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# Implementing a Simple REST Service

1. Getting started
2. Defining a simple REST service

# 1. Getting Started

- Spring Boot web applications
- The role of REST services
- REST services in Spring MVC
- Supporting JSON and XML
- Defining a model class

# Spring Boot Web Applications

- To create a web app, add the **Spring Web** dependency:

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

We'll do this

pom.xml

- Alternatively, add the **Spring Reactive Web** dependency
  - Good if you have very high load or a continuous stream of data

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

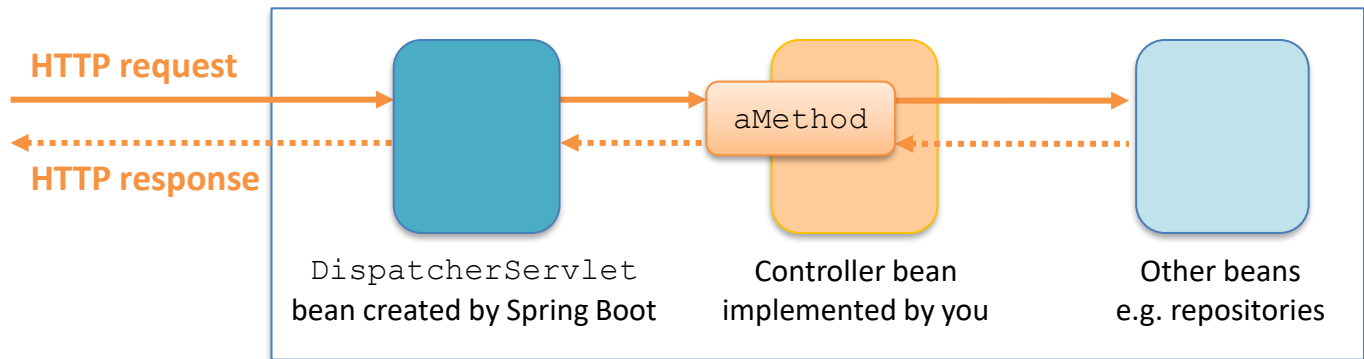
pom.xml

# The Role of REST Services

- A REST service is an endpoint in a web application
  - Has methods that are mapped to URLs
  - Easily accessible by clients over HTTP(S)
  - Consume/return data, typically JSON (or XML)
- The role of REST services in a full-stack application:
  - Callable from UI, e.g. from a React web UI
  - Provides a façade to back-end data/functionality

# REST Services in Spring MVC

- This is how REST services work in Spring MVC:



Spring Boot application

# Supporting JSON and XML

- REST controller methods receive/return Java objects
- Spring Boot automatically creates a JSON serializer bean, to convert Java objects to/from JSON
- If you also want to support XML serialization, you must add the following dependency in your POM file:

```
<dependency>  
  <groupId>com.fasterxml.jackson.dataformat</groupId>  
  <artifactId>jackson-dataformat-xml</artifactId>  
</dependency>
```

pom.xml

# Defining a Model Class

- We'll use the following POJO class in our REST services:

```
public class Product {  
    private long id;  
    private String description;  
    private double price;  
  
    // Plus constructors, getters/setters, etc ...  
}
```

Product.java

- The JSON/XML serializers will convert `Product` objects to/from JSON or XML automatically, as appropriate

## 2. Defining a Simple REST Service

- How to define a REST controller
- Example REST controller
- Pinging the simple REST controller
- A better approach
- Mapping path variables
- Mapping request parameters



# How to Define a REST Controller

- Define a class and annotate with:
  - `@Controller` (or `@RestController`)
  - `@RequestMapping` (optional base URL)
  - `@CrossOrigin` (optional CORS support)
- Define methods annotated with one of the following:
  - `@GetMapping`, `@PostMapping`, `@PutMapping`,  
`@DeleteMapping`, `@RequestMapping`
- For each method, also specify the path (URL)

