Reactive Streams

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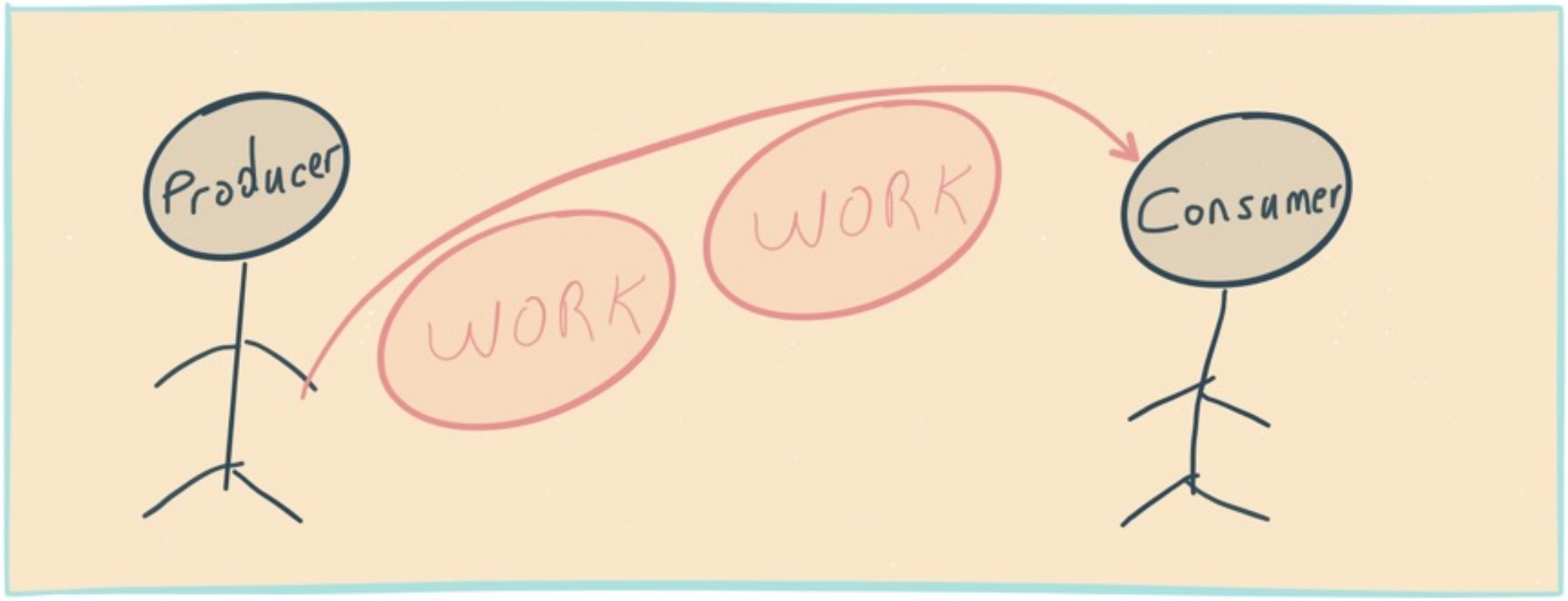
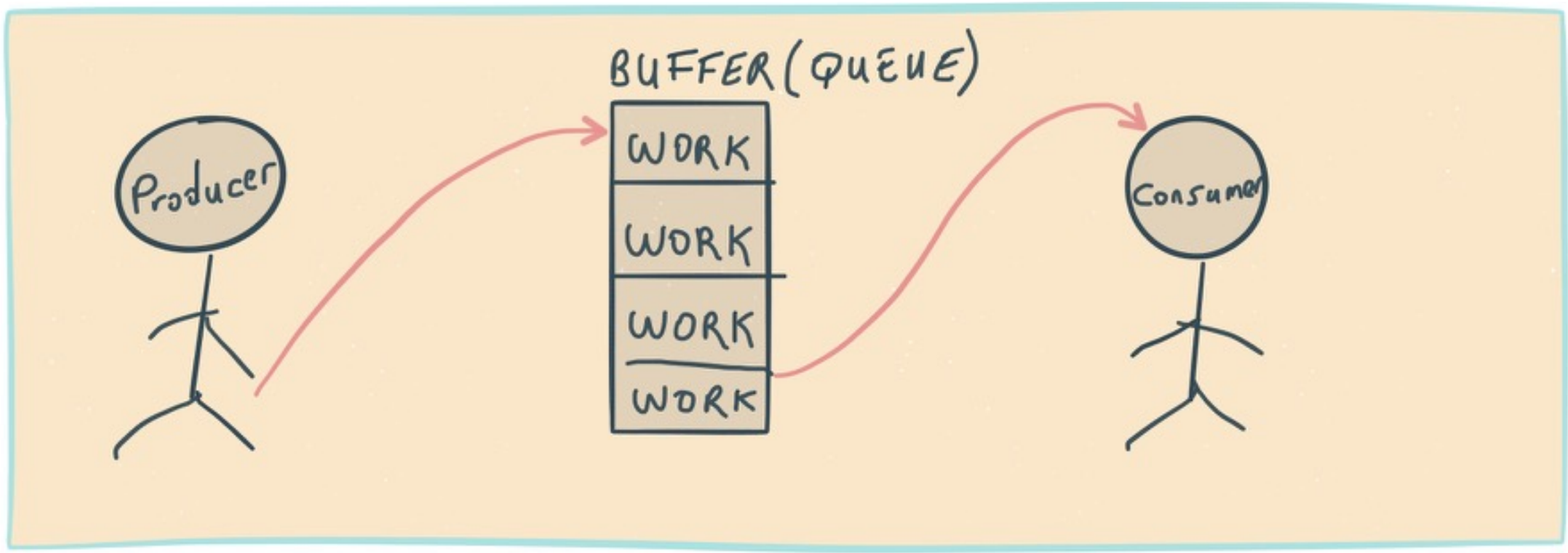
Producer-Consumer Pattern



