Comparing & Contrasting Spring WebMVC & WebFlux

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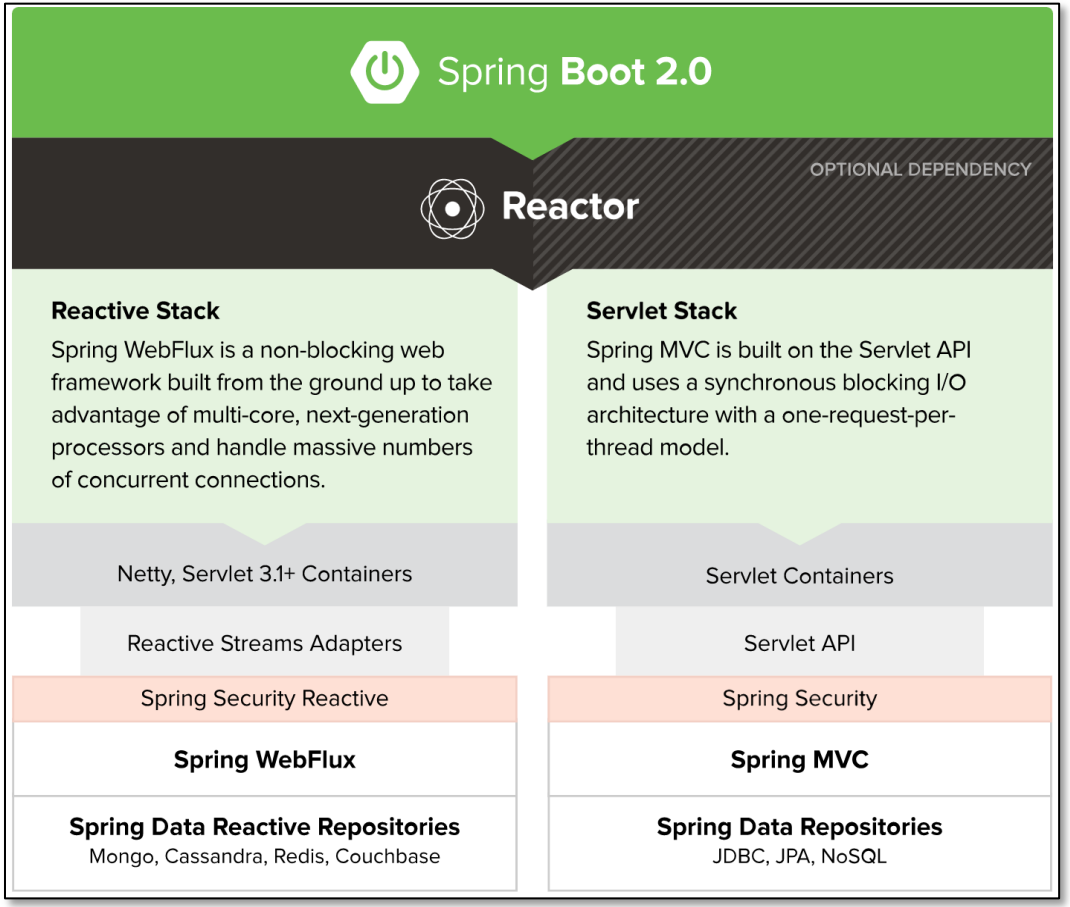
Learning Objectives in this Lesson

- Recognize the similarities & differences between Spring WebMVC & WebFlux frame-works supported by Spring Boot 2.0



