BE REACTIVE AND MICRO WITH A MICROPROFILE STACK

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- open-source specification for Java microservices (microprofile.io)

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GOALS TO SOLVE

- Better user experience

- save resources/costs

- keep up with massive loads
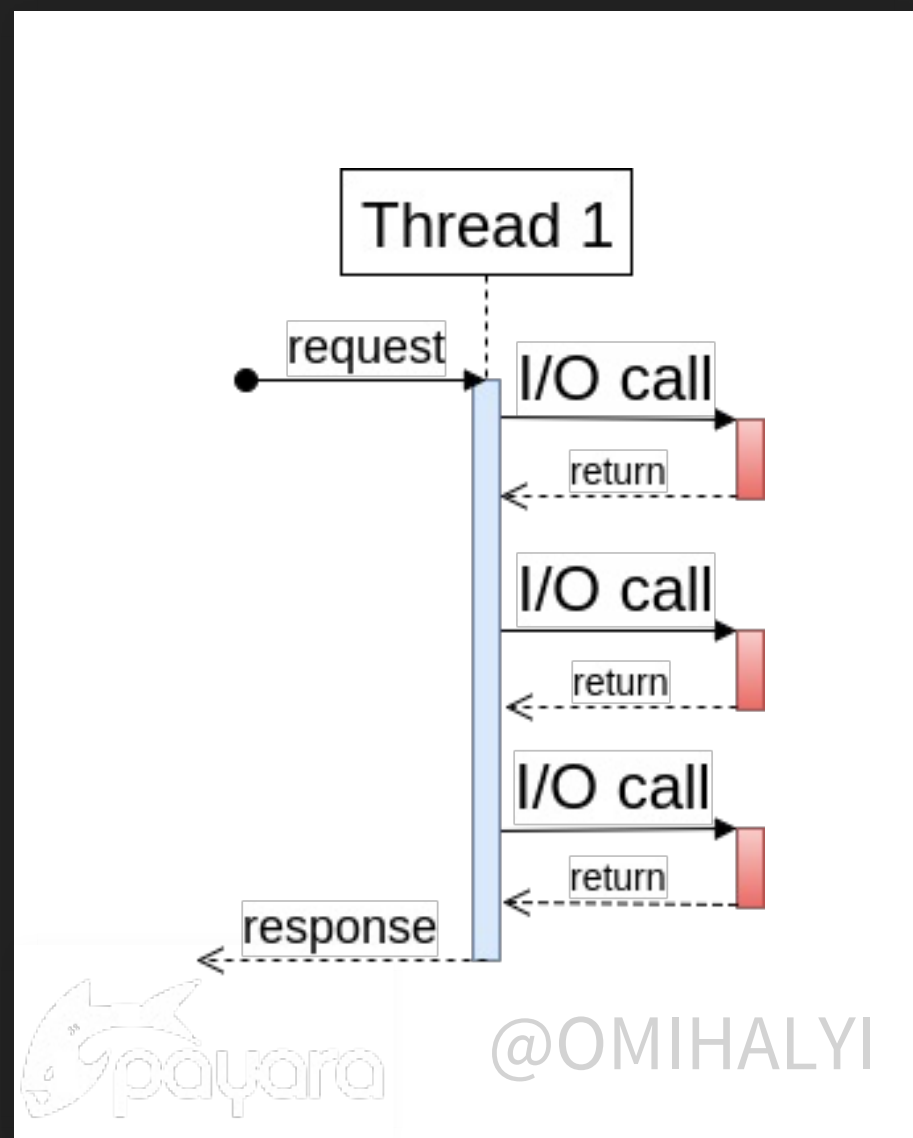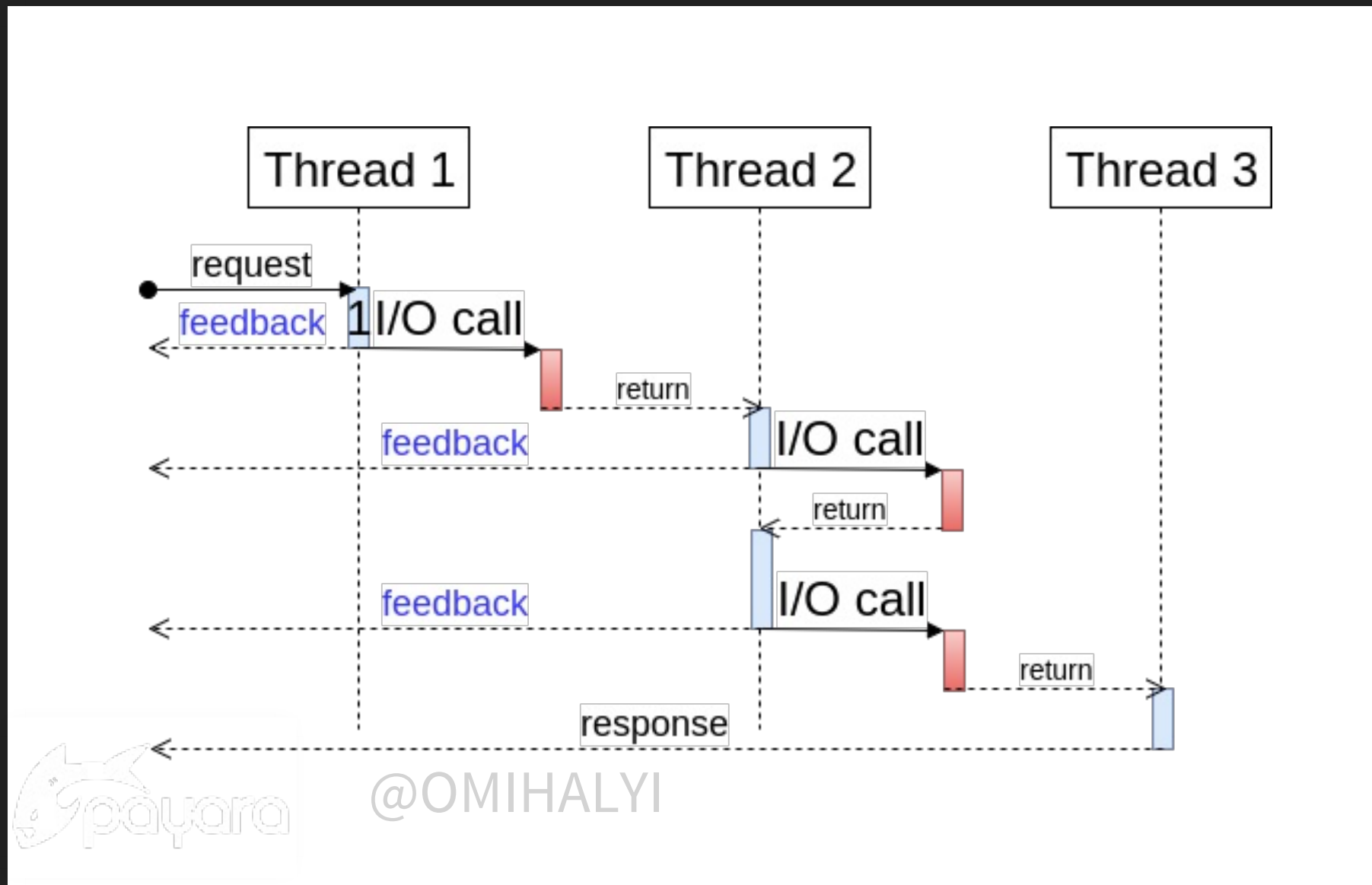
- *handle/recover from **FAILURES***

