

YOU DON'T KNOW MOBXSTATETREE

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{codemotion}



HI I'M MAX GALLO

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AGENDA

- » Part One: MobX
- » Part Two: MobX State Tree
- » Part Three: Designing a Reactive Project

PART ONE

MOBX

Mu

The logo for Mu is displayed in a large, bold, dark blue sans-serif font. The letters are partially cut off by a thick vertical white line on the left and a thick horizontal white line at the bottom. The letter 'M' has a vertical green bar on its left side. The letter 'u' has a vertical green bar on its left side. The letter 'B' has a vertical green bar on its left side. The letter 'x' has a vertical green bar on its left side.

- » State Management Library
- » Flexible / Unopinionated
- » Transparent Reactive Programming
- » Helps decoupling View from Business Logic

MOBX OBSERVABLES & REACTIONS

```
import { observable, autorun} from 'mobx';

const album = observable({
  title: 'Californication',
  playCount: 0,
});

autorun(() => console.log(`New play count: ${album.playCount}`))
// New play count: 0

album.playCount = 1; // New play count: 1

album.playCount = 24; // New play count: 24
```

MOBX COMPUTED VALUES

```
import { observable, autorun, computed} from 'mobx';

const album = observable({
  title: 'Californication',
  playCount: 0,
}):

const all = computed(() => album.title + album.playCount);

autorun(() => console.log(all))
// Californication0

album.playCount = 1;          // Californication1
album.title = 'OkComputer'; // OkComputer1
album.playCount = 24;        // OkComputer24
```

MOBX RECAP

Observable state

Mutable Application State

Reactions

Side effects like autorun or updating a React component

Computed Values

Automatically derived values, lazily evaluated

PART TWO

MOBX STATE TREE

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 43   window.innerHeight,
 44   scrolls,
 45   getRowHeight,
 46   getOffset
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MOBX STATE TREE

- » Powered by MobX
- » Runtime typed Application State
- » Opinionated & ready to use
- » Relies on the concept of Trees (Stores)

WHAT'S A TREE/STORE?

```
import { types } from 'mobx-state-tree';

const AlbumStore = types
  .model('Album', {
    title: types.string,           // mobx observable
    rating: types.integer,        // mobx observable
  })
  .views(self => ({
    get isGood() {                // mobx computed
      return self.rating >= 7
    }
  }));
}

const okComputer = AlbumStore
  .create({ title: 'Ok Computer', rating: 8 });

console.log(okComputer.isGood); // true
```

MOBX STATE TREE STORES



```
1 const AlbumStore = types.model('Album',...)
2
3
4 const MusicLibraryStore = types
5   .model('MusicLibrary', {
6     albums: types.array(AlbumStore), // -----> Model
7   })
8   .views(self => {
9     get goodAlbums() { // -----> View
10       return self.albums.filter(x => x.isGood)
11     }
12   })
13   .actions(self => {
14     addAlbum(album) { // -----> Action
15       self.albums.push(album);
16     },
17   });
18
19 const musicLibrary = MusicLibraryStore.create(
20   { albums: [ { title: 'Rumours', rating: 9 } ] }
21 );
22
23 musicLibrary.addAlbum({ title: 'Harvest', rating: 8 });
24 musicLibrary.addAlbum({ title: 'Ten', rating: 9 });
```

Model

- » Mutable observable state
- » Runtime type information
- » Could contain other trees

Views

MobX computed values

Actions

The only way to update the model

MOBX STATE TREE

**HOW TO CONNECT
THE STORES
WITH THE VIEW?**



```
1 /** ----- App.js ----- */
2
3 import { Provider }      from 'mobx-react'
4 import App               from './App.js'
5 import ShopStore         from './Shop.store.js'
6 import NavigationStore  from './Navigation.store.js'
7
8 const shopStore = ShopStore.create()
9
10 ReactDOM.render(
11   <Provider
12     shop={shopStore}
13     navigation={navigationStore}
14   >
15     <App />
16   </Provider>,
17   document.getElementById('root')
18 )
```



```
1 /** ----- CheckoutView.js ----- */
2
3 import React             from 'react'
4 import { inject, observer } from 'mobx-react'
5
6 @inject('shop') @observer
7 class CheckoutView extends React.Component {
8   render() {
9     const { shop } = this.props;
10    return (
11      { shop.checkoutAmount }
12    );
13  }
14 }
```

