Error or Exception handling in spring MVC/spring Boot MVC

==

Http status/response status codes

101 -199 / 1xx : :: Information (The happenings in the server will be displayed)
200- 299 /2xx :: success (for given reuqest , the response has come successfully with out error /exception)
request
300-399 / 3xx: :: Redirection (The given to one website will be redirected to another website)
400-499/4xx :: Incomplete (Some problem in locating and executing the web comp) (Client side errors) | (these codes will come
500-599 / 5xx :: Server Error (For exceptions raised in web comps or in underlying server/container) | when there is a problem
in the execution of web applicaiton)

400-499 /4xx :: Http Errors (Client side errors)
500-599/5xx :: Http Erros(becoz of exceptions raised in web comps/ in underlying server/container)
(Exceptions) (SErver side errors)

Important error codes

404 --> reuested resource not found
405 --> requested METHOD is not supported
401 ---> Authentication is failed
403 ---> Authorization os failed
400 ---> Bad request (incomplete info in the request URL)

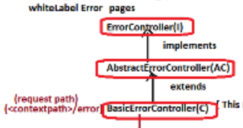
500 ---> Exception is thrown in the execution
Server side code (servlet, controller,
Rest controller and etc..)

200 ----> Success
(It is default repsonse status code)

201 ----> Success , but no output

300 ----> Redirection (the request given to one URL
is redirected to another URL)

Spring Rest/ class s and
=> Spring Boot MVC is having pre-defined Controller to handle these HttpErrors/exception to give default whiteLabel Error pages
that controller class name is
"BasicErrorController"

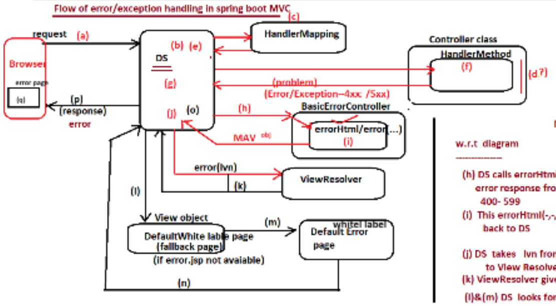


[This ErrorController can handle both Spring Boot MVC && Spring Rest app HttpErrors/Exceptions and generates WhiteLablel Error pages as the default error pages

(for web applications) type is related to boot boot
--> errorHtml(-,-,-) (return ModelAndView) [For browser generated requests ^ spring MVC/Spring Rest App)

|---> error(-,-,-) (return type is ResponseEntity) [For Non-browser genrated requests in spring MVC/Spring Rest App)
(Destkop App/ Mobile App/ Tools (Postman))
(for distributed Apps)

Flow of error/exception handling in spring boot MVC



w.r.t diagram

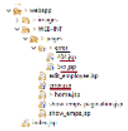
MAV obj means ModelAndView class obj
which contains Model data/Model attributes
and Logical View name

(h) DS calls errorHtml(-,-,-,-) method of BasicErrorController class by recieving error response from handler method of controller class having response code 400- 599
(i) This errorHtml(-,-,-,-) method of BasicErrorController returns MAV object back to DS

(j) DS takes lvn from the MAV object (error) and gives to View Resolver
(k) ViewResolver gives View object having default WhiteLabel error info
(l)&(m) DS looks for error.jsp as the error page if not there goes DefaultErrorPage

(n)&(o) The Error Page generated output goes to browser as whiteLabel Error page through DispatcherServlet.

=>Instead of whiteLabel error page which is fallback error page for diffent problems we can configure custom Error Pages for different Http Errors/ Exceptions (4xx and 5xx problems)



=>we configure error.jsp in WEB-INF/pages folder as global Error page i.e these error page executes for 4xx and 5xx error/exceptions raised in web application.. if specific error code based error pages not found..

WEB-INF/pages/error.jsp

```
<%@ page isELIgnored="false" %>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>
  <h1 style="color:red;text-align:center"> Some internal problem --Inconvience is regratted </h1>
  <hr>
   <table border="1" bgcolor="cyan" align="center">
    <tr>
     <td>status </td>
     <td>${status}</td>
    </tr>
    <tr>
     <td>timestamp </td>
     <td>${timestamp}</td>
    </tr>
     <tr>
     <td>message </td>
     <td>${message}</td>
    </tr>
    <tr>
     <td>type </td>
     <td>${type}</td>
    </tr>
      <tr>
     <td>path </td>
     <td>${path}</td>
    </tr>

    <tr>
     <td>trace</td>
     <td>${trace}</td>
    </tr>
   </table>
</body>
</html>
```

How can we feel pratically in spring boot MVC/spirng MVC application that errorHtml(-,-,-,-) of BasicErrorController class is executing towards giving DefaultWhiteLabel error page messages?

