第一节:springboot快速开始(对三篇)

一:springboot **微服务开发利器**

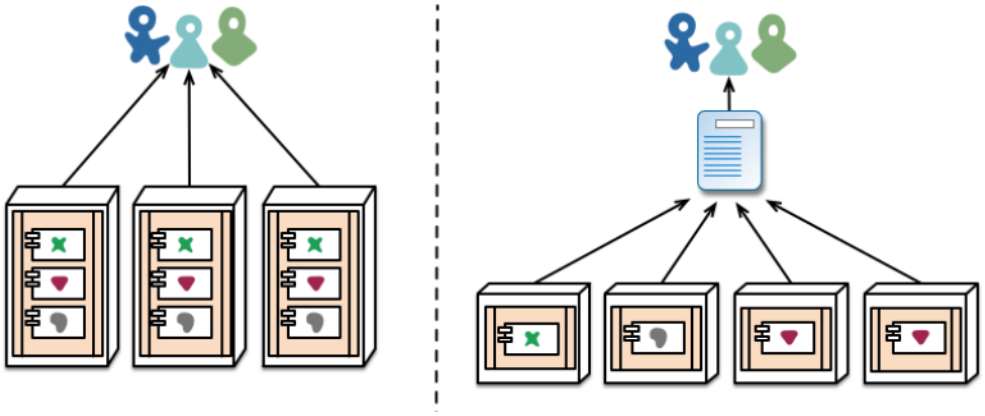
1.1)**什么是微服务，微服务和微服务架构的区别**?

目前而已，对于微服务业界**没有一个统一的标准定义**,但是通常而言提倡把一个单一的应用程序划分为**一组小的服务，**

每个小的服务都会运行在自己的进程中，服务之间通**过轻量级的通信机制（**http**的**rest api**）**进行通信,那么一个个的

小服务就是微服务。

①：单体架构与微服务架构图示

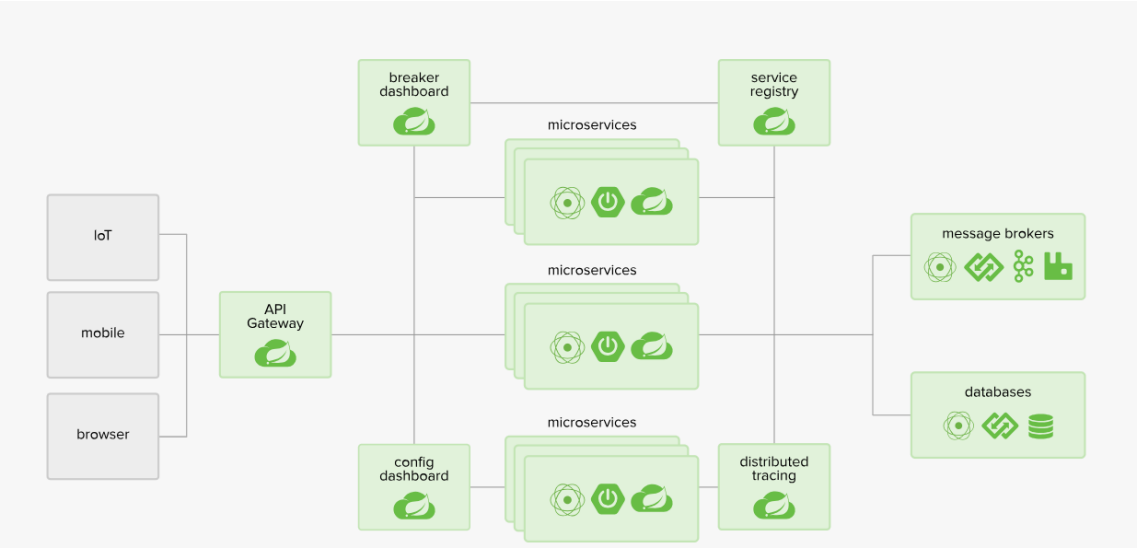


传统的的单一电商应用来说，订单，支付，用户，商品，库存等模块都在一个项目中，若某一个模块出现线上bug，会导致整个版本发布回退.

若把单一应用拆分为一个一微服务，比如订单微服务，用户微服务，商品微服务，积分微服务等，若某一个微服务出错不会导致整个版本回退。

1.2）什么是微服务架构

微服务架构是一种架构模式（**用于服务管理微服务的**），它把一组小的服务互相协调、互相配合，并且完成功能。每个服务运行在其独立的进程中，服务与服务间采用轻量级的通信机制互相协作（通常是基于HTTP 协议的RESTfulAPI ）。每个服务都围绕着具体业务进行构建，并且能够被独立的部署到生产环境、类生产环境等。另外，应当尽量避免统一的、集中式的服务管理机制，对具体的一个服务而言，应根据业务上下文，选择合适的语言、工具对其进行构建。



1.3**微服务的优缺点**:

优点:

①:优点每个服务足够内聚，足够小，代码容易理解这样能聚焦一个指定的业务功能或业务需求(职责单一)
②:开发简单、开发效率提高，一个服务可能就是专一的只干一件事,微服务能够被小团队单独开发，这个小团队是 2 到 5 人的开发人员组成。
③:微服务能使用不同的语言开发。
④:易于和第三方集成，微服务允许容易且灵活的方式集成自动部署，通过持续集成工具，如 Jenkins,Hudson,bamboo。
⑤:微服务只是业务逻辑的代码，不会和 HTML,CSS或其他界面组件混合。
⑥:每个微服务都有自己的存储能力，可以有自己的数据库。也可以有统一数据库。
.....

.....

缺点:

开发人员要处理分布式系统的复杂性(分布式事物)

多服务运维难度，随着服务的增加，运维的压力也在增大

系统部署依赖

服务间通信成本

数据一致性

.....

.....

