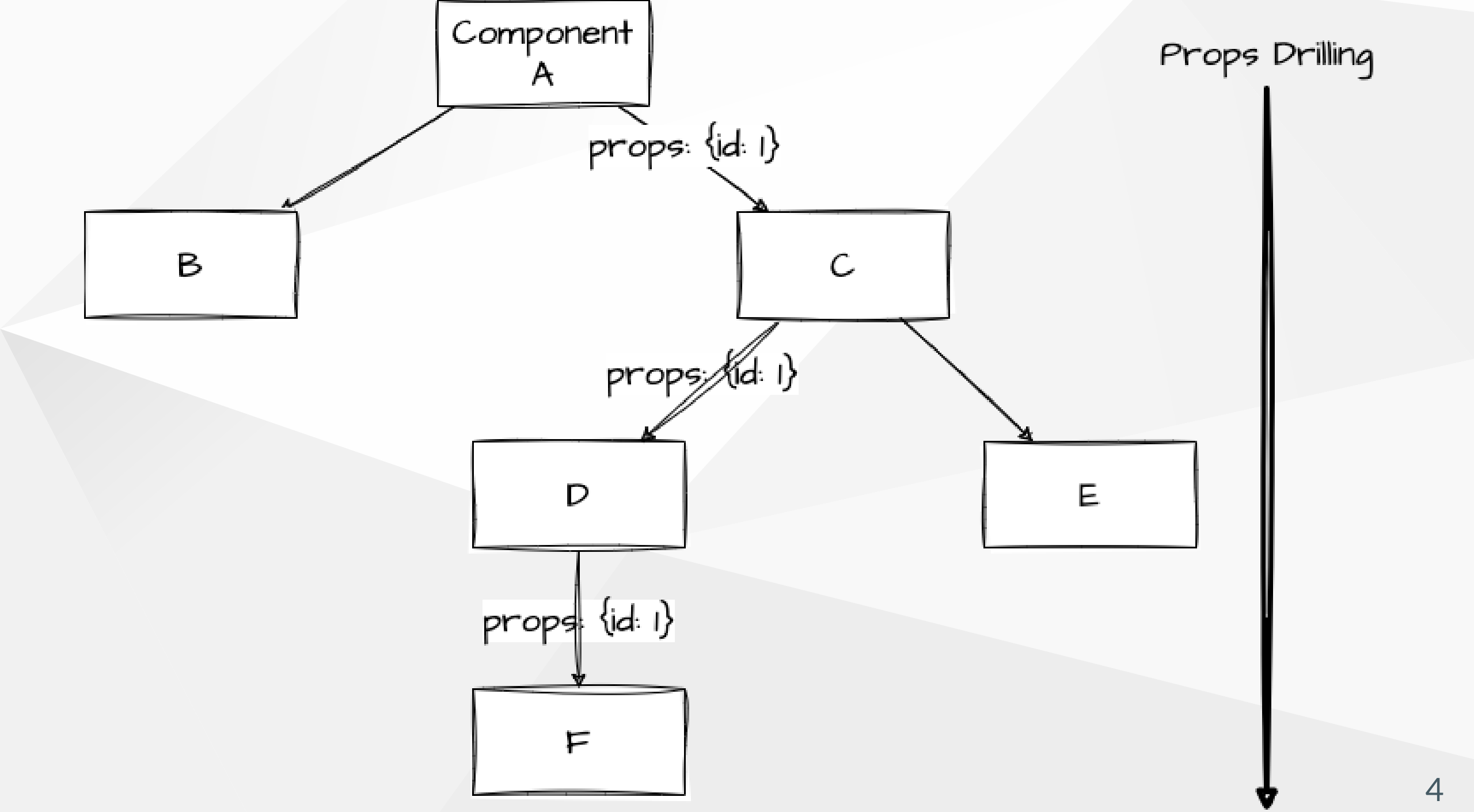
https://codesandbox.io/s/lecture-16-qqcw4n

State Management

Introduction to State Management

- State management is a way to manage the state of your application
- Problem with React: state is local to a component, but sometimes you want to share state between components, so props drilling. To solve this problem, we can use state management libraries like **Redux**, MobX, etc., or React's Context API


Component A
B
C
D
E
F
props: {id: 1}
props: {id: 1}
props: {id: 1}
Props Drilling

Introduction to Redux

- What is Redux?
- Why Redux?
- How to use Redux in React?

