

REACT.JS



PRZEMYSŁAW WISZOWATY

HELLO!



software HUT

TENDERHUT GROUP

meet.js

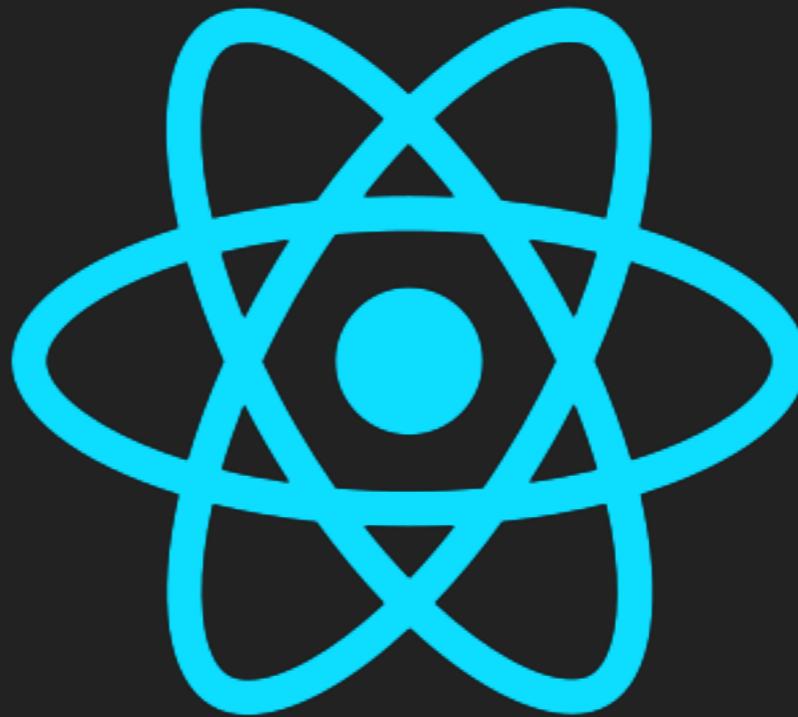
białystok



REACT IS EVERYWHERE

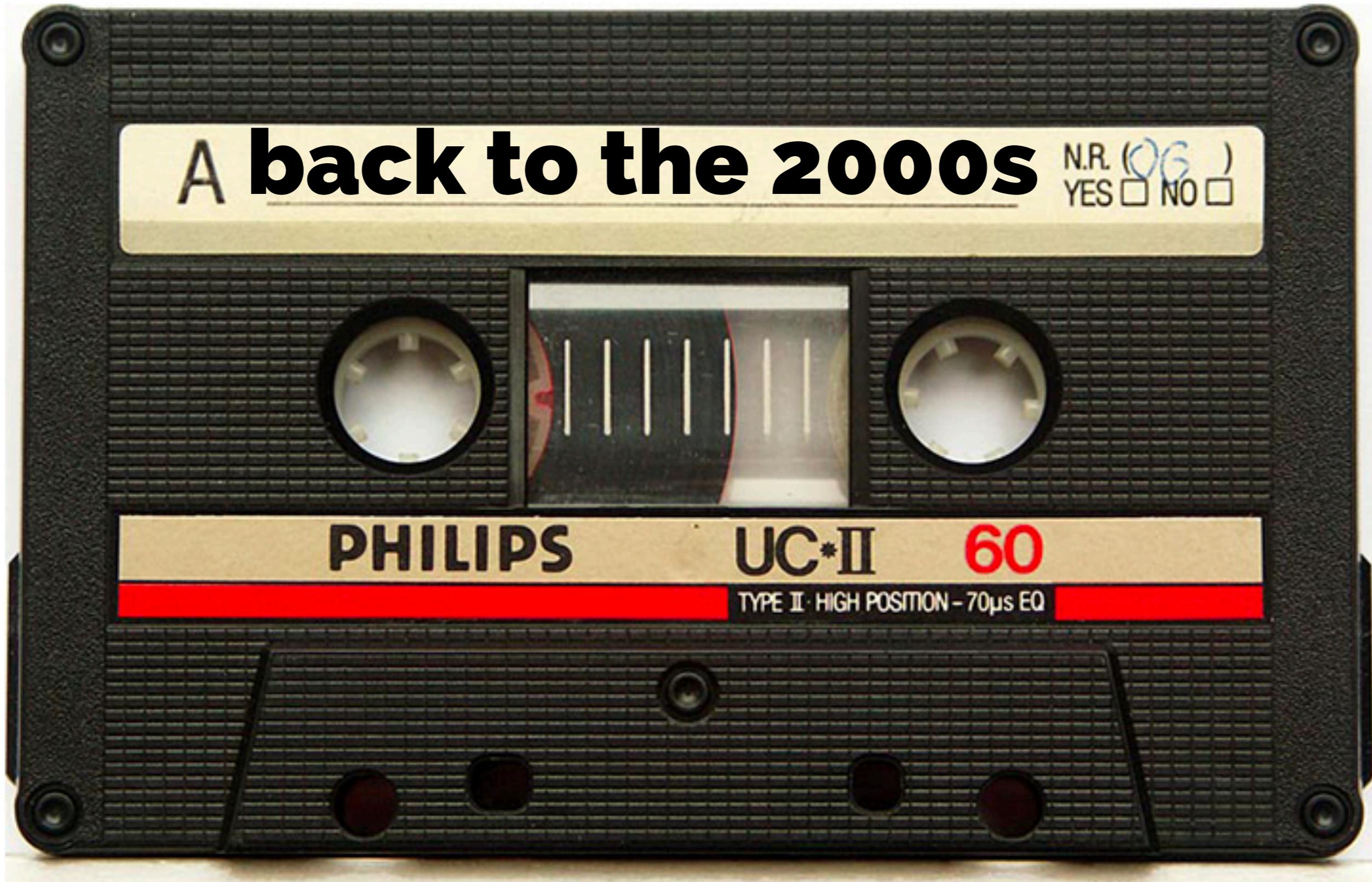
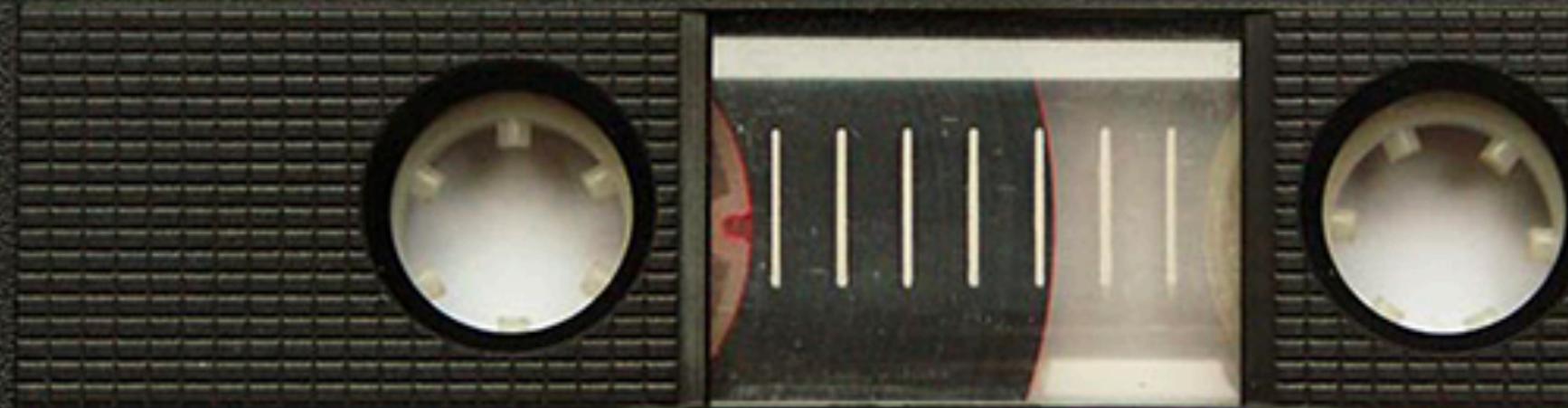
„Learn Once, Write Anywhere”

FRONTEND
BACKEND
MOBILE



A back to the 2000s

N.R. (OG)
YES NO



The Geocities-izer

Ge Look Like It Was Made By A 13 Year-Old In 1996

Type any URL in the box below and click Submit to see how it would look as a Geocities page.

Or Try one of these:



[The New York Times](#)



[YouTube](#)



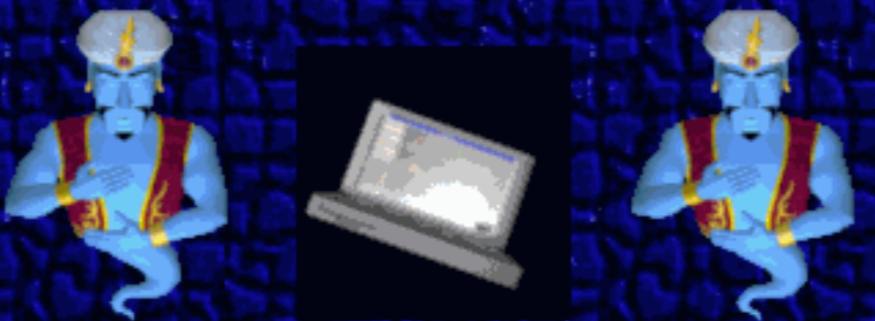
[BoingBoing](#)

http://

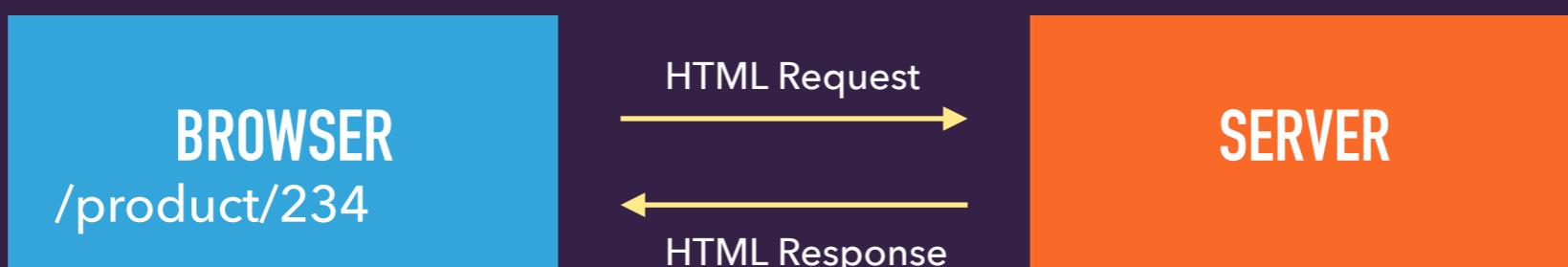
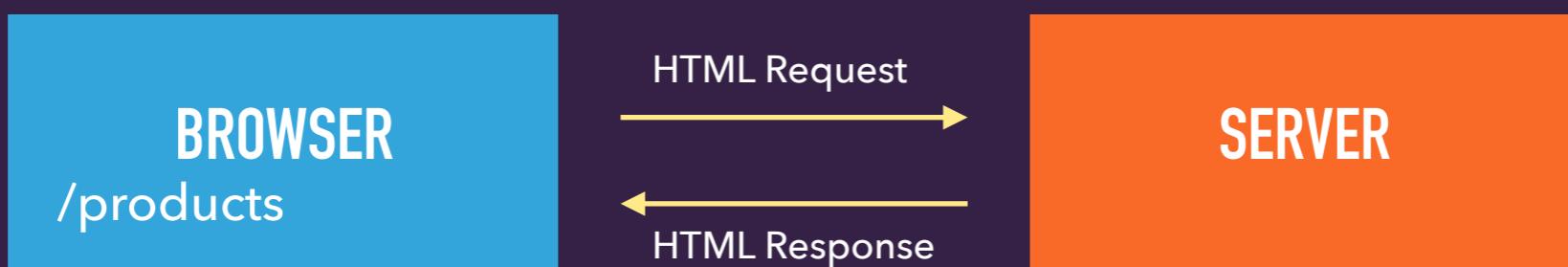
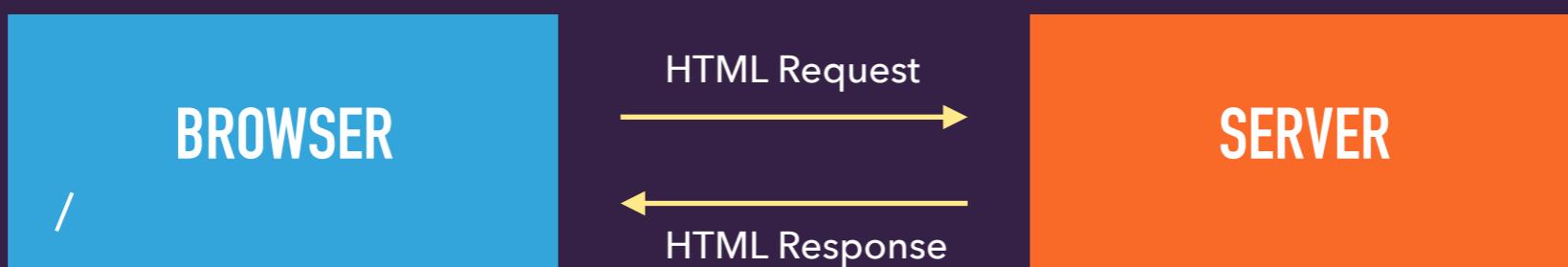
Some pages may work very slowly or not at all. Many webapps are just too advanced for Geocities.

Turn your sound up for the full effect.

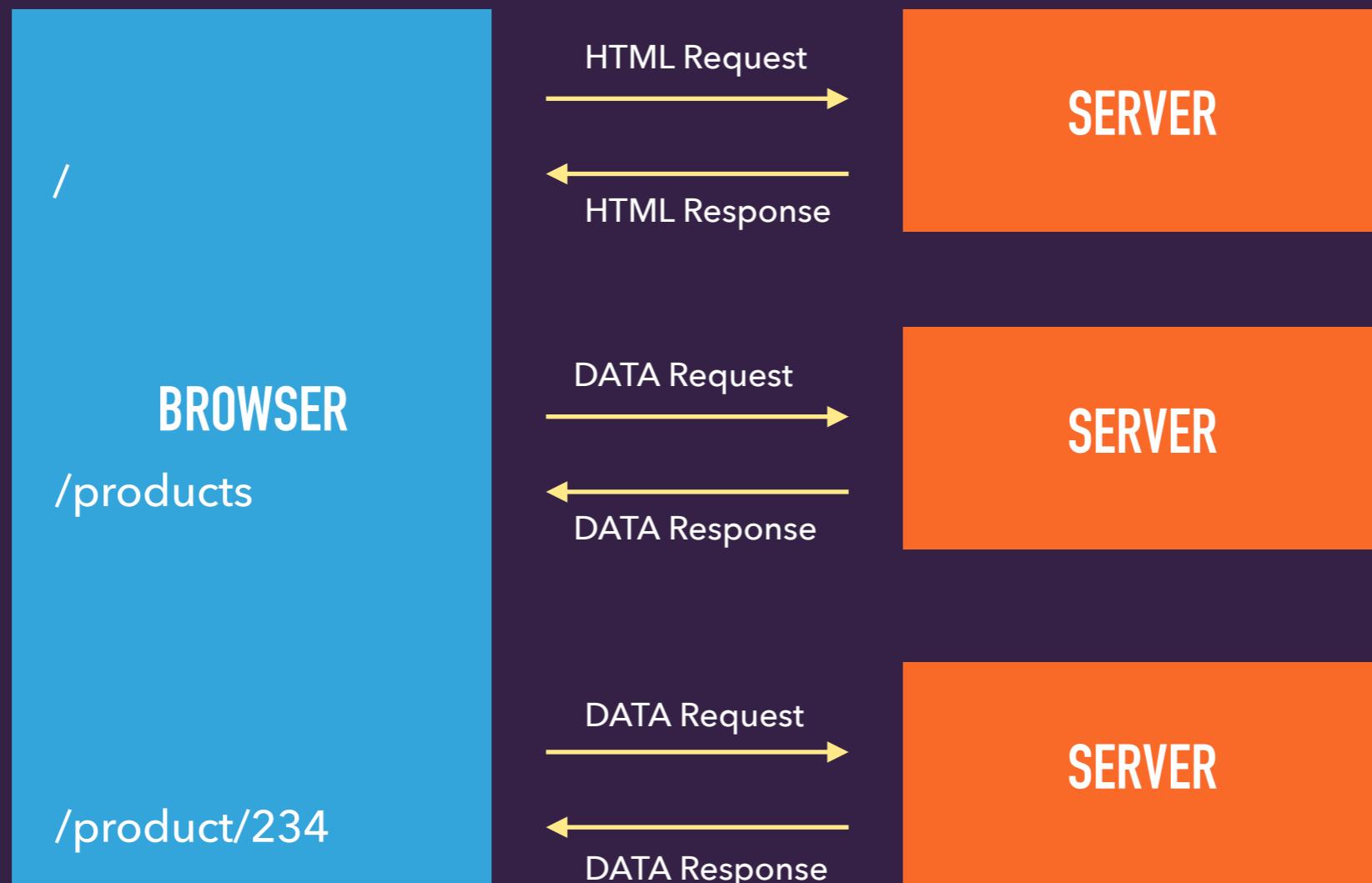
Created by [Mike Lacher](#)



