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The first Hub for Developers

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MobX

Code.Learn Program:
React

State management

- refers to the management of the state of one or more user interface controls
- the state of one UI control depends on the state of other UI controls

local vs global scope

a bug can impact anything and everything in scope

huge global state objects → huge global bugs

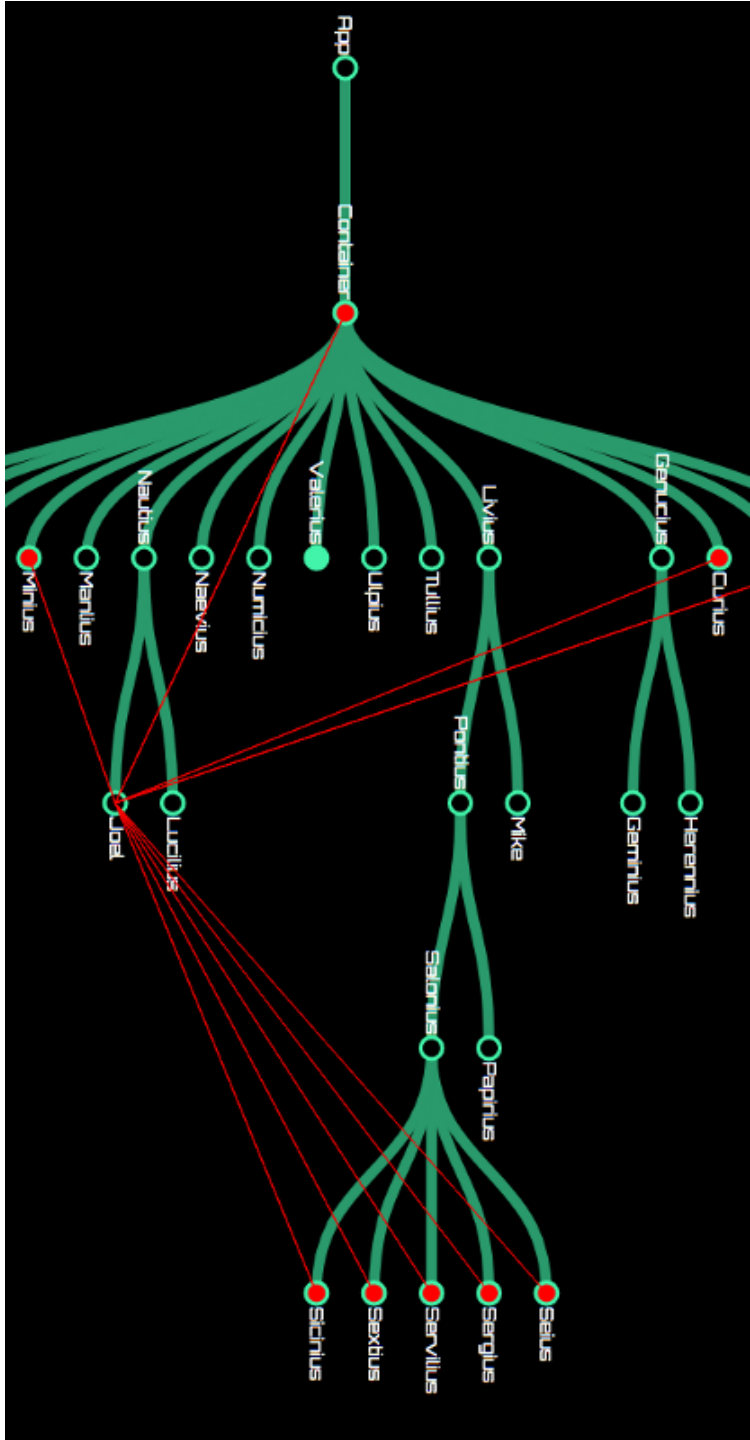
tiny state objects → tiny localised bugs

state and props

- both props and state are plain JS objects
- both props and state changes trigger a render update
- both props and state are deterministic. If your component generates different outputs for the same combination of props and state then you're doing something wrong

Vanilla React

state management primitives:
immutable props and mutable state



Good or Bad?

In React there is a lot of freedom to solving your structural and architectural problems

Questions about store

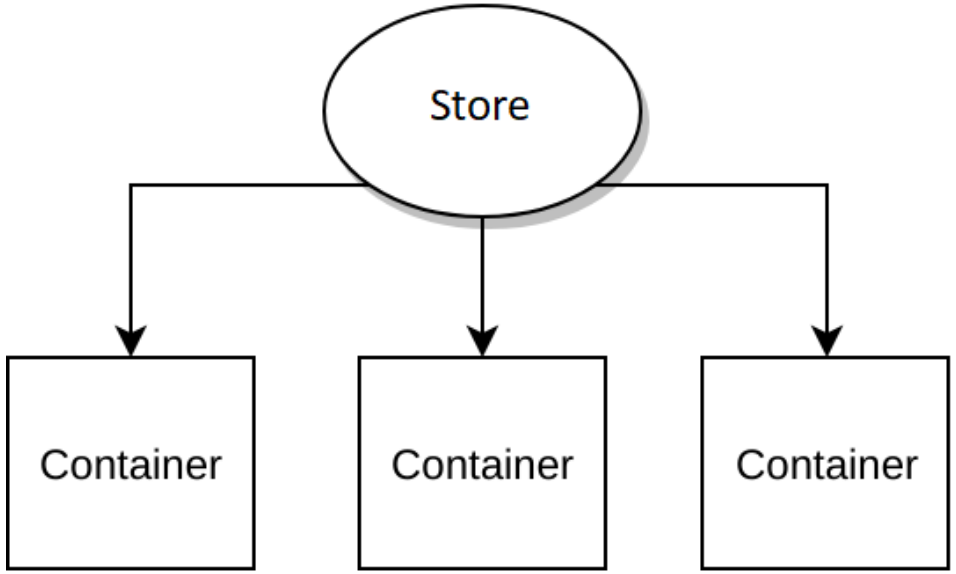
- does this application need store?
- if so, how much state should store be responsible for?
- how smart should the smart components be?
- how dumb should the dumb components be?
- what components should be responsible for affecting and consuming global state?

State Definitions

- Global State
- Component State
- Relative State
- Provided State

Global State

State that is maintained outside of the component tree. The state that is held here is accessible from anywhere in the application.

