REDUX

A Predicable State Container for JavaScript Apps

REDUX IS SIMPLE

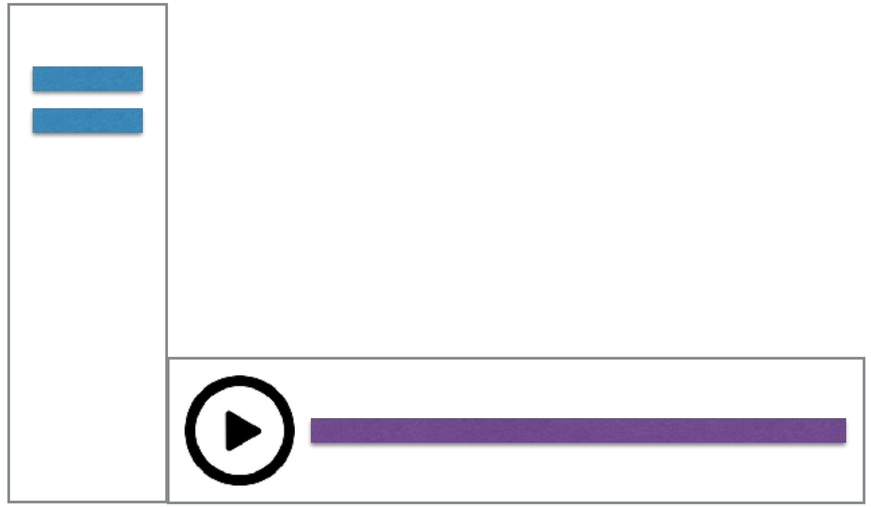
- It’s just a couple of functions - you could write it yourself
- Simplicity is powerful
- All signals to change application state go through one channel
- Encourages/enforces programming tactics of immutability and function purity

THREE PRINCIPLES

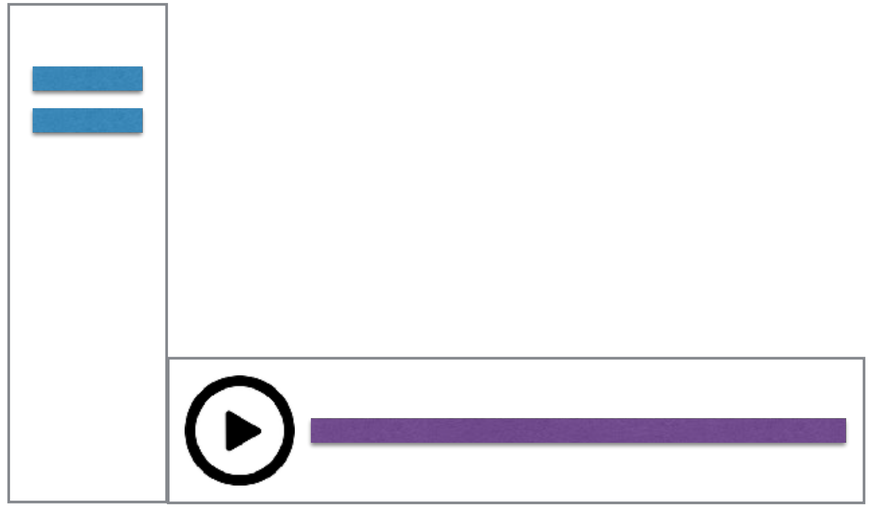
- **Single source of truth**
- **State is read-only**
- **Changes can be requested through actions and are made with pure functions**
  - No side effects (AJAX, mutations)
  - Same input => same output, no matter what!

