springboot自动装配原理详解

1)**传统**ssm**整合**redis**的时候 需要在**xml**的配置文件中 进行大量的配置**Bean

我们在这里使用springboot来代替ssm的整合，只是通过xml的形式来整合redis

第一步:**加入配置**

```
<dependency>
      <groupId>org.springframework.data</groupId>
      <artifactId>spring-data-redis</artifactId>
      <version>2.0.9.RELEASE</version>
</dependency>

<dependency>
      <groupId>redis.clients</groupId>
      <artifactId>jedis</artifactId>
      <version>2.9.0</version>
</dependency>
```

第二步: **配置**xml**的**bean**的配置**

```
  //配置连接池
  <bean id="poolConfig" class="redis.clients.jedis.JedisPoolConfig">
     <property name="minIdle" value="10"></property>
     <property name="maxTotal" value="20"></property>
  </bean>

  //配置连接工厂
  <bean id="jedisConnectionFactory" class="org.springframework.data.redis.connection.jedis.JedisConnectionFactory">
     <property name="hostName" value="47.104.128.12"></property>
     <property name="password" value="123456"></property>
     <property name="database" value="0"></property>
     <property name="poolConfig" ref="poolConfig"></property>
  </bean>


  //配置 redisTemplate 模版类
  <bean id="redisTemplate" class="org.springframework.data.redis.core.RedisTemplate">
     <property name="connectionFactory"  ref="jedisConnectionFactory"/>
     <!--如果不配置Serializer，那么存储的时候缺省使用String，如果用User类型存储，那么会提示错误User can't cast to String!
     <property name="keySerializer">
        <bean class="org.springframework.data.redis.serializer.StringRedisSerializer"/>
     </property>
     <property name="valueSerializer">
        <bean class="org.springframework.data.redis.serializer.GenericJackson2JsonRedisSerializer"/>
     </property>
     <property name="hashKeySerializer">
        <bean class="org.springframework.data.redis.serializer.StringRedisSerializer"/>
     </property>
     <property name="hashValueSerializer">
      <bean class="org.springframework.data.redis.serializer.GenericJackson2JsonRedisSerializer"/>
     </property>
  </bean>
```

第三步:**导入配置**

@ImportResource(locations = "classpath:beans.xml") **可以导入**xml**的配置文件**

```
@SpringBootApplication
@ImportResource(locations = "classpath:beans.xml")
@RestController
public class TulingOpenAutoconfigPrincipleApplication {

	@Autowired
	private RedisTemplate redisTemplate;

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

	@RequestMapping("/testRedis")
	public String testRedis() {
		redisTemplate.opsForValue().set("smlz","smlz");
		return "OK";
	}
}
```

2)**综上所述 我们发现，若整合**redis**的时候通过传统的整合，进行了大量的配置,那么我们来看下通过**springboot**自动装配整合的对比**

导入依赖:

```
		<dependency>
			<groupId>org.springframework.boot</groupId>
			<artifactId>spring-boot-starter-data-redis</artifactId>
		</dependency>
```

修改yml**配置文件**

```
spring.redis.host=47.104.128.12
spring.redis.port=6379
spring.redis.password=123456
```

直接使用(下述代码可以不要配置，为了解决保存使用jdk**的序列方式才配置的)**

```
	@Bean
	public RedisTemplate<Object, Object> redisTemplate(RedisConnectionFactory redisConnectionFactory)  {
		RedisTemplate<Object, Object> template = new RedisTemplate<>();
		template.setDefaultSerializer(new Jackson2JsonRedisSerializer<Object>(Object.class));
		template.setConnectionFactory(redisConnectionFactory);
		return template;
	}
```

3）传统整合和springboot**自动装配 优劣势分析。。。。。。。。。。。。**

4）自动装配原理前的不得不说的几个注解

4.1)**通过**@Import**注解来导入**ImportSelector**组件**

①:写一个配置类在配置类上标注一个@Import的注解，

```
@Configuration
@Import(value = {TulingSelector.class})
public class TulingConfig {
}
```

