

O'REILLY®

Velocity

CONFERENCE

BUILD RESILIENT SYSTEMS AT SCALE

velocityconf.com

#velocityconf

React & Redux in Hulu

程墨 (Morgan Cheng)

About Me

@morgancheng

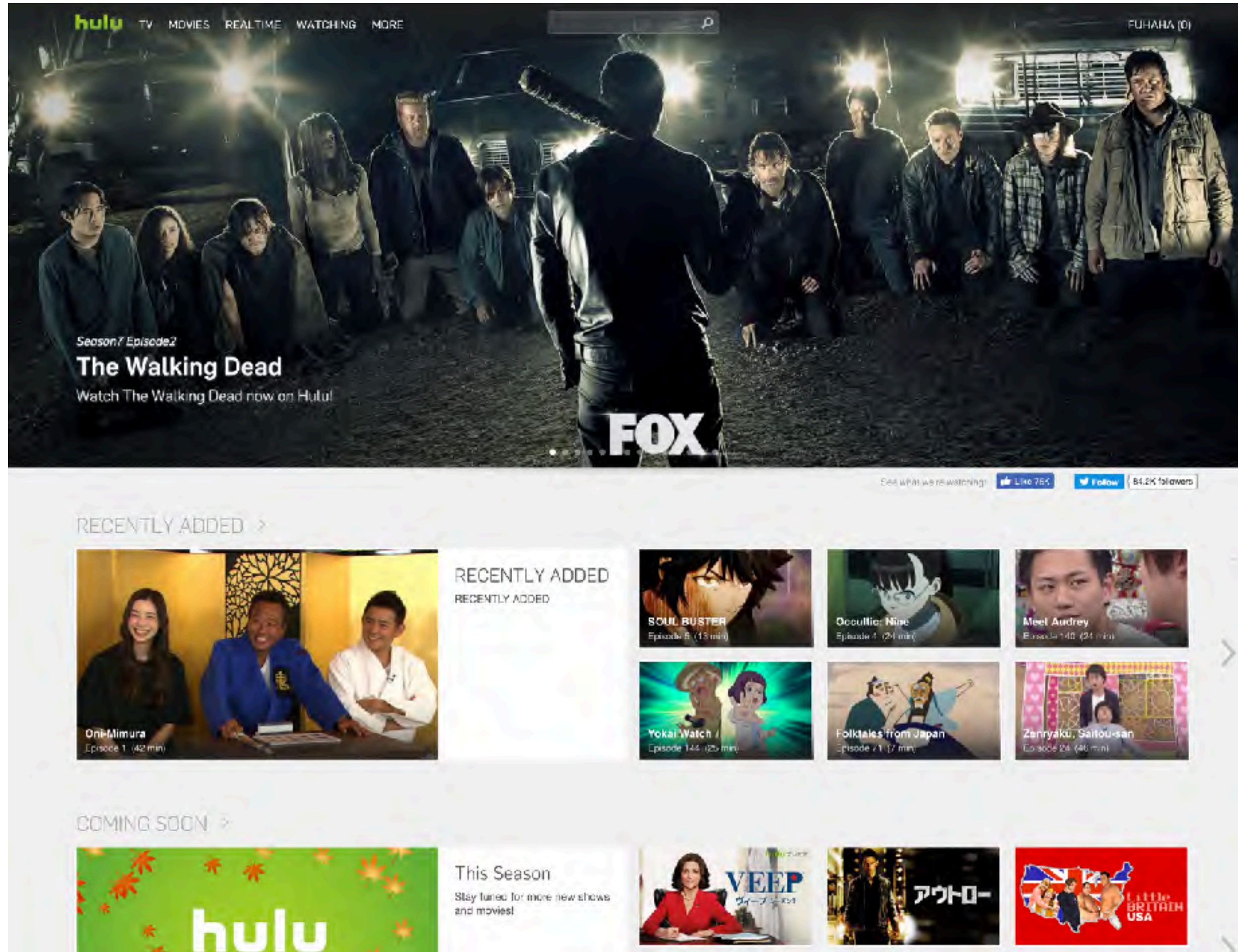
hulu



YAHOO!



About Hulu



Challenges

- System Complexity
 - Legacy code in jQuery & Backbone
 - UI non-predictable
 - Lack of component isolation
- Performance Bottleneck
 - Initial AJAX roundtrip for browser-side-rendering

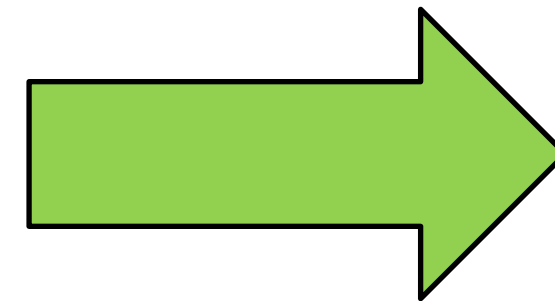


Tech Stack

jQuery

Backbone

Ruby on Rails



React

Redux

Node + Express

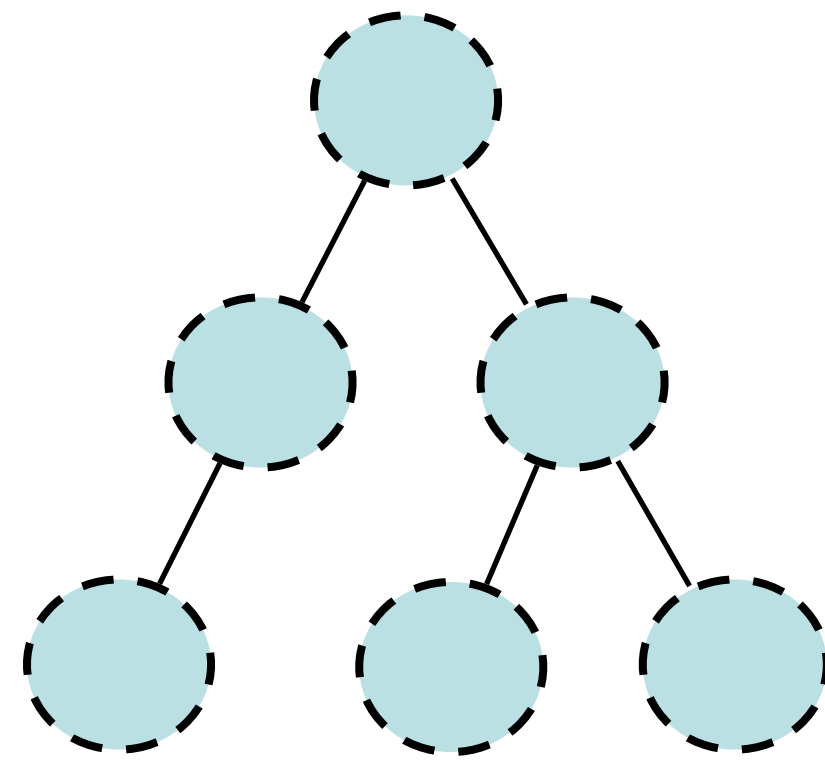
React vs. jQuery

Code in jQuery

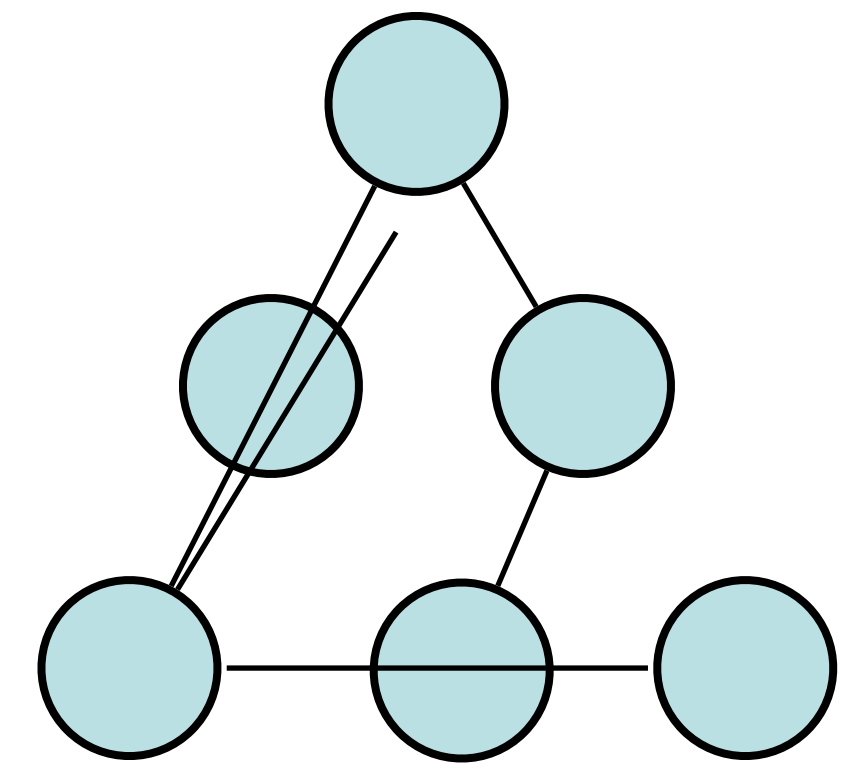



```
<div>
  <Foo/>
  <Bar>children</Bar>
</div>
```