BACK TO REACT

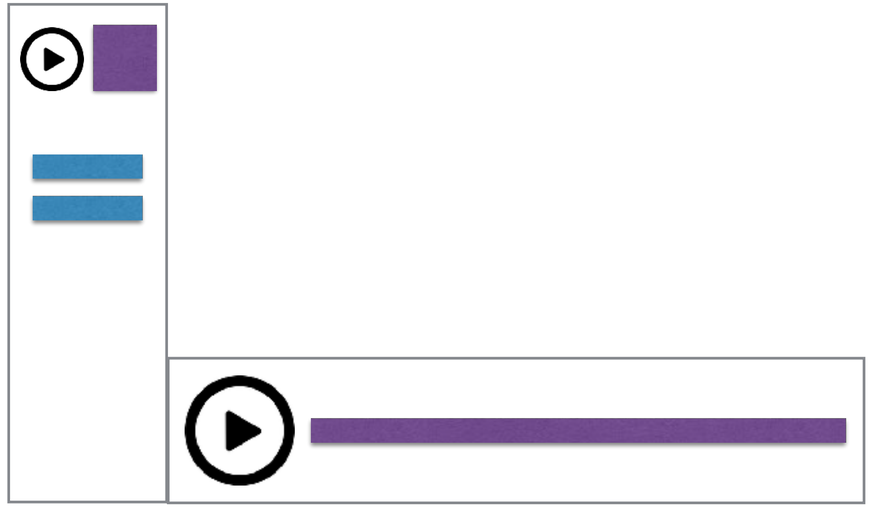
WHY NOT COMPONENT STATE?



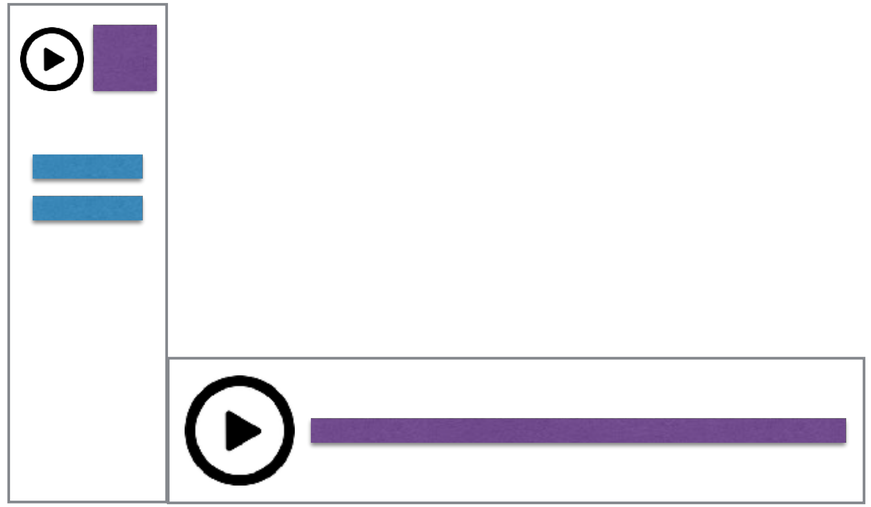
```
          <Main />
        /         \
<Sidebar/>       <Player/>
```



```
          <Main />
        /         \
<Sidebar/>       <Player/>  this.state = { currentSong }
```

