Functional Reactive Programming

Mastering Time

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What is FRP?

- Using functional programming constructs to handle streams of values over time.
- A way to handle asynchronicity.
- An elegant solution for infinite streams.

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Observable.timer(

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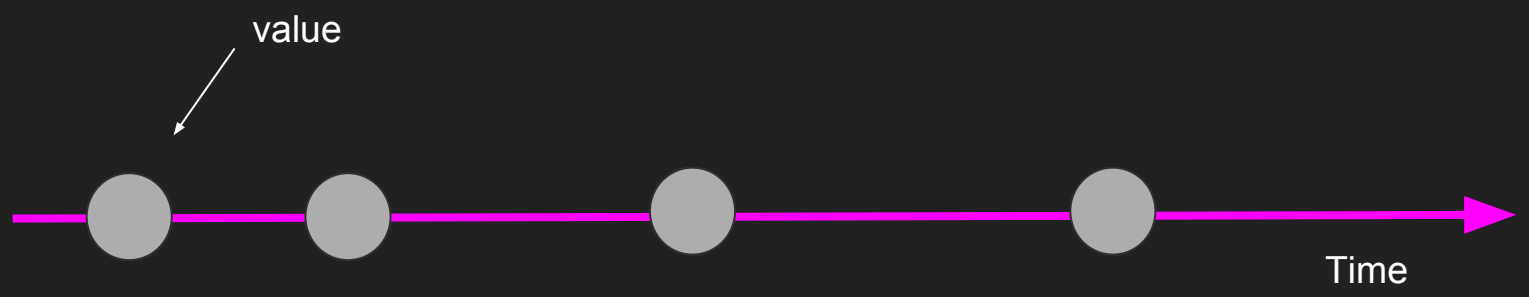
What’s a stream?



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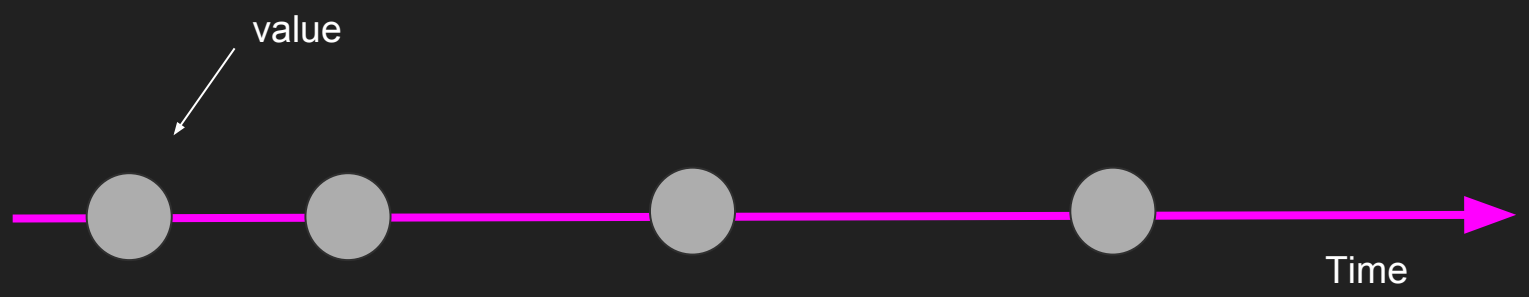

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Observable

- A way to handle stream of values that occur over time.
- Push-based
- Lazy
- Concurrency model agnostic (synchronous, asynchronous)
- A combination of **Observer** and **Iterator** patterns and functional programming

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Operators and Transformations