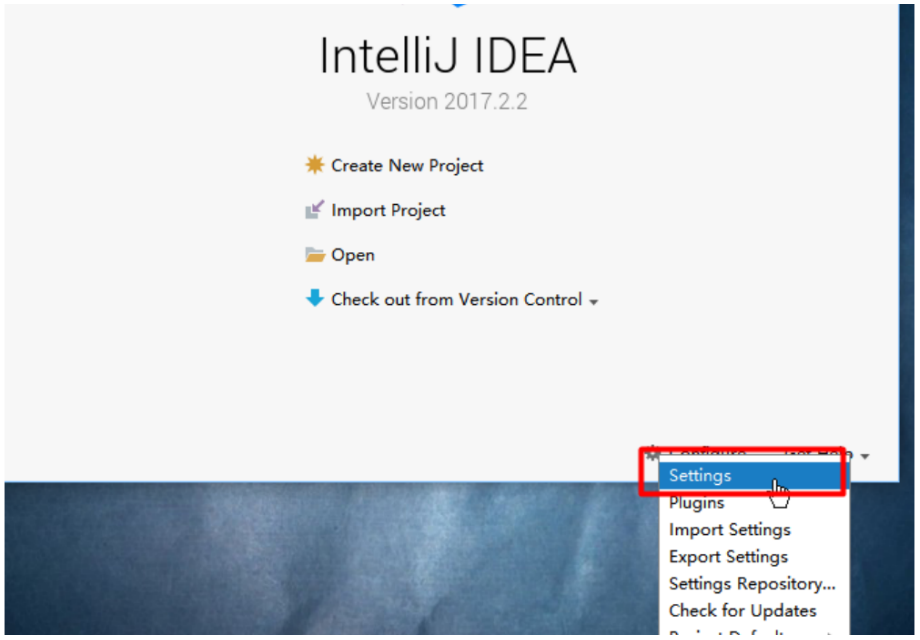
二:springboot快速开始

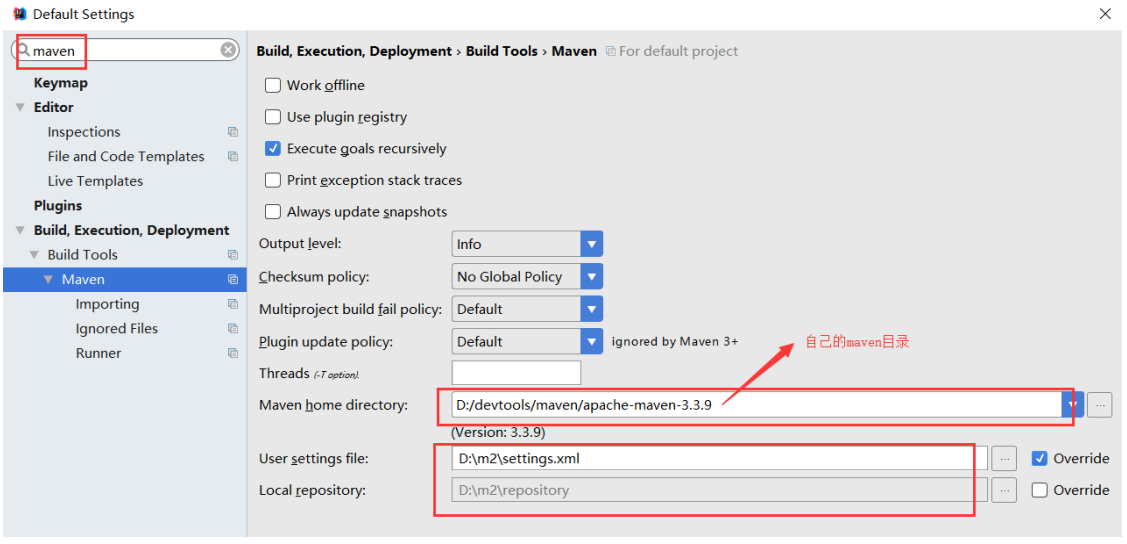
2.1)(**基于**mavne**版本构建**)

```
2.1)先把maven的配置文件设置为如下配置
<profile>
    <id>jdk-1.8</id>
    <activation>
    <activeByDefault>true</activeByDefault>
```

```
    <jdk>1.8</jdk>
    </activation>
    <properties>
    <maven.compiler.source>1.8</maven.compiler.source>
    <maven.compiler.target>1.8</maven.compiler.target>
    <maven.compiler.compilerVersion>1.8</maven.compiler.compilerVersion>
    </properties>
</profile>
```

2.1)配置IDE的环境（maven配置）





2.2)**创建一个空的**maven**工程，然后导入**springboot**相关的**jar**包**

```
    //父工程依赖
    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>2.0.8.RELEASE</version>
    </parent>

    spring mvc-web的依赖
```

```
    <dependencies>
        <dependency>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-starter-web</artifactId>
        </dependency>
    </dependencies>

    <!-- 引入一个spring boot插件，可以支持我们将web应用程序打成可运行jar包 -->
    <build>
        <plugins>
            <plugin>
                <groupId>org.springframework.boot</groupId>
                <artifactId>spring-boot-maven-plugin</artifactId>
            </plugin>
        </plugins>
    </build>
```

①：编写主入口程序

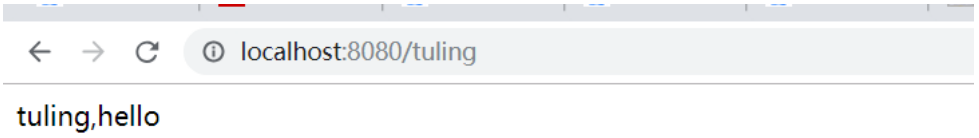
```
/**
 * Created by smlz on 2019/3/18.
 */
@SpringBootApplication
public class TulingStartMain {

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

②:其他业务组件 比如controller service repository compent**注解标示的组件**

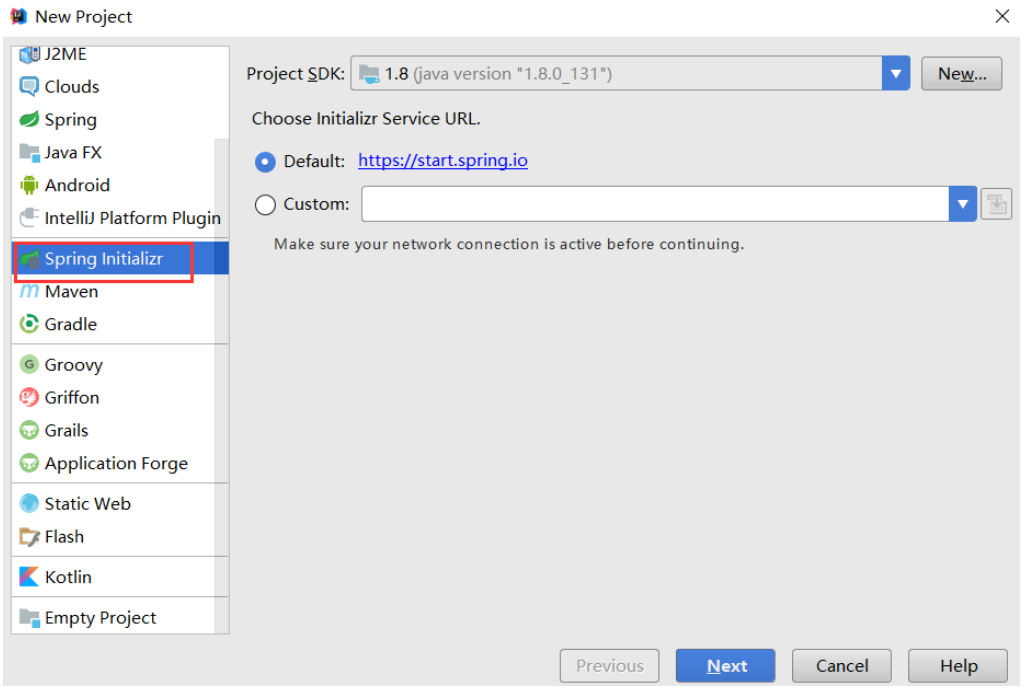
********** **自己写的组件必须放在主启动类**(TulingStartMain)**在所包的及其子包下**???????? **将源码分析时候探究原理**

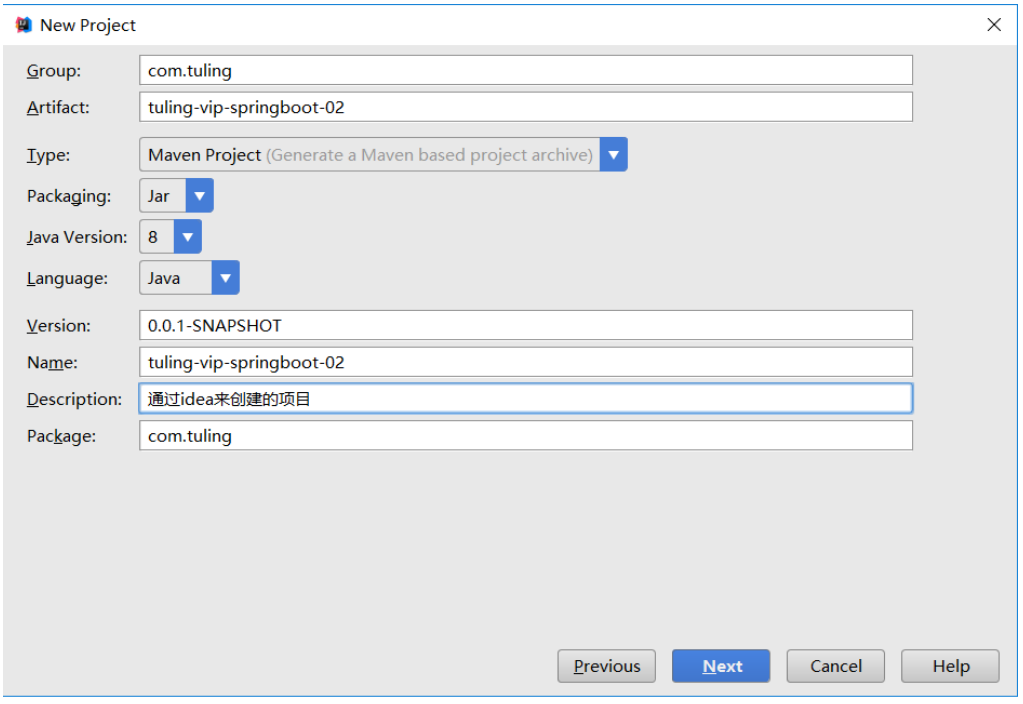
```
/**
 * Created by smlz on 2019/3/18.
 */
@RestController
public class TulingController {

    @RequestMapping("/tuling")
    public String tulingHelloWorld() {
        return "tuling,hello";
    }