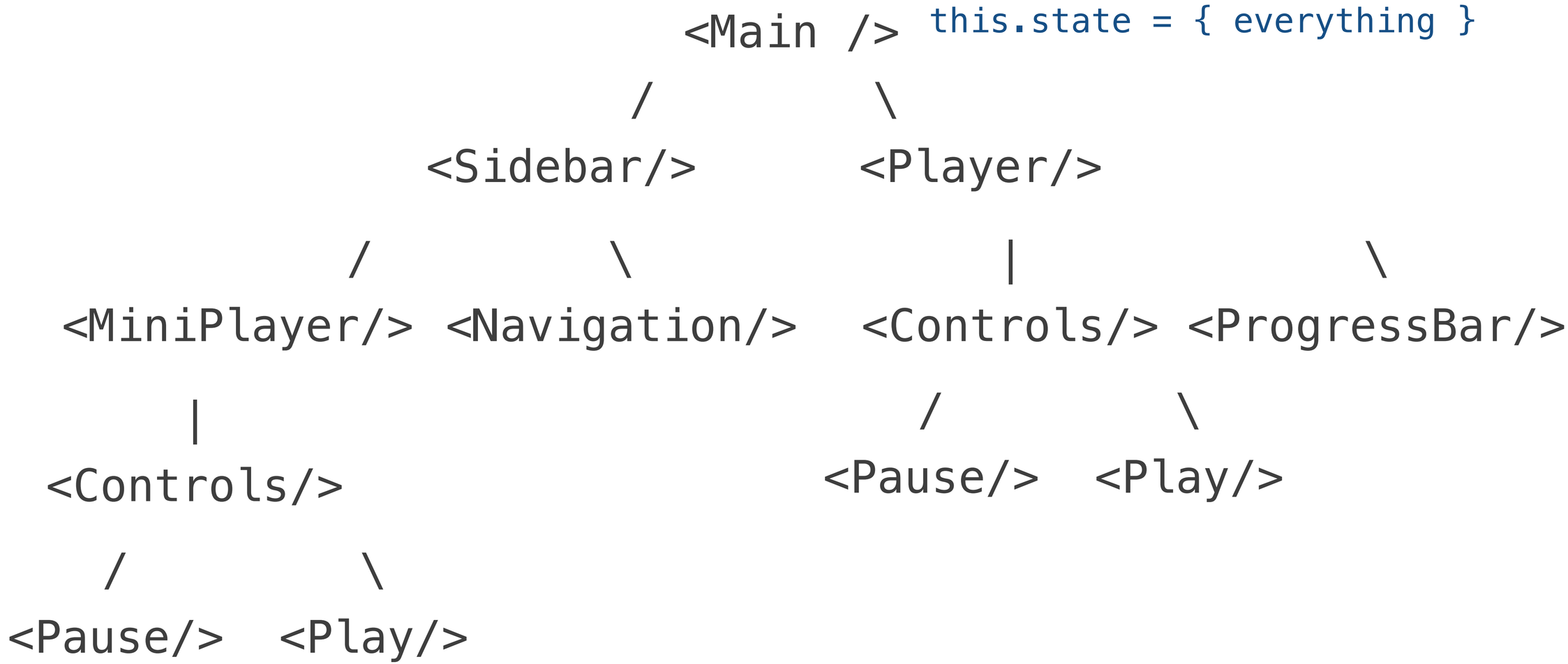


```
                <Main />
              /         \
     <Sidebar/>          <Player/> this.state = { currentSong }
       /
<MiniPlayer/>
```