Comparing & Contrasting Spring WebMVC & WebFlux

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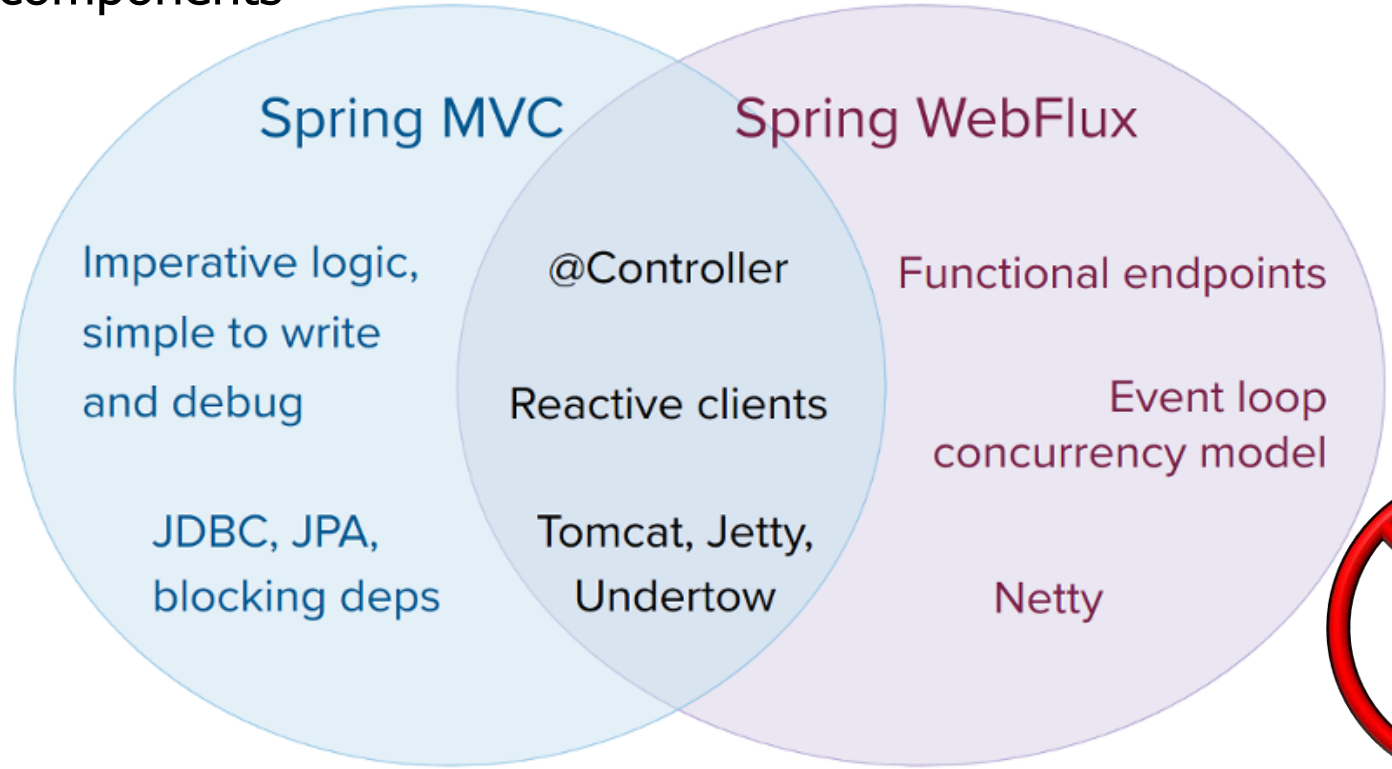