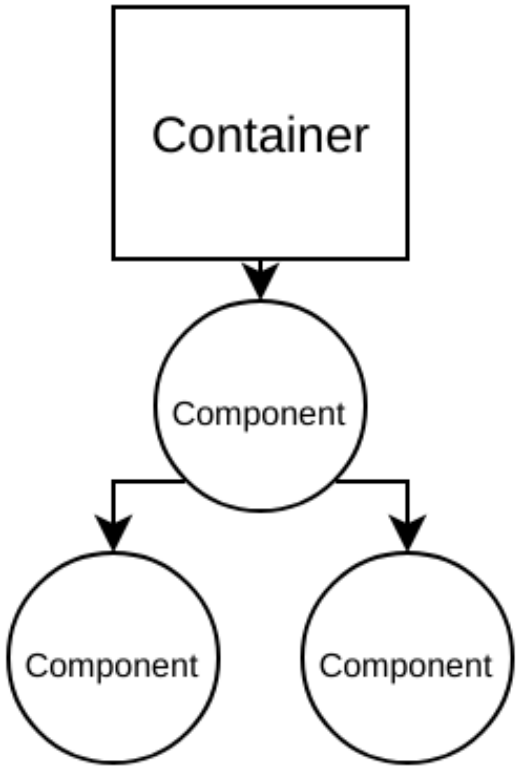


Component State

State that is held within a component and manipulated with this.setState

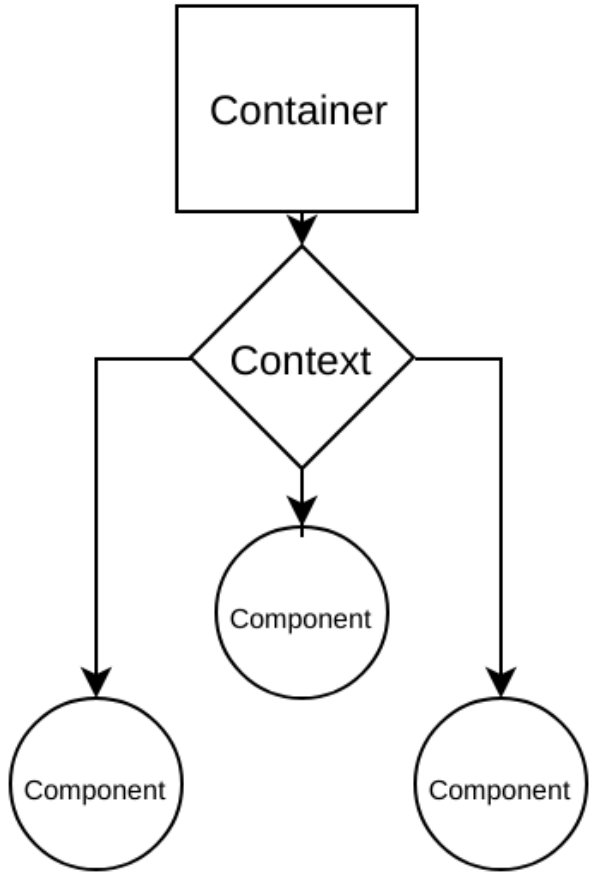
Relative State

State that is passed from parent to child down the component tree.



Provided State

The state is placed into a context by a provider. It can then be consumed by components individually without the need to be passed down the component tree.