TRADITIONAL WEBSITE



SINGLE PAGE APPLICATION





414 x 736



Elements

Console

Sources

Network

Performance

Memory

Application

Security

Audits

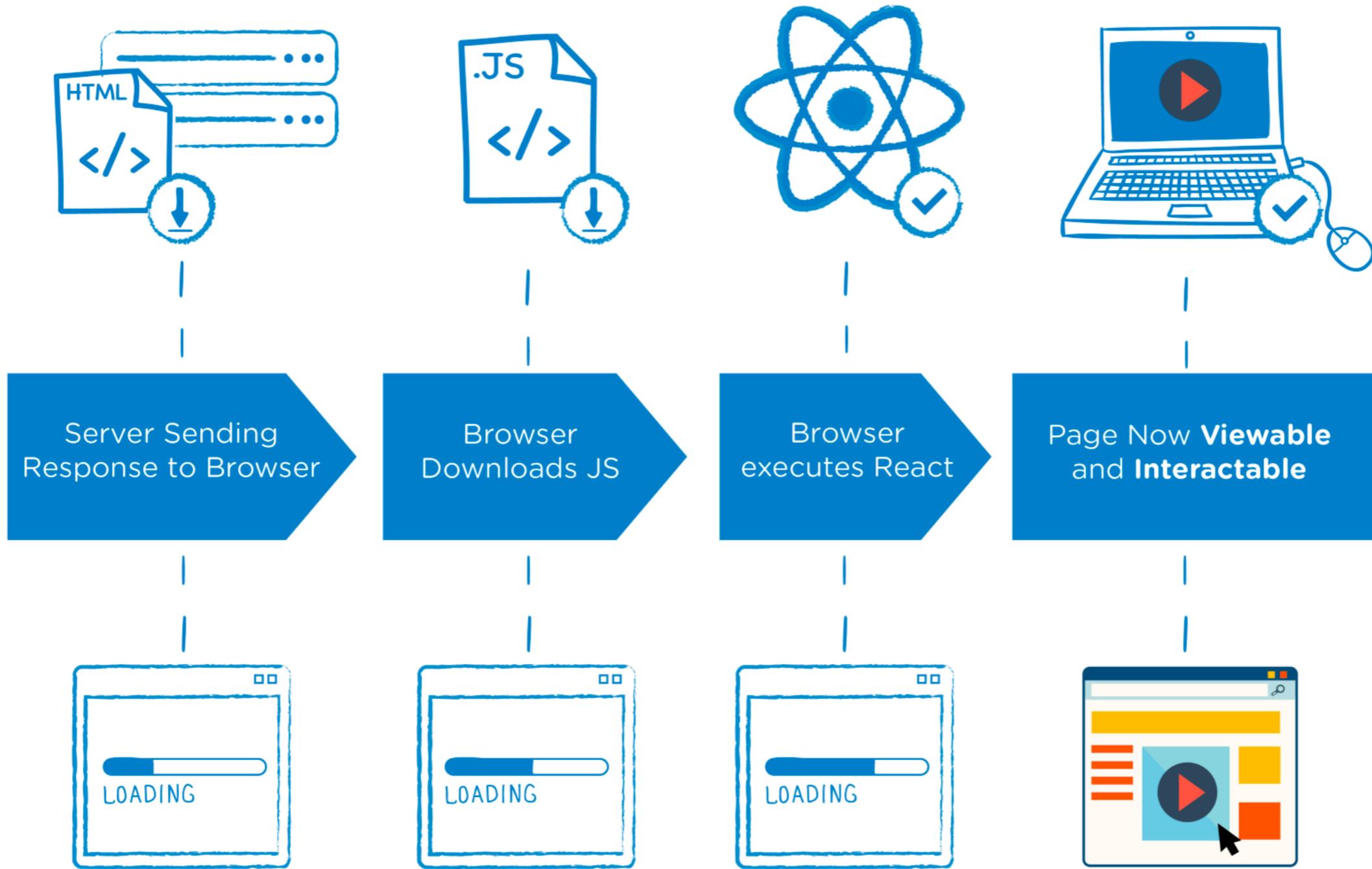


(index) :formatted x

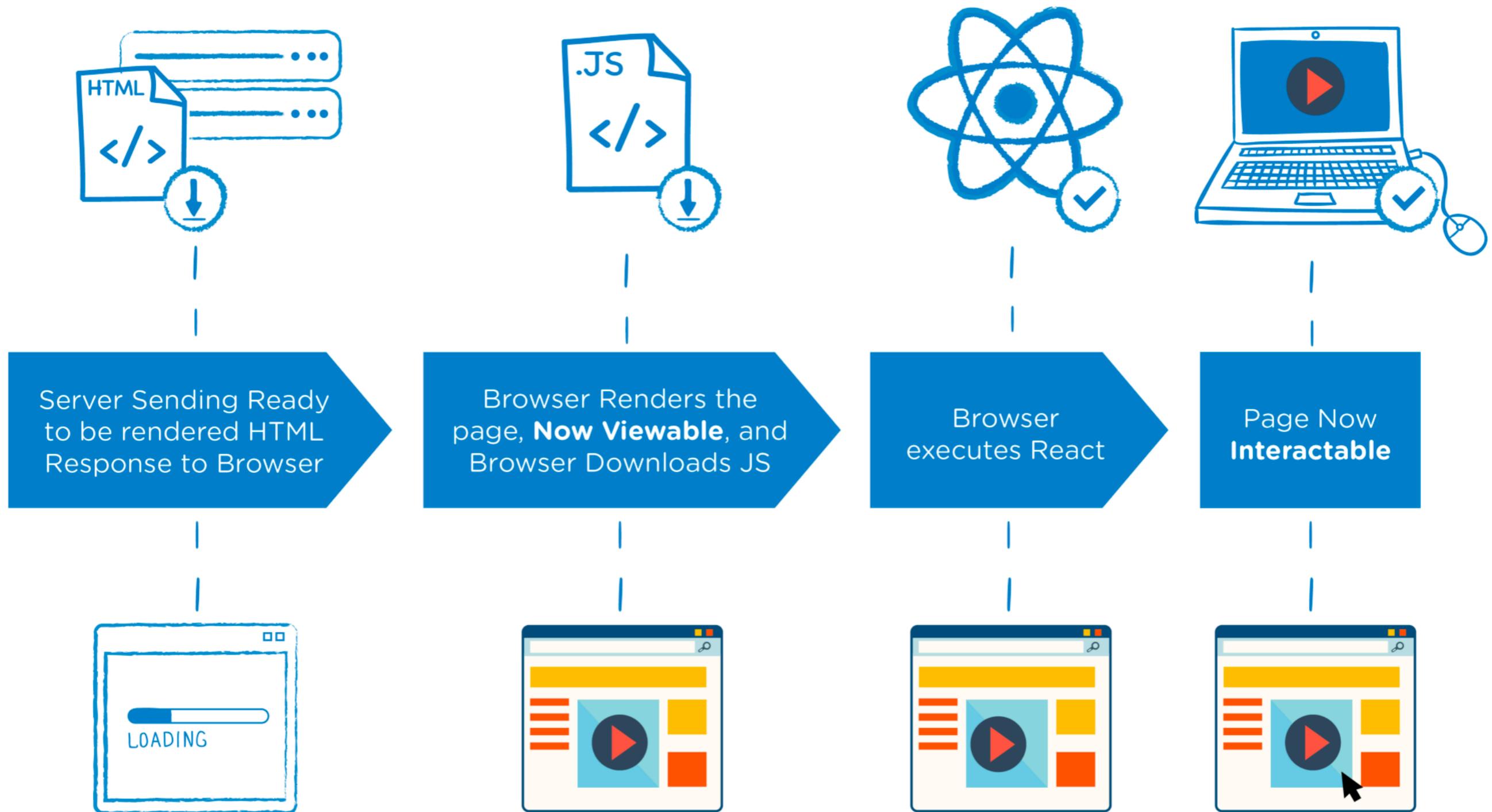
```
1 <!DOCTYPE html>
2 <html lang="en" prefix="og: http://ogp.me/ns#">
3   <head>
4     <meta charset="utf-8">
5     <meta name="viewport" content="width=device-width,initial-scale=1,shrink-to-fit=no">
6     <link rel="apple-touch-icon" sizes="180x180" href="/icons/apple-touch-icon.png?v=694AzX47gQ">
7     <link rel="icon" type="image/png" sizes="32x32" href="/icons/favicon-32x32.png?v=694AzX47gQ">
8     <link rel="icon" type="image/png" sizes="16x16" href="/icons/favicon-16x16.png?v=694AzX47gQ">
9     <link rel="mask-icon" href="/icons/safari-pinned-tab.svg?v=694AzX47gQ" color="#5bbad5">
10    <link rel="shortcut icon" href="/icons/favicon.ico?v=694AzX47gQ">
11    <meta name="msapplication-TileColor" content="#2d89ef">
12    <meta name="msapplication-config" content="/icons/browserconfig.xml?v=694AzX47gQ">
13    <meta name="theme-color" content="#ffffff">
14    <meta name="google-site-verification" content="NCJvpBpTbp9pUJdDk7t6dhIis0j4kZJEphgntRU-TbM"/>
15    <link rel="manifest" href="/manifest.json">
16    <title>TenderHut</title>
17    <link href="/static/css/main.5ca042e5.css" rel="stylesheet">
18  </head>
19  <body>
20    <noscript>You need to enable JavaScript to run this app.</noscript>
21    <div id="app-root"></div>
22    <div id="modal-root"></div>
23    <script type="text/javascript" src="/static/js/main.dc65024f.js"></script>
24  </body>
25</html>
```



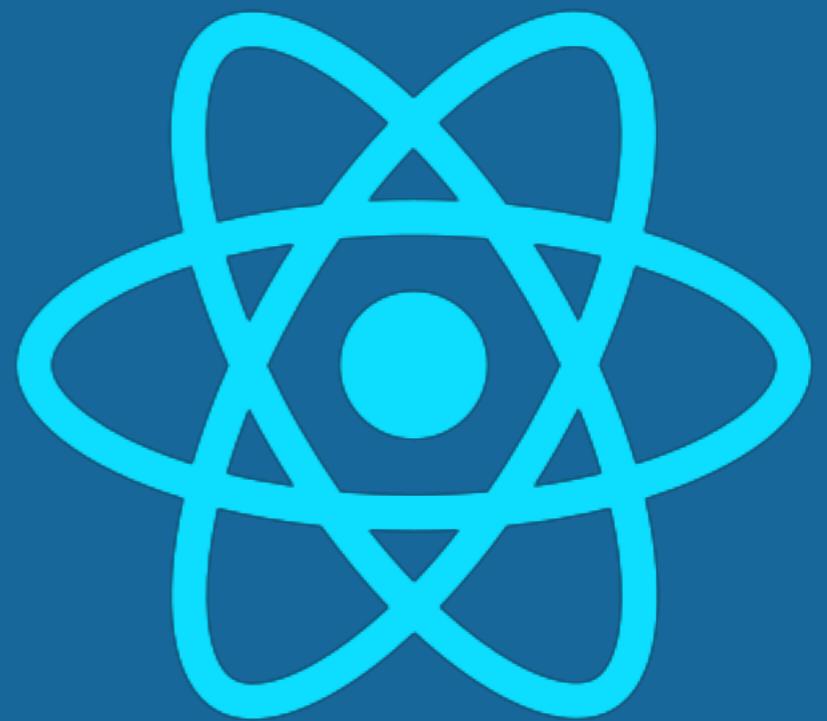
CSR



SSR



WHAT IS REACT?

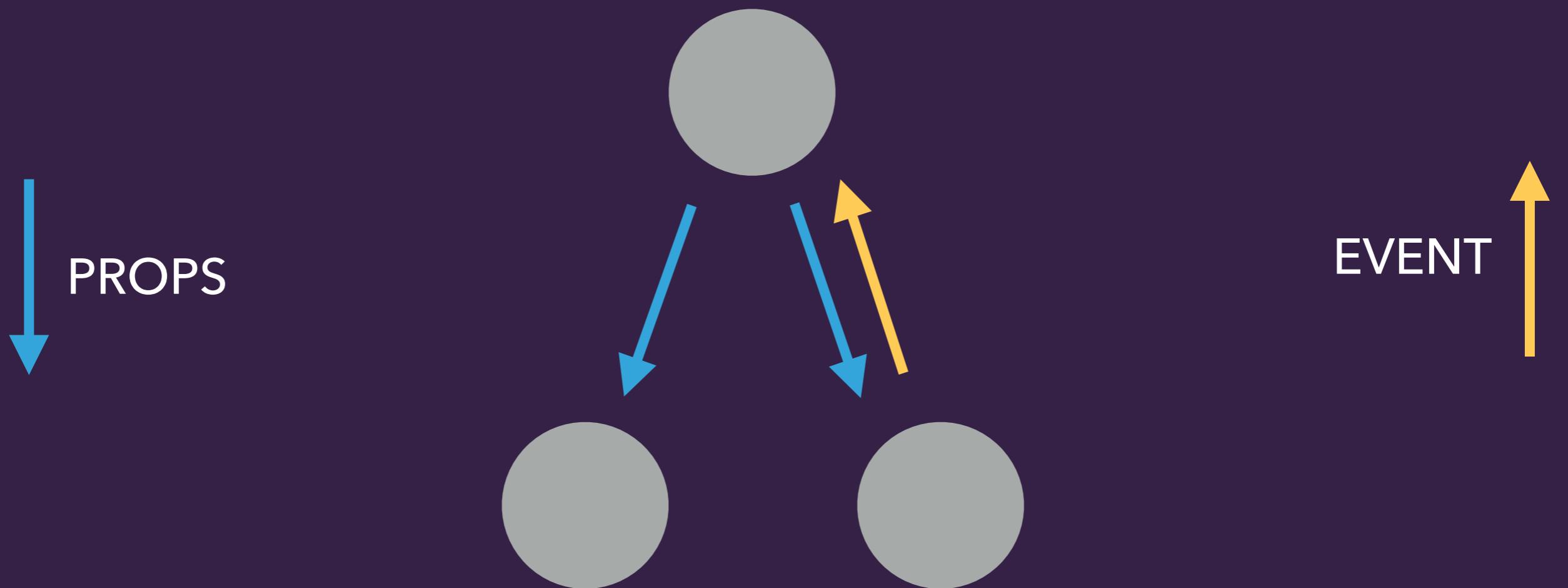


**LIBRARY
NOT
~~FRAMEWORK~~**

LOW LEARNING CURVE

ONE WAY DATA FLOW

ONE WAY DATA FLOW



NO CONTROLLERS

NO MODELS

NO DIRECTIVES

NO GLOBAL EVENT LISTENER

**JUST
COMPONENT**

COMPONENT

ISOLATED

REUSABLE

TESTABLE

COMPONENT TYPES

FUNCTIONAL

```
function Welcome(props) {  
  return <h1>Hello, {props.name}</h1>;  
}
```

FUNCTIONAL

```
const Welcome = props => {
  return <h1>Hello, {props.name}</h1>;
};
```

FUNCTIONAL

```
const Welcome = ({name}) => {  
  return <h1>Hello, {name}</h1>;  
};
```

CLASS

```
class Welcome extends React.Component {  
  render() {  
    const {name} = this.props;  
    return (  
      <h1>Hello, {name}</h1>  
    )  
  }  
}
```

**EVERYTHING
IS A COMPONENT**

CardComponent

CardHeaderComponent

COMPONENT...

COMPONENT EVERYWHERE

makeameme.org

CardBodyComponent

UserPhotoComponent

```
1 import React from 'react';
2
3 const FacebookComponent = () => (
4   <CardComponent>
5     <CardHeaderComponent>
6       <SelectorComponent />
7       <SelectorComponent />
8       <SelectorComponent />
9     </CardHeaderComponent>
10
11    <CardBodyComponent>
12      <UserPhotoComponent />
13    </CardBodyComponent>
14
15    <CardFooterComponent />
16  </CardComponent>
17);
18
19 export default FacebookComponent;
20
```

JSX

```
const Welcome = () => {  
  return <h1>Hello, World</h1>;  
};
```

JSX

```
const Welcome = function Welcome() {  
  return React.createElement(  
    "h1",  
    null,  
    "Hello, World"  
);  
};
```

JS

**REACT DOESN'T
REQUIRE USING JSX**

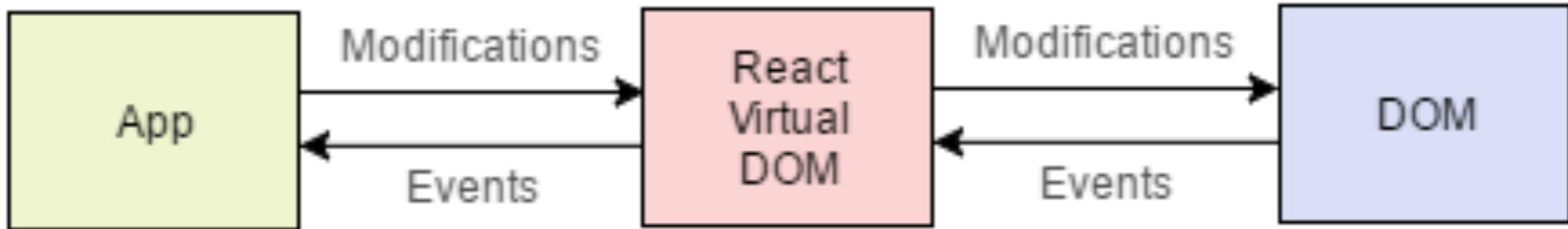
**VIRTUAL
DOM**

IT'S FAST
IT'S PURE
IT WORKS

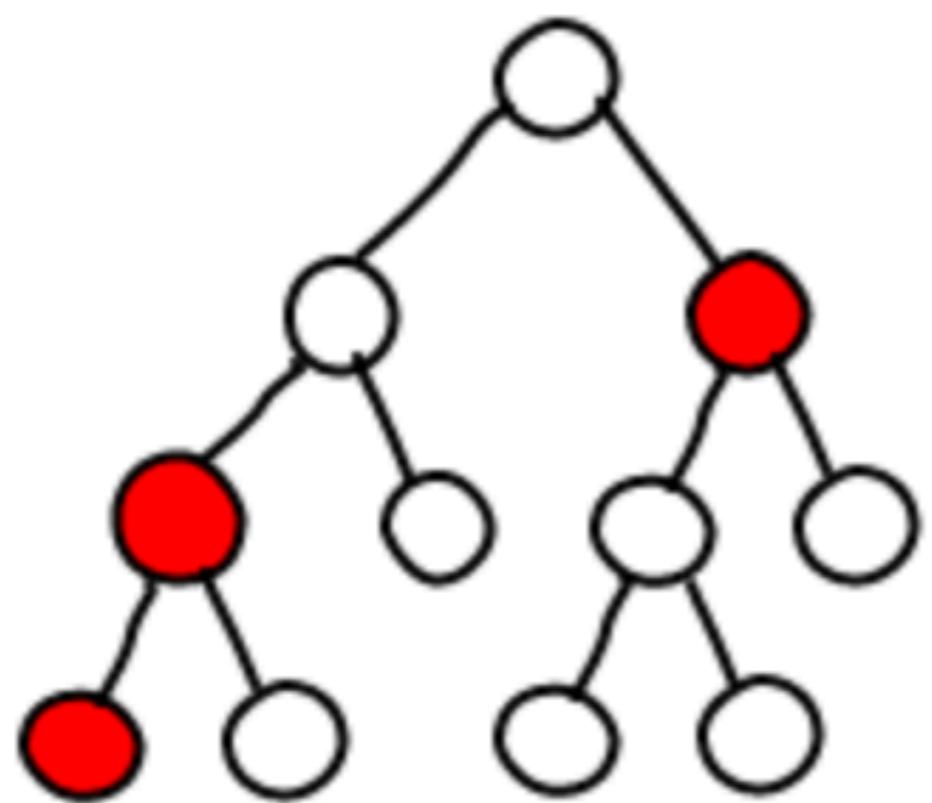
Traditional Web Application



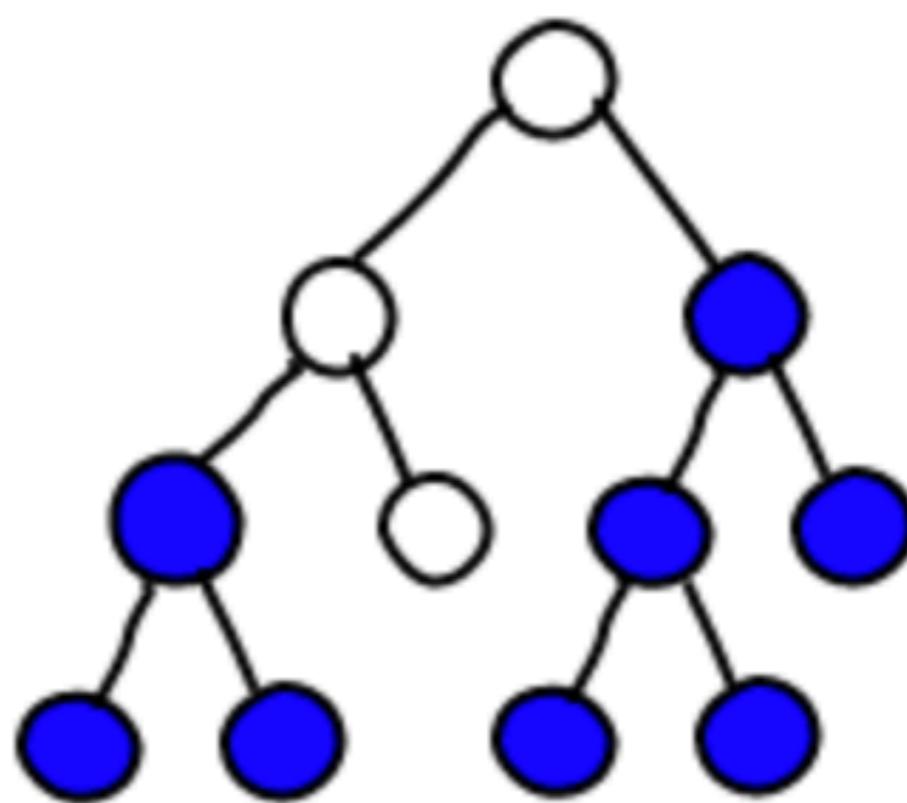
React.js



Dirty



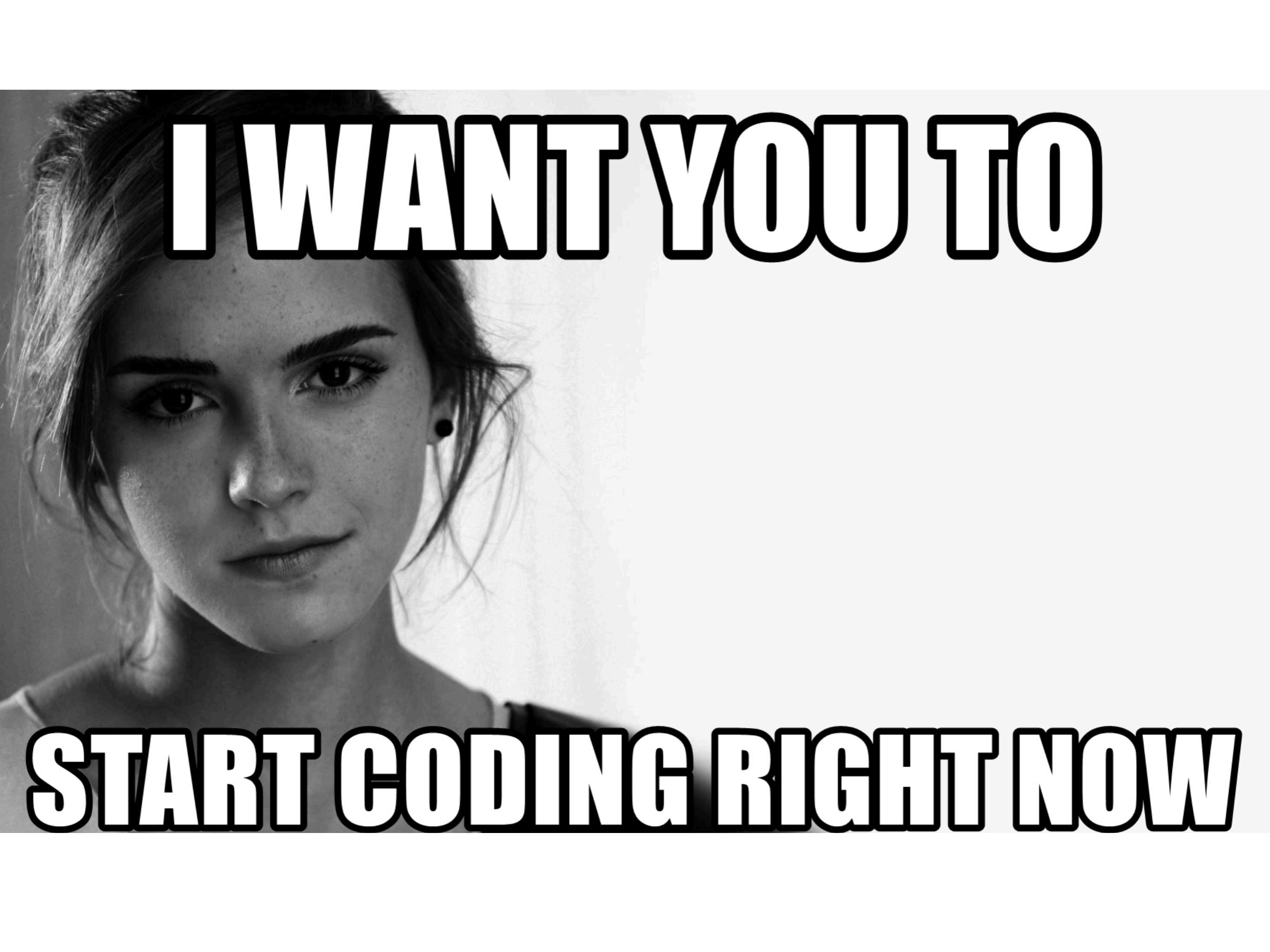
Re-rendered



Hello, world!