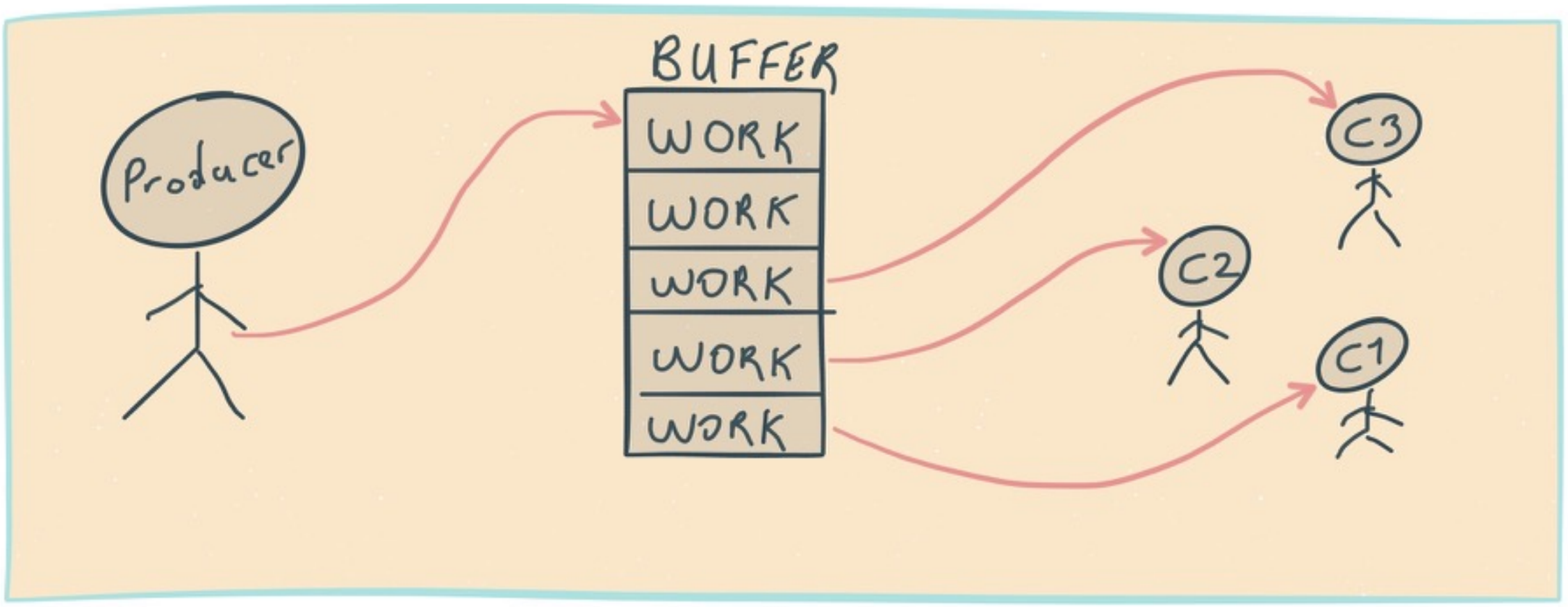
- Separate work and executor
- Readable / Maintainable