- map
- flatMap
- filter
- reduce

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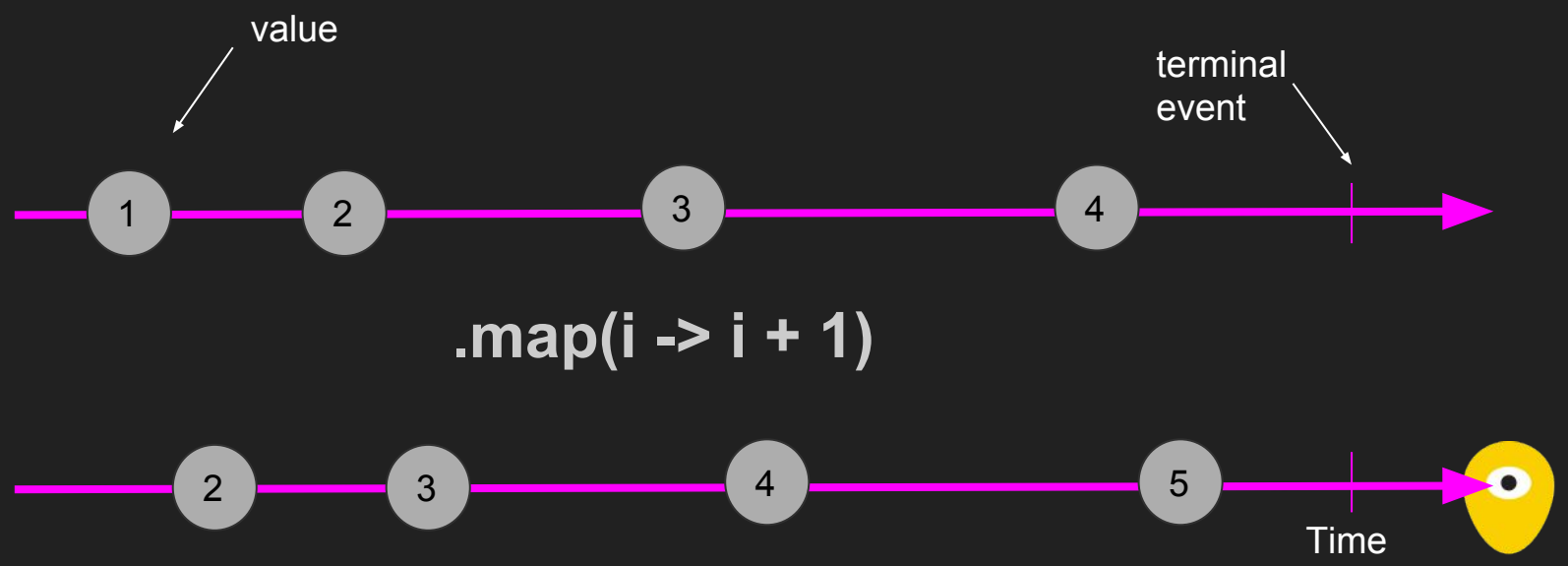
What’s a map over a stream?