It is 12:26:46 PM.

```
Console  Sources  Network  Timeline
▼<div id="root">
  ▼<div data-reactroot>
    <h1>Hello, world!</h1>
    ▼<h2>
      <!-- react-text: 4 -->
      "It is "
      <!-- /react-text -->
      <!-- react-text: 5 -->
      "12:26:46 PM"
      <!-- /react-text -->
      <!-- react-text: 6 -->
      "."
      <!-- /react-text -->
    </h2>
  </div>
</div>
```



I WANT YOU TO

START CODING RIGHT NOW

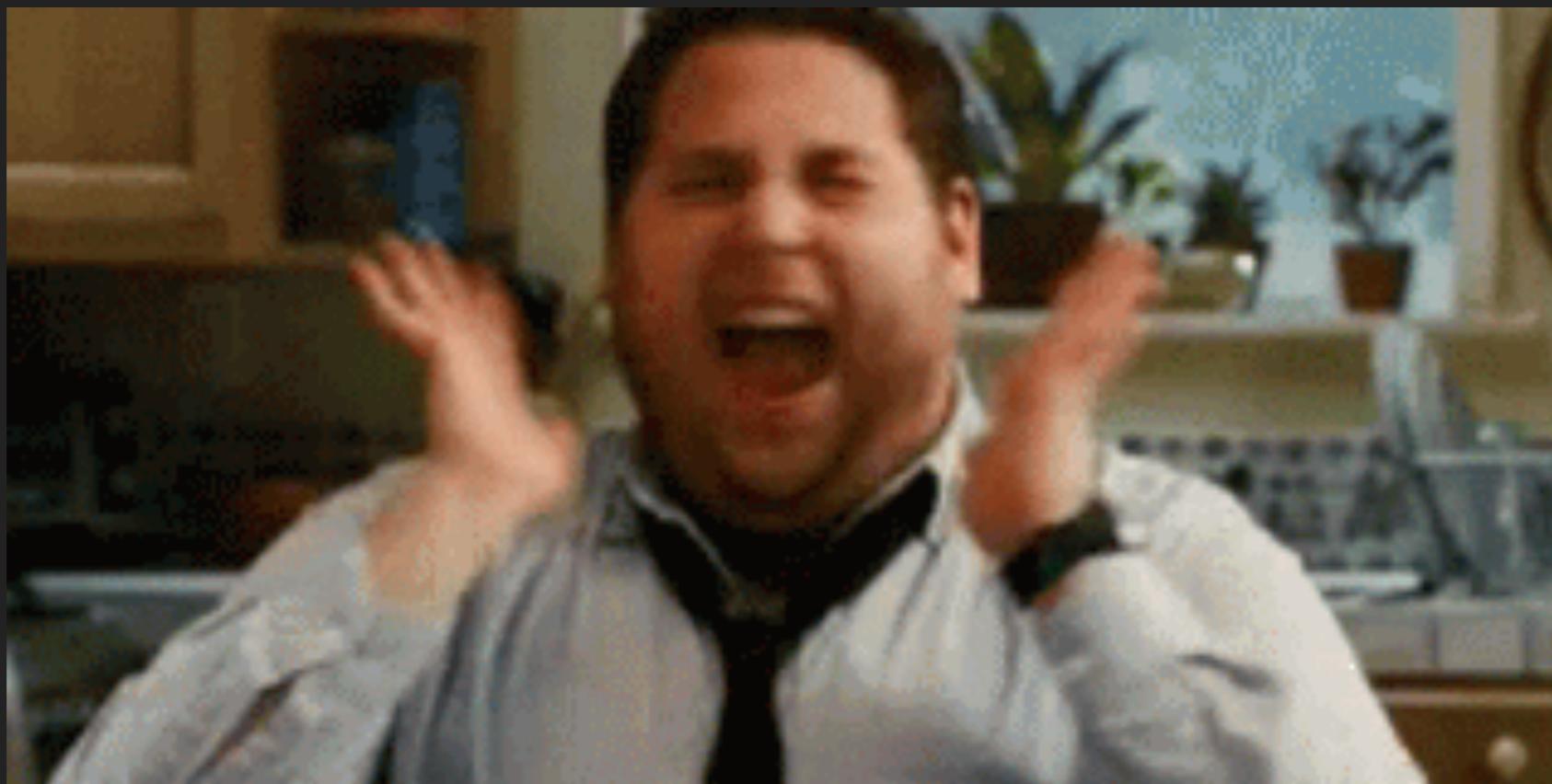
```
<!DOCTYPE html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <title>React App</title>
    <script src="https://unpkg.com/react@16/umd/react.production.min.js" crossorigin></script>
    <script src="https://unpkg.com/react-dom@16/umd/react-dom.production.min.js" crossorigin></script>
  </head>
  <body>
    <div id="root"></div>

    <script type="text/javascript">
      var Welcome = function Welcome() {
        return React.createElement("h1", null, "Hello, World");
      };

      ReactDOM.render(Welcome, document.getElementById("root"));
    </script>
  </body>
</html>
```

**CREATE
REACTAPP**

npx create-react-app myapp

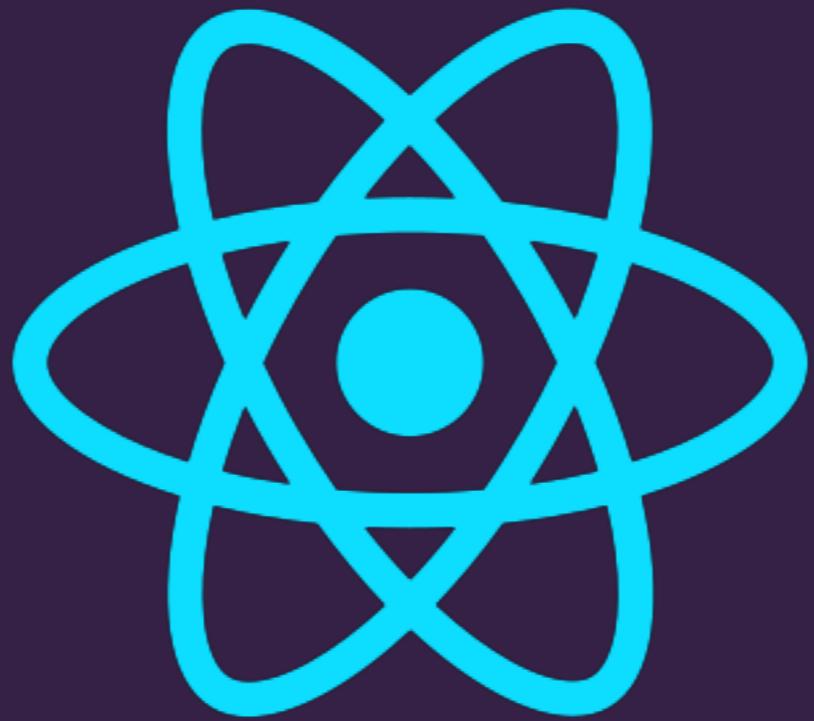


DEMO

REACT DEV TOOLS

DEMO

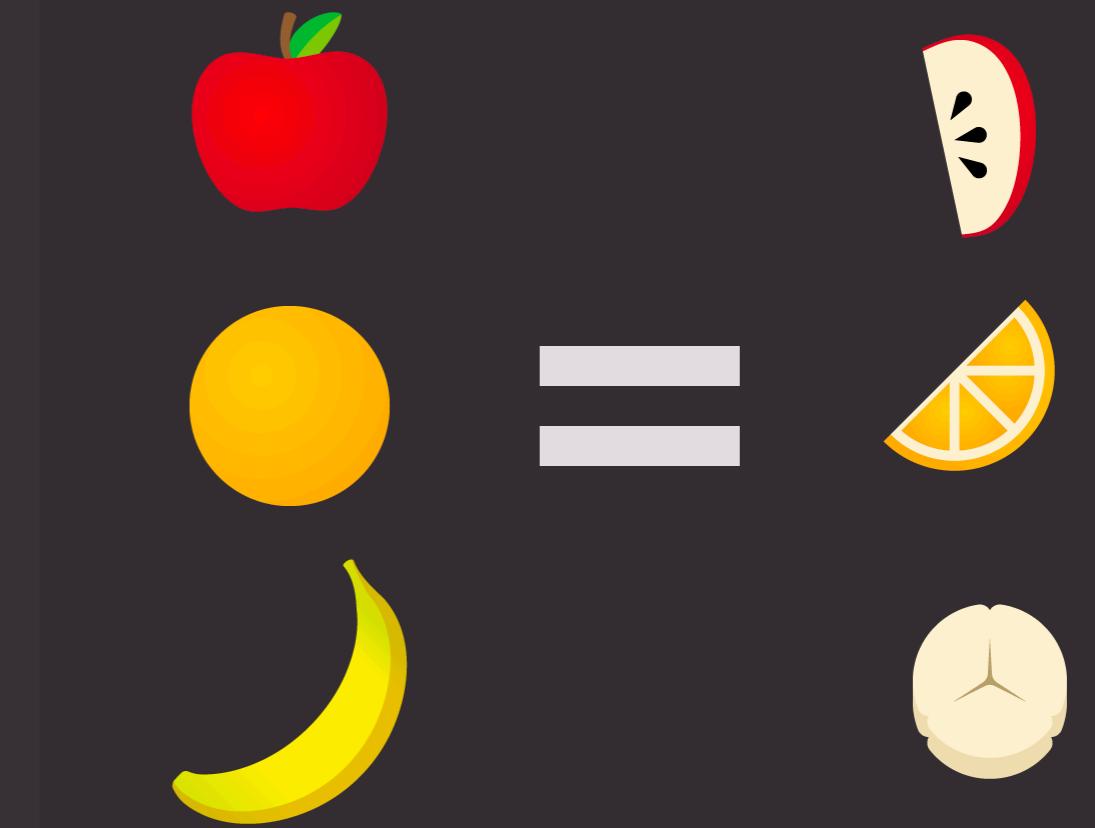
THANKS



REACT.JS

FUNCTIONAL PROGRAMMING

MAP



MAP

```
const array = [1,2,3,4,5];
```

```
const newArray = array.map(element => element + 1);
```

```
> newArray[2,,,]
```

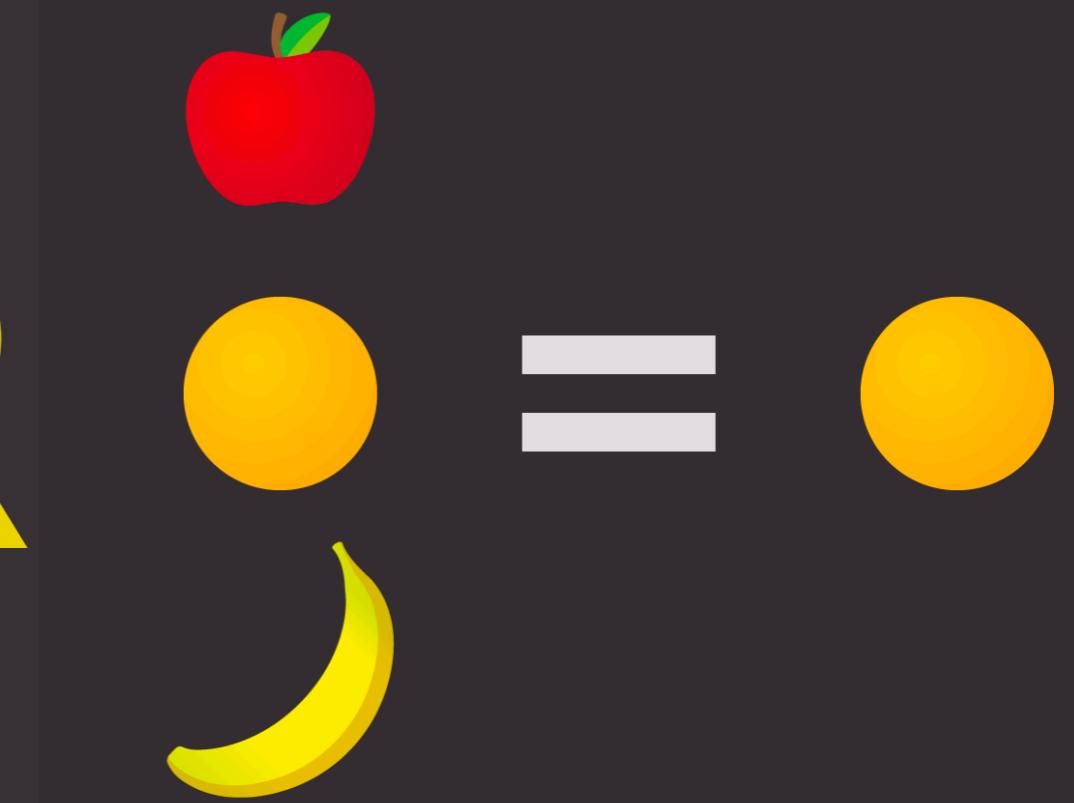
```
> newArray[2,3,,,]
```

```
> newArray[2,3,4,,,]
```

```
> newArray[2,3,4,5,,]
```

```
> newArray[2,3,4,5,6]
```

FILTER



FILTER

```
const array = [1,2,3,4,5];
```

```
const newArray = array.map(element => element > 3);
```

```
> newArray[]
```

```
> newArray[]
```

```
> newArray[]
```

```
> newArray[4]
```

```
> newArray[4,5]
```

RENDER MULTIPLE COMPONENT

RENDER MULTIPLE COMPONENT

```
const App = () => (
  <div>
    <h4>Asia</h4>
    <h4>Paweł</h4>
    <h4>Gosia</h4>
    <h4>Darek</h4>
  </div>
);
```

```
const App = () => (
  <div>
    {[{"name": "Asia"}, {"name": "Paweł"}, {"name": "Gosia"}, {"name": "Darek"}].map(item =>
      <h4>{item}</h4>
    )
  </div>
);
```

RENDER MULTIPLE COMPONENT

```
const names = [  
  "Asia",  
  "Paweł",  
  "Gosia",  
  "Darek"  
];
```

map()

```
{[  
  <h4>Asia</h4>,  
  <h4>Paweł</h4>,  
  <h4>Gosia</h4>,  
  <h4>Darek</h4>  
]}
```

RENDER MULTIPLE COMPONENT

```
const names = ["Asia", "Paweł", "Gosia", "Darek"];
```

```
names.map(name => <h4>{name}</h4>);
```

```
{[  
  <h4>Asia</h4>,  
  <h4>Paweł</h4>,  
  <h4>Gosia</h4>,  
  <h4>Darek</h4>  
]}  
}
```

RENDER MULTIPLE COMPONENT

```
const names = ["Asia", "Paweł", "Gosia", "Darek"];
```

```
const App = () => (
  <div>
    {names.map(name => (
      <h4>{name}</h4>
    ))}
  </div>
);
```

✖ 00:35:03.447 ▶ Warning: Each child in an array or iterator should have [index.js:1452](#) a unique "key" prop.

Check the render method of `App`. See <https://fb.me/react-warning-keys> for more information.

in h4 (at App.js:10)

in App (at src/[index.js:7](#))



**KEY
SHOULD BE
UNIQUE**

**NOT
TIMESTAMP
RANDOM**

GOOD

```
▼ <App> == $r
  ▼ <div>
    ▼ <div className="content">
      <h4 key="0">Asia</h4>
      <h4 key="1">Paweł</h4>
      <h4 key="2">Gosia</h4>
      <h4 key="3">Darek</h4>
    </div>
    ▼ <div className="sidebar">
      <h4 key="0">Skoda</h4>
      <h4 key="1">VW</h4>
      <h4 key="2">BMW</h4>
      <h4 key="3">Porsche</h4>
    </div>
  </div>
</App>
```

ANTI PATTERN

KEY={INDEX}

BUT....

