Reactive Programming with RxJS and Angular

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Thomas Cybulski

tho_cyb

ThomasCybulski

t.cybulski@salt-and-pepper.eu

Agenda

- Basics & History
- Reactive Extensions
- Observables and Subjects
- Operator - Code Examples
- Lessons learned

01
Basics & History

It can be so easy ...

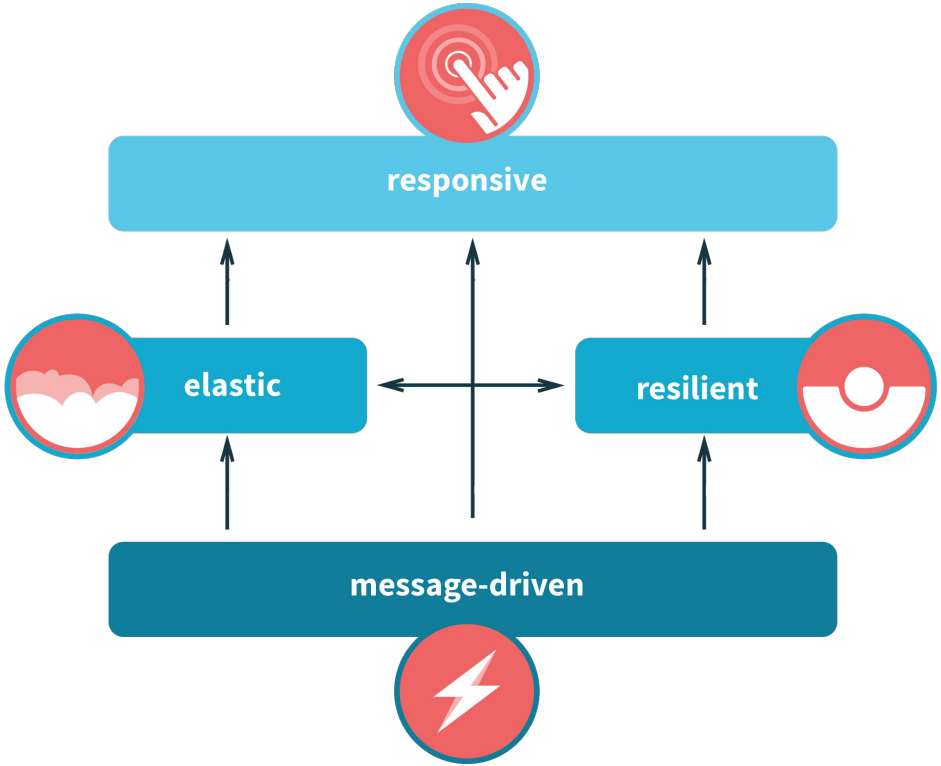
> **Rx.Observable.prototype.flatMapLatest(selector, [thisArg])**

> Projects each element of an observable sequence into a new sequence of observable sequences by incorporating the element's index and then transforms an observable sequence of observable sequences into an observable sequence producing values only from the most recent observable sequence.

Motivation

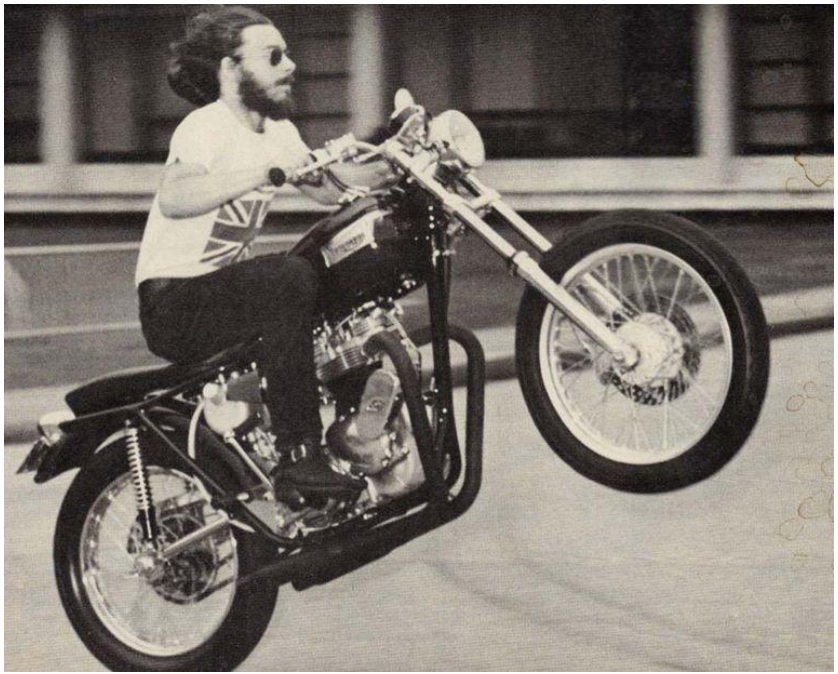
```
search(term:string) {
  let promise = new Promise((resolve, reject) => {
    this.http.get('my_URL')
      .toPromise()
      .then(
        res => { // Success
          this.results = res.json().results;
          resolve();
        },
        msg => { // Error
          reject(msg);
        }
      );
  });
  return promise;
}
```