Linked By a Queue



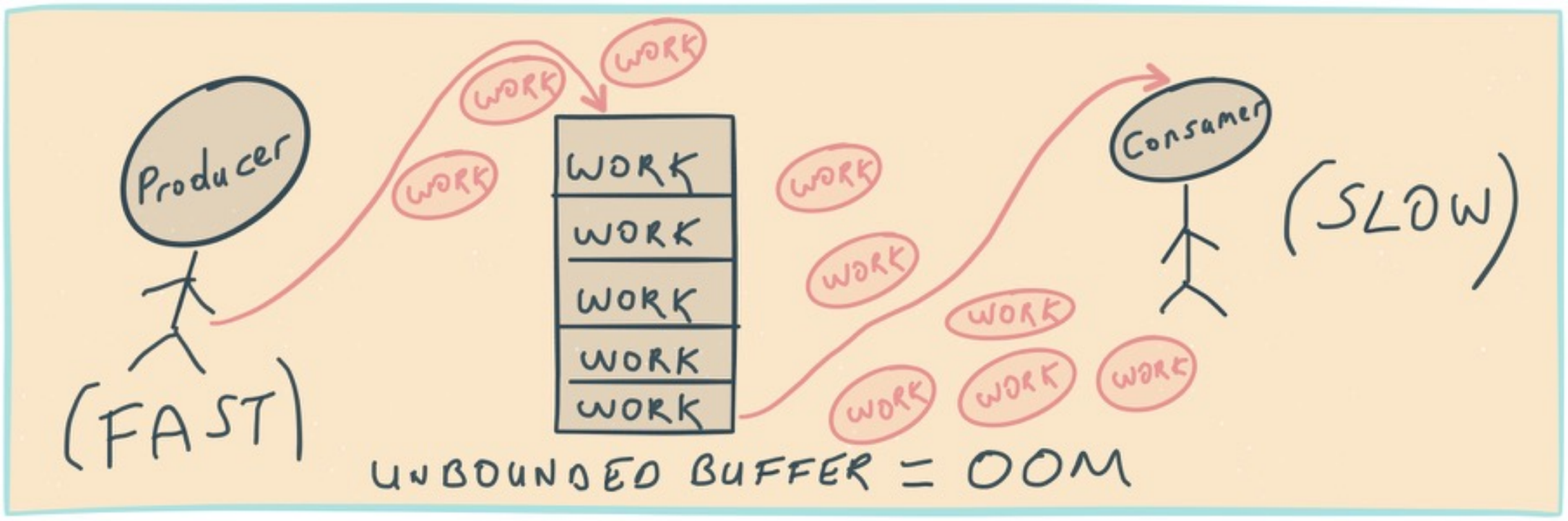
- Decoupled architecture
- Producer places work into the buffer
- Consumer takes work from the buffer

Multiple Producers/Consumers



- Enabled by decoupled architecture

Problem



- Unbounded buffer = Out Of Memory
- Bounded buffer = Dropping messages

Solution

BACK-PRESSURE

Streams

What is a stream?