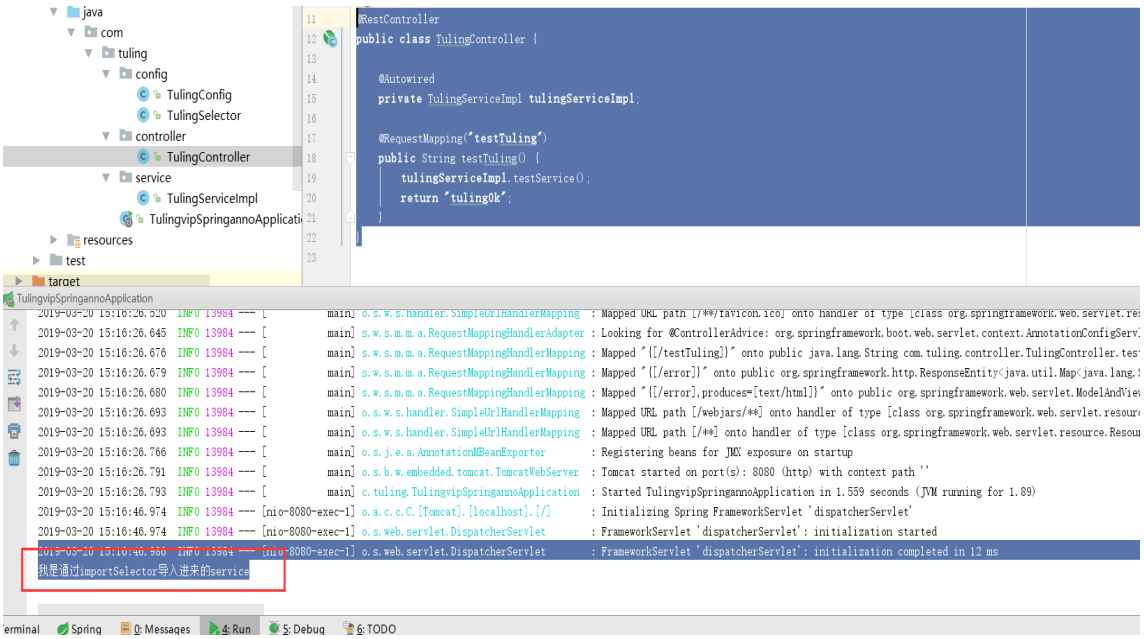
②：在@Import注解的value值 写自己需要导入的组件

在selectImports方法中 就是你需要导入组件的全类名

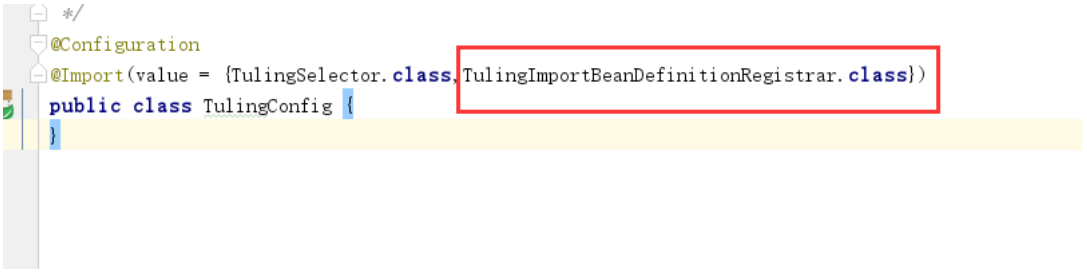
```
public class TulingSelector implements ImportSelector {
    @Override
    public String[] selectImports(AnnotationMetadata annotationMetadata) {
        return new String[]{"com.tuling.service.TulingServiceImpl"};
    }
}
```

