RxJS and Angular Signal Fundamentals

Reactive Programming

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Version Check

This course is applicable to:

- RxJS v7
- Angular v13 through Angular v16
  - Signals new in Angular v16

Version Check

This course was created using:

- RxJS 7.8
- Angular v16.2

```
let x = 5;
let y = 3;
let z = x + y;
console.log(z);
```

What is z?

8

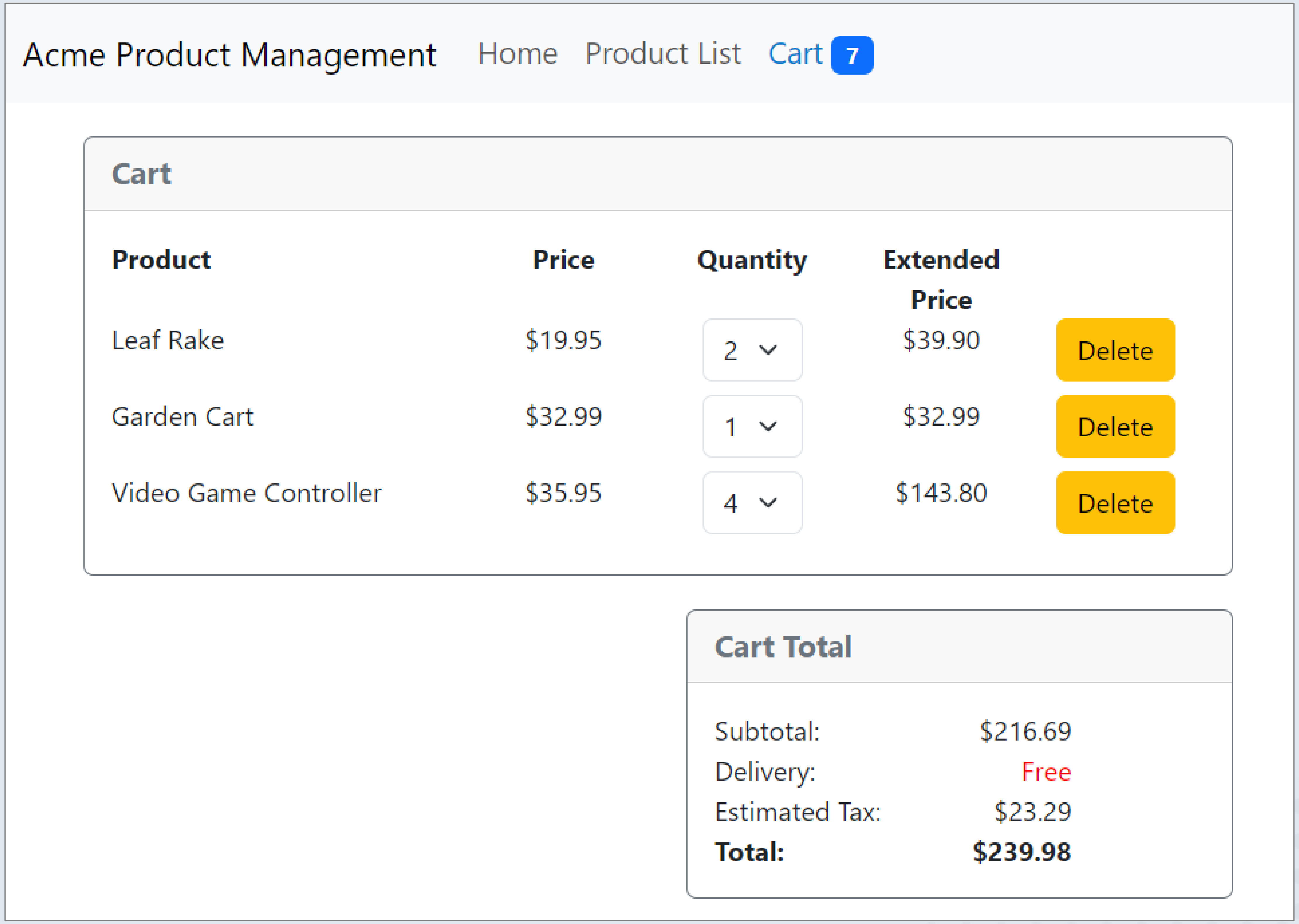
```
let x = 5;
let y = 3;
let z = x + y;
console.log(z);

x = 10;
console.log(z);
```

Now what is z?

8

Value is assigned when the expression is first evaluated

z does not react to changes in x or y



Cart

Product	Price	Quantity	Extended Price	
Leaf Rake	$19.95	2	$39.90	Delete
Garden Cart	$32.99	1	$32.99	Delete
Video Game Controller	$35.95	4	$143.80	Delete

