



# Angular Advanced State management with @ngrx/store



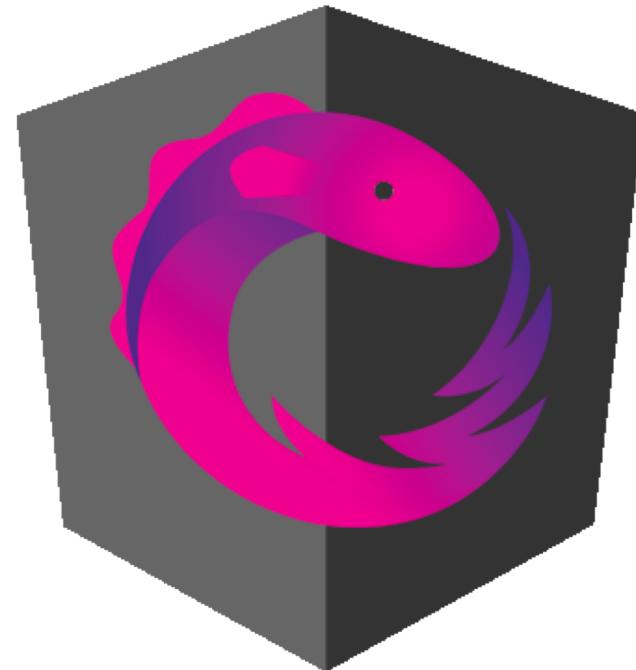
A CANON COMPANY



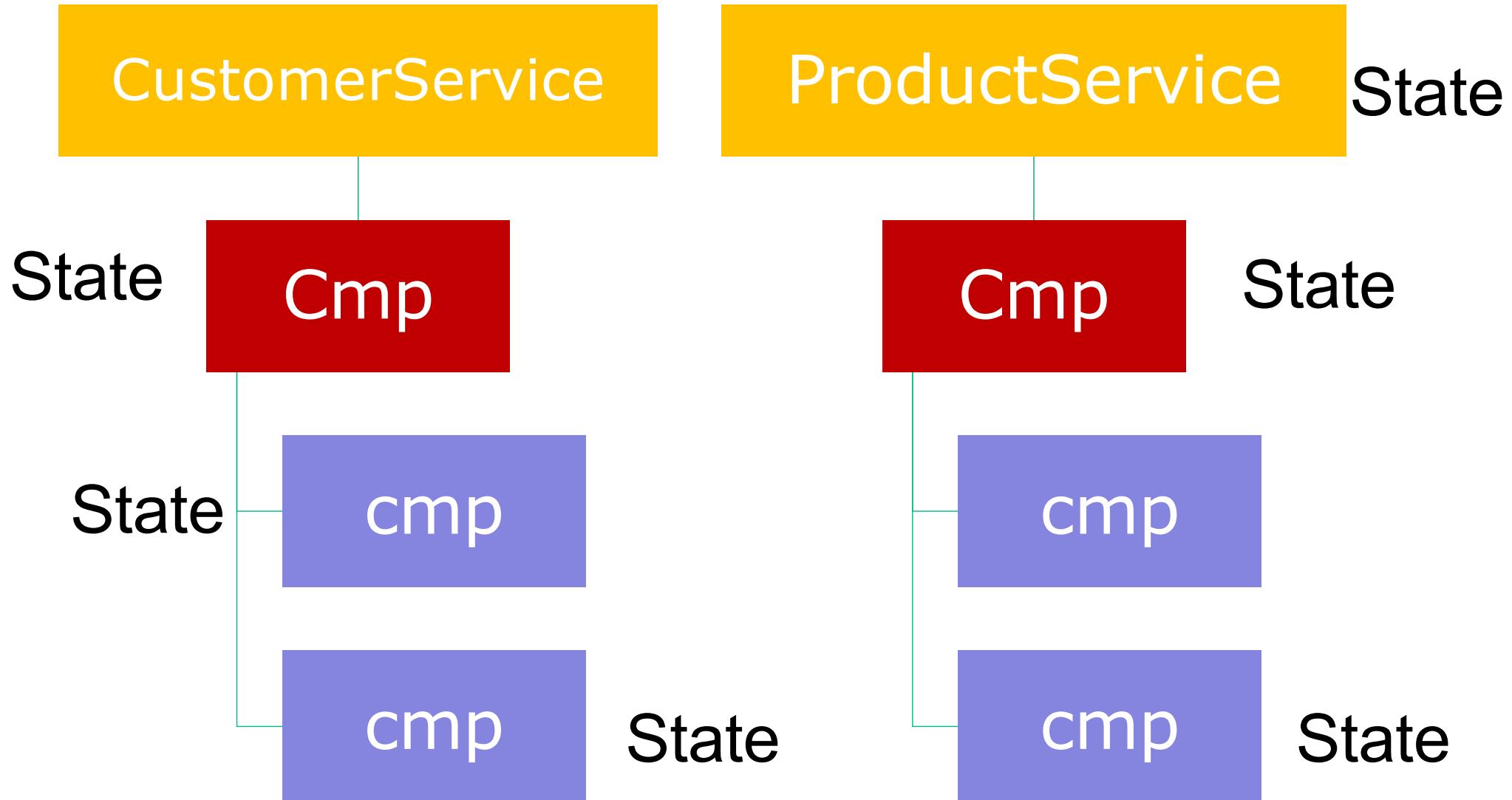
Peter Kassenaar –  
[info@kassenaar.com](mailto:info@kassenaar.com)

# What is State Management?

- Various design patterns, used for managing *state* (data in its broadest sense!) in your application.
- Multiple solutions possible – depends on application & framework