}
```

③:运行main**函数启动程序，访问**http://localhost:8080/tuling**，或者执行**mvn package**将项目打成**jar**包，用**java -jar XXX.jar**直接运行**



2.3)**通过**sts/idea**创建 一个**springboot**项目**





编写自己的业务代码就maven**构建**springboot**工程版本的一样 这里就不做累赘讲诉.**

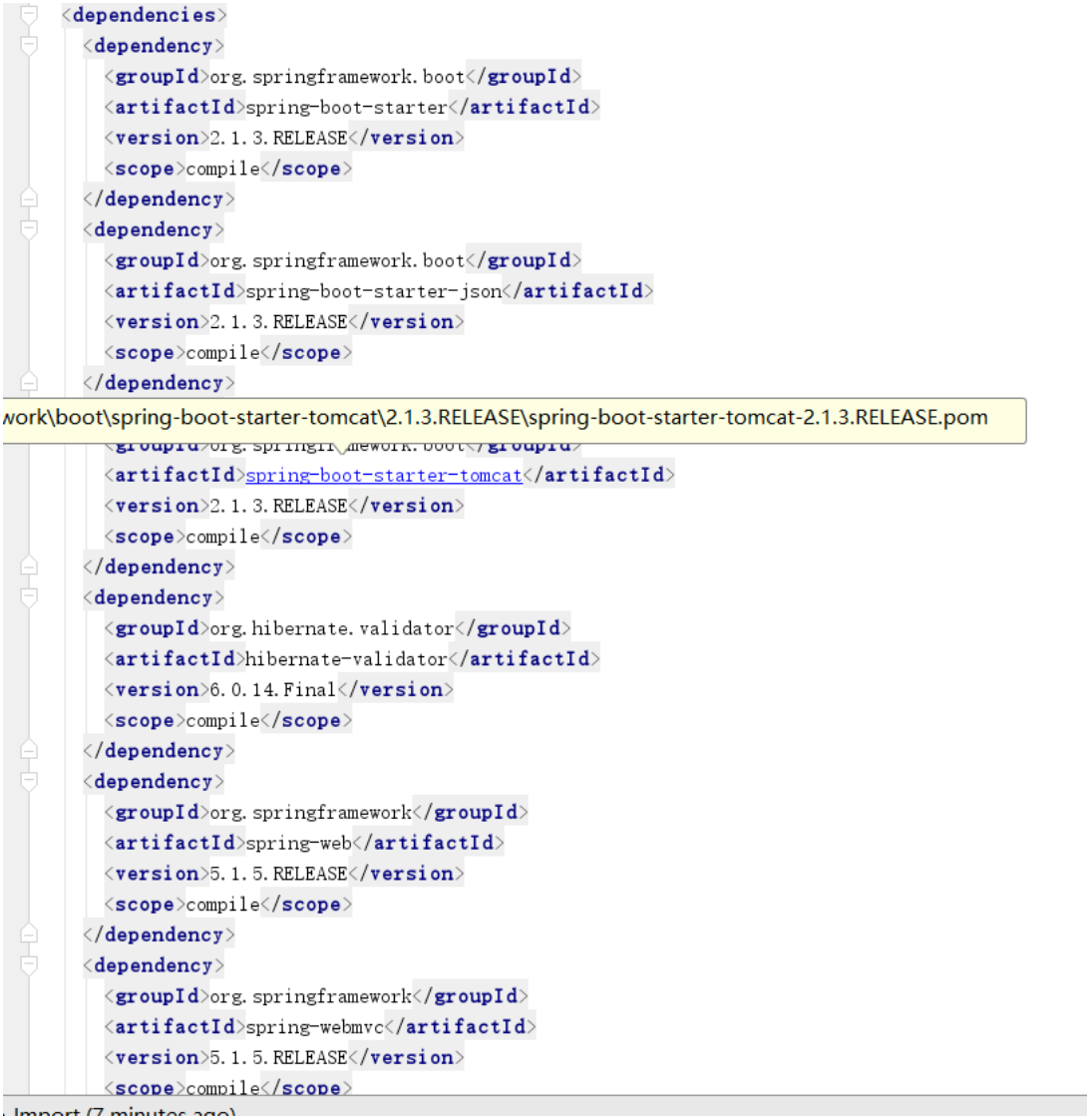
三:helloworld**的探究，为啥我只要引入** spring-boot-starter-parent **和** spring-boot-starter-web**就可以快速开发**mvc**的项目**

3.1）pom**分析**

```
    <parent>
        <groupId>org.springframework.boot</groupId>
        <artifactId>spring-boot-starter-parent</artifactId>
        <version>2.0.8.RELEASE</version>
        <relativePath/> <!-- lookup parent from repository -->
    </parent>

    真正的版本管理仲裁中心 来决定应用的版本
    <parent>
    <groupId>org.springframework.boot</groupId>
    <artifactId>spring-boot-dependencies</artifactId>
    <version>2.0.8.RELEASE</version>
    <relativePath>../../spring-boot-dependencies</relativePath>
  </parent>
```

以后我们导入依赖默认是不需要写版本；（没有在dependencies里面管理的依赖自然需要声明版本号)

3.2) 我们来分析看下 spring-boot-starter-web **（场景启动器）为我项目中导入** web**开发需要的**jar**包依赖**



4)**多profile切换**

我们在开发应用时，通常一个项目会被部署到不同的环境中，比如：开发、测试、生产等。其中每个环境的数据库地址、服务器端口等等配置都会不同，对于多环境的配置，大部分构建工具或是框架解决的基本思路是一致的，通过配置多份不同环境的配置文件，再通过打包命令指定需要打包的内容之后进行区分打包

4.1)yml**支持多模块文档块**

```
server:
  port: 8081
  servlet:
    context-path: /tuling01
spring:
  profiles:
    active: dev
---
开发环境配置
spring:
  profiles: dev
server:
  port: 8082
---
生产环境配置
spring:
  profiles: prod
server:
  port: 8083
```

```
lerMapping  : Mapped URL path [/**/favicon.ico] onto handler of type [class org.springframework.web.servlet.resource.Re
dlerAdapter : Looking for @ControllerAdvice: org.springframework.boot.web.servlet.context.AnnotationConfigServletWebSer
dlerMapping : Mapped "{[/testTuling]}" onto public java.lang.String com.tuling.controller.TulingController.tulingHelloW
dlerMapping : Mapped "{[/error]}" onto public org.springframework.http.ResponseEntity<java.util.Map<java.lang.String, j
dlerMapping : Mapped "{[/error],produces=[text/html]}" onto public org.springframework.web.servlet.ModelAndView org.sp
lerMapping  : Mapped URL path [/webjars/**] onto handler of type [class org.springframework.web.servlet.resource.Resou
lerMapping  : Mapped URL path [/**] onto handler of type [class org.springframework.web.servlet.resource.ResourceHttpRe
rter        : Registering beans for JMX exposure on startup
tWebServer  : Tomcat started on port(s): 8082 (http) with context path '/tuling01'
ication     : Started TulingVipSpringboot02Application in 1.599 seconds (JVM running for 1.923)
```

从上图看出，我们激活的配置是开发环境的配置,但是现在 我们还看到了 servlet:context-path**的配置形成互补配置**

4.2) **多**yml|properties**文件的环境切换**

application.yml (用于激活不同环境的配置文件)

```
spring:
  profiles:
    active: dev
```

application-dev.yml

```
server:
  port: 8081
  servlet:
    context-path: /tl_dev
```

application-prod.yml

