The PrimeCheck App Case Study: Client Structure & Functionality

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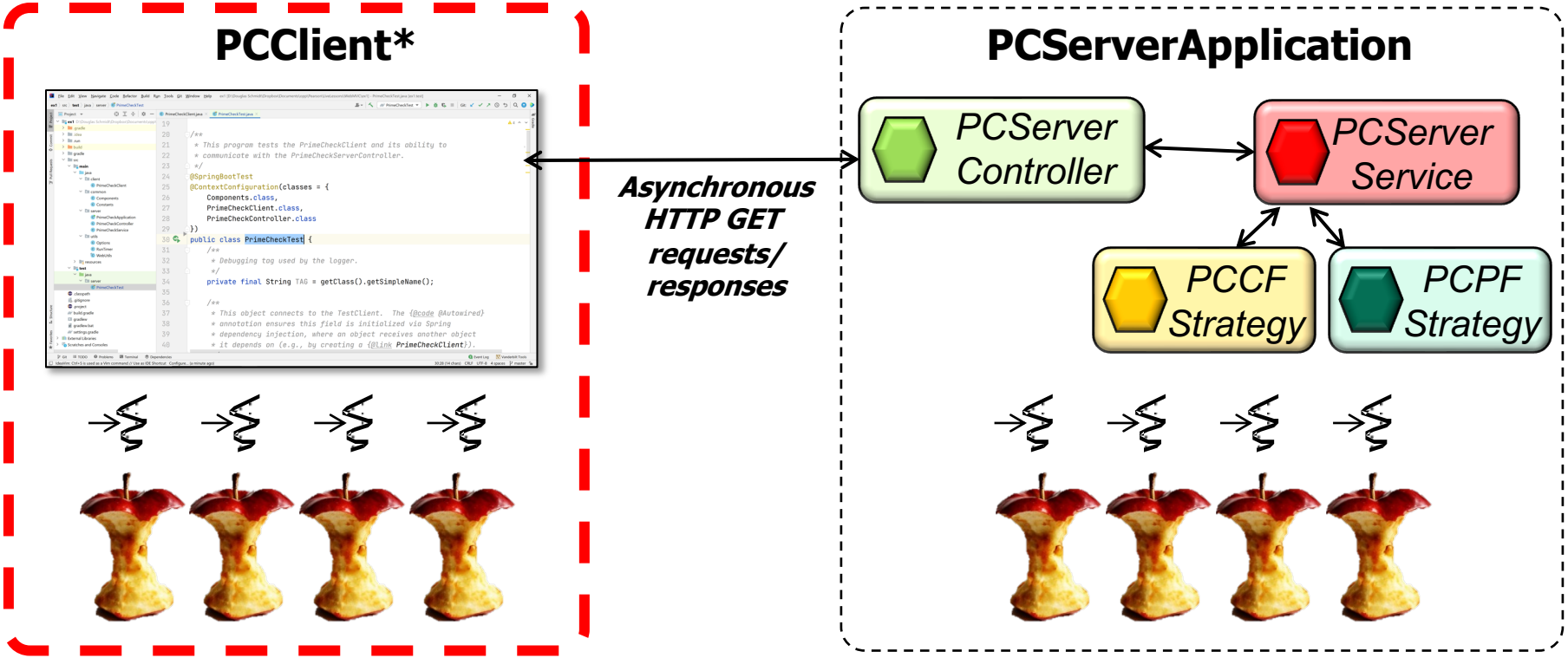
Learning Objectives in this Part of the Lesson

- Understand the structure & functionality of PCClient* classes that send/receive HTTP GET requests/responses to/from the PCServerApplication microservice



See github.com/douglascraigschmidt/LiveLessons/tree/master/WebFlux/ex2

The Structure & Functionality of PCClient* Classes

The Structure & Functionality of PCClient* Classes

- The PCClient* classes performs asynchronous remote method invocations on the PCServerController to determine the primality of large integers

```
@Component
public class PCClientParallelFlux
  @Autowired PCProxyAPI mPCProxy;

  public Flux<Integer> testIndividualCalls
    (Flux<Integer> primeCandidates) {...}

  public Flux<Integer> testFluxCall
    (Flux<Integer> primeCandidates) {...}
}
```

See WebFlux/ex2/src/main/java/client/PCClientParallelFlux.java

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This annotation enables the auto-detection & wiring of dependent implementation classes via classpath scanning