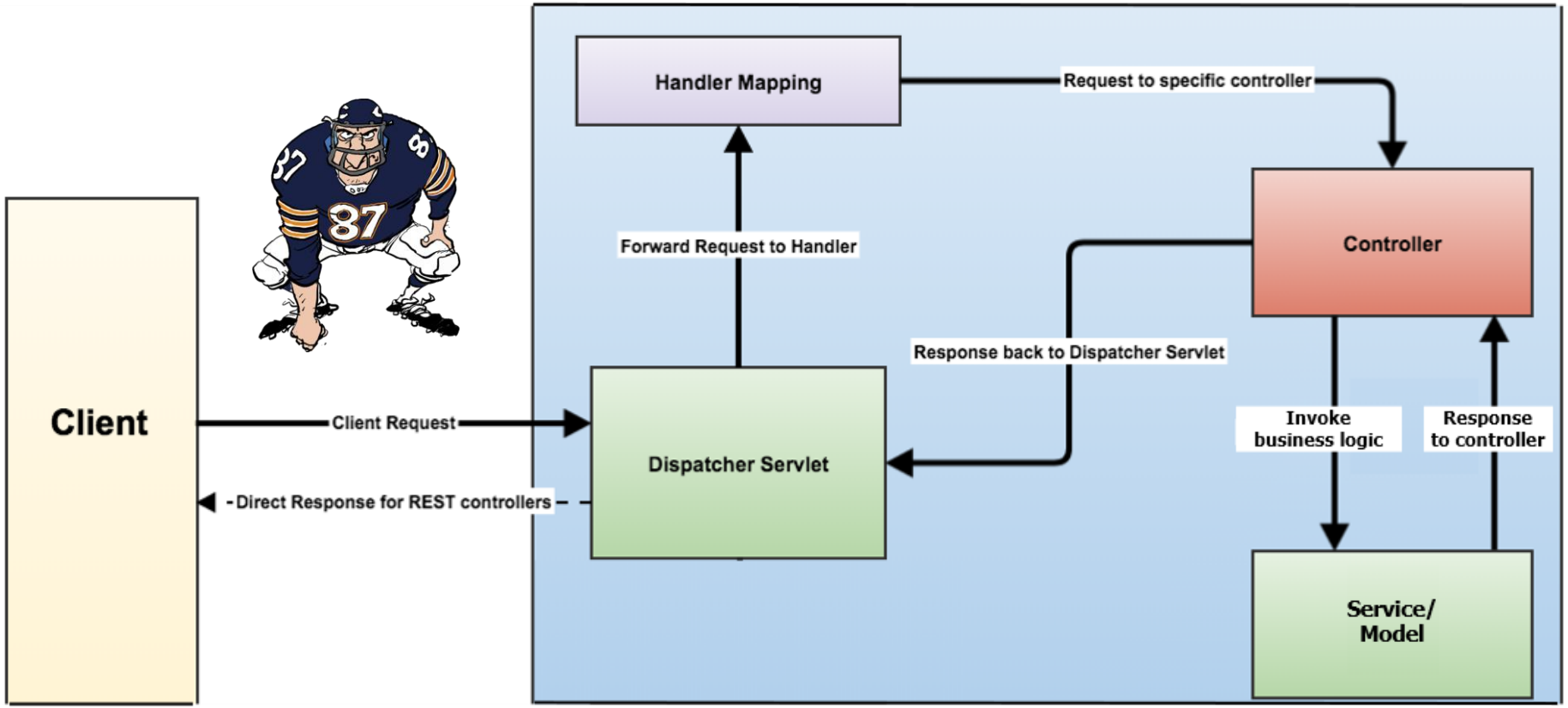
- Spring WebMVC & WebFlux have similarities & differences wrt functionality & internal components