MOBX STATE TREE STORES

DEEP DIVE



- » Mutable and Immutable (Snapshots, Time Travelling)
- » Composition
- » Lifecycle Methods
- » Dependency Injection



MOBX STATE TREE STORES

DEPENDENCY

INJECTION

```
1 import { getEnv, types } from 'mobx-state-tree';
2
3 const MusicLibraryStore = types
4   .model('MusicLibrary', {
5     albums: types.array(types.string),
6   })
7   .actions(self => ({
8     downloadAlbums() {
9       getEnv(self).getAlbumsFromBackend()
10      .then(albums => self.albums = albums);
11    }
12  }));
13
14 const getAlbumsFromBackend = function() {
15   /** Fetching albums from Backend **/
16 }
17
18 const musicLibrary = MusicLibraryStore.create(
19   { albums: ['Who\'s Next'] }, // Initial state
20   { getAlbumsFromBackend } // Environment
21 );
```

- » Inject anything
- » Environment is shared per tree
- » Useful for testing

PART THREE

DESIGNING A REACTIVE PROJECT

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" Press ? for help
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 43   window.innerHeight,
 44   scrolls,
 45   getRowHeight,
 46   getOffset
 47 )
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DESIGNING STORES



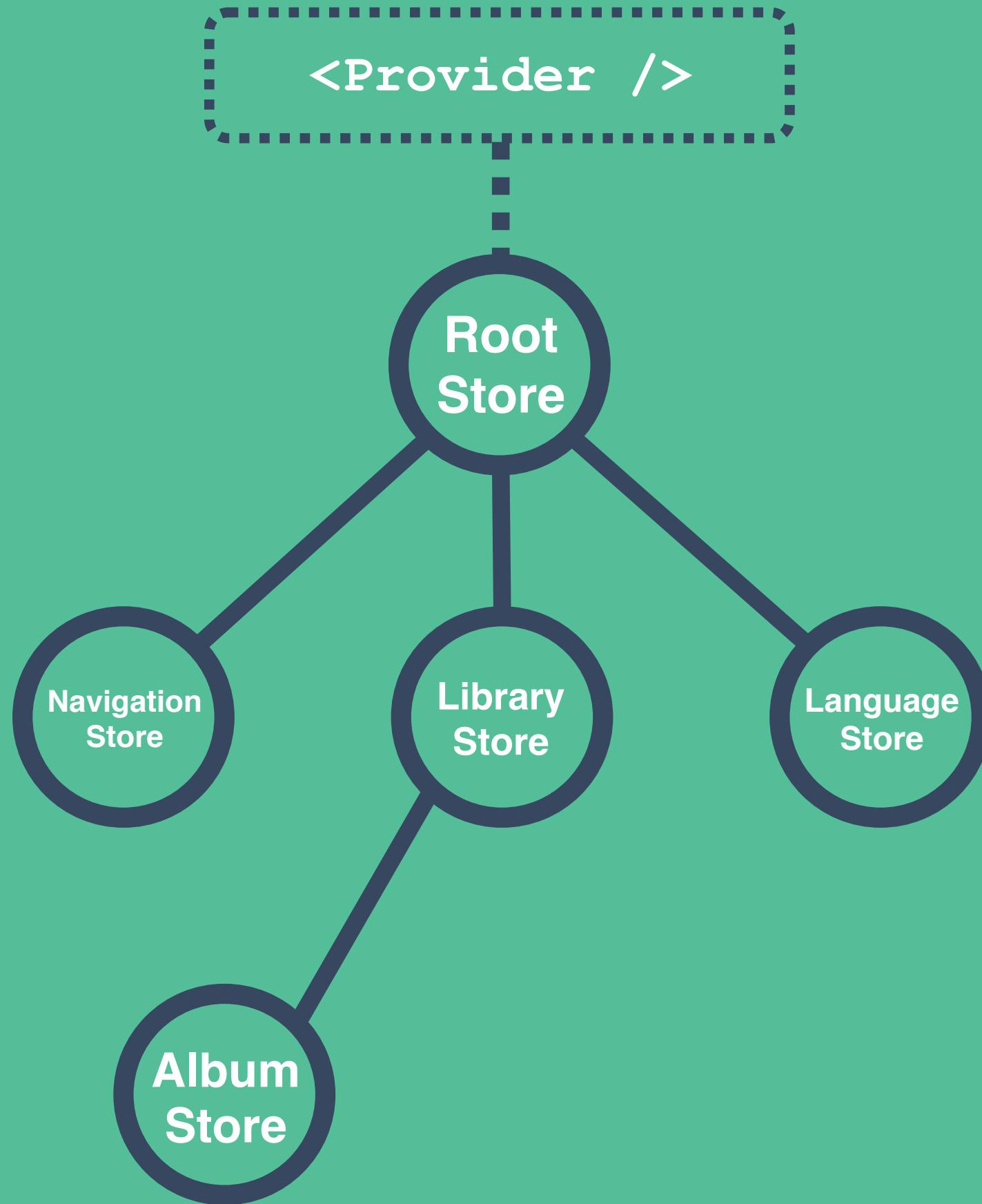
1. Shape your Trees

One Root Store vs Multiple Root Stores

2. Stores Communication

How Stores communicate between each other

SHAPE YOUR TREES ONE ROOT STORE



Pros

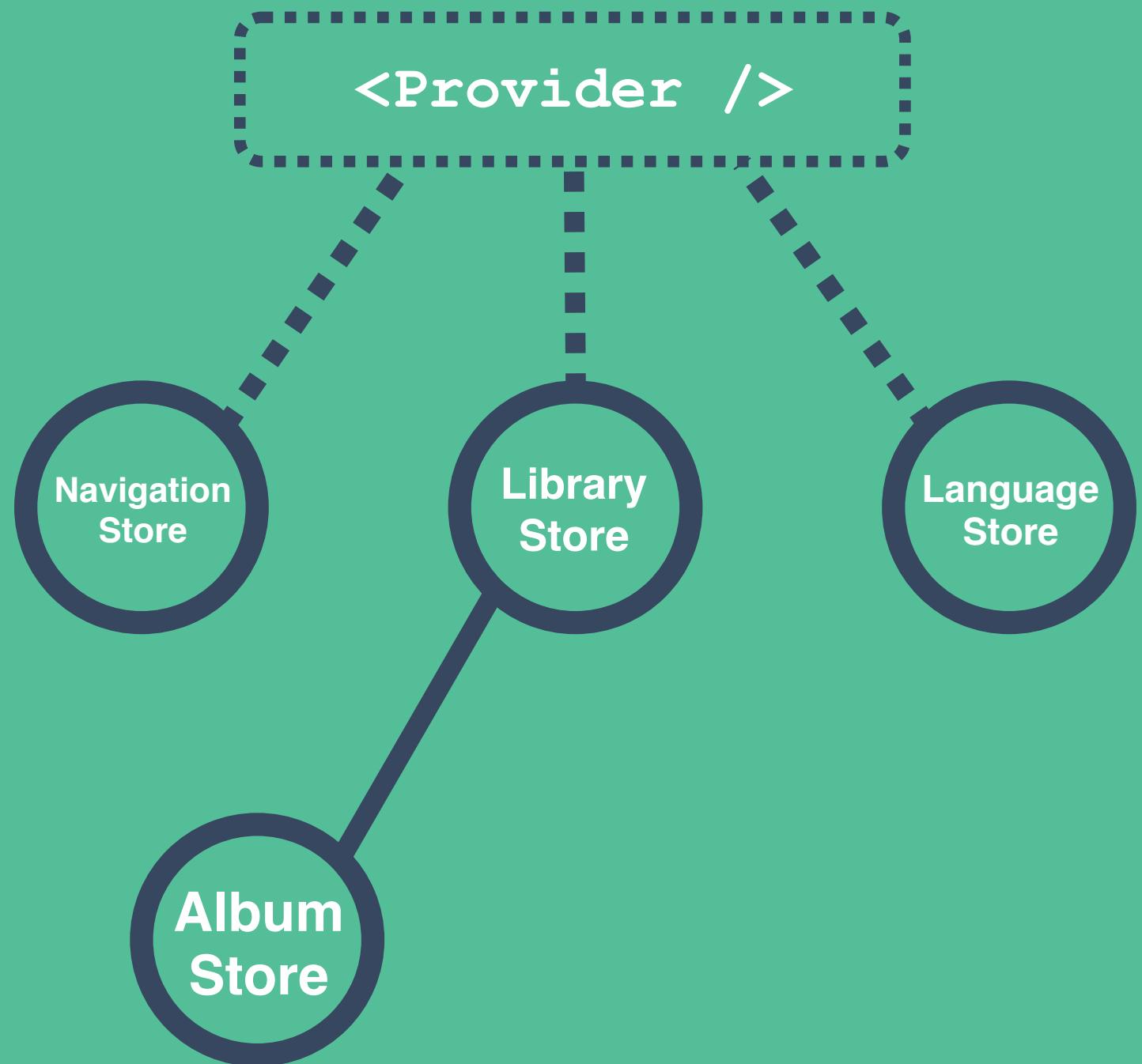
- » Easier to perform actions on everything at once (snapshot, creation, destroy).
- » Unique environment for dependency injection.

