

Reactive - land of confusion

Piotr Kafel (@PiotrKafel)

Confusion!



Hadi Hariri
@hhariri

Following



So if it wasn't bad enough calling HTML a programming language, now we're calling ReactJS one too.

RETWEETS

14

LIKES

44



2:51 AM - 29 Apr 2017

What are we going to talk about

- Reactive systems
- Reactive programming
- Reactive streams



What are we NOT going to talk about

- Reactive functional programming
- Reactive developers



Reactive Systems

Statistics

2008

2017

Facebook

100 millions



1,9 billion users

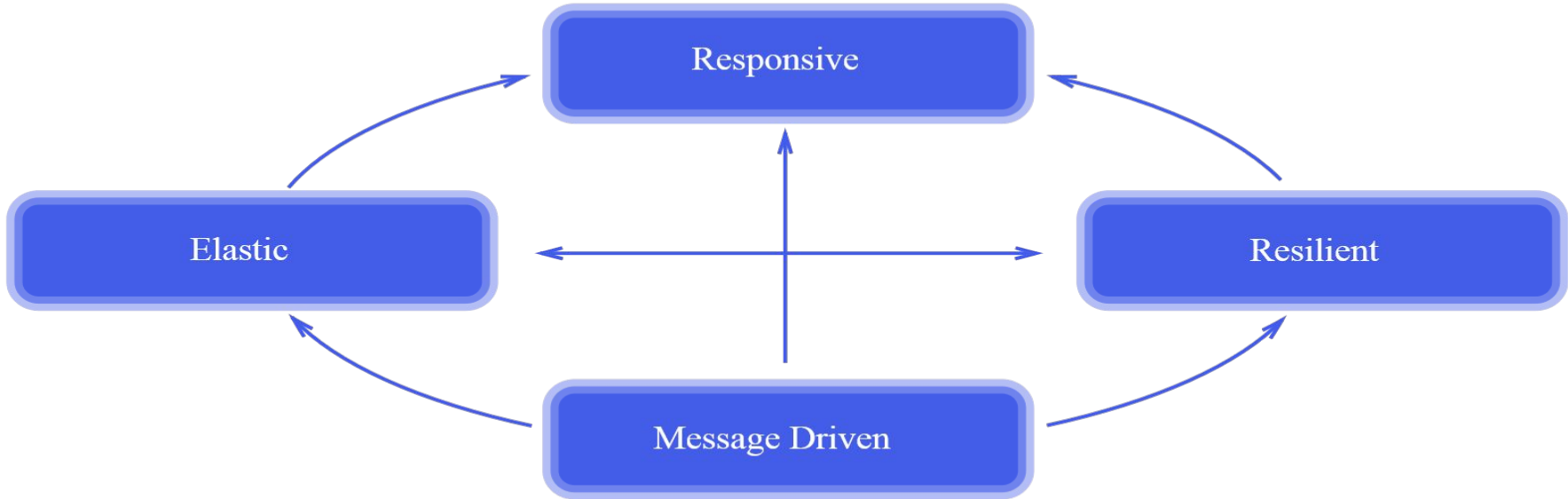
Internet

1,5 billion



3,7 billion users

Reactive Manifesto



Message Driven

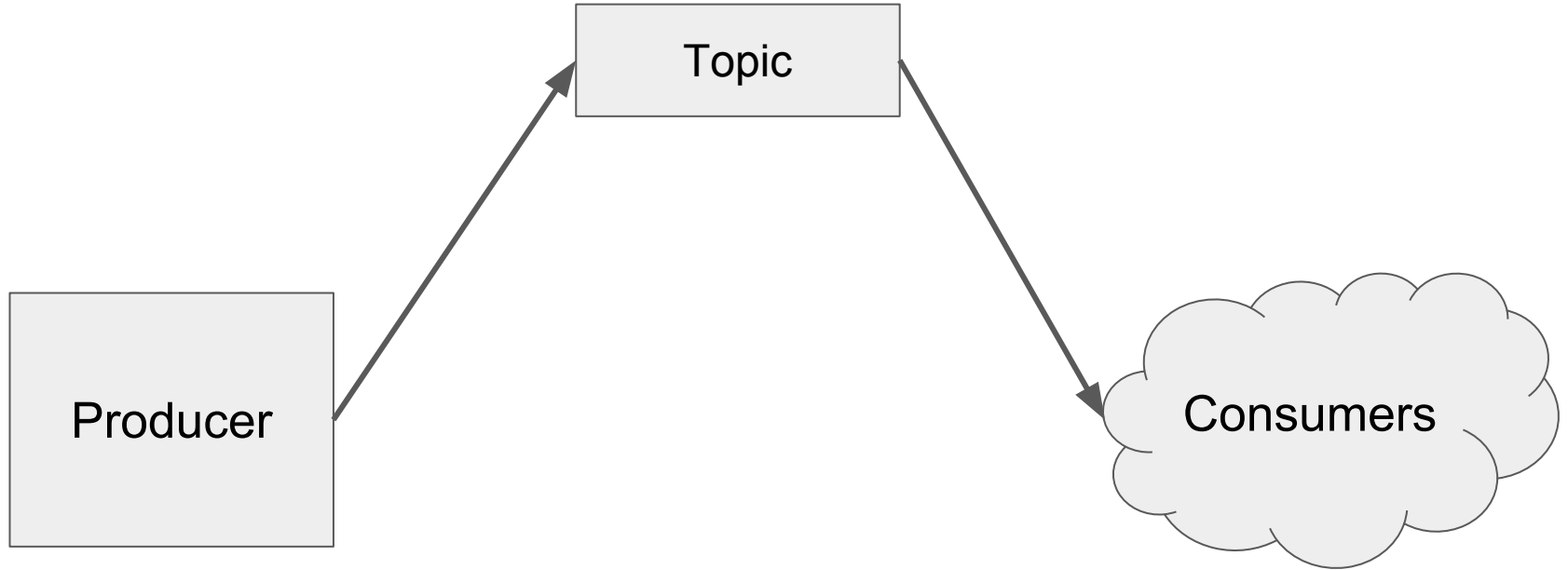
“Reactive Systems rely on **asynchronous message-passing** to establish a boundary between components that ensures loose coupling, isolation and **location transparency**.”