See maddy4java.blogspot.com/2019/11/spring-boot-spring-webflux-vs-spring-mvc.html

Comparing & Contrasting Spring WebMVC & WebFlux

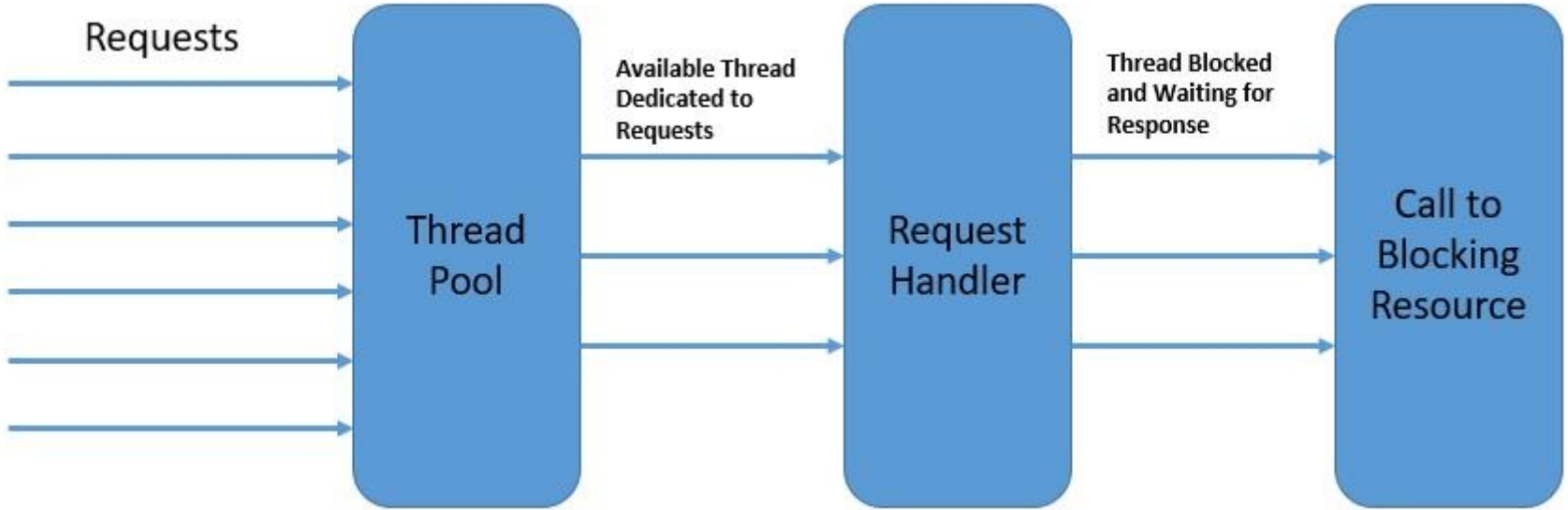
- WebMVC is sync



Built on Servlet API & uses a synchronous I/O w/one-thread-per-request model

Comparing & Contrasting Spring WebMVC & WebFlux

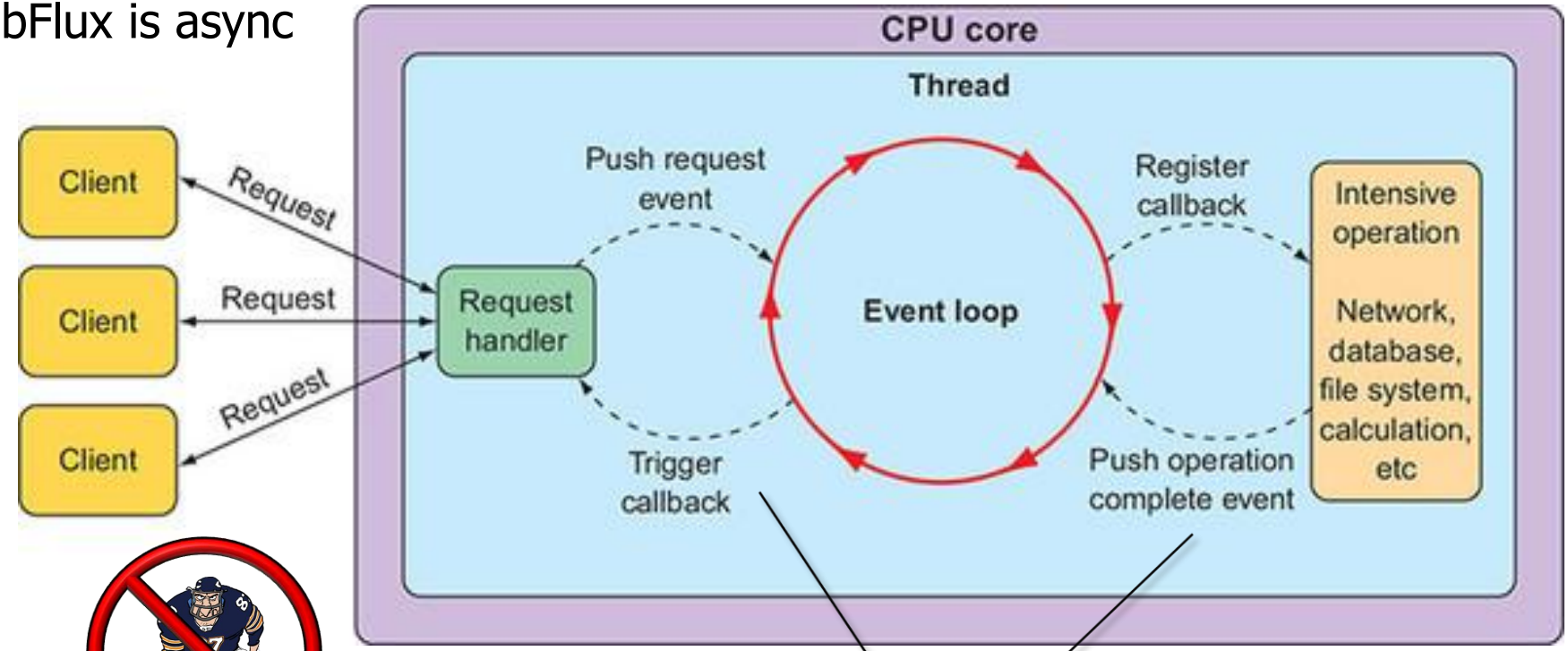
- WebMVC is sync
  - The server uses a thread-per-request, where each thread handles a single request at a time