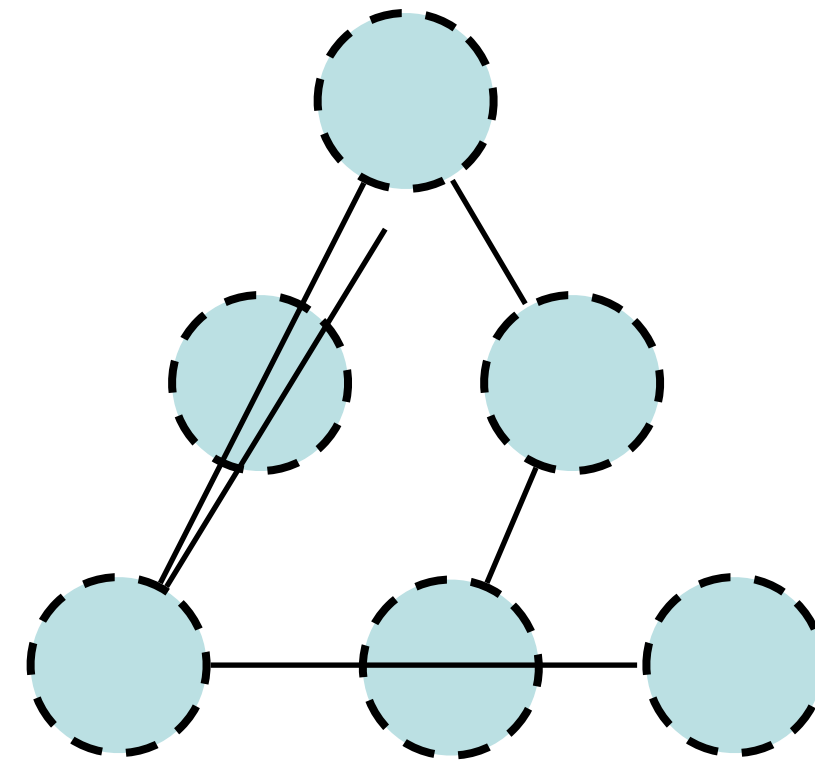
JSX



Virtual DOM



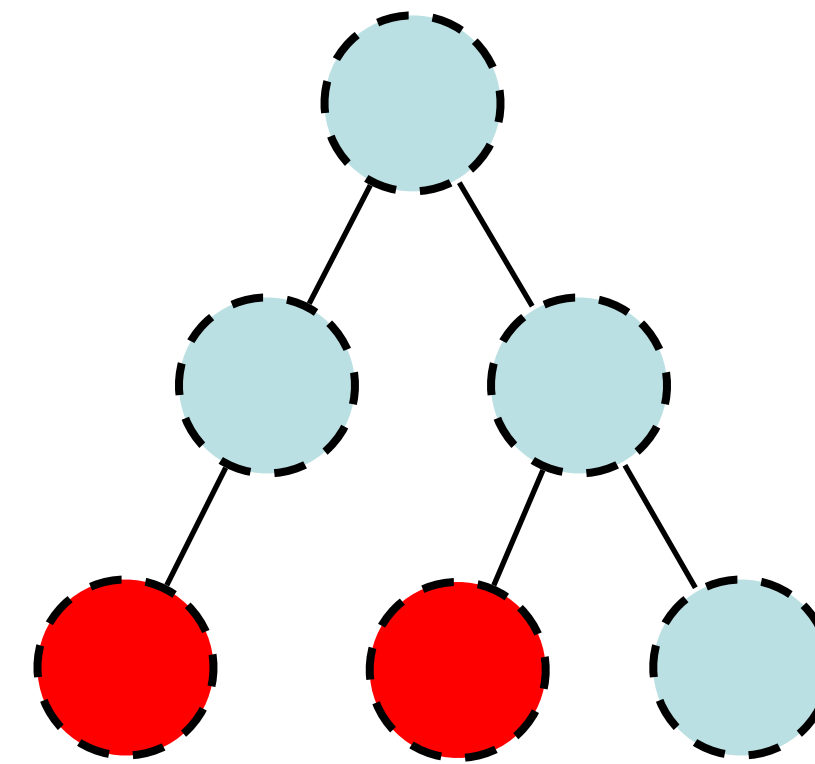
DOM



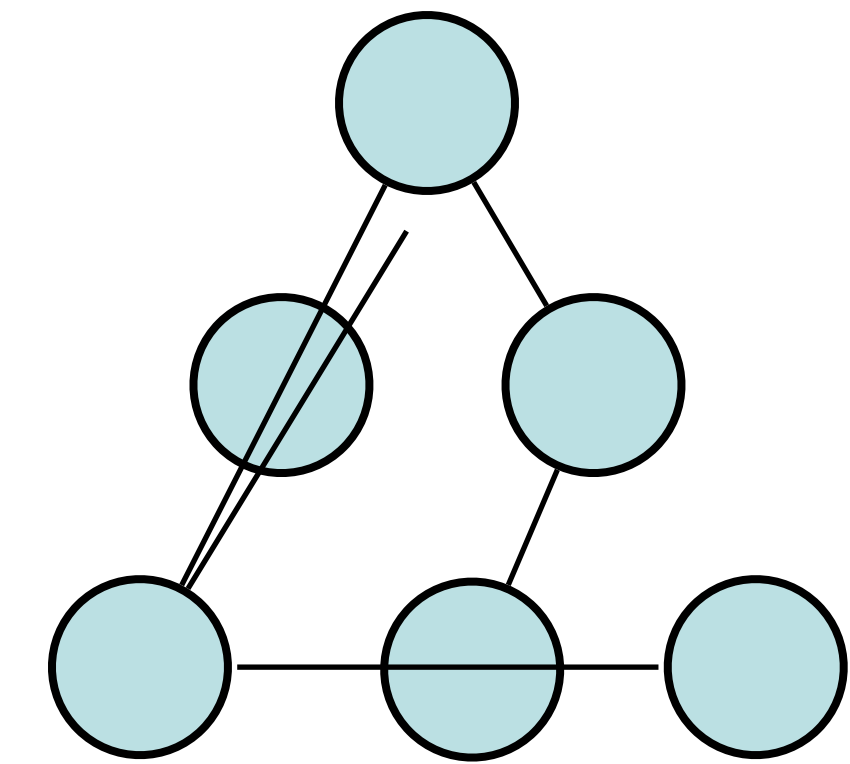
Previous Virtual DOM

```
<div>  
  <Foo/>  
  <Bar>children</Bar>  
</div>
```

JSX



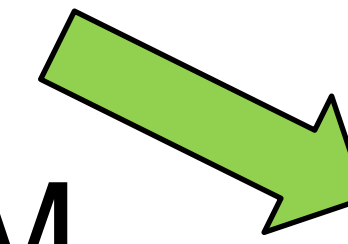
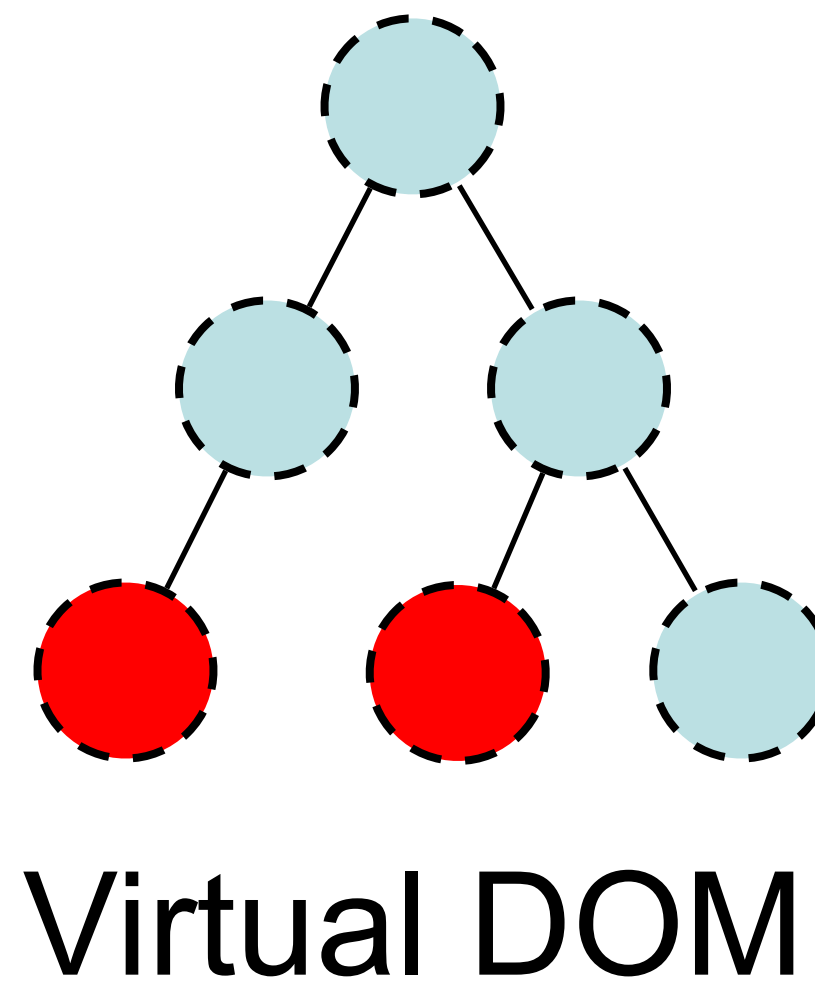
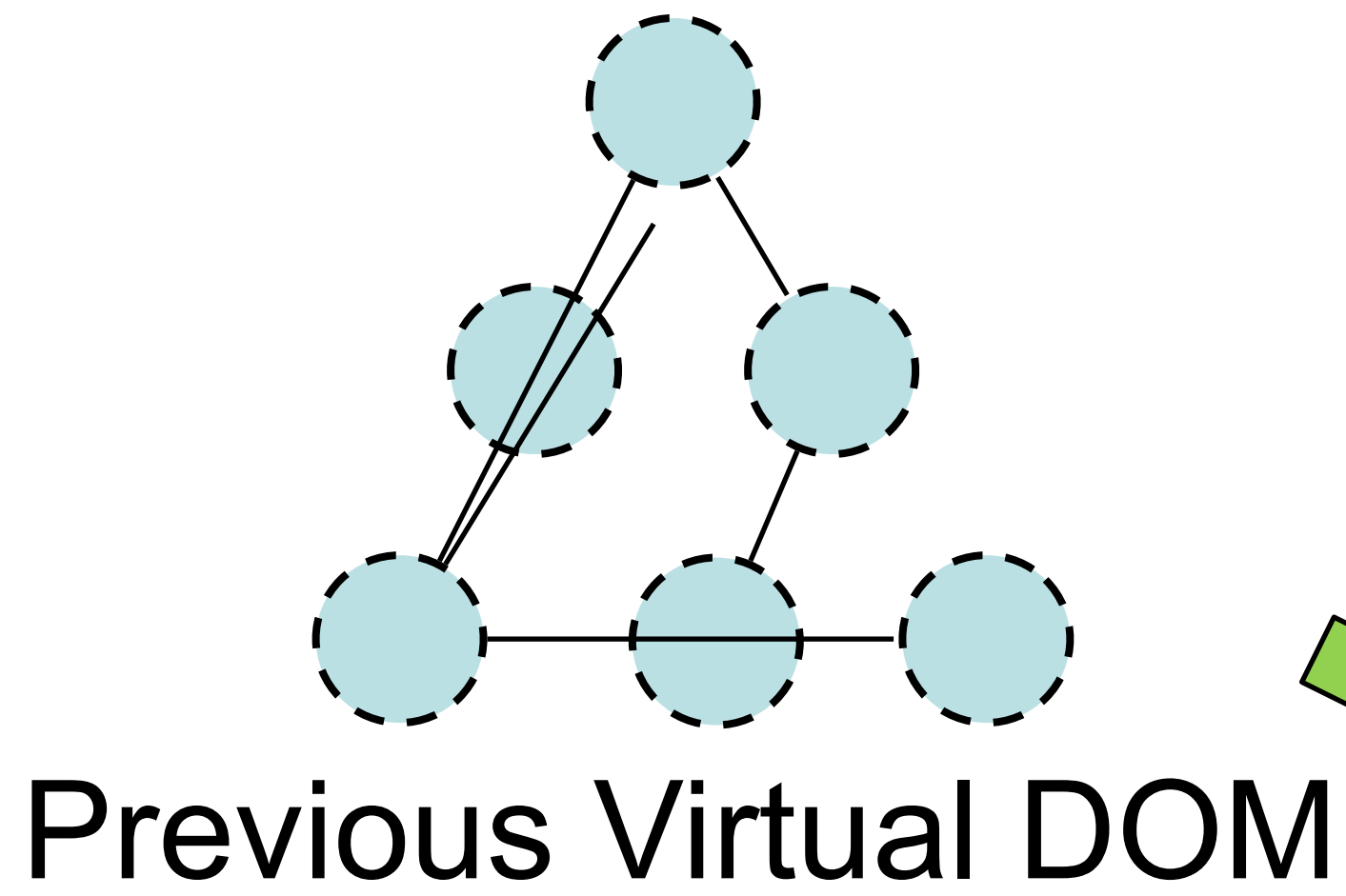
Virtual DOM



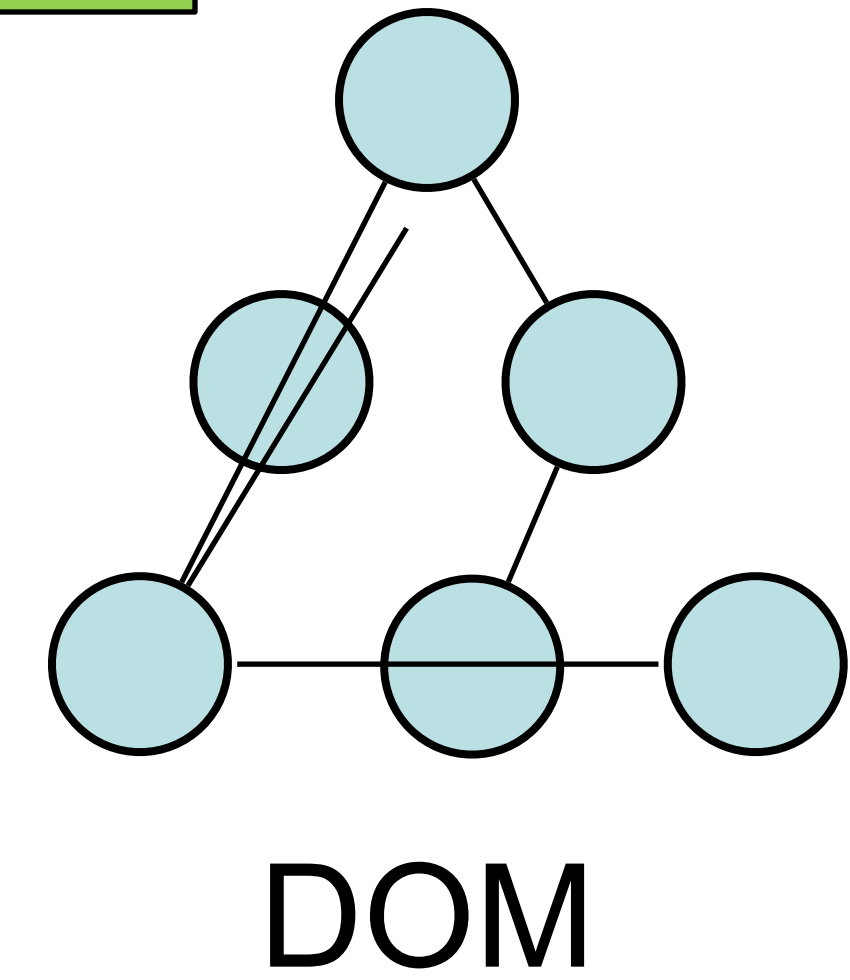
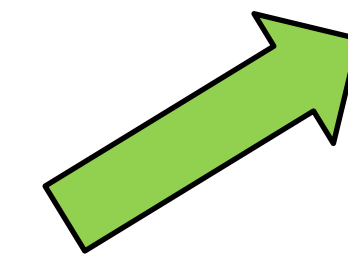
DOM

```
<div>
  <Foo/>
  <Bar>children</Bar>
</div>
```