Cons

Very easy to create tightly coupled stores

SHAPE YOUR TREES

MULTIPLE ROOT STORES



Pros

Easier to reason by Domain

Cons

- » Less immediate to perform actions on everything
- » Not single environment for dependency injection

REAL WORLD STORES COMMUNICATION



1. Default Approach
2. Actions Wrapper
3. Dependency Injection



STORES COMMUNICATION DEFAULT APPROACH

```
1 /** ----- Root.store.js ----- */
2
3 import { types } from 'mobx-state-tree';
4
5 const RootStore = types
6   .model('RootStore', {
7     navStore : types.maybe(NavStore),
8     pageStore : types.maybe(PageStore)
9   })
10
11 /** ----- Page.store.js ----- */
12
13 import { types, getParent } from 'mobx-state-tree';
14
15 const PageStore = types
16   .model('PageStore', {
17     currentView : types.option(types.string, '')
18   })
19   .actions(self => {
20     showLoginForm() {
21       self.currentView = 'login';
22       getParent(self).navStore.setPath('/login')
23     },
24   });

```

Each Store access directly other Stores.

- » Easier when using a Single Root Store

- » Each Store could end up knowing the whole structure



STORES COMMUNICATION ACTIONS WRAPPER



```
1 import { types, getParent } from 'mobx-state-tree'
2
3 const ActionsWrapperStore = types
4   .model('ActionsWrapperStore', {})
5   .actions(self => ({
6     login() {
7       authStore.login()
8       pageStore.login()
9       navigationStore.login()
10    },
11    goHome() {
12      pageStore.showDefault();
13      navigationStore.login()
14    }
15  }));

```

One Store,
to rule them all 

- » Calls directly other Stores
- » Friendly interface
- » Knows a lot about your App



```
1 /** ----- Region.store.js ----- */
2 const RegionStore = types
3   .model('RegionStore', {
4     region: types.optional(types.string, 'UK')
5   })
6
7 /** ----- Navigation.store.js ----- */
8 import { types, getEnv } from 'mobx-state-tree';
9
10 const NavigationStore = types
11   .model('NavigationStore', { path: types.string })
12   .view(self => {
13     get urlPath() {
14       return getEnv(self).regionStore.region
15         + '/' + self.path;
16     }
17   });
18
19 /** ----- index.js ----- */
20 const regionStore = RegionStore.create({});
21 const navigationStore = NavigationStore.create(
22   { path: 'login' },
23   { regionStore }
24 );
25
26 console.log(navigationStore.urlPath); // 'UK/login'
```

STORES COMMUNICATION DEPENDENCY INJECTION

Injecting one or multiple stores into another one.

- » You could use it for both Actions and Views
- » Circular dependencies while loading could be non-trivial

ONE MORE THING . . .