DEMO

**KEY
ISN'T PASSED
TO COMPONENT**

PROPS

**PROPS =
PRIMITIVE VALUES,
REACT ELEMENTS
FUNCTIONS**

PROPS DEFAULT IS TRUE

```
<MyComponent dark />
```

```
<MyComponent dark={true} />
```

PROPS SPREAD ATTRIBUTES

```
const postData = {  
  title: "Post Title",  
  image: "https://pic.com/1.jpg",  
  text: "Lorem ipsum dolor sit."  
};
```

```
<Post {...postData} />
```



```
<Post  
  title="Post Title"  
  image="https://pic.com/1.jpg"  
  text="Lorem ipsum dolor sit."  
/>
```

NOTHING RENDER

```
<div />
```

```
<div></div>
```

```
<div>{false}</div>
```

```
<div>{null}</div>
```

```
<div>{undefined}</div>
```

```
<div>{true}</div>
```

CONDITIONAL RENDERING

CONDITIONAL RENDERING

```
const App = () => {  
  if (post) {  
    return <Post {...post} />;  
  } else {  
    return null;  
  }  
};
```

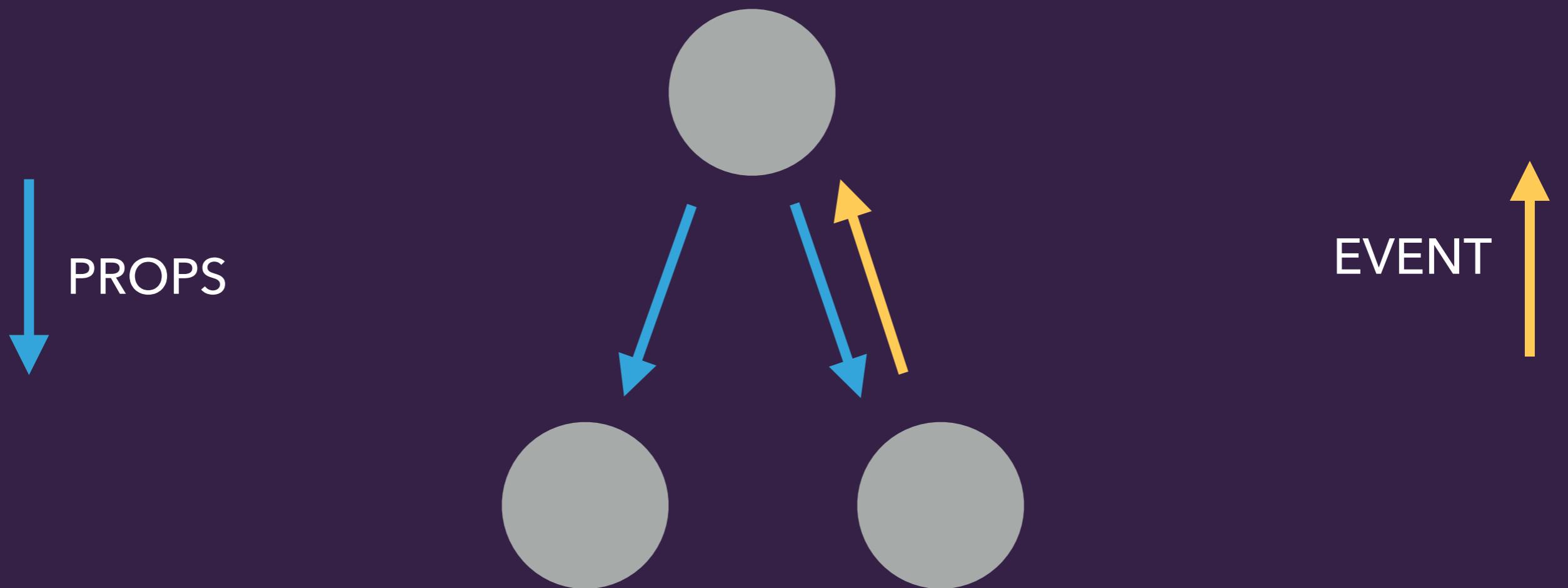
```
const App = () => {  
  return post ? <Post {...post} /> : null;  
};
```

CONDITIONAL RENDERING

```
const App = () => {  
  return post && <Post {...post} />;  
};
```

true && expression = expression
false && expression = false

ONE WAY DATA FLOW



REACT
EVENTS

event **props** of React element

```
// ReactElement
<button onClick={ this.handleClick }>Click!</button>
<input type="text" defaultValue="" onBlur={ this.handleBlur } />
```

// HTML DOM element

```
<button onclick="handle_click()">Click!</button>
<input type="text" value="" onblur="handle_blur()" />
```

event **attributes** of HTML DOM element

REACT EVENTS

```
const App = () => {  
  return <Button name="Save" />;  
};
```

```
const Button = ({ name }) => (  
  <button onClick={() => alert("Click Button")}>  
    {name}  
  </button>  
>);
```

REACT EVENTS

```
const onButtonClick = () => alert("Click Button");
```

```
const App = () => {
  return <Button name="Save" onClick={onButtonClick}/>;
};
```

```
const Button = ({ name, onClick }) => (
  <button onClick={onClick}>{name}</button>
);
```

PROPTYPES

PROPTYPES

```
import PropTypes from "prop-types";
```

```
const Hello = ({ name }) => <h1>Hello, {name}</h1>;
```

```
Hello.propTypes = {  
  name: PropTypes.string  
};
```

```
Hello.defaultProps = {  
  name: 'unknown'  
};
```

PROPTYPES

✖ 22:52:11.651 ► Warning: Failed prop type: Invalid prop `name` of type `array` supplied to `Hello`, expected `string`.
 in Hello (at App.js:6)
 in App (at src/index.js:7)

PROPTYPES

<https://github.com/facebook/prop-types>

CONTEXT API

CONTEXT

```
const App = () => (
  <Wrapper lang="pl">
    <Content lang={props.lang}>
      <BlogPosts lang={props.lang}>
        <Post lang={props.lang} />
      </BlogPosts>
    </Content>
    <Sidebar lang={props.lang}>
      <SomeComponent lang={props.lang}>
        <NewsletterForm lang={props.lang} />
      </SomeComponent>
    </Sidebar>
  </Wrapper>
);
```

CONTEXT

```
const Context = React.createContext();
```

```
<Context.Provider />
```

```
<Context.Consumer />
```

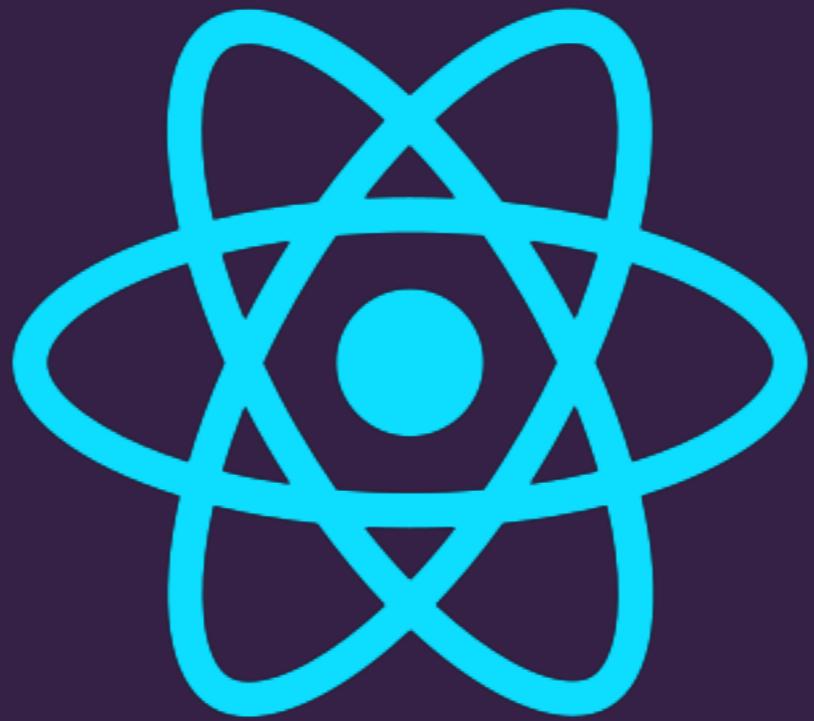
<PROVIDER>

<CONSUMER>

```
const LanguageContext = React.createContext();
```

```
const App = () => (
  <LanguageContext.Provider value="pl">
    <Wrapper>
      <Content>
        <BlogPosts>
          <LanguageContext.Consumer>
            {lang => <Post lang={lang} />}
          </LanguageContext.Consumer>
        </BlogPosts>
      </Content>
      <Sidebar>
        <SomeComponent>
          <LanguageContext.Consumer>
            {lang => <NewsletterForm lang={lang} />}
          </LanguageContext.Consumer>
        </SomeComponent>
      </Sidebar>
    </Wrapper>
  </LanguageContext.Provider>
);
```

THANKS



REACT.JS

HOC
**HIGH ORDER
COMPONENT**

HOC

```
component => componentOnSteroids;
```

HOC

```
const EnhancedComponent = higherOrderComponent(WrappedComponent);
```

HOC

```
const withLanguage = WrappedComponent => {
  return props => (
    <WrappedComponent {...props} language="pl" />
  );
};
```

```
const HelloWithLang = withLanguage(Hello);
```

```
const App = () => (
  <>
    <Hello name="Kasia" />
    <HelloWithLang name="Kasia" />
  </>
);
```

HOC

```
▼ <App> == $r
  ► <Hello name="Kasia">...</Hello>
  ▼ <Unknown name="Kasia">
    ► <Hello name="Kasia" language="pl">...</Hello>
    </Unknown>
  </App>
```

HOC



HOC

```
function logProps(InputComponent) {  
  InputComponent.prototype.componentWillReceiveProps = function(nextProps) {  
    console.log('Current props: ', this.props);  
    console.log('Next props: ', nextProps);  
  };  
  return InputComponent;  
}  
  
const EnhancedComponent = logProps(InputComponent);
```

HOC

```
function logProps(WrappedComponent) {  
  return class extends React.Component {  
    componentWillMount(nextProps) {  
      console.log('Current props: ', this.props);  
      console.log('Next props: ', nextProps);  
    }  
    render() {  
      return <WrappedComponent {...this.props} />;  
    }  
  }  
}
```

HOC

```
const EnhancedComponent = hoc(Component);
```

```
const EnhancedComponent = anotherHoc(Component, config);
```

```
const ConnectedComponent = connect(param1, param2)(Component);
const enhance = connect(param1, param2);
const ConnectedComponent = enhance(Component);
```

HOC

```
const EnhancedComponent = withRouter(connect(param)(WrappedComponent))
```

```
const enhance = compose(  
  withRouter,  
  connect(commentSelector)  
)  
const EnhancedComponent = enhance(WrappedComponent)
```

HOC

```
@withRouter
@connect(param)
export default class MyFancyComponent extends React.Component {
}
```

HOC

react-fns

<https://github.com/jaredpalmer/react-fns>

**CLASS
COMPONENT**

CLASS COMPONENT

```
const Welcome = props => {
  return <h1>Hello, {props.name}</h1>;
}
```

```
class Welcome extends React.Component {
  render() {
    return <h1>Hello, {this.props.name}</h1>;
}
}
```

CLASS COMPONENT

„When should I use a function and when a class?”

~undefined

**CLASS
COMPONENT**

DIFFERENCES

CLASS COMPONENT

SYNTAX

CLASS COMPONENT DIFFERENCES

```
var Welcome = function Welcome(props) {  
  return React.createElement(  
    "h1",  
    null,  
    "Hello, ",  
    props.name);  
};
```

CLASS COMPONENT

```
var Welcome = (function(_React$Component) {
  _inherits(Welcome, _React$Component);

  function Welcome() {
    _classCallCheck(this, Welcome);

    return _possibleConstructorReturn(
      this,
      (Welcome.__proto__ || Object.getPrototypeOf(Welcome)).apply(
        this,
        arguments
      )
    );
  }

  _createClass(Welcome, [
    {
      key: "render",
      value: function render() {
        return React.createElement("h1", null, "Hello, ", this.props.name);
      }
    }
  ]);

  return Welcome;
}
```

**CLASS
COMPONENT**

STATE

**CLASS
COMPONENT
STATE**

STATE VS PROPS

CLASS COMPONENT STATE

COMMON

plain JS objects

render update

deterministic

**CLASS
COMPONENT
STATE**

PROPS

Component's configuration

Received from above

Immutable

CLASS COMPONENT STATE

STATE

Component's information

Created in component

Changeable

CLASS COMPONENT STATE

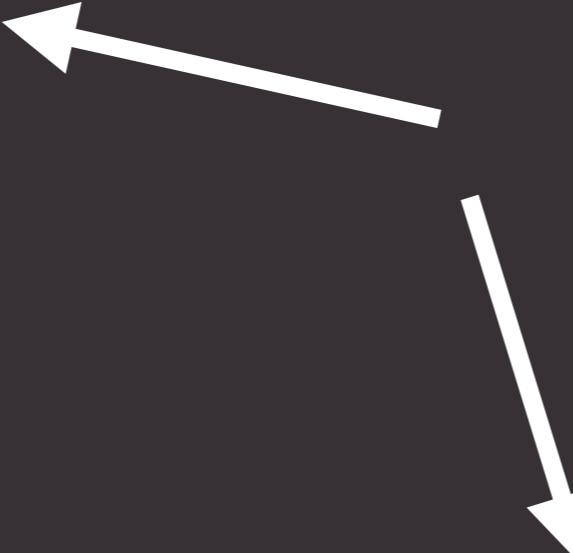
```
class Button extends React.Component {  
  constructor() {  
    super();  
    this.state = {  
      count: 0,  
    };  
  }  
}
```



```
  render() {  
    .....  
  }  
}
```

CLASS COMPONENT STATE

```
class Button extends React.Component {  
  constructor() {  
    super();  
    this.state = {  
      count: 0  
    };  
  }  
  
  render() {  
    return (  
      <button>  
        Clicked {this.state.count} times  
      </button>  
    );  
  }  
}
```

A diagram illustrating the state flow in a Class Component. It shows two code snippets: the constructor and the render method. In the constructor, 'this.state' is assigned an object with a 'count' property set to 0. An arrow points from this assignment to the 'count' prop in the render method's JSX, indicating that the state value is being used to render the button's text.

```
class Button extends React.Component {  
  constructor() {  
    super();  
    this.state = {  
      count: 0  
    };  
    this.updateCount = this.updateCount.bind(this)  
  }  
}
```

```
updateCount() {  
  this.setState((prevState, props) => {  
    return { count: prevState.count + 1 };  
  });  
}
```

```
render() {  
  return (  
    <button onClick={this.updateCount}>  
      Clicked {this.state.count} times  
    </button>  
  );  
}  
}
```

DEMO

INITIALIZE STATE

```
this.state = {}
```

CHANGE STATE

```
this.setState()
```

setState()

```
this.setState({ count: 2 });
```

```
this.setState((state) => {  
  return {count: state.count + 1};  
});
```

setState()



```
constructor() {  
  super();  
  this.state = {  
    count: 0;  
  }  
}
```

```
incrementCount() {  
  this.setState({count: this.state.count + 1});  
}
```

```
handleSomething() {  
  this.incrementCount();  
  this.incrementCount();  
  this.incrementCount();  
}
```

```
constructor() {  
  super();  
  this.state = {  
    count: 0;  
  }  
}
```

```
incrementCount() {  
  this.setState((state) => {  
    return {count: state.count + 1}  
  });  
}
```

```
handleSomething() {  
  this.incrementCount();  
  this.incrementCount();  
  this.incrementCount();  
}
```

setState()



STATE ANTI-PATTERN



```
class MyComponent extends Component {
  constructor(props) {
    super(props);
    this.state = {
      someValue: props.someValue,
    };
  }
}
```

„When should I use a function and when a class?”

~undefined

REACT HOOKS

COMING SOON!

```
import { useState } from 'react';

const Example = () => {
  // Declare a new state variable, which we'll call "count"
  const [count, setCount] = useState(0);

  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={() => setCount(count + 1)}>
        Click me
      </button>
    </div>
  );
}
```

COMING SOON!

CLASS COMPONENT DIFFERENCES

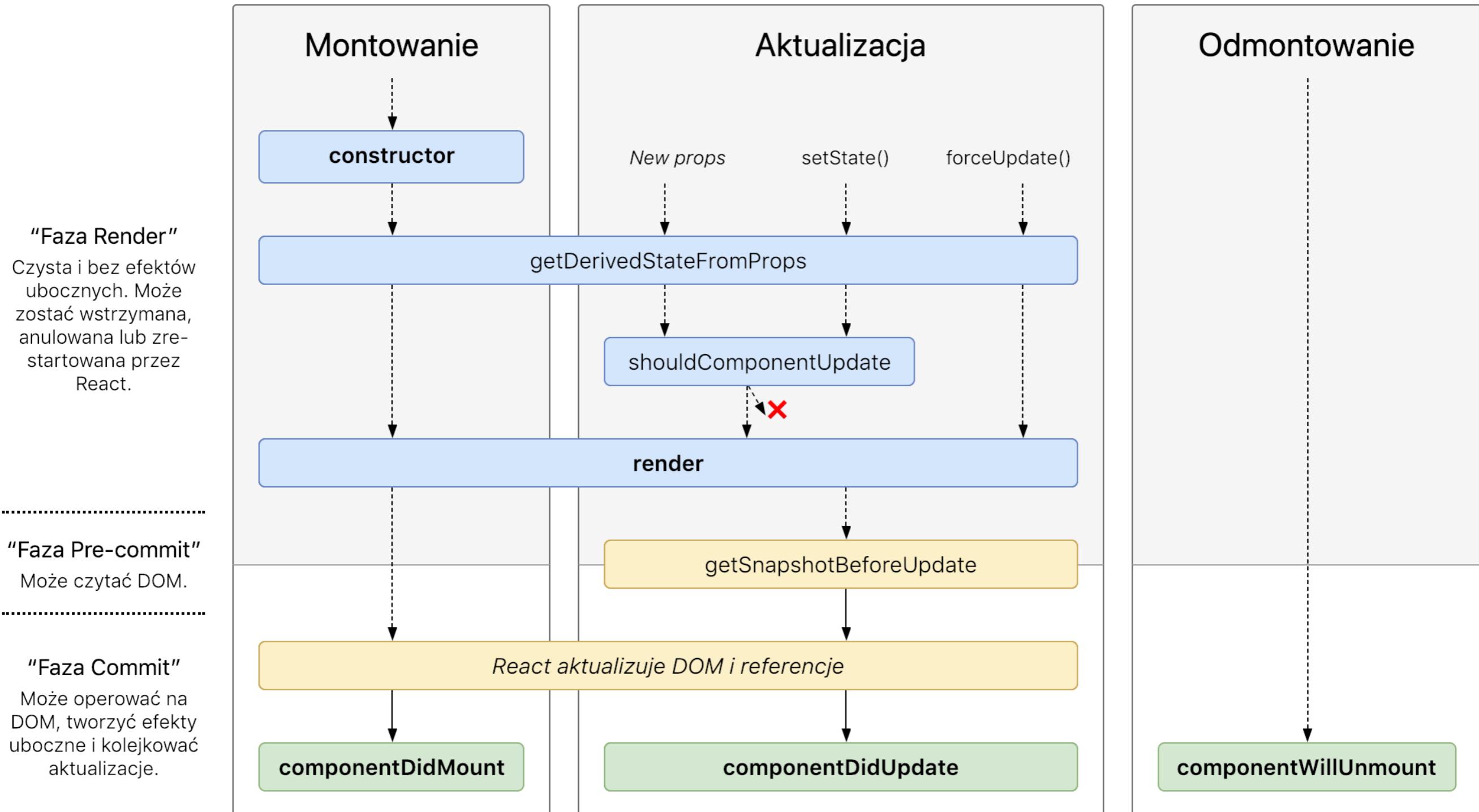
LIFECYCLE HOOKS

LIFECYCLE HOOKS

MOUNTING

UPDATING

UNMOUNTING



constructor()

initialize state (`this.state`)

bind methods

static getDerivedStateFromProps()

return an object to update
the state

fired on every render

render()

required

componentDidMount()

load data from a remote endpoint

side-effect

DOM

shouldComponentUpdate()

performance optimization

getSnapshotBeforeUpdate()

componentDidUpdate()

invoked immediately after
updating

good to do network requests

componentWillUnmount()

invoked immediately before a
component is unmounted and destroyed
cleaning up

BIND

```
class Foo extends Component {  
  handleClick() {  
    console.log("Click happened", this.state);  
  }  
  render() {  
    return <button onClick={this.handleClick}>Click Me</button>;  
  }  
}
```

BIND



```
class Foo extends Component {  
  constructor(props) {  
    super(props);  
    this.handleClick = this.handleClick.bind(this);  
  }  
  handleClick() {  
    console.log('Click happened', this.state);  
  }  
  render() {  
    return <button onClick={this.handleClick}>Click Me</button>;  
  }  
}
```

BIND



```
class Foo extends Component {  
  handleClick = () => {  
    console.log("Click happened", this.state);  
  }  
  render() {  
    return <button onClick={this.handleClick}>Click Me</button>;  
  }  
}
```

BIND



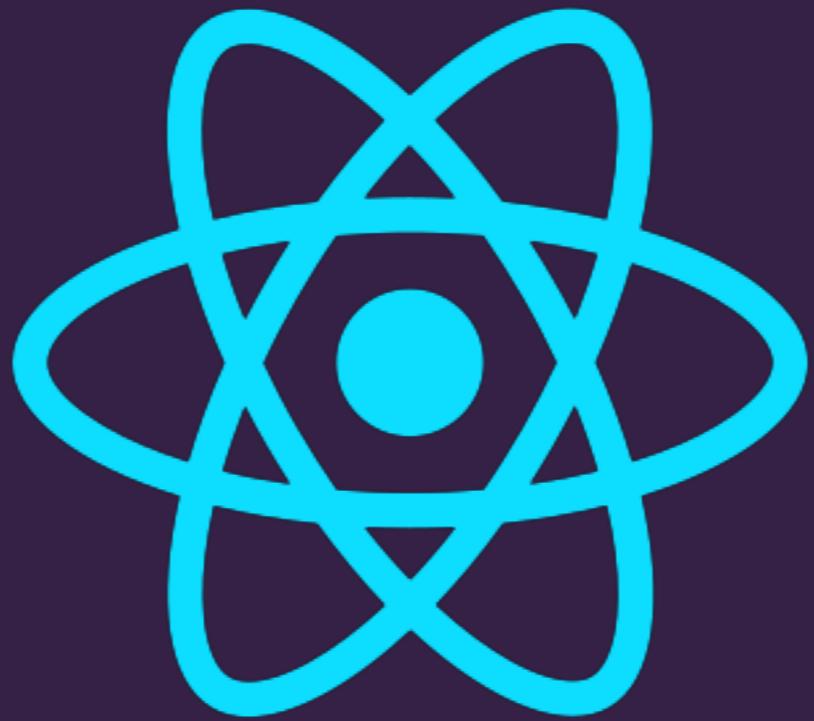
```
class Foo extends Component {  
  handleClick() {  
    console.log("Click happened", this.state);  
  };  
  render() {  
    return (  
      <button onClick={this.handleClick.bind(this)}>  
        Click Me  
      </button>  
    );  
  }  
}
```