JSX

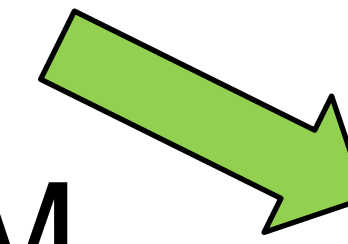
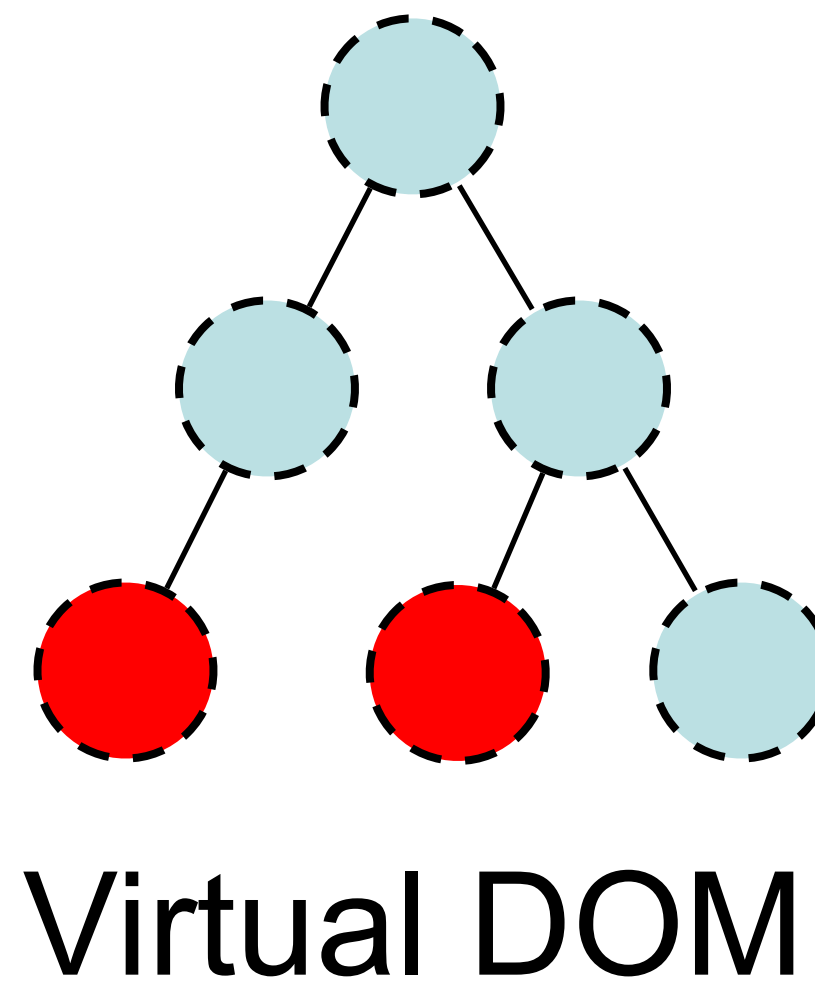
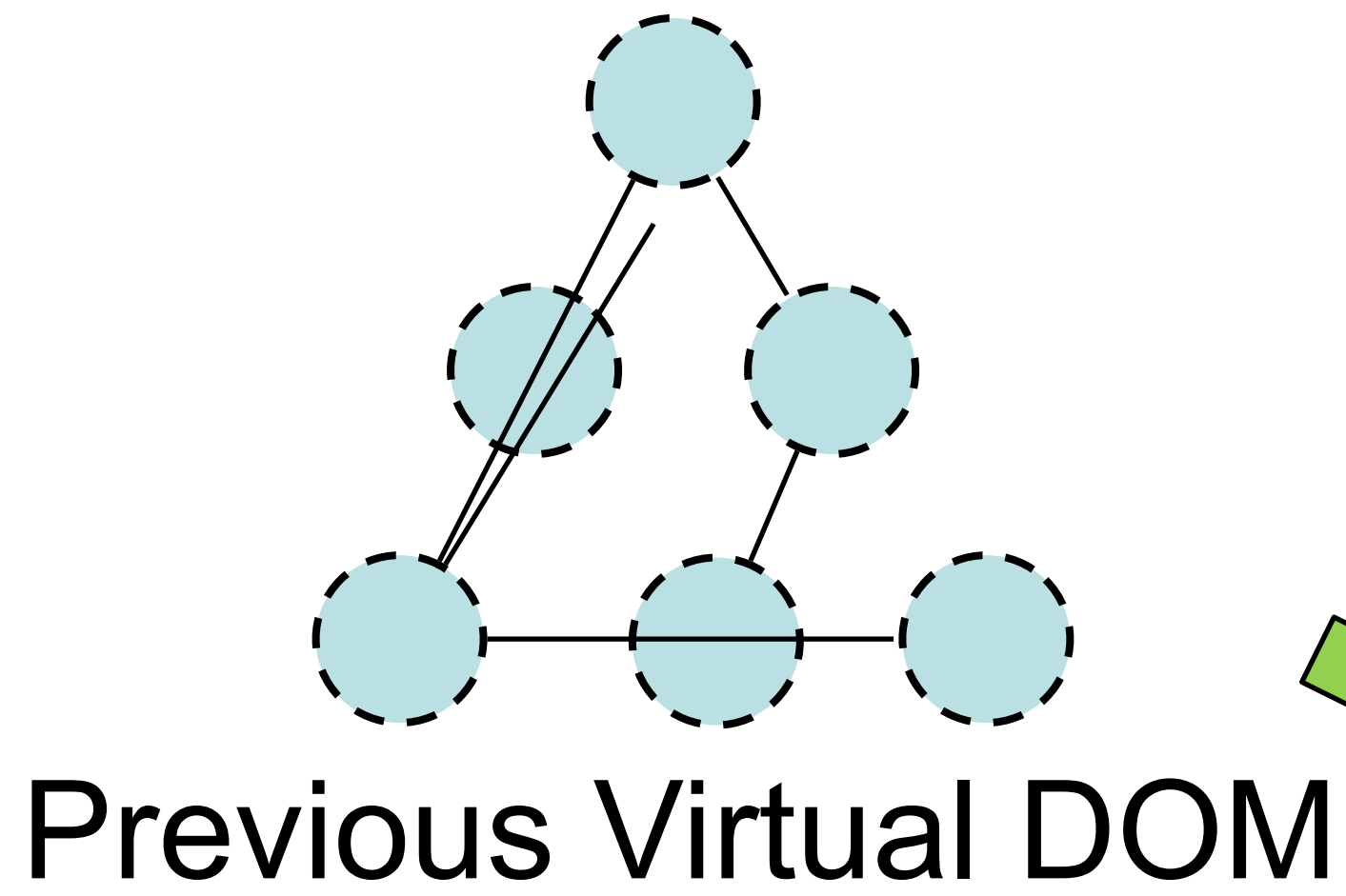


Diff

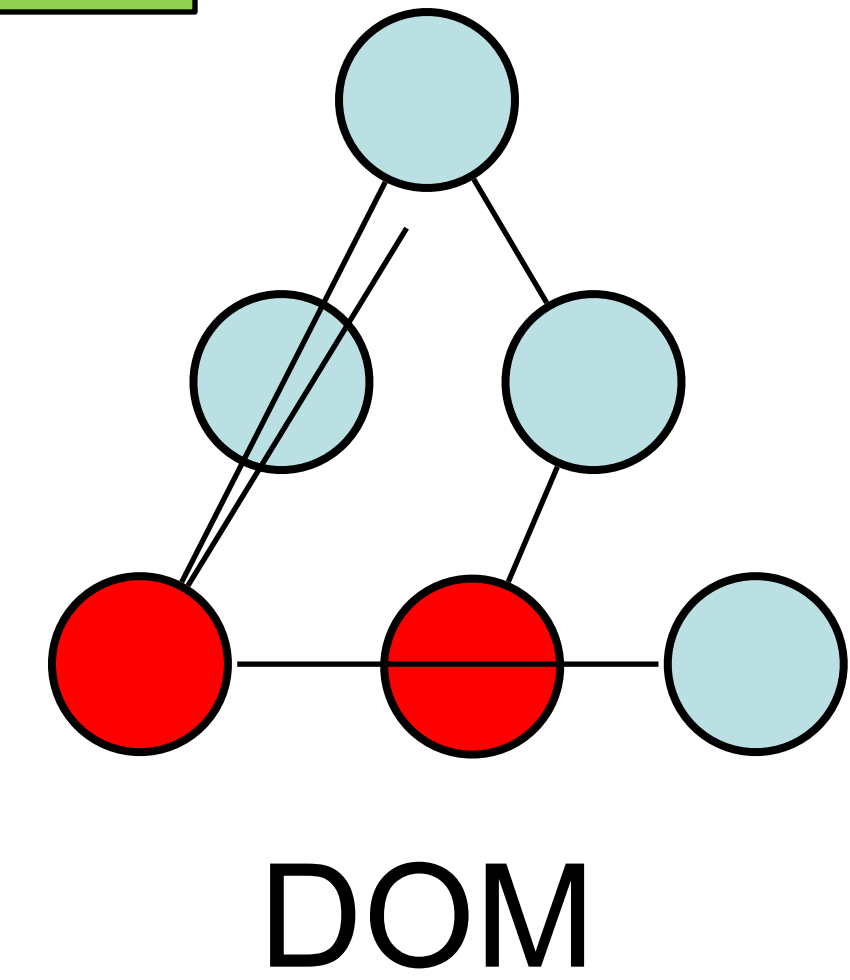
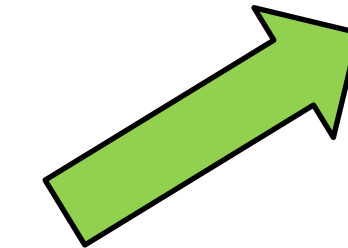


```
<div>
  <Foo/>
  <Bar>children</Bar>
</div>
```

JSX



Diff



React App = Keep Rendering

UI = f(state)

React mixes JS/Style/Markup

```
if (process.env.BROWSER) {  
  require('./style.scss');  
}  
  
const divStyle = {  
  color: 'blue'  
};  
  
function render() {  
  
  return (  
    <div onClick={this.onClick} style={divStyle}>Click Me</div>  
  );  
}
```

Isomorphic/Universal React

```
const appHtml = ReactDOMServer.renderToString(component);
```