See www.baeldung.com/spring-webflux-concurrency

Comparing & Contrasting Spring WebMVC & WebFlux

- WebFlux is async

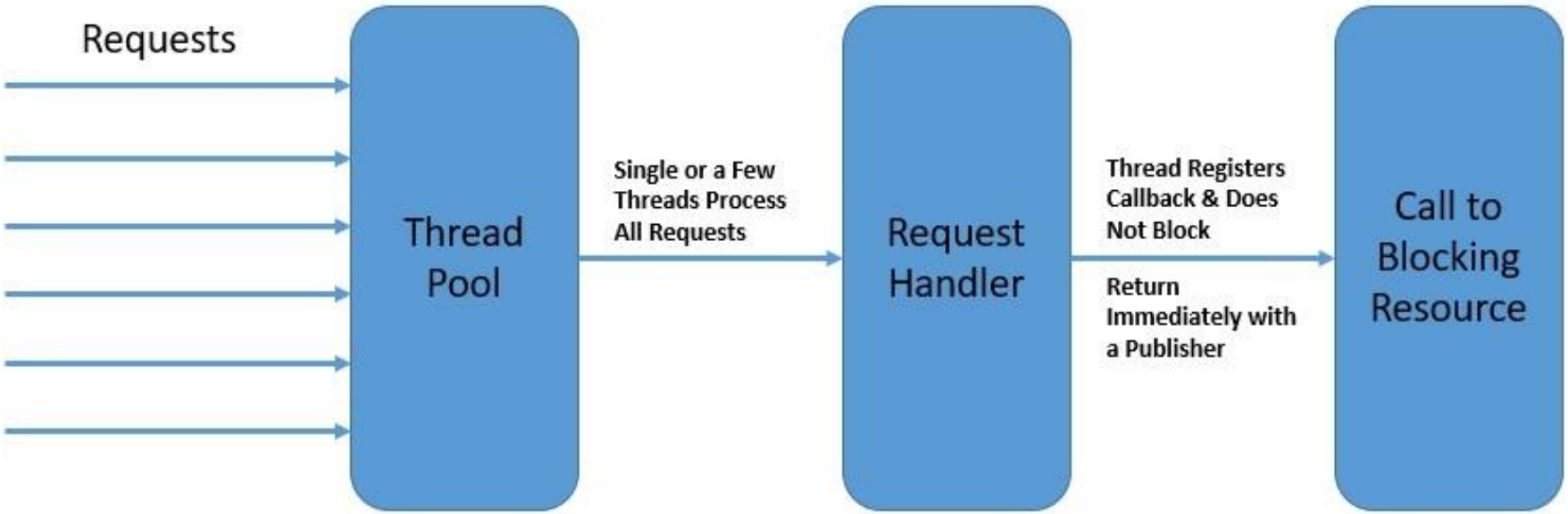


Callbacks are transparent to server code that uses Mono & Flux reactive types

Non-blocking I/O that leverages multiple cores & handles large # of connections

Comparing & Contrasting Spring WebMVC & WebFlux

- WebFlux is async
  - It uses a completely non-blocking environment that can achieve higher concurrency with better resource utilization



