude filters public
- Support amqps:// URIs in `spring.rabbitmq.addresses`

## Dependency upgrades

Some dependencies have been upgraded in Spring Boot v2.2.1 are as follows:

- MongoDB 3.11.2
- Spring Security 5.2.1.RELEASE
- Slf4j 1.7.29
- Spring Hateoas 1.0.1.RELEASE
- Hibernate Validator 6.0.18.Final

- Hibernate 5.4.8.Final
- Jetty 9.4.22.v20191022
- Spring Framework 5.2.1
- Spring AMQP 2.2.1
- H2 1.4.200
- Spring Security 5.2
- Spring Batch 4.2

Some important and widely used third-party dependencies are upgraded in this release are as follows:

- Micrometer 1.3.1
- Flyway 6.0.7
- Elasticsearch 6.8.4
- JUnit 5.5
- Jackson 2.10

## Performance Improvements

In Spring Boot 2.2.1 the following performance has been improved:

### Lazy Initialization

In Spring Boot 2.2.1, we can enable global lazy initialization by using the property **spring.main.lazy-initialization** property. It reduces the application startup time.

### Java 13 Support