BIND



```
class Foo extends Component {  
  handleClick() {  
    console.log("Click happened", this.state);  
  }  
  render() {  
    return (  
      <button onClick={() => this.handleClick()}>  
        Click Me  
      </button>  
    );  
  }  
}
```

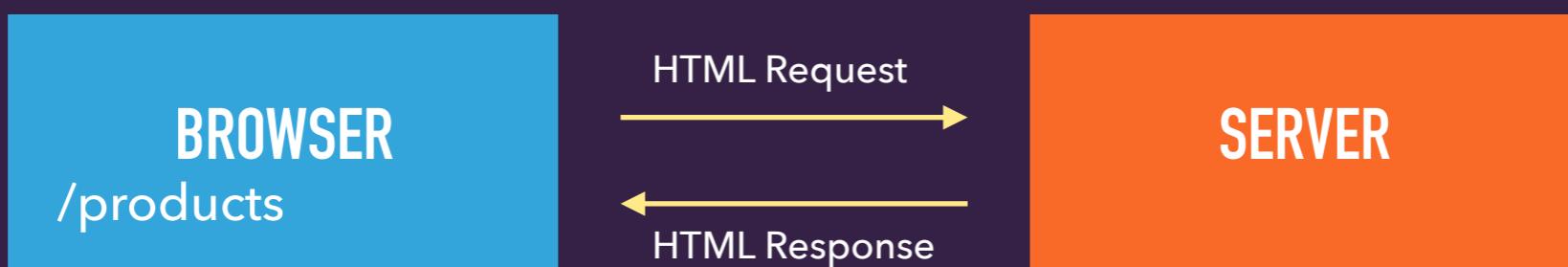
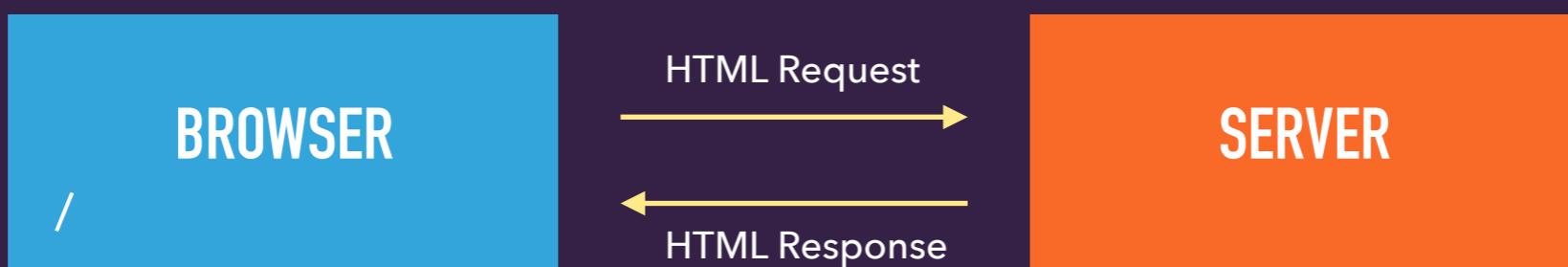
THANKS



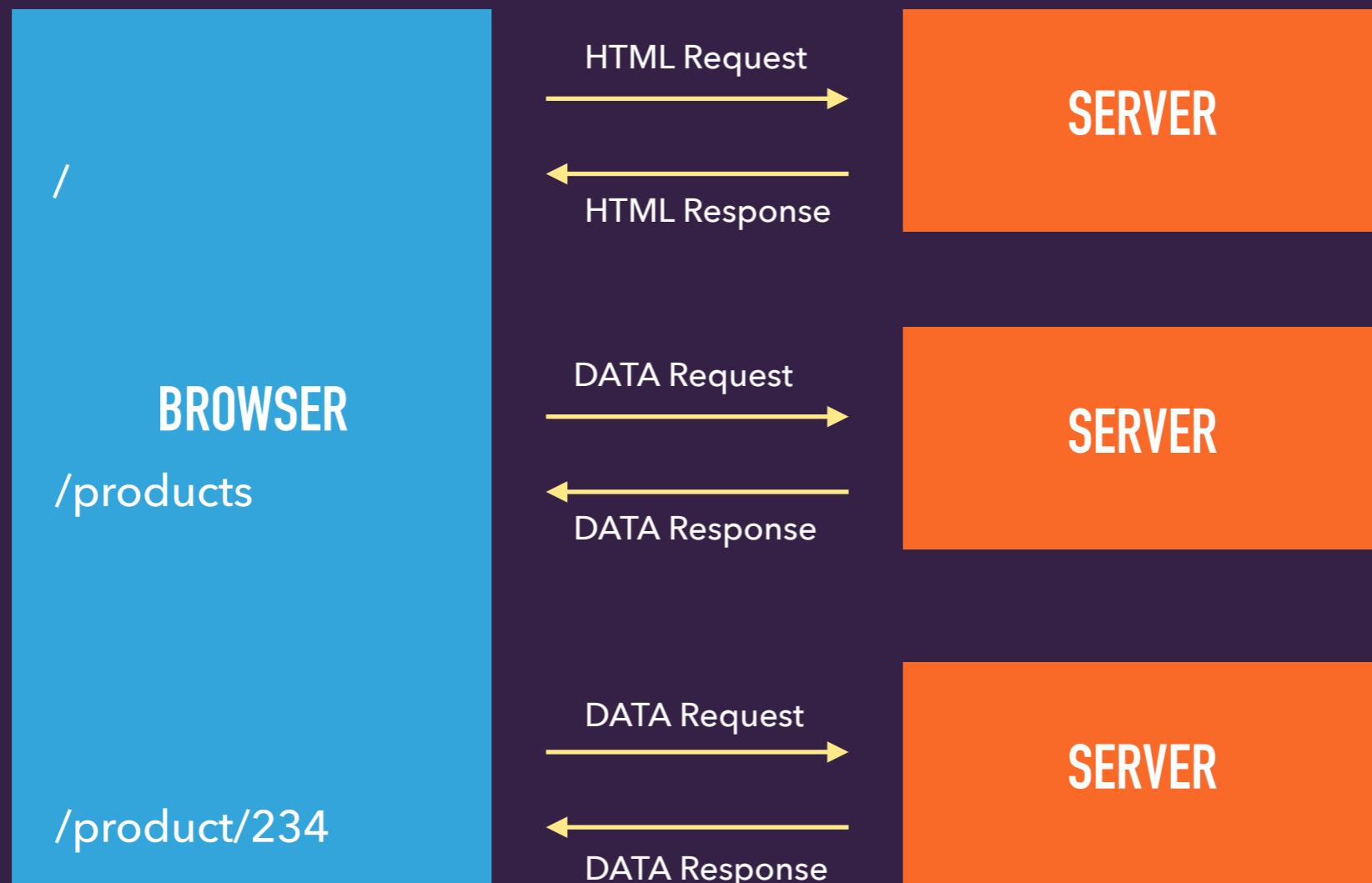
REACT.JS

ROUTING

TRADITIONAL WEBSITE



SINGLE PAGE APPLICATION

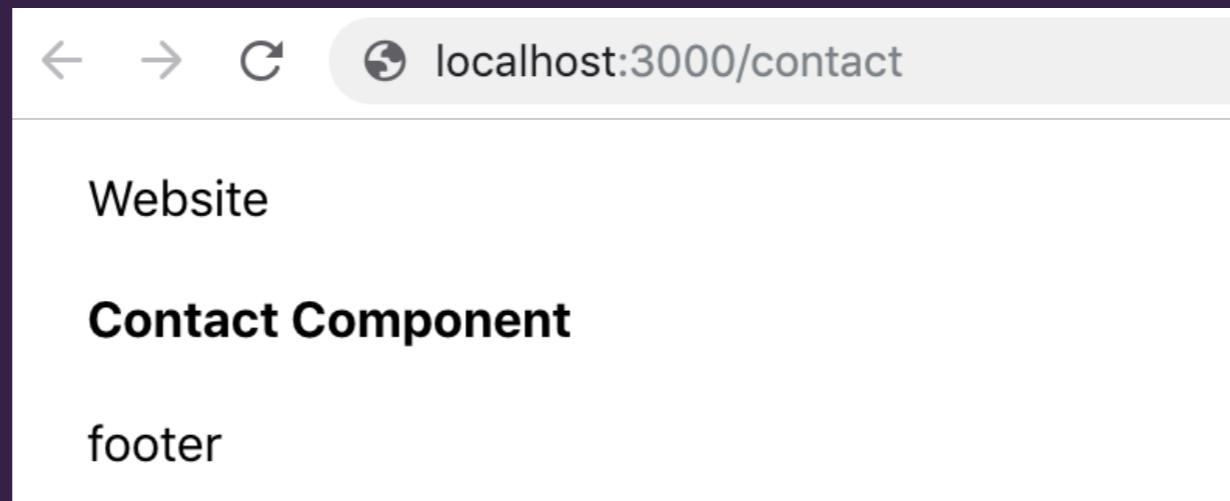
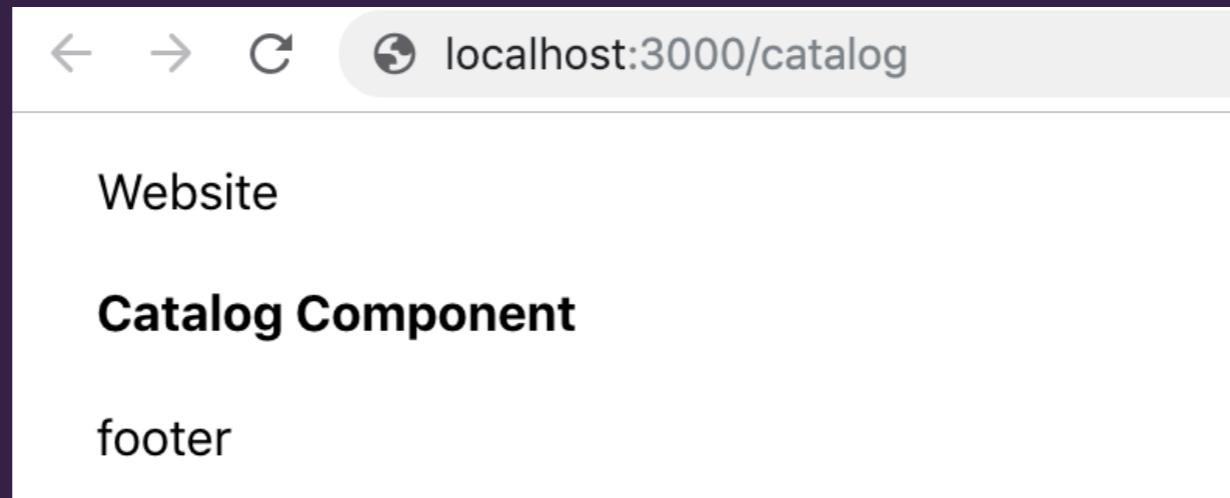
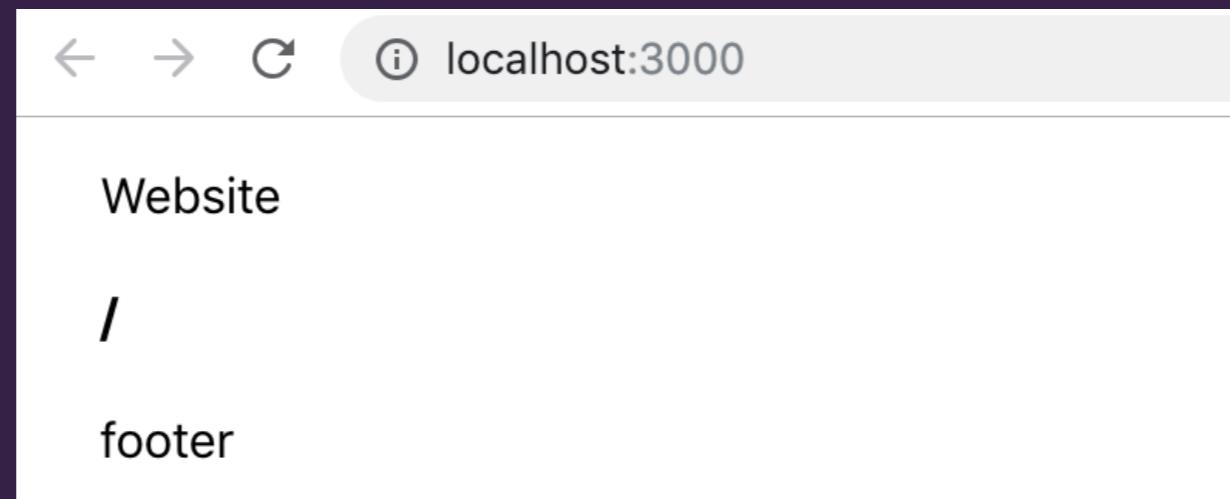


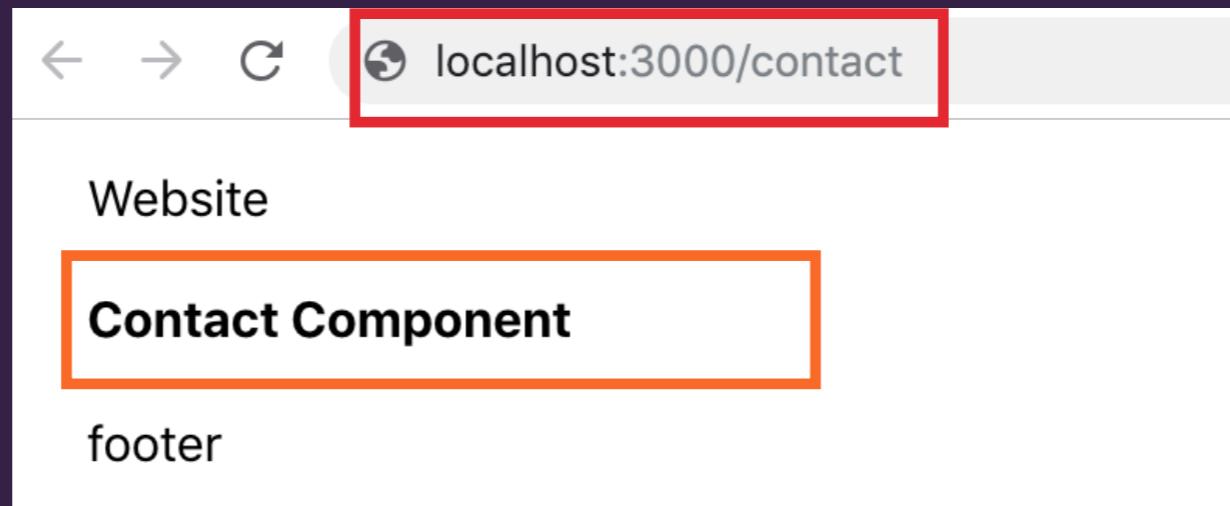
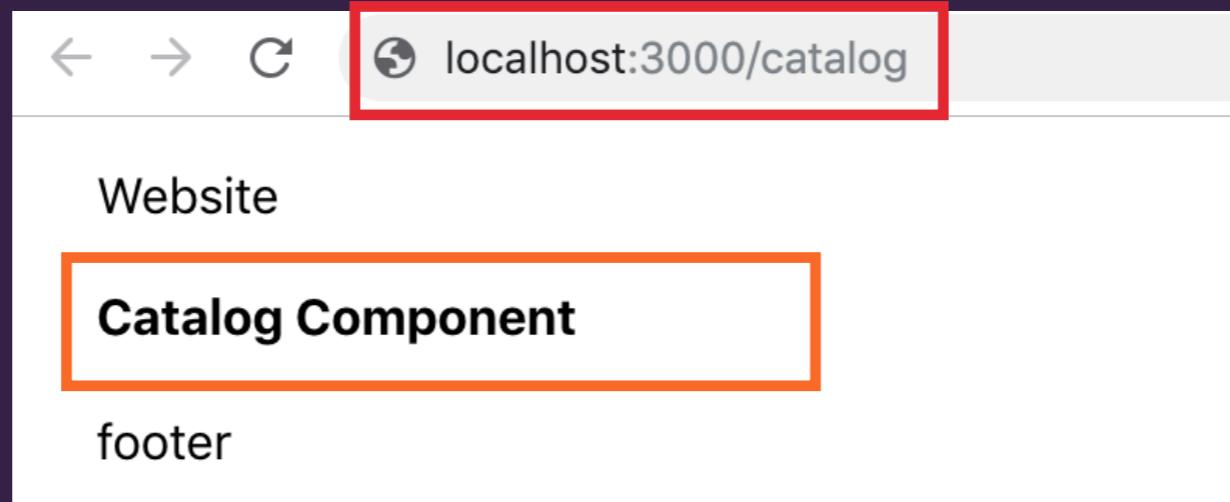
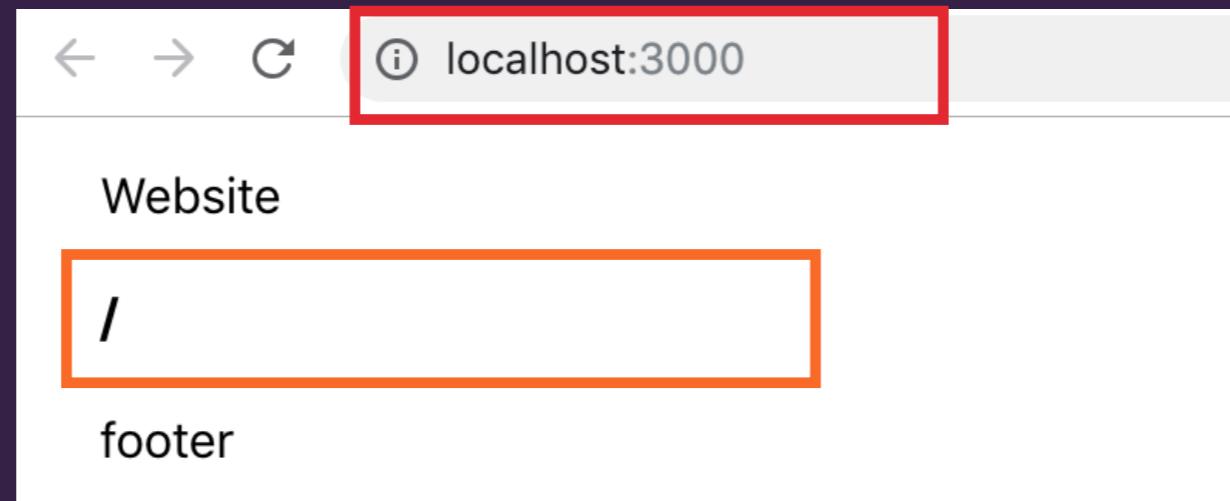
STATIC ROUTING

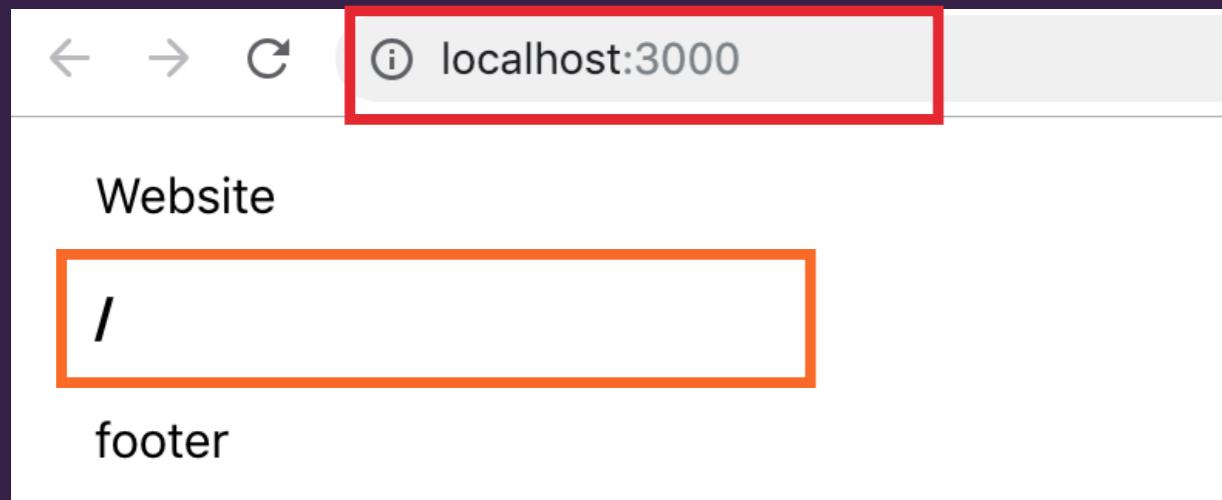
DYNAMIC ROUTING

„When we say dynamic routing, we mean routing that takes place as your app is rendering, not in a configuration or convention outside of a running app. That means almost everything is a component in React Router.”