Server Side

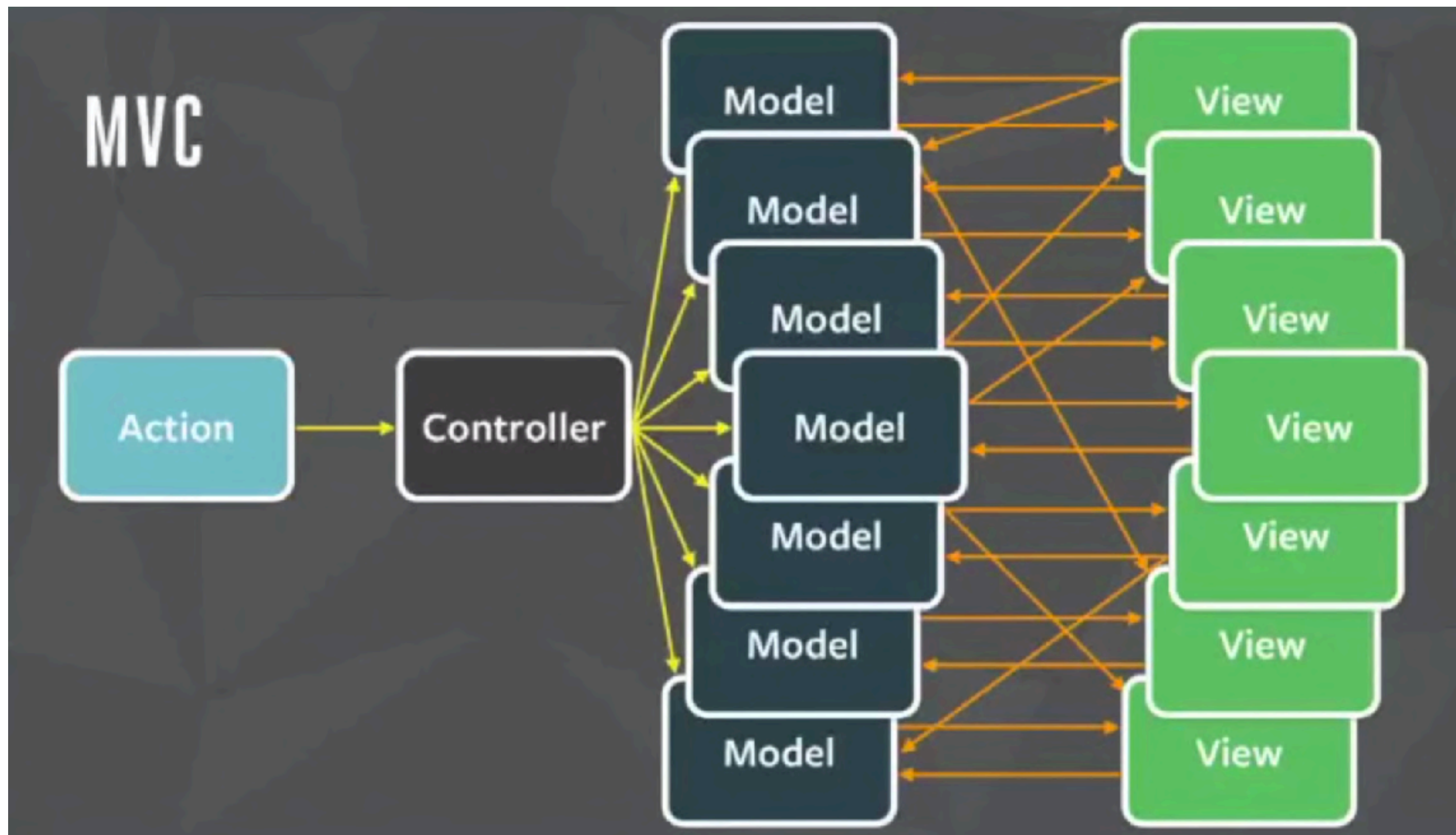
Browser Side

```
ReactDOM.render(component,  
  window.document.getElementById("appRoot"));
```

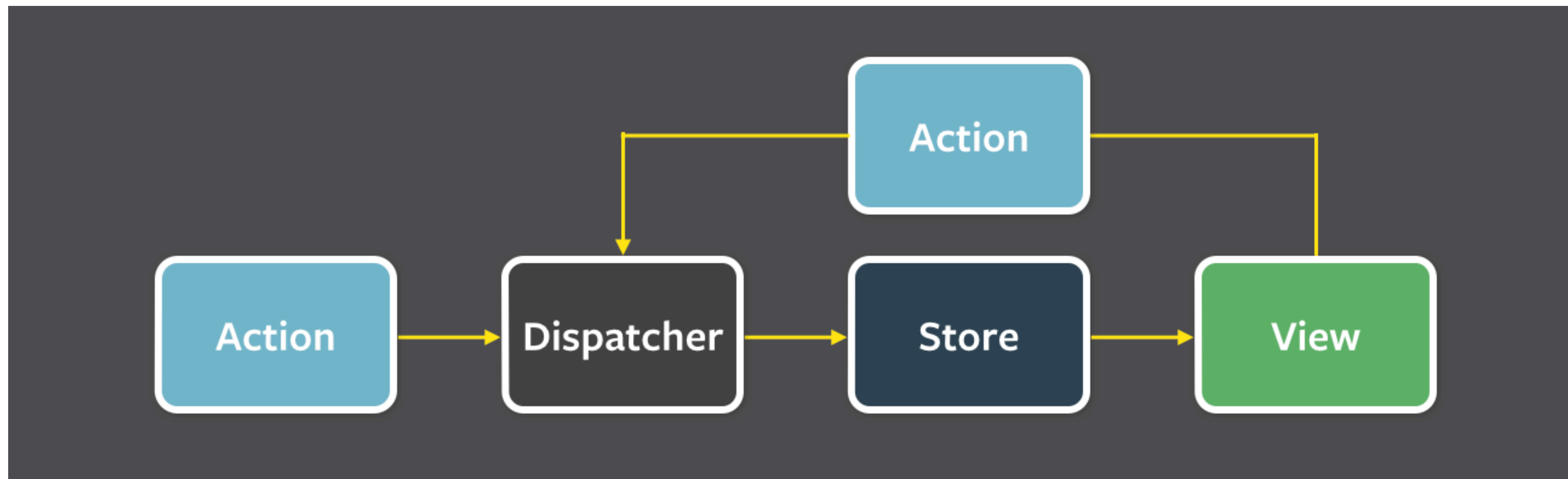

React Components are bricks, not building



Problem of MVC



Flux



Drawbacks of Flux

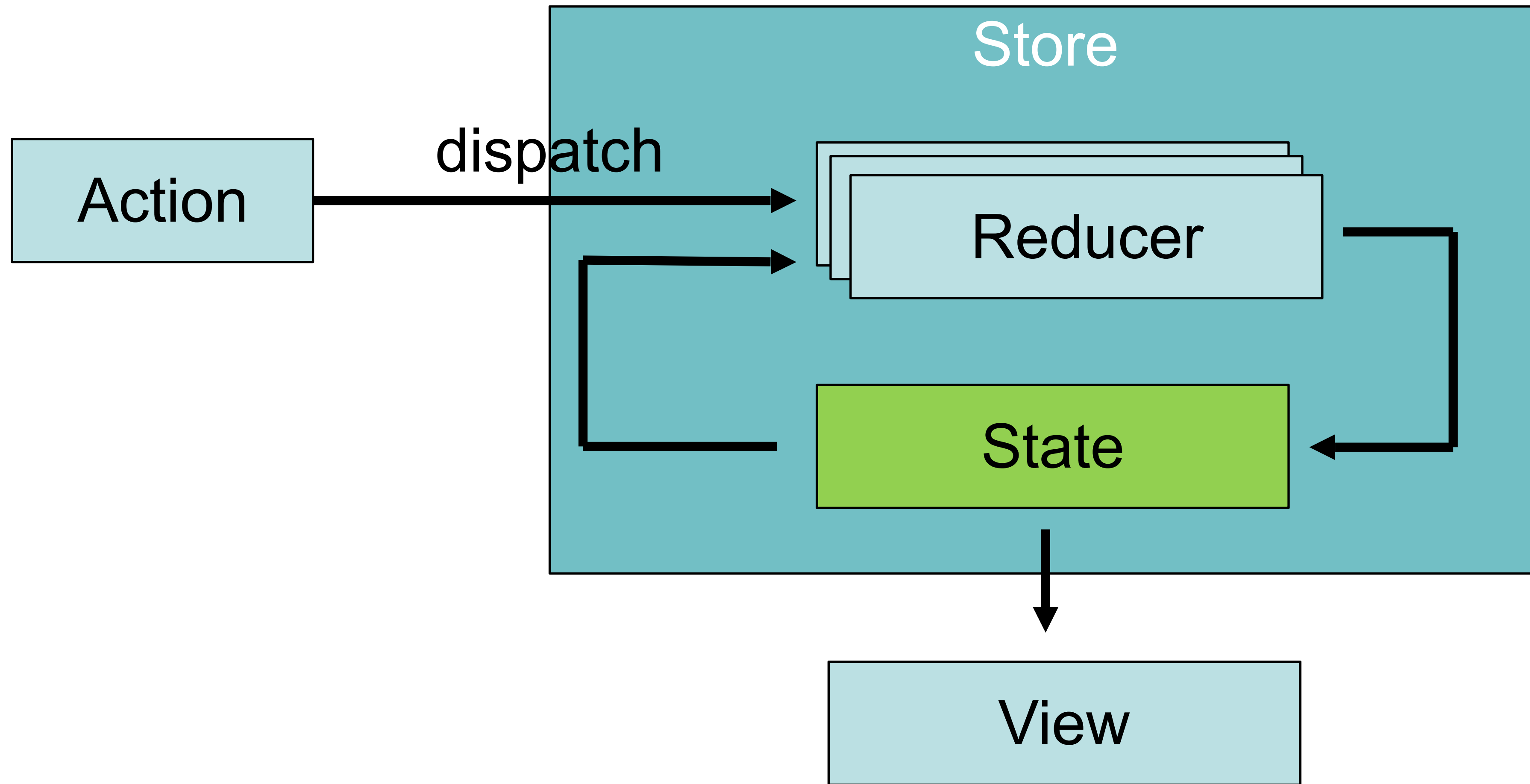
- Inter-dependency among multiple stores
- Hard to support server-side-rendering
- Hard to do hot-reloading