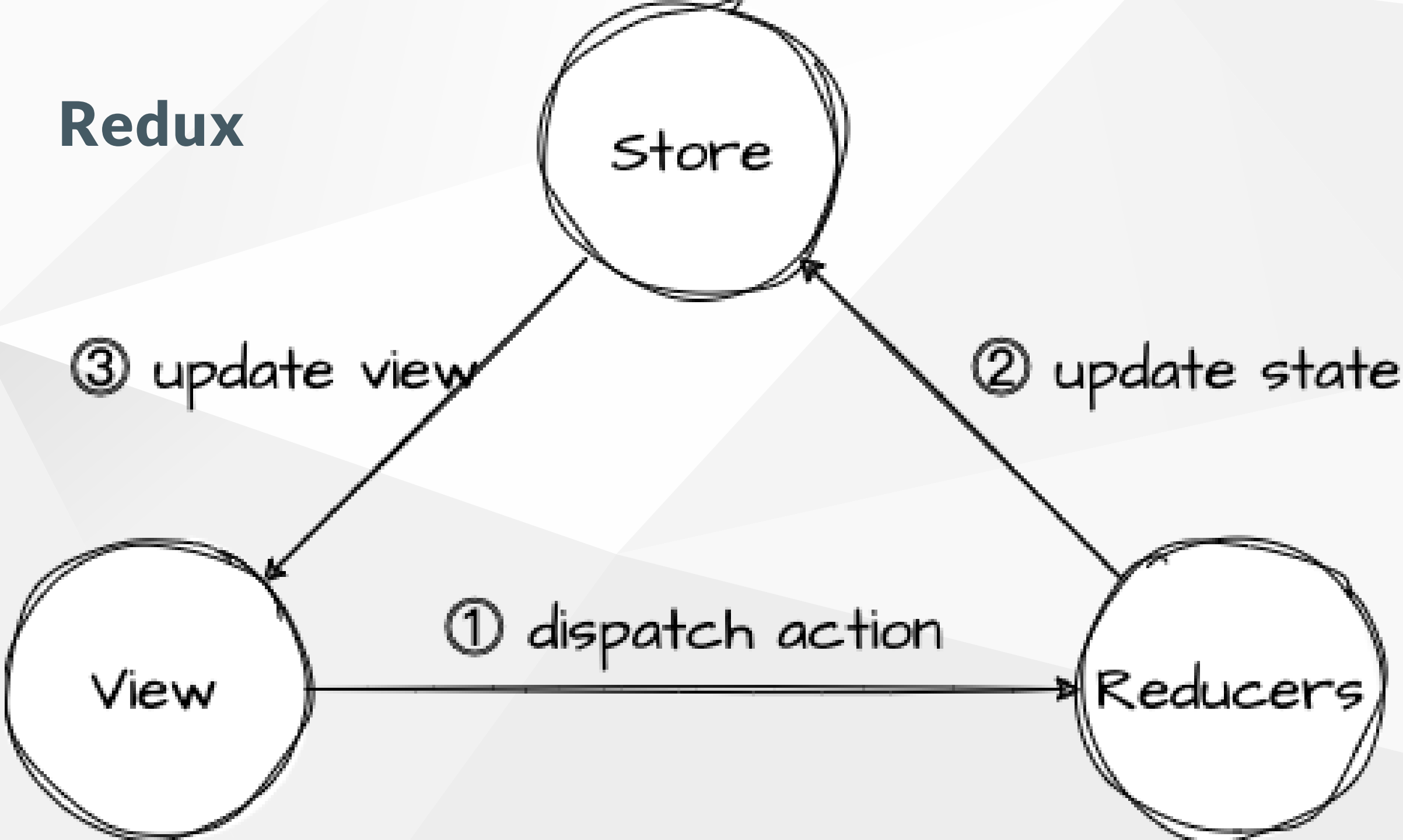
What is Redux?

- Redux is a predictable state container for JavaScript applications
- State transition machine
- For **any** JS application, not just React

Why Redux?

- Predictable
- Centralized
  - Store: single source of truth
- Debuggable
- Flexible
  - Middleware

Redux


Store
③ update view
② update state
View
① dispatch action
Reducers

Terms

- Store: single source of truth, only place to hold the state of your application
- Reducer: pure function that takes the previous state and an action, and returns the next state
- View: an app that connect store, React in our case
- Action: plain JS object that describes what happened
- Dispatch: only way to trigger a state change
- Slice: a collection of reducer login and actions for a single feature of your app (aka slice reducer)

Redux Principles

- Single source of truth
  - The state of your whole application is stored in an object tree within a single store
- State is read-only and immutable
  - The only way to change the state is to emit an action, an object describing what happened
- Changes are made with pure functions
  - To specify how the state tree is transformed by actions, you write pure reducers

Reducer

```
const initialState = {
  count: 0
};

function reducer(state = initialState, action) {
  switch (action.type) {
    case 'INCREMENT':
      return {
        ...state,
        count: state.count + 1
      };
    case 'DECREMENT': // ...
    default: // ...
  }
}
```

Store

```
import { createStore } from 'redux';
import reducer from './reducer';

const store = createStore(reducer);

store.subscribe(() => {
  console.log(store.getState());
});

store.dispatch({ type: 'INCREMENT' });
store.dispatch({ type: 'DECREMENT' });
```

- `dispatch` is the only way to trigger a state change
- `subscribe` is used to listen to state changes
- `getState` is used to get the current state

Action

```
const increment = () => ({
  type: 'INCREMENT'
});
```

- Action is an object that describes what happened
- Action creators are functions that create actions
- `dispatch` can take an action object or an action creator

Redux Toolkit (RTK)

- RTK is the official, opinionated, batteries-included toolset for efficient Redux development
- RTK is a wrapper around Redux
- RTK provides utilities that simplify common Redux use cases, including store setup, defining reducers, immutable update logic, and even creating entire "slices" of state at once
- `createSlice`, `configureStore`