Ans) =>Open the pre-defined class (BasicErrorController) source code using ctrl+shift+T and go to errorHtml(-,-,-,-) Definitation and add break point in the 1st line of that method
=> make sure that one or other exception will be raised in the spring boot MVC App (Like changing the request path)
=> Run the app using "Debug As Server " mode
right click on the Project ---> debug as --> debug on Server --->
.... when the exeption is raised the control stops in the first line of errorHtml(-,-,-,-) method .. from them use f6, f7 buttons to feel the flow of execution.

we can cfg error page for each error code like 404,405, 500,501,502 and etc.. for that we need to take <errorcode>.jsp as the file name in WEB-INF/pages/error folder.
or we can also take error page for spefic serries error codes like 4xx.jsp for 400-499 error codes and similarly 5xx.jsp for all 500-599 errors/exceptions..
we should also place these pages in WEBE-INF/pages/error folder.

5xx.jsp

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
  pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>
   <h1 style="color:red;text-align:center">Server Internal Problem (5xx)</h1>
   <p style="text-align:center"><img  src="images/500_error.jfif"/> </p>
</body>
```

404.jsp
=======

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1"
  pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>
   <h1 style="color:red;text-align:center">Requested Resource not found (404)</h1>
   <p style="text-align:center"><img  src="images/404_error.jfif"/> </p>
</body>
</html>
```

We can also make Custom Exceptions generating our choice error codes (4xx or 5xx) by using @ResponseStatus annotation on the top of Custom Exception class

EmployeeNotFoundException.java

```
package com.nt.exception;

import org.springframework.http.HttpStatus;
import org.springframework.web.bind.annotation.ResponseStatus;
                                    502 error
@ResponseStatus(code = HttpStatus.BAD_GATEWAY)
public class EmployeeNotFoundException extends RuntimeException {
     public EmployeeNotFoundException() {
          super();
     }


     public EmployeeNotFoundException(String msg) {
          super(msg);
     }
```

In Service class

```
@Override
   public Employee fetchEmployeeByEno(int eno) {
        //use repo
   Optional<Employee> opt=empRepo.findById(eno);
    if(opt.isPresent())
        return opt.get();   //returns Employee
    else
        throw new  EmployeeNotFoundException("Problem in getting employee");
      //throw new RuntimeException("Problem in fetching record");
   }
```

alternate code

```
return empRepo.findById(eno).orElseThrow(()->new
EmployeeNotFoundException("emp not found"));
```

Problem in handler method

Error or Exception handling in spring MVC/spring Boot MVC

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Http status/response status codes

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400-499/4xx :: Http Errors (Client side errors)

500-599/5xx :: Http Erros (becoz of exceptions raised in web comps/ in underlying server/container) (Exceptions) (Server side errors) Spring Rest/ class ,s and => Spring Boot MVC is having pre-defined Controller to handle these HttpErrors/exception to give default whiteLabel Error pages that controller class name is "BasicErrorController"

ErrorController(1)

implements

(these codes will come when there is a problem

in the execution of web applicaiton)

important error codes

404 --> reuested resource not found

405 --> requested METHOD is not supported

401---> Authentication is failed

403 ---> Authorization os failed

500 ---> Exception is thrown in the execution Server side code (servlet, controller, Rest controller and etc..)

400 ---> Bad request (incomplete info in the request URL)

200----> Success

(request path)

AbstractErrorController(AC)]

extends

(<contextpath>/error) BasicErrorController(C) This ErrorController can handle both Spring Boot MVC && Spring Rest

(for web applications)

app HttpErrors/Exceptions and generates WhiteLablel Error pages as the default error pages related to boot type is boot errorHtml(-,-,-) (return ModelAndView) [For browser generated requests spring MVC/Spring Rest App) |---> error(-,-,-) (return type is ResponseEntity) (for distributed Apps)

Flow of error/exception handling in spring boot MVC

request (a)

Browser

error page

(q)

(b) (e)

(c) HandlerMapping

[For Non-browser genrated requests inr spring MVC/Spring Rest App) (Destkop App/ Mobile App/ Tools (Postman))

(problem)

(Error/Exception--4xx: /5xx)

Controller class

HandlerMethod (f)

(d)

(response)

DS

=

(g)

(h) (j) (0)

(d?)