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Accessing Mono & Flux Endpoints Seamlessly

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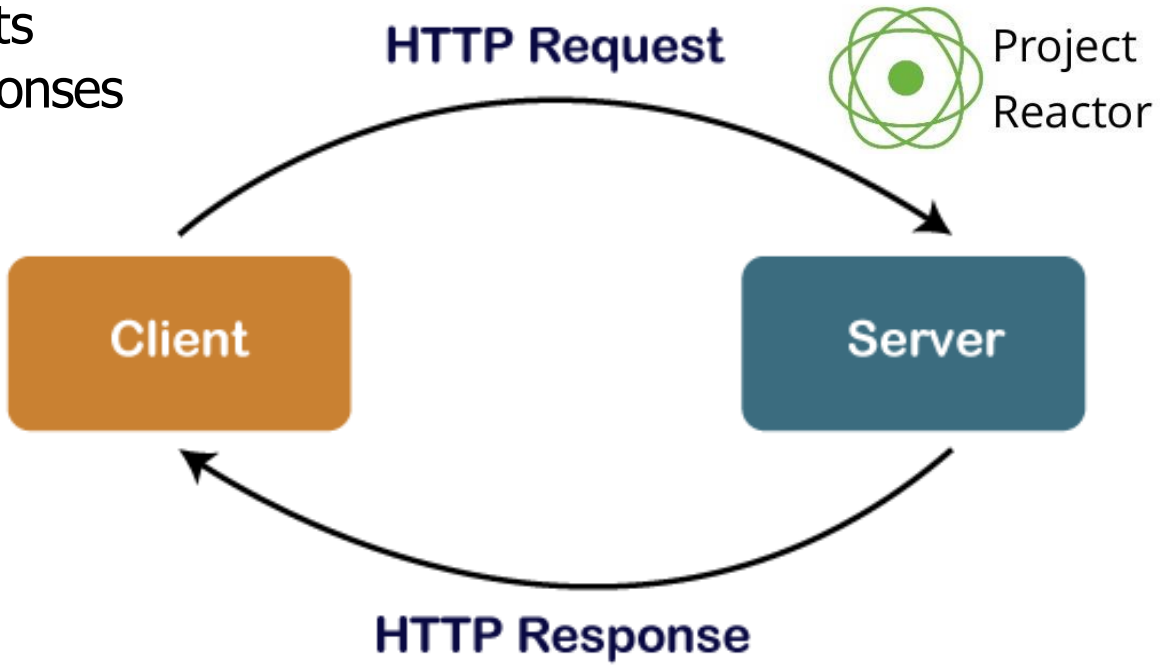
- WebFlux Mono/Flux endpoints exchange HTTP requests/responses



See docs.spring.io/spring-framework/docs/current/reference/html/web-reactive.html

Accessing Mono & Flux Endpoints Seamlessly

- WebFlux Mono/Flux endpoints exchange HTTP requests/responses
  - WebClient or RestTemplate can send/receive HTTP requests/ responses to/from reactive endpoints

```
Flux<Airport> airports = webClient
   .get()
   .uri(baseUrl + AIRPORT
         + "/" + AIRPORTS)
   .retrieve()
   .bodyToFlux(Airport.class);
```

```
Airport[] airports = restTemplate
   .getForEntity(baseUrl + AIRPORT + "/" + AIRPORTS,
                                 Airport[].class)
   .getBody();
```

See www.baeldung.com/spring-webclient-resttemplate

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         + "/" + AIRPORTS)
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   .bodyToFlux(Airport.class);
```

Use auto-wired fields here!