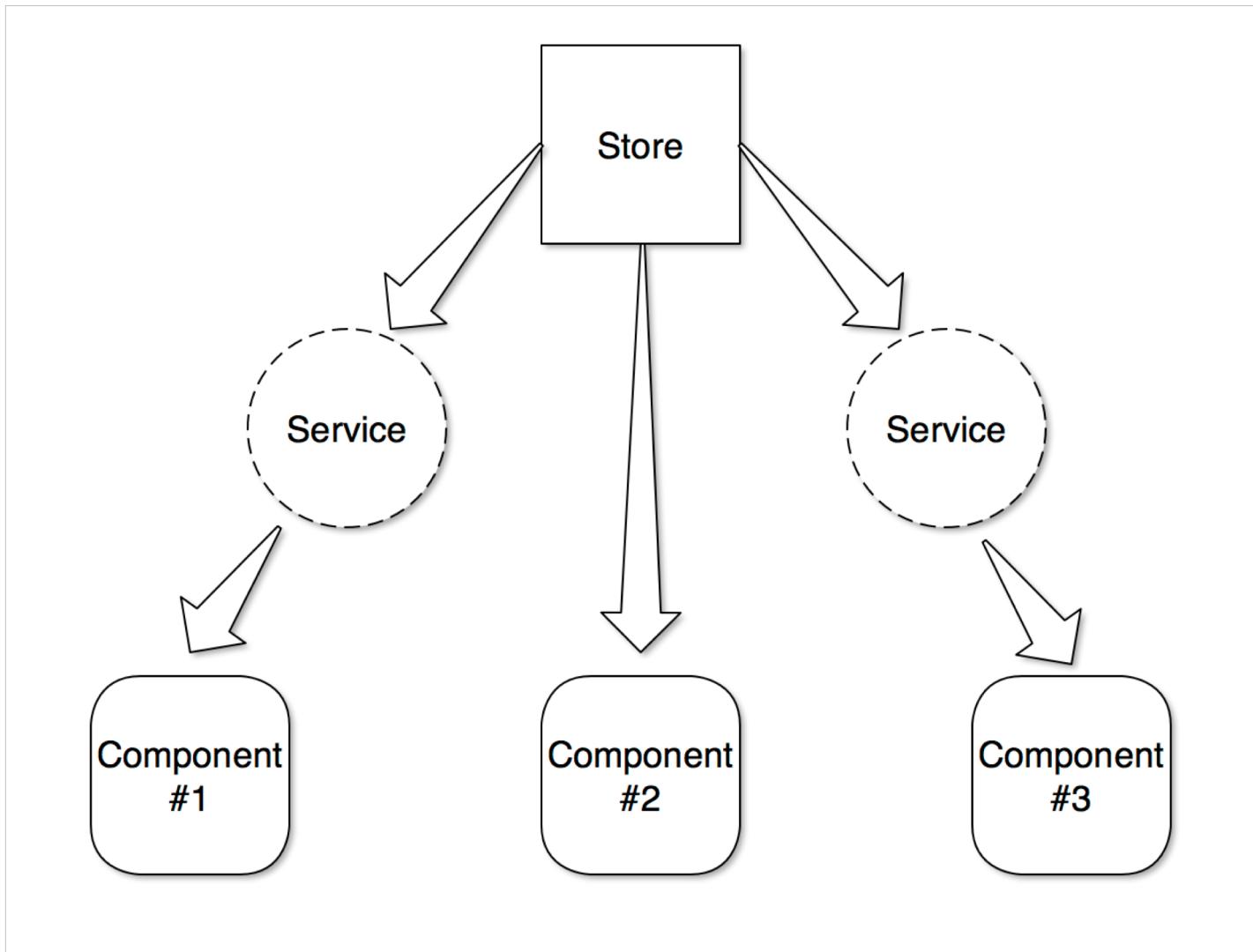
# State management without a store



# Benefits of using a store

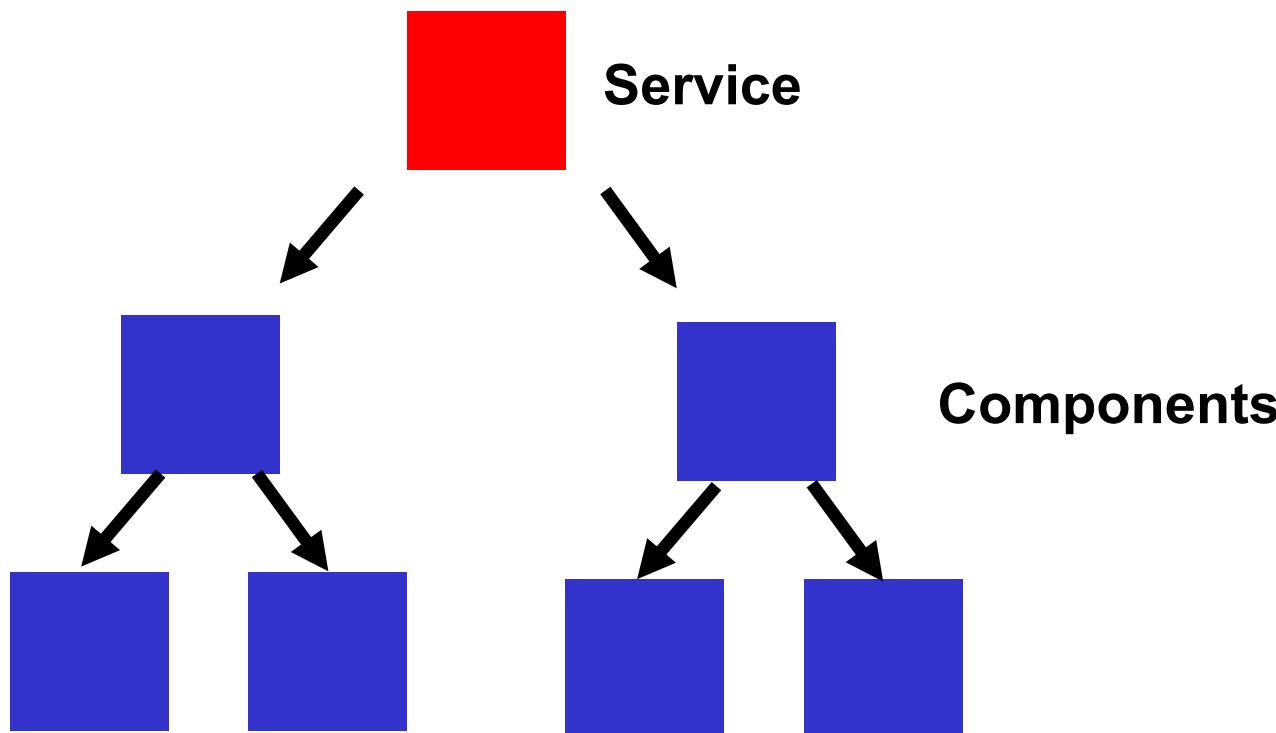
- State is only changed in a controlled way
- Component state is also driven from the store
- Based on immutable objects – b/c they are predictable
- In Angular – immutability is fast
  - Because no changes can appear, no change detection is needed!
- Developer tools available to debug and see how the store changes over time
  - “Time travelling Developer tools”