STORE COMPOSITION

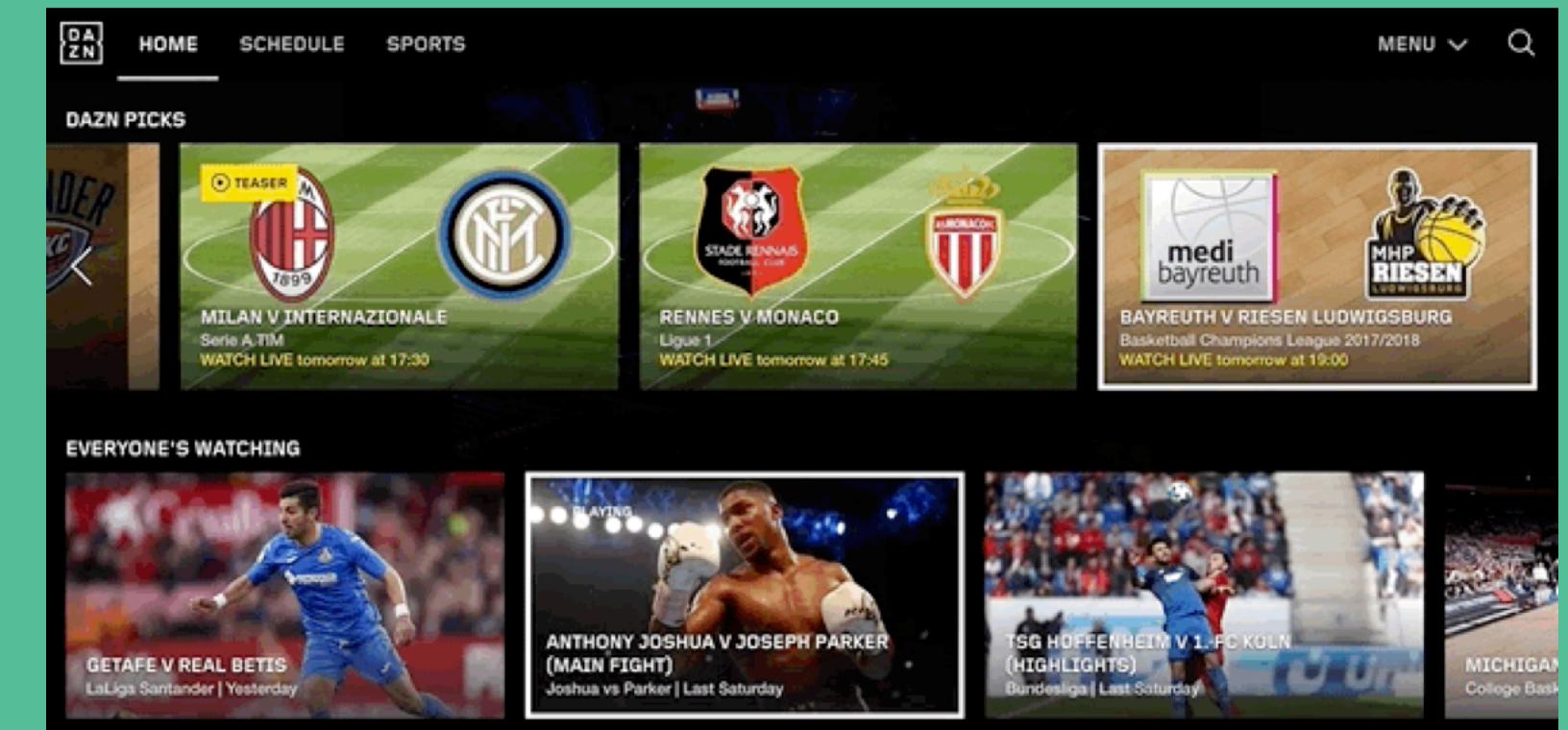
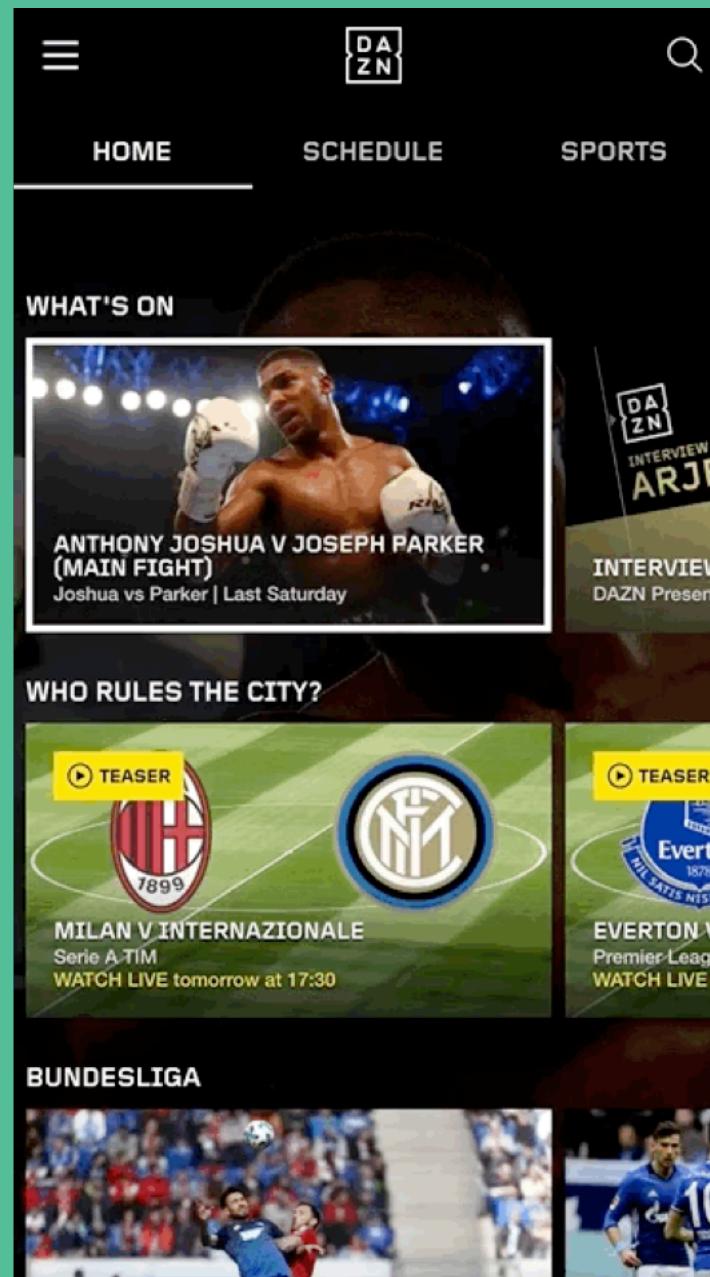
```
1 const DataStore = types
2   .model('DataStore', {
3     itemArray: types.array(types.string)
4   });
5
6 const BigStore = types
7   .model('BigStore', {})
8   .views(self => ({
9     get updatedArray(){
10       return self.itemArray.map(x => `big ${x}`);
11     }
12   }));
13
14
15 const BigDataStore = types.compose(DataStore, BigStore);
16
17 const bigDataStore = BigDataStore.create({
18   itemArray: ['pen', 'sword']
19 });
20
21 bigDataStore.itemArray // ['pen', 'sword']
22 bigDataStore.updatedArray // ['big pen', 'big sword']
```