```
Airport[] airports = restTemplate
   .getForEntity(baseUrl + AIRPORT + "/" + AIRPORTS,
                 Airport[].class)
   .getBody();
```

See flights-microservices/-/blob/master/src/main/java/server/flight/FlightService.java

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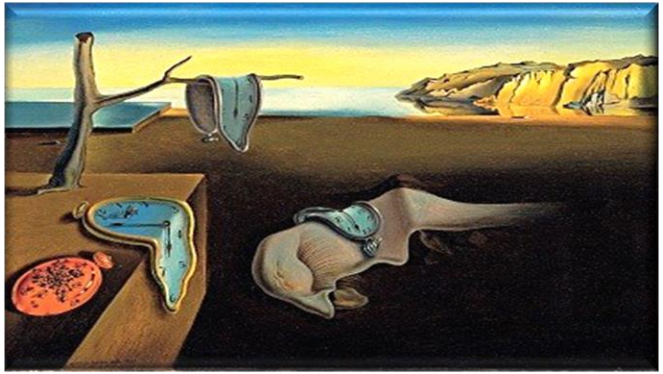

```
Airport[] airports = restTemplate
   .getForEntity(baseUrl + AIRPORT + "/" + AIRPORTS,
                                 Airport[].class)
   .getBody();
```

RestTemplate treats reactive types synchronously from the perspective of a client

However, no changes are required on the (reactive) server side

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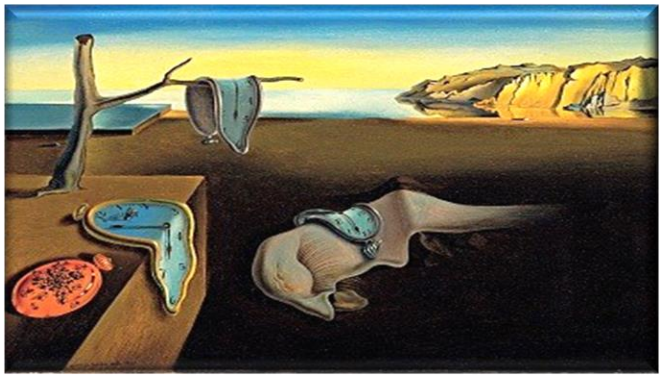

```
Airport[] airports = restTemplate
   .getForEntity(baseUrl + AIRPORT + "/" + AIRPORTS,
                                 Airport[].class)
   .getBody();

Flux<Airports> Flux.fromIterable
  (airports != null ? List.of(airports): Collections.emptyList());
```

Easy to convert back to reactive types

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   .get()
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         + "/" + AIRPORTS)
   .retrieve()
   .bodyToFlux(Airport.class);
```

WebClient leverages reactive types more effectively since responses are emitted as soon as they are available

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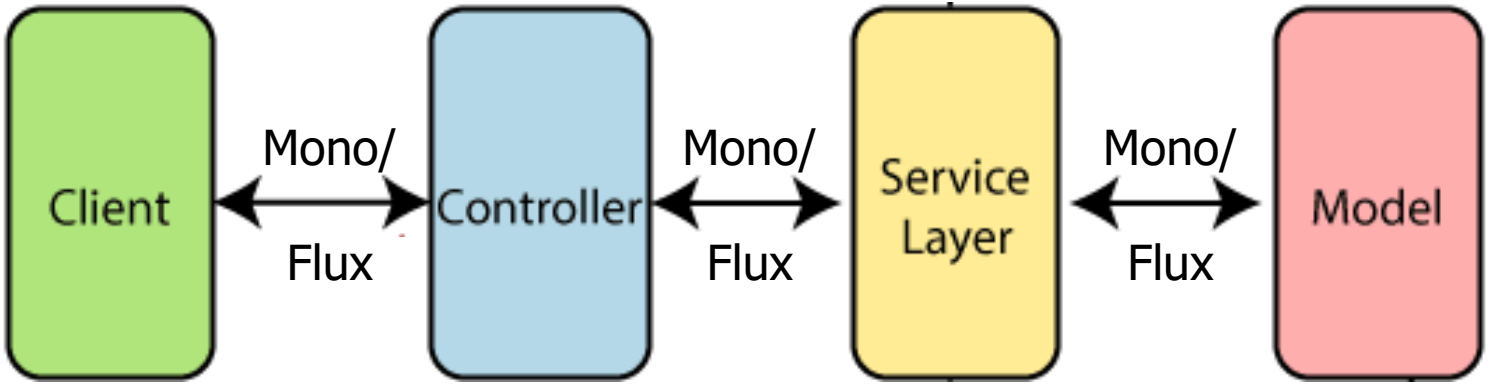
```

WebClient also enables end-to-end asynchrony



An HTTP request is not sent until subscribe() is called (& runs in thread pool)

Accessing Mono & Flux Endpoints Seamlessly

- WebFlux Mono/Flux endpoints exchange HTTP requests/responses
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  - JSon encoding/decoding is identical for reactive WebFlux Mono/Flux types or traditional WebMVC RefTypes/List types