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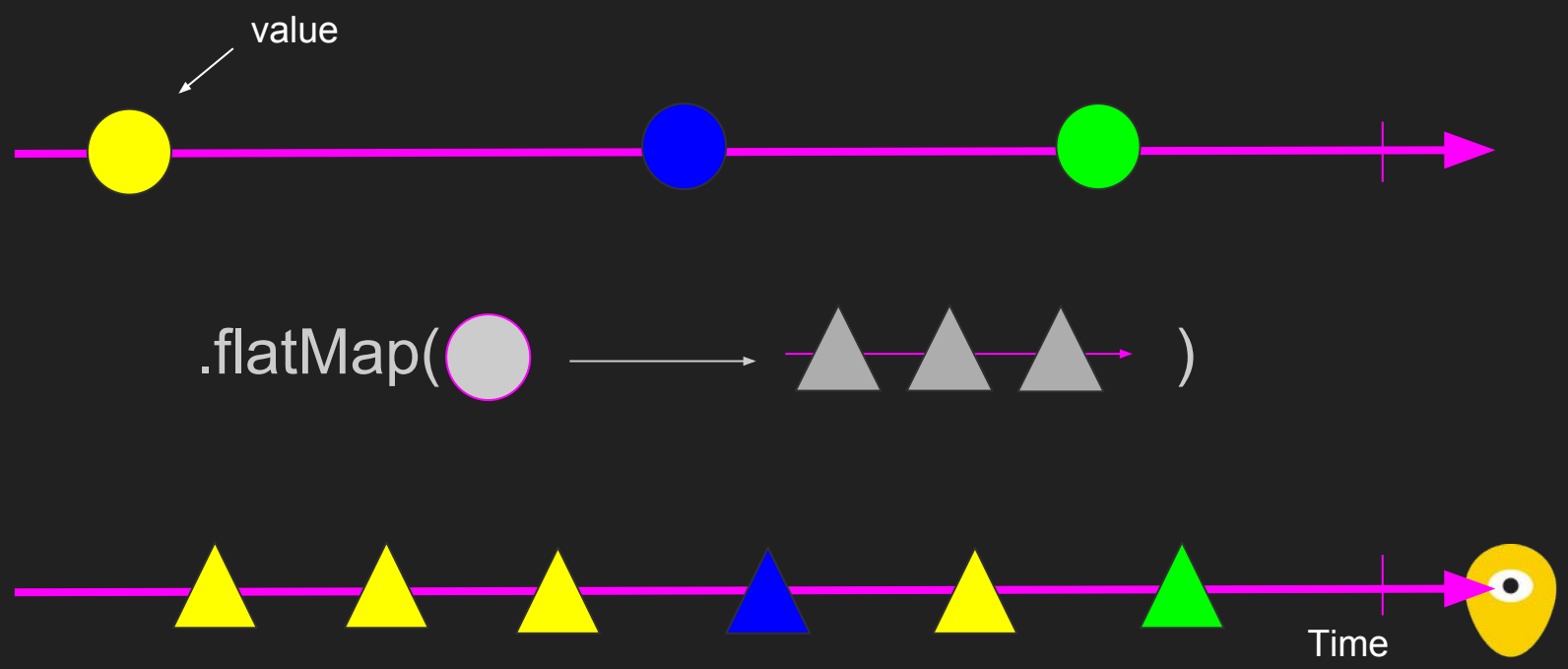
What’s a flatMap over a stream?



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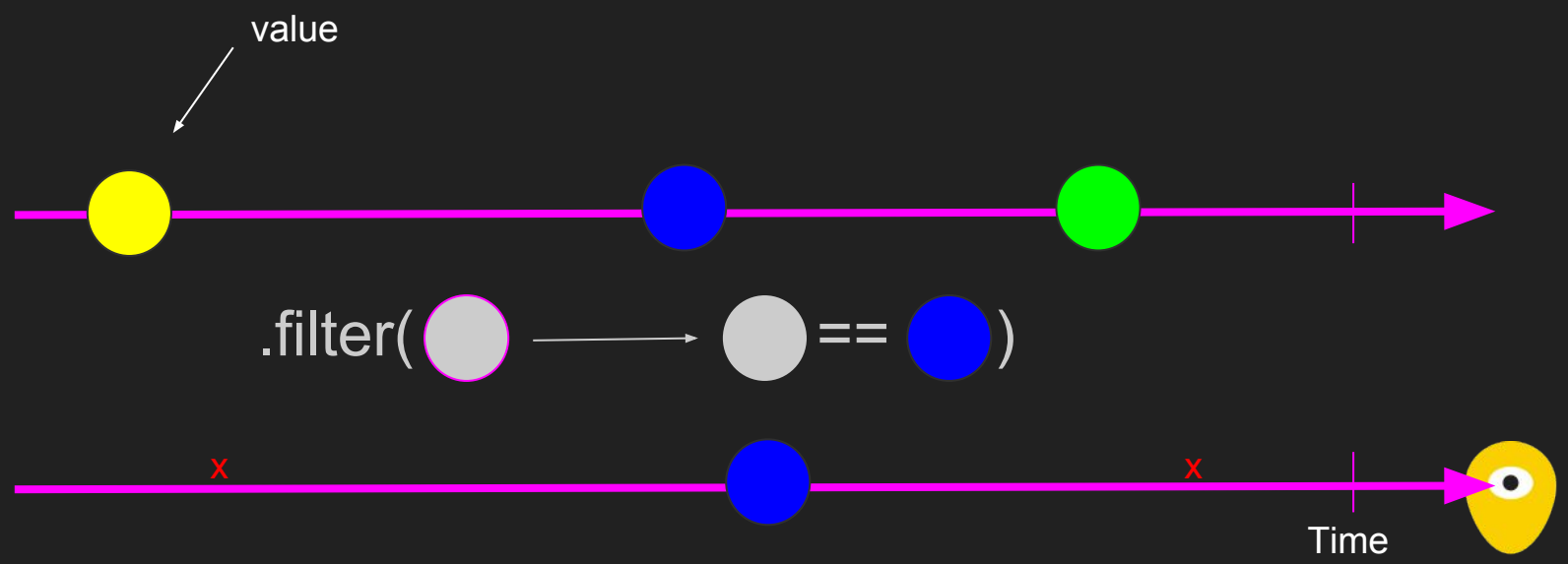
What’s a filter over a stream?



