Overview of Spring WebMVC

Douglas C. Schmidt
d.schmidt@vanderbilt.edu
www.dre.vanderbilt.edu/~schmidt

Professor of Computer Science
Institute for Software Integrated Systems
Vanderbilt University
Nashville, Tennessee, USA
Learning Objectives in this Lesson

- Understand the structure & functionality of the Spring WebMVC framework supported by Spring Boot 2.0

See docs.spring.io/spring-framework/docs/3.2.x/spring-framework-reference/html/mvc.html
Learning Objectives in this Lesson

- Understand the structure & functionality of the Spring WebMVC framework supported by Spring Boot 2.0, e.g.
- Its concurrency model
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• Understand the structure & functionality of the Spring WebMVC framework supported by Spring Boot 2.0, e.g.
  • Its concurrency model
  • Its communication model
Overview of Spring WebMVC Concurrency
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- Spring WebMVC concurrency
- Built on the Servlet API & uses a synchronous I/O architecture w/one-thread-per-request model
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- Each request is handled by a thread that blocks until it is able to fully process the request

A request to a list of flights from a database over the network might take a few seconds, which blocks threads from servicing other requests & responses

See en.wikipedia.org/wiki/Blocking_(computing)
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- Blocking calls are a natural form of back pressure

See medium.com/@jayphelps/backpressure-explained-the-flow-of-data-through-software-2350b3e77ce7
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  - Forces the caller to wait

See en.wikipedia.org/wiki/Rate_limiting
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  - Blocking calls are a natural form of back pressure
    - Forces the caller to wait
    - Eliminates the need for end-to-end rate control

See [en.wikipedia.org/wiki/Rate_limiting](en.wikipedia.org/wiki/Rate_limiting)
Overview of Spring WebMVC Communication

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  - However, a server may need many thread to handle bursty clients

See [www.baeldung.com/java-web-thread-pool-config](http://www.baeldung.com/java-web-thread-pool-config)
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    - However, a server may need many thread to handle bursty clients
    - The client may need thread too
Overview of Spring WebMVC Communications
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- Spring WebMVC communications
- Network communication uses common Java types

See [docs.oracle.com/javase/8/docs/technotes/guides/collections/overview.html](docs.oracle.com/javase/8/docs/technotes/guides/collections/overview.html)
Overview of Spring WebMVC Communication

- Spring WebMVC communications
- Network communication uses common Java types
  - e.g., Java String & Integer objects, as well as List & Map collections

```java
public class FlightController {
    
    @GetMapping(FLIGHT_DATES)
    List<LocalDate> findDepartureDates
        (@RequestParam String departureAirport,
         @RequestParam String arrivalAirport)
    {
        ... 
    }
}
```

See `flights-microservices/-/blob/master/src/main/java/server/flight/FlightController.java`
Overview of Spring WebMVC Communication

- Spring WebMVC communications
  - Network communication uses common Java types
- WebMVC endpoints send & return Java collections in one fell swoop
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  - Network communication uses common Java types
- WebMVC endpoints send & return Java collections in one fell swoop
  - Client latency may suffer & thus not be as responsive as possible

See [en.wikipedia.org/wiki/Spinning_pinwheel](en.wikipedia.org/wiki/Spinning_pinwheel)
Overview of Spring WebMVC Communication

- Spring WebMVC communications
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- WebMVC endpoints send & return Java collections in one fell swoop
  - Client latency may suffer & thus not be as responsive as possible
  - Memory is needed to buffer this data at multiple points

See english.stackexchange.com/questions/337497/what-is-meant-by-memory-hog
Overview of Spring WebMVC Communication

- Spring WebMVC communications
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  - Addressed by Spring WebFlux & reactive programming

See [docs.spring.io/spring-framework/docs/current/reference/html/web-reactive.html#webflux]
End of Overview of Spring WebMVC