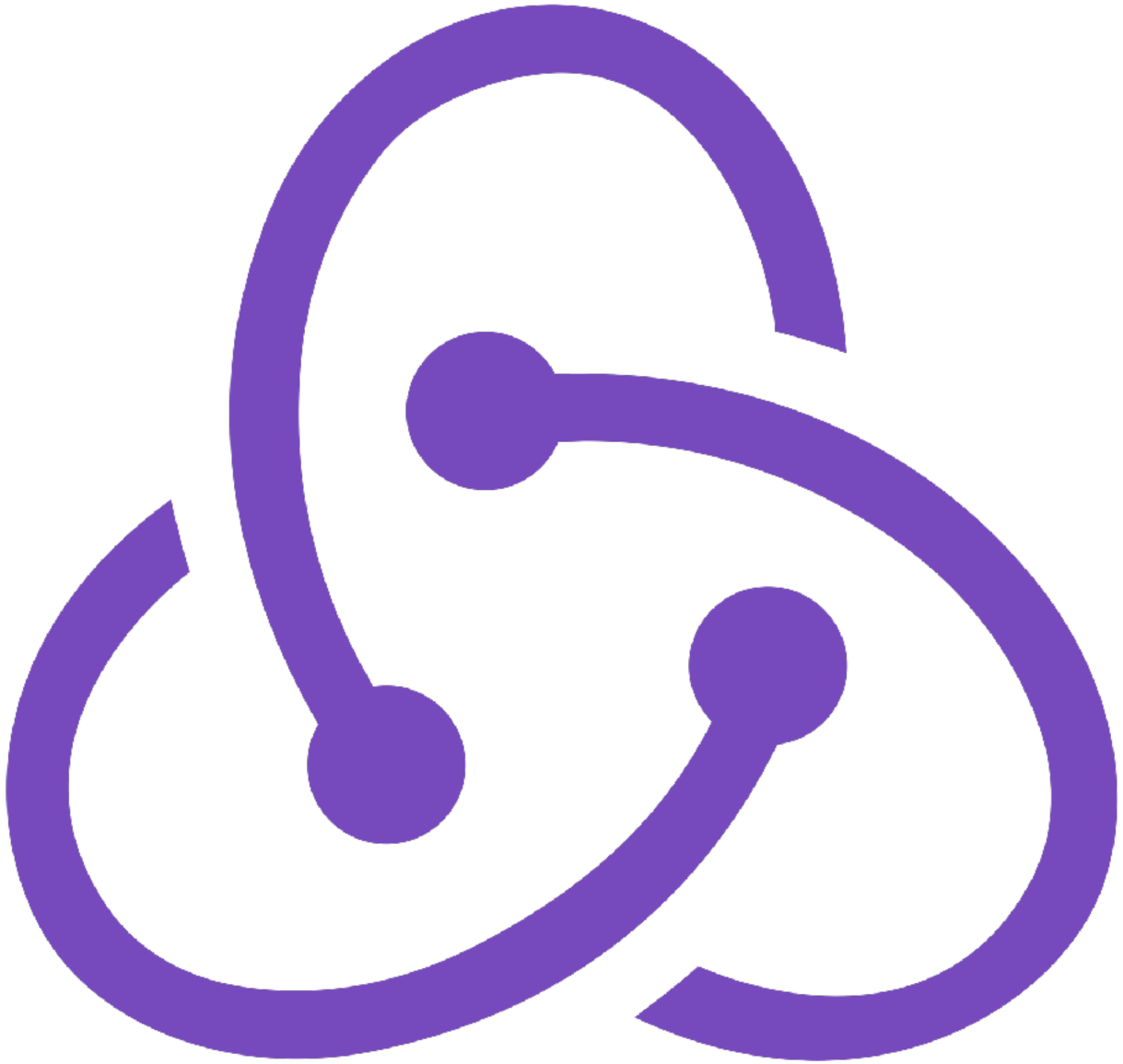
```
                    <Main />   this.state = { currentSong }
                  /         \
          <Sidebar/>         <Player/>
            /
<MiniPlayer/>
```