A stream is like a river of data. If you are late, you may miss initial elements.

Stream examples

- Real-time data sources
- Monitoring and analytics
- Bulk data transfer
- Batch processing of large data

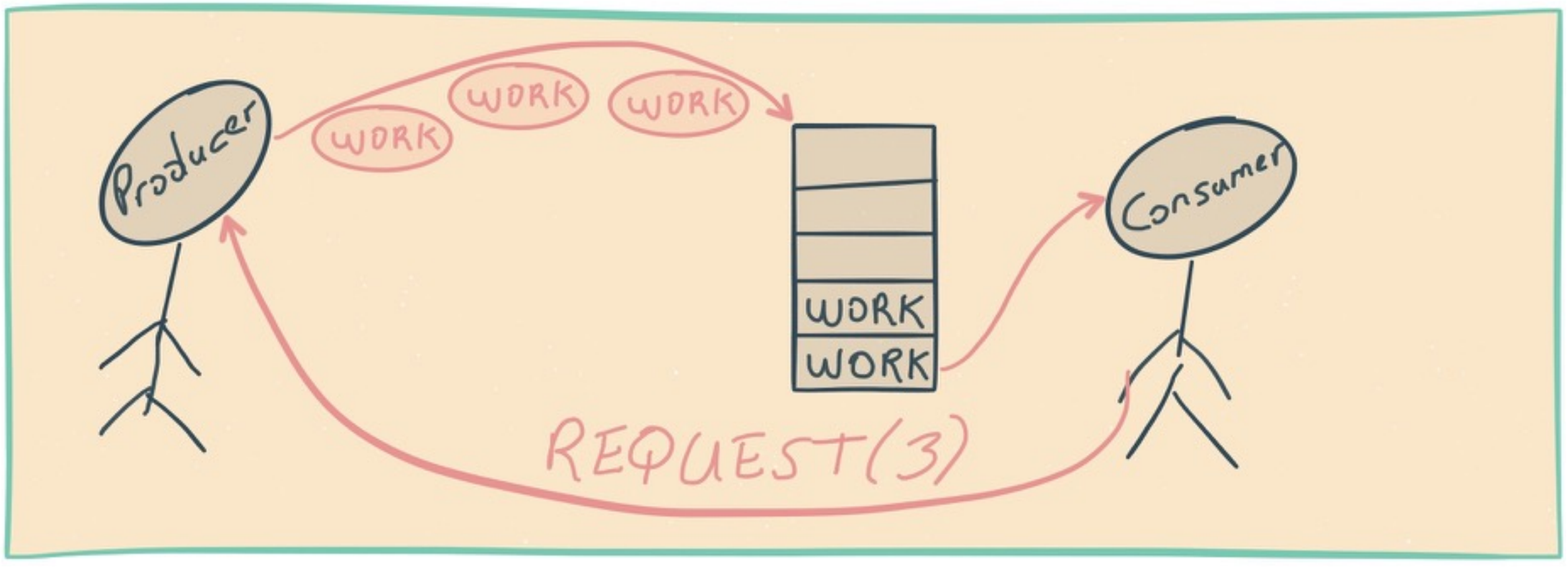
Reactive Streams

- Stream processing
- Back-pressured
- Asynchronous
- Standardised

Engineers from:

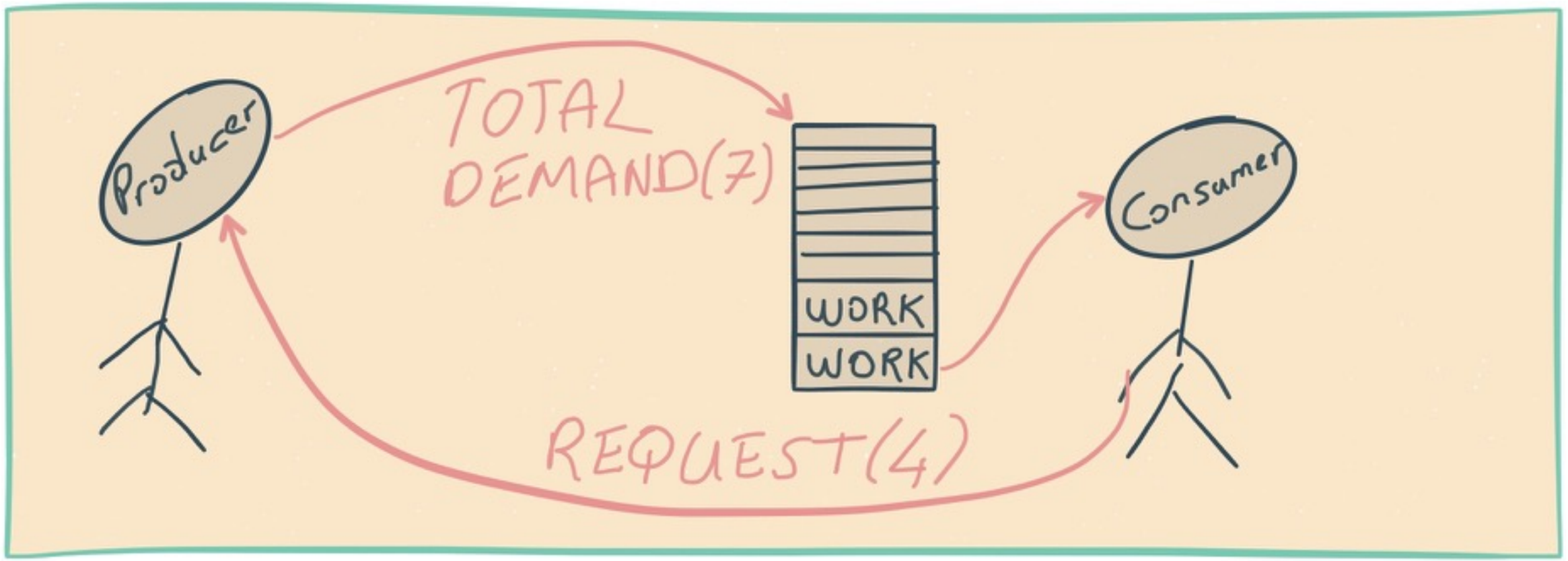
- Netflix
- Oracle
- Pivotal
- Red Hat
- Twitter
- Typesafe (Lightbend)

Pull-based Back-pressure



Fast producer will send at-most 3 elements.

Accumulated requests



Producer accumulates total demand.

Specification

```
public interface Publisher<T> {
    public void subscribe(Subscriber<? super T> s);
}

public interface Subscriber<T> {
    public void onSubscribe(Subscription s);
    public void onNext(T t);
    public void onError(Throwable t);
    public void onComplete();
}

public interface Subscription {
    public void request(long n);
    public void cancel();
}
```

Akka Streams

```
// Obtain reference to the collection "source" using database
val source = db("source")

// Obtain reference to the collection "destination" using database
val destination = db("destination")

val src = source.find(BsonDocument.empty)
  .mapConcat(identity)
  .groupedWithin(1000, 10 millis) // Mongo batch insert has a maximum of 1000 items
  .map(_.toList)

destination.insertFromSource(src).runForeach(is => println(s"insert result: $is"))
```

Tepkin (Reactive MongoDB client) supports Akka Streams

Thanks

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