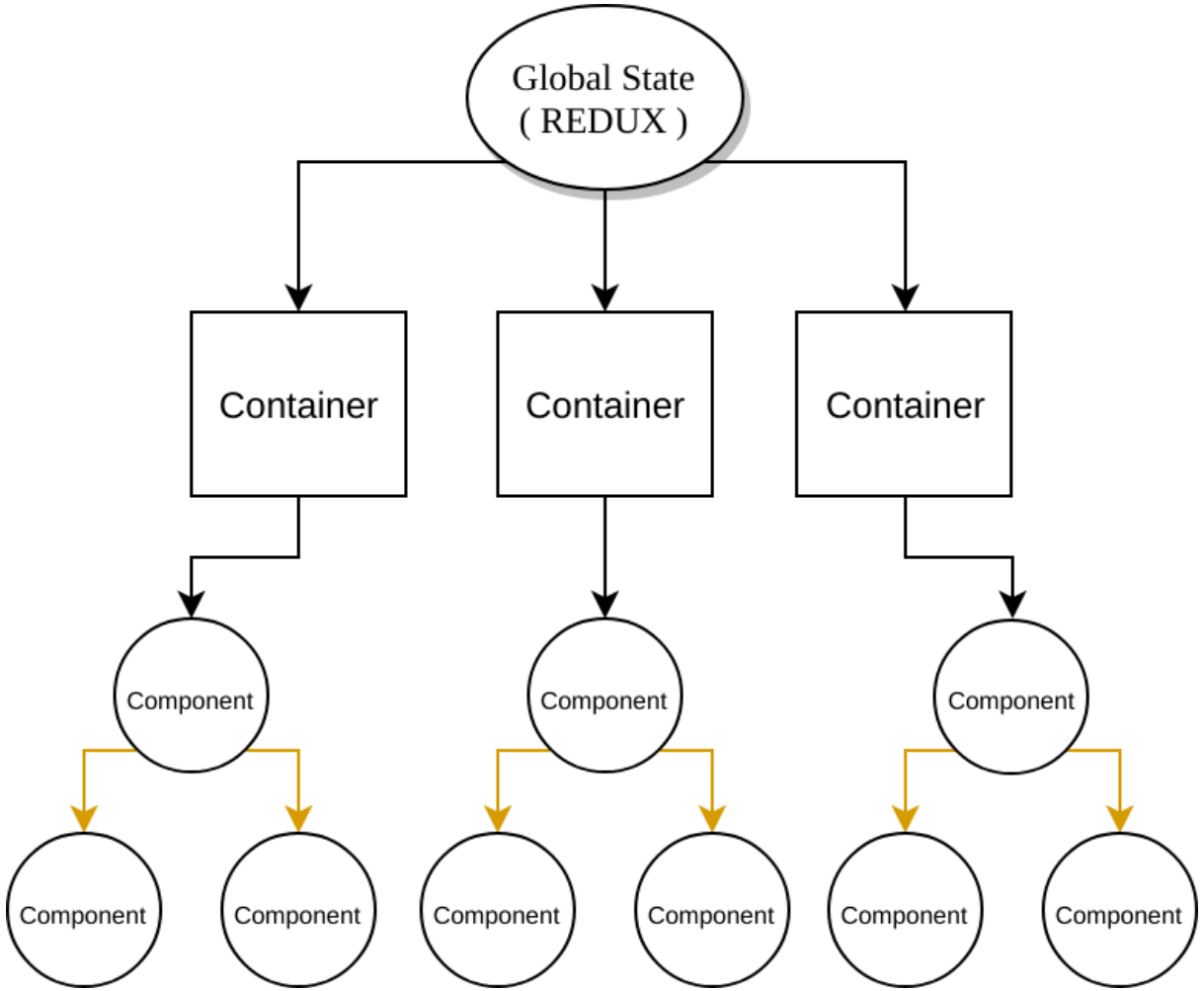


Patterns

- Prop-drilling
- Redux-centric
- Provided State

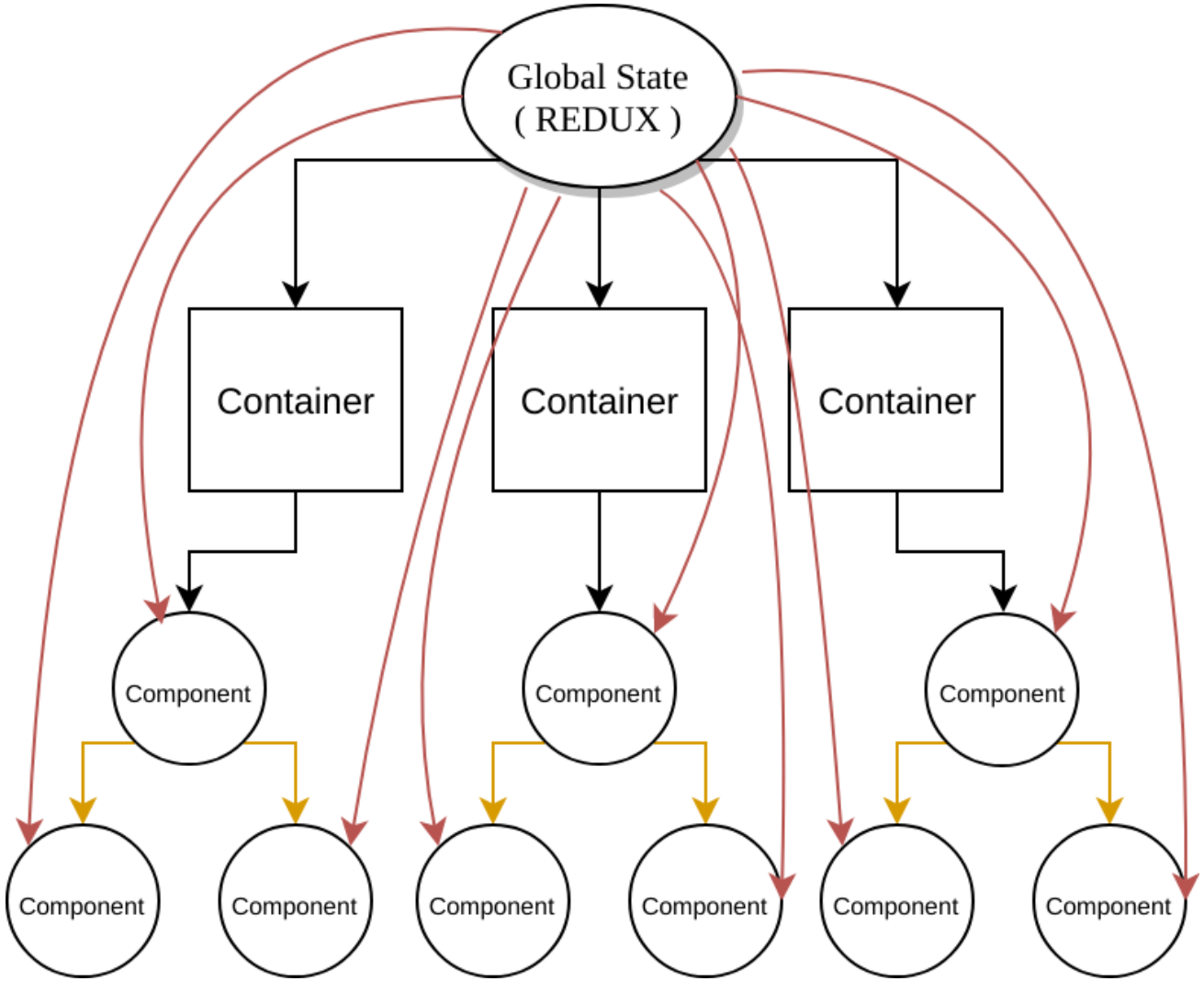
Prop drilling

Three types of state: Global state, component state, relative state



Redux-centric

Components are a little bit smarter than before



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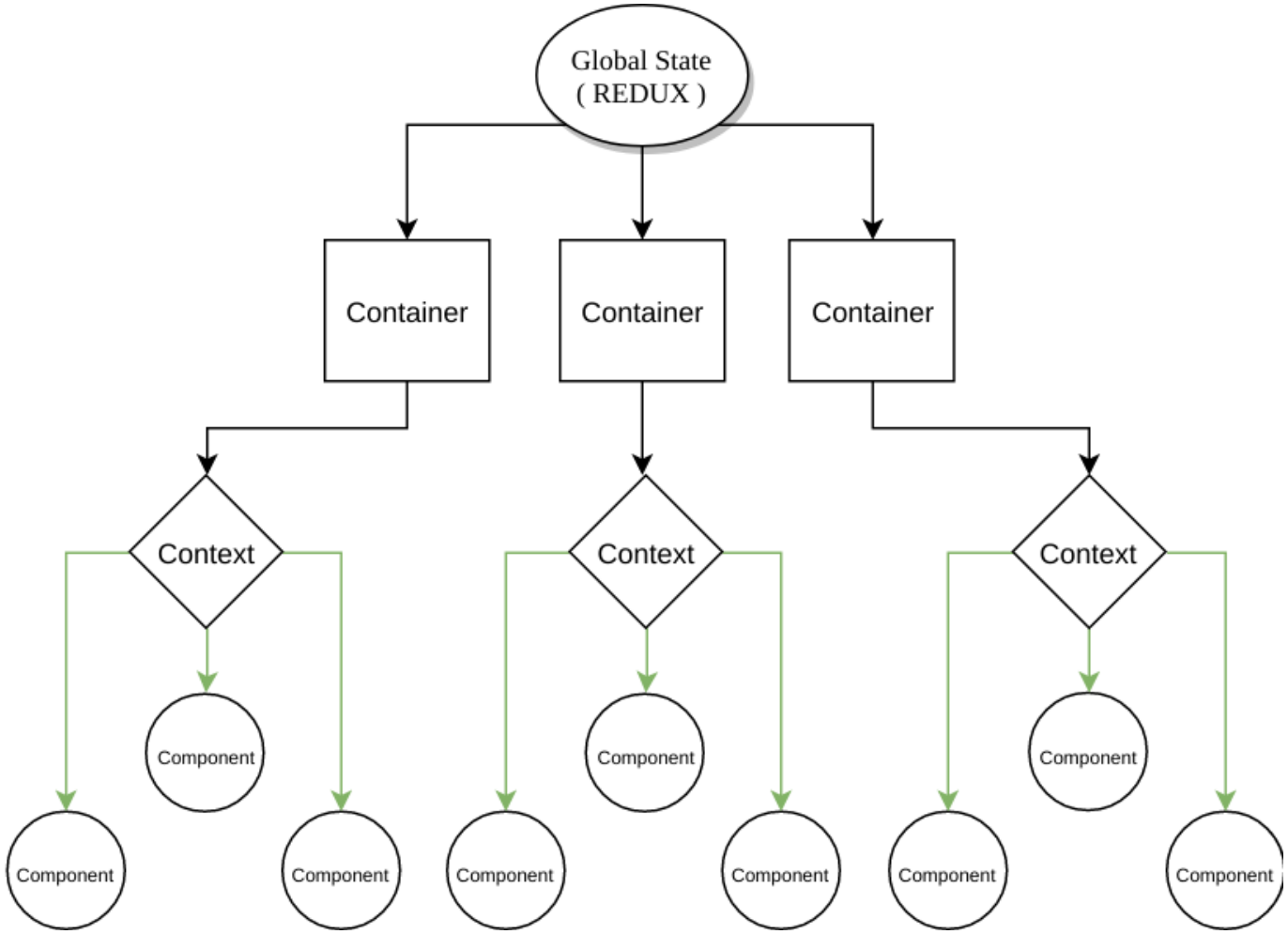
Provided State

Containers manipulate and consume the global state. Components are only concerned with grabbing props from the context and displaying it.



