

1 Spring Spring

Spring Java Java

Spring

Spring Spring

Spring 20 /

, Web AOP

- Spring
- Dependency Injection(DI)
- EJB IoC CPU
- Spring Spring ORM logging J2EE Q
uartz JDK Timer
- Spring
- Spring
JavaBean POJO
- Spring Web Web MVC web
Struts web
- Spring DB
JTA DB

3 (1 OC)

“ ”

Java

1.

2. Setter

3.

4 Spring IoC
Spring org.springframework.beans org.springframework.context
 Spring IoC
BeanFactory
ApplicationContext BeanFactory BeanFactory
 Spring AOP message resource
_____ Web
WebApplicationContext
org.springframework.beans.factory.BeanFactory Spring IoC
 bean BeanFactory Spring IoC
IOC: spring

5 BeanFactory ApplicationContext

BeanFactory bean BeanFactory bean
 bean
BeanFactory BeanFactory bean bean
 BeanFactory bean
 initialization methods destruction methods
 application context bean factory bean bean
 bean applicationContext

1.

2.

3. bean

ApplicationContext

1 ClassPathXmlApplicationContext classpath XML

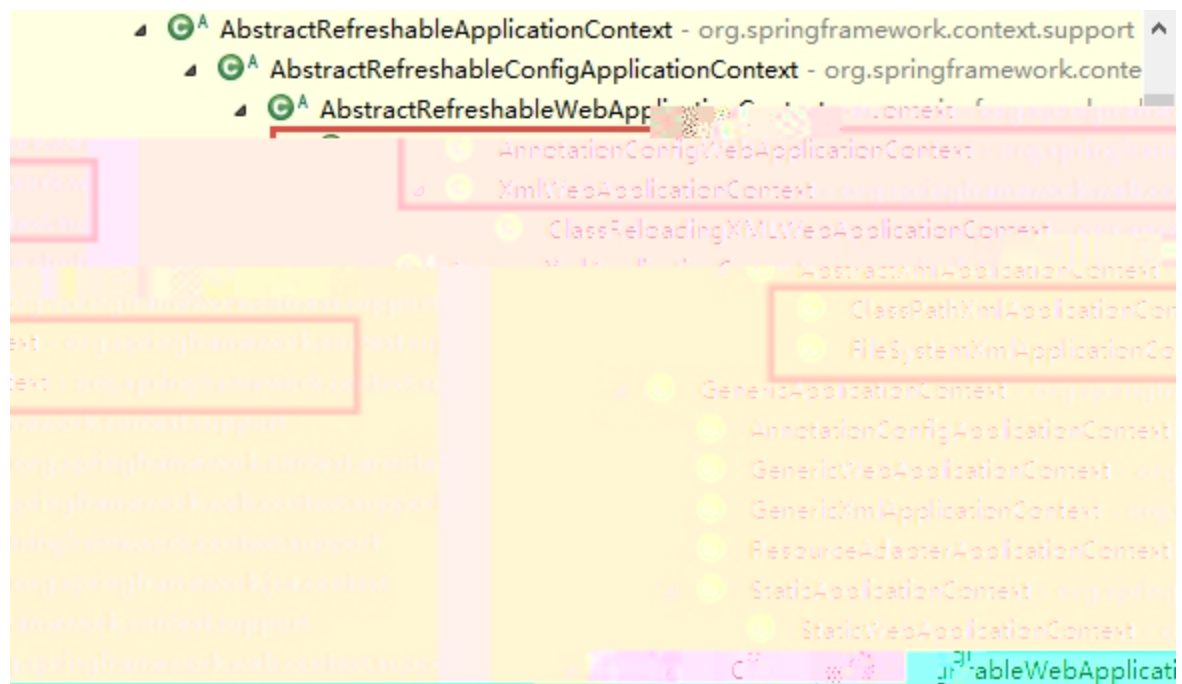
```
ApplicationContext context = new  
ClassPathXmlApplicationContext(" bean.xml " );
```

2 FileSystemXmlApplicationContext XML

```
ApplicationContext context = new  
FileSystemXmlApplicationContext(" bean.xml " );
```

3 XmlWebApplicationContext Web XML

4.AnnotationConfigApplicationContext(Java)