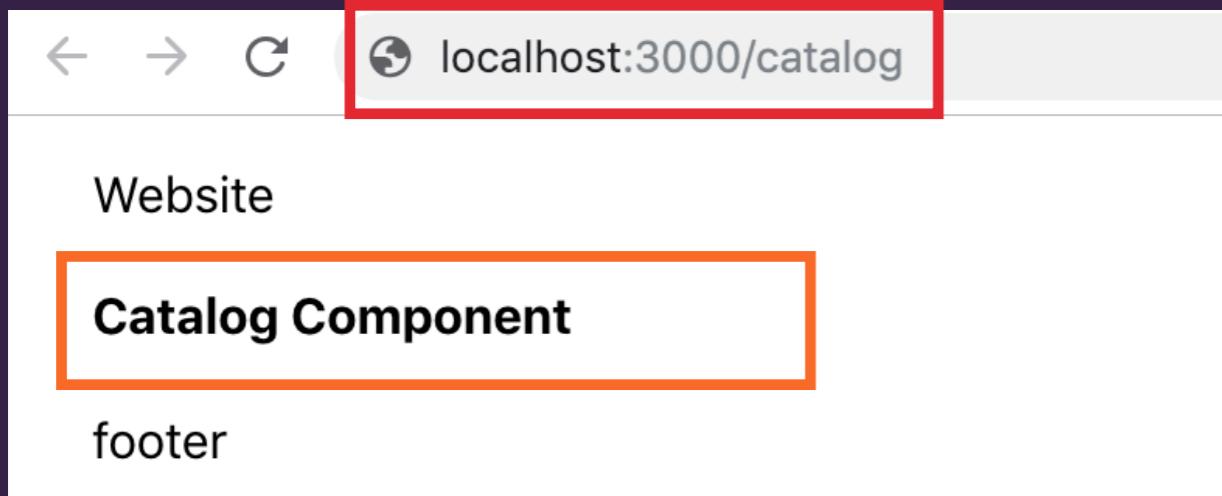
– React Training



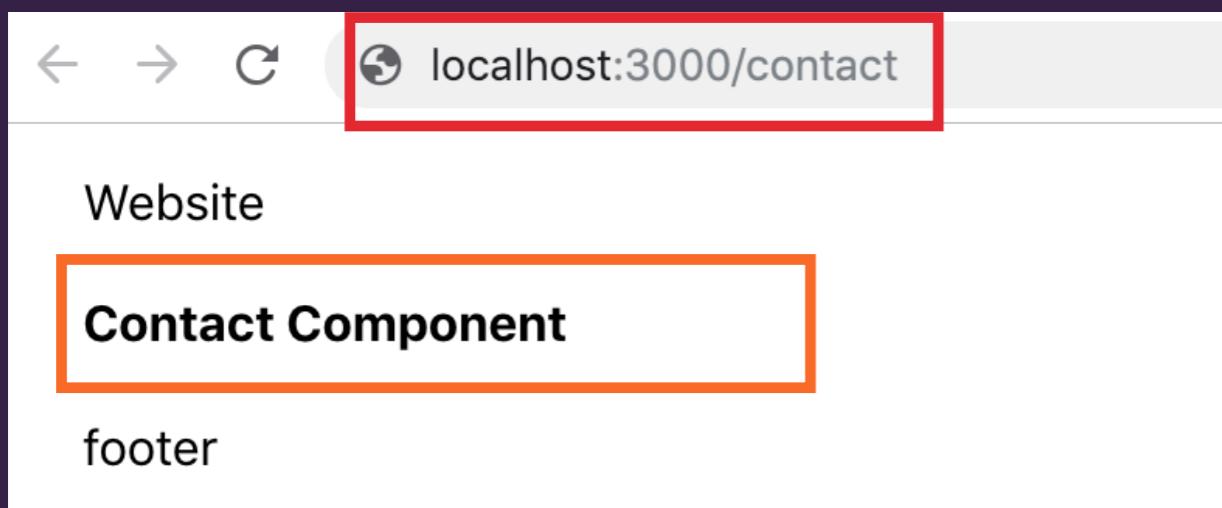




path: /
component: Home



path: /catalog
component: Catalog



path: /contact
component: Contact

REACT ROUTER V4

PACKAGES

REACT-ROUTER

The core of React Router

REACT-ROUTER-DOM

DOM bindings for React Router

REACT-ROUTER-NATIVE

React Native bindings for React Router

REACT-ROUTER-CONFIG

Static route config helpers

REACT ROUTER API

<Router>

```
<Router history={history}>
  <App />
</Router>
```

REACT ROUTER API

<BrowserRouter>

```
<BrowserRouter>
  <App />
</BrowserRouter>
```

REACT ROUTER API

<BrowserRouter>

example.com

example.com/catalog

example.com/contact

REACT ROUTER API

<HashRouter>

```
<HashRouter>
  <App />
</HashRouter>
```

REACT ROUTER API

<HashRouter>

example.com

example.com/#/catalog

example.com/#/contact

REACT ROUTER API

<Route>

```
<Router>
  <div>
    <Route path="/" component={Home}/>
    <Route path="/catalog" component={Catalog}/>
    <Route path="/contact" component={Contact}/>
  </div>
</Router>
```

REACT ROUTER API

<Route>

```
<Route exact path="/" component={Home}/>
<Route strict path="/catalog/" component={Catalog}/>
<Route sensitive path="/Contact" component={Contact}/>
```

REACT ROUTER API

<Route>

```
<Route path="/" component={Home}/>
<Route path="/" render={() => <Home />} />
<Route path="/" children={() => <Home />} />
```

REACT ROUTER API

<Route>

```
<Router>
  <div>
    <Route path="/" component={Home}/>
  </div>
</Router>
```

```
const Home = ({ match, location, history }) => (
  .....
)
```

REACT ROUTER API

<Link>

```
<Link to="/contact">Contact</Link>  
<Link  
  to={{  
    pathname: "/contact",  
    search: "?from=pl",  
    hash: "#hash",  
    state: { fromDashboard: true }  
  }}>  
</Link>
```

REACT ROUTER API

<NavLink>

```
<NavLink to="/contact" activeClassName="selected">  
  Contact  
</NavLink>
```

```
<NavLink to="/contact" activeStyle={{color: "red"}}>  
  Contact  
</NavLink>
```

REACT ROUTER API

<Redirect>

```
<Redirect to=",/contact"/>
```

```
<Redirect  
  to={  
    pathname: "/contact"  
  }  
/>
```

REACT ROUTER API

<Switch>

```
<Switch>
  <Route path="/" />
  <Route path="/" />
  <Route path="/" />
</Switch>
```

REACT ROUTER API

withRouter

```
class MyComponent extends Component {  
  render() {  
    const { match, location, history } = this.props;  
  
    return <div>You are now at {location.pathname}</div>;  
  }  
}  
  
withRouter(MyComponent);
```

DOCUMENTATION

reacttraining.com/react-router/

```
/catalog => <Catalog />
```

```
/contact => <Contact />
```

```
class App extends Component {  
  render() {  
    return (  
      <div>  
        <h2>Website 2019</h2>  
        <Catalog />  
        <Contact />  
      </div>  
    );  
  }  
}
```

`npm i react-router-dom`

```
import {  
  BrowserRouter as Router,  
  Route  
} from "react-router-dom";
```

```
class App extends Component {  
  render() {  
    return (  
      <div>  
        <h2>Website 2019</h2>  
        <Catalog />  
        <Contact />  
      </div>  
    );  
  }  
}
```

```
import {  
  BrowserRouter as Router,  
  Route  
} from "react-router-dom";  
  
class App extends Component {  
  render() {  
    return (  
      <Router>  
        <div>  
          <h2>Website 2019</h2>  
          <Route path="/catalog" component={Catalog} />  
          <Route path="/contact" component={Contact} />  
        </div>  
      </Router>  
    );  
  }  
}
```

DEMO

404

```
<Switch>
  <Route exact path="/" component={Home} />
  <Route path="/catalog" component={Catalog} />
  <Route path="/contact" component={Contact} />
  <Route component={NotFound} />
</Switch>
```

NESTED ROUTERS

```
const Catalog = ({ match }) => (
  <div>
    <h1>I am Catalog Component {match.url}</h1>
    <Route path={`${match.url}/a`} component={CatalogA} />
    <Route path={`${match.url}/b`} component={CatalogB} />
  </div>
);
```

url: http://localhost:3000/catalog
match.url: /catalog

```
<Router>
  <Switch>
    <Route path="/catalog" component={Catalog} />
    <Route path="/contact" component={Contact} />
    <Route component={NotFound} />
  </Switch>
</Router>
```

path=/catalog/a
path=/catalog/b

PARAMETERS ROUTERS

```
const Catalog = ({ match }) => (
  <div>
    <h1>I am Catalog Component, id: {match.params.id}</h1>
  </div>
);
```



```
<Route path="/catalog/:id" component={Catalog} />
```



**STYLE REACT
COMPONENT**

96* Ways to Style React Components in 2019

INLINE CSS

INLINE CSS

```
const helloStyle = {  
  color: "red",  
  fontSize: "20px"  
};
```

```
const Hello = () => <h1 style={helloStyle}>Hello</h1>;
```

CLASS NAME

CLASS NAME

Style.css

```
.red {  
  color: red;  
  font-size: 20px  
}
```

App.js

```
import "./Style.css";  
  
const Hello = () => <h1 className="red">Hello</h1>;
```

CSS MODULES

CSS MODULES

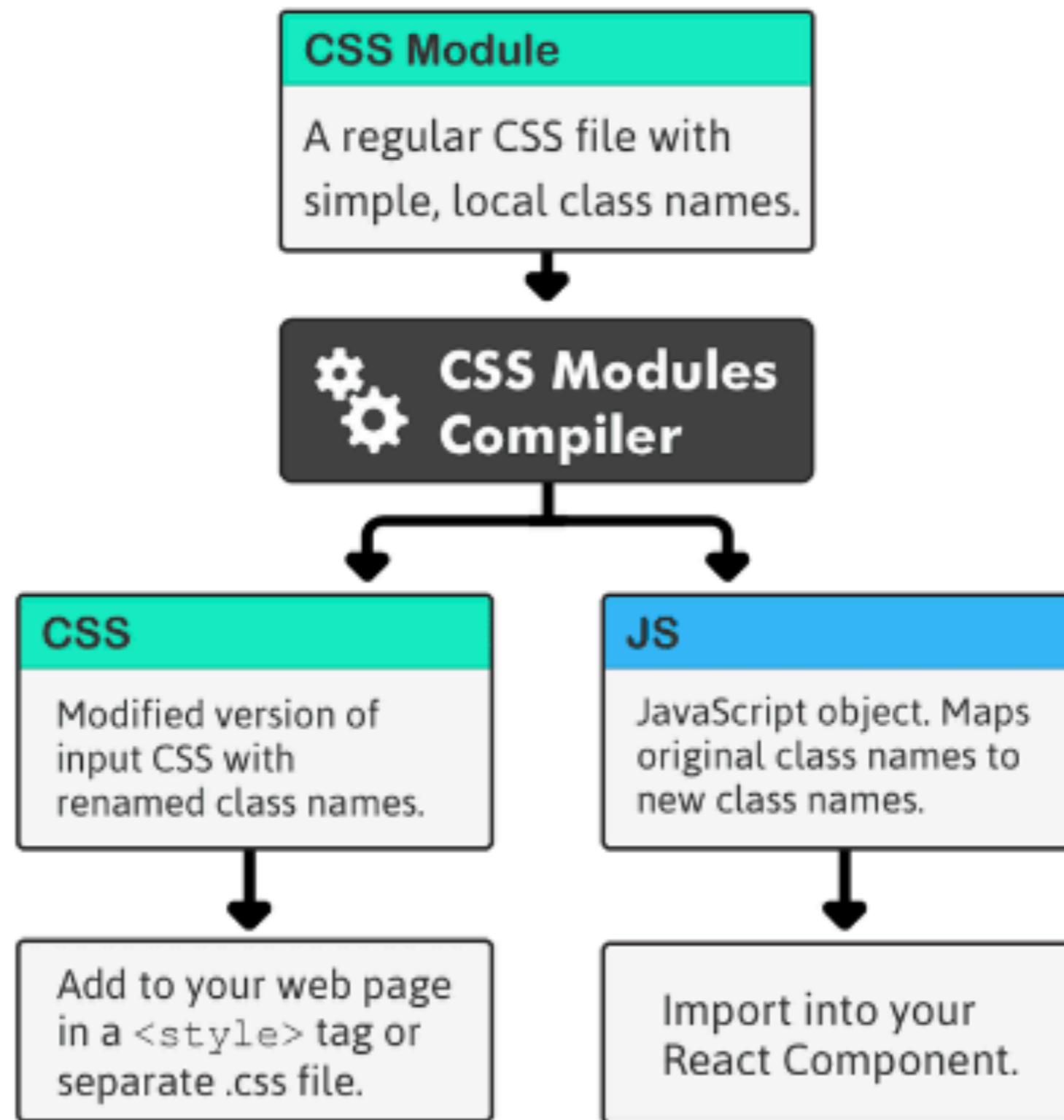
Style.module.css

```
.Red {  
  color: red;  
  font-size: 20px  
}
```

App.js

```
import styles from "./Style.module.css";
```

```
const Hello = () => <h1 className={styles.Red}>Hello</h1>;
```



CSS MODULES

Style.module.css

```
.Red {  
  color: red;  
  font-size: 20px  
}
```

```
<style type="text/css">.Style_Red___55GV {  
  color: red;  
  font-size: 20px  
</style>
```

App.js

```
import styles from "./Style.module.css";  
  
console.log(styles); // Red: "Style_Red___55GV"  
  
const Hello = () => <h1 className={styles.Red}>Hello</h1>;
```

CSS IN JS

STYLED COMPONENTS

```
import styled from 'styled-components';
```

```
const Hello = styled.h1`  
  color: red;  
  font-size: 20px  
`;
```

STYLED COMPONENTS

```
<style data-styled="" data-styled-version="4.1.3">
  /* sc-component-id: sc-bdVaJa */
  .cSRbkb {
    color:red;
    font-size:20px;
  }
</style>
```

```
<h1 class="sc-bdVaJa cSRbkb">Hello world</h1>
```

```
const Hello = styled.h1`  
  color: red;  
  font-size: 20px  
`;
```

```
class App extends Component {  
  render() {  
    return <Hello>Hello world</Hello>;  
  }  
}
```

STYLED COMPONENTS

```
const Hello = styled.h1`  
  color: ${props => props.color};  
  font-size: 20px;  
`;
```

```
<Hello color="red">Hello world</Hello>;
```

Other libraries...

<https://github.com/tuchk4/awesome-css-in-js>

REFS

Refs make it possible to access DOM nodes directly within React.

REFS

When use?

Managing focus, text selection, or media playback.

Triggering imperative animations.

Integrating with third-party DOM libraries.

REFS

```
class App extends Component {  
  constructor() {  
    super();  
    this.inputRef = React.createRef();  
  }  
}
```

```
render() {  
  return (  
    <div>  
      <input type="text" ref={this.inputRef} />  
    </div>  
  );  
}  
}
```

REFS

```
class App extends Component {  
  constructor() {  
    super();  
    this.inputRef = React.createRef();  
  }  
  
  componentDidMount() {  
    this.inputRef.current.focus();  
  }  
  
  render() {  
    return (  
      <div>  
        <input type="text" ref={this.inputRef} />  
      </div>  
    );  
  }  
}
```

SUMMARY

AJAX & APIS

```
class App extends React.Component {  
  state = {  
    user: null  
  };  
  
  render() {  
    const { user } = this.state;  
  
    return (  
      <div>  
        <img src={user.avatar} alt="avatar" />  
        Name: {user.name}  
        E-mail: {user.email}  
      </div>  
    );  
  }  
}
```

```
class App extends React.Component {  
  state = {  
    user: null  
  };  
  
  async componentDidMount() {  
    const response = await fetch("https://my.awesome.api/v1/");  
    const data = await response.json();  
    const [user] = data.results;  
    this.setState({ user });  
  }  
  
  render() {  
    const { user } = this.state;  
  
    return (  
      <div>  
        <img src={user.avatar} alt="avatar" />  
        Name: {user.name}  
        E-mail: {user.email}  
      </div>  
    );  
  }  
}
```

← → 1 of 2 errors on the page

TypeError: Cannot read property 'avatar' of null

App.render
src/App.js:24

```
21 |
22 | return (
23 |   <div>
> 24 |     <img src={user.avatar} alt="avatar" />
25 |   ^ Name: {user.name}
26 |   E-mail: {user.email}
27 | </div>
```

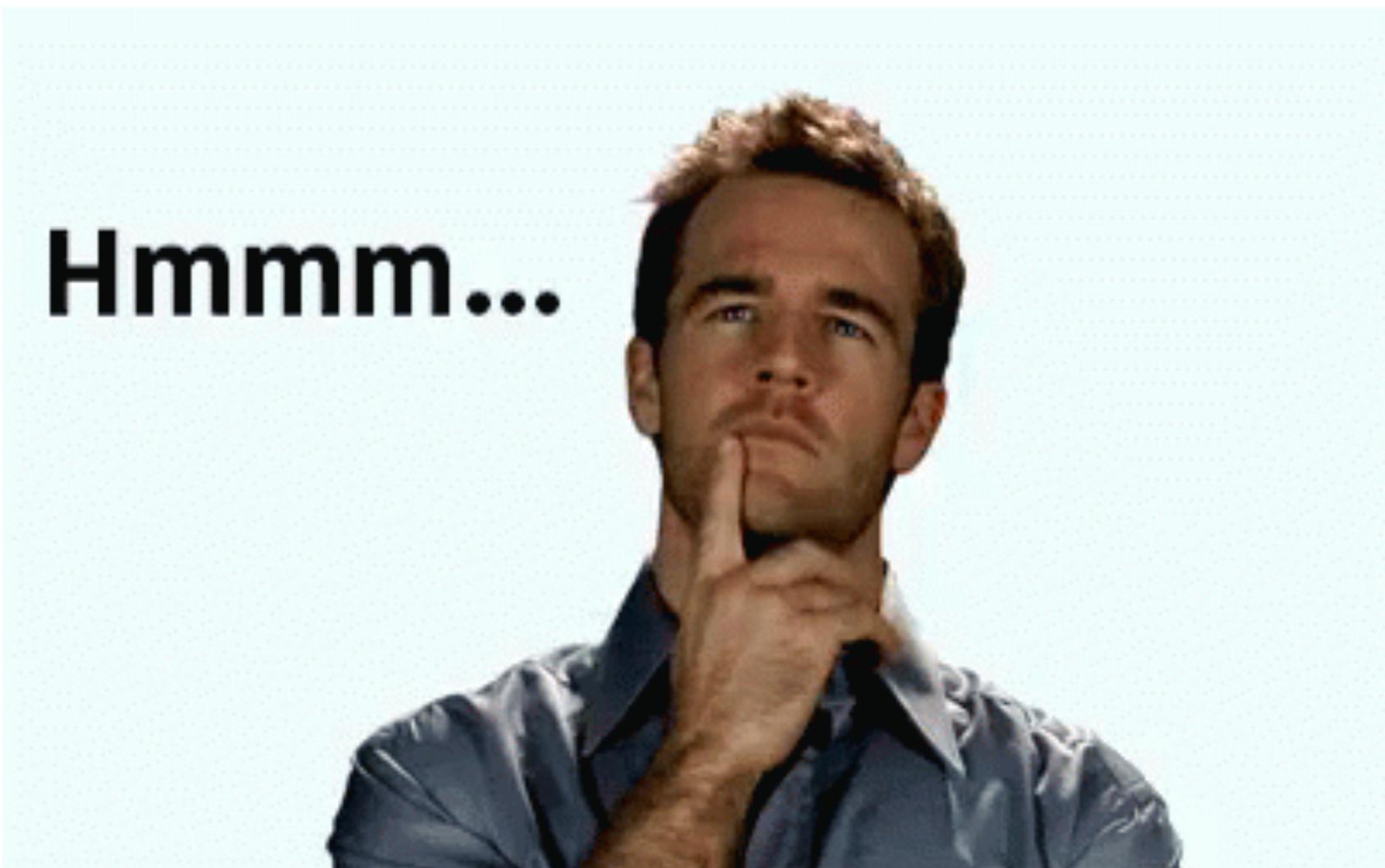
[View compiled](#)

```
class App extends React.Component {  
  state = {  
    isLoading: false,  
    user: null  
};
```

```
async componentDidMount() {  
  //...pobieranie danych  
  this.setState({  
    user,  
    isLoading: true  
});  
}
```

```
render() {  
  const { user, isLoading } = this.state;  
  
  if(!isLoading) {  
    return <div>Loading...</div>;  
  }  
  
  //...dalsza czesc render  
}
```