Redux = Reducer + Flux

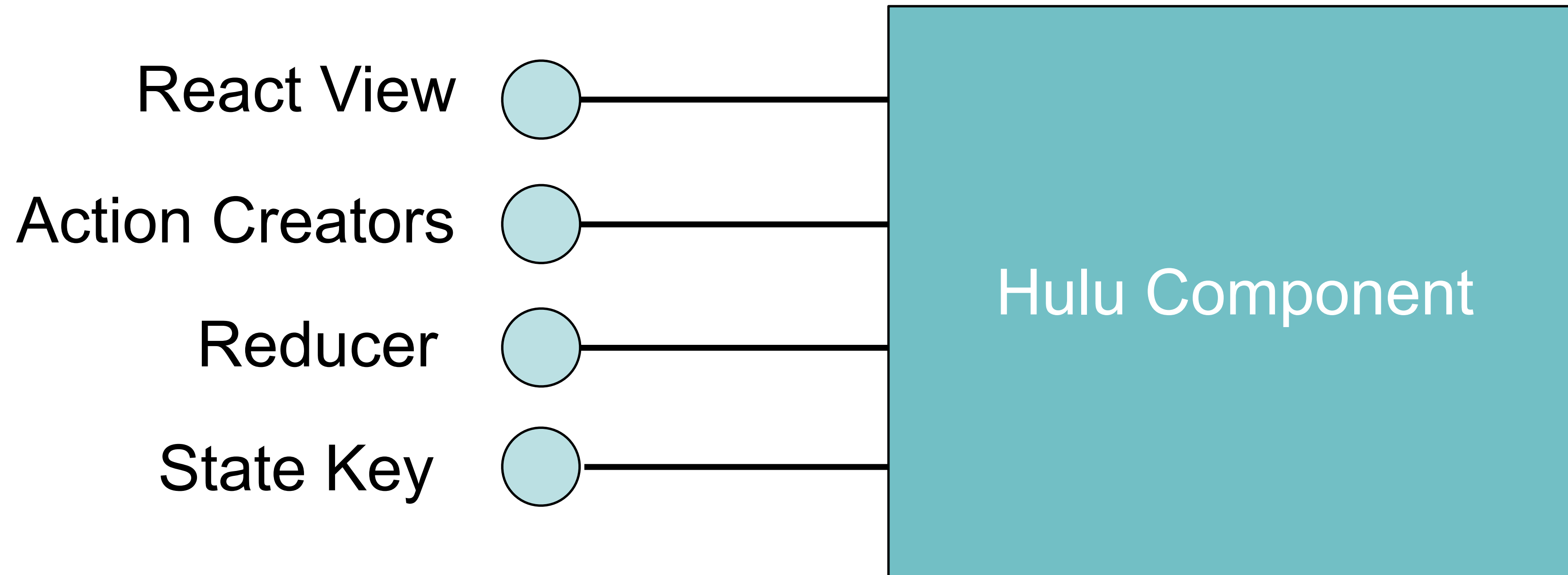
Reducer

`(state, action) => newState`

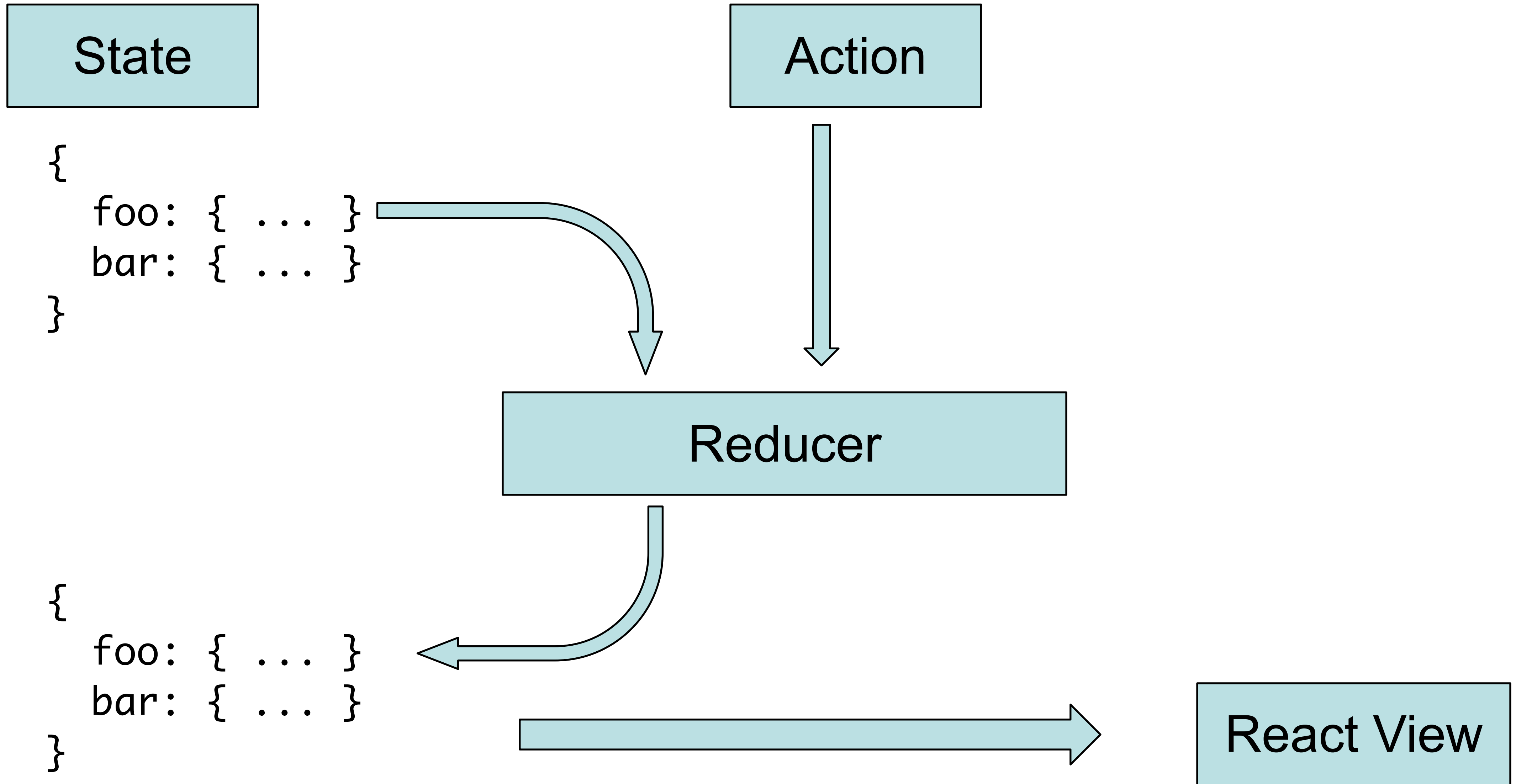
Redux



From Perspective of Component



```
export {view, actions, reducer, stateKey}
```

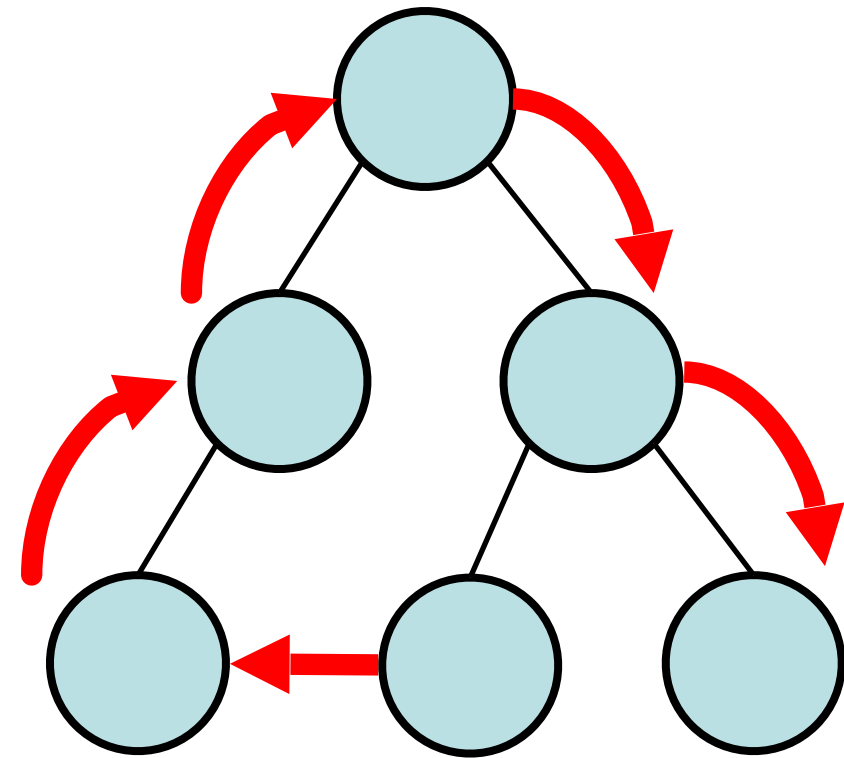



React + Redux = Win!

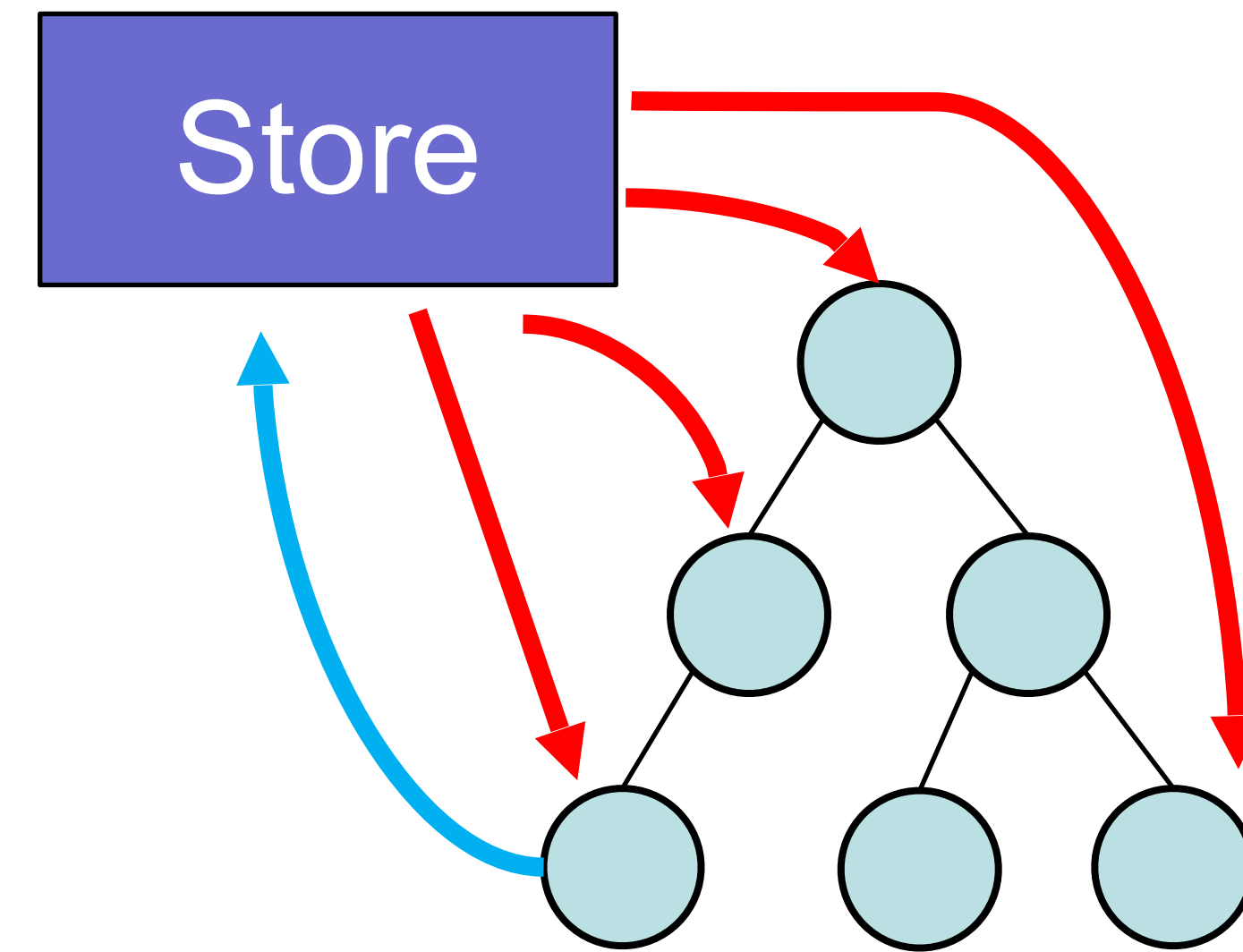
We get *Performance*
and *Maintainability* at
the same time with
React & Redux