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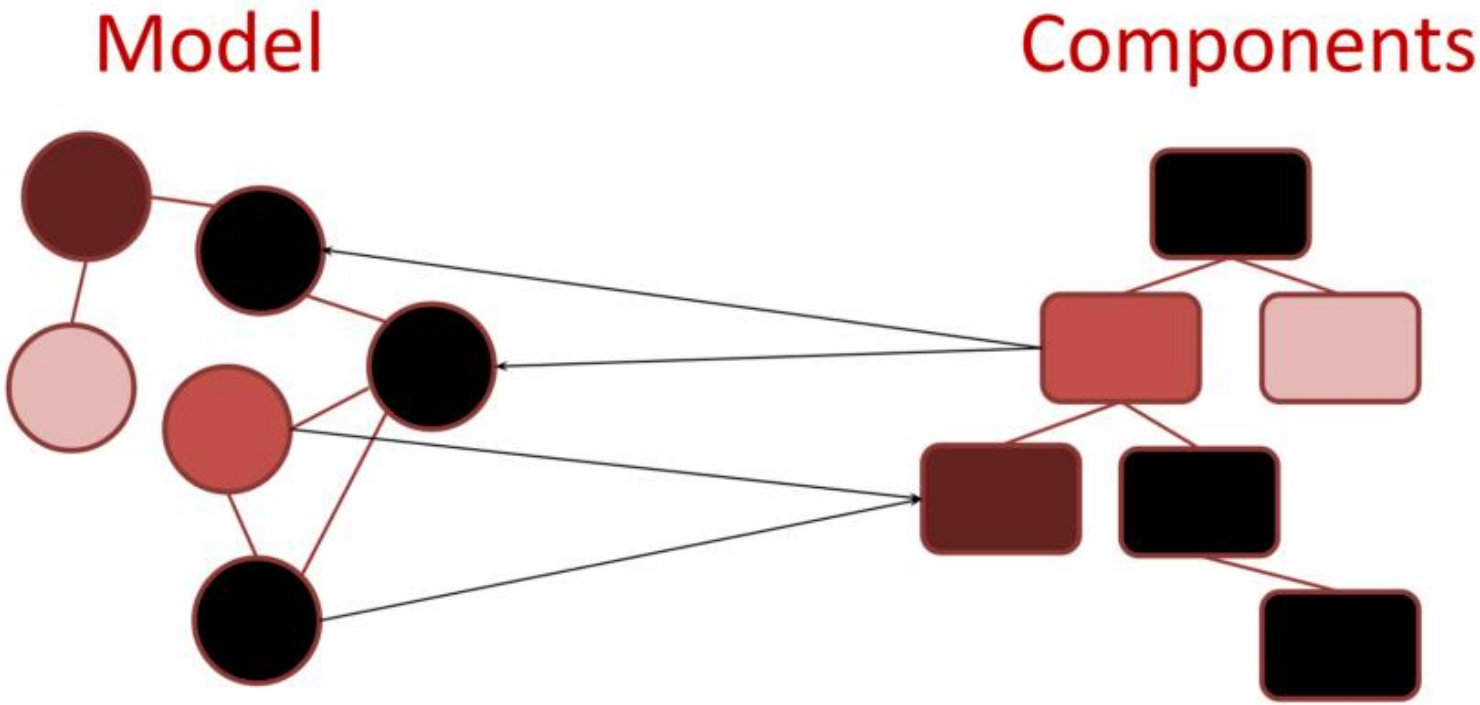
Who needs state management?

Building Frontends - Single page applications, is complex because there is so much state.



Transforming state per component

general rule:

- a component '*should never transform data itself*'
- you '*should never write logic inside a UI component*'

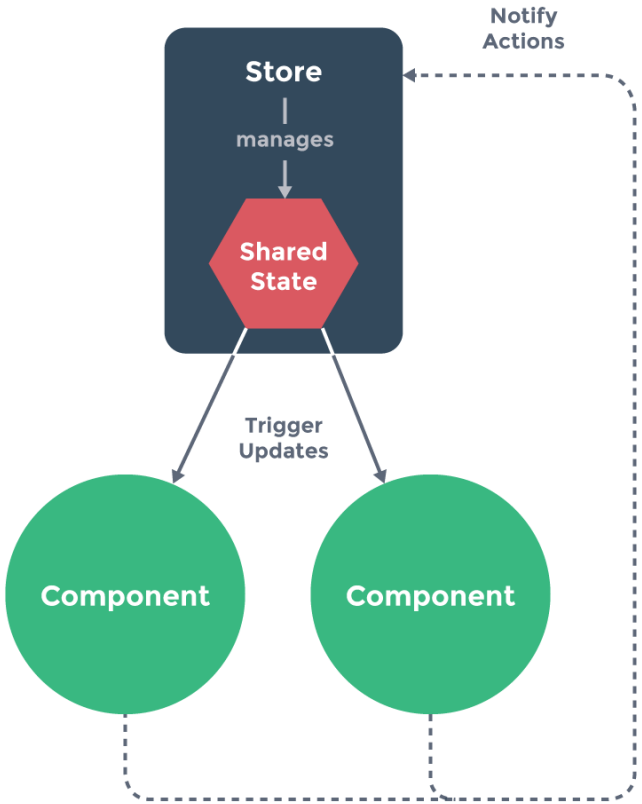
Transforming state per component

Not transform data in a component:

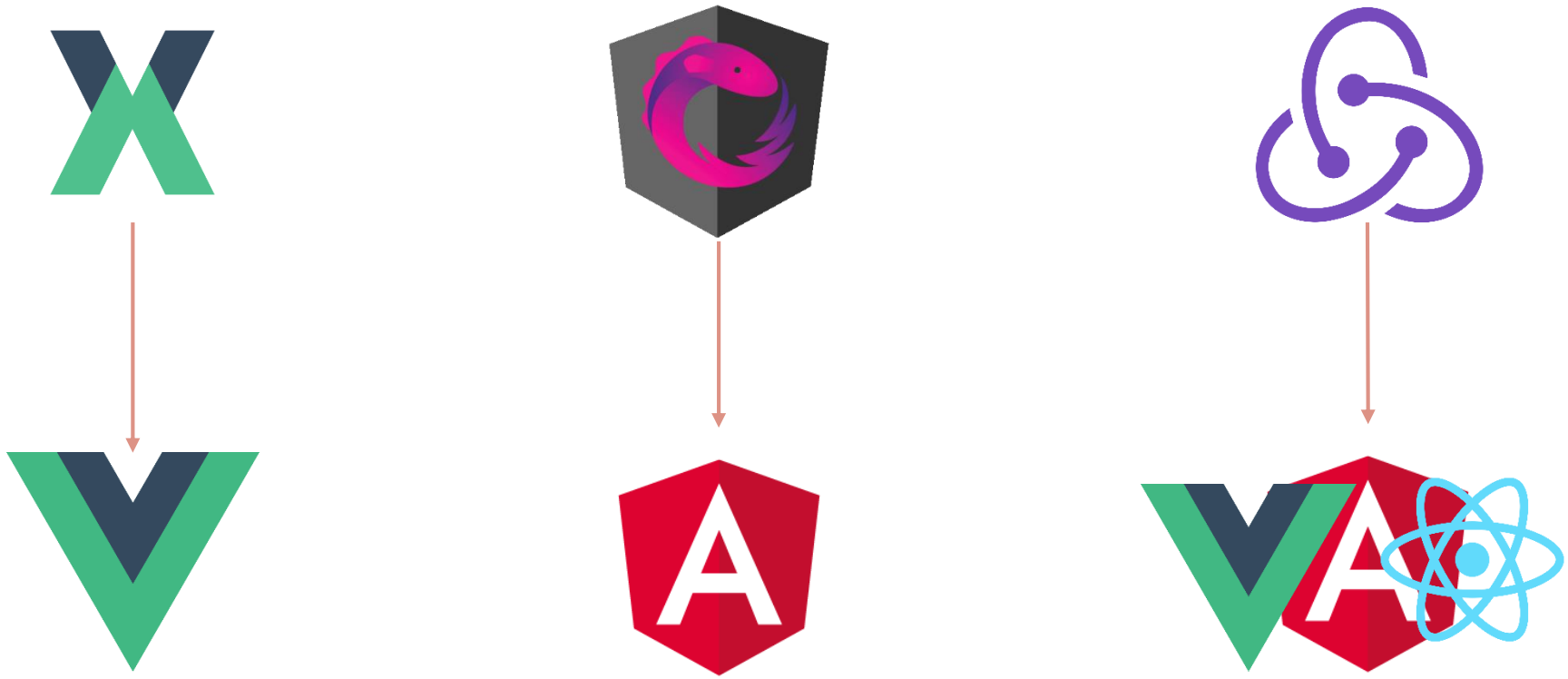
- coupling your component to a particular data structure means your component isn't reusable
- the transformation itself is single-use
- the transformation is harder to test inside a component
- it clutters components, making them far less readable

