

# Spring BOOT

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## Spring boot: initializer

The screenshot shows the Spring Initializr web application. The interface includes a sidebar with navigation links: Project, Language, Spring Boot, Project Metadata, and Dependencies. The main content area is divided into sections for Project (Maven Project, Gradle Project), Language (Java, Kotlin, Groovy), Spring Boot (2.3.0 M1, 2.3.0 (SNAPSHOT), 2.2.5 (SNAPSHOT), 2.2.4, 2.1.13 (SNAPSHOT), 2.1.12), Project Metadata (Group, Artifact, Options), and Dependencies (Search dependencies to add, Selected dependencies). The 'Generate' button is highlighted in green.

Create a spring boot project

Add dependency: web, actuator, JPA

监控app健康状态 连接数据

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## Starter

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>com.example</groupId>
  <artifactId>myproject</artifactId>
  <version>0.0.1-SNAPSHOT</version>

  <!-- Inherit defaults from Spring Boot -->
  <parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-starter-parent</artifactId>
    <version>2.1.0.RELEASE</version>
  </parent>

  <!-- Add typical dependencies for a web application -->
  <dependencies>
    <dependency>
      <groupId>org.springframework.boot</groupId>
      <artifactId>spring-boot-starter-web</artifactId>
    </dependency>
  </dependencies>

  <!-- Package as an executable jar -->
  <build>
    <plugins>
      <plugin>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-maven-plugin</artifactId>
      </plugin>
    </plugins>
  </build>
</project>
```

### Common Starters

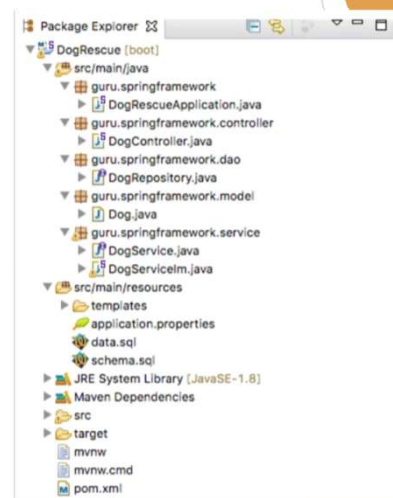
spring-boot-starter-data-jpa  
spring-boot-starter-security  
spring-boot-starter-test  
spring-boot-starter-web

Question:  
How does Spring boot determine the  
dependency version?

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## Code Layout

```
com
+- example
  +- myapplication
    +- Application.java
    |
    +- customer
      +- Customer.java
      +- CustomerController.java
      +- CustomerService.java
      +- CustomerRepository.java
    |
    +- order
      +- Order.java
      +- OrderController.java
      +- OrderService.java
      +- OrderRepository.java
```



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## Application.java

```
package com.example.myapplication;

import org.springframework.boot.SpringApplication;
import org.springframework.boot.autoconfigure.SpringBootApplication;

@SpringBootApplication
public class Application {

    public static void main(String[] args) {
        SpringApplication.run(Application.class, args);
    }

}
```

How it works:

1. @SpringBootApplication tells this is a spring boot application file and it starts from here
2. Main -> SpringApplication.run() bootstrap spring and application and server/tomcat
3. Application.class - this is the primary spring component

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## Annotations

- @SpringBootApplication
  - = @EnableAutoConfiguration
  - + @ComponentScan
    - (@Component vs @Bean)
  - + @Configuration

```
@Configuration
@EnableAutoConfiguration
@ComponentScan
public class Application {
    public static void main(String[] args) {
        SpringApplication.run(Application.class, args);
    }
}
```

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## @EnableAutoConfiguration

- ▶ Enable auto-configuration of the Spring Application Context, attempting to guess and configure beans that you are likely to need. Auto-configuration classes are usually applied based on your classpath and what beans you have defined.

```
@Configuration
@EnableJpaRepositories
@EnableTransactionManagement
public class ApplicationConfig {
    @Bean
    public DataSource dataSource() {
        ...
    }

    @Bean
    public EntityManagerFactory entityManagerFactory() {
        ...
        factory.setDataSource(dataSource());
        return factory.getObject();
    }

    @Bean
    public PlatformTransactionManager transactionManager() {
        JpaTransactionManager txManager = new JpaTransactionManager();
        txManager.setEntityManagerFactory(entityManagerFactory());
        return txManager;
    }
}
```



```
spring.datasource.url=jdbc:mysql://localhost/test
spring.datasource.username=dbuser
spring.datasource.password=dbpass
spring.datasource.driver-class-name=com.mysql.jdbc.Driver
```

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## @Component vs @Bean

- ▶ @Component (@Component, @Controller, @Service, @Repository) - class level
- ▶ @Bean - method level

```
@Configuration
@ComponentScan({"com.logicbig.example.di.cons"})
public class ConstBasedDI_WireByType {

    @Bean(name = "a")
    public OrderService orderServiceByProvider1 () {
        return new OrderServiceImpl1();
    }