- Spring
1. XML
 - 2.
 3. Java

7 XML Spring XML

Spring bean

<beans>

SpringXML Spring xml

Spring Java Class

Spring XML Spring XML

Spring context beans jdbc tx aop mvc aso

```
<!-- JSON Support -->
<bean name="viewResolver"
class="org.springframework.web.servlet.view.BeanNameViewResolver"/>
<bean name="jsonTemplate"
class="org.springframework.web.servlet.view.json.MappingJackson2JsonView"/>
<bean id="restTemplate"
class="org.springframework.web.client.RestTemplate"/>
</beans>
```

web.xml DispatcherServlet

```
<web-app>
<display-name>Archetype Created Web Application</display-name>
<servlet>
<servlet-name>spring</servlet-name>
<servlet-
class>org.springframework.web.servlet.DispatcherServlet</servlet-
class>
<load-on-startup>1</load-on-startup>
</servlet>
```



```
}
```

@Configuration

```
@Configuration
@ComponentScan(basePackages = "com.somnus")
public class AppConfig {
    ...
}
```

com.acme

@Component

Spring bean

web

AnnotationConfigWebApplicationContext

Spring

Servlet

ContextLoaderListener

Spring MVC

DispatcherServlet



```
<web-app>
```

```
    <!-- Configure ContextLoaderListener to use
AnnotationConfigWebApplicationContext
    instead of the default XmlWebApplicationContext -->
```

```
    <context-param>
```

```
        <param-name>contextClass</param-name>
```

```
        <param-value>
```

```
org.springframework.web.context.support.AnnotationConfigWebApplication
nContext
```

```
        </param-value>
```

```
    </context-param>
```

```
    <!-- Configuration locations must consist of one or more comma- or
space-delimited
```

```
    fully-qualified @Configuration classes. Fully-qualified
packages may also be
```

```
    specified for component-scanning -->
```

```
    <context-param>
```

```
        <param-name>contextConfigLocation</param-name>
```

```
        <param-value>com.howtodoinjava.AppConfig</param-value>
```

```
    </context-param>
```

```
    <!-- Bootstrap the root application context as usual using
ContextLoaderListener -->
```

```

<listener>
  <listener-
class>org.springframework.web.context.ContextLoaderListener</listener-
class>
  </listener>

  <!-- Declare a Spring MVC DispatcherServlet as usual -->
  <servlet>
    <servlet-name>dispatcher</servlet-name>
    <servlet-
class>org.springframework.web.servlet.DispatcherServlet</servlet-
class>
    <!-- Configure DispatcherServlet to use
AnnotationConfigWebApplicationContext
instead of the default XmlWebApplicationContext -->
    <init-param>
      <param-name>contextClass</param-name>
      <param-value>
org.springframework.web.context.support.AnnotationConfigWebApplicati
onContext
      </param-value>
    </init-param>
    <!-- Again, config locations must consist of one or more comma-
or space-delimited
and fully-qualified @Configuration classes -->
    <init-param>
      <param-name>contextConfigLocation</param-name>
      <param-value>com.howtodoinjava.web.MvcConfig</param-
value>
    </init-param>
  </servlet>

  <!-- map all requests for /app/* to the dispatcher servlet -->
  <servlet-mapping>
    <servlet-name>dispatcher</servlet-name>
    <url-pattern>/app/*</url-pattern>
  </servlet-mapping>
</web-app>

```



9 Spring
 Spring 2.5 XML
 bean bean
 XML

Spring Spring

```
<beans>
  <context:annotation-config/>
  <!-- bean definitions go here -->
</beans>
```

<context:annotation-config/> Spring

1. @Required
2. @Autowired
3. @Qualifier @Autowired bean
4. JSR-250 Annotations Spring JSR-250 @Resource
 @PostConstruct @PreDestroy

10 Spring Bean
 Spring Bean bean
 bean bean

Spring bean factory call back spring bean Bean

1.

2.