Redux in React

redux-class.jsx redux-hooks.jsx

- `react-redux` is the official Redux UI binding library for React
- `Provider` component
- hooks: `useSelector`, `useDispatch`
- class components: `connect` HOC

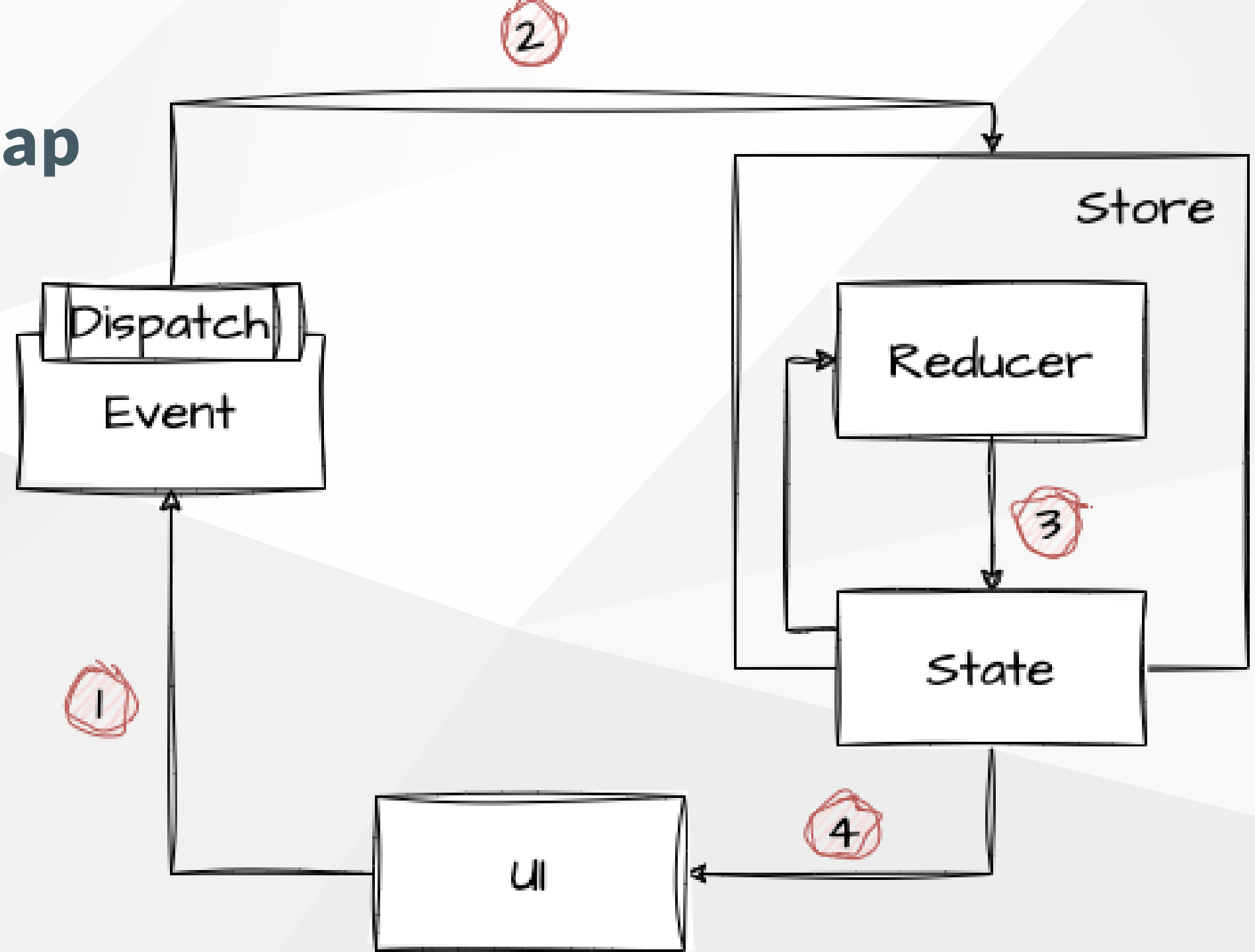
Redux in Class Components (legacy)

```
import { connect } from 'react-redux';

class Counter extends React.Component {}

const mapStateToProps = (state) => ({
  count: state.count
});

const mapDispatchToProps = (dispatch) => ({
  increment: () => dispatch({ type: 'INCREMENT' }),
  decrement: () => dispatch({ type: 'DECREMENT' })
});

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

Redux devtools

- Browser extension
- Time travel
- Very useful for debugging
- Setup Redux devtools
  - `npm install --save-dev redux-devtools-extension`
  - in RTK `configureStore`:
    `devTools: process.env.NODE_ENV !== 'production'`

Recap



React Reducer Hook

Reducer.jsx

- `useReducer` is a React hook that accepts a reducer function and an initial state, and returns the current state paired with a `dispatch` method

Context.jsx

React Context API

- Context provides a way to pass data through the component tree without having to pass props down manually at every level
- `createContext`, `Context.Provider`, `useContext`