# Store architecture - #1

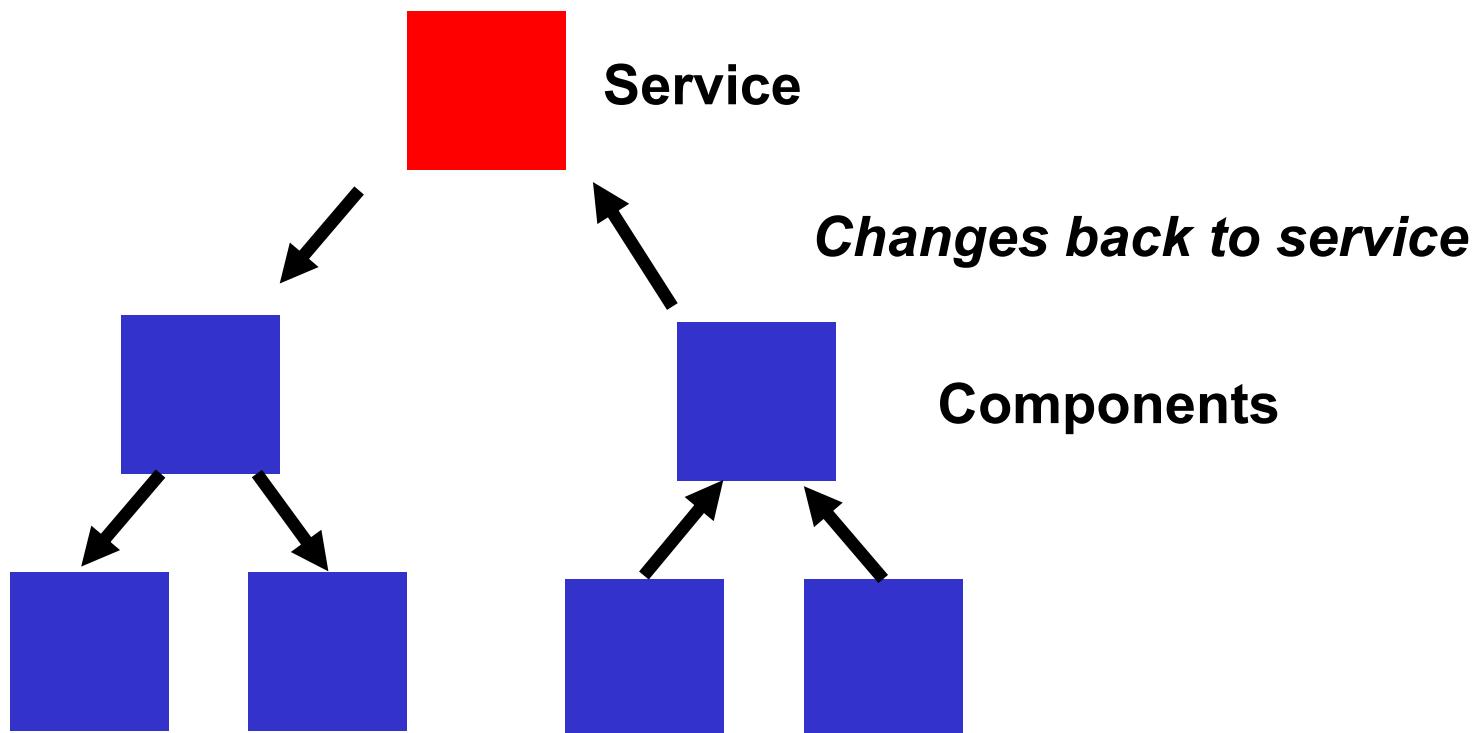


<https://gist.github.com/btroncone/a6e4347326749f938510>

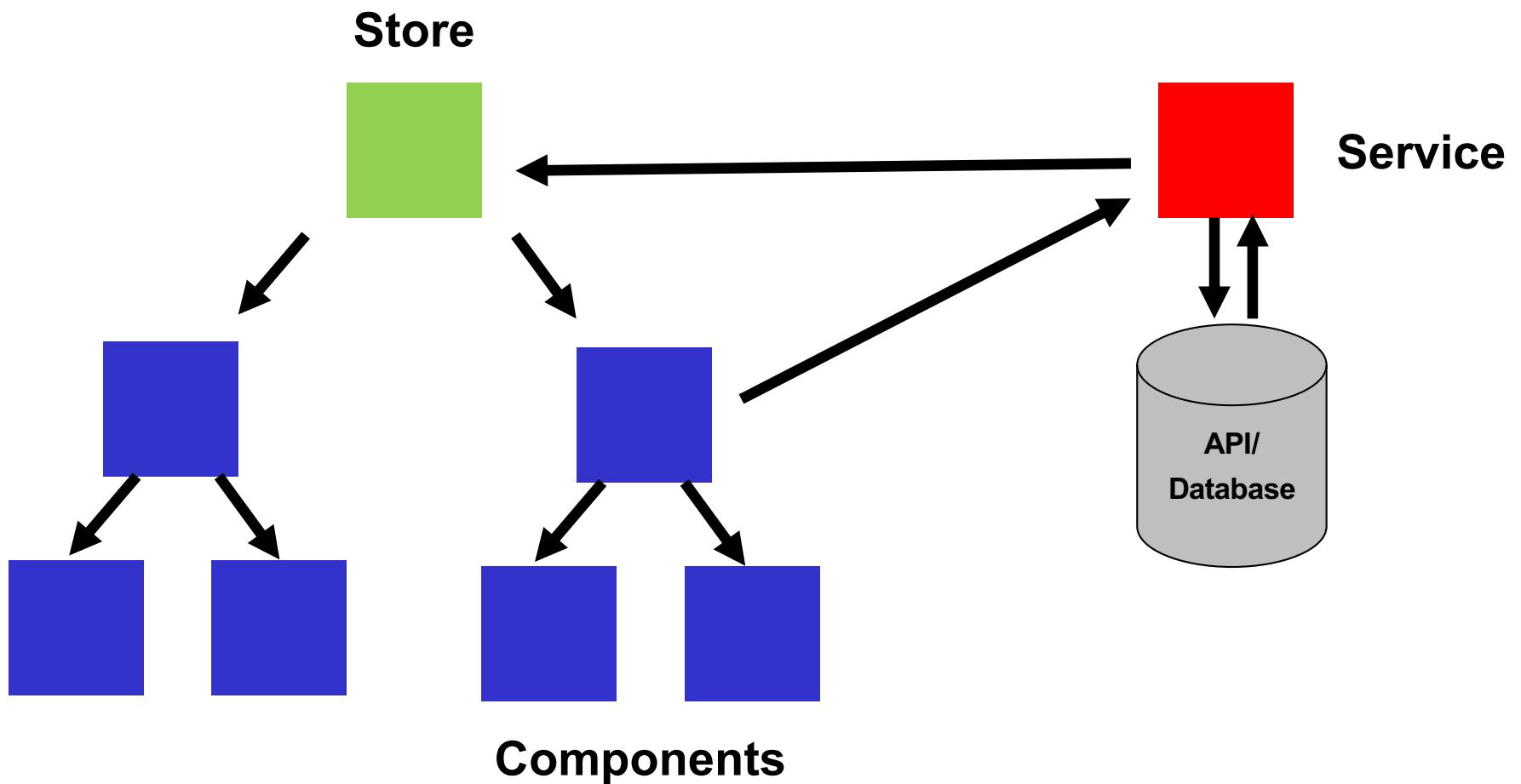
# Store architecture - #2 - traditional



# Store architecture - #2



# Store architecture - #2 with a store



# Angular State Management

- Simple applications - In the component

- counter : number = 0;
  - this.counter += 1;

- Intermediate applications - In a service

- counter : number = 0;
  - this.counter = this.counterService.increment(1);
  - Cache counter value in the service

- Larger applications - In a *data store* – all based on *observables*

```
counter$: Observable<number>;  
  
constructor(private store: Store<AppState>) {  
    this.counter$ = store.select('counter');  
}  
  
increment() {  
    this.store.dispatch({ type: INCREMENT });  
}
```