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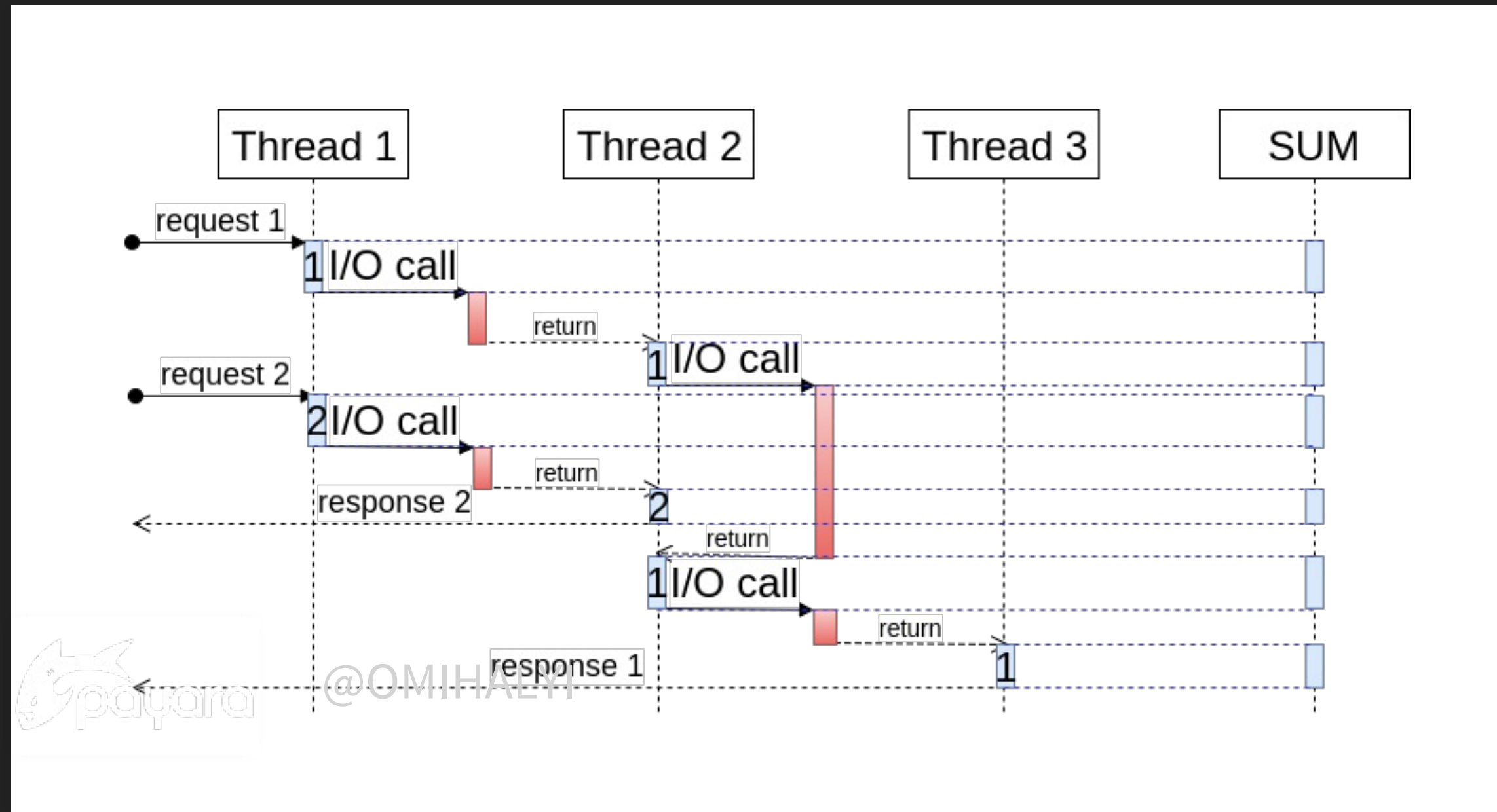
REACTIVE IN A NUTSHELL