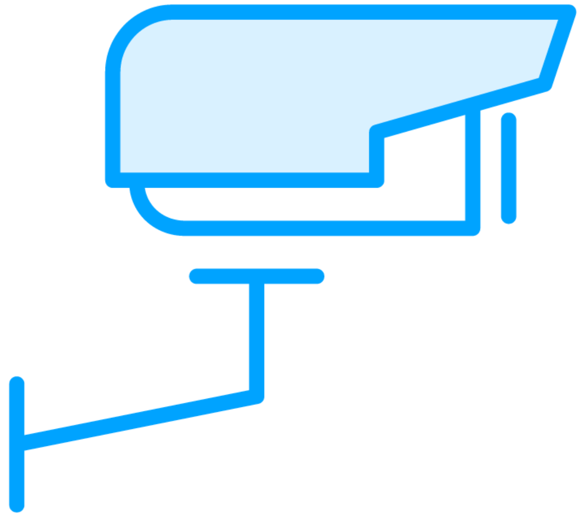
Cart Total

Subtotal:	$216.69
Delivery:	Free
Estimated Tax:	$23.29
Total:	**$239.98**

We want to react to changes

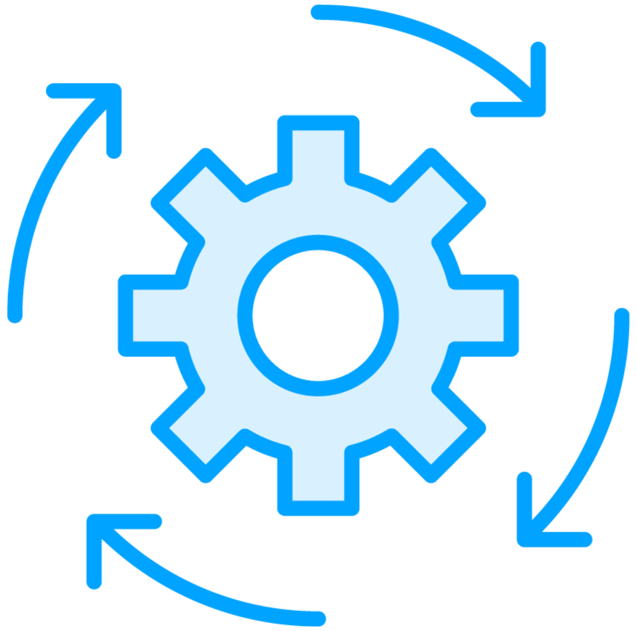
Reactive Programming

How do signals and RxJS
help us with reactive programming?



Observe
events (actions)
or state (data)

Sign up to receive
notifications
when event occurs
or state changes



Reacts to the
notification

Applications are
more responsive
and provide a better
user experience

Signals

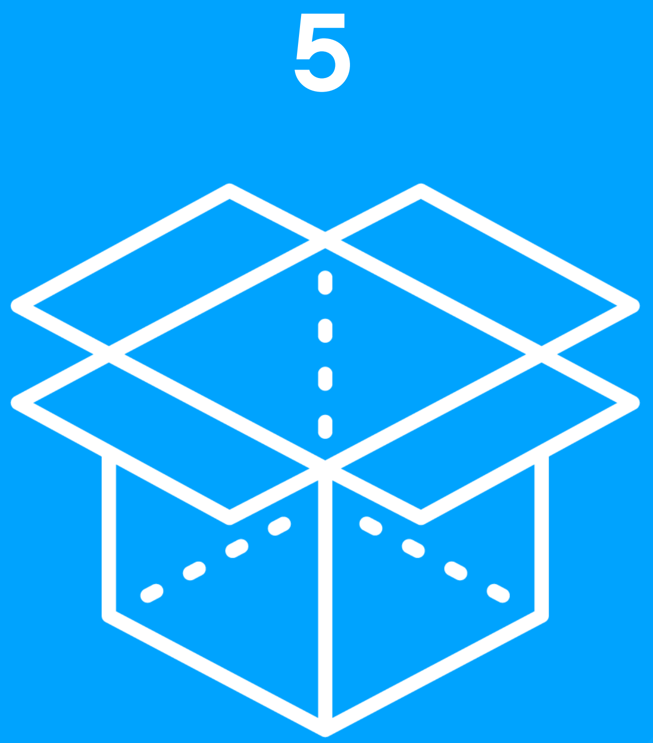
New way for our code to observe data, notify and react when that data changes

Share data between components and services

Important for improved change detection

Available as a developer preview in Angular v16

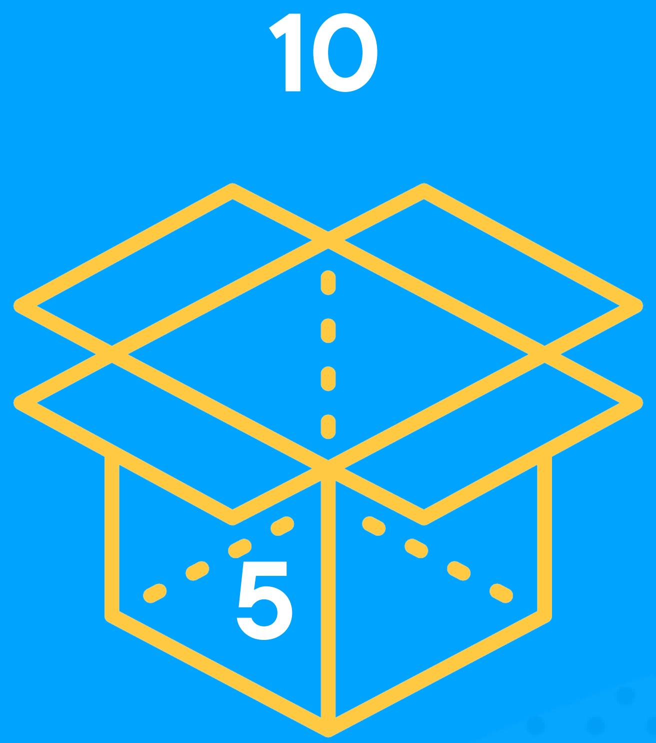
Signal = data value
+ change notification