```
server:
  port: 8082
  servlet:
    context-path: /tl_prod
```

4.3)激活指定环境配置的方法

①:直接在application.yml的配置文件中使用　spring.profiles.active=dev|prod|test

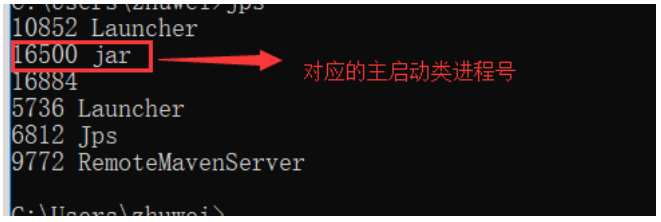
②:设置虚拟机参数 -Dspring.profiles.active=dev|prod|test

③:命令行参数启动(打成Jar包时候) java -jar tuling-vip-springboot-02-0.0.1-SNAPSHOT.jar --spring.profiles.active=prod

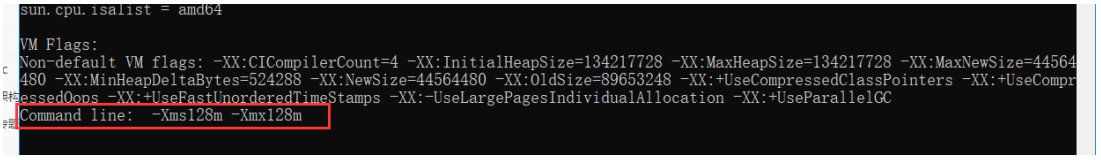
4.4)设置jvm参数 然后我们看是否设置成功

java -Xms128m -Xmx128m -jar tuling-vip-springboot-02-0.0.1-SNAPSHOT.jar --server.port=8888

第一步:在cmd窗口中使用jps来看我们主进程的



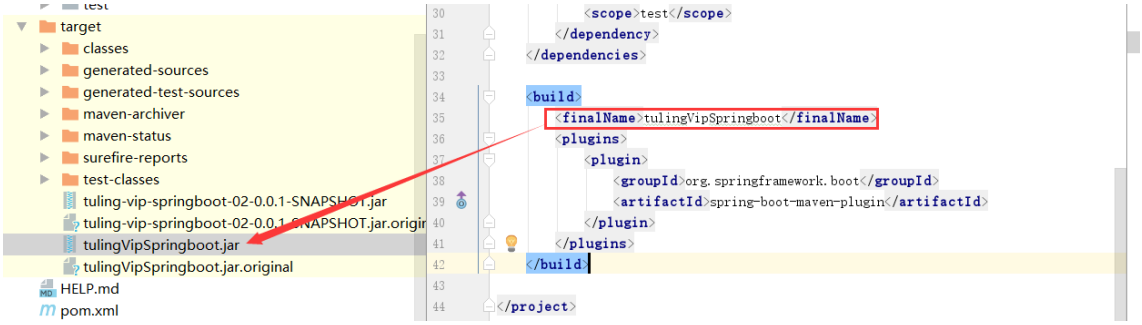
第二步:使用jinfo命令 +进程号来查看具体信息



4.5) springboot关于打包问题总结

4.5.1):打成指定的jar名称的

```
<build>
    指定打包的文件名称
    <finalName>tulingVipSpringboot</finalName>
    <plugins>
        <plugin>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-maven-plugin</artifactId>
        </plugin>
    </plugins>
</build>
```



4.5.2)若出现工程中出现多个mainclass的时候需要指定主启动类

```
<build>
    <finalName>tulingVipSpringboot</finalName>
    <plugins>
        <plugin>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-maven-plugin</artifactId>
            <configuration>
                <mainClass>com.tuling.TulingVipSpringboot02Application</mainClass>
            </configuration>
            <goals>
                <goal>repackage</goal>
            </goals>
        </plugin>
    </plugins>
</build>
```

```
<build>
    <finalName>tulingVipSpringboot</finalName>
    <plugins>
        <plugin>
            <groupId>org.springframework.boot</groupId>
            <artifactId>spring-boot-maven-plugin</artifactId>
            <configuration>
                <mainClass>com.tuling.TulingVipSpringboot02Application</mainClass>
            </configuration>
            <goals>                    有多个main启动类的时候需要通过该配置指定
                <goal>repackage</goal>
            </goals>
        </plugin>
    </plugins>
```

4.5.3）如何打出一个war包

第一步:指定springboot pom中的打包方式 由jar改为war

```
        <relativePath/> <!-- lookup parent from repository -->
    </parent>
    <groupId>com.tuling</groupId>
    <artifactId>tuling-vip-springboot-02</artifactId>
    <version>0.0.1-SNAPSHOT</version>
    <packaging>war</packaging>
    <name>tuling-vip-springboot-02</name>
    <description>Demo project for Spring Boot</description>

    <properties>
```

第二步:在spring-boot-starter-web模块打包比依赖与 tomcat

第三步:主启动类上 实现SpringBootServletInitializer 从写confiure方法(原理第三节课节讲)

```
@SpringBootApplication
public class TulingVipSpringboot03Application extends SpringBootServletInitializer {

	public static void main(String[] args) {
		SpringApplication.run(TulingVipSpringboot03Application.class, args);
	}

	@Override
	protected SpringApplicationBuilder configure(SpringApplicationBuilder application) {
		return application.sources(TulingVipSpringboot03Application.class);
	}

}
```

第四步:打成war包 放在tomcat上运行.

6)springboot 的web开发（）

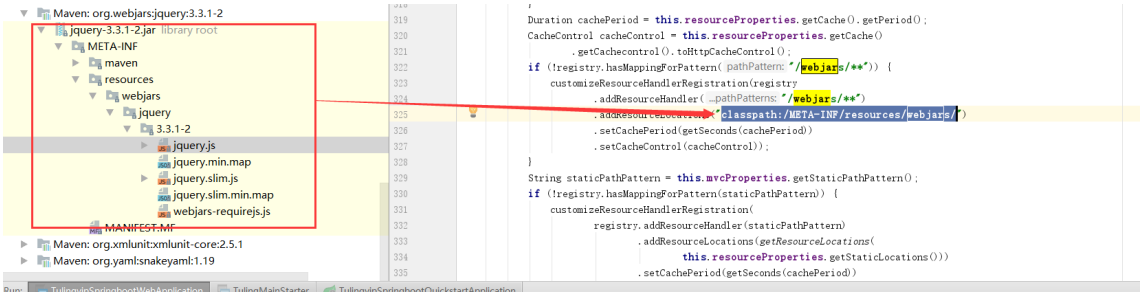
6.1）什么是webJar：以jar包的形式来引入前端资源,比如jquery 或者是BootStrap

https://www.webjars.org/

6.1.1）引入对应的jar包

```
<dependency>
    <groupId>org.webjars</groupId>
    <artifactId>jquery</artifactId>
    <version>3.3.1-2</version>
</dependency>
```

6.1.2)映射规则 /webjars/** 都会被映射到classpath:/META-INF/resources/webjars/ **目录下去处理**

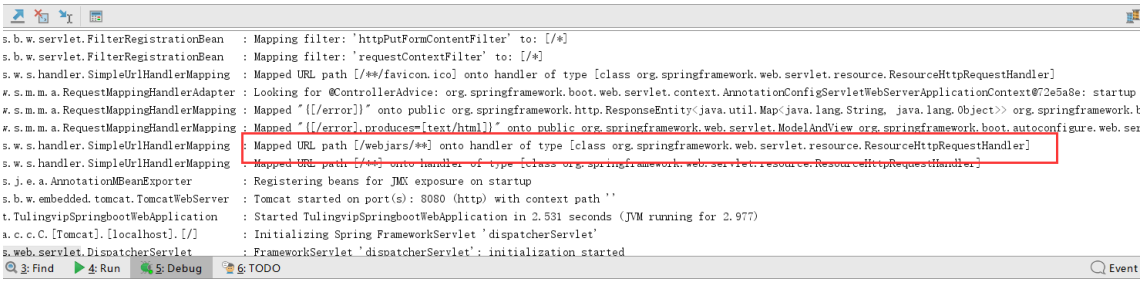


6.1.3)前端资源映射规则 核心源代码:

```
public void addResourceHandlers(ResourceHandlerRegistry registry) {
    if(!this.resourceProperties.isAddMappings()) {
        logger.debug("Default resource handling disabled");
    } else {
        Duration cachePeriod = this.resourceProperties.getCache().getPeriod();
        CacheControl cacheControl = this.resourceProperties.getCache().getCachecontrol().toHttpCacheControl();
        //处理映射webjar 的请求的
        if(!registry.hasMappingForPattern("/webjars/**")) {
            this.customizeResourceHandlerRegistration(registry.addResourceHandler(new String[]{"/webjars/**"}).addRes
        }

        //处理静态资源文件的
        String staticPathPattern = this.mvcProperties.getStaticPathPattern();
        if(!registry.hasMappingForPattern(staticPathPattern)) {
            this.customizeResourceHandlerRegistration(registry.addResourceHandler(new String[]{staticPathPattern}).add
        }