SOLUTION: KEEP ALL STATE IN ONE PLACE


this.state = { everything }
<Main />
<Sidebar/>
<Player/>
<MiniPlayer/>
<Navigation/>
<Controls/>
<ProgressBar/>
<Controls/>
<Pause/>
<Play/>
<Pause/>
<Play/>

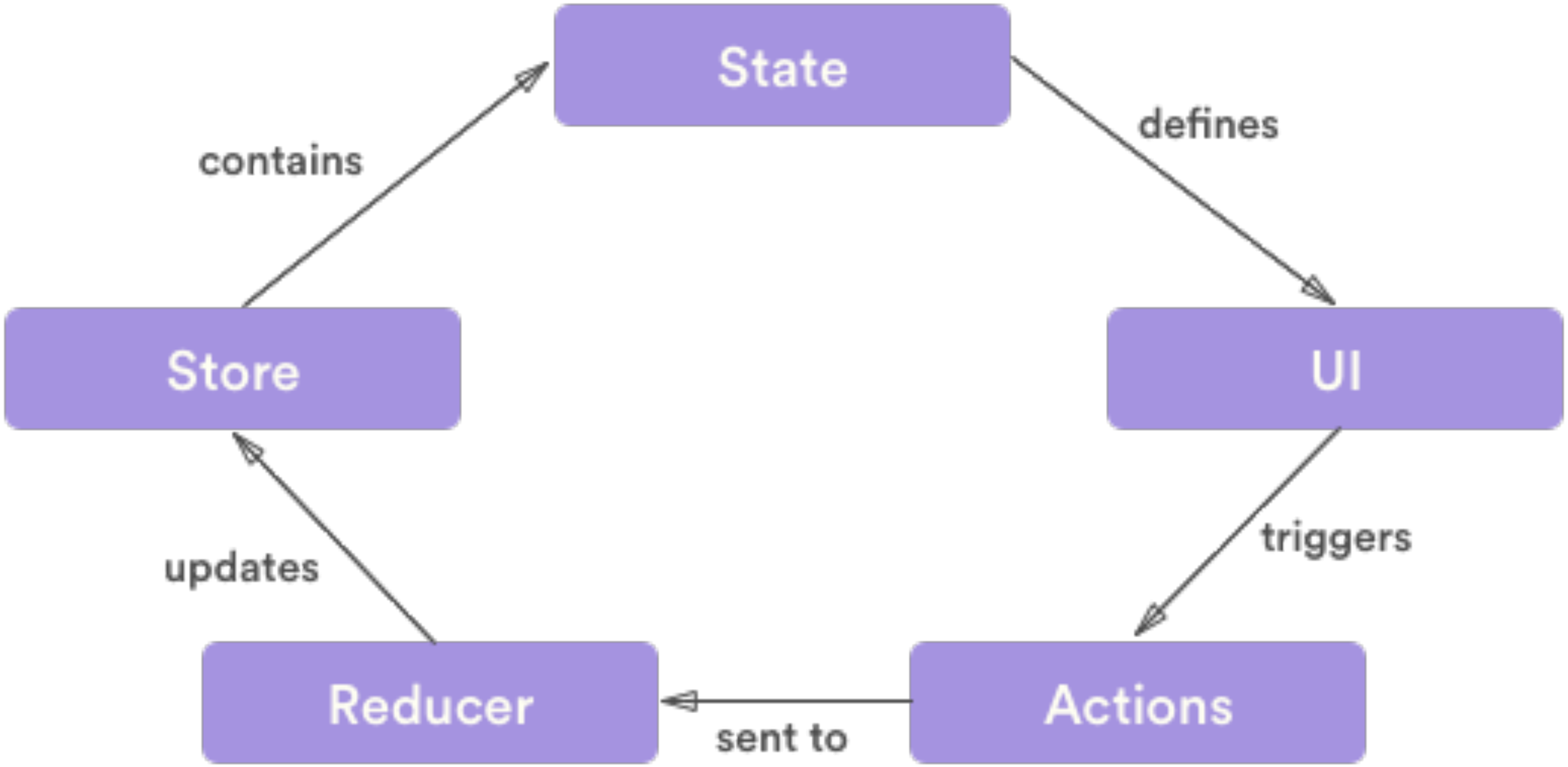
PROBLEM: PASSING PROPS ALL THE WAY DOWN IS A PAIN