ERRORS?



```
class App extends React.Component {  
  state = {  
    error: null,  
    isLoading: false,  
    user: null  
  };  
  
  async componentDidMount() {  
    try {  
      ///...pobieranie danych  
      this.setState({  
        user,  
        isLoading: true  
      });  
    } catch (e) {  
      this.setState({  
        error: e.message,  
        isLoading: true  
      });  
    }  
  }  
  
  render() {  
    const { user, isLoading, error } = this.state;  
  
    if (error) { return <div>{error}</div>; }  
  
    if (!isLoading) { return <div>Loading...</div>; }  
  
    ///...dalsza czesc render
```

UNCONTROLLED COMPONENTS

UNCONTROLLED COMPONENTS

```
class Form extends Component {  
  render() {  
    return (  
      <div>  
        <input type="text" />  
      </div>  
    );  
  }  
}
```

UNCONTROLLED COMPONENTS

Form data handled by

DOM

UNCONTROLLED COMPONENTS

```
this.inputRef = React.createRef();
```

```
this.inputRef.current.value;
```

```
<input type="text" ref={this.inputRef}/>
```

INPUT [TYPE=FILE]

Always uncontrolled

INPUT [TYPE=FILE]

```
this.fileInputRef = React.createRef();
```

```
this.fileInputRef.current.files;
```

```
<input type="file" ref={this.fileInputRef} />
```

CONTROLLED COMPONENTS

CONTROLLED COMPONENTS

Form data handled by

REACT Component

CONTROLLED COMPONENTS

```
<input type="text" value={value} onChange={handleChange} />
```

CONTROLLED COMPONENTS

```
class Form extends React.Component {  
  state = {  
    name: ""  
  };  
  
  handleChange = event => {  
    this.setState({ name: event.target.value });  
  };  
  
  render() {  
    return (  
      <input type="text" value={this.state.name} onChange={this.handleChange} />  
    );  
  }  
}
```

CONTROLLED VS UNCONTROLLED

feature	uncontrolled	controlled
one-time value retrieval (e.g. on submit)		
validating on submit		
instant field validation		
conditionally disabling submit button		
enforcing input format		
several inputs for one piece of data		
dynamic inputs		

FORMS

FORMS ARE HARD

FORM STATE

Which field currently has focus?

Which fields are dirty?

Which fields have errors?

Which fields was touched?

Are we currently submitting?

Have we tried to submit and received some errors from server

FINAL FORMS

FINAL FORMS

Zero dependencies

Only peer dependencies: React and Final Form

Opt-in subscriptions - only update on the state you need!

3.0k + 4.8k gzipped

FINAL FORMS

```
class App extends React.Component {  
  onSubmit = values => {  
    console.log("handleSubmit", values);  
  };  
  
  render() {  
    return (  
      <Form  
        onSubmit={this.onSubmit}  
        render={({ handleSubmit }) => (  
          <form onSubmit={handleSubmit}>  
            <Field name="imie" component="input" />  
            <Field name="nazwisko" component="input" />  
            <input type="submit" value="Wyslij" />  
          </form>  
        )}  
      />  
    );  
  }  
}
```

HOOKS

HOOKS

Hooks is a special function that lets you “hook into” React features like React state and lifecycle.

HOOKS

The image shows four versions of a React component, each with a different background color (blue, purple, orange, and yellow) and a corresponding screenshot of the component's interface.

Version 1 (Blue): Class-based component using lifecycle methods and event listeners.

```
import React from 'react'
import { Card, Row, Input, Text } from './components'
import ThemeContext from './ThemeContext'

export default class Greetings extends React.Component {
  constructor(props) {
    super(props)
    this.state = {
      name: 'Mary',
      surname: 'Poppins',
      width: window.innerWidth
    }

    this.handleNameChange = this.handleNameChange.bind(this)
    this.handleSurnameChange = this.handleSurnameChange.bind(this)
    this.handleResize = this.handleResize.bind(this)
  }

  componentDidMount() {
    window.addEventListener('resize', this.handleResize)
    document.title = this.state.name + ' ' + this.state.surname
  }

  componentDidUpdate() {
    document.title = this.state.name + ' ' + this.state.surname
  }

  componentWillUnmount() {
    window.removeEventListener('resize', this.handleResize)
  }

  handleNameChange(event) {
    this.setState({ name: event.target.value })
  }

  handleSurnameChange(event) {
    this.setState({ surname: event.target.value })
  }

  handleResize() {
    this.setState({ width: window.innerWidth })
  }

  render() {
    const { name, surname, width } = this.state

    return (
      <ThemeContext.Consumer>
        {theme => (
          <Card theme={theme}>
            <Row label="Name">
              <Input value={name} onChange={this.handleNameChange} />
            </Row>
            <Row label="Surname">
              <Input value={surname} onChange={this.handleSurnameChange} />
            </Row>
            <Row label="Width">
              <Text>{width}</Text>
            </Row>
          </Card>
        )}
      </ThemeContext.Consumer>
    )
  }
}
```

Version 2 (Purple): Class-based component using hooks.

```
import React from 'react'
import { Card, Row, Input, Text } from './components'
import ThemeContext from './ThemeContext'

export default class Greetings extends React.Component {
  constructor(props) {
    super(props)
    this.state = {
      name: 'Mary',
      surname: 'Poppins',
      width: window.innerWidth
    }
  }

  componentDidMount() {
    this.setState({ name: 'Mary' })
    this.setState({ surname: 'Poppins' })
    this.setState({ width: window.innerWidth })
  }

  componentDidUpdate() {
    this.setState({ name: 'Mary' })
    this.setState({ surname: 'Poppins' })
    this.setState({ width: window.innerWidth })
  }

  componentWillUnmount() {
    this.setState({ name: 'Mary' })
    this.setState({ surname: 'Poppins' })
    this.setState({ width: window.innerWidth })
  }

  render() {
    const { name, surname, width } = this.state

    return (
      <Card theme={theme}>
        <Row label="Name">
          <Input value={name} onChange={this.handleNameChange} />
        </Row>
        <Row label="Surname">
          <Input value={surname} onChange={this.handleSurnameChange} />
        </Row>
        <Row label="Width">
          <Text>{width}</Text>
        </Row>
      </Card>
    )
  }
}
```

Version 3 (Orange): Functional component using useState, useContext, and useEffect.

```
import React, { useState, useContext, useEffect } from 'react'
import { Card, Row, Input, Text } from './components'
import ThemeContext from './ThemeContext'

export default function Greetings(props) {
  const [name, setName] = useState('Mary')
  const [surname, setSurname] = useState('Poppins')
  const theme = useContext(ThemeContext)
  const width = useState(window.innerWidth)

  useEffect(() => {
    document.title = name + ' ' + surname
  })

  return (
    <Card theme={theme}>
      <Row label="Name">
        <Input value={name} onChange={handleNameChange} />
      </Row>
      <Row label="Surname">
        <Input value={surname} onChange={handleSurnameChange} />
      </Row>
      <Row label="Width">
        <Text>{width}</Text>
      </Row>
    </Card>
  )
}

function handleNameChange(e) {
  setName(e.target.value)
}

function handleSurnameChange(e) {
  setSurname(e.target.value)
}
```

Version 4 (Yellow): Functional component using useState, useContext, useEffect, and a utility hook.

```
import React, { useState, useContext, useEffect } from 'react'
import { Card, Row, Input, Text } from './components'
import ThemeContext from './ThemeContext'

function useFormInput(initialValue) {
  const [value, setValue] = useState(initialValue)

  function handleChange(e) {
    setValue(e.target.value)
  }

  return {
    value,
    onChange: handleChange
  }
}

function useDocumentTitle(title) {
  useEffect(() => {
    document.title = title
  })
}

function useWindowWidth() {
  const [width, setWidth] = useState(window.innerWidth)

  useEffect(() => {
    const handleResize = () => setWidth(window.innerWidth)
    window.addEventListener('resize', handleResize)
    return () => {
      window.removeEventListener('resize', handleResize)
    }
  })
  return width
}

export default function Greetings(props) {
  const name = useFormInput('Mary')
  const surname = useFormInput('Poppins')
  const theme = useContext(ThemeContext)
  const width = useWindowWidth()

  useDocumentTitle(name.value + ' ' + surname.value)

  return (
    <Card theme={theme}>
      <Row label="Name">
        <Input {...name} />
      </Row>
      <Row label="Surname">
        <Input {...surname} />
      </Row>
      <Row label="Width">
        <Text>{width}</Text>
      </Row>
    </Card>
  )
}
```

HOOKS

Functional Stateless Components

now is

Functional Components

HOOKS

Don't waist your time to rewriting your existing components overnight but you can start using Hooks in the new ones if you'd like



HOOKS

Don't call Hooks inside loops, conditions, or nested functions

Only call Hooks at the top level.

Don't call Hooks from regular JavaScript functions

Only call Hooks from React function components.

HOOKS

useState

useState is a Hook that lets you add React state to function components

HOOKS

useState

```
class App extends React.Component {  
  state = {  
    count: 0  
  }  
}
```

```
const App = () => {  
  const [count, setCount] = useState(0);  
}
```

HOOKS

useState

```
this.setState({  
  count: 0  
});  
  
setCount(0);
```

HOOKS

useState

```
const App = () => {  
  const [count, setCount] = useState(0);  
  
  return (  
    <div>  
      Count {count}  
      <button onClick={() => setCount(count + 1)}>Click</button>  
    </div>  
  )  
};
```

HOOKS

useState

```
const App = () => {  
    //multiple state variables!  
    const [count, setCount] = useState(0);  
    const [name, setName] = useState("");  
    const [email, setEmail] = useState("");
```

HOOKS

useState

DEMO

HOOKS

useRef

```
const App = () => {  
  const inputRef = useRef(null);  
  const onButtonClick = () => {  
    inputRef.current.focus();  
  };  
  return (  
    <>  
      <input ref={inputRef} type="text" />  
      <button onClick={onButtonClick}>Focus the input</button>  
    </>  
  );  
};
```

HOOKS

useContext

Accepts a context object and returns the current context value for that context.

```
const value = useContext(MyContext);
```

HOOKS

useContext

DEMO

HOOKS

useEffect

Accepts a function that contains imperative, possibly effectful code.

```
useEffect(didUpdate);
```

HOOKS

useEffect

```
// side-effects in a React class component
class MyComponent extends Component {
  // setup phase
  componentDidMount() {
    // add listener for feature
  }
  // clean up phase
  componentWillUnmount() {
    // remove listener for feature
  }
}
```

```
// side-effects in React function component with React Hooks
MyComponent = () => {
  useEffect(() => {
    // add listener for feature (setup)
    // return function to remove listener for feature (clean up)
  });
}
```

HOOKS

useEffect

```
// side-effects in React function component with React Hooks  
MyComponent = () => {  
  useEffect(() => {  
    });  
}
```

```
// side-effects in React function component with React Hooks  
MyComponent = () => {  
  useEffect(() => {  
    }, []);  
}
```

```
// side-effects in React function component with React Hooks  
MyComponent = () => {  
  useEffect(() => {  
    }, [name]);  
}
```

HOOKS

useEffect

DEMO

HOOKS

useYourImagination

Write custom hook

DEMO

**GLOBAL STATE?
WHY?**

CATALOG

Search

Clear

search...

Manufacturer

- All
- Apple
- Dell

Cart

Viewed



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

iMac 27 Retina



\$2099.99

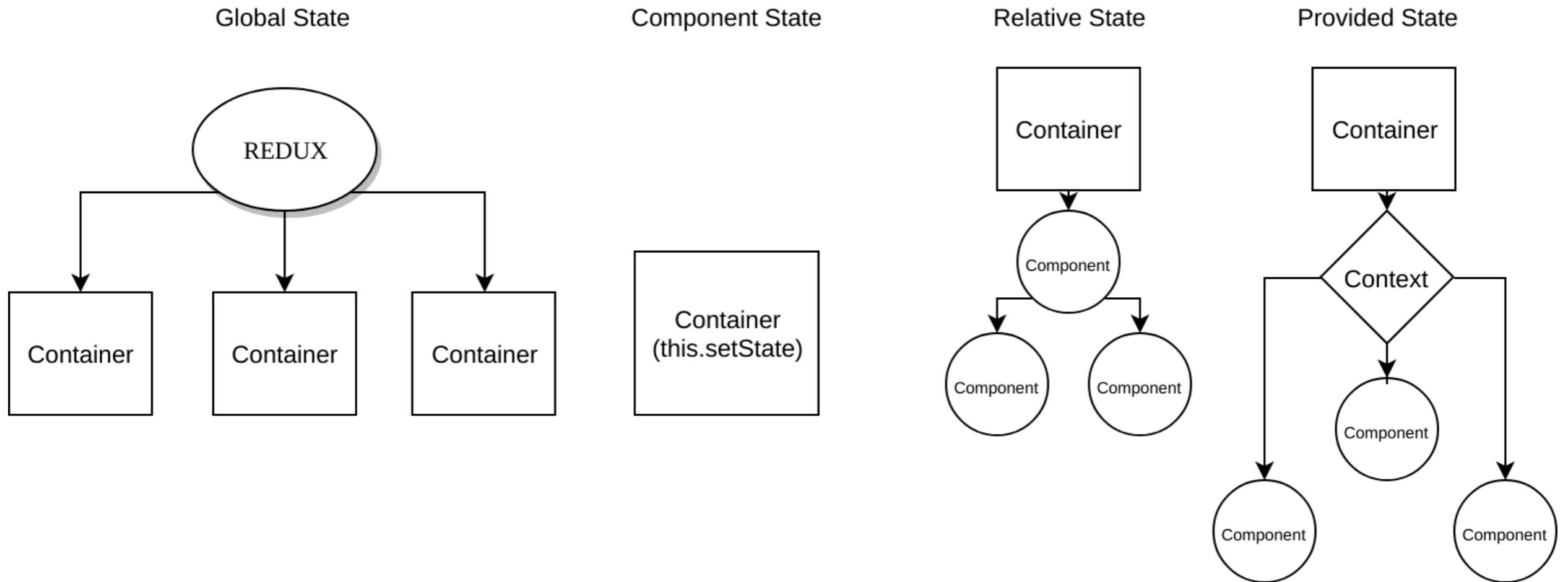
iMac 27 Retina



\$2099.99

iMac 27 Retina

REACT STATE MANAGEMENT PATTERNS



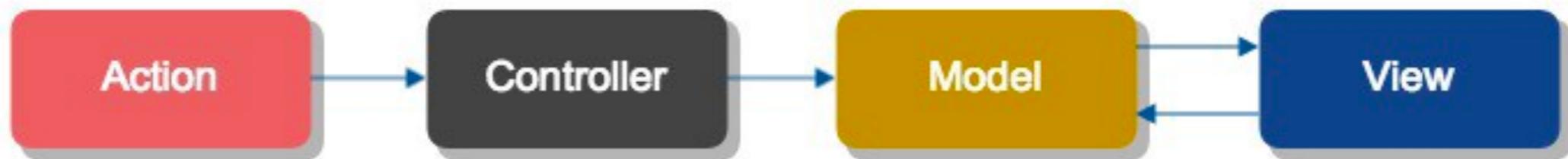
REDUX?



BUT FIRST...

MVC

MODEL, VIEW, CONTROLLER



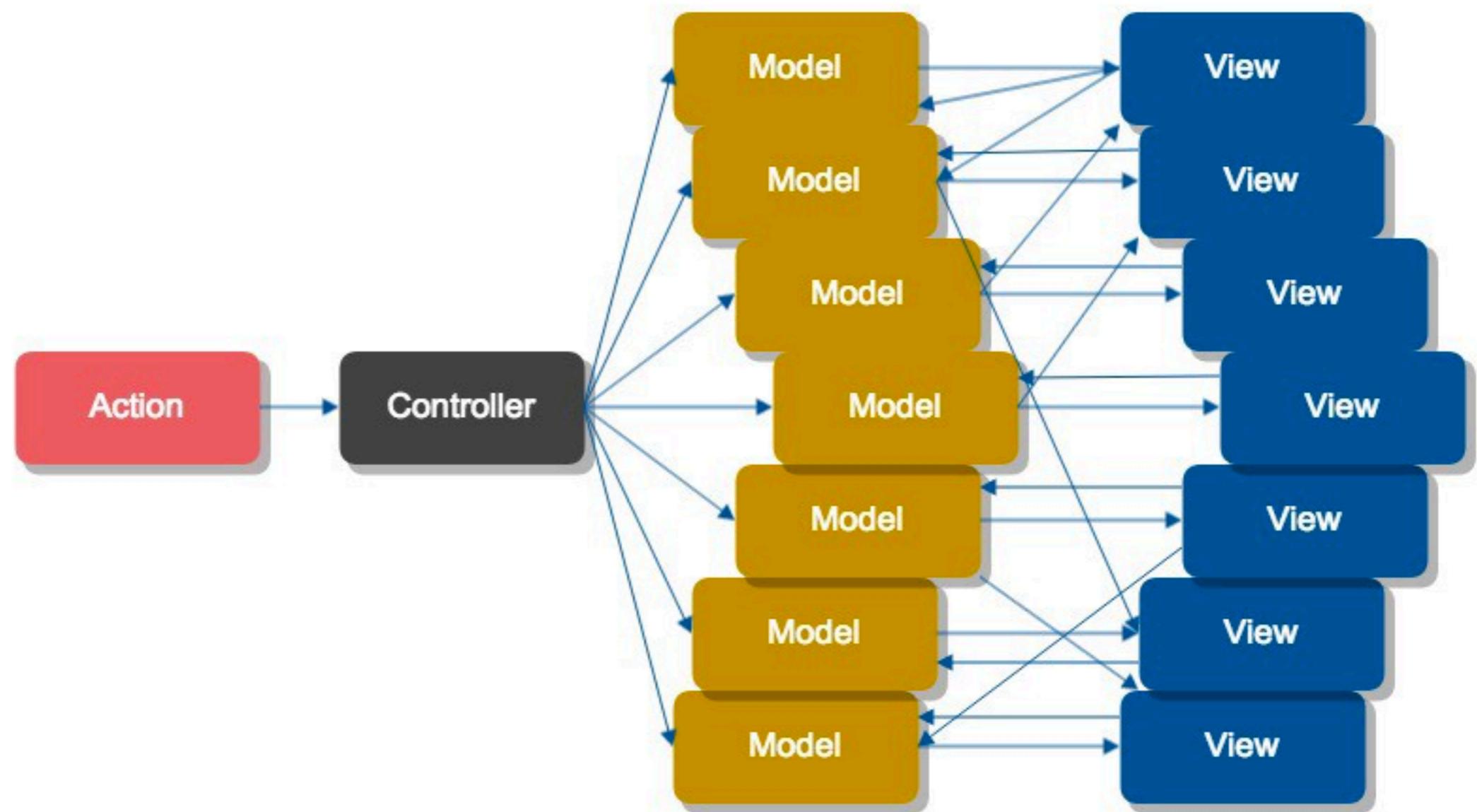
Model: manages the behavior and data of the application domain

View: represents the display of the model in the UI

Controller: takes user input, manipulates the model and causes the view to update

**IN SERVER SIDE, MVC IS GOOD,
BUT IN CLIENT...**

“MVC DOESN’T SCALE”



FACEBOOK STORY







Search for people, places and things



Jing Home



83

Inbox Other

More

Jing Aling

+ New Message

Actions



Search



Jing Aling
let's do it!