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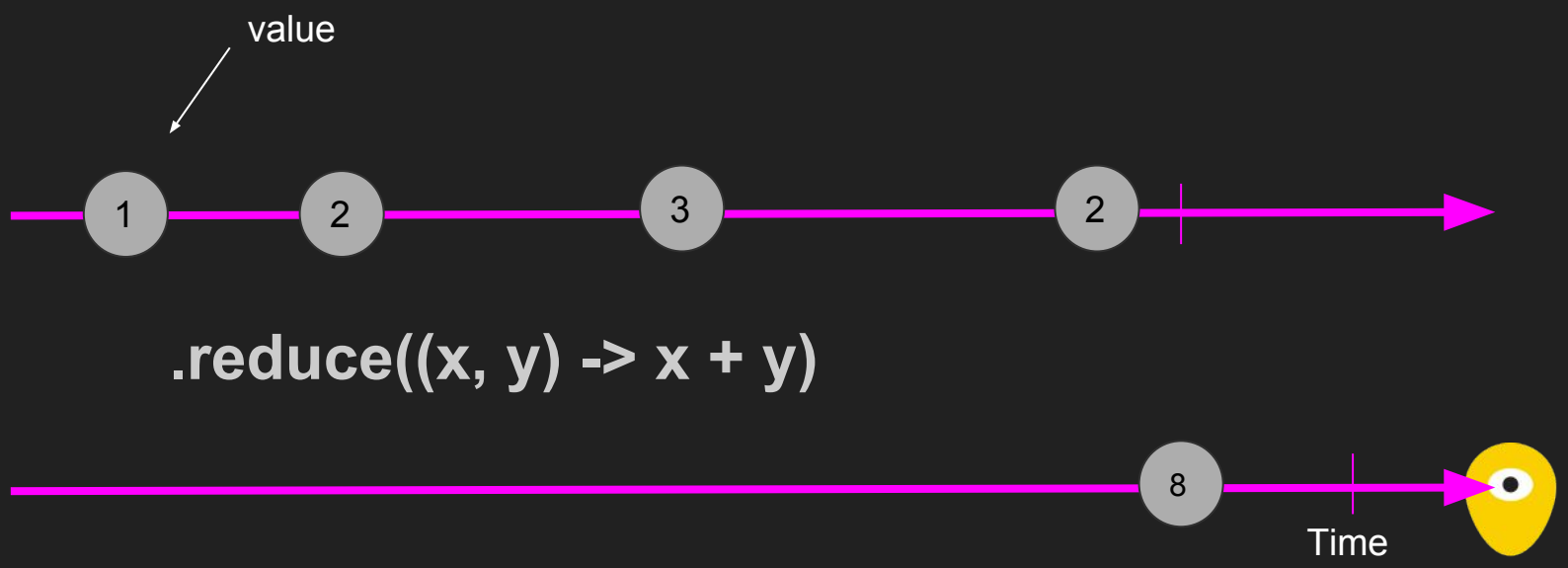
What’s a reduce over a stream?