Without Redux



With Redux



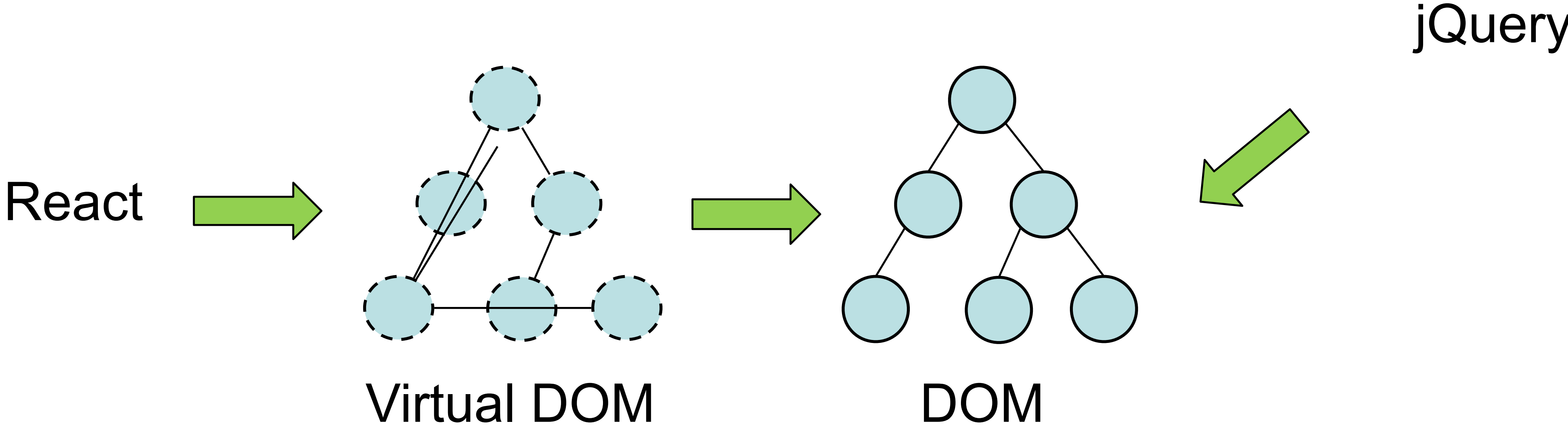
Constraints over Conventions



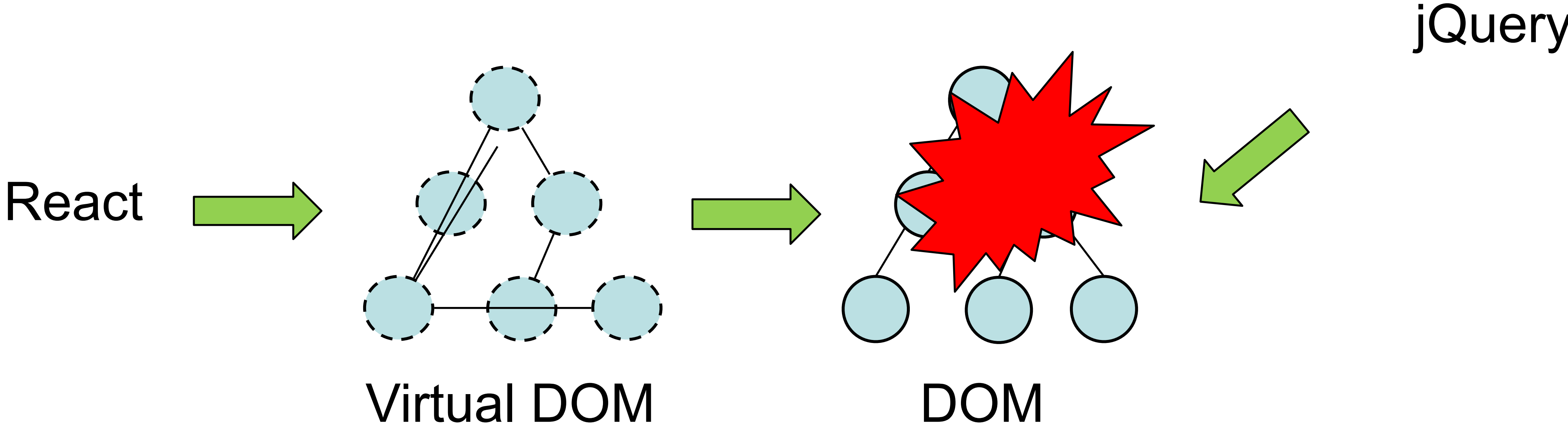
- jQuery Dies Hard
 - Legacy Code
 - Third Party JavaScript Code
 - e.g. Optimizely



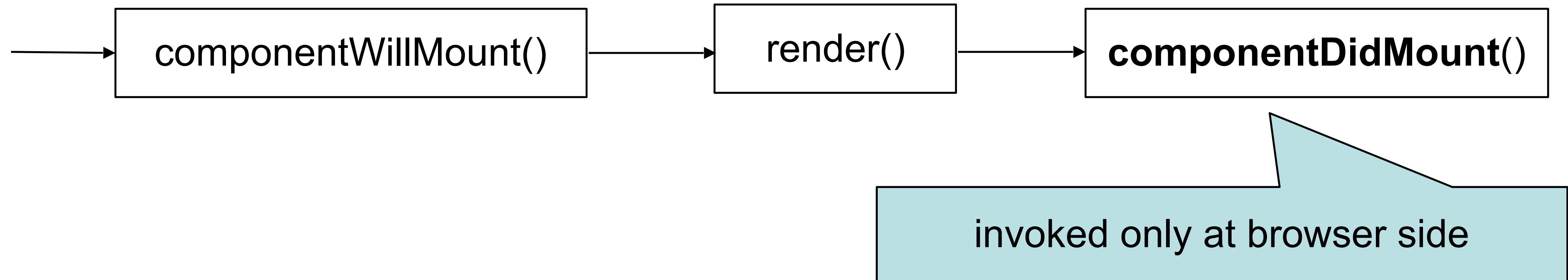
React conflicts with jQuery



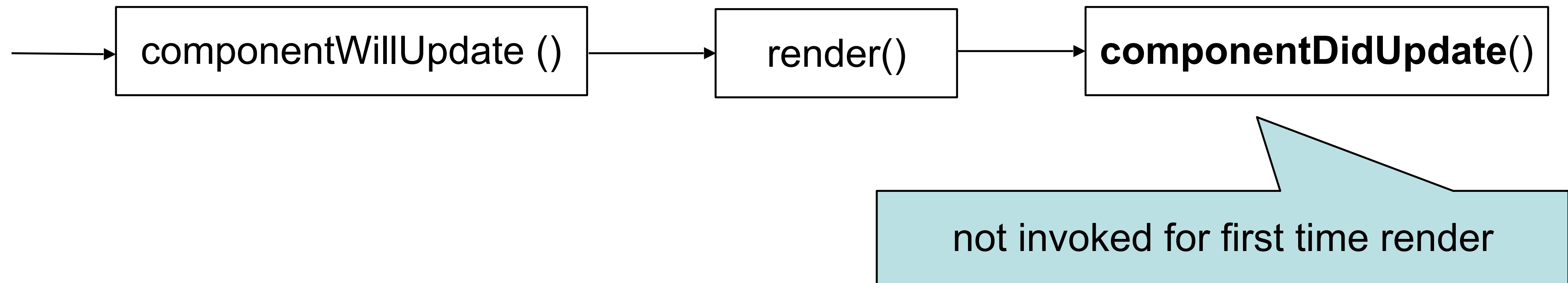
React conflicts with jQuery



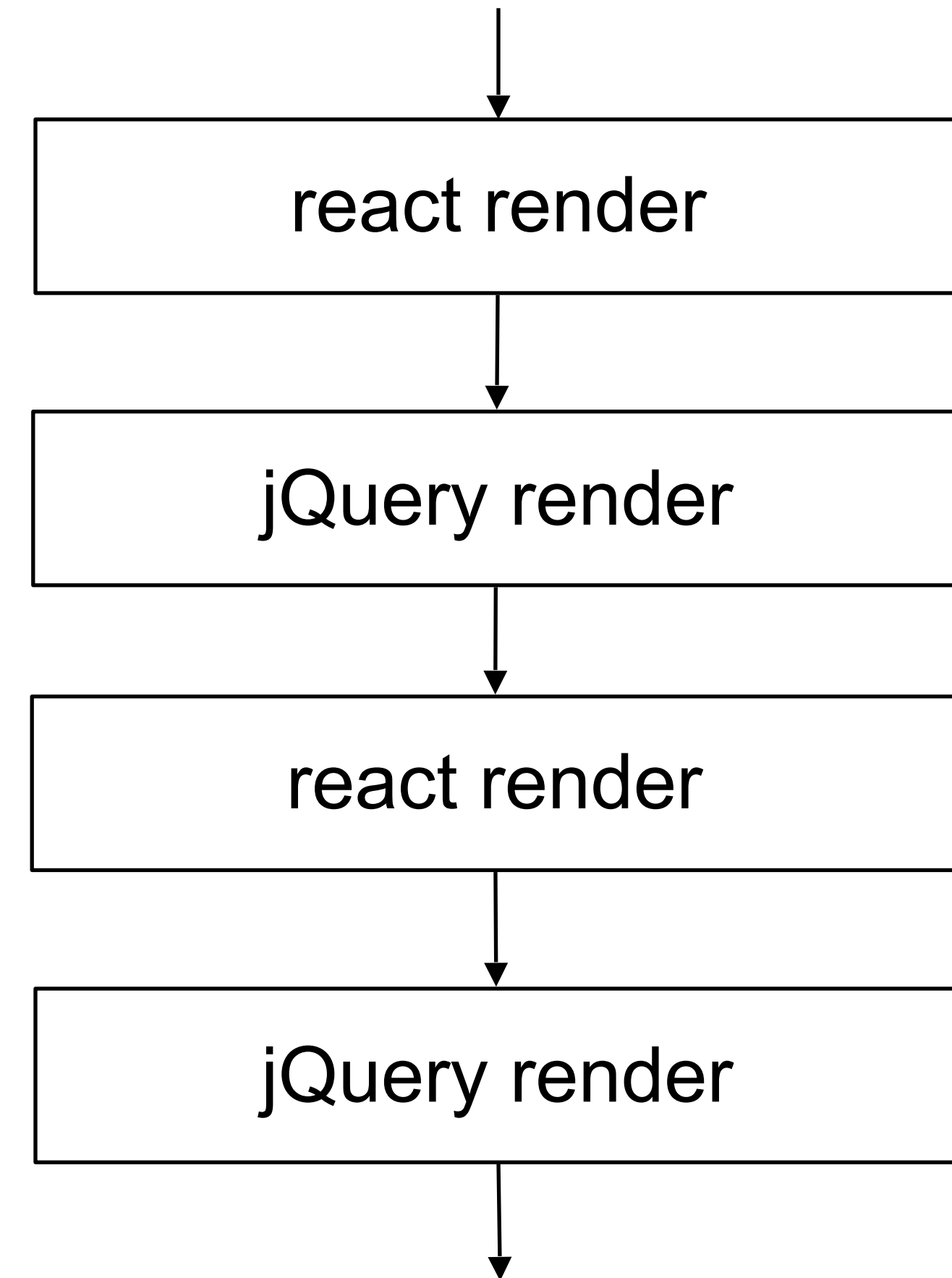
React Mounting Phase



React Updating Phase



```
class Foo extends React.Component{  
  componentDidMount() {  
    // do DOM manipulation with jQuery  
  }  
  
  componentDidUpdate() {  
    // do DOM manipulation with jQuery  
  }  
  
  render() {  
    // render JSX for react  
  }  
}
```