State management

- state management: the toughest thing to get right
- unfortunately that's a lesson you learn over time, and without good planning you can lose your sanity



State Tools



react state management tools 1

- Controllerim: A state management library for React
- Dakpan: A tiny React state management library using the new React context.
- Freactal: Clean and robust state management for React and React-like libs.
- Freezer: A tree data structure that emits events on updates, even if the modification is triggered by one of the leaves, making it easier to think in a reactive way.
- Laco: Ultra lightweight state management for React and Inferno
- MobX: Simple, scalable state management
- react-contextual: is a tiny (less than 1KB) helper around React 16s new context api
- react-copy-write: Immutable state with a mutable API
- react-easy-state: minimal React state management with the power of ES6 Proxies
- redux + react-redux: Predictable state container for JavaScript apps + Official React bindings for Redux

react state management tools 2

- Refunk: Simple React functional setState
- rosmaro + rosmaro-react: Visual automata-based programming for React
- Rematch: A Redux Framework
- Remx: Opinionated mobx
- Satcheljs: Satchel is a data store based on the Flux architecture. It is characterized by exposing an observable state that makes view updates painless and efficient.
- Stator: Simple, plain JavaScript state management with built-in support for React
- Sunfish: functional transaction based state management library
- tiny atom: Minimal, yet awesome, state management.
- Undux: Dead simple state management for React
- Unstated: State so simple, it goes without saying

State is everywhere in JavaScript

- what the user sees
- what data are we fetching
- what URL are we showing to the user
- what items are selected inside the page
- the errors in the applications

MboX

Simple, scalable state management, a standalone library

Mobx

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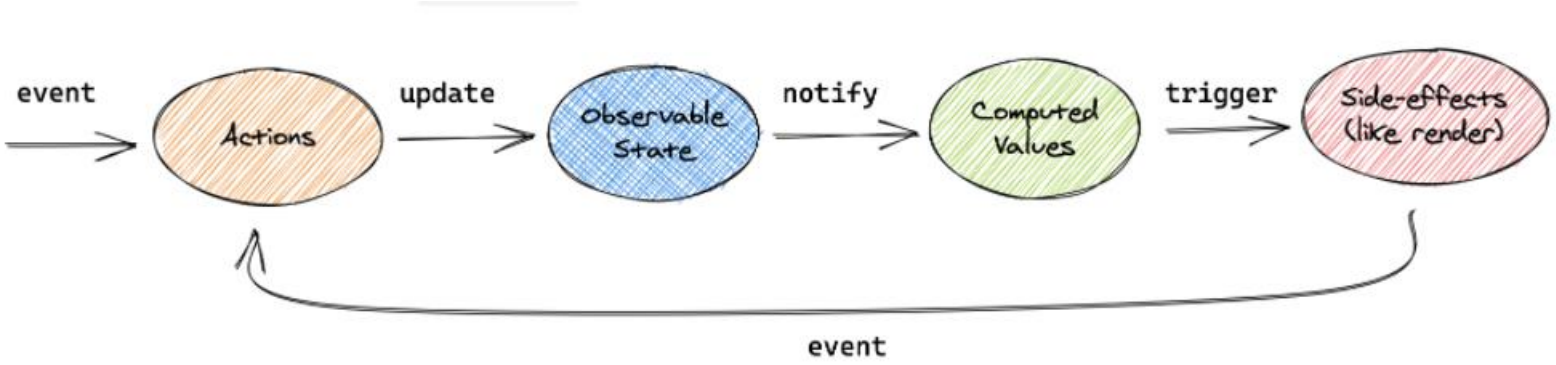
Installation - Browser support

- npm install mobx –save
- npm install mobx-react --save

NPM Version	Support MobX version	Supported React versions	Supports hook based components
v7	6.*	16.8+	Yes
v6	4._ / 5._	16.8+	Yes
v5	4._ / 5._	0.13+	No, but it is possible to use `<Observer>` sections inside hook based components

Introduction

Anything that can be derived from the application state, should be derived - Automatically



The philosophy

MobX is a battle tested library that makes state management simple and scalable by transparently applying functional reactive programming (TFRP)

- Straightforward
- Effortless optimal rendering
- Architectural freedom

Straightforward

No special tools are required, the reactivity system will detect all your changes and propagate them out to where they are being used.

Effortless optimal rendering

All changes to and uses of your data are tracked at runtime, building a dependency tree that captures all relations between state and output.