Asynchronous vs synchronous

Non blocking vs blocking

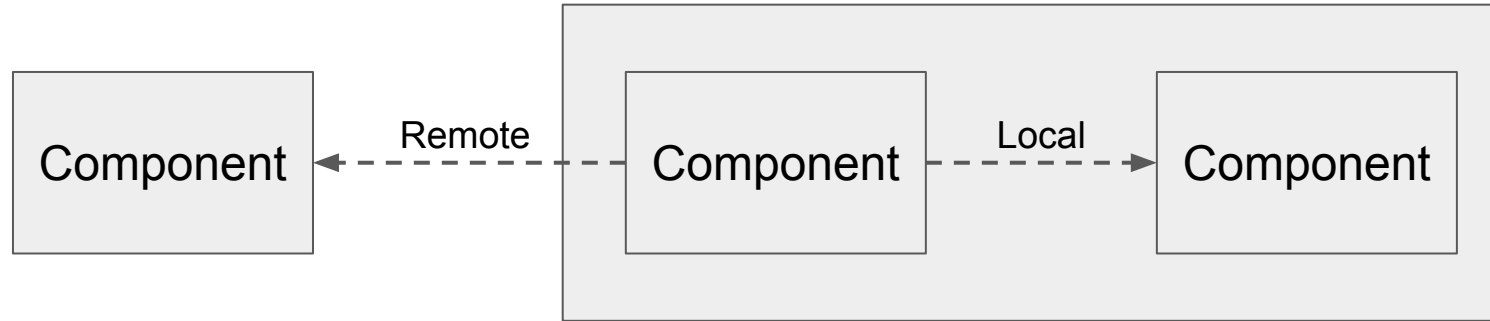
Event vs Message



Event vs Message



Location transparency



Elastic

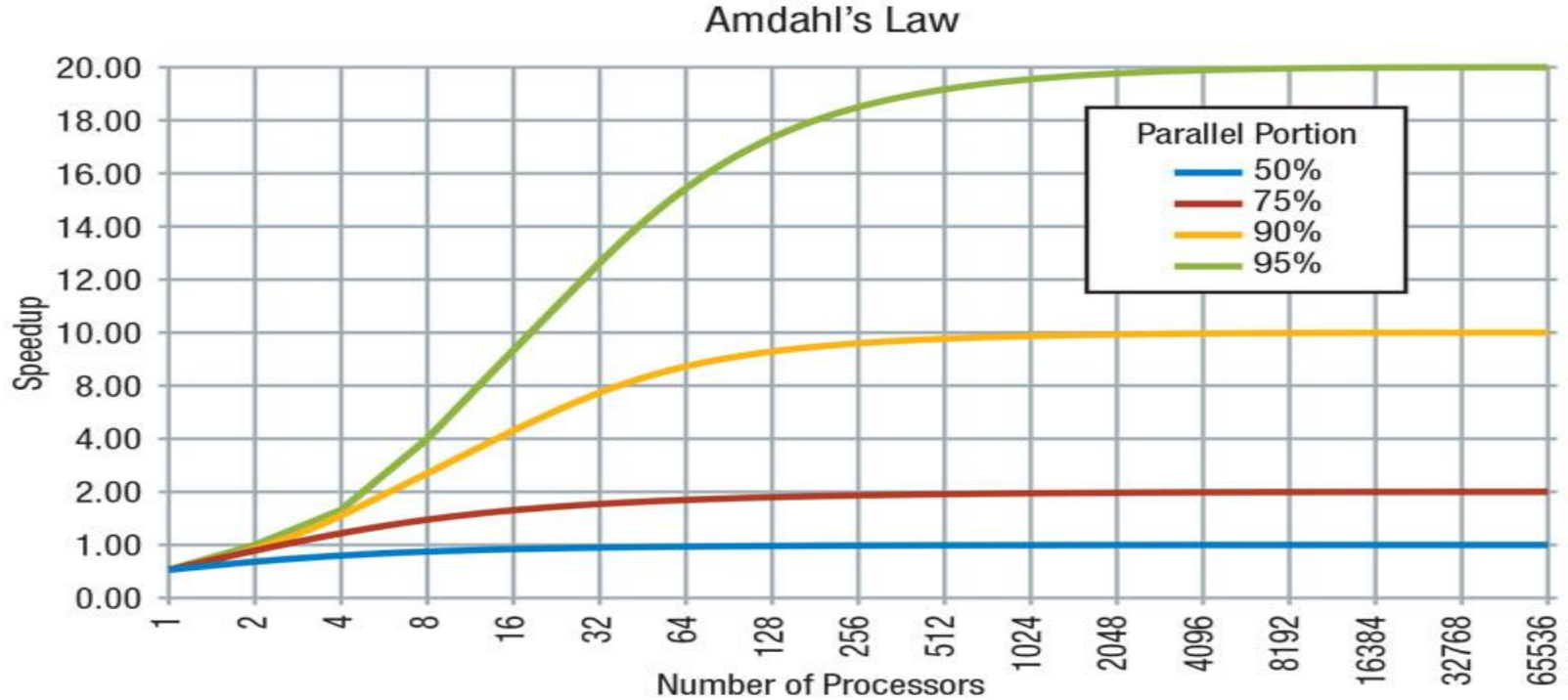


Amdahl Law

$S(n) = N / (1 + \alpha (N - 1))$ where

- N is number of available threads
- α is the fraction of the program that is serialized