Spring bean

- InitializingBean DisposableBean
- Aware
- Bean Custom init() destroy()

- @PostConstruct @PreDestroy

customInit() customDestroy() bean

```
<beans>
  <bean id="demoBean" class="com.somnus.task.DemoBean" init-
method="customInit" destroy-method="customDestroy"></bean>
</beans>
```

11 Spring Bean

Spring bean 5

1. singleton bean
bean bean factory
2. prototype bean
3. request bean
4. Session session bean session bean
5. global-session global-session Portlet
portlet portlet
global-session
Servlet session

12 Spring inner beans

Spring bean bean bean setter " " " "

Person Customer Person
Customer

```
public class Customer{
  private Person person;
  //Setters and Getters
```

```
}
```



```
public class Person{  
    private String name;  
    private String address;  
    private int age;  
    //Setters and Getters  
}
```



bean



```
<bean id="CustomerBean" class="com.somnus.common.Customer">  
    <property name="person">  
        <!-- This is inner bean -->  
        <bean class="com.howtodoit.java.common.Person">  
            <property name="name" value="Iokesh" />  
            <property name="address" value="India" />  
            <property name="age" value="34" />  
        </bean>  
    </property>  
</bean>
```



13 Spring Beans
Spring _____ bean
DAO) Spring bean
View Model bean
"singleton" "prototype"
bean (Service bean

Spring

- <list> : list
- <set> : set
- <map>:
- <props> :



```
<beans>
  <!-- Definition for javaCollection -->
  <bean id="javaCollection" class="com.howtodoinjava.JavaCollection">
    <!-- java.util.List -->
    <property name="customList">
      <list>
        <value>INDIA</value>
        <value>Pakistan</value>
        <value>USA</value>
        <value>UK</value>
      </list>
    </property>

    <!-- java.util.Set -->
    <property name="customSet">
      <set>
        <value>INDIA</value>
        <value>Pakistan</value>
        <value>USA</value>
        <value>UK</value>
      </set>
    </property>

    <!-- java.util.Map -->
    <property name="customMap">
      <map>
        <entry key="1" value="INDIA"/>
        <entry key="2" value="Pakistan"/>
        <entry key="3" value="USA"/>
        <entry key="4" value="UK"/>
      </map>
    </property>
  </bean>
</beans>
```

```

    </property>

    <!-- java.util.Properties -->
    <property name="customProperties">
        <props>
            <prop key="admin">admin@nospam.com</prop>
            <prop key="support">support@nospam.com</prop>
        </props>
    </property>

</bean>
</beans>

```



15 Spring Bean Java.util.Properties

<props>



```

<bean id="adminUser" class="com.somnus.common.Customer">

    <!-- java.util.Properties -->
    <property name="emails">
        <props>
            <prop key="admin">admin@nospam.com</prop>
            <prop key="support">support@nospam.com</prop>
        </props>
    </property>

</bean>

```



"util:"
bean

properties

propertiesbean

setter

16 Spring Bean

Spring bean Spring Spring
 bean Bean Factory
 bean bean bean

 XML bean

```
<bean id="employeeDAO" class="com.howtodoinjava.EmployeeDAOImpl"
autowire="byName" />
```

bean @Autowired
 bean @Autowired Spring

```
<context:annotation-config />
```

AutowiredAnnotationBeanPostProcessor

```
<bean class
="org.springframework.beans.factory.annotation.AutowiredAnnotationBeanPostProcessor"/>
```

```

@Autowired
@Autowired
public EmployeeDAOImpl ( EmployeeManager manager ) {
    this.manager = manager;
}

```

17

- Spring 5
1. no Spring bean
 2. byName bean bean bean
bean bean
 3. byType bean bean bean
bean bean
 4. constructor byType bean
bean
 5. autodetect byType bean
byTpe

18

@Autowired AutowiredAnnotationBeanPostProcessor

1 <bean> <context:annotation-config>

```
<beans>
  <context:annotation-config />
</beans>
```

2 bean AutowiredAnnotationBeanPostProcessor

```
<beans>
  <bean
class="org.springframework.beans.factory.annotation.AutowiredAnnotationBeanPostProcessor"/>
</beans>
```

19

@Required

IoC

bean bean bean

<bean> "dependency-check"

bean

bean

"dependency-

check"

@Required

bean

```
public class EmployeeFactoryBean extends AbstractFactoryBean<Object>{
    private String designation;
    public String getDesignation() {
        return designation;
    }
    @Required
    public void setDesignation(String designation) {
        this.designation = designation;
    }
    //more code here
}
```

RequiredAnnotationBeanPostProcessor Spring

@Required bean

RequiredAnnotationBeanPostProcessor bean

IoC

```
<bean
class="org.springframework.beans.factory.annotation.RequiredAnnotationBeanPostProcessor" />
```