Architectural freedom

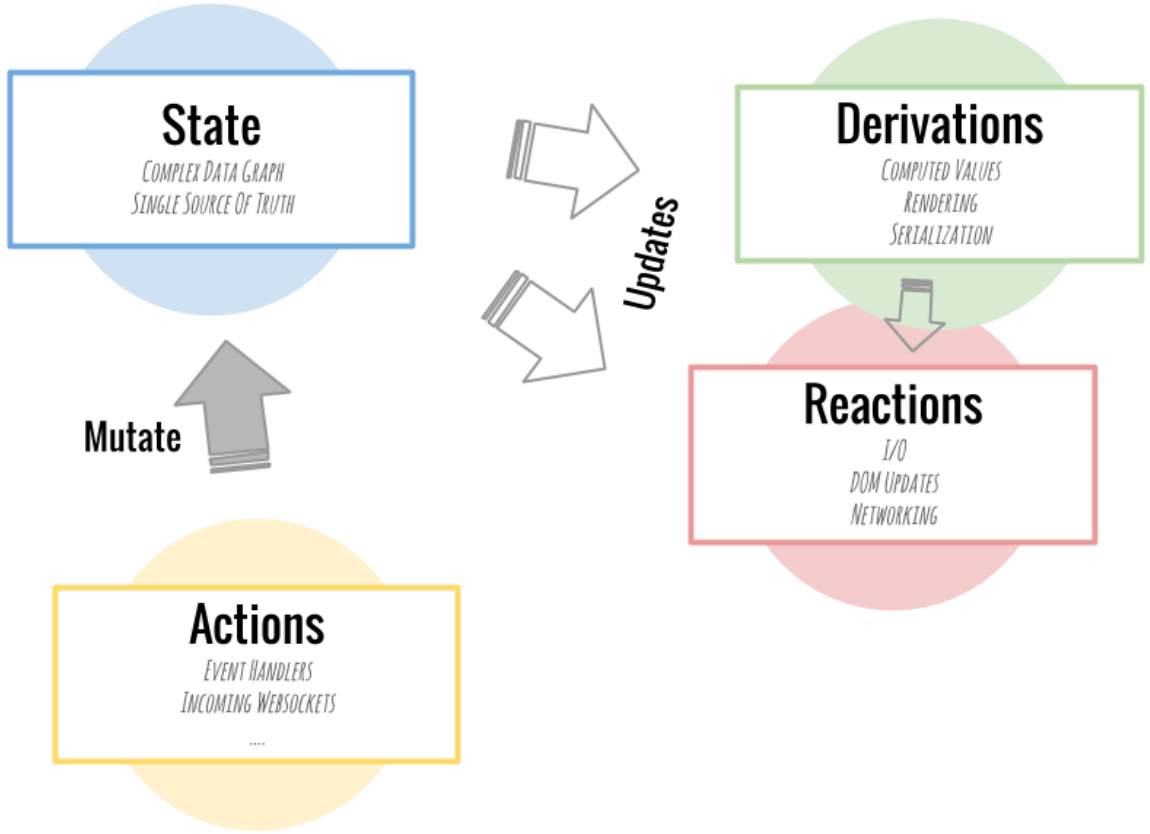
MobX is unopinionated and allows you to manage your application state outside of any UI framework. This makes your code decoupled, portable, and above all, easily testable.

Observe everything

- Any value can be observable
- Any component can be an observer
- Components (observers) will automatically re-render when observable values change

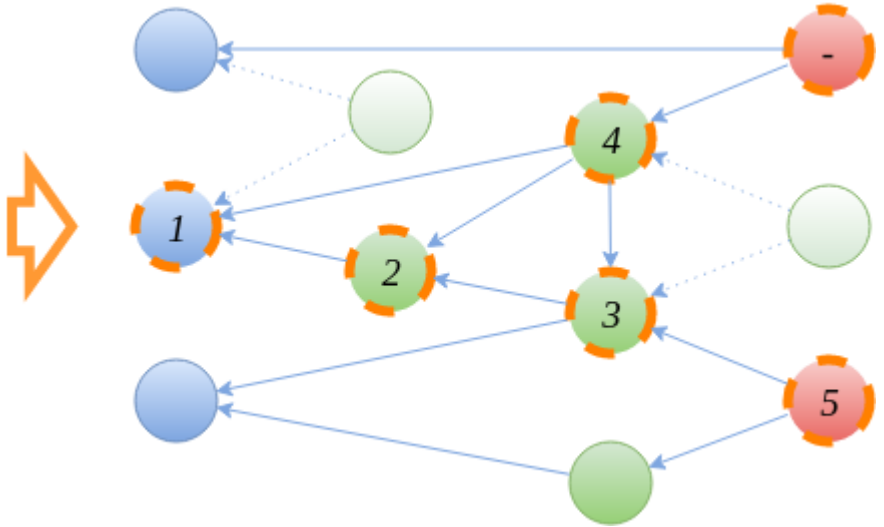
Core concepts

- Observable state
- Computed
- Reactions
- Actions



Virtual dependency state graph

- Observable state (blue)
- Computed values (green)
- Reactions (red)



Observable state

```
import {makeObservable, observable,} from "mobx"

class Doubler {
 value = 0;

  makeObservable(this, {
    value: observable
  })
}
```

Computed values

```
import {makeObservable, observable, computed} from "mobx"

class Doubler {
 value = 0;

  makeObservable(this, {
    value: observable,
    double: computed,
  })

  get double() {
    return this.value * 2
  }
}
```

Define values that will be derived automatically when relevant data is modified

Reactions

- similar to a computed value
- produces a side effect incrementally updating the React component tree to patch the DOM, etc.

Reactions

```
const App = () => {
const {increment} = store;
  return (
    <Counter
       value={store.value}
       increment ={increment}
    />
  );
};

export default observer(App);
```

Custom reactions

```
autorun (() => {
  console.log(`the number of counter is {this.value}`);
});
```

Custom reactions can simply be created using the autorun, reaction or when functions to fit your specific situations

Actions

Somehow the state should be updated

```
import { ..., action } from "mobx"
...
 makeObservable(this, {
    value: observable,
    double: computed,
    increment: action
  })
...
  increment() {
    this.value++
  }
```

Provider and inject

Provider: component that can pass stores (or other stuff) using React's context mechanism to child components

inject: can be used to pick up those stores

```
import {Provider, inject} from 'mobx-react';

<Provider store={store}>
  <App />
</Provider>


…
inject(['store'])(Counter)
```

Asynchronous processes

```
import { when } from 'mobx';

async() => {
  await when(() => user.loggedOut)
  alert("You have been successfully logged out!")
}
```

Observables to JavaScript

To convert a collection shallowly, the usual JavaScript mechanisms work:

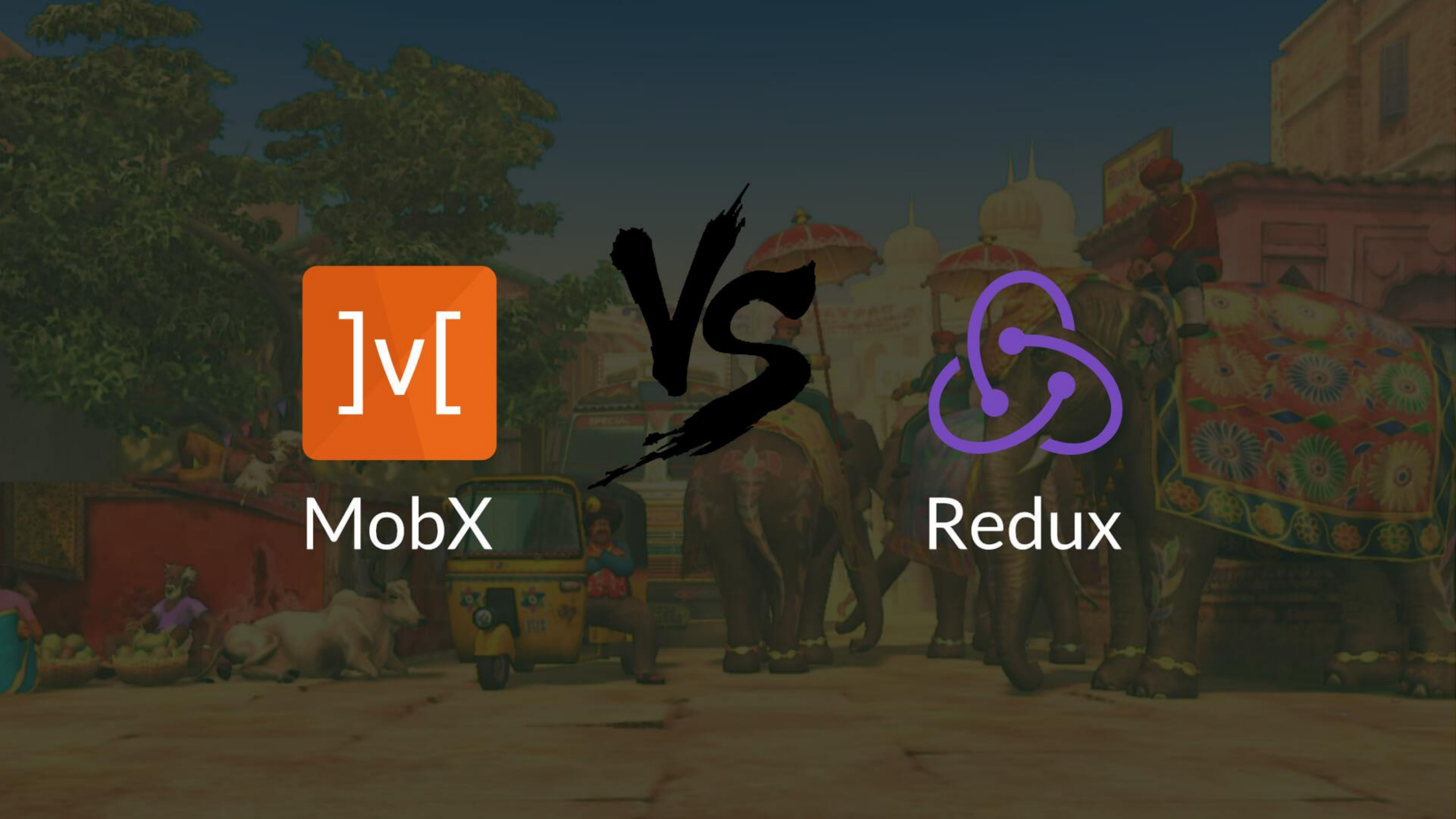
```
const plainObject = { ...observableObject };

const plainArray = observableArray.slice();

const plainMap = new Map(observableMap);
```

Simple and scalable

- one of the least obtrusive libraries you can use for state management
- not just simple, but very scalable
    - referential integrity is guaranteed
    - using classes and real references
    - simpler actions are easier to maintain
    - fine grained observability is efficient
    - easy interoperability

Best Practices

- the stores represent the ui state
- separate your rest calls from the stores
- keep your business logic in stores
- don’t create global store instances
- only the store is allowed to change its properties
- always annotate each component with observer
- use computed properties
- try to favor controlled components over uncontrolled components