Traditional - single thread

REACTIVE IN A NUTSHELL

Reactive - not bound to a thread

Reactive - not bound to a thread

REACTIVE PIPELINE

→ incoming request

→ subscribe

→ process

→ publish (data/error)

REACTIVE SUPPORT IN MICROPROFILE 2.0

- Reactive REST & SSE (JAX-RS)

- Async CDI events

- Monitoring via Metrics

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JAX-RS

```java
@GET
void getValue(@Suspended AsyncResponse response)
{
    initClient()
            .request()
            .rx(RxFlowableInvoker.class)
            .get(String.class)
            .doOnNext(rate -> {
                response.resume(rate);
            })
            .doOnError(e -> {
                response.resume(e);
            })
            .subscribe();
}
```

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HOW MICROPROFILE FITS THE PIPELINE

- **REACTIVE JAX-RS**
  - *subscribe* to REST requests and responses
  - *publish* REST responses
- **SERVER-SENT EVENTS** (JAX-RS) - *publish* via HTTP
- **ASYNC CDI EVENTS** - *publish* to other components
- **MONITORING** via Metrics - *publish* metrics to external systems

WHAT'S MISSING?

- **PROCESSING** streams of messages
  - connect suscribers to publishers
- **PUBLISH** and **SUBSRIBE** to message queues/topics
  - connect decoupled publishers to subscribers

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MORE TO COME IN MICROPROFILE

- **PROCESSING** streams of messages

  - Reactive operators - release candidate

- **PUBLISH** and **SUBSRIBE** to message queues/topics

  - Reactive Messaging - draft API

- Bonus:

  - Asynch. Fault Tolerance interceptors

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- Message-Driven Beans
  - via Kafka JCA connector
  - **PUBLISH** and **SUBSRIBE** to message queues/topics