Reactive Primitive

Signal = data value

+ change notification



Reactive Primitive

Variables vs. Signals

Variables

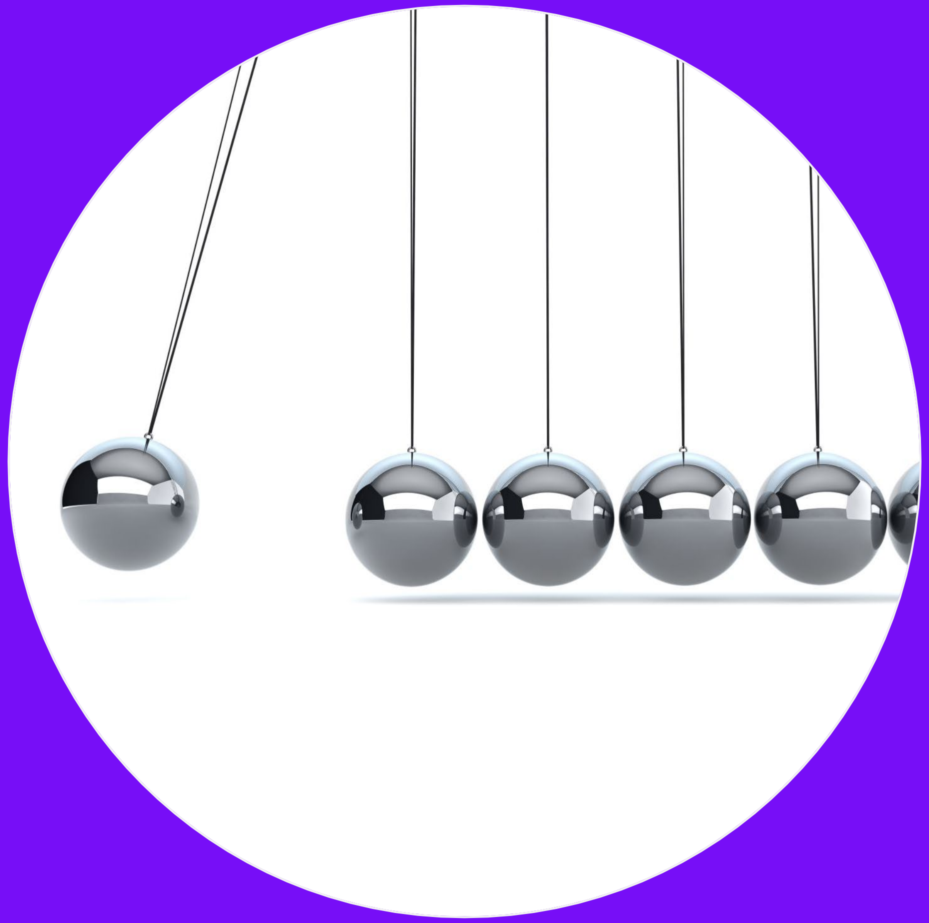
vs

```
let x = 5;
let y = 3;
let z = x + y;

console.log(z); // 8

x = 10;
console.log(z); // 8
```

Signals

```
const x = signal(5);
const y = signal(3);
const z = computed(()=>
           x() + y());
console.log(z()); // 8

x.set(10);
console.log(z()); // 13
```

Reactive Extensions for JavaScript (RxJS)