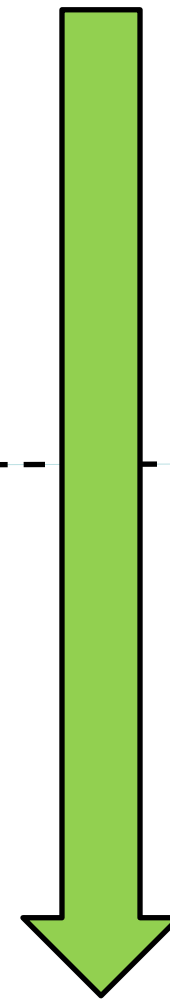
Dehydrate & Rehydrate



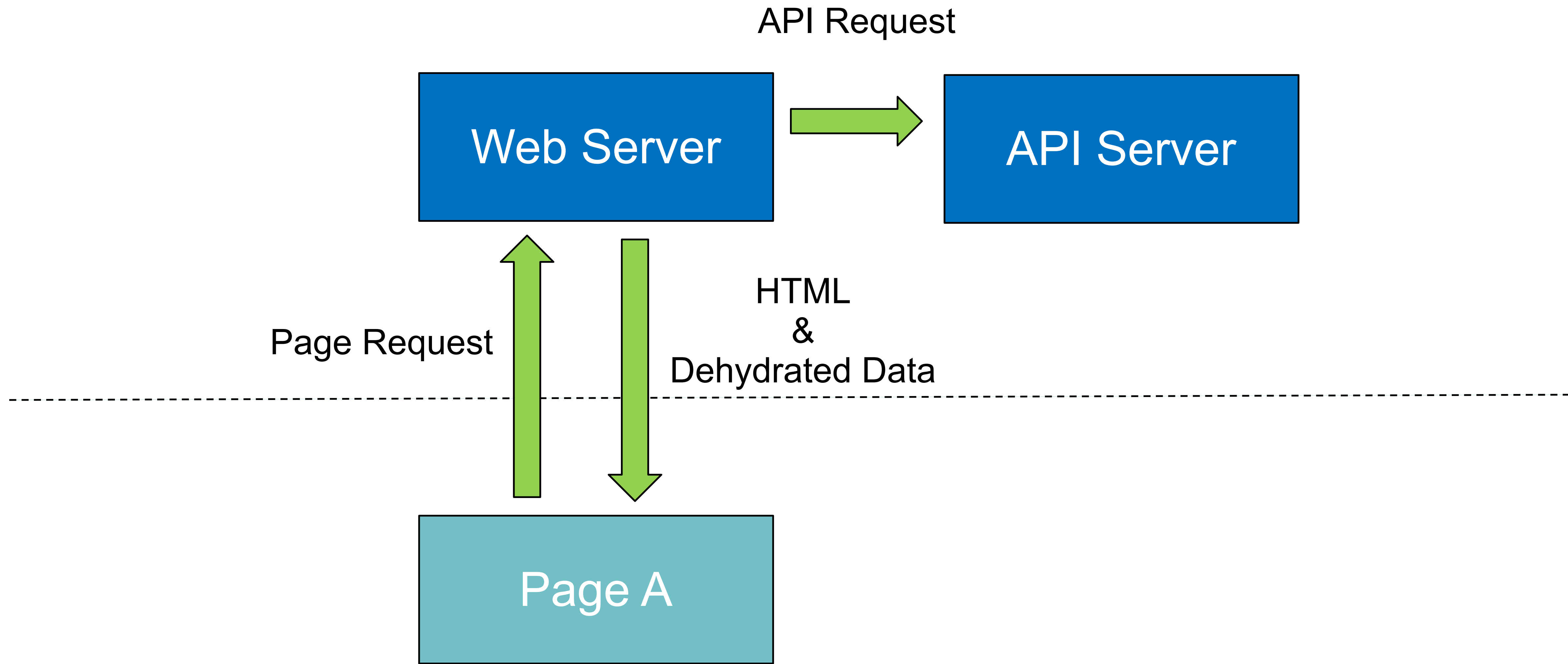
State + React = HTML

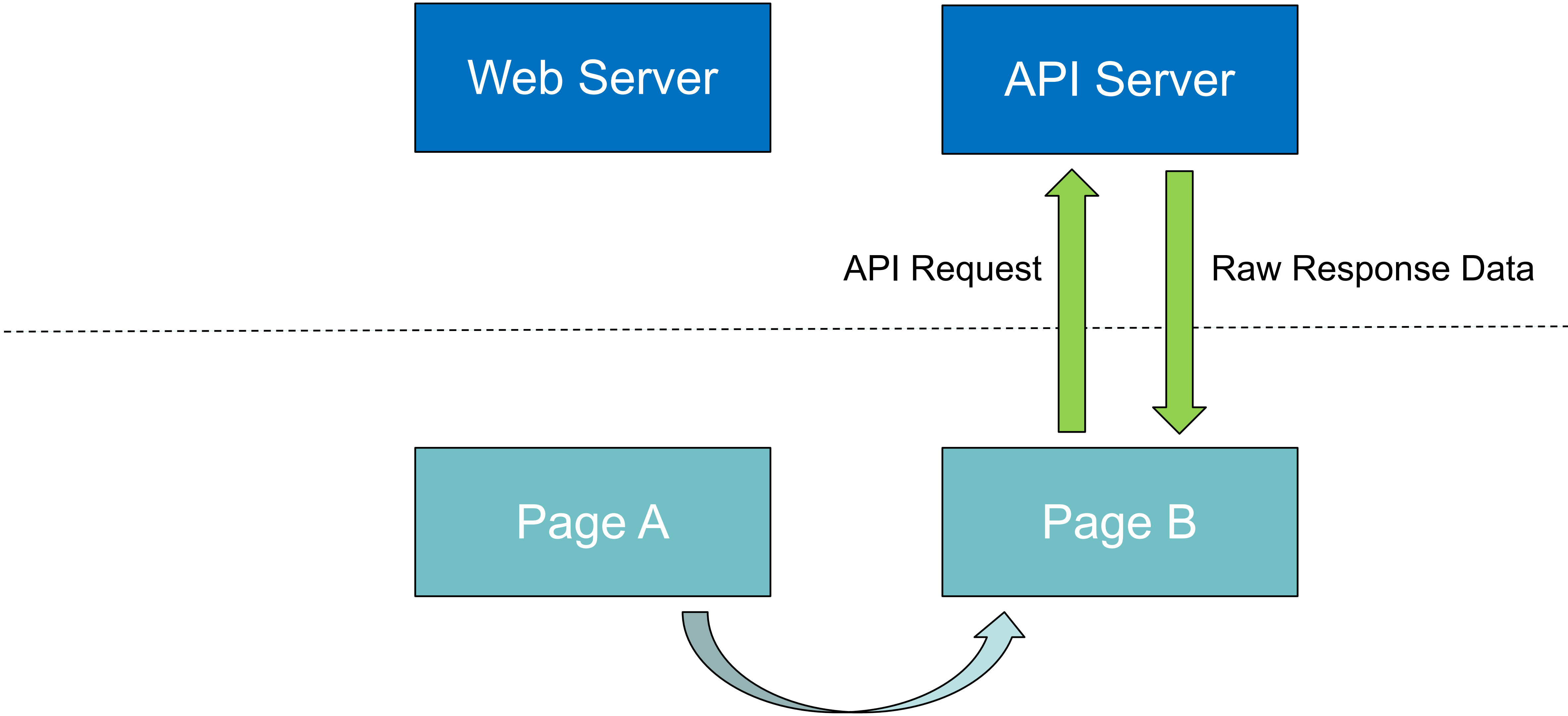
Server Side

Browser Side



Dehydrated State + React = Rehydrated HTML

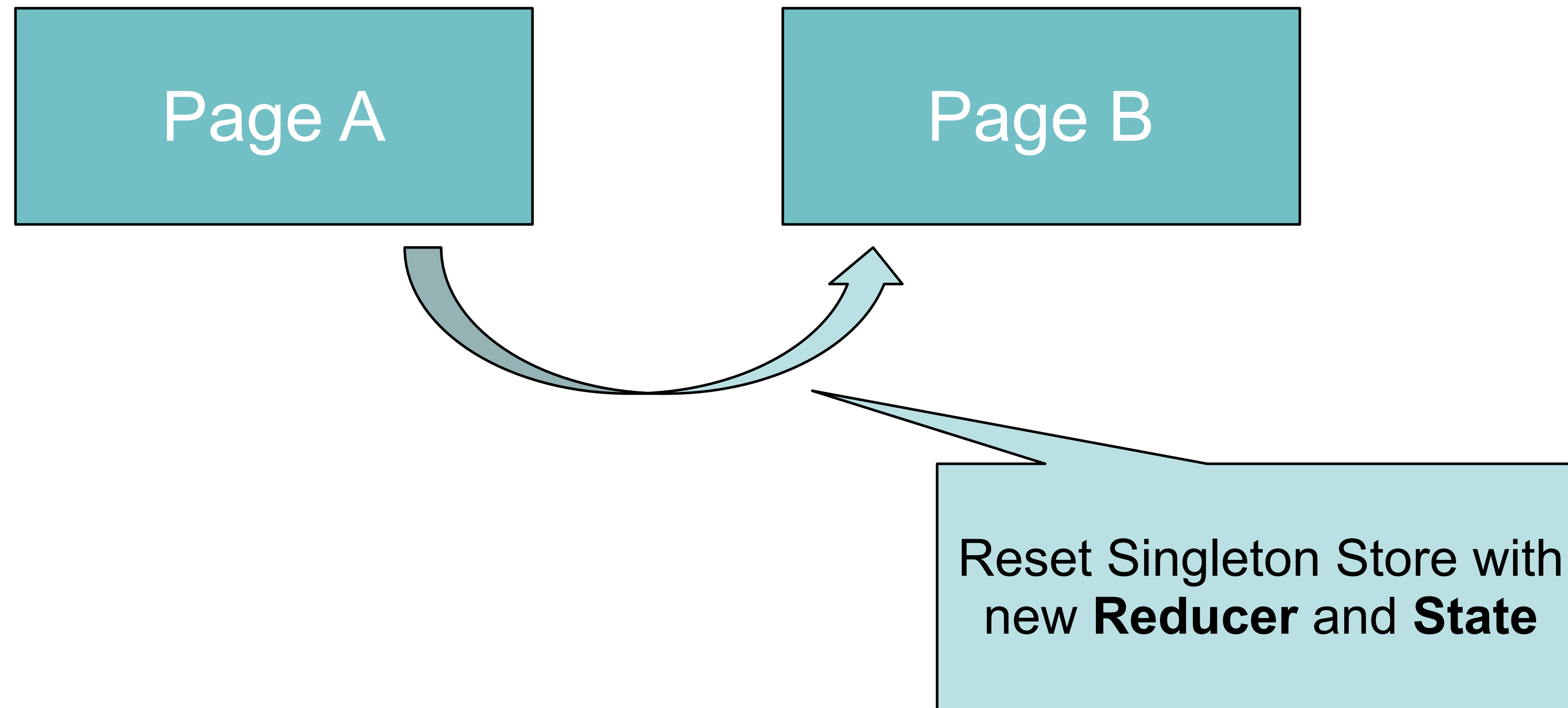




Chunked Code



On SPA Navigation



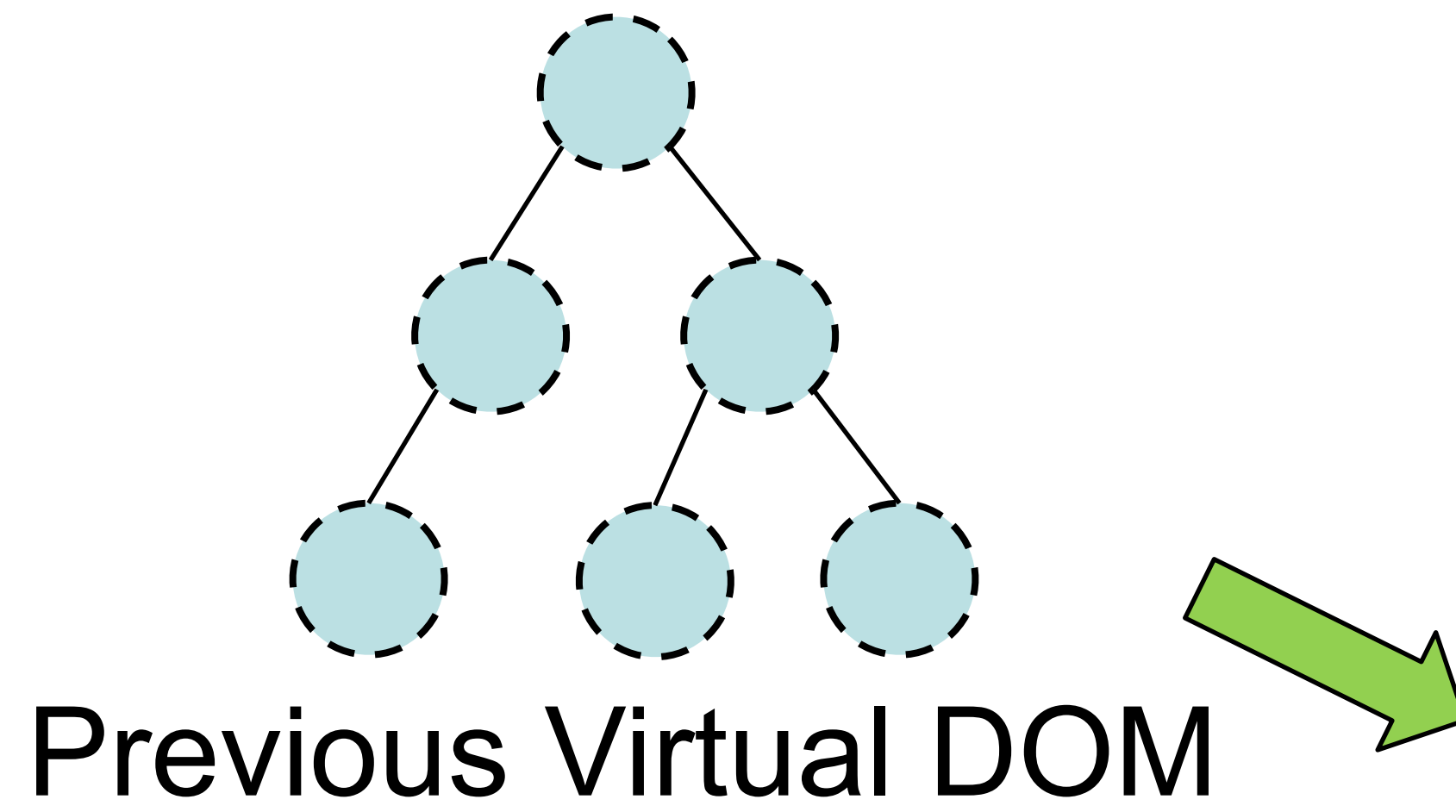
Faster React Server Rendering



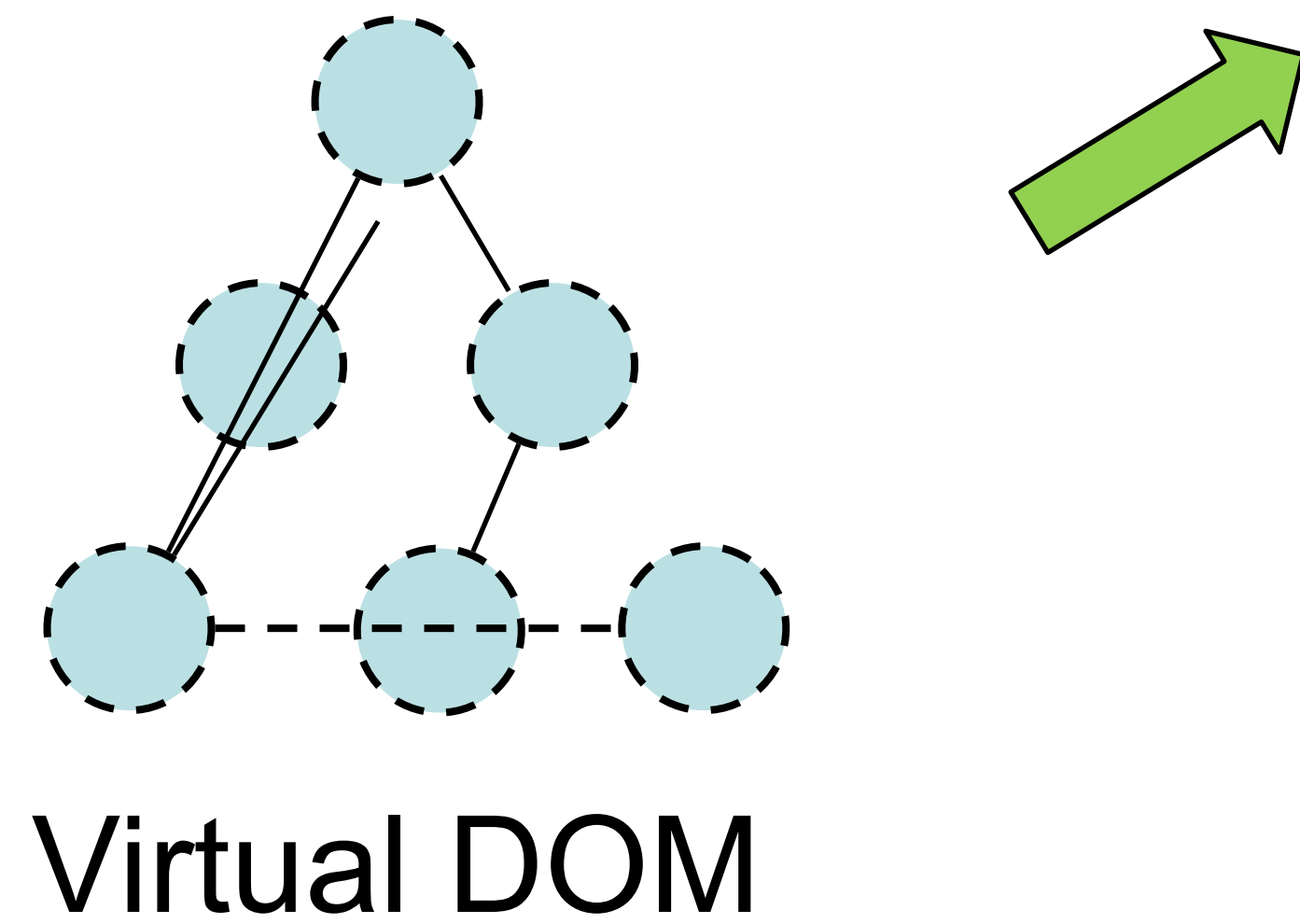
- Set Production Mode
 - **NODE_ENV=production** node app.js
- ~~Use Minified React.js~~
 - require('react/dist/react.min.js');
 - After v0.14, DO_NOT_USE_OR_YOU_WILL_BE_FIRED
- Babel-react-optimize Preset
 - <https://github.com/thejameskyle/babel-react-optimize>

Avoid Wasted-Rendering-Time





Waste If Same



Avoid Dynamic *props*

```
<Foo onClick={function() { doSomething(); } } />
```



```
<Bar style={{margin: "0px"}} />
```