SOLUTION....



REACT WITH REDUX

- **React does not try to solve the problem of application state or architecture**
- **Redux is a good fit for a component-system based on unidirectional data flow**
  - “State at the top, passed down as a prop”
- **Components dispatch actions to Redux store, new state is produced, components listen and update**



http://www.theodo.fr/uploads/blog//2016/03/ui_workflow.png

CONNECTING COMPONENTS

- **Your components shouldn't be aware of Redux - Just use props & render.**
- **Wrap your component into a Container (or Connected) component**
- **Connected component acts as a bridge:**
  - Subscribe to the Redux Store
  - Syncs only the parts of the store state we want
  - Maps the dispatches
  - Passes everything down as props to your original component

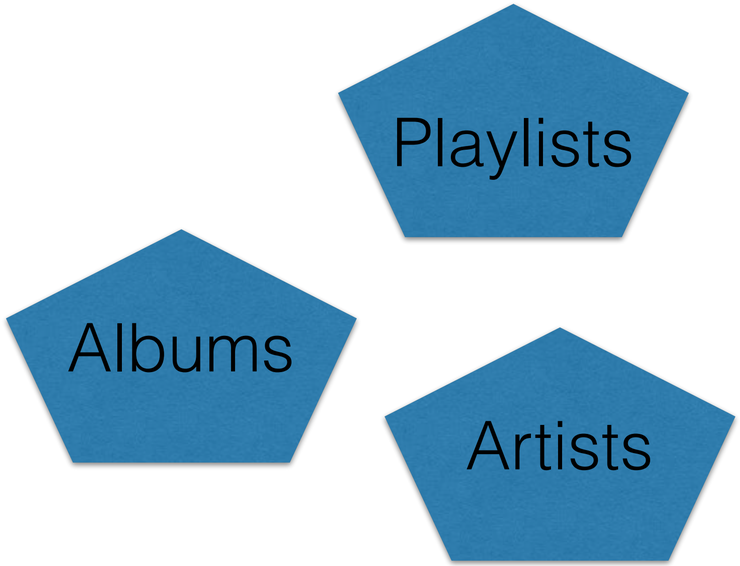
Demo

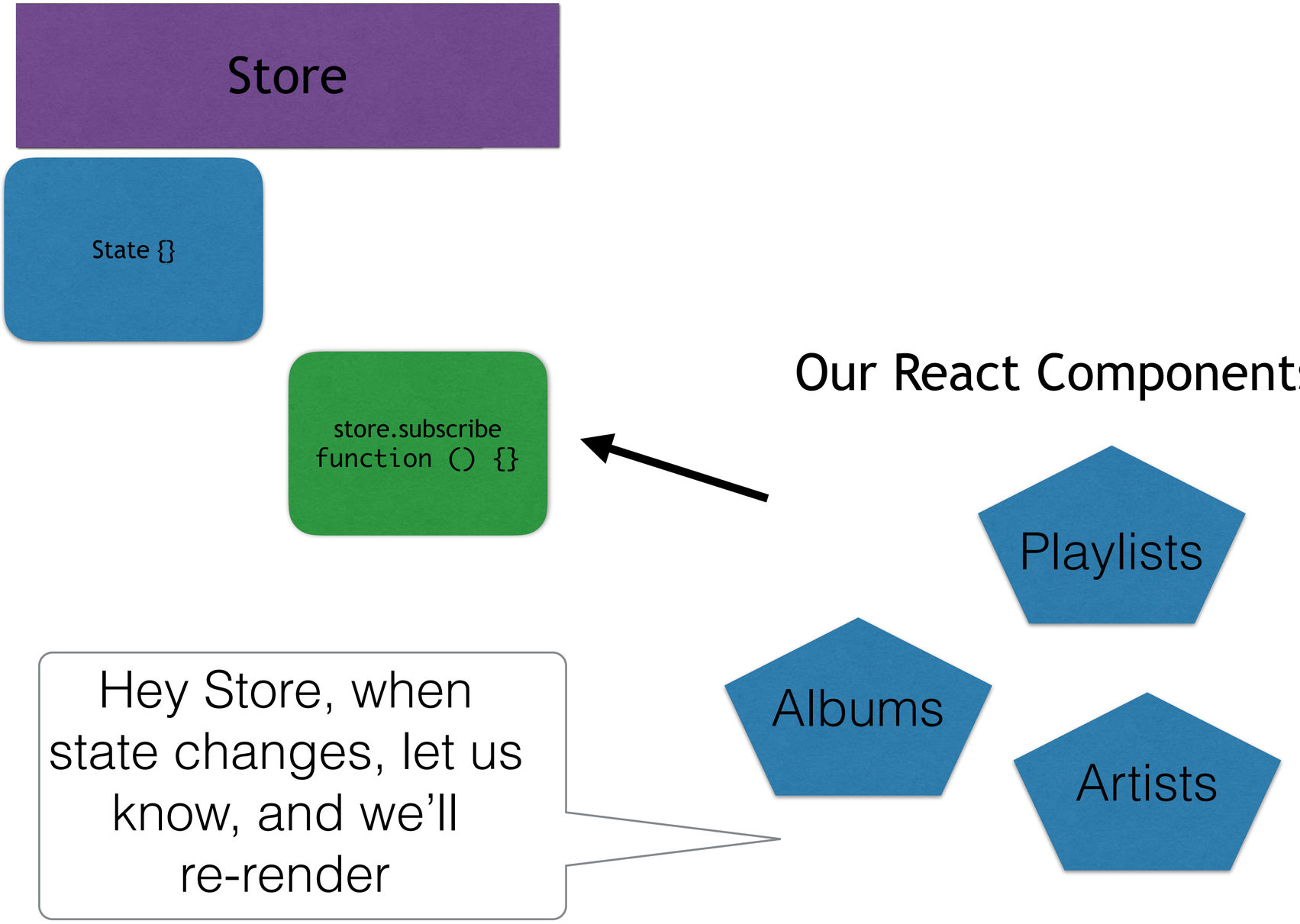

Store
State {}

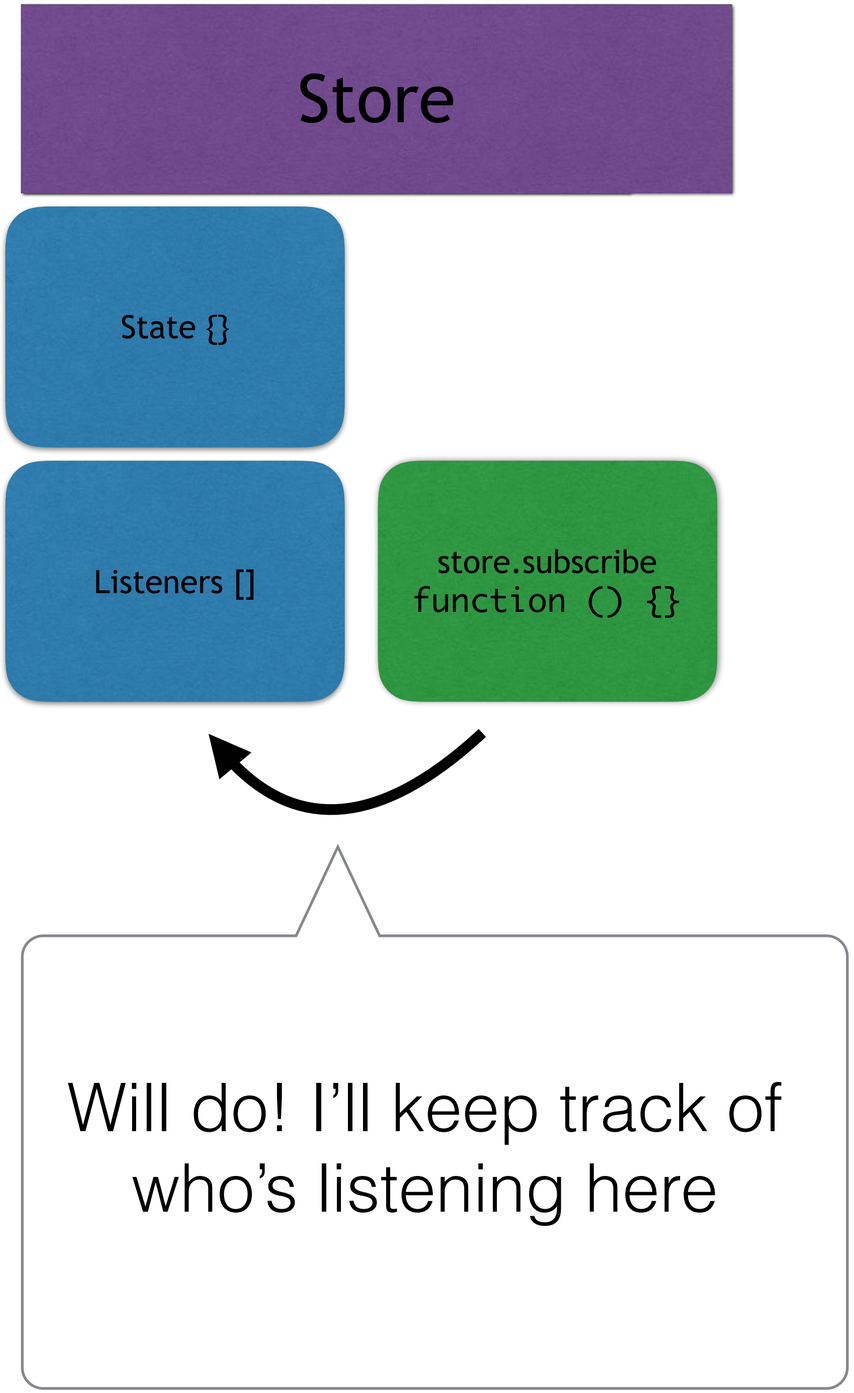
State

```
{
  albums: [],
  artists: [],
  selectedAlbum: {},
  // etc…
}
```