1:12pm



Tom:

1:10pm
2 new



Message



Message



Message



Message



Message



Message



Jing Chen
hey is it time to grab dinner again?

1:10pm



Jing Aling
let's do it!

1:12pm

Conversation started today

Write a reply...

Add Files

Add Photos

Press Enter to send

Jing Aling

X

2 minutes ago

hey is it time to grab dinner again?



let's do it!

...

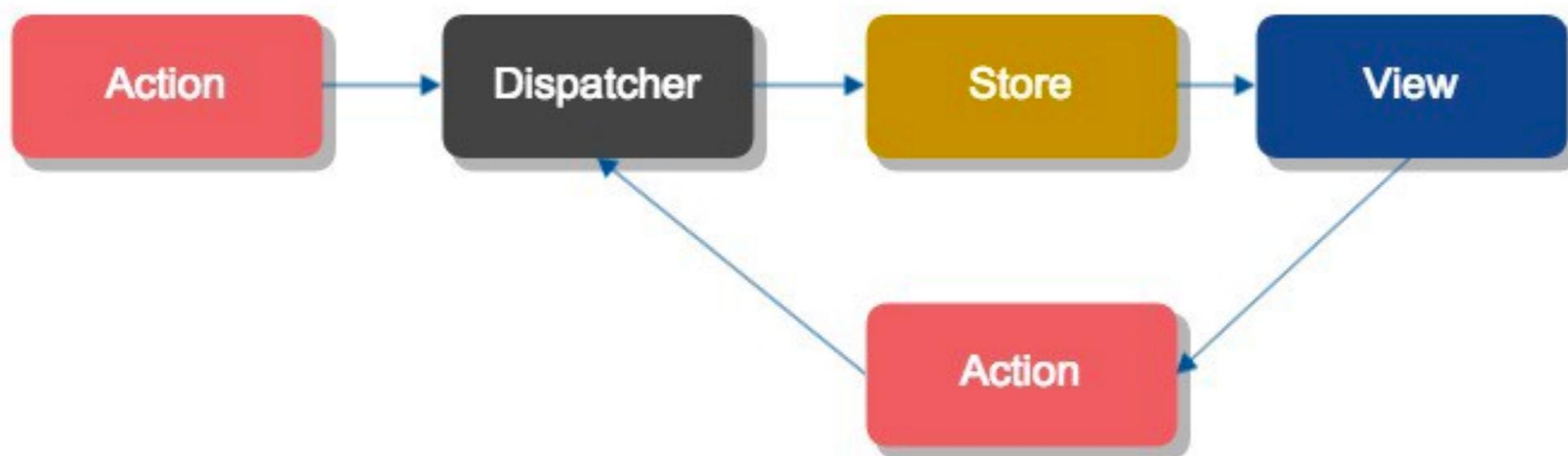
FLUX

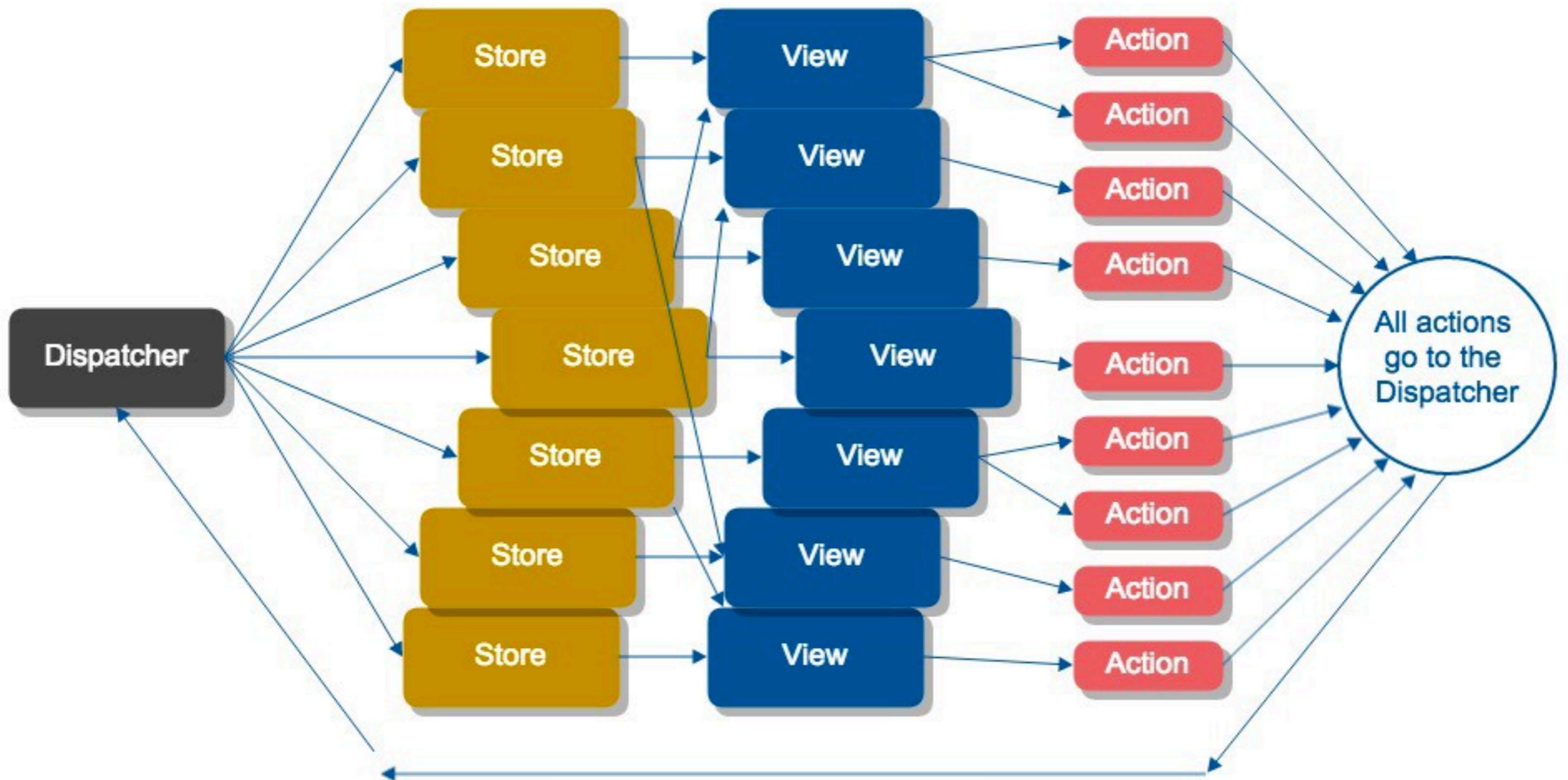
FLUX

**architecture for creating data layers in JavaScript applications
designed at Facebook along with the React**

Focused on

**explicit and understandable update paths
tracing changes during development simpler
bugs easier to track down and fix**





Flux keeps things predictable.

REDUX

A predictable state container for JavaScript apps.



A predictable state container for JavaScript apps.

[GET STARTED](#)



Predictable

Redux helps you write applications that **behave consistently**, run in different environments (client, server, and native), and are **easy to test**.



Centralized

Centralizing your application's state and logic enables powerful capabilities like **undo/redo**, **state persistence**, and much more.



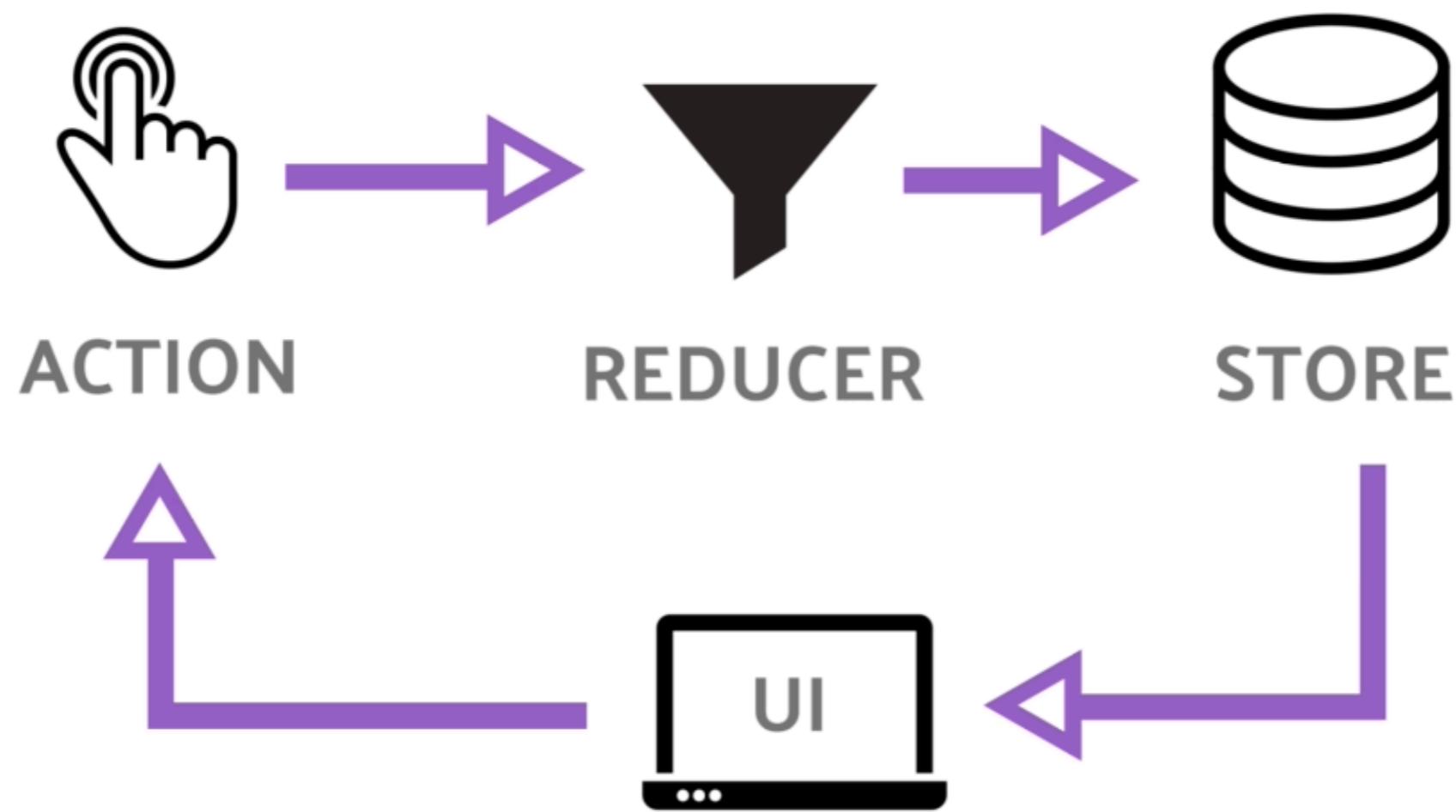
Debuggable

The Redux DevTools make it easy to trace **when, where, why, and how your application's state changed**. Redux's architecture lets you log changes, use **"time-travel debugging"**, and even send complete error reports to a server.



Flexible

Redux **works with any UI layer**, and has a **large ecosystem of addons** to fit your needs.





The Redux principle #1.

ONE application STATE OBJECT
managed by ONE STORE



The Redux principle #2.

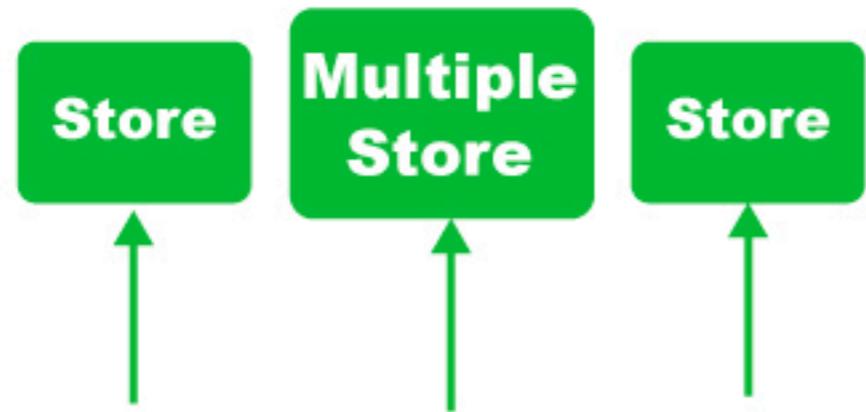
The only way to change the state is to emit an action, an object describing what happened.



The Redux principle #3.

To specify how the state tree is transformed by actions, you write pure reducers.

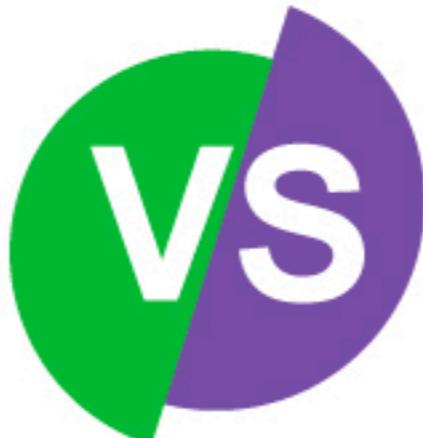
Flux



multiple source of truth

singleton dispatcher

mutable state



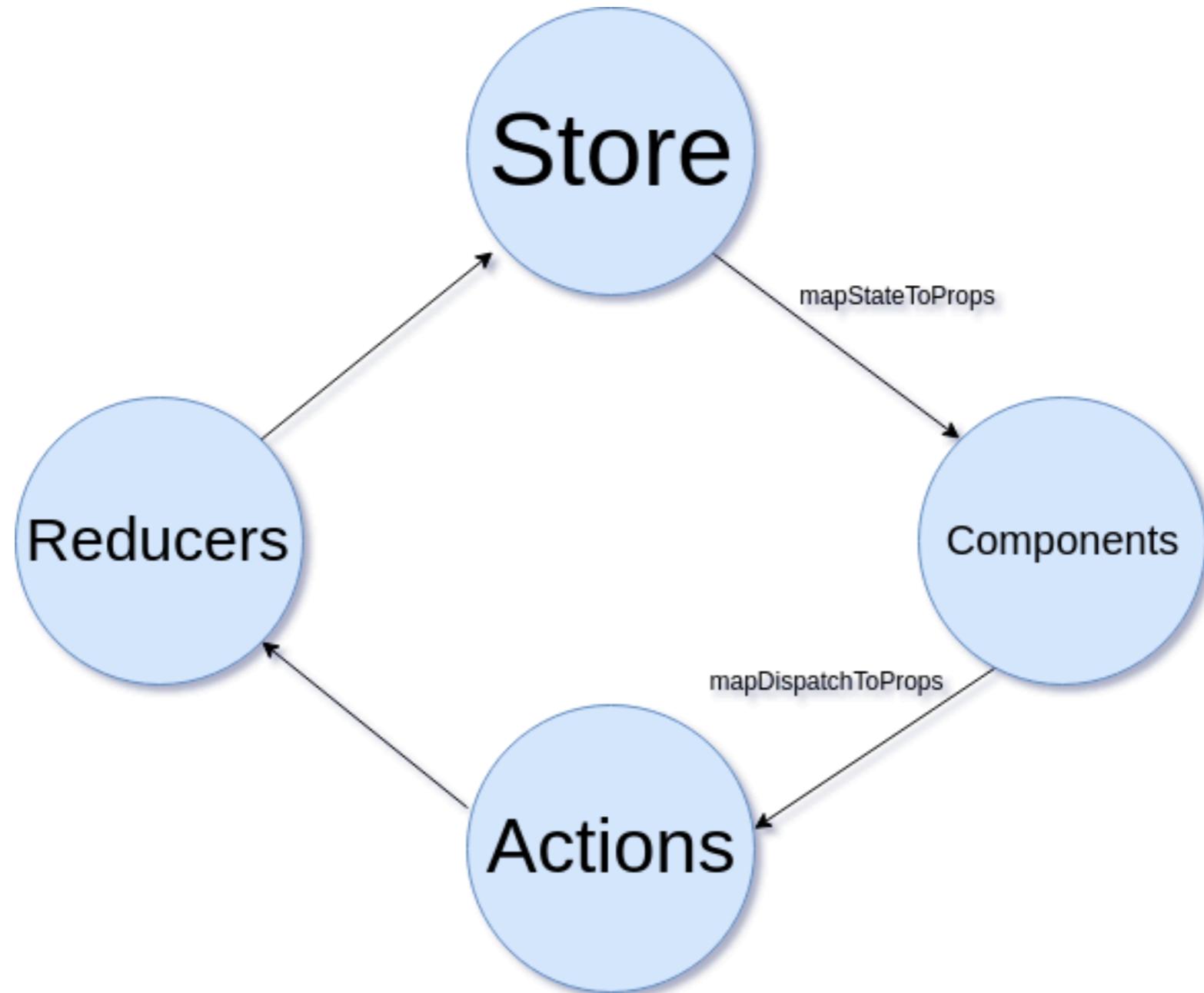
Redux



one source of truth

no dispatcher

immutable state



STORE

STORE

```
import { createStore } from "redux";
```

```
const store = createStore(  
  reducer,  
  { counter: 0 }, /* optional */  
  enhancer, /* optional */  
);
```

ACTIONS

payloads of information that send data from your application to your store.

ACTIONS

```
store.dispatch( { type: "INCREMENT" } )
```

```
store.dispatch( { type: "DECREMENT" } )
```

```
store.dispatch( { type: "OTHER_ACTION", payloads } )
```

BEST PRACTICES

```
// actionTypes.js
```

```
export const INCREMENT = 'INCREMENT';
export const DECREMENT = 'DECREMENT';
```

REDUCER

**Specify how the application's state changes in response
to actions sent to the store**

REDUCER

```
const reducer = (prevState, action) => {  
  switch (action.type) {  
    case „XXXXXXX“:  
      return {...}; // newCalculatedState  
    default:  
      return newState;  
  }  
};
```

REDUCER

```
const reducer = (state, action) => {
  switch (action.type) {
    case "INCREMENT":
      return { ...state, counter: state.counter + 1 };
    case "DECREMENT":
      return { ...state, counter: state.counter - 1 };
    default:
      return state;
  }
};
```

REDUCER

No side effects.

No API calls.

No mutations.

Just a calculation.

YOU SHOULD NEVER DO

Mutate its arguments;

Perform side effects like API calls and routing transitions;

Call non-pure functions, e.g. Date.now() or Math.random().

DEMO

REACT-REDUX

Official React bindings for Redux

<PROVIDER>

makes the Redux store available to the rest of your app

<PROVIDER>

```
import { Provider } from "react-redux";
```

```
const App = () => (
  <Provider store={store}>
    <Counter />
  </Provider>
);
```

CONNECT()

connect your component to the store.

CONNECT()

```
function connect(  
  mapStateToProps?,  
  mapDispatchToProps?,  
  mergeProps?,  
  options?  
)
```

CONNECT()

```
mapStateToProps?: (state, ownProps?) => Object
```

```
const mapStateToProps = state => {
  return { counter: state.counter };
};
```

```
const mapStateToProps = (state, ownProps) => {
  return { item: state.items[ownProps.itemId] };
};
```

CONNECT()

```
mapDispatchToProps?: Object | (dispatch, ownProps?) => Object
```

```
const mapDispatchToProps = dispatch => {
  return {
    onIncrement: () => dispatch({ type: "INCREMENT" }),
    onDecrement: () => dispatch({ type: "DECREMENT" })
  };
};
```

```
// binds on component re-rendering
<button onClick={() => this.props.deleteItem(this.props.itemId)} />
```

```
// binds on `props` change
const mapDispatchToProps = (dispatch, ownProps) => {
  deleteItem: () => dispatch(deleteItem(ownProps.itemId))
}
```

CONNECT()

```
mapDispatchToProps?: Object | (dispatch, ownProps?) => Object
```

```
const onIncrement = () => ({ type: "INCREMENT" });
const onDecrement = () => ({ type: "DECREMENT" });
```

```
const mapDispatchToProps = {
  onIncrement,
  onDecrement
};
```

CONNECT()

```
mergeProps?: (stateProps, dispatchProps, ownProps) => Object
```

Returns default

```
{ ...ownProps, ...stateProps, ...dispatchProps }
```

CONNECT() EXAMPLES

```
connect(mapStateToProps, mapDispatchToProps)(Counter);
```

```
connect(mapStateToProps)(Counter);
```

```
connect(null, mapDispatchToProps)(Counter);
```

DEMO

REDUX DEVTOOLS EXTENSION

<http://extension.remotedev.io/>