(It is default repsonse status code) 201> Success, but no output

300----> Redirection (the request given to one URL is redirected to another URL)

error

BasicErrorController

MAV obj

errorHtml/error...) (i)

w.r.t diagram

error(lvn)

ViewResolver

(k)

View object

DefaultWhite lable page

(fallback page)

(if error.jsp not avaiable)

(n)

(m)

whitel label

Default Error page

MAV obj means ModelAndView class obj which contains Model data/Model attributes and Logical View name

(h) DS calls errorHtml(-,-,-,-) method of BasicErrorController class by recieving error response from handler method of controller class having response code 400-599

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page

(1)&(m) DS looks for error.jsp as the error if not there goes DefaultErrorPage

=>Instead of whiteLabel error page which is fallback error page for diffent problems we can configure custom Error Pages for different Http Errors/ Exceptions (4xx and 5xx problems)

✓ > webapp

>> images

> WEB-INF

✓ pages

error

404.jsp

5xx.jsp

edit_employee.jsp

error.jsp

>home.jsp

show_emps_pagination.jsp

show_emps.jsp

index.jsp

=>we configure error.jsp in WEB-INF/pages folder as global Error page i.e these error page executes for 4xx and 5xx error/exceptions raised in web application..

if specific error code based error pages not found..

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<body>
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(n)&(o) The Error Page generated output goes to browser as whiteLabel Error page through DispatcherServlet.

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<td>status </td>
```

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<td>${status}</td>
</tr>
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</table>
```

5xx.jsp

```
</body> </html>
```

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we need to take <errorcode>.jsp as the file name in WEB-INF/pages/error folder.

or we can also take error page for spefic serries error codes like 4xx.jsp for

400-499 error codes and similarly 5xx.jsp for all 500-599 errors/exceptions.. place we should also these

pages in WEBE-INF/pages/error folder.

```
<%@ page language="java" contentType="text/html; charset=ISO-8859-1" pageEncoding="ISO-8859-1"%>
```

404.jsp

```
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
<%@ page language="java" contentType="text/html; charset=ISO-8859-1" pageEncoding="ISO-8859-1"%>
<!DOCTYPE html>
<html>
<head>
</head>
<body>
<h1 style="color:red;text-align:center">Server Internal Problem (5xx)</h1>
<p style="text-align:center"><img src="images/500 error.jfif"/> </p> </body>
<meta charset="ISO-8859-1">
<title>Insert title here</title>
</head>
<body>
<h1 style="color:red;text-align:center">Requested Resource not found (404)</h1>
<p style="text-align:center"><img src="images/404 error.jfif"/> </p>
</body> </html>
```

We can also make Custom Exceptions generating our choice error codes (4xx or 5xx) by using @ResponseStatus annotation on the top of Custom Exception class

EmployeeNotFoundException.java

```
package com.nt.exception;
import org.springframework.http.HttpStatus;
import org.springframework.web.bind.annotation. ResponseStatus;
```

502 error

```
@ResponseStatus(code = HttpStatus.BAD_GATEWAY)
public class EmployeeNotFoundException extends RuntimeException { public
EmployeeNotFoundException() {
super();
}
```

In Service class

```
@Override
public Employee fetchEmployee ByEno(int eno) { //use repo
Optional<Employee> opt=empRepo.findById(eno); if(opt.isPresent())
return opt.get(); //returns Employee
else
throw new EmployeeNotFoundException("Problem in getting employee"); //throw new
RuntimeException("Problem in fetching record");
}
}
public EmployeeNotFoundException(String msg) {
super(msg);
}
```

Problem in handler method

specific error code page (like 404.jsp,500.jsp,501.jsp and etc..)

(if not found)

specific error series page (4xx.jsp, 5xx.jsp)

(if not found)

error.jsp (Glogal error page)

(if not found)

Error

DefaultWhite Lablel page

alternate code

```
return empRepo.findById(eno).orElse Throw(()->new EmployeeNotFoundException("emp not found"));
```