The Reactive Manifesto



Responsive

React to user



Resilient

React to failure

Elastic

React to load

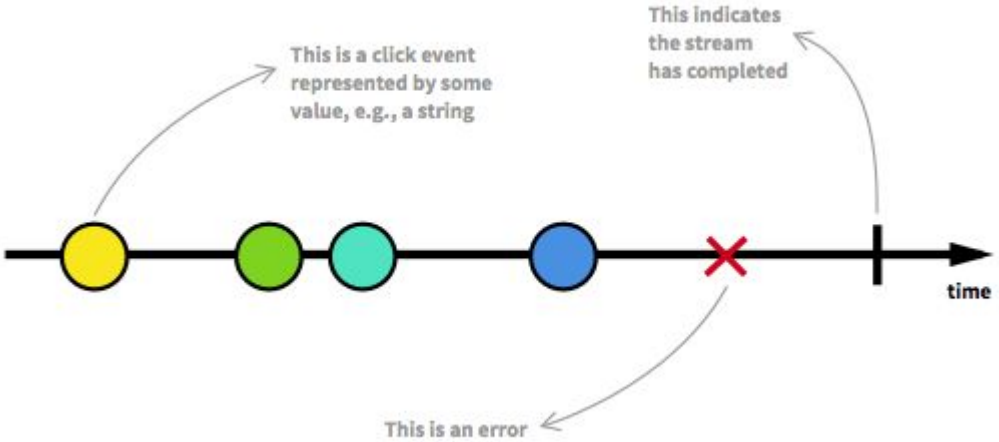
Message Driven

React to event

“Reactive programming is programming with asynchronous data streams.”

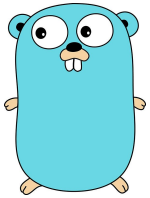
André Staltz https://bit.ly/1ls6KOt

Reactive Streams



02
Reactive Extensions

Reactive Extensions



Not only for JavaScript

03
Observables and Subjects

What are Observables?

- Data producer
- Observer - has `next()`, `error()` and `complete()` methods
- You can subscribe to him
- When it's done, it's done! No reuse after `unsubscribe()`, `error()` or `complete()`

What are Subjects?

- Like Observable
- Difference:
  - Data producer and consumer
  - It’s multicast
  - Has a state

Observables

Hot and cold Observables

Cold Observables

```
// Does not run until someone USES it
let names = http.get('/contacts.json');
```

Cold Observables

```
| async
```

Hot Observables

```
const socket = new WebSocket('ws://myUrl');

const source = new Observable((observer) => {
    socket.addEventListener('message', (e) => observer.next(e));
});
```

Subscribe only once!

04
Operators

Operators

RxJS 5 Operators By Example

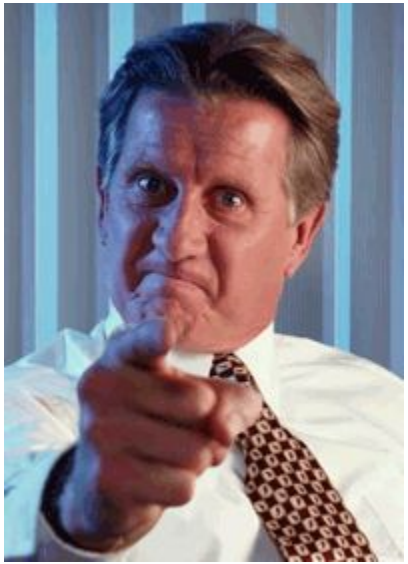
A complete list of RxJS 5 operators with clear explanations, relevant resources, and executable examples.

Prefer a split by operator type?

Contents (In Alphabetical Order)

⭐ - *commonly used*

Operators



Operators

- Don’t be scared!
- Use known operators!
- When no operator fits:
  - Develop imperative in the `subscribe()` function

Operators

```
let names = data.map( data =>
 data.name
);
```

Operators

```
// Try 5 times to get the data
let resilientNames = names.retry(5);
```

Operators

```
// LearnRxJS
```

https://www.learnrxjs.io/

Operators

```
// Which operator do I use?
```

https://xgrommx.github.io

Operators

```
// RX Marbles
```

http://rxmarbles.com/

// Show us some examples!!

Lessons learned - “Simple Films”

- `HttpClient` API is observable
- `subscribe()` to execute
- `pipe` to operators
- `map` to transform
- `catchError`

Lessons learned - “Wikipedia & Error Isolation”

- Reactive Forms API is observable
- `valueChanges`
- `pipe` many operators to transform

Lessons learned - “takeUntil & async pipe”

- `unsubscribe()` otherwise MemoryLeaks
- `async` cares to `subscribe()` & `unsubscribe()`