Two or more stores can be composed

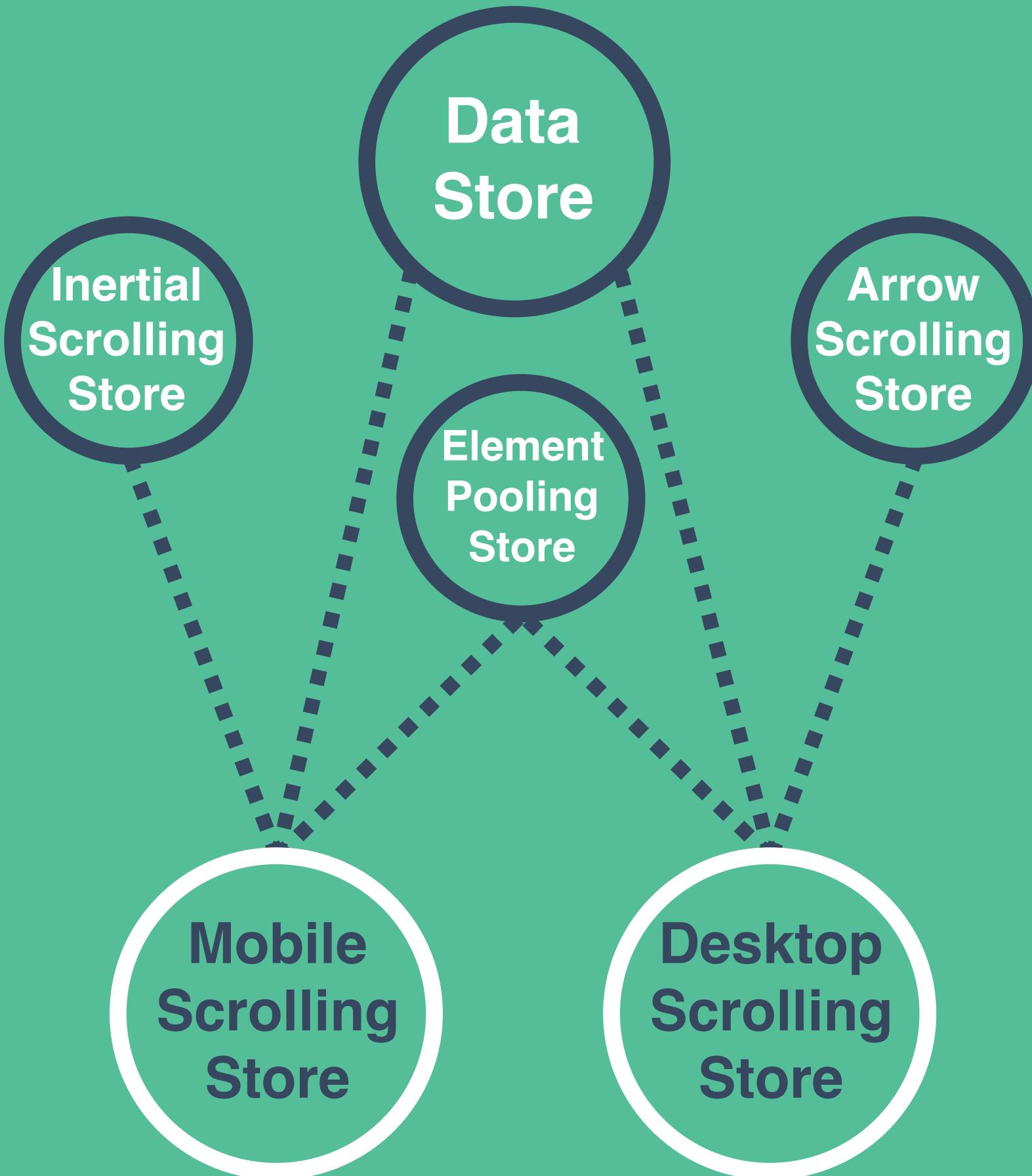
- » Separation of Concerns

- » Reusability

COMPOSITION REAL WORLD EXAMPLE



COMPOSITION REAL WORLD EXAMPLE



Data Store

Holds the data to render

Inertial/Arrow Scrolling

Manages scrolling

Element Pooling Store

Renders only in view

CONCLUSIONS

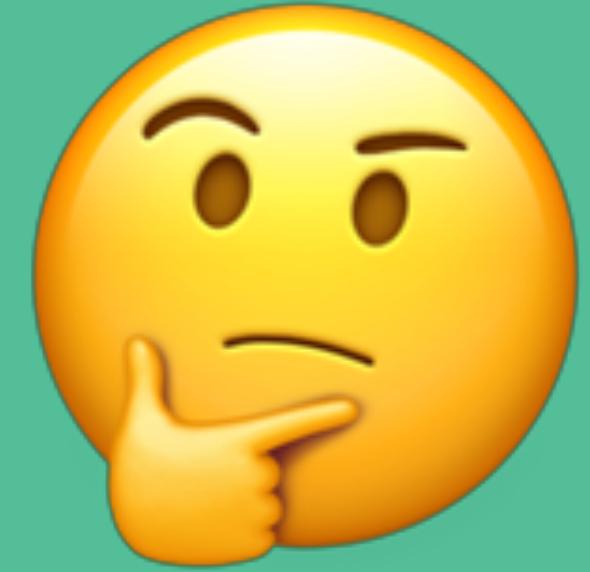
DERIVE EVERYTHING

CONCLUSIONS

DERIVE EVERYTHING

Next time you're adding properties to the Model,
ask yourself first

CAN I DERIVE IT?



“Anything that can be derived from the application state, should be derived. Automatically”
- Michel Weststrate

TAKEAWAYS



- » MobX opens the doors of Reactive Programming
- » MobX State Tree provides a structure
- » Shape your tree & setup the communication
- » Embrace Composition!
- » Embrace Reactivity!

THANKS

👉 github.com/maxgallo/you-dont-know-mobx-state-tree
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twitter @_maxgallo
web maxgallo.io