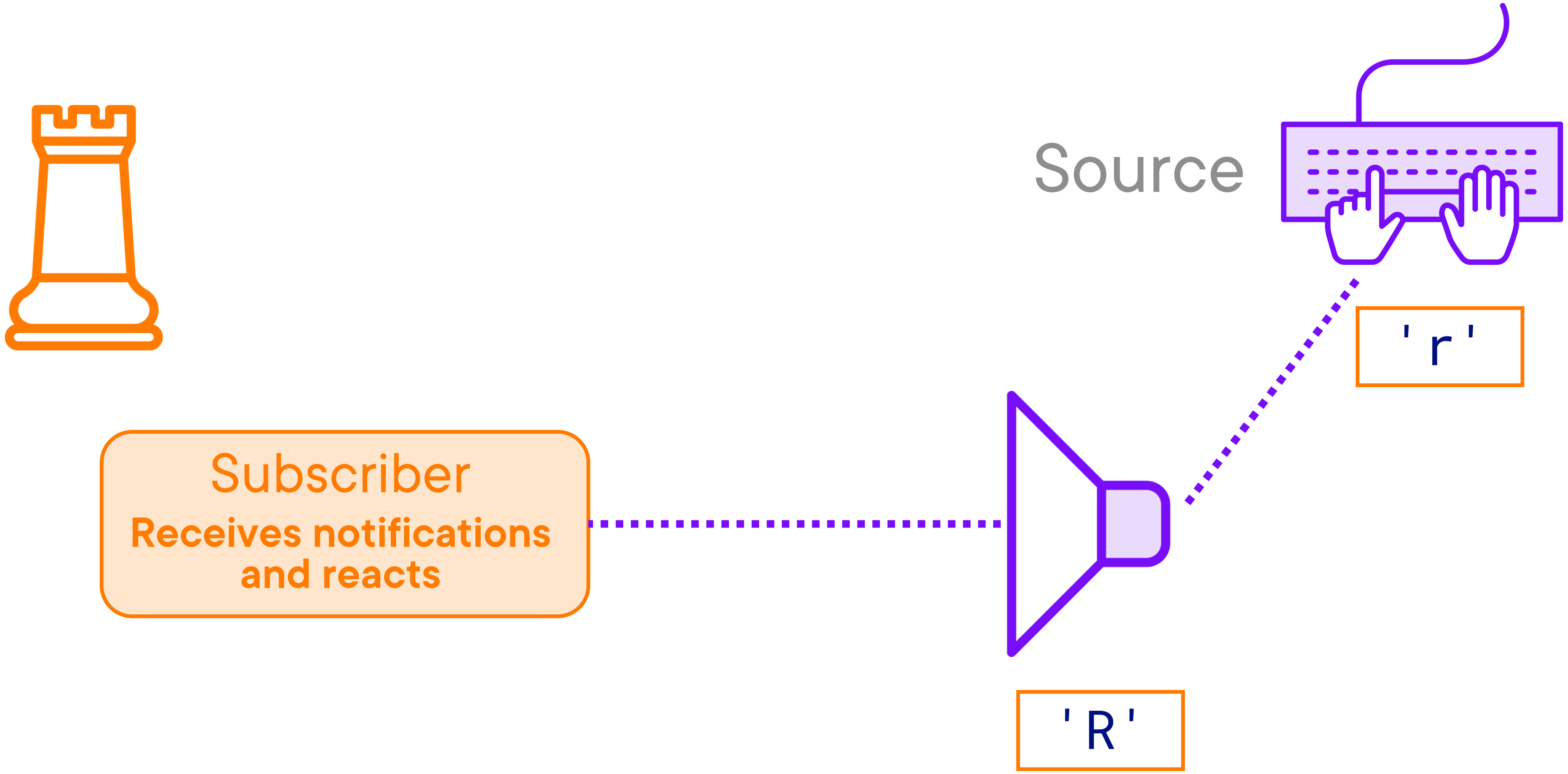


Popular library for **reactive programming**

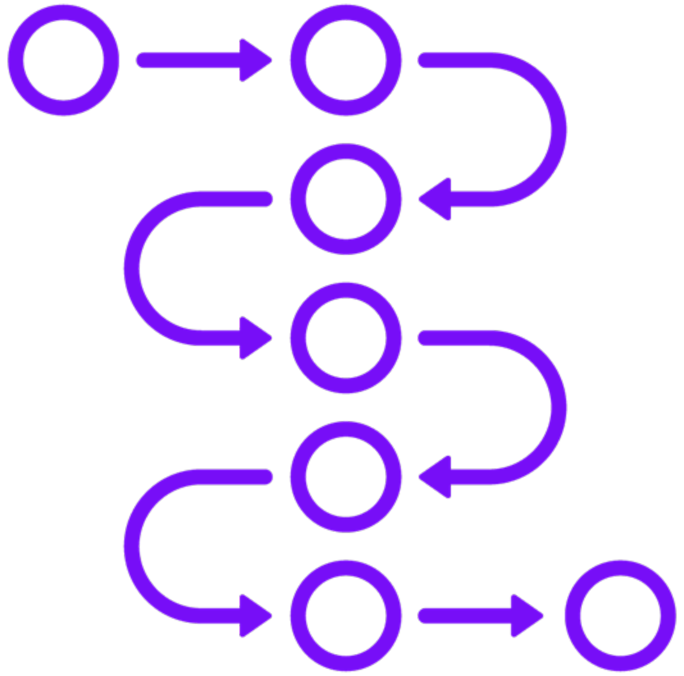
Use RxJS to compose observable data streams

- **Observe** events and data over time
- Subscribe to receive a **notification** when the event occurs or data is emitted
- **React** to the notification and perform an operation or process the data