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Observable

Being lazy this does nothing:

```
myObservable
    .map(i -> i + 1);
```

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    .map(this::myMethod);
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You have to subscribe

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Observer

Connects to Observable via subscription

Three types of events pushed by the Observable:

- onNext
- onError
- onCompleted

What’s a stream?

```
Rx.Observable.fromEvent(document.querySelector('input'), 'input')
  .map(ev => ev.target.value)
  .filter(n => n > 10)
  .map(n => n * 2)
  .subscribe(n => console.log(n)); // e.g. - 30, 300, ...
```

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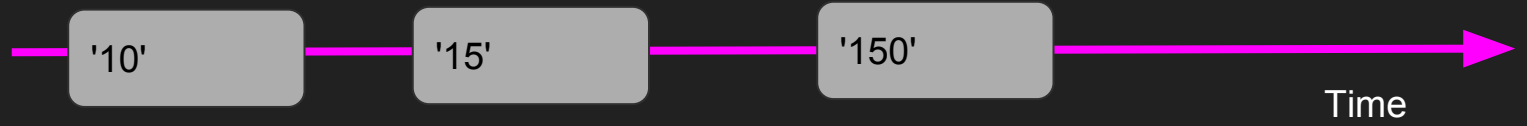
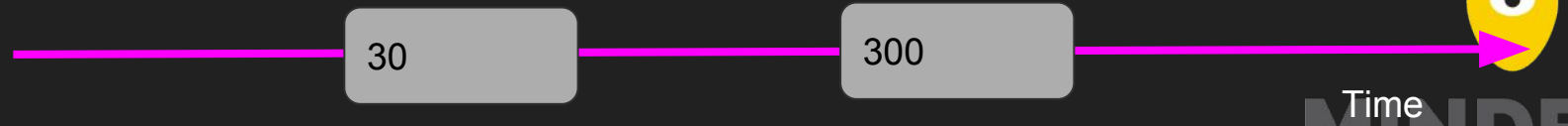
```
Rx.Observable.fromEvent(document.querySelector('input'), 'input')
```


```
.map(ev => ev.target.value)
```




```
.filter(n => n > 10)
```


```
.map(n => n * 2)
```




```
.subscribe(n => console.log(n));
```

Demo

An excel sheet built with JS and RxJS, powered by an computation engine built on Java and RxJava.

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	1	2	3	4
A	1	2		
B		A1+A2		
C			B2 * 2	

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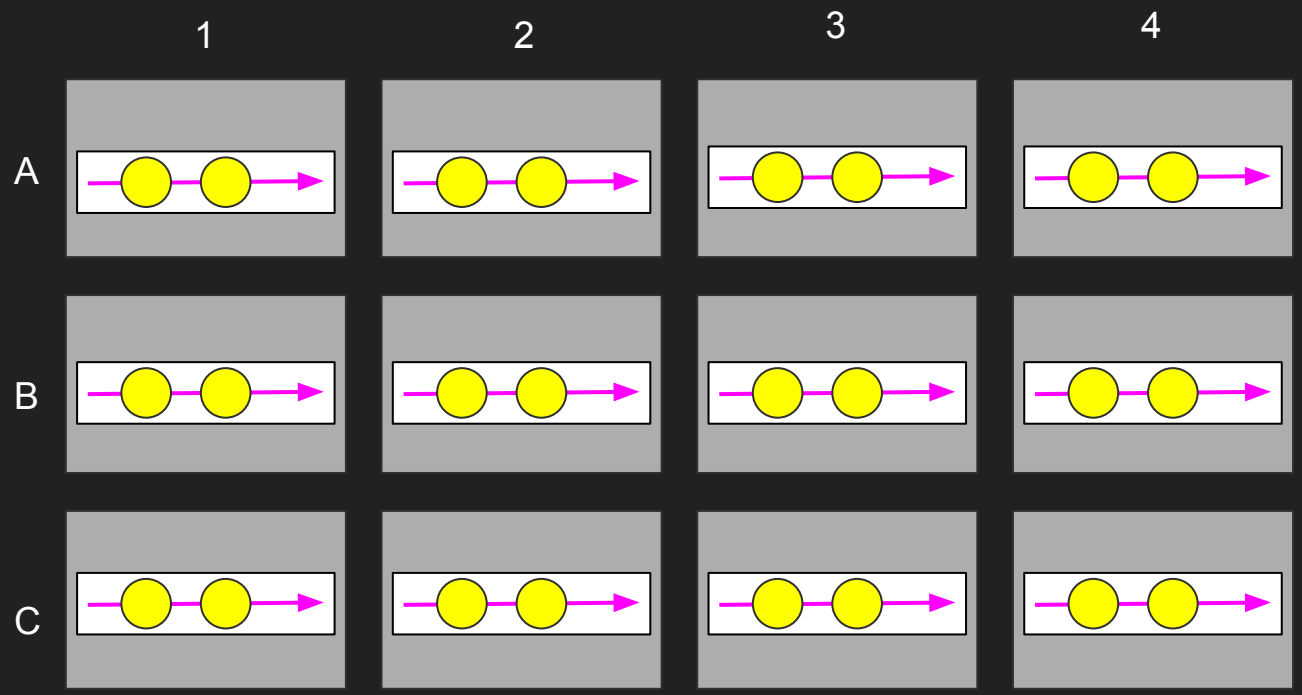