# **Store Terminology and concepts**

# Important Store terminology / concepts

## Store

*"The store can be seen as your client side database. But more importantly, it reflects the state of your application. You can see it as the single source of truth."*

*"The store holds all the data. You modify it by dispatching **actions** to it."*

# Reducer

*"Reducers are functions that know what to do with a given action and the previous state of your app.*

*Reducers will take the previous state from your store and apply a pure function to it. From the result of that pure function, you will have a new state. The new state is put in the store."*

# Actions

*"Actions are the payload that contains needed information to alter your store. Basically, an action has a **type** and a **payload** that your reducer function will take to alter the state."*

# Dispatcher

*"Dispatchers are simply an entry point for you to dispatch your action. In Ngrx, there is a dispatch method directly on the store. I.e., you call `this.store.dispatch({...})`"*

# **Reducers, Store and Components -**

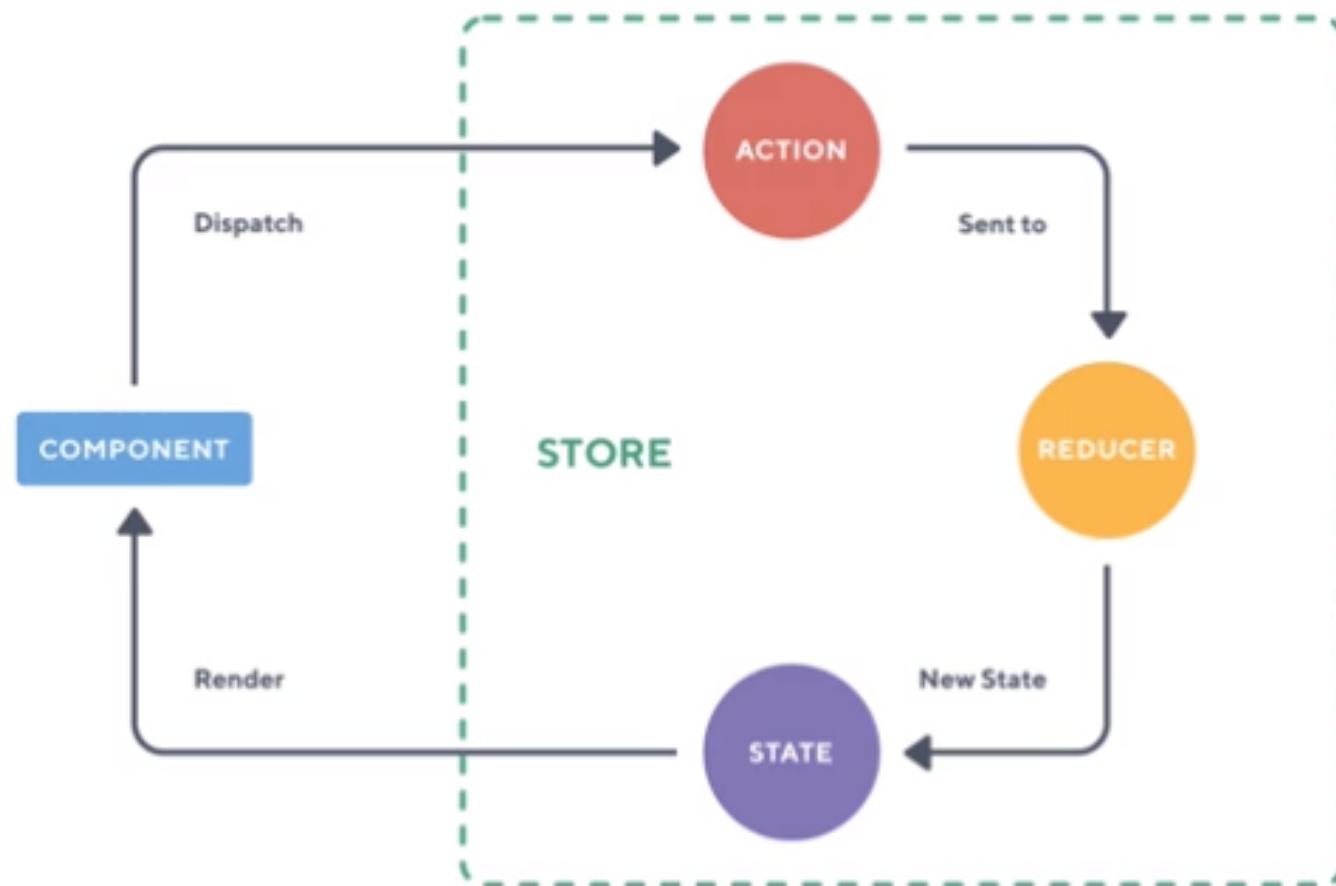
## **The complete picture**

The **Component** first dispatches an Action. When the **Reducer** gets the Action, it will update the state(s) in the **Store**.

The Store has been injected to the Component, so the View will update based on the store state change (it is subscribed).