    }
}
```

6.1.4）http://localhost:8080/webjars/jquery/3.3.1-2/jquery.js 请求如何拦截处理请求的

①根据日志打印，我们发现如下突破口



②:第二步:

org.springframework.web.servlet.resource.ResourceHttpRequestHandler#handleRequest**方法**

>org.springframework.web.servlet.resource.ResourceHttpRequestHandler#getResource

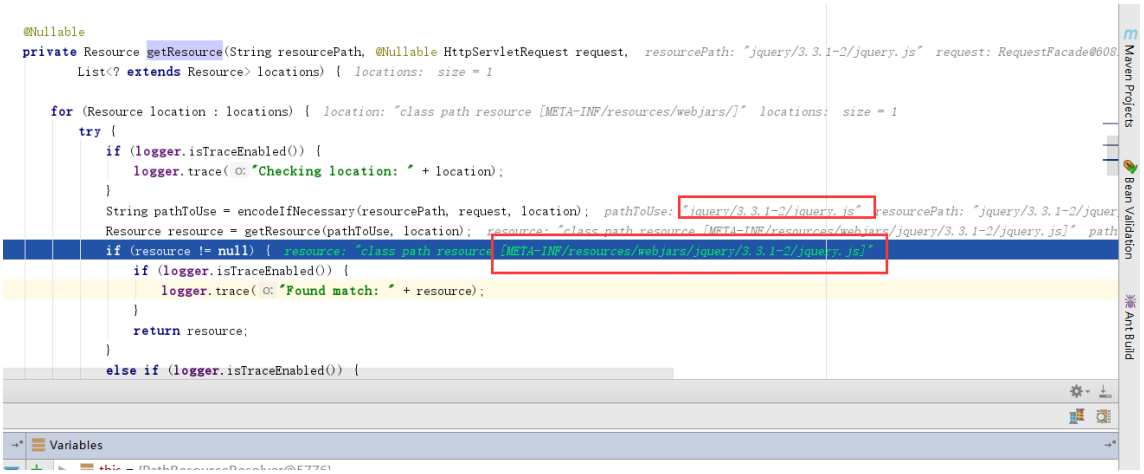
>org.springframework.web.servlet.resource.ResourceResolverChain#resolveResource

>org.springframework.web.servlet.resource.PathResourceResolver#resolveResourceInternal

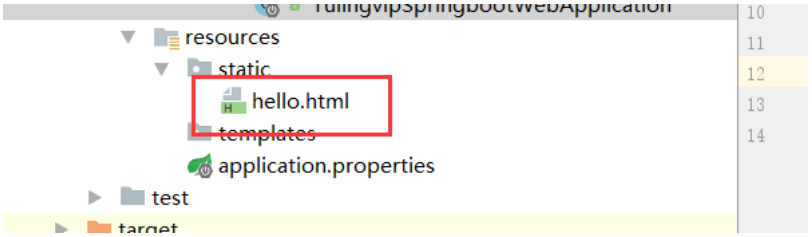
>org.springframework.web.servlet.resource.PathResourceResolver#getResource(**真正的资源映射处理逻辑**)

```
private Resource getResource(String resourcePath, @Nullable HttpServletRequest request,
                    List<? extends Resource> locations) {

            for (Resource location : locations) {
                try {
                    if (logger.isTraceEnabled()) {
                        logger.trace("Checking location: " + location);
                    }
                    String pathToUse = encodeIfNecessary(resourcePath, request, location);
```

```
                    //真正的处理逻辑 把jquery/3.3.1-2/jquery.js 映射到
                    Resource resource = getResource(pathToUse, location);
                    if (resource != null) {
                        if (logger.isTraceEnabled()) {
                            logger.trace("Found match: " + resource);
                        }
                        return resource;
                    }
                    else if (logger.isTraceEnabled()) {
                        logger.trace("No match for location: " + location);
                    }
                }
                catch (IOException ex) {
                    logger.trace("Failure checking for relative resource - trying next location", ex);
                }
            }
            return null;
        }
```



6.1.5)**访问静态html页面 我们直接把静态页面放在static的目录下，直接可以在路径直接访问**



6.1.6)**映射原理 /**请求都会被映射到**

```
    private static final String[] CLASSPATH_RESOURCE_LOCATIONS = {
            "classpath:/META-INF/resources/", "classpath:/resources/",
            "classpath:/static/", "classpath:/public/" };
```

```
public void addResourceHandlers(ResourceHandlerRegistry registry) {
        .....
        ......
        ......
            String staticPathPattern = this.mvcProperties.getStaticPathPattern();
            if (!registry.hasMappingForPattern(staticPathPattern)) {
                customizeResourceHandlerRegistration(
```

```
                registry.addResourceHandler(staticPathPattern)
                        .addResourceLocations(getResourceLocations(
                                this.resourceProperties.getStaticLocations()))
                        .setCachePeriod(getSeconds(cachePeriod))
                        .setCacheControl(cacheControl));
            }
        }
```

6.1.7)**欢迎页； 静态资源文件夹下的所有**index.html**页面；被**"/**"**映射；**

```
WelcomePageHandlerMapping(TemplateAvailabilityProviders templateAvailabilityProviders,
        ApplicationContext applicationContext, Optional<Resource> welcomePage,
        String staticPathPattern) {
    if (welcomePage.isPresent() && "/**".equals(staticPathPattern)) {
        logger.info( o: "Adding welcome page: " + welcomePage.get());
        setRootViewName("forward:index.html");
    }
    else if (welcomeTemplateExists(templateAvailabilityProviders,
            applicationContext)) {
        logger.info( o: "Adding welcome page template: index");
        setRootViewName("index");
    }
}
```

6.1.8) **使用**webjar**的方式修前端页面修改引用路径**

```
    <title>Signin Template for Bootstrap</title>
    <!-- Bootstrap core CSS -->
    <link href="asserts/css/bootstrap.min.css" th:href="@{/webjars/bootstrap/4.3.1/css/bootstrap.min.css}" rel="style
    <!-- Custom styles for this template -->
    <link href="asserts/css/signin.css" rel="stylesheet" th:href="@{/asserts/css/signin.css}">
</head>
```

```
    <title>Signin Template for Bootstrap</title>
    <!-- Bootstrap core CSS -->
    <link href="/tuling-web/webjars/bootstrap/4.3.1/css/bootstrap.min.css" rel="stylesheet">
    <!-- Custom styles for this template -->
    <link href="/tuling-web/asserts/css/signin.css" rel="stylesheet">
</head>

<body class="text-center">
```

6.2)springboot**是如何整合**springmvc**功能的（**WebMvcAutoConfiguration**）**

6.2.1**）自动装配的组件**

①:ContentNegotiatingViewResolver 和 BeanNameViewResolver 视图解析器

视图解析器的作用:根据方法的值找到对应的视图

②:Support for serving static resources, including support for WebJars 支持静态资源和webJars

③:Converter ,日期格式化器 Formatter

④:消息装换器: HttpMessageConverters

⑤:首页设置index.html

⑥:图标支持 Favicon

6.2.2)**如何扩展**springmvc**的配置（**springboot**提我们自己配置的**springmvc**的功能不丢失的情况下） 比如我需要使用自己定义的拦截器**

我们需要自己写一个配置类 继承 WebMvcConfigurerAdapter 需要什么组件 就注册什么组件

A:**如何往容器中添加一个拦截器**

第一步:**创建一个拦截器**

```
@Component
public class TulingInterceptor implements HandlerInterceptor {

    public boolean preHandle(HttpServletRequest request, HttpServletResponse response, Object handler)throws Exception
        System.out.println("我是TulingInterceptor的preHandle方法");
        return true;
    }

    public void postHandle(HttpServletRequest request, HttpServletResponse response, Object handler,@Nullable ModelAnd
        System.out.println("我是TulingInterceptor的postHandle方法");

    }

    public void afterCompletion(HttpServletRequest request, HttpServletResponse response, Object handler,@Nullable Exce
        System.out.println("我是TulingInterceptor的afterCompletion方法");

    }
}
```

第二步:**注册拦截器**

```
@Configuration
public class TulingConfig extends WebMvcConfigurerAdapter {

    @Autowired
    private TulingInterceptor tulingInterceptor;

    /**
     * 注册拦截器
     * @param registry
     */
    public void addInterceptors(InterceptorRegistry registry) {
        registry.addInterceptor(tulingInterceptor).addPathPatterns("/**").excludePathPatterns("/index.html","/");
    }
}
```

B:**往容器中增加一个过滤器**

```
public class TulingFilter implements Filter {
    @Override
    public void init(FilterConfig filterConfig) throws ServletException {

    }

    @Override
    public void doFilter(ServletRequest servletRequest, ServletResponse servletResponse, FilterChain filterChain) throws IOE
        System.out.println("TulingFilter的doFilter方法");
        filterChain.doFilter(servletRequest,servletResponse);
    }
```

```
    @Override
    public void destroy() {

    }
}
```

```
    /**
     * 注册一个filter
     * @return
     */
    @Bean
    public FilterRegistrationBean tulingFilter(){
        FilterRegistrationBean filterRegistrationBean = new FilterRegistrationBean();
        filterRegistrationBean.setFilter(new TulingFilter());
        filterRegistrationBean.addUrlPatterns("/*");
        return filterRegistrationBean;
    }
```

C:**往容器中增加一个**servlet