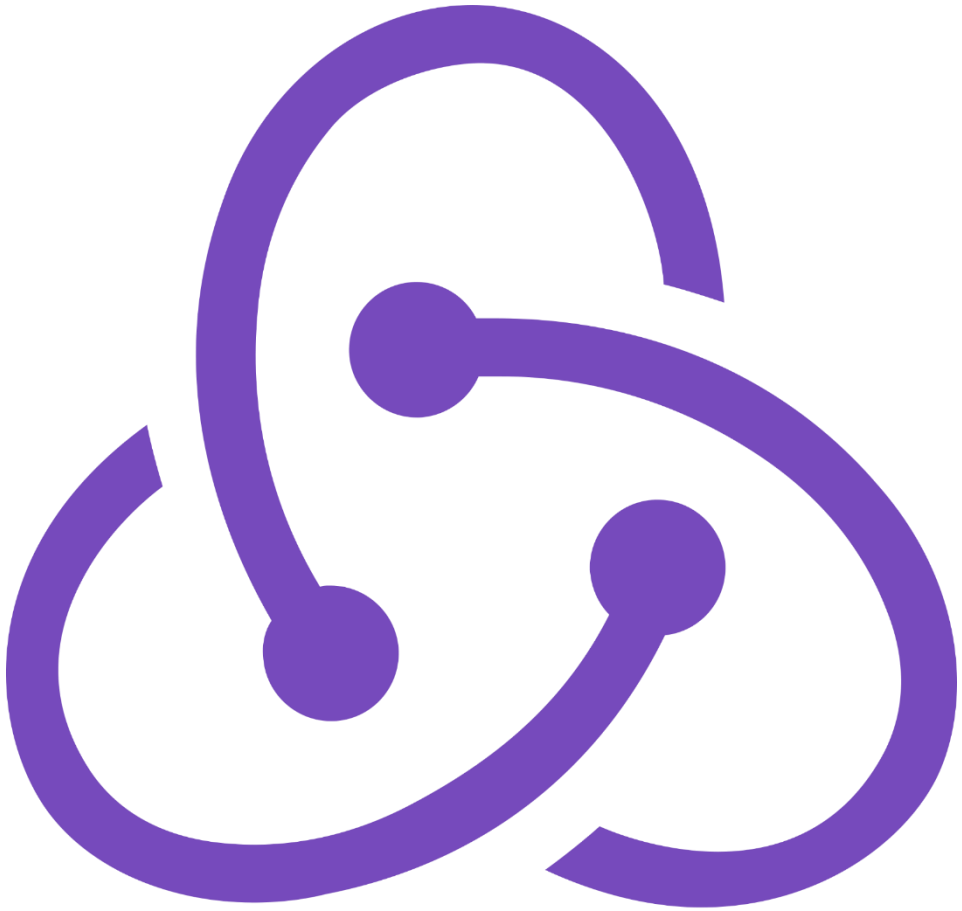

MobX
VS
Redux

Common

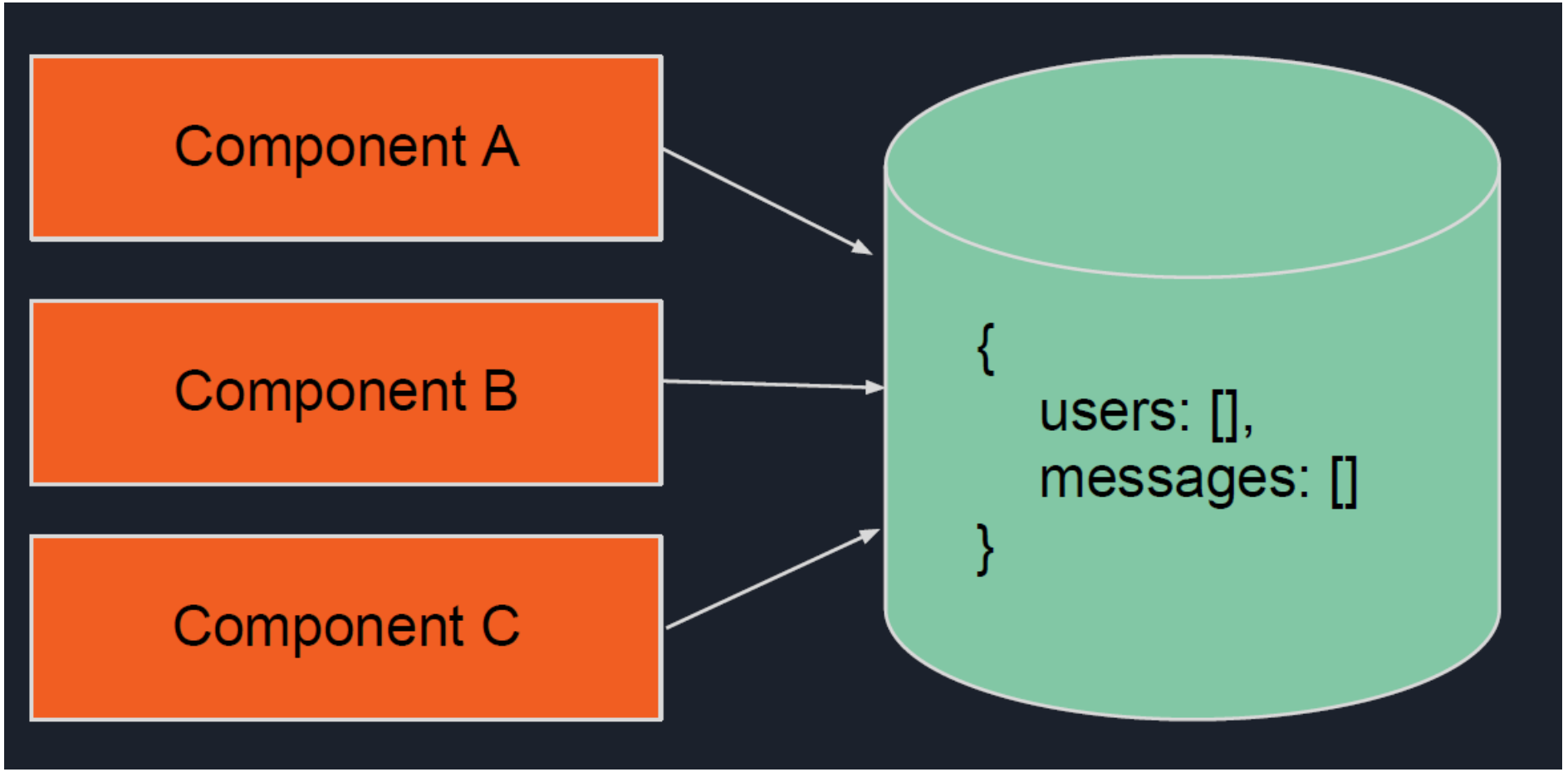
- are open-source libraries
- provide client-side state management
- are not tied to a specific framework
- have extensive support for React/React Native frameworks
- both Redux and MobX works well with react

Redux

- single store
- functional programming paradigm
- Immutable
- Pure
- explicit update logic
- plain JavaScript
- more boilerplate
- normalized state



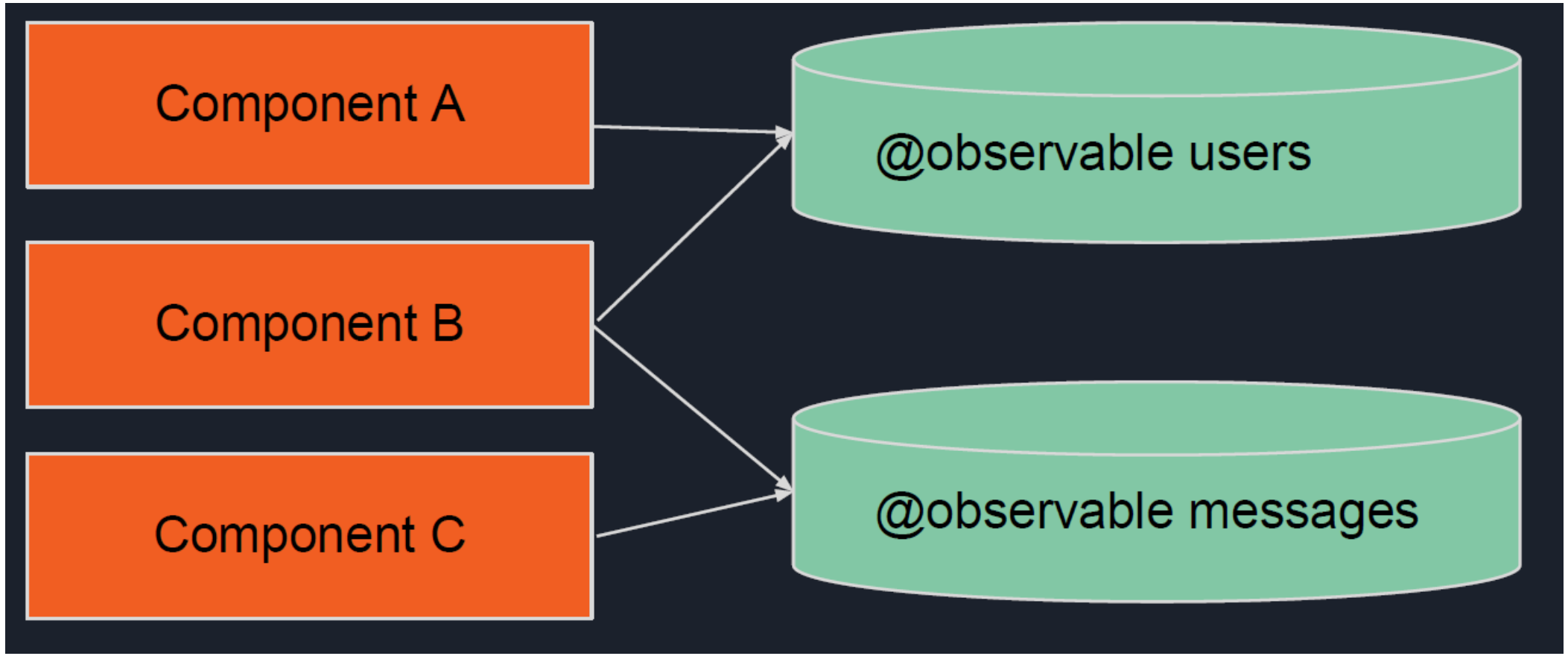
Single store



MobX

- multiple stores
- object-oriented programming and reactive programming paradigms
- mutable
- impure
- implicit update logic
- “magic” JavaScript
- less boilerplate
- denormalized state
- nested state

Multiple stores



Redux vs MobX

- Single store vs Multiple Store
- Plain data vs Observable data
- Immutable vs mutable (Pure vs Impure)
- Manual vs Automatic
- Normalized state vs Nested state
- Learning
- Testing
- Scale and Maintenance
- Developer Support

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Redux vs MboX

	setState	MobX	Redux
Location	Component	Component / Global	Global
Synchronicity	Asynchronous	Synchronous	Synchronous
Subscription	Implicit	Implicit	Explicit
Mutability	Mutable	Mutable	Immutable
Data structure	-	Graph	Tree
Observing Changes	-	Side Effect	Immutable -> append only

Ask yourself

1. Is the application small and simple?
2. Prefer to build the app fast?
3. Large team looking for more maintainable code?
4. Complex app with scalable option?