核心代码:

```
@RestController
public class TulingController {

    //自动注入 tulingServiceImpl
    @Autowired
    private TulingServiceImpl tulingServiceImpl;

    @RequestMapping("testTuling")
    public String testTuling() {
        tulingServiceImpl.testService();
        return "tulingOk";
    }
}

这里是没有标注其他注解提供给spring包扫描的
public class TulingServiceImpl {

    public void testService() {
        System.out.println("我是通过importSelector导入进来的service");
    }
}
```



1.2）通过@Import导入ImportBeanDefinitionRegistrar 从而进来导入组件

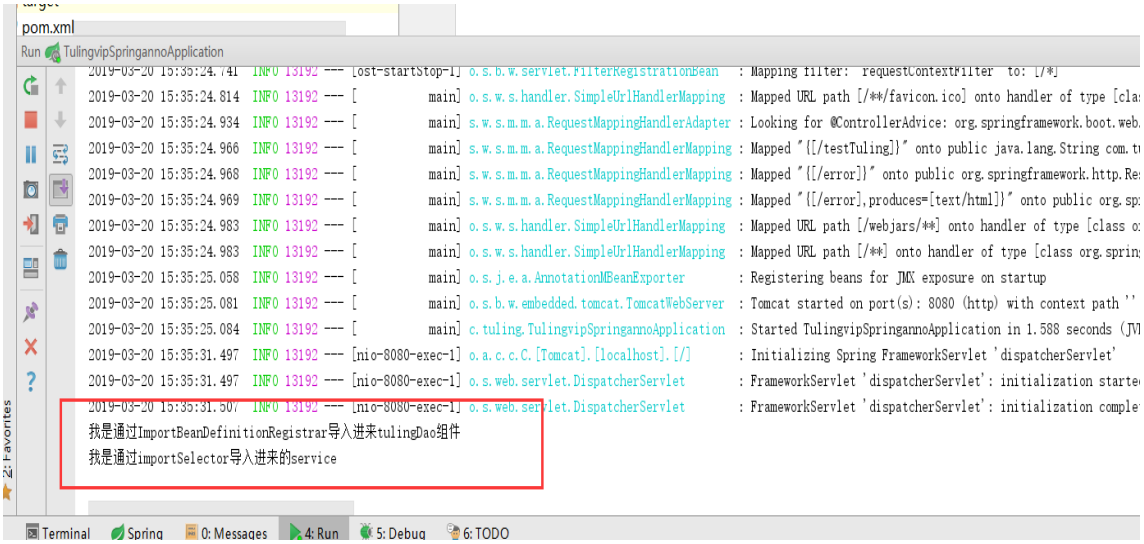


核心代码:

```
public class TulingImportBeanDefinitionRegistrar implements ImportBeanDefinitionRegistrar {
    @Override
    public void registerBeanDefinitions(AnnotationMetadata annotationMetadata, BeanDefinitionRegistry beanDefinitionReg
        //定义一个BeanDefinition
        RootBeanDefinition rootBeanDefinition = new RootBeanDefinition(TulingDao.class);
        //把自定义的bean定义导入到容器中
        beanDefinitionRegistry.registerBeanDefinition("tulingDao",rootBeanDefinition);
    }
}

通过ImportSelector功能导入进来的
public class TulingServiceImpl {

    @Autowired
    private TulingDao tulingDao;

    public void testService() {
        tulingDao.testTulingDao();
        System.out.println("我是通过importSelector导入进来的service");
    }
}

通过ImportBeanDefinitionRegistar导入进来的
public class TulingDao {

    public void testTulingDao() {
```

```
        System.out.println("我是通过ImportBeanDefinitionRegistrar导入进来tulingDao组件");
    }
}
```

测试结果:



1.3)spring**底层条件装配的原理**@Conditional

应用要求:**比如我有二个组件,一个是**TulingLog **一个是**TulingAspect

而TulingLog **是依赖**TulingAspect**的 只有容器中有**TulingAspect**组件才会加载**TulingLog

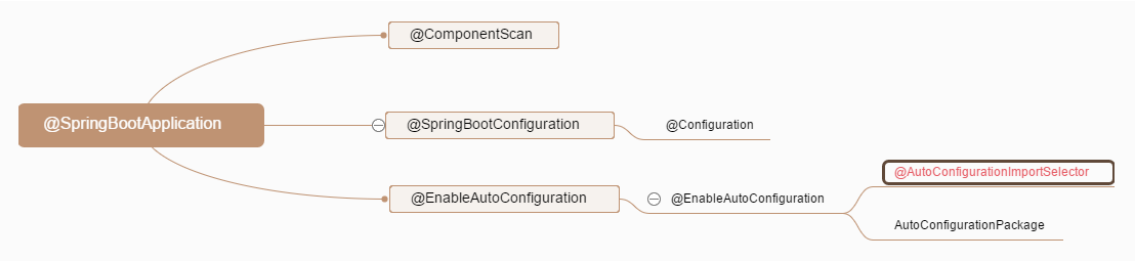
```
tulingLog组件  依赖TulingAspect组件
public class TulingLog {
}

tulingAspect组件
public class TulingAspect {
}
```

①:自定义条件组件条件

```
public class TulingConditional implements Condition {
    @Override
    public boolean matches(ConditionContext conditionContext, AnnotatedTypeMetadata annotatedTypeMetadata) {
        //容器中包含tulingAspect组件才返回Ture
        if(conditionContext.getBeanFactory().containsBean("tulingAspect")){
            return true;
        }else{
            return false;
        }

    }
}

    ----------------------------------------该情况下会加载二个组件----------------------------------------

    @Bean
    public TulingAspect tulingAspect() {
        System.out.println("TulingAspect组件自动装配到容器中");
        return new TulingAspect();
    }
```

```
@Bean
@Conditional(value = TulingConditional.class)
public TulingLog tulingLog() {
    System.out.println("TulingLog组件自动装配到容器中");
    return new TulingLog();
}

------------------------------------二个组件都不会被加载----------------------------------------
/*@Bean**/
public TulingAspect tulingAspect() {
    System.out.println("TulingAspect组件自动装配到容器中");
    return new TulingAspect();
}


@Bean
@Conditional(value = TulingConditional.class)
public TulingLog tulingLog() {
    System.out.println("TulingLog组件自动装配到容器中");
    return new TulingLog();
}
```