@Required
BeanInitializationException

20 @Autowired

@Autowired @Required bean @Autowired bean
Spring @Autowired setter @Autowired <property>
bean @Autowired @Autowired <constructor-arg>
byType

```
public class TextEditor {  
    private SpellChecker spellChecker;  
    @Autowired  
    public TextEditor(SpellChecker spellChecker){  
        System.out.println("Inside TextEditor constructor. " );  
        this.spellChecker = spellChecker;  
    }  
    public void spellCheck(){  
        spellChecker.checkSpelling();  
    }  
}
```

```
<beans>  
  
    <context:annotation-config/>  
  
    <!-- Definition for textEditor bean without constructor-arg -->  
    <bean id="textEditor" class="com.howtodoinjava.TextEditor"/>  
  
    <!-- Definition for spellChecker bean -->  
    <bean id="spellChecker" class="com.howtodoinjava.SpellChecker"/>
```


</beans>



21

@Qualifier

@Qualifier

Spring

bean

bean

Qualifier

Customer

person

person

```
public class Customer{  
    @Autowired  
    private Person person;  
}
```

Person



```
<bean id="customer" class="com.somnus.common.Customer" />
```

```
<bean id="personA" class="com.somnus.common.Person" >
```

```
    <property name="name" value="lokes" />
```

```
</bean>
```

```
<bean id="personB" class="com.somnus.common.Person" >
```

```
    <property name="name" value="alex" />
```

```
</bean>
```



Spring

person bean

Caused by:

org.springframework.beans.factory.NoSuchBeanDefinitionException:

No unique bean of type [com.howtodoinjava.common.Person] is defined:
expected single matching bean but found 2: [personA, personB]

@Qualifier

Spring

bean

```
public class Customer{  
    @Autowired  
    @Qualifier("personA")  
    private Person person;  
}
```

22

1. int string long

2.

3.

4. A B A Spring B A
sObjectCurrentlyInCreationException
Spring

23 Spring

Spring ApplicationContext
 bean ApplicationContext ApplicationEvent
 ApplicationContext bean
 ApplicationListener ApplicationEvent bean

```

public class AllApplicationEventListener implements ApplicationListener
< ApplicationEvent >{
    @Override
    public void onApplicationEvent(ApplicationEvent applicationEvent)
    {
        //process event
    }
}

```

- | | | |
|---------|-----------------------|---|
| Spring | 5 | |
| 1. | ContextRefreshedEvent | ApplicationContext
ConfigurableApplicationContext refresh() |
| 2. | ContextStartedEvent | ConfigurableApplicationContext |
| Start() | / | |
| 3. | ContextStoppedEvent | ConfigurableApplicationContext |
| Stop() | | |
| 4. | ContextClosedEvent | ApplicationContext |
| | Bean | |
| 5. | RequestHandledEvent | Web http request |

```

ApplicationEvent
public class CustomApplicationEvent extends ApplicationEvent{
    public CustomApplicationEvent ( Object source, final String msg ){
        super(source);
        System.out.println("Created a Custom event");
    }
}

```

```

public class CustomEventListener implements ApplicationListener <
CustomApplicationEvent >{
    @Override
    public void onApplicationEvent(CustomApplicationEvent
applicationEvent) {
        //handle event
    }
}

```

```

        applicationContext        publishEvent()
CustomApplicationEvent customEvent = new
CustomApplicationEvent(applicationContext, "Test message");
applicationContext.publishEvent(customEvent);

```

```

24 FileSystemResource    ClassPathResource
    FileSystemResource        spring-config.xml
        ClassPathResource    spring    ClassPath
ClassPathResource        ClassPath
    spring-config.xml        src
src
        ClassPathResource
                                FileSystemResource

```

25 Spring

Spring

- — AOP remoting
- — spring bean

- — . RestTemplate, JmsTemplate, JpaTemplate
- —Spring DispatcherServlet
- (View Helper)—Spring JSP
- — BeanFactory / ApplicationContext
- —BeanFactory

1. Spring ?

. IOC

. AOP

. .

2. AOP IOC AOP:

Aspect Oriented Program, () ;Filter() AOP. AOP
 , OOP(Object-Oriented Programming,) . AOP
 (aspect), . .

IOC: Invert Of Control, . DI() .

IOC , , .

3. Spring Bean ?

Bean : &
 FactoryBean

4. IOC Bean :

. Bean

. Bean Bean

. Bean Bean postProcessBeforeInitialization

. Bean (init-method)

```
. Bean Bean postProcessAfterInitialization
. Bean
. , Bean (destroy-method)
```