Amdahl Law

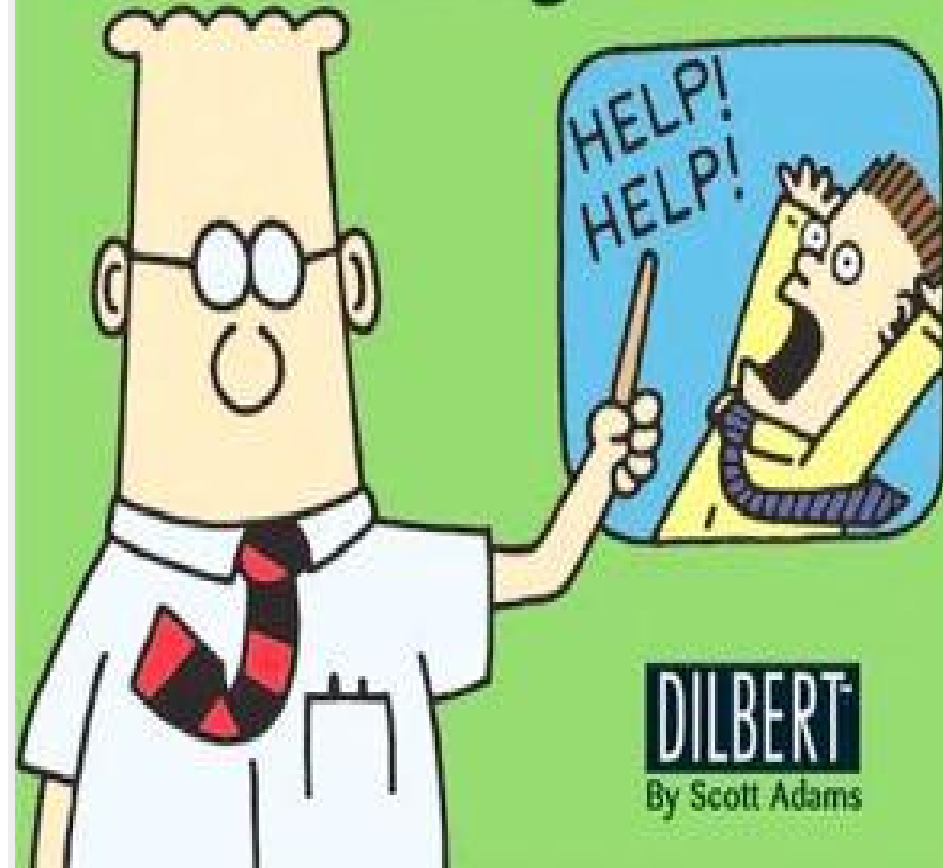


Tools



Resilient

**Our Disaster Recovery Plan
Goes Something Like This...**



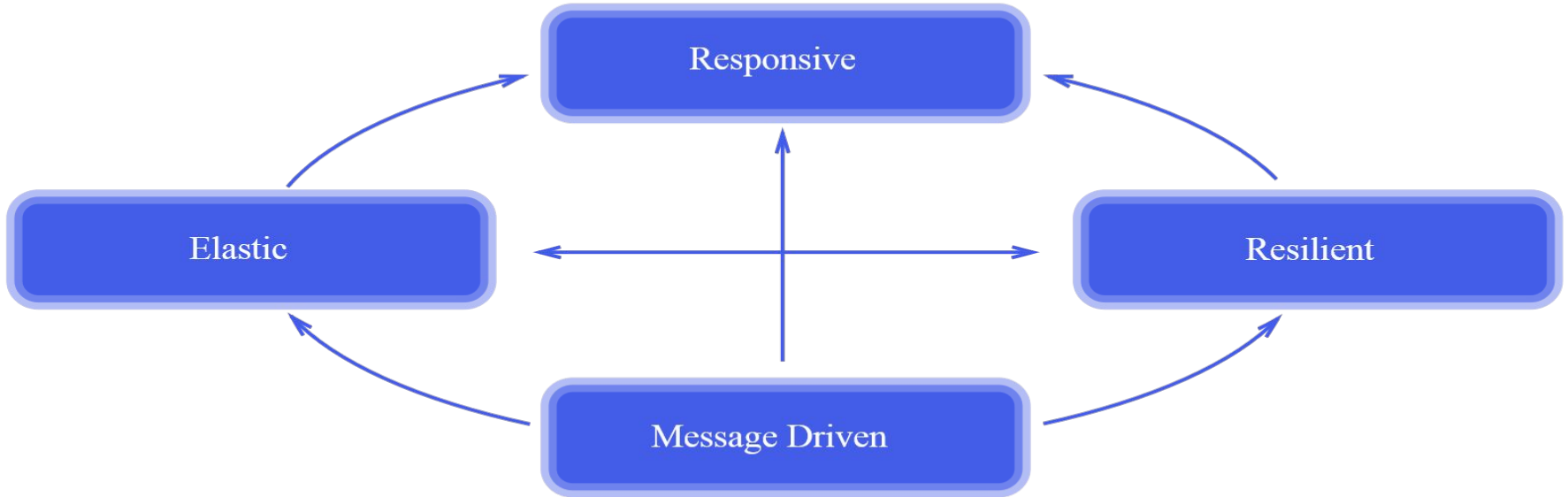
DILBERT
By Scott Adams

Replication, isolation and delegation

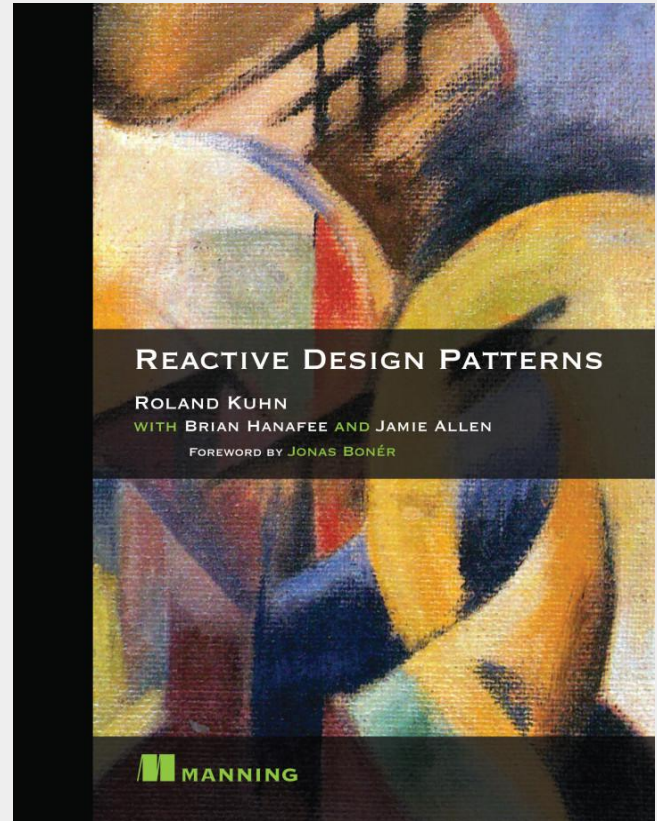
Tools



Lets wrap it up



In order to get
more
information





Piotr Kafel @PiotrKafel · Apr 21

I dont know when parents should start reading #books to children but my 2 weeks old really enjoys "Fables for Robots" by Stanislaw Lem



1



1



1



Piotr Kafel @PiotrKafel · Apr 21

To make it clear - he likes this particular book. I tried to read him Reactive Design Patterns (@rolandkuhn) but it didnt work out... 😂



2



3



Roland Kuhn

@rolandkuhn

Follow

Replying to @PiotrKafel

Just wait until he starts building distributed systems ;-)

Reactive programming

“Reactive Programming is a subset of Asynchronous Programming and a paradigm where the availability of new information drives the logic forward rather than having control flow driven by a thread-of-execution.”

