Spring Web Annotations

**1. Overview**

In this tutorial, we’ll explore Spring Web annotations from the *org.springframework.web.bind.annotation* package.

**2. *@RequestMapping***

Simply put, [*@RequestMapping*](https://www.baeldung.com/spring-requestmapping) **marks request handler methods** inside *@Controller* classes; it can be configured using:

* *path,* or its aliases, *name,* and *value:* which URL the method is mapped to
* *method:* compatible HTTP methods
* *params:* filters requests based on presence, absence, or value of HTTP parameters
* *headers:* filters requests based on presence, absence, or value of HTTP headers
* *consumes:* which media types the method can consume in the HTTP request body
* *produces:* which media types the method can produce in the HTTP response body

Here’s a quick example of what that looks like:

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8 | @Controller  class VehicleController {        @RequestMapping(value = "/vehicles/home", method = RequestMethod.GET)      String home() {          return "home";      }  } |

We can provide **default settings for all handler methods in a *@Controller* class** if we apply this annotation on the class level. The only **exception is the URL which Spring won’t override** with method level settings but appends the two path parts.

For example, the following configuration has the same effect as the one above:

|  |  |
| --- | --- |
| 1  2  3  4  5  6  7  8  9 | @Controller  @RequestMapping(value = "/vehicles", method = RequestMethod.GET)  class VehicleController {        @RequestMapping("/home")      String home() {          return "home";      }  } |

Moreover, *@GetMapping*, *@PostMapping*, *@PutMapping*, *@DeleteMapping*, and *@PatchMapping* are different variants of *@RequestMapping*with the HTTP method already set to GET, POST, PUT, DELETE, and PATCH respectively.

These are available since Spring 4.3 release.

**3. *@RequestBody***

Let’s move on to [*@RequestBody*](https://www.baeldung.com/spring-request-response-body) – which maps the **body of the HTTP request to an object**:

|  |  |
| --- | --- |
| 1  2  3  4 | @PostMapping("/save")  void saveVehicle(@RequestBody Vehicle vehicle) {      // ...  } |

The deserialization is automatic and depends on the content type of the request.

**4. *@PathVariable***

Next, let’s talk about *@PathVariable*.

This annotation indicates that a **method argument is bound to a URI template variable**. We can specify the URI template with the *@RequestMapping* annotation and bind a method argument to one of the template parts with *@PathVariable*.

We can achieve this with the *name* or its alias, the *value* argument:

|  |  |
| --- | --- |
| 1  2  3  4 | @RequestMapping("/{id}")  Vehicle getVehicle(@PathVariable("id") long id) {      // ...  } |

If the name of the part in the template matches the name of the method argument, we don’t have to specify it in the annotation:

|  |  |
| --- | --- |
| 1  2  3  4 | @RequestMapping("/{id}")  Vehicle getVehicle(@PathVariable long id) {      // ...  } |

Moreover, we can mark a path variable optional by setting the argument *required* to false:

|  |  |
| --- | --- |
| 1  2  3  4 | @RequestMapping("/{id}")  Vehicle getVehicle(@PathVariable(required = false) long id) {      // ...  } |

**5. *@RequestParam***

We use *@RequestParam* for **accessing HTTP request parameters**:

|  |  |
| --- | --- |
| 1  2  3  4 | @RequestMapping  Vehicle getVehicleByParam(@RequestParam("id") long id) {      // ...  } |

It has the same configuration options as the *@PathVariable* annotation.

In addition to those settings, with *@RequestParam* we can specify an injected value when Spring finds no or empty value in the request. To achieve this, we have to set the *defaultValue* argument.

Providing a default value implicitly sets *required* to *false:*

|  |  |
| --- | --- |
| 1  2  3  4 | @RequestMapping("/buy")  Car buyCar(@RequestParam(defaultValue = "5") int seatCount) {      // ...  } |

Besides parameters, there are **other HTTP request parts we can access: cookies and headers**. We can access them with the annotations ***@CookieValue* and *@RequestHeader*** respectively.

We can configure them the same way as *@RequestParam*.

**6. Response Handling Annotations**

In the next sections, we will see the most common annotations to manipulate HTTP responses in Spring MVC.