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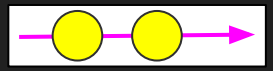
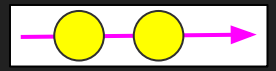
allChanges = merge( ,  , …)

allChanges = 

```
allChanges
        .filter(change => !change.computed)
        .flatMap(change => compute(change, allChanges)) //or mergeMap
        .subscribe(computed => {
                updateCell(computed.cellId, computed.value);
        });
```

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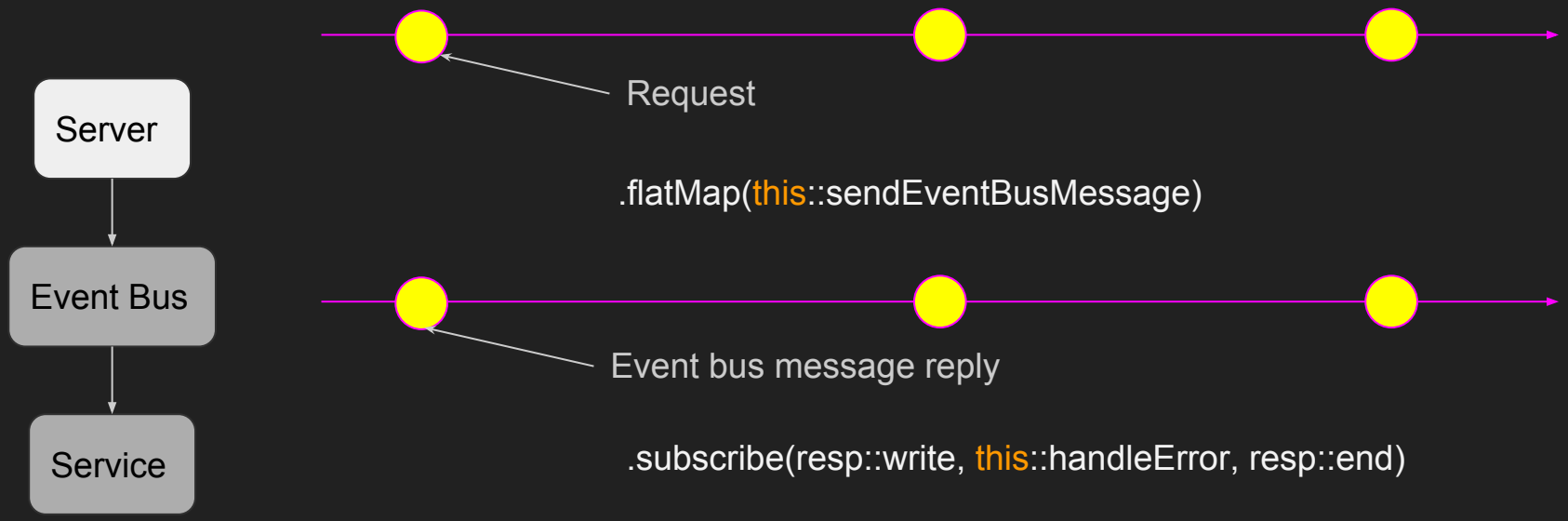