“Reactive Programming versus Reactive Systems” Jonas Bonér and Viktor Klang

Example

```
CompletableFuture<UserData> userDataFuture = // get somehow user data

userDataFuture.thenCompose(userData -> {
    CompletableFuture<UserContacts> contactsFuture = getContacts(userData);
    CompletableFuture<UserPreferences> preferencesFuture = getPreferences(userData);
    return contactsFuture.thenCombine(preferencesFuture,
        (contacts, preferences) -> new UserProfile(userData, contacts, preferences));
})
// more logic here...
```

Reactive streams

“Reactive Streams is an initiative to provide a standard for asynchronous stream processing with non-blocking back pressure.”

Interfaces

```
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();  
}
```

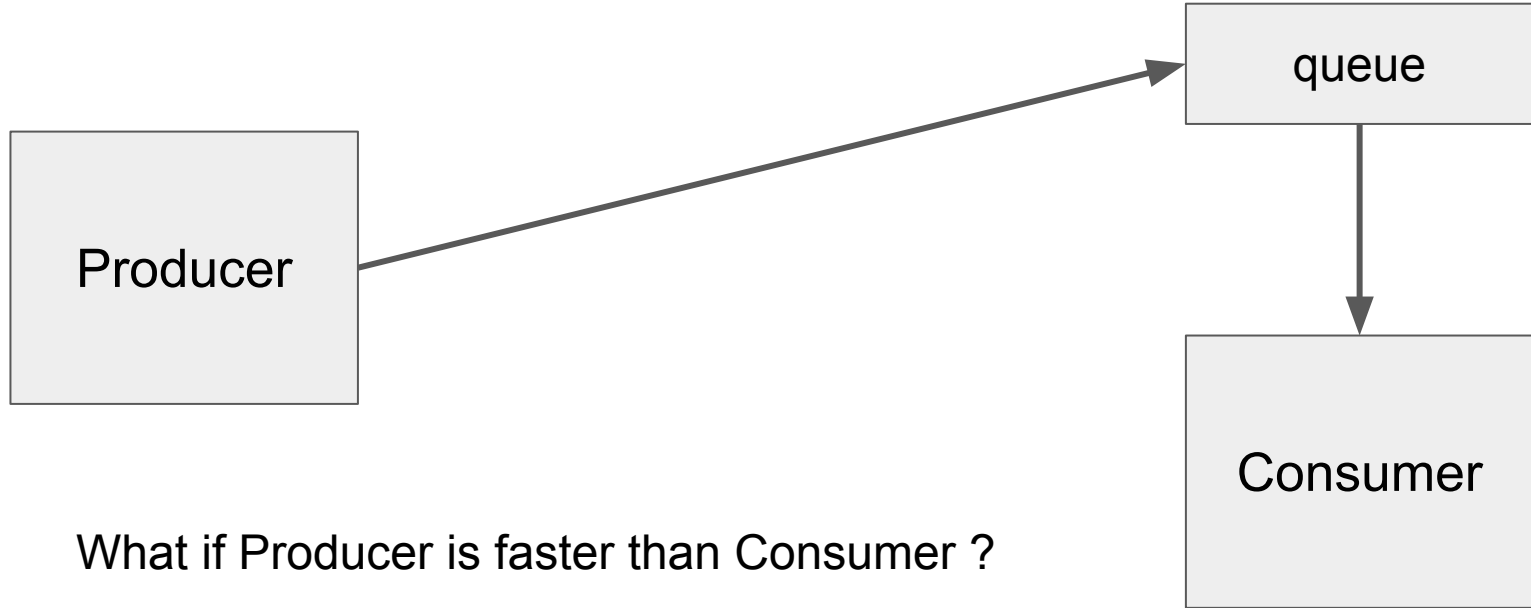
```
public interface Processor<T, R>  
    extends  
        Subscriber<T>, Publisher<R> {  
}
```