**6.1. *@ResponseBody***

If we mark a request handler method with [*@ResponseBody*](https://www.baeldung.com/spring-request-response-body)*,* **Spring treats the result of the method as the response itself**:

|  |  |
| --- | --- |
| 1  2  3  4  5 | @ResponseBody  @RequestMapping("/hello")  String hello() {      return "Hello World!";  } |

If we annotate a *@Controller* class with this annotation, all request handler methods will use it.

**6.2. *@ExceptionHandler***

With this annotation, we can declare a **custom error handler method**. Spring calls this method when a request handler method throws any of the specified exceptions.

The caught exception can be passed to the method as an argument:

|  |  |
| --- | --- |
| 1  2  3  4 | @ExceptionHandler(IllegalArgumentException.class)  void onIllegalArgumentException(IllegalArgumentException exception) {      // ...  } |

**6.3. *@ResponseStatus***

We can specify the **desired HTTP status of the response** if we annotate a request handler method with this annotation. We can declare the status code with the *code* argument, or its alias, the *value*argument.

Also, we can provide a reason using the *reason* argument.

We also can use it along with *@ExceptionHandler*:

|  |  |
| --- | --- |
| 1  2  3  4  5 | @ExceptionHandler(IllegalArgumentException.class)  @ResponseStatus(HttpStatus.BAD\_REQUEST)  void onIllegalArgumentException(IllegalArgumentException exception) {      // ...  } |

For more information about HTTP response status, please visit [this article](https://www.baeldung.com/spring-mvc-controller-custom-http-status-code).

**7. Other Web Annotations**

Some annotations don’t manage HTTP requests or responses directly. In the next sections, we’ll introduce the most common ones.

**7.1. *@Controller***

We can define a Spring MVC controller with *@Controller*. For more information, please visit [our article about Spring Bean Annotations](https://www.baeldung.com/spring-bean-annotations).

**7.2. *@RestController***

The *@RestController* **combines *@Controller* and *@ResponseBody***.

Therefore, the following declarations are equivalent:

|  |  |
| --- | --- |
| 1  2  3  4  5 | @Controller  @ResponseBody  class VehicleRestController {      // ...  } |
| 1  2  3  4 | @RestController  class VehicleRestController {      // ...  } |

**7.3. *@ModelAttribute***

With this annotation we can **access elements that are already in the model** of an MVC *@Controller,*by providing the model key:

|  |  |
| --- | --- |
| 1  2  3  4 | @PostMapping("/assemble")  void assembleVehicle(@ModelAttribute("vehicle") Vehicle vehicleInModel) {      // ...  } |

Like with *@PathVariable* and *@RequestParam*, we don’t have to specify the model key if the argument has the same name:

|  |  |
| --- | --- |
| 1  2  3  4 | @PostMapping("/assemble")  void assembleVehicle(@ModelAttribute Vehicle vehicle) {      // ...  } |

Besides, *@ModelAttribute* has another use: if we annotate a method with it, Spring will **automatically add the method’s return value to the model**:

|  |  |
| --- | --- |
| 1  2  3  4 | @ModelAttribute("vehicle")  Vehicle getVehicle() {      // ...  } |

Like before, we don’t have to specify the model key, Spring uses the method’s name by default:

|  |  |
| --- | --- |
| 1  2  3  4 | @ModelAttribute  Vehicle vehicle() {      // ...  } |

Before Spring calls a request handler method, it invokes all *@ModelAttribute* annotated methods in the class.

More information about *@ModelAttribute* can be found in [this article](https://www.baeldung.com/spring-mvc-and-the-modelattribute-annotation).

**7.4. *@CrossOrigin***

*@CrossOrigin* **enables cross-domain communication** for the annotated request handler methods:

|  |  |
| --- | --- |
| 1  2  3  4  5 | @CrossOrigin  @RequestMapping("/hello")  String hello() {      return "Hello World!";  } |

If we mark a class with it, it applies to all request handler methods in it.

We can fine-tune CORS behavior with this annotation’s arguments.

For more details, please visit [this article](https://www.baeldung.com/spring-cors).

**8. Conclusion**

In this article, we saw how we can handle HTTP requests and responses with Spring MVC.