Incremental Page Rendering



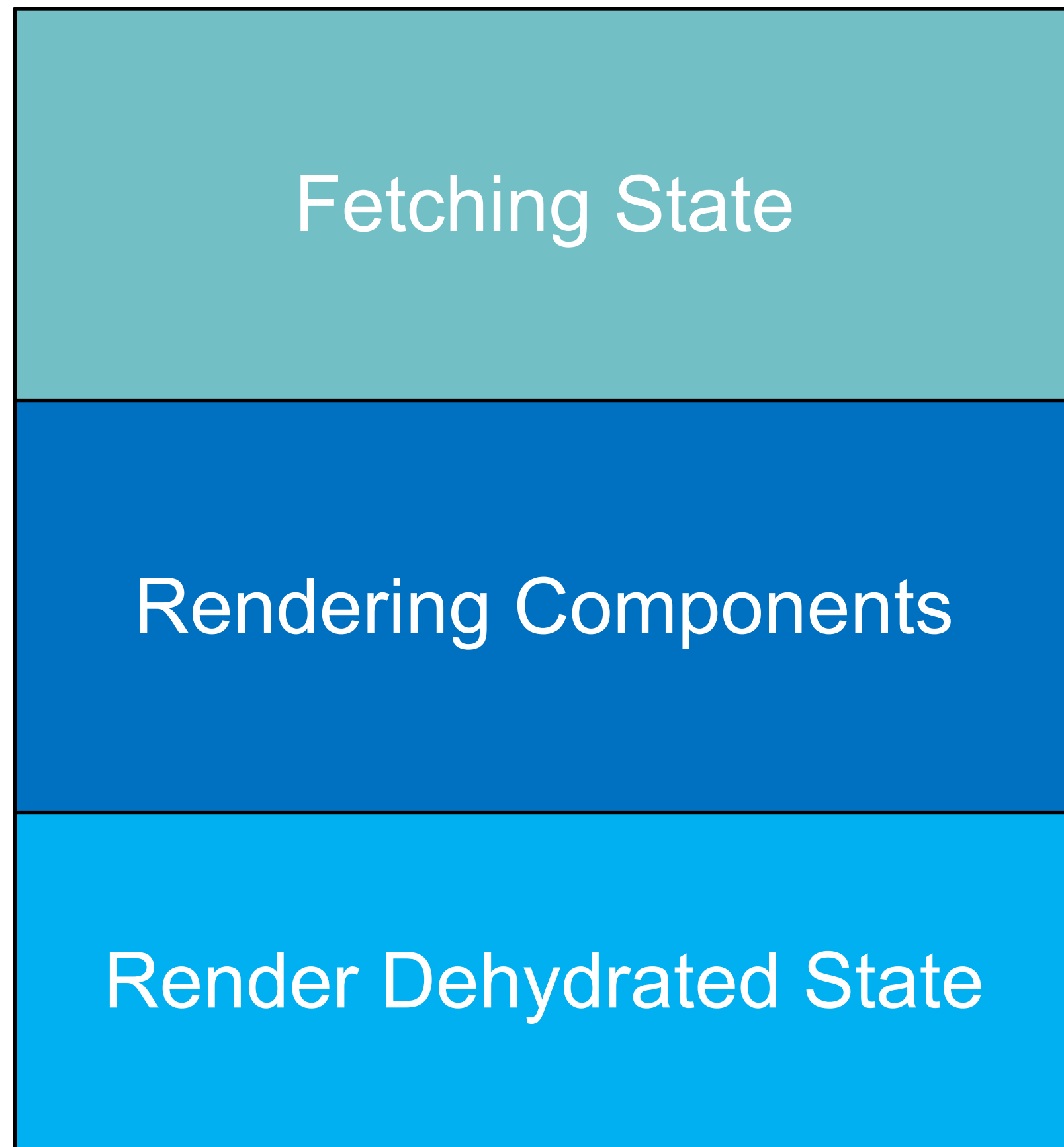
React-Router-Redux

```
<Provider store={store} >  
  <Router history={history}>  
    <Route path="/" component={App}>  
      <Route path="foo" component={Foo} />  
      <Route path="bar" component={Bar} />  
    </Route>  
  </Router>  
</Provider>
```



Maps Path to Page Component

Server Rendering Process



```
fetchState().then(render)
```

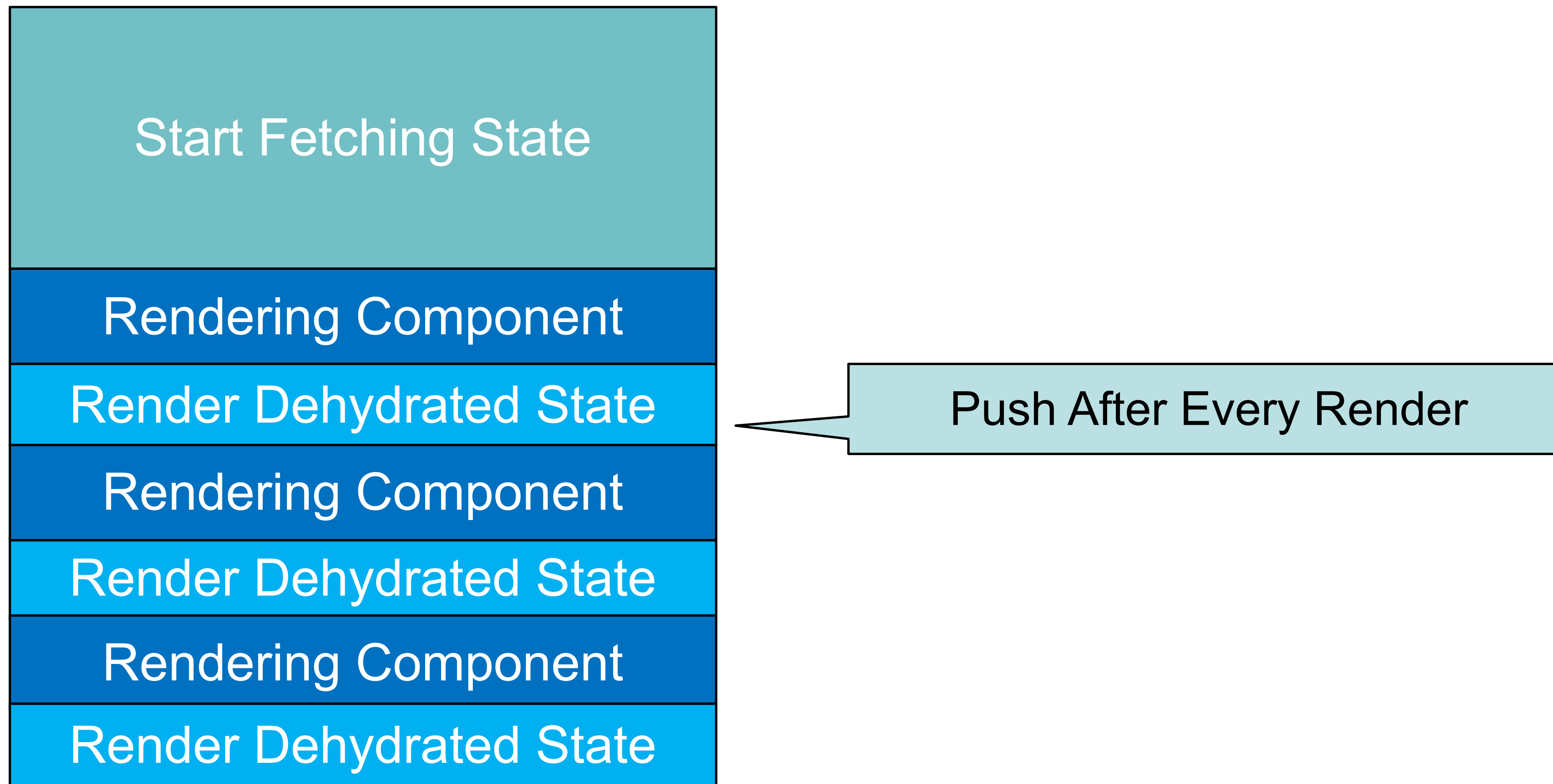
```
ReactDOMServer.renderToString(...)
```

```
<script>  
  window.initState = ...  
</script>
```


Page Should Not Be Component

```
class Page {  
    getComponents() {  
        return [  
            Header,  
            Foo,  
            Bar,  
            Footer  
        ];  
    }  
}
```

Server Rendering Process Improved



Constraint over Conventions

Search **Hulu** in WeChat



Thanks
Any Question?