```
public class TulingServlet extends HttpServlet {

    protected void doPost(HttpServletRequest req, HttpServletResponse resp) throws ServletException, IOException {
        resp.getWriter().write("hello.....");
    }

    protected void doGet(HttpServletRequest req, HttpServletResponse resp) throws ServletException, IOException {
        doPost(req,resp);
    }
}
```

```
public class TulingServlet extends HttpServlet {

    protected void doPost(HttpServletRequest req, HttpServletResponse resp) throws ServletException, IOException {
        resp.getWriter().write("hello.....");
    }

    protected void doGet(HttpServletRequest req, HttpServletResponse resp) throws ServletException, IOException {
        doPost(req,resp);
    }
}
```

7）**如何全面接管**springboot**的**mvc**配置**(让springboot给我们自动配置的功能失效,自己像如何整合ssm一样的整合springmvc,不推荐)

官网原话:

If you want to keep Spring Boot MVC features and you want to add additional MVC configuration (interceptors, formatters, view controllers, and other features), you can add your own `@Configuration` class of type `WebMvcConfigurer` but without `@EnableWebMvc`. If you wish to provide custom instances of `RequestMappingHandlerMapping`, `RequestMappingHandlerAdapter`, or `ExceptionHandlerExceptionResolver`, you can declare a `WebMvcRegistrationsAdapter` instance to provide such components.

大概意思说，在配置文件中使用一个@EnableWebMvc**来标识到配置类上,就会导致配置失效　why?为什么会失**

效????????????????

原理: @EnableWebMvc **为容器中导入了**DelegatingWebMvcConfiguration**的组件**

```
@Retention(RetentionPolicy.RUNTIME)
@Target(ElementType.TYPE)
@Documented
@Import(DelegatingWebMvcConfiguration.class)
public @interface EnableWebMvc {
}
```

1)**我们来分析一下**DelegatingWebMvcConfiguration**是一个什么东西？？？？？**

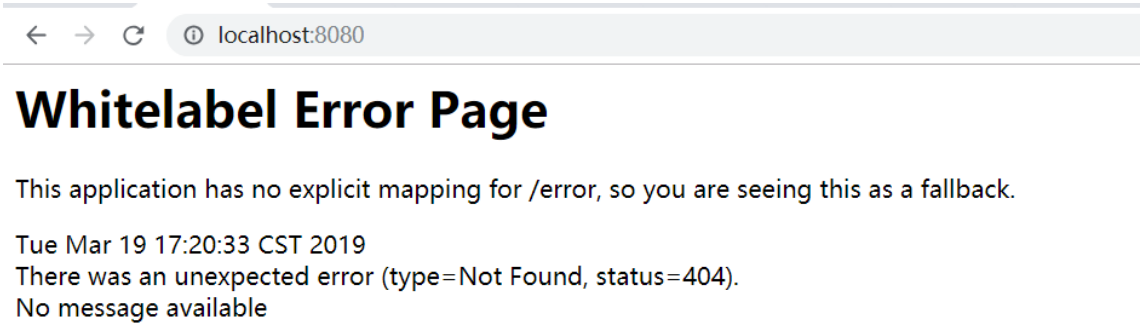
我们发现DelegatingWebMvcConfiguration**是**WebMvcConfiurationSupport（**只保证了**springmvc**的基本功能**）**类型的**

```
@Configuration
public class DelegatingWebMvcConfiguration extends WebMvcConfigurationSupport
```

2)**我们来看下**WebMvcAutoConfiguration**上的注解**

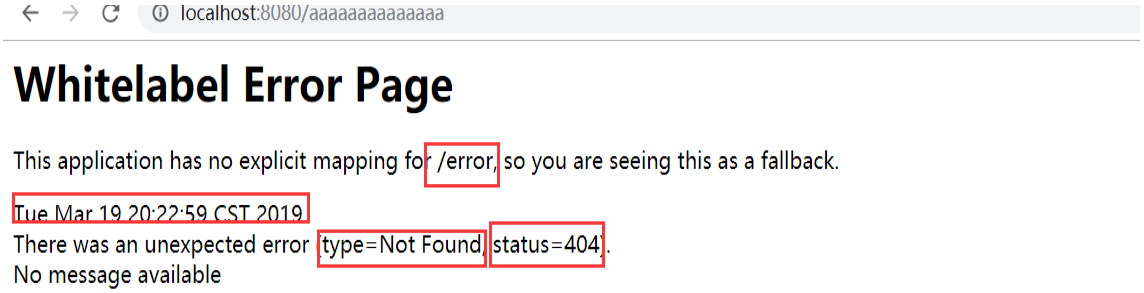
```
@Configuration
@ConditionalOnWebApplication(type = Type.SERVLET)
@ConditionalOnClass({ Servlet.class, DispatcherServlet.class, WebMvcConfigurer.class })

//容器中 没有WebMvcConfigurationSupport 该配置文件才生生效,但是我们使用了 @EnableWebMvc  导入了WebMvcConfiuration
//只保存了springmvc的最基本的功能
@ConditionalOnMissingBean(WebMvcConfigurationSupport.class)
@AutoConfigureOrder(Ordered.HIGHEST_PRECEDENCE + 10)
@AutoConfigureAfter({ DispatcherServletAutoConfiguration.class,
        ValidationAutoConfiguration.class })
public class WebMvcAutoConfiguration
```

3)**我们的**webJar **欢迎页 等全部失效**



8)springboot**错误处理机制?如何定制错误页面?**

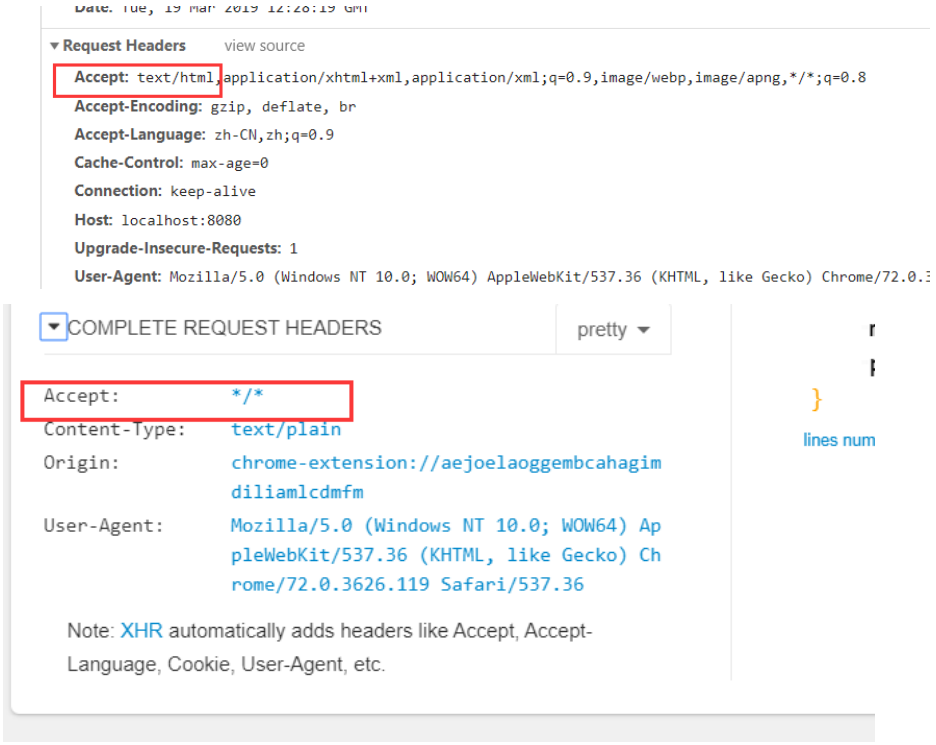
案例:浏览器模拟发送的错误请求 http://localhost:8080/aaaaaaaaaaaaa



案例2:通过postman **或者**restlet **发送的请求** http://localhost:8080/testTuling/dddd

我们可以看出 不同的终端发送的请求 会返回不同的错误异常类容 是根据什么原理?

原理: 是根据不同客户端发送的请求的请求头来区分是 返回页面还是json**数据**



8.1）**我们来看**springboot**为我们自动配置的异常处理的一些**bean

org.springframework.boot.autoconfigure.web.servlet.error.ErrorMvcAutoConfiguration

```
@Bean
	@ConditionalOnMissingBean(value = ErrorAttributes.class, search = SearchStrategy.CURRENT)
	public DefaultErrorAttributes errorAttributes() {
		return new DefaultErrorAttributes(
				this.serverProperties.getError().isIncludeException());
	}