# Example REST Controller

- Here's a simple REST controller
  - The method returns a product collection:

```
@RestController
@RequestMapping("/simple")
@CrossOrigin
public class SimpleController {

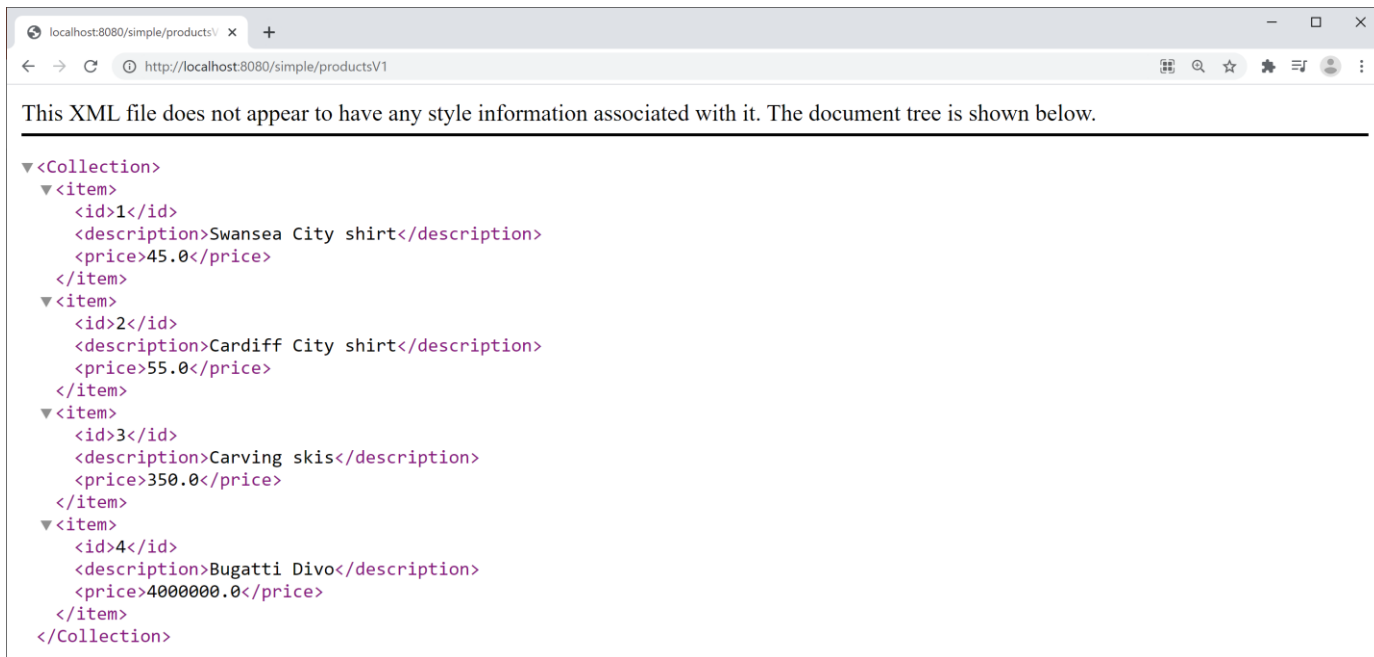
    private Map<Long, Product> catalog = new HashMap<>();
    ...

    @GetMapping("/productsV1")
    public Collection<Product> getProductsV1() {
        return catalog.values();
    }
    ...
}
```

SimpleController.java

# Pinging the Simple REST Controller

- Run the Spring Boot app, then browse to:
  - <http://localhost:8080/simple/productsV1>



# A Better Approach

- So far, we return a `Collection<Product>`
  - This populates the HTTP response body
  - But it doesn't set the HTTP headers or status code
- A better approach is to return `ResponseEntity<T>`
  - Gives control over entire HTTP response body
  - We can set HTTP headers and status code:

```
@GetMapping("/productsV2")  
public ResponseEntity<Collection<Product>> getProductsV2() {  
    return ResponseEntity.ok().body(catalog.values());  
}
```

`SimpleController.java`

# Mapping Path Variables

- You can map parts of the path to variables
  - In the path, define { ... } placeholder(s)
  - In the method, annotate param with @PathVariable

```
@GetMapping("/products/{id}")
public ResponseEntity<Product> getProductById(@PathVariable long id) {

    Product p = catalog.get(id);
    if (p == null)
        return ResponseEntity.notFound().build();
    else
        return ResponseEntity.ok().body(p);
}
```

SimpleController.java

<http://localhost:8080/simple/products/1>

# Mapping Request Parameters

- You can map HTTP request parameter(s)
  - In the path, optionally provide parameter(s) after ?
  - In the method, annotate param with `@RequestParam`

```
@GetMapping("/products")
public ResponseEntity<Collection<Product>> getProductsMoreThan(
    @RequestParam(value="min", required=false, defaultValue="0.0") double min) {

    Collection<Product> products = catalog.values()
        .stream()
        .filter(p -> p.getPrice() > min)
        .collect(Collectors.toList());

    return ResponseEntity.ok().body(products);
}
```

SimpleController.java

<http://localhost:8080/simple/products?min=100>

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# Summary

- Getting started
- Defining a simple REST service