自动装配原理分析 从@SpringbootApplication入手分析

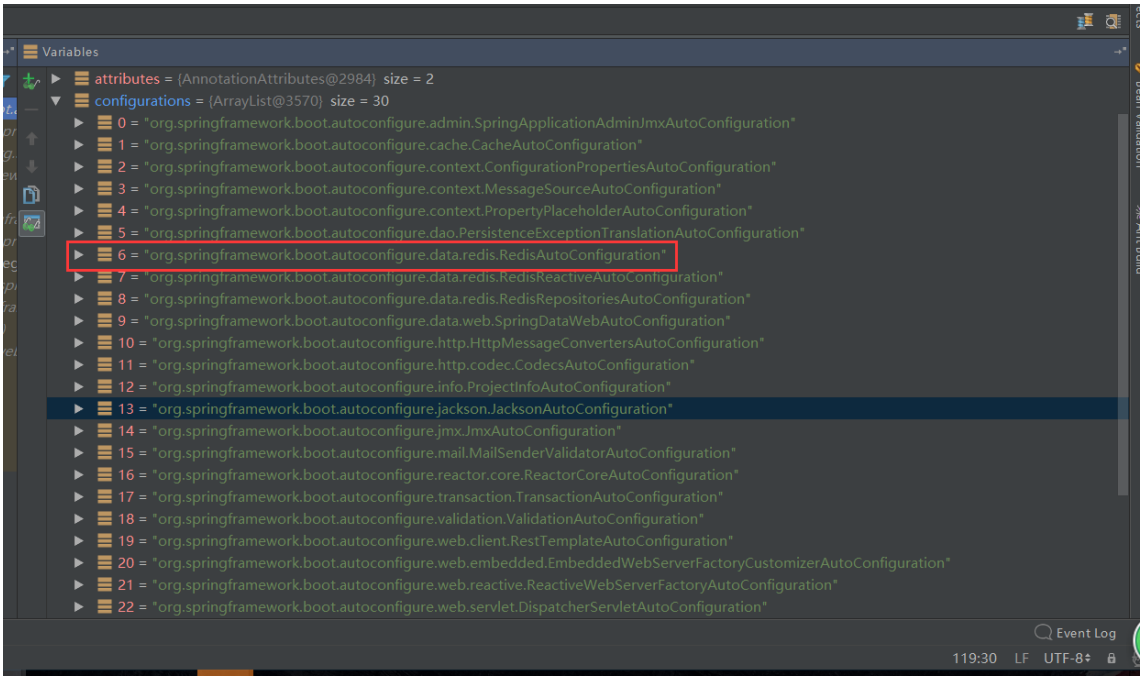


那我们仔细分析

org.springframework.boot.autoconfigure.AutoConfigurationImportSelector#selectImports

```
public class AutoConfigurationImportSelector
        implements DeferredImportSelector, BeanClassLoaderAware, ResourceLoaderAware,
        BeanFactoryAware, EnvironmentAware, Ordered {


    @Override
    public String[] selectImports(AnnotationMetadata annotationMetadata) {
        if (!isEnabled(annotationMetadata)) {
            return NO_IMPORTS;
        }
        AutoConfigurationMetadata autoConfigurationMetadata = AutoConfigurationMetadataLoader
                .loadMetadata(this.beanClassLoader);
        AnnotationAttributes attributes = getAttributes(annotationMetadata);
        //去mata-info/spring.factories文件中 查询 EnableAutoConfiguration对于值
        List<String> configurations = getCandidateConfigurations(annotationMetadata,
                attributes);
        //去除重复的配置类，若我们自己写的starter 可能存主重复的
        configurations = removeDuplicates(configurations);
```

```
            Set<String> exclusions = getExclusions(annotationMetadata, attributes);
            checkExcludedClasses(configurations, exclusions);
            configurations.removeAll(exclusions);
            //根据maven 导入的启动器过滤出 需要导入的配置类
            configurations = filter(configurations, autoConfigurationMetadata);
            fireAutoConfigurationImportEvents(configurations, exclusions);
            return StringUtils.toStringArray(configurations);
        }
    }

    //去spring.factories 中去查询EnableAutoConfirution类
    private static Map<String, List<String>> loadSpringFactories(@Nullable ClassLoader classLoader) {
            MultiValueMap<String, String> result = cache.get(classLoader);
            if (result != null) {
                return result;
            }

            try {
                Enumeration<URL> urls = (classLoader != null ?
                        classLoader.getResources(FACTORIES_RESOURCE_LOCATION) :
                        ClassLoader.getSystemResources(FACTORIES_RESOURCE_LOCATION));
                result = new LinkedMultiValueMap<>();
                while (urls.hasMoreElements()) {
                    URL url = urls.nextElement();
                    UrlResource resource = new UrlResource(url);
                    Properties properties = PropertiesLoaderUtils.loadProperties(resource);
                    for (Map.Entry<?, ?> entry : properties.entrySet()) {
                        List<String> factoryClassNames = Arrays.asList(
                                StringUtils.commaDelimitedListToStringArray((String) entry.getValue()));
                        result.addAll((String) entry.getKey(), factoryClassNames);
                    }
                }
                cache.put(classLoader, result);
                return result;
            }
            catch (IOException ex) {
                throw new IllegalArgumentException("Unable to load factories from location [" +
                        FACTORIES_RESOURCE_LOCATION + "]", ex);
            }
        }
```