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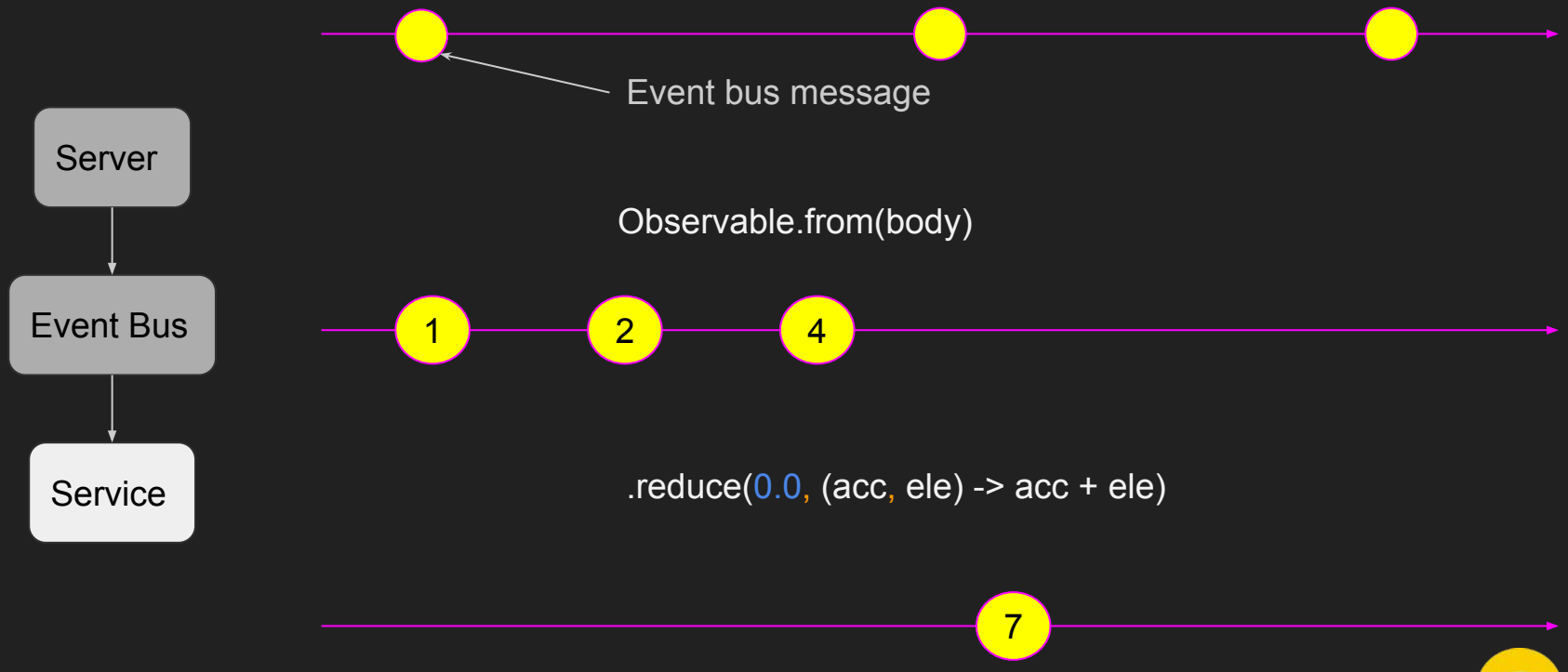

Q&A

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Thank you!

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