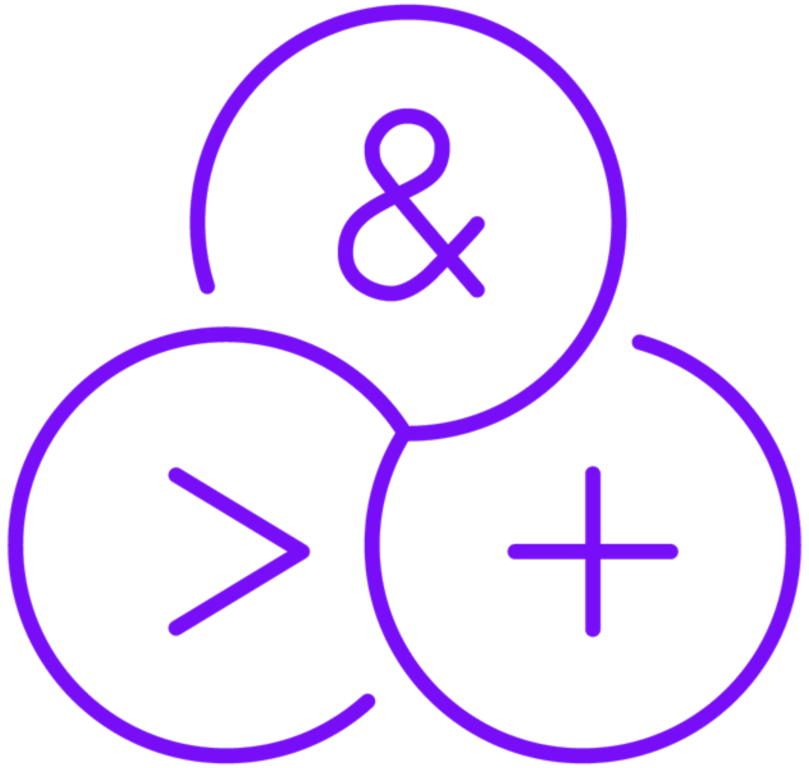
Observing Keyboard Events



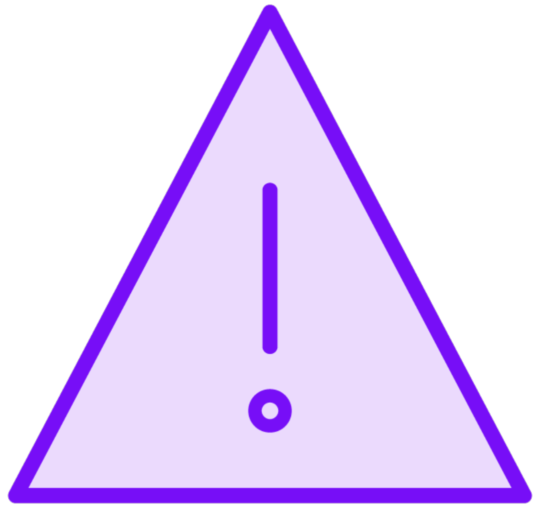
RxJS Operators



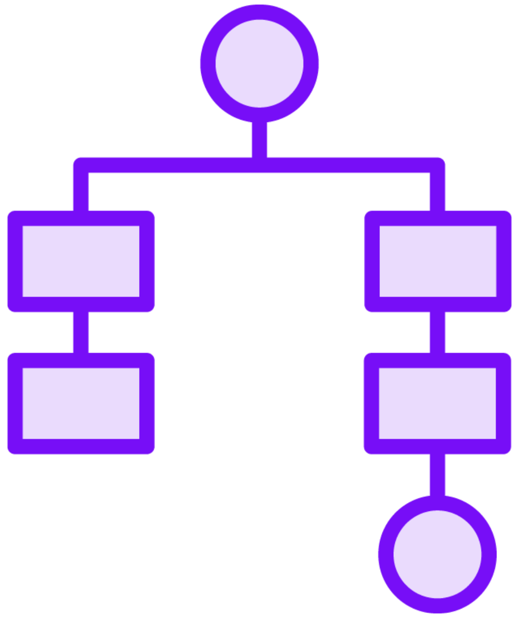
Work with the data before it is emitted



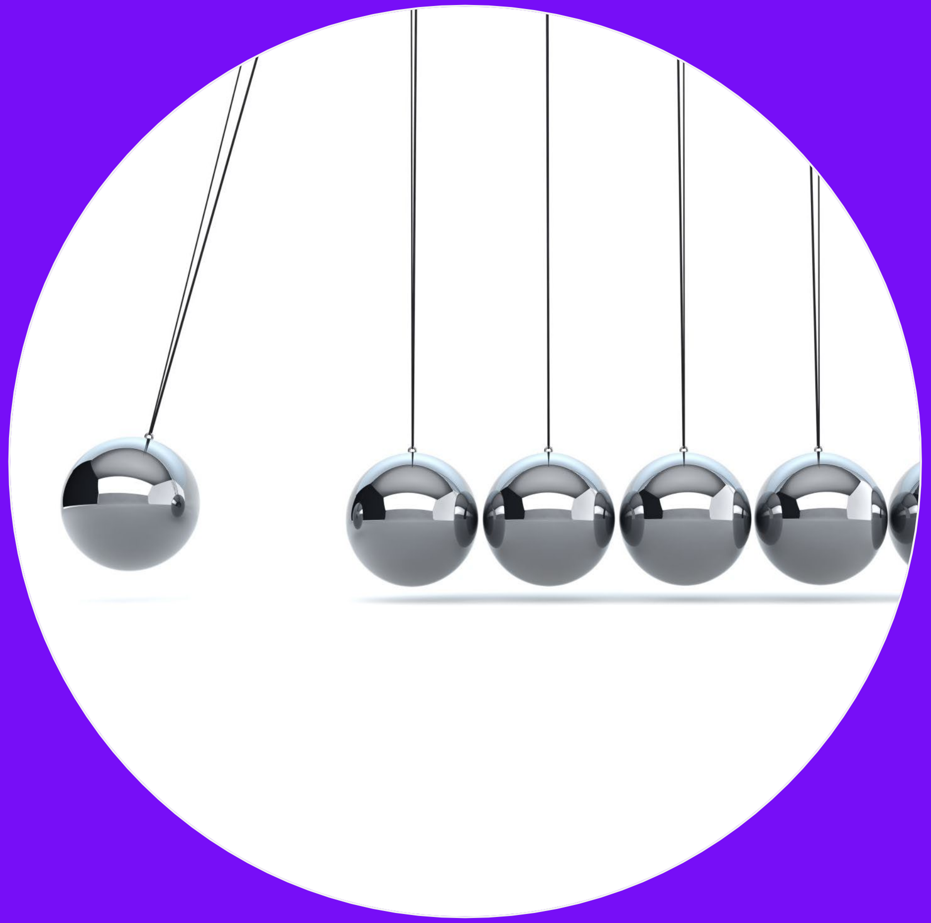
100+ operators



Provide error handling



Handle multiple complex data sets



Reactive Extensions (Rx)

Originally developed by Microsoft as Rx.NET (https://github.com/dotnet/reactive)

- RxJava, RxPy, Rx.rb
- RxJS: Reactive Extensions for JavaScript
- Use in: Angular, React, Vue, TypeScript, JavaScript

Proposal for ECMAScript Observable (https://tc39.es/proposal-observable/)

How Is RxJS Used in Angular?

Routing events

```
this.route.paramMap
this.route.data
this.router.events
```

Reactive forms events

```
this.productForm.valueChanges
```

HttpClient response notifications

```
getProducts(): Observable<Product[]> {
  return this.http.get<Product[]>(this.url);
}
```