WE'LL FILL WHAT'S MISSING

- RxJava (Reactive Streams)
  - **PROCESSING** streams of messages
  - asynchronous Fault Tolerance
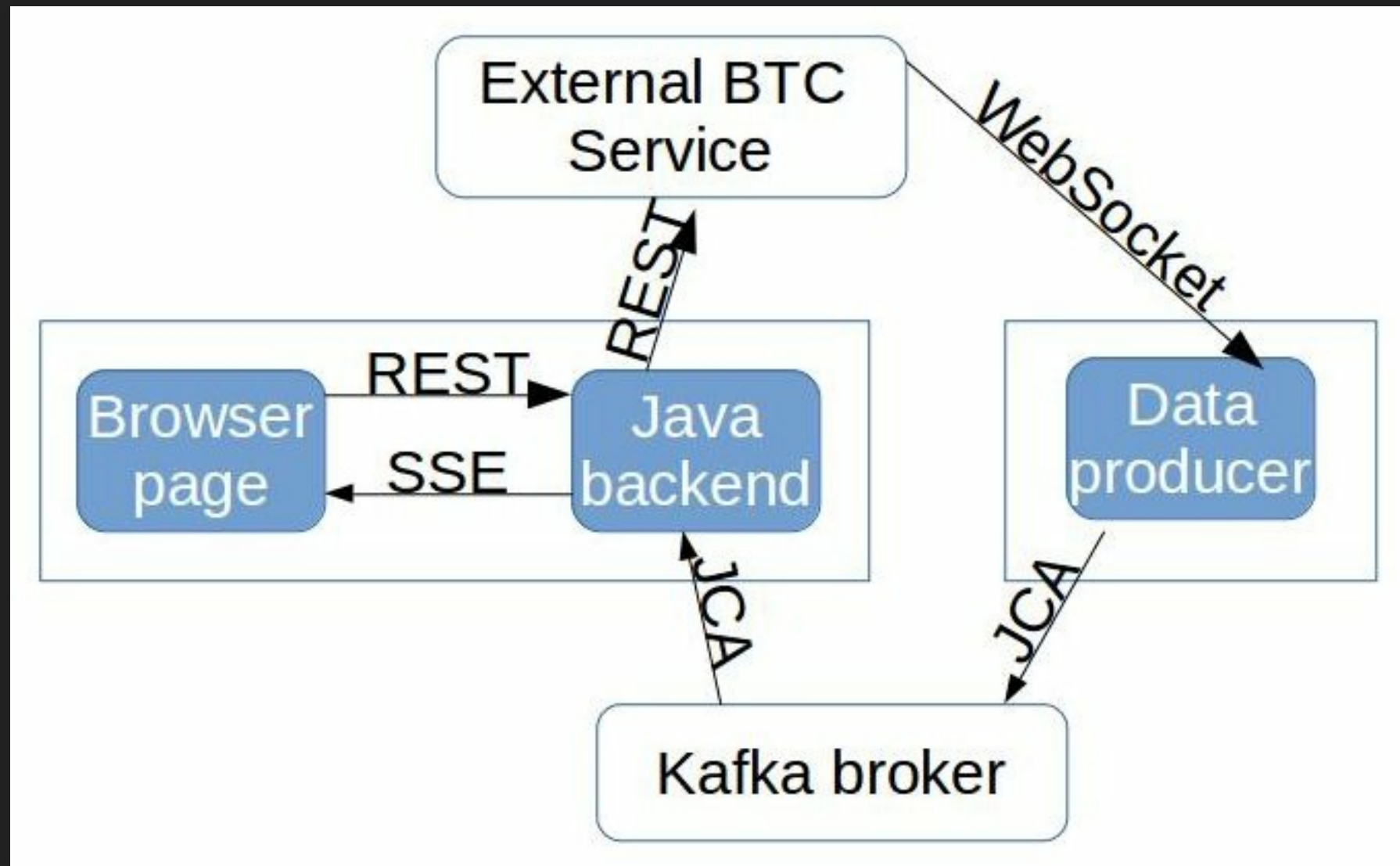- React.js
  - turn message stream into UI update

AND RUN WITH PAYARA MICRO

- **JAVA EE** and **MICROPROFILE** together
- executable JAR, <70 MB
- easy to run apps with no installation
  - command line, maven plugin
- build uber JAR
- https://payara.fish

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OUR DEMO APPLICATION

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DEMO

Source: https://github.com/OndrejM-demonstrations/Reactive-and-Micro-with-MicroProfile-and-Payara

FURTHER RESOURCES

- JCA Cloud Connectors: https://github.com/payara/Cloud-Connectors

- MicroProfile Reactive Operators: https://github.com/eclipse/microprofile-reactive-streams

THANK YOU!

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- Working for Payara

- MicroProfile project member

- Eclipse Foundation and JCP member

- Czech JUG leader