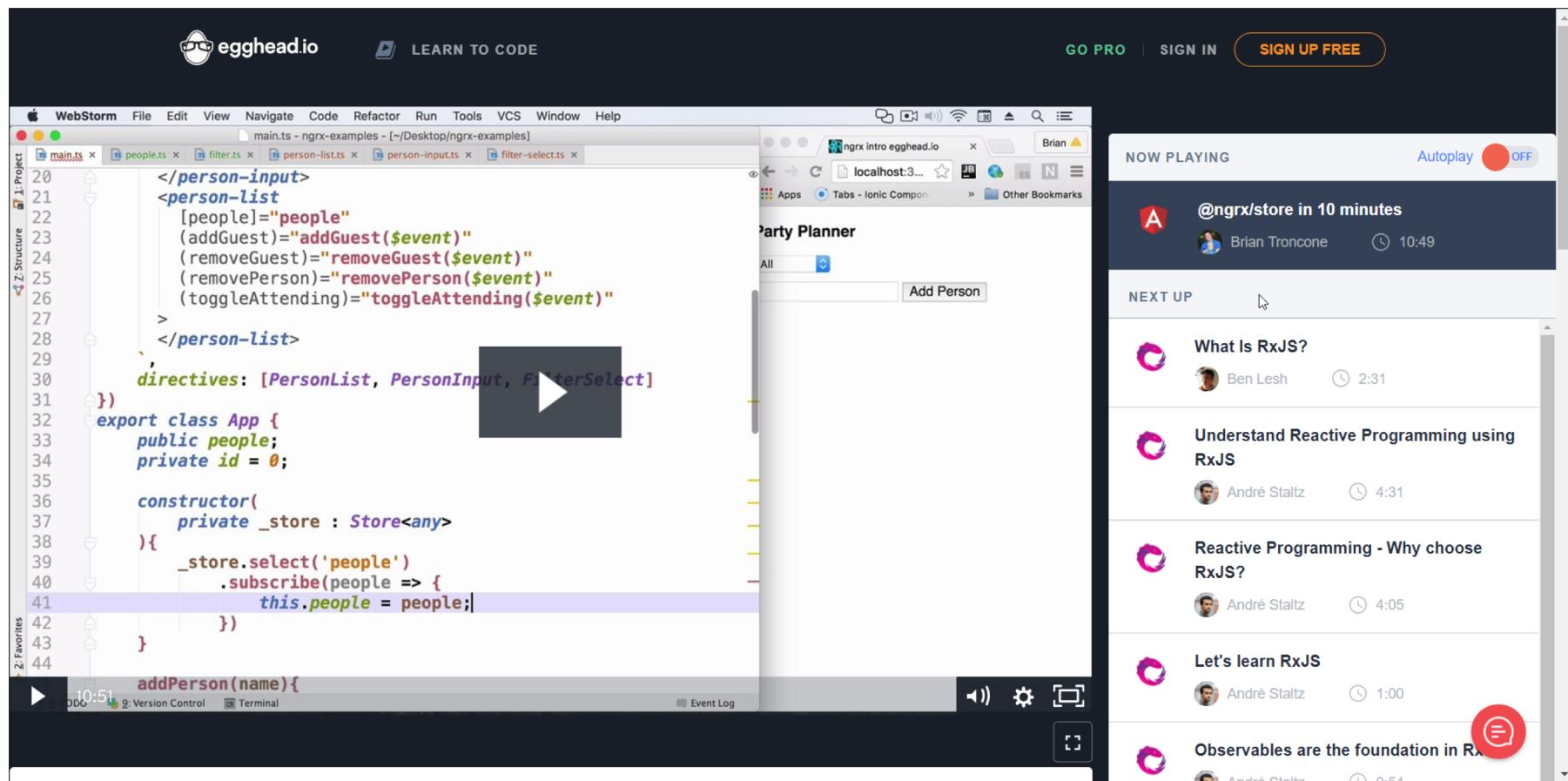
## REDUX ARCHITECTURE

# One-way dataflow



<https://platform.ultimateangular.com/courses/ngrx-store-effects/lectures/3788532>

# Store concepts in a video



<https://egghead.io/lessons/angular-2-ngrx-store-in-10-minutes>

# Setting up @ngrx/store

- Install core files & store files
- Create new project or add to existing project
- v2.x:

```
npm install @ngrx/core @ngrx/store --save
```

- V4.x +:

```
npm install @ngrx/store --save
```

# Different versions, different docs...

README.md

---

This repository is for version 2.x of @ngrx/store.

---

[Click here for the latest version \(4.x\)](#)

---

## @ngrx/store

---

RxJS powered state management for Angular applications, inspired by Redux

[chat](#) [on gitter](#) [circleci](#) [passing](#) [npm package](#) [4.1.1](#)

@ngrx/store is a controlled state container designed to help write performant, consistent applications on top of Angular. Core tenets:

- State is a single immutable data structure
- Actions describe state changes
- Pure functions called reducers take the previous state and the next action to compute the new state
- State accessed with the `Store`, an observable of state and an observer of actions

These core principles enable building components that can use the `OnPush` change detection strategy giving you [intelligent, performant change detection](#) throughout your application.

<https://github.com/ngrx/store>

# Different versions, different docs...

The screenshot shows the `README.md` file for the `@ngrx` repository on GitHub. The page is titled `README.md` and contains the following content:

- @ngrx**
- Reactive libraries for Angular
- Support**
  - backers 42
  - sponsors 5
  - chat on gitter
  - commitsizen friendly
- Packages**
  - [@ngrx/store](#) - RxJS powered state management for Angular applications, inspired by Redux
  - [@ngrx/effects](#) - Side Effect model for `@ngrx/store` to model event sources as actions.
  - [@ngrx/router-store](#) - Bindings to connect the Angular Router to `@ngrx/store`
  - [@ngrx/store-devtools](#) - Store instrumentation that enables a [powerful time-travelling debugger](#).
  - [@ngrx/entity](#) - Entity State adapter for managing record collections.
- Examples**
  - [example-app](#) - Example application utilizing `@ngrx` libraries, showcasing common patterns and best practices.
- Migration**
  - [Migration guide](#) for users of `ngrx` packages prior to 4.x.
- News**

<https://github.com/ngrx/platform>

# Migration guide (but Google is more useful):

## Dependencies

You need to have the latest versions of TypeScript and RxJS to use ngrx V4 libraries.

TypeScript 2.4.x

RxJS 5.4.x

## @ngrx/core

@ngrx/core is no longer needed, and can conflict with @ngrx/store. You should remove it from your project.

BEFORE:

```
import { compose } from '@ngrx/core/compose';
```

AFTER:

```
import { compose } from '@ngrx/store';
```

## @ngrx/store

### Action interface

The `payload` property has been removed from the `Action` interface. It was a source of type-safety issues, especially when used with `@ngrx/effects`. If your interface/class has a payload, you need to provide the type.

<https://github.com/ngrx/platform/blob/master/MIGRATION.md>

# 1. Create your first reducer

- A reducer is simply an exported function with a name.
- It takes two parameters:
  - Current state, or otherwise empty object/initial state
  - action, of type Action
- action is of shape {type : string, payload? : any}.
- NO DEFAULT payload in @ngrx/store >4.0.0
- Switch on action.type
  - Later: use abstraction. For now – a simple string
  - Always provide a default action which returns the unaltered state.

# New file – counter.ts

```
// counter.ts - a simple reducer
import {Action} from '@ngrx/store';

export function counterReducer(state: number = 0, action: Action) {
  switch (action.type) {
    case 'INCREMENT':
      return state + 1;

    case 'DECREMENT':
      return state - 1;

    case 'RESET':
      return 0;

    default:
      return state;
  }
}
```

## 2. Adding store and reducer

- Register the state container with your application.
- Import reducers
- V.4.0.0: Use `StoreModule.forRoot()` to add it to the module

...

```
// Store stuff
```

```
import {StoreModule} from '@ngrx/store';
```

```
import {counterReducer} from './reducers/counter';
```

```
@NgModule({
```

...,

```
imports : [
```

```
    BrowserModule,
```

```
    StoreModule.forRoot({counter: counterReducer})
```

```
],
```