    @Bean(name = "b")
    public OrderService orderServiceByProvider2 () {
        return new OrderServiceImpl2();
    }

    public static void main (String... strings) {
        AnnotationConfigApplicationContext context = new AnnotationConfigApplicationContext(
            ConstBasedDI_WireByType.class);
        OrderServiceClient bean = context.getBean(ConstBasedDI_WireByType.OrderServiceClient.class);
        bean.showPendingOrderDetails();
    }
}
```

```
@Component
public static class OrderServiceClient {

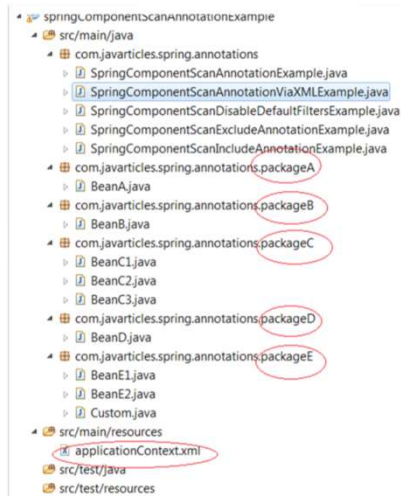
    private final OrderService orderService1;
    private final OrderService orderService2;

    @Autowired
    OrderServiceClient (@Qualifier("a") OrderService orderService1,
        @Qualifier("b") OrderService orderService2) {
        this.orderService1 = orderService1;
        this.orderService2 = orderService2;
    }

    public void showPendingOrderDetails () {
        System.out.println(orderService1.getOrderDetails("100"));
        System.out.println(orderService2.getOrderDetails("100"));
    }
}
```

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## @ComponentScan



```
package com.javarticles.spring.annotations;

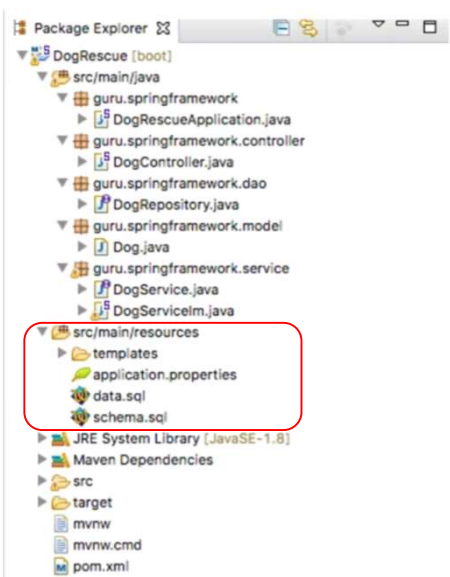
import org.springframework.context.annotation.AnnotationConfigApplicationContext;
import org.springframework.context.annotation.ComponentScan;
import org.springframework.context.annotation.Configuration;

import com.javarticles.spring.annotations.packageC.BeanC1;

@Configuration
@ComponentScan(basePackages = {
    "com.javarticles.spring.annotations.packageA",
    "com.javarticles.spring.annotations.packageB",
    "com.javarticles.spring.annotations.packageE" }, basePackageClasses = BeanC1.class)
public class SpringComponentScanAnnotationExample {
    public static void main(String[] args) {
        AnnotationConfigApplicationContext ctx = new AnnotationConfigApplicationContext();
        try {
            ctx.register(SpringComponentScanAnnotationExample.class);
            ctx.refresh();
            System.out.println("SpringComponentScanAnnotationExample: " +
                ctx.getBean("springComponentScanAnnotationExample"));
            System.out.println("BeanA: " +
                ctx.getBean("beanA"));
            System.out.println("BeanB: " +
                ctx.getBean("beanB"));
            System.out.println("BeanC1: " +
                ctx.getBean("beanC1"));
            System.out.println("BeanC2: " +
                ctx.getBean("beanC2"));
            System.out.println("Contains BeanC3: " +
                ctx.containsBean("beanC3"));
            System.out.println("Contains BeanD?: " +
                ctx.containsBean("beanD"));
            System.out.println("Contains BeanE1: " +
                ctx.containsBean("beanE1"));
            System.out.println("Contains BeanE2?: " +
                ctx.containsBean("beanE2"));
        } finally {
            ctx.close();
        }
    }
}
```

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## Load properties file



- ▶ Application.properties is a default, auto-load file, no special treatment required

- ▶ Foo.properties - put in src/main/resources (classpath)

To load:

@Configuration

@PropertySource{

    "classpath: foo.properties"

    "classpath: foo-\${env}.properties"

}

public class PropertiesWithJavaConfig {}

- ▶ Inject/Use a property

@Value("\${jdbc.url}")

private String jdbcUrl;

OR::

private Environment env;

String keyValue = env.getProperty(key);

OR::

@ConfigurationProperties("app")

POJO class with each field match the key (app.key) in the properties

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## Question

- ▶ 1. why use spring boot
- ▶ 2. steps to create spring boot project
- ▶ 3. what is auto configuration
- ▶ 4. what is starter
- ▶ 5. spring boot version and java version

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## Example

- ▶ Build a Spring boot project with Models corresponding to the database table structures for clinical project
- ▶ Include the view components into spring boot project and finish controller and service layer

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