RxJS + Signals

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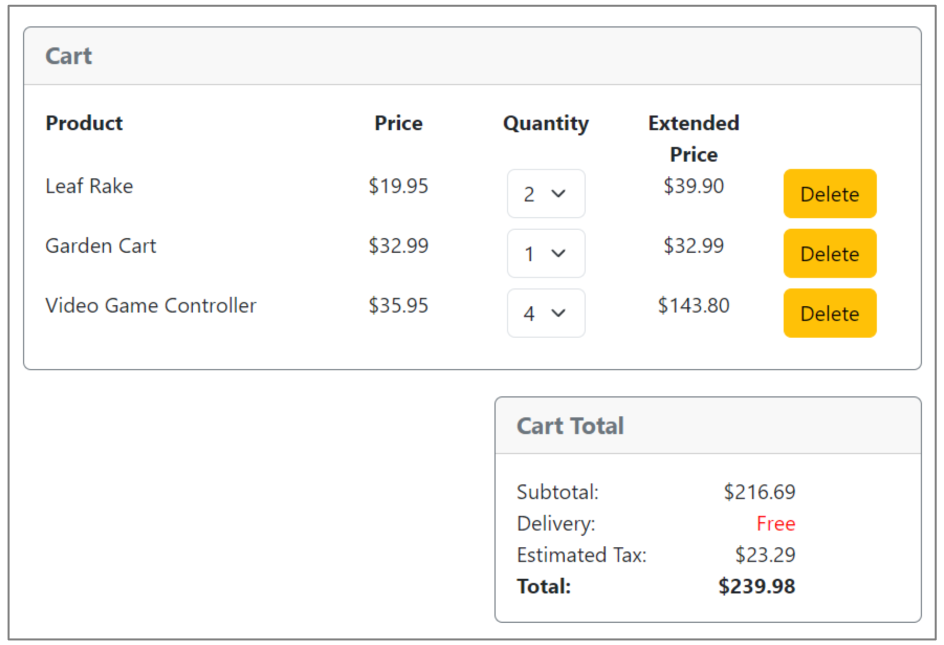
Reactive Programming

Signals

Observe state (variable values)

Notify when that state changes

React to those notifications



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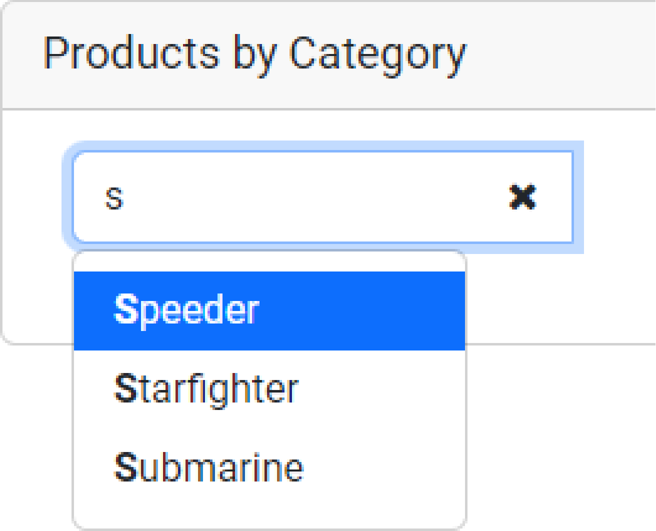
RxJS Observables

Observe events or data that arrive over time

Notify when the event occurs, or data is emitted

React to those notifications



Products by Category

s ✖

- Speeder
- Starfighter
- Submarine

RxJS + Signals: Better Together

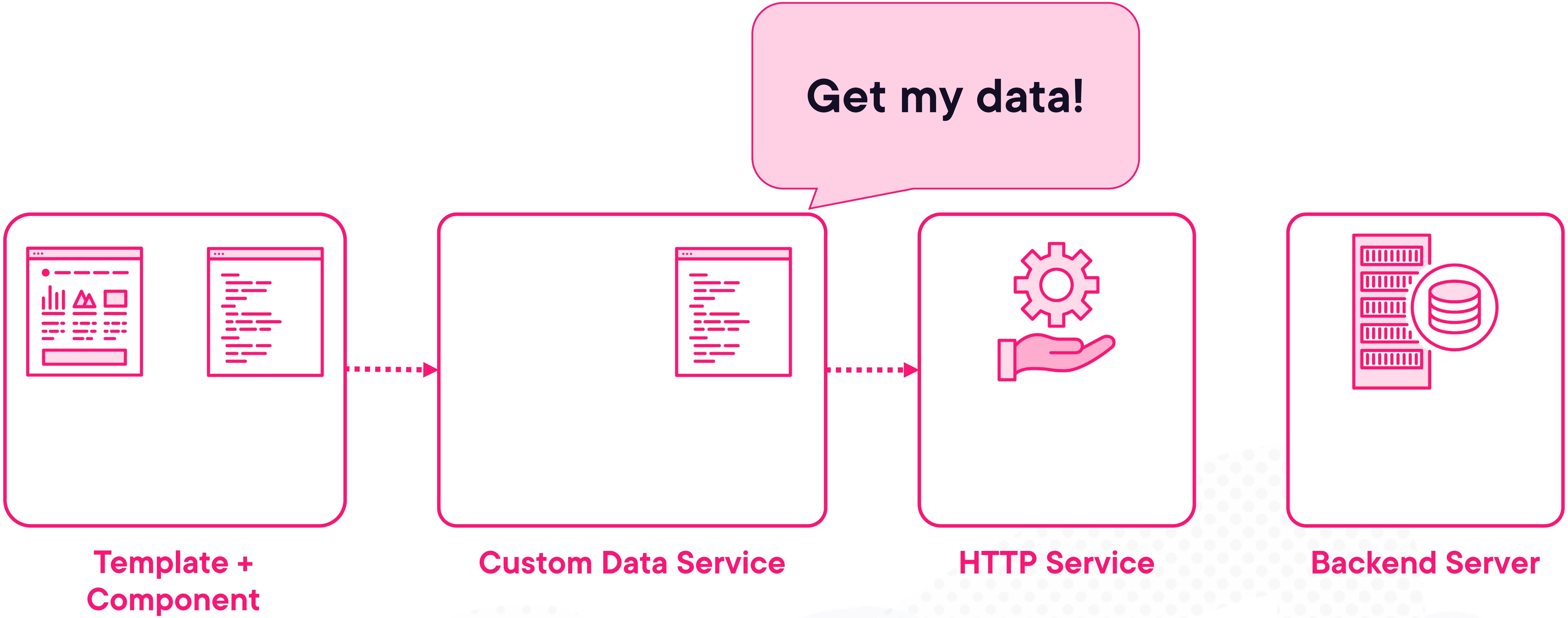
Asynchronous operations such as HTTP requests

Retrieving and merging related sets of data

Managing data after it's been retrieved + computed signals

Binding in the template for better change detection

RxJS + Signals: Better Together



Get my data!