...

```
})
```

```
export class AppModule {}
```

### 3. Using the Store Service

- Import and inject the `Store` service to components
- Create an interface (or class) for your `AppState`
- Initialize the store with `AppState Type`
- Use `store.select()` to select slice(s) of the state
- Add methods to call reducer functions
  - `increment()`
  - `decrement()`
  - etc..

```
import {Component} from '@angular/core';
import {Store} from '@ngrx/store';
import {Observable} from 'rxjs/Observable';

interface AppState {
  counter: number;
}

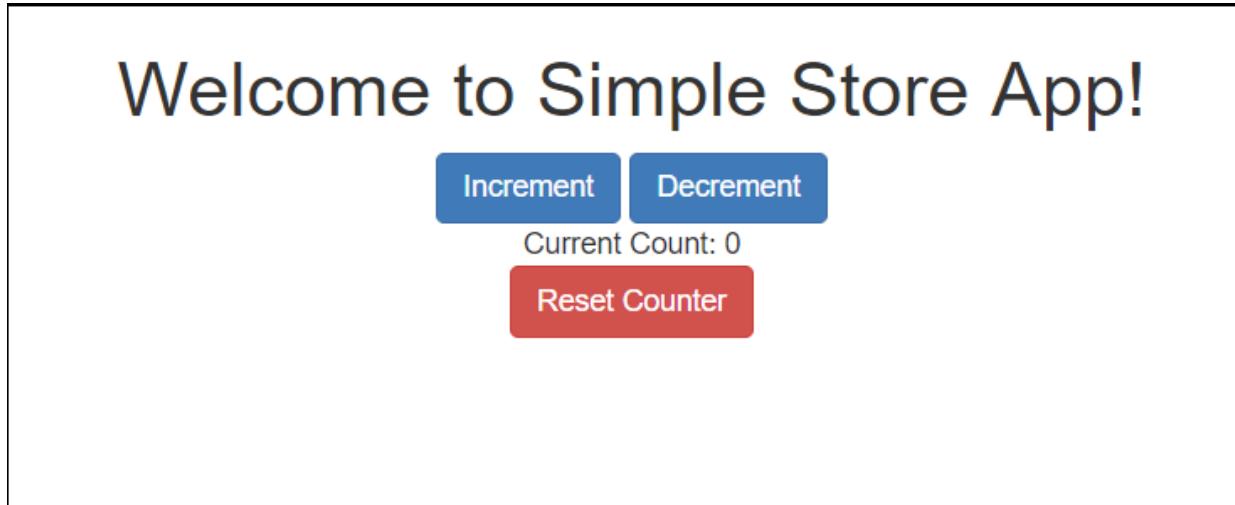
@Component({
  selector : 'app-root',
  templateUrl: './app.component.html'
})
export class AppComponent {
  counter$: Observable<number>;

  constructor(private store: Store<AppState>) {}

  ngOnInit() {
    this.counter$ = this.store.select('counter')
  }

  increment() {
    this.store.dispatch({type: 'INCREMENT'})
  }
  ...
}
```

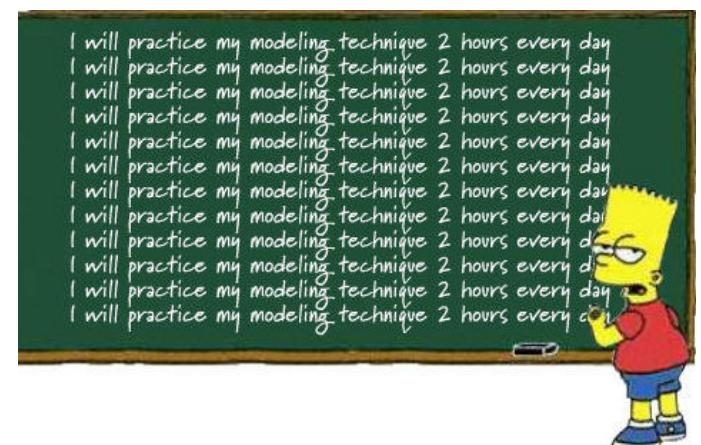
# Next steps



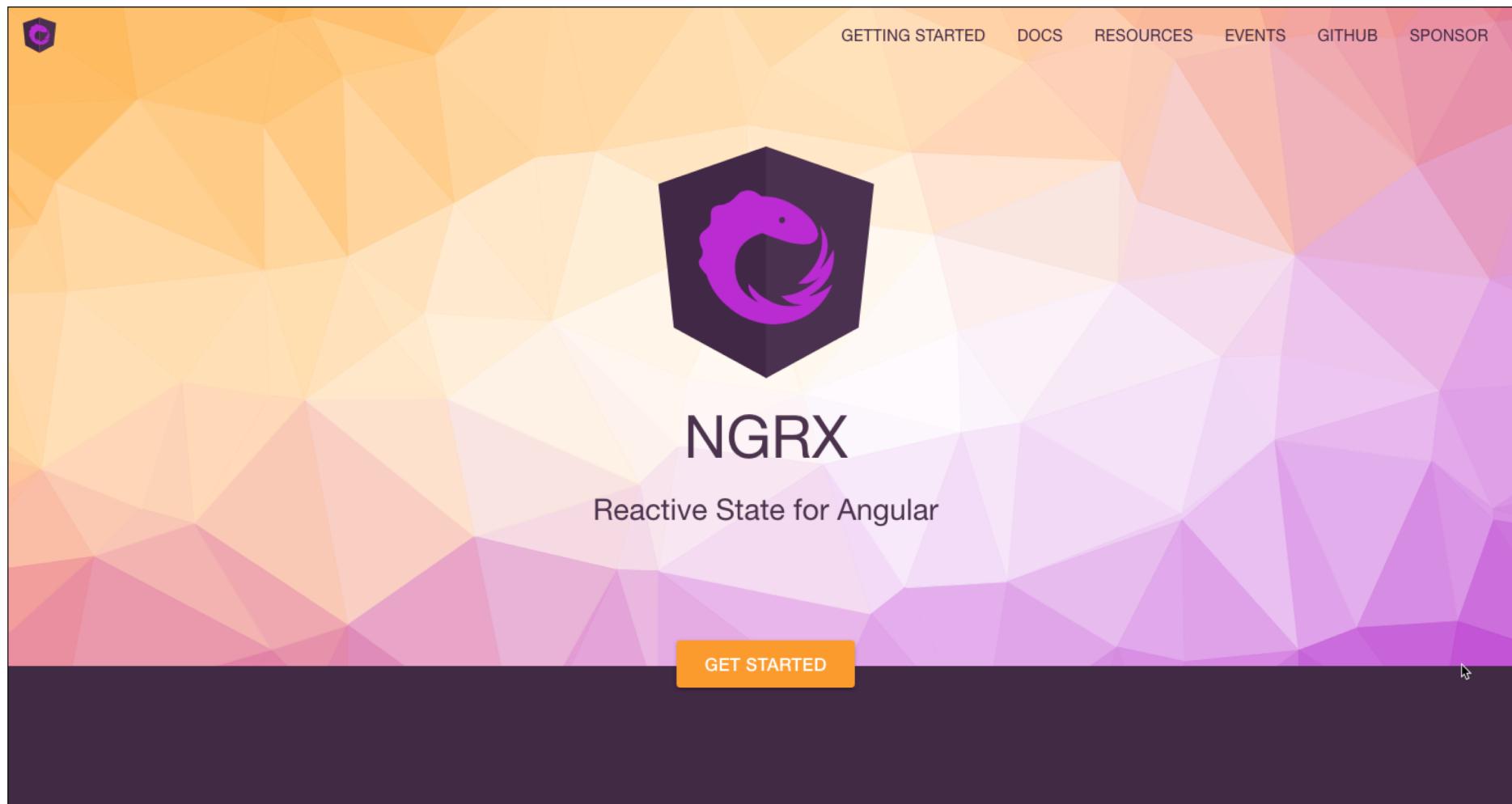
Add new components, subscribe to store,  
enhance store, etc.