然后我们分析RedisAutoConfiguration**类**

导入了三个组件 RedisTemplate StringRedisTemplate

JedisConnectionConfiguration

```
@Configuration
@ConditionalOnClass(RedisOperations.class)
@EnableConfigurationProperties(RedisProperties.class)
@Import({ LettuceConnectionConfiguration.class, JedisConnectionConfiguration.class })
public class RedisAutoConfiguration {

   //导入redisTemplate
      @Bean
      @ConditionalOnMissingBean(name = "redisTemplate")
      public RedisTemplate<Object, Object> redisTemplate(
                  RedisConnectionFactory redisConnectionFactory) throws UnknownHostException {
            RedisTemplate<Object, Object> template = new RedisTemplate<>();
            template.setConnectionFactory(redisConnectionFactory);
            return template;
      }

      @Bean
      @ConditionalOnMissingBean
      public StringRedisTemplate stringRedisTemplate(
                  RedisConnectionFactory redisConnectionFactory) throws UnknownHostException {
            StringRedisTemplate template = new StringRedisTemplate();
            template.setConnectionFactory(redisConnectionFactory);
            return template;
      }

}

=====================================JedisConnectionConfiguration==================

@Configuration
@ConditionalOnClass({ GenericObjectPool.class, JedisConnection.class, Jedis.class })
class JedisConnectionConfiguration extends RedisConnectionConfiguration {

      private final RedisProperties properties;

      private final List<JedisClientConfigurationBuilderCustomizer> builderCustomizers;

      JedisConnectionConfiguration(RedisProperties properties,
                  ObjectProvider<RedisSentinelConfiguration> sentinelConfiguration,
                  ObjectProvider<RedisClusterConfiguration> clusterConfiguration,
                  ObjectProvider<List<JedisClientConfigurationBuilderCustomizer>> builderCustomizers) {
            super(properties, sentinelConfiguration, clusterConfiguration);
            this.properties = properties;
            this.builderCustomizers = builderCustomizers
                        .getIfAvailable(Collections::emptyList);
      }

      @Bean
      @ConditionalOnMissingBean(RedisConnectionFactory.class)
      public JedisConnectionFactory redisConnectionFactory() throws UnknownHostException {
            return createJedisConnectionFactory();
      }

      private JedisConnectionFactory createJedisConnectionFactory() {
            JedisClientConfiguration clientConfiguration = getJedisClientConfiguration();
```

```
            if (getSentinelConfig() != null) {
                  return new JedisConnectionFactory(getSentinelConfig(), clientConfiguration);
            }
            if (getClusterConfiguration() != null) {
                  return new JedisConnectionFactory(getClusterConfiguration(),
                              clientConfiguration);
            }
            return new JedisConnectionFactory(getStandaloneConfig(), clientConfiguration);
      }

      private JedisClientConfiguration getJedisClientConfiguration() {
            JedisClientConfigurationBuilder builder = applyProperties(
                        JedisClientConfiguration.builder());
            RedisProperties.Pool pool = this.properties.getJedis().getPool();
            if (pool != null) {
                  applyPooling(pool, builder);
            }
            if (StringUtils.hasText(this.properties.getUrl())) {
                  customizeConfigurationFromUrl(builder);
            }
            customize(builder);
            return builder.build();
      }

      private JedisClientConfigurationBuilder applyProperties(
                  JedisClientConfigurationBuilder builder) {
            if (this.properties.isSsl()) {
                  builder.useSsl();
            }
            if (this.properties.getTimeout() != null) {
                  Duration timeout = this.properties.getTimeout();
                  builder.readTimeout(timeout).connectTimeout(timeout);
            }
            return builder;
      }

      private void applyPooling(RedisProperties.Pool pool,
                  JedisClientConfiguration.JedisClientConfigurationBuilder builder) {
            builder.usePooling().poolConfig(jedisPoolConfig(pool));
      }

      private JedisPoolConfig jedisPoolConfig(RedisProperties.Pool pool) {
            JedisPoolConfig config = new JedisPoolConfig();
            config.setMaxTotal(pool.getMaxActive());
            config.setMaxIdle(pool.getMaxIdle());
            config.setMinIdle(pool.getMinIdle());
            if (pool.getMaxWait() != null) {
                  config.setMaxWaitMillis(pool.getMaxWait().toMillis());
            }
            return config;
      }
}
```