	@Bean
	@ConditionalOnMissingBean(value = ErrorController.class, search = SearchStrategy.CURRENT)
	public BasicErrorController basicErrorController(ErrorAttributes errorAttributes) {
		return new BasicErrorController(errorAttributes, this.serverProperties.getError(),
				this.errorViewResolvers);
	}

	@Bean
	public ErrorPageCustomizer errorPageCustomizer() {
		return new ErrorPageCustomizer(this.serverProperties, this.dispatcherServletPath);
	}

@Bean
@ConditionalOnBean(DispatcherServlet.class)
@ConditionalOnMissingBean
public DefaultErrorViewResolver conventionErrorViewResolver() {
	return new DefaultErrorViewResolver(this.applicationContext,
			this.resourceProperties);
}

@Configuration
	@ConditionalOnProperty(prefix = "server.error.whitelabel", name = "enabled", matchIfMissing = true)
	@Conditional(ErrorTemplateMissingCondition.class)
	protected static class WhitelabelErrorViewConfiguration {
```

```
        private final SpelView defaultErrorView = new SpelView(
                "<html><body><h1>Whitelabel Error Page</h1>"
                        + "<p>This application has no explicit mapping for /error, so you are seeing this as a fall
                        + "<div id='created'>${timestamp}</div>"
                        + "<div>There was an unexpected error (type=${error}, status=${status}).</div>"
                        + "<div>${message}</div></body></html>");

        @Bean(name = "error")
        @ConditionalOnMissingBean(name = "error")
        public View defaultErrorView() {
            return this.defaultErrorView;
        }
```

我们具体来分析上诉源代码的组件

A: org.springframework.boot.autoconfigure.web.servlet.error.ErrorMvcAutoConfiguration.ErrorPageCustomizer**（错误页面定制器）**

作用：系统出现错误以后来到/error**请求进行处理；**

```
    /**
     * Path of the error controller.
     */
    @Value("${error.path:/error}")
    private String path = "/error";
```

那么当我们 发生错误，需要/error **的请求映射来请求 接下来就会引出另外一个组件 来处理**/error**请求**

B：org.springframework.boot.autoconfigure.web.servlet.error.BasicErrorController **（基础错误控制器）**

```
@Controller
@RequestMapping("${server.error.path:${error.path:/error}}")
public class BasicErrorController extends AbstractErrorController {


    //处理浏览器页面异常
    @RequestMapping(produces = "text/html")
    public ModelAndView errorHtml(HttpServletRequest request,
            HttpServletResponse response) {
        HttpStatus status = getStatus(request);
        Map<String, Object> model = Collections.unmodifiableMap(getErrorAttributes(
                request, isIncludeStackTrace(request, MediaType.TEXT_HTML)));
        response.setStatus(status.value());
        ModelAndView modelAndView = resolveErrorView(request, response, status, model);
        return (modelAndView != null) ? modelAndView : new ModelAndView("error", model);
    }

  //处理postman 请求的Json数据异常错误
    @RequestMapping
    @ResponseBody
    public ResponseEntity<Map<String, Object>> error(HttpServletRequest request) {
        Map<String, Object> body = getErrorAttributes(request,
                isIncludeStackTrace(request, MediaType.ALL));
        HttpStatus status = getStatus(request);
        return new ResponseEntity<>(body, status);
    }

}
```

B1:**我们来看下浏览器的响应过程怎么来处理请求异常信息的?**

```
    public ModelAndView errorHtml(HttpServletRequest request,
            HttpServletResponse response) {
        //获取状态码
        HttpStatus status = getStatus(request);
        //获取页面的模型数据
        Map<String, Object> model = Collections.unmodifiableMap(getErrorAttributes(
                request, isIncludeStackTrace(request, MediaType.TEXT_HTML)));
        response.setStatus(status.value());
        //解析错误视图
        ModelAndView modelAndView = resolveErrorView(request, response, status, model);

        return (modelAndView != null) ? modelAndView : new ModelAndView("error", model);
    }


    protected ModelAndView resolveErrorView(HttpServletRequest request,
        HttpServletResponse response, HttpStatus status, Map<String, Object> model) {
  //获取容器中的所有错误视图解析器   DefaultErrorViewResolver
    for (ErrorViewResolver resolver : this.errorViewResolvers) {
        ModelAndView modelAndView = resolver.resolveErrorView(request, status, model);
        if (modelAndView != null) {
            return modelAndView;
        }
    }
    return null;
}
```

B2:**我们接着分析**
org.springframework.boot.autoconfigure.web.servlet.error.DefaultErrorViewResolver#DefaultErrorViewResolver
错误视图解析器

```
    @Override
    public ModelAndView resolveErrorView(HttpServletRequest request, HttpStatus status,
            Map<String, Object> model) {
        //解析视图
        ModelAndView modelAndView = resolve(String.valueOf(status), model);

        //没有对应的解析精确匹配的状态码  使用模糊匹配比如4XX  5XX
        if (modelAndView == null && SERIES_VIEWS.containsKey(status.series())) {
            //返回4XX  5XX的页面
            modelAndView = resolve(SERIES_VIEWS.get(status.series()), model);
        }
        return modelAndView;
    }

    private ModelAndView resolve(String viewName, Map<String, Object> model) {
       // error/404
        String errorViewName = "error/" + viewName;
        //视图是否有模版引擎解析
        TemplateAvailabilityProvider provider = this.templateAvailabilityProviders
                .getProvider(errorViewName, this.applicationContext);
        //有模版引擎解析直接返回
        if (provider != null) {
            return new ModelAndView(errorViewName, model);
        }
        //静态html的页面解析
        return resolveResource(errorViewName, model);
    }
```

```
private ModelAndView resolveResource(String viewName, Map<String, Object> model) {
        for (String location : this.resourceProperties.getStaticLocations()) {
                try {
                    //在static模版下需要创建一个error/404.html
                        Resource resource = this.applicationContext.getResource(location);
                        resource = resource.createRelative(viewName + ".html");
                        //存在该页面 直接返回
                        if (resource.exists()) {
                                return new ModelAndView(new HtmlResourceView(resource), model);
                        }
                }
                catch (Exception ex) {
                }
        }
        return null;
}
```

浏览器模拟发送异常请求的流程 视图解析过程

org.springframework.boot.autoconfigure.web.servlet.error.AbstractErrorController#resolveErrorView
开始解析视图，获取所有的异常错误视图解析器

>org.springframework.boot.autoconfigure.web.servlet.error.DefaultErrorViewResolver#resolveErrorView
默认错误视图解析器解析视图

>org.springframework.boot.autoconfigure.web.servlet.error.DefaultErrorViewResolver#resolve
响应码精准匹配视图

1)**判断模版引擎是否能够处理错误视图,能处理就处理，不能处理交给静态页面解析处理**

>org.springframework.boot.autoconfigure.web.servlet.error.DefaultErrorViewResolver#resolveResourc
html**资源视图**

>**若不能精准匹配，那么就进行**4XX 5XX**模糊匹配**

>**若不能精准匹配**(error/**状态码**.html)**的错误页面，也没有（**error/**状态码开头**xx.html**错误页面那就使用默认的错误空白页面）**

```
private final SpelView defaultErrorView = new SpelView(
                "<html><body><h1>Whitelabel Error Page</h1>"
                                + "<p>This application has no explicit mapping for /error, so you are seeing this as a fall
                                + "<div id='created'>${timestamp}</div>"
                                + "<div>There was an unexpected error (type=${error}, status=${status}).</div>"
                                + "<div>${message}</div></body></html>");

@Bean(name = "error")
@ConditionalOnMissingBean(name = "error")
public View defaultErrorView() {
        return this.defaultErrorView;
}
```

我们怎么包含一个自己的错误异常信息的 自适应的效果

浏览器效果:(**需要返回自己定义的错误页面 包含了自定义的错误异常信息**)