```
GET flighthost:8081/airports

[
  {
    "airportCode": "ALB",
    "airportName": "Albany, NY"
  },
  {
    "airportCode": "AMA",
    "airportName": "Amarillo, TX"
  },
  {
    "airportCode": "ATL",
    "airportName": "Atlanta, GA"
  }, ...
```

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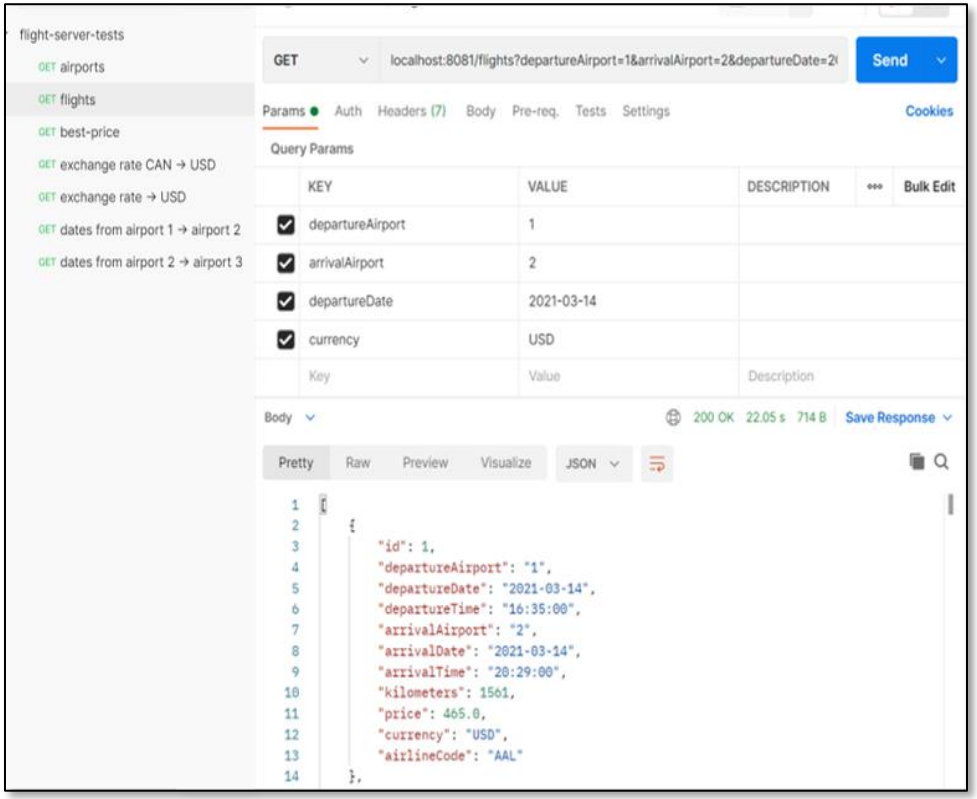
  - JSon encoding/decoding is identical for reactive WebFlux Mono/Flux types or traditional WebMVC RefTypes/List types
    - Tools like Postman can thus work seamlessly with either



See www.postman.com

End of Overview of Spring WebMVC & WebFlux