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```

See www.baeldung.com/spring-component-repository-service

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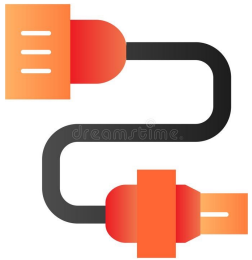

This field is auto-wired by Spring's dependency injection framework

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See www.baeldung.com/spring-autowire

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}
```

Sends individual HTTP GET requests to the server

The Structure & Functionality of PCClient* Classes

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```
Flux<Integer> testIndividualCalls(Flux<Integer> primeCandidates)
{
  return primeCandidates
    .parallel()

    .runOn(Schedulers.boundedElastic())

    .map(primeCandidate -> mPCProxy
         .checkIfPrime(PARALLEL_FLUX,
                       primeCandidate))

    .sequential();
}
```

Use a ParallelFlux to make all the calls in parallel

Parallelism is performed by the client rather than by the server

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    .sequential();
}
```

Use the BoundedElastic Scheduler since these calls go over the network

See projectreactor.io/docs/core/release/api/reactor/core/scheduler/Schedulers.html#boundedElastic

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Flux<Integer> testIndividualCalls(Flux<Integer> primeCandidates)
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  return primeCandidates
    .parallel()

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    .map(primeCandidate -> mPCProxy
         .checkIfPrime(PARALLEL_FLUX,
                       primeCandidate))

    .sequential();
}
```

Perform a remote method invocation via a proxy

The Structure & Functionality of PCClient* Classes

- The PCClient* classes performs asynchronous remote method invocations on the PCServerController to determine the primality of large integers

Sends a Flux of Integer objects in a single HTTP POST request to server

```
@Component
public class PCClientParallelFlux
  @Autowired PCProxy mPCProxy;

  public Flux<Integer> testIndividualCalls
    (Flux<Integer> primeCandidates,
     boolean parallel) {...}

  public Flux<Integer> testFluxCall
    (Flux<Integer> primeCandidates) {...}
}
```

The Structure & Functionality of PCClient* Classes

- The PCClient* classes performs asynchronous remote method invocations on the PCServerController to determine the primality of large integers

```
Flux<Integer> testFluxCalls(Flux<Integer> primeCandidates) {

  return mPCProxy
    .checkIfPrimeFlux(PARALLEL_FLUX,
                      primeCandidates);
}
```

Perform a remote method invocation via a proxy

Any requested parallelism is performed by the server rather than by the client

The Structure & Functionality of the PCProxyAPI Interface

The Structure & Functionality of the PCProxyAPI Interface

- PCProxyAPI uses the declarative HTTP interface features in Spring 6 to abstract low-level details of remote method invocations using HTTP

```
public interface PCProxyAPI {
  @GetExchange(CHECK_IF_PRIME)
  Integer checkIfPrime(@RequestParam Integer strategy,
                       @RequestParam Integer primeCandidate);

  @PostExchange(value = CHECK_IF_PRIME_FLUX,
                contentType = APPLICATION_NDJSON_VALUE)
  Flux<Integer> checkIfPrimeFlux
                  (@RequestParam Integer strategy,
                   @RequestBody Flux<Integer> primeCandidates);
```

See WebFlux/ex2/src/main/java/client/PCProxy.java

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                   (@RequestParam Integer strategy,
                    @RequestBody Flux<Integer> primeCandidates);
```

These proxy methods shield clients from low-level HTTP programming details

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```

These annotations generate HTTP GET & POST requests

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                    @RequestBody Flux<Integer> primeCandidates);
```

These path variables route the GET & POST requests to the appropriate endpoint handles

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   Flux<Integer> checkIfPrimeFlux
                   (@RequestParam Integer strategy,
                    @RequestBody Flux<Integer> primeCandidates);
```

This value enables passing Flux as a param

See org/springframework/web/service/annotation/PostExchange.html

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   Flux<Integer> checkIfPrimeFlux
                   (@RequestParam Integer strategy,
                    @RequestBody Flux<Integer> primeCandidates);
```

These annotations enable passing params via HTTP GET & POST requests

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   Flux<Integer> checkIfPrimeFlux
                   (@RequestParam Integer strategy,
                    @RequestBody Flux<Integer> primeCandidates);
```

This proxy method returns a Flux that emits Integer results

End of the PrimeCheck App Case Study: Structure & Functionality of the Client