Implementations

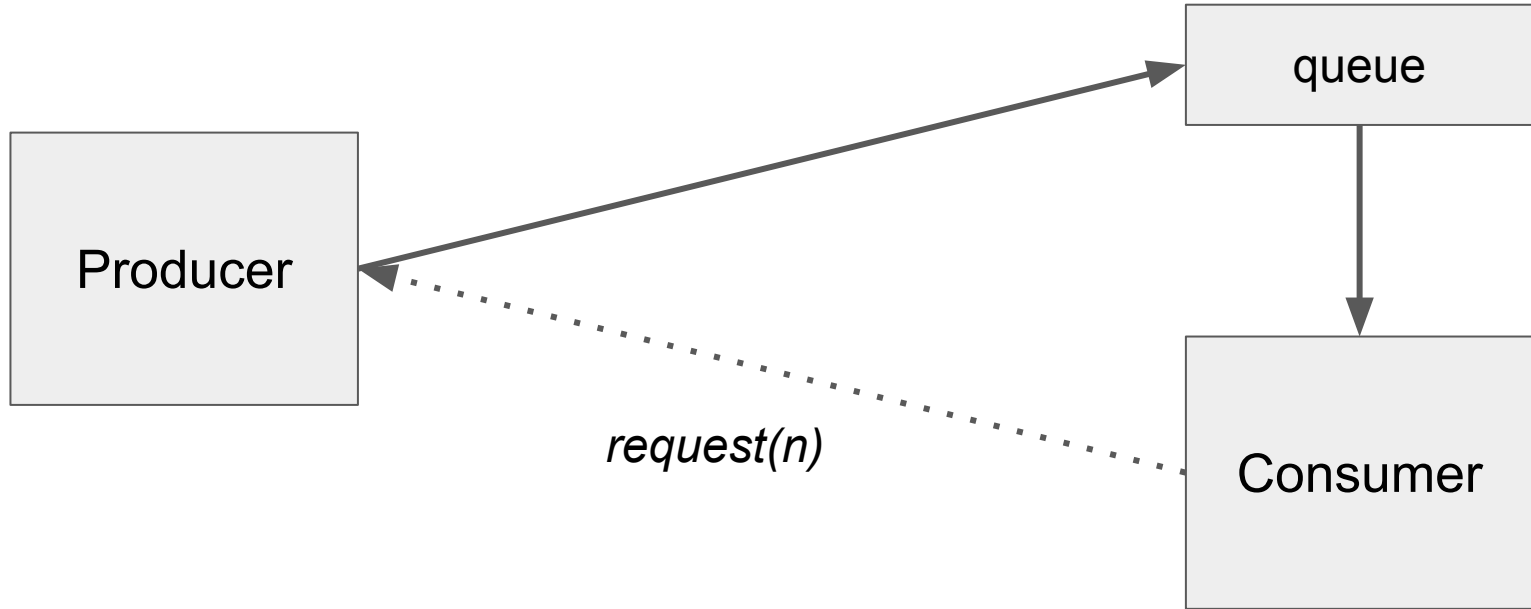


Backpressure

Backpressure



Backpressure



Can I use reactive streams to implement
reactive system ?

Summary

Thank you!

... and by the way...

We are hiring!



Resources

- http://cdn-01.media-brady.com/store/stuk/media/catalog/product/cache/3/image/85e4522595efc69f496374d01ef2bf13/1420520593/d/m/dme_u_jan2013_1_std.lang.all.png
- <http://www.reactivemanifesto.org/images/reactive-traits.svg>
- http://www.elyomnew.com/sites/default/files/styles/large/public/news/2015/01/07/unnamed_5.jpg?itok=lwHFS5N5
- <https://ae01.alicdn.com/kf/HTB1YbSPXXXXbBXXXXq6xXFXXO/Century-of-font-b-Toys-b-font-Metal-Slinky-font-b-Rainbow-b-font-font-b.jpg>
- <http://cdn2.hubspot.net/hubfs/208250/apachejmeter.jpg>
- <http://gatling.io/wp-content/uploads/2017/02/Gatling-logo.png>
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- <http://jonasboner.com/images/posts/reactive-design-patterns-book-cover.png>
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- <http://doc.akka.io/docs/akka/current/images/akka-icon.svg>
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