# Workshop

- Create a new app, follow the previous steps to add a Store
- OR: Start from `../200-ngrx-simple-store`
- Make yourself familiar with the store concepts and data flow. Study the example code.
- Create some extra actions on the reducer. For example:
  - Add +5 with one click
  - Subtract -5 with one click
  - Reset counter to 0 if `counter >= 10;`



# Official site



<https://ngrx.io/>

# More info on @ngrx/store

The screenshot shows a GitHub Gist page for a file named 'ngrxintro.md' by user 'btroncone'. The page has a dark header with 'GitHubGist' and a search bar. Below the header, the author's profile picture and name 'btroncone / ngrxintro.md' are displayed, along with the note 'Last active 18 hours ago'. The gist has 602 stars and 77 forks. The 'Code' tab is selected, showing the content of the Markdown file. The content includes a header '#Comprehensive Introduction to @ngrx/store By: @BTroncone', a link to 'Also check out my lesson @ngrx/store in 10 minutes on egghead.io!', and a note about updates. A table of contents follows.

## Table of Contents

- Overview
  - Introduction
  - Core Concepts
  - Not Your Classic Angular
  - Advantages of Store
- Building Blocks of @ngrx/store
  - Exploration of Subject / Dispatcher
  - Exploration of BehaviorSubject / Store
  - Store + Dispatcher Data Flow
  - What's A Reducer?
  - Aggregating State with scan
  - Managing Middleware with let
  - Slicing State with map
  - Managing Updates with distinctUntilChanged

<https://gist.github.com/btroncone/a6e4347326749f938510>

# Gitbooks

Overview  
Create our first app  
Add Component  
  Component 101  
  Add ChatComponent  
Add Pipe  
Add Form  
Add Service  
  Update ChatComponent  
  Add ChatService  
Smart and Dumb Component  
ChangeDetectionStrategy  
Add Router  
  Add Routes  
  Add ProfileComponent and Ro...  
Finish the app  
Part III RxJS 5  
Part IV Add ngrx  
  Add ngrx/store  
  Add ngrx/effects  
  Finish the rest part  
Part V Add REST  
Part VI Update to Apollo

## Add ngrx/store

### Dataflow

ngrx/store is RxJS powered state management for Angular 2 apps, inspired by [Redux](#). It helps us manage all states in one place (Store).

Without ngrx/store, the **Component** updates the View directly.

```
graph LR; View[View] --> Component[Component]
```

With ngrx/store, the dataflow looks like this. The **Component** first dispatch an Action. When the **Reducer** gets the Action, it will update the states in the **Store**.

The Store has been injected to the Component, so the View will update based on the store state change.

```
graph LR; View[View] --> Component[Component]; Component -- Dispatch Action --> Reducer[Reducer]; Reducer --> Store[Store]; Store --> Component
```

## Add ngrx/store

Published with GitBook

<https://hongbo-miao.gitbooks.io/angular2-server/content/part4/add-ngrx-store.html>

# OneHungryMind – Lukas Ruebelke

The screenshot shows a blog post on the OneHungryMind website. The header features the site's logo (a brain icon) and the text "ONEHUNGRY MIND". A navigation link "ABOUT" is visible in the top right corner. The main title of the post is "Build a Better Angular 2 Application with Redux and ngrx". Below the title, the author is listed as "Lukas Ruebelke". The central image for the post is a photograph of a railway track leading into a sunset, with the Angular logo (a red hexagon with a white 'A') and the ngrx logo (a pink circular icon) superimposed on the tracks. The post title "The Evolution of Angular State Management" is displayed at the bottom of the post area.

<http://onehungrymind.com/build-better-angular-2-application-redux-ngrx/>

# Dzone article

The screenshot shows a DZone article page. At the top, there's a navigation bar with links for REF CARDZ, GUIDES, ZONES, and various technology categories like AGILE, BIG DATA, CLOUD, DATABASE, DEVOPS, INTEGRATION, IOT, JAVA, MOBILE, PERFORMANCE, SECURITY, and WEB DEV. There's also a search icon and a user profile icon. The main title of the article is "Managing State in Angular with ngrx/store" by Kim Maida. Below the title, a brief description states: "In this article, we'll explore managing state with an immutable data store in an Angular application using ngrx/store: reactive Redux for Angular." The author's profile picture is shown next to the name. The article was published on Mar. 15, 17, and is categorized under Web Dev Zone. Below the author info, there are social sharing icons for Like (3), Comment (1), Save, and Tweet, and a view count of 4,711. A call-to-action button says "JOIN FOR FREE". Further down, there's a promotional message for Crafter CMS, followed by another section titled "Managing State in Angular Apps" with a "Subscribe" button.

<https://dzone.com/articles/managing-state-in-angular-with-ngrxstore>

# Rob Wormald - co-created @ngrx/store



<https://www.youtube.com/watch?v=mhA7zzZ23Odw> - and more

# Online Training by Todd Motto

The screenshot shows the homepage of the Ultimate Angular website. At the top, there's a navigation bar with links for Courses, About, Shop, Reviews, and Login. The main title "Ultimate Angular™" is displayed with a logo. Below the navigation, the title "NGRX Store + Effects" is prominently shown. Underneath the title, it says "with Todd Motto" next to a small profile picture, "41 lessons 7 hours", and "ngrx:v4". A descriptive text block follows: "Master reactive and highly performant state management for Angular apps. Everything you need on structuring data, entities, selectors, the Redux pattern, side effects and immutability, through to preloading, router state and testing. All as we build out a real-world application, end to end." At the bottom of the page, there are several promotional boxes: "Stream or download" (with a note about learning at home or on the commute), "Free lifetime updates" (noting unlimited updates forever), "Slack community" (with a link to the Slack channel), and "Expert trainers" (with a link to the trainers' profiles). To the right, a "Single course" section is shown for "ngrx Store + Effects", marked as "NEW".

<https://ultimateangular.com/ngrx-store-effects>

# Think about this – “The Ugly side of Redux”

Upgrade

# Medium

Applause from John Papa and 26 others

Nir Yosef [Follow](#)  
Dec 13 · 10 min read

## The ugly side of Redux

In this post I will briefly explain Redux at a very high level for those of you who don't already know it, I will try to convince you why Redux is actually promoting an anti-pattern (the singleton global store), and I'll show you my own alternative called [Controllerim](#).