```
<!DOCTYPE html>
<html lang="en" xmlns:th="http://www.thymeleaf.org">
<head>
    <meta charset="UTF-8">
    <title>500错误页面</title>
</head>
<body>
    <h1>code:[[${ext.code}]]</h1>
    <h2>msg:[[${ext.msg}]]</h2>
</body>
</html>
```

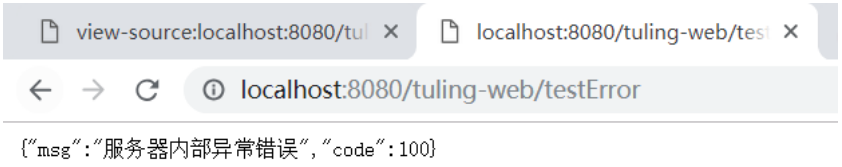
其他客户端的效果:

第一步:我们定义一个全局异常处理器，然后返回看执行效果

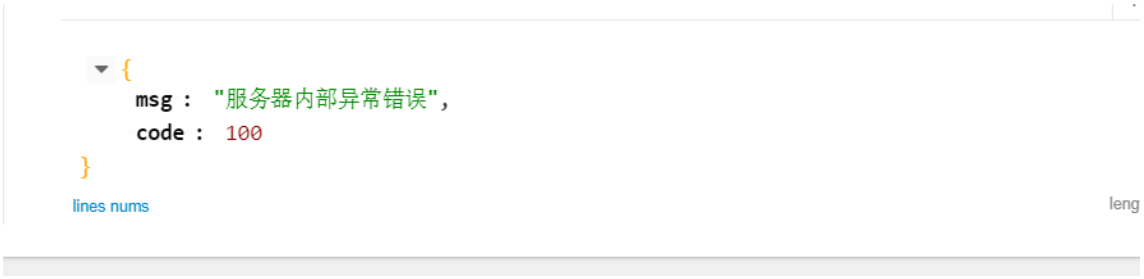
```
@ControllerAdvice
public class TulingExceptionHanlder {


    /**
     * 浏览器和其他客户端都返回了json 数组，不满足自适应
     * @param e
     * @param request
     * @return
     */
    @ExceptionHandler(value= TulingException.class)
    @ResponseBody
    public Map<String,Object> dealException(TulingException e, HttpServletRequest request){
```

```
        Map<String,Object> retInfo = new HashMap<>();
        retInfo.put("code",e.getCode());
        retInfo.put("msg",e.getMsg());
        return retInfo;
    }
}
```

效果: 浏览器不满足 自适应效果返回的是一个json字符串,而不是一个页面



其他客户端满足要求，返回自己定义的错误异常信息



第二步:在异常处理器中 进行重定向

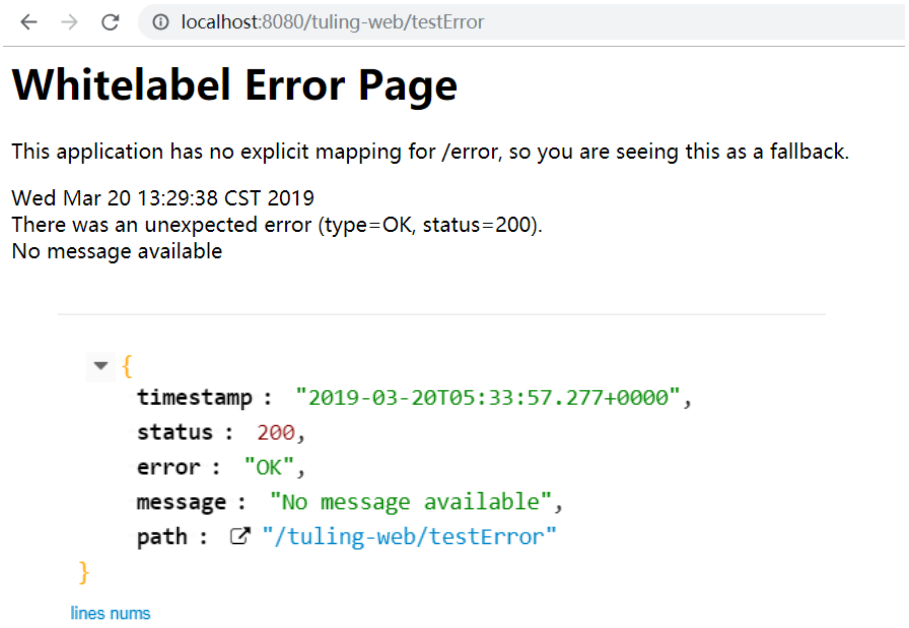
根据第一步的效果来看 浏览器不能满足自适应效果 ,那么我们看下BasicErrorController的类

```
@Controller
@RequestMapping("${server.error.path:${error.path:/error}}")
public class BasicErrorController extends AbstractErrorController
```

他处理的请求是/error的请求，那么我们就想到 在全局异常处理器进行重定向

```
@ControllerAdvice
public class TulingExceptionHanlder {

    @ExceptionHandler(value= TulingException.class)
    public String dealException(TulingException e, HttpServletRequest request){
        Map<String,Object> retInfo = new HashMap<>();
        retInfo.put("code",e.getCode());
        retInfo.put("msg",e.getMsg());
        //重定向，把请求转发到BasicErrorController来处理  /error
        return "forward:/error";
    }
```

执行效果:



分析过程

①:根据上述执行效果我们发现 进行转发后 他的http状态码变为200 那么错误异常处理就不能进行正常流程的处理

②:那么我们需要分析 错误异常处理器 看下是如何获取异常状态码的.

org.springframework.boot.autoconfigure.web.servlet.error.AbstractErrorController#getStatus

很明显，BasicErrorController 的getStatus的过程中，都是从request中获取javax.servlet.error.status_code属性

```
protected HttpStatus getStatus(HttpServletRequest request) {
        Integer statusCode = (Integer) request
                        .getAttribute("javax.servlet.error.status_code");
        if (statusCode == null) {
                return HttpStatus.INTERNAL_SERVER_ERROR;
        }
        try {
                return HttpStatus.valueOf(statusCode);
        }
        catch (Exception ex) {
                return HttpStatus.INTERNAL_SERVER_ERROR;
        }
}
```

那么我们需要在我们的全局异常处理器中request中设置该属性

```
    /**/

    @ExceptionHandler(value= TulingException.class)
    public String dealException(TulingException e, HttpServletRequest request){
        Map<String,Object> retInfo = new HashMap<>();
        retInfo.put("code",e.getCode());
        retInfo.put("msg",e.getMsg());
        request.setAttribute( s: "javax.servlet.error.status_code", o: 500);
        request.setAttribute( s: "ext",retInfo);
        return "forward:/error";
    }


}
```

页面返回的属性字段是在哪里配置的？？？

```
@RequestMapping(produces = "text/html")
public ModelAndView errorHtml(HttpServletRequest request,
        HttpServletResponse response) {
    HttpStatus status = getStatus(request);
    Map<String, Object> model = Collections.unmodifiableMap(getErrorAttributes(
            request, isIncludeStackTrace(request, MediaType.TEXT_HTML)));
    response.setStatus(status.value());
    ModelAndView modelAndView = resolveErrorView(request, response, status, model);
    return (modelAndView != null) ? modelAndView : new ModelAndView( viewName: "error", model);
}

@RequestMapping
@ResponseBody
public ResponseEntity<Map<String, Object>> error(HttpServletRequest request) {
    Map<String, Object> body = getErrorAttributes(request,
            isIncludeStackTrace(request, MediaType.ALL));
    HttpStatus status = getStatus(request);
    return new ResponseEntity<>(body, status);
}
```

那我们来着重分析一下
org.springframework.boot.web.servlet.error.DefaultErrorAttributes#getErrorAttributes

```
    @Override
    public Map<String, Object> getErrorAttributes(WebRequest webRequest,
            boolean includeStackTrace) {
        Map<String, Object> errorAttributes = new LinkedHashMap<>();
        errorAttributes.put("timestamp", new Date());
        addStatus(errorAttributes, webRequest);
        addErrorDetails(errorAttributes, webRequest, includeStackTrace);
        addPath(errorAttributes, webRequest);
        return errorAttributes;
    }
```

疑问:我们来看下这个类的自动装配原理,发现容器中有ErrorAttributes主键，那么就不进行自动装配,我们可以来自己写一个类来继承他

```
}

@Bean
@ConditionalOnMissingBean(value = ErrorAttributes.class, search = SearchStrategy.CURRENT)
public DefaultErrorAttributes errorAttributes() {
    return new DefaultErrorAttributes(
            this.serverProperties.getError().isIncludeException());
}

@Bean
```

```
@Component
public class TulingErrorAttribute extends DefaultErrorAttributes {

    public Map<String, Object> getErrorAttributes(WebRequest webRequest, boolean includeStackTrace) {
        //获取父类的封装字段结果
        Map<String, Object> retInfo = super.getErrorAttributes(webRequest,includeStackTrace);
        //获取全局异常自定义的结果
        Map<String,Object> ext = (Map<String, Object>) webRequest.getAttribute("ext",0);
        //封装自定义的错误信息
        retInfo.put("company","tuling");
        retInfo.put("ext",ext);
        return retInfo;
    }
}
```