Template + Component

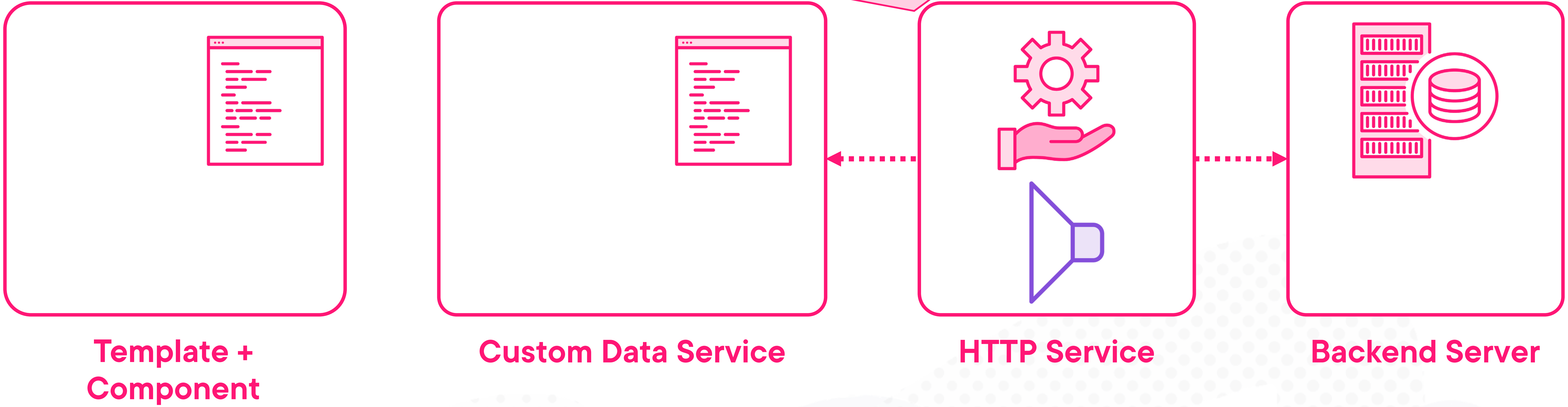
Custom Data Service

HTTP Service

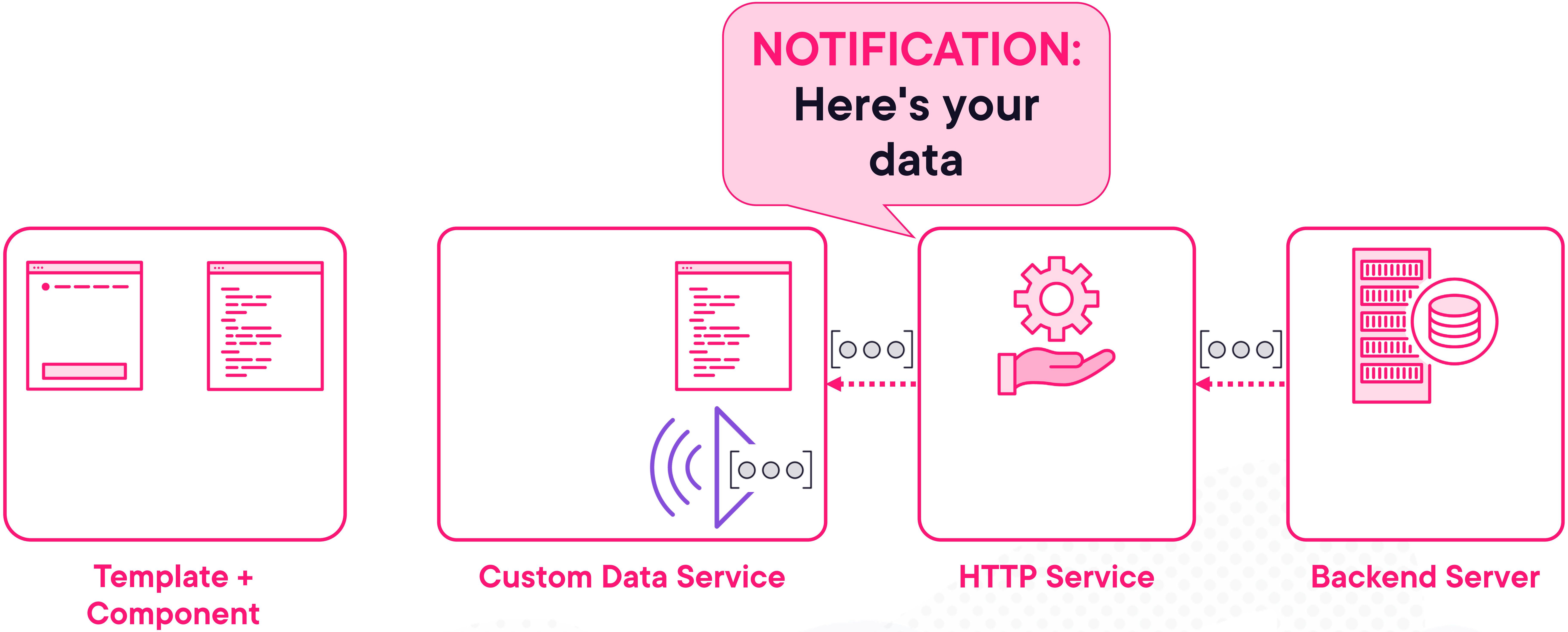
Backend Server

RxJS + Signals: Better Together

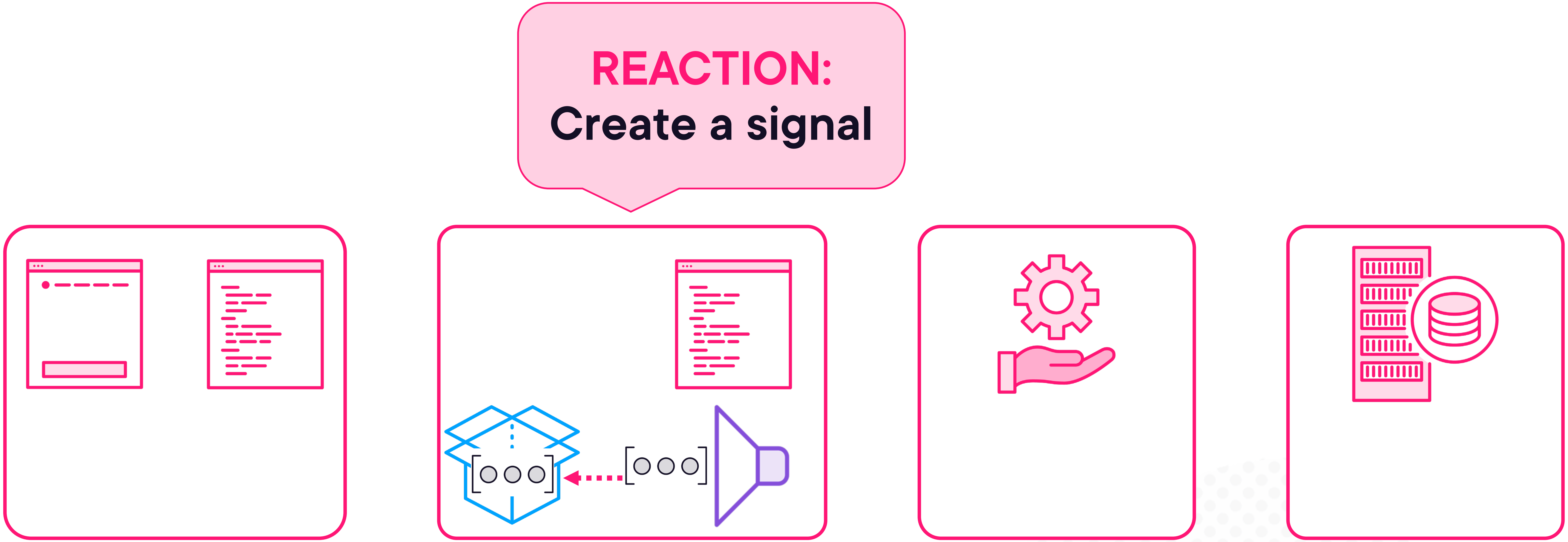
Here's an observable to provide a notification when I receive the data



RxJS + Signals: Better Together



RxJS + Signals: Better Together



REACTION:
Create a signal

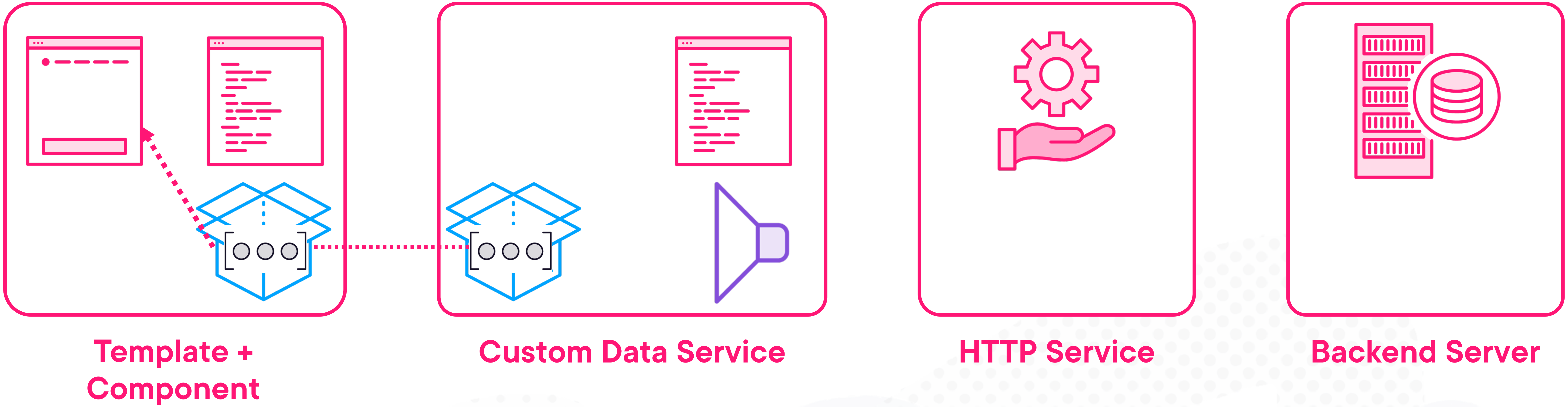
Template + Component

Custom Data Service

HTTP Service

Backend Server

RxJS + Signals: Better Together



Getting the Most from This Course

Required

- Components
- Templates
- Services

Helpful

- Basic knowledge of Observable/HttpClient

Not required

- Extensive knowledge of RxJS or signals

Goals for This Course

Add clarity

Examine reactive patterns

React to user actions

React to state changes

Improve state management

Improve UI performance

Overview

RxJS

Signals

RxJS + Signals

Build a sample application

Up Next:

RxJS Terms and Syntax