### What is Redux

Let's start from the very beginning and try to define Redux. In the Redux repo you can find this definition:

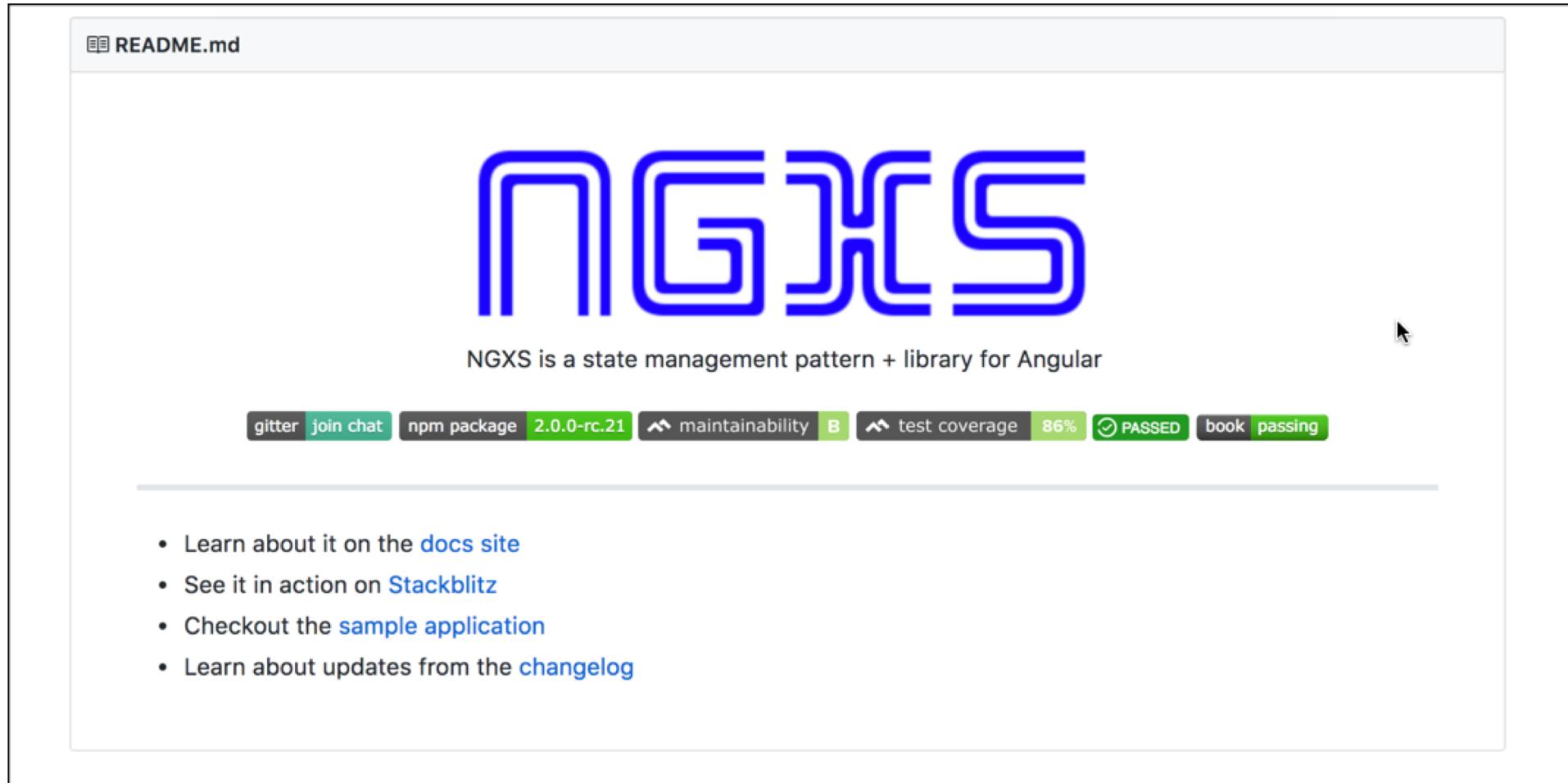
*Redux is a predictable state container for JavaScript apps.*

Simple isn't it? You just take Redux and put a state inside it, and everything

186 Next story [React-Native Tutorial #3— Int...](#)

<https://medium.com/@niryo/the-ugly-side-of-redux-6591fde68200>

# Alternative State Management solution



The screenshot shows the GitHub README page for the NGXS project. At the top left is a link to 'README.md'. Below the title is the large blue NGXS logo. A subtitle reads 'NGXS is a state management pattern + library for Angular'. Below the logo are several GitHub badges: 'gitter' (join chat), 'npm package' (version 2.0.0-rc.21), 'maintainability' (B), 'test coverage' (86%), 'PASSED' (circle icon), 'book' (passing). A horizontal line separates this from a bulleted list of links:

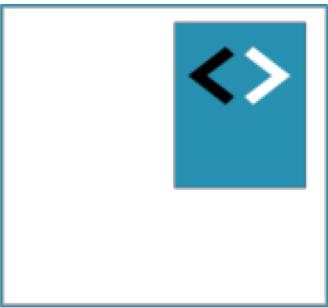
- Learn about it on the [docs site](#)
- See it in action on [Stackblitz](#)
- Checkout the [sample application](#)
- Learn about updates from the [changelog](#)

<https://github.com/amcdnl/ngxs>

# Akita – another state management alternative

The screenshot shows a blog post on a website. At the top left, there's a user icon (a black 'M') and a profile picture of a person with a colorful patterned background. To the right of the profile picture are three small icons: a magnifying glass, a bell, and a user profile. Below the header, the main title of the post is displayed: "🚀 Introducing Akita: A New State Management Pattern for Angular Applications". To the left of the title is a small circular icon containing a colorful pattern. Below the title, the author's name, "Netanel Basal", is listed next to a small circular profile picture, followed by the date "Jun 12, 2018 · 4 min read". The main content of the post is a large, hand-written style text "HELLO MY NAME IS" written in white chalk on a dark green chalkboard.

<https://netbasal.com/introducing-akita-a-new-state-management-pattern-for-angular-applications-f2f0fab5a8>



# Sample Store apps

Some study material

# Ngrx store platform sample app

The screenshot shows the GitHub repository page for `ngrx / platform`. The repository has 220 pull requests, 4,448 stars, and 1,142 forks. The master branch is selected, and the commit history for the `platform / projects / example-app` directory is displayed. The commits are as follows:

Commit	Message	Date
<code>src</code>	feat(example): make the example app more user friendly (#1508)	2 months ago
<code>README.md</code>	docs(example): update stackblitz link (#1277)	6 months ago
<code>browserslist</code>	chore(example): move example app into projects folder (#1242)	6 months ago
<code>jest.config.js</code>	feat: update angular dependencies to V7	4 months ago
<code>karma.conf.js</code>	chore(example): move example app into projects folder (#1242)	6 months ago
<code>tsconfig.app.json</code>	feat: update angular dependencies to V7	4 months ago
<code>tsconfig.spec.json</code>	chore(example): move example app into projects folder (#1242)	6 months ago
<code>tslint.json</code>	chore(example): move example app into projects folder (#1242)	6 months ago
<code>README.md</code>		

**@ngrx example application**

<https://github.com/ngrx/platform/tree/master/projects/example-app>

# Store tutorial from scratch

ANGULAR

## Angular NgRx Store Tutorial Example From Scratch

### Angular 5 ngrx/store Tutorial

By  Krunal — Last updated Oct 23, 2018

Share       

 25,859 |  11



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<https://appdividend.com/2018/01/31/angular-ngrx-store-tutorial-example-scratch/>