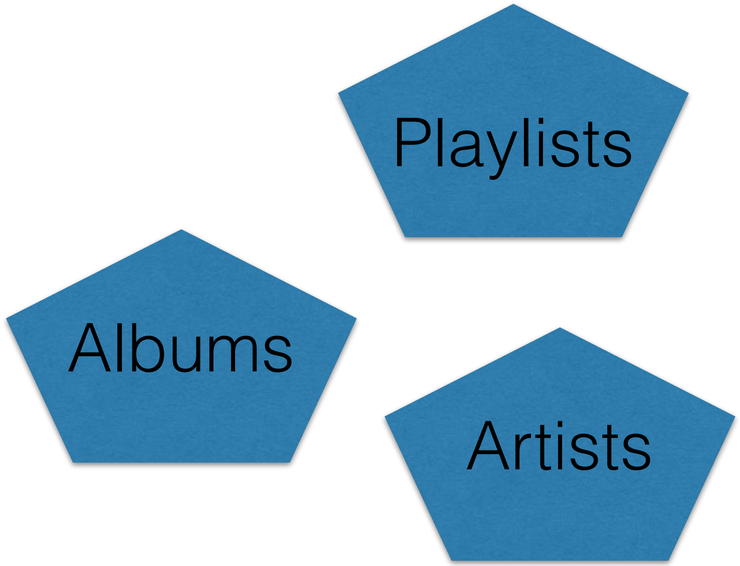
Our React Components

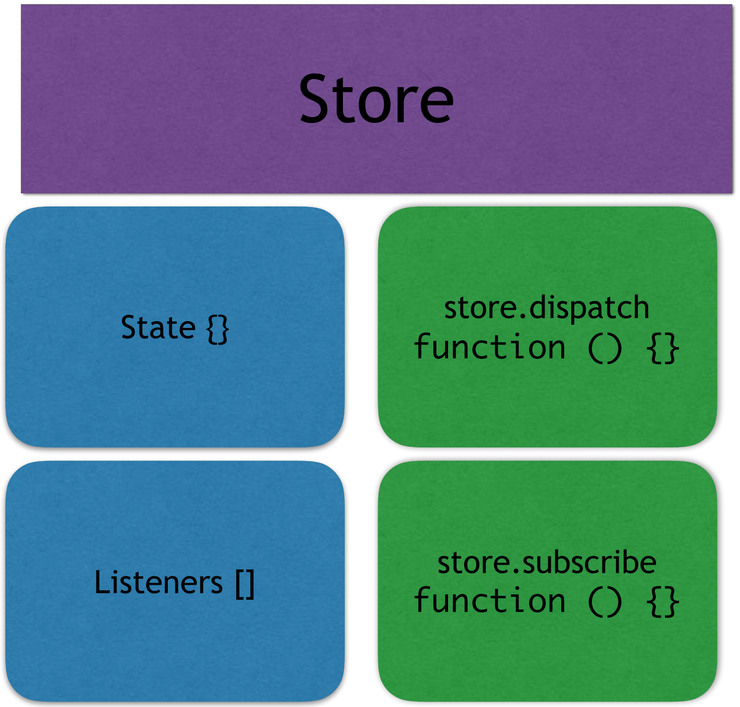



Store
State {}
store.subscribe
function () {}
Our React Components
Playlists
Albums
Artists
Hey Store, when state changes, let us know, and we'll re-render



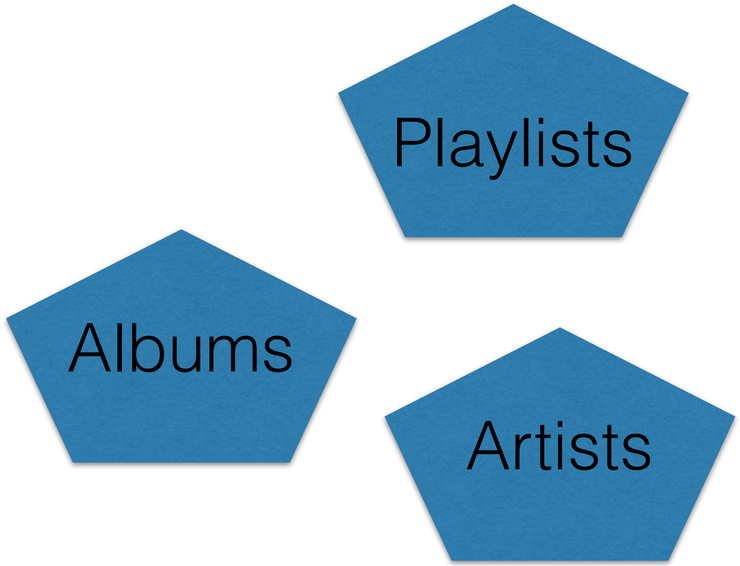
Our React Components





Now - if you want to change something, send an“action” to my “dispatch”method

Our React Components



Action

```
{
  type: ADD_ALBUM,
  newAlbum: {
    id: 6,
    name: “4:44”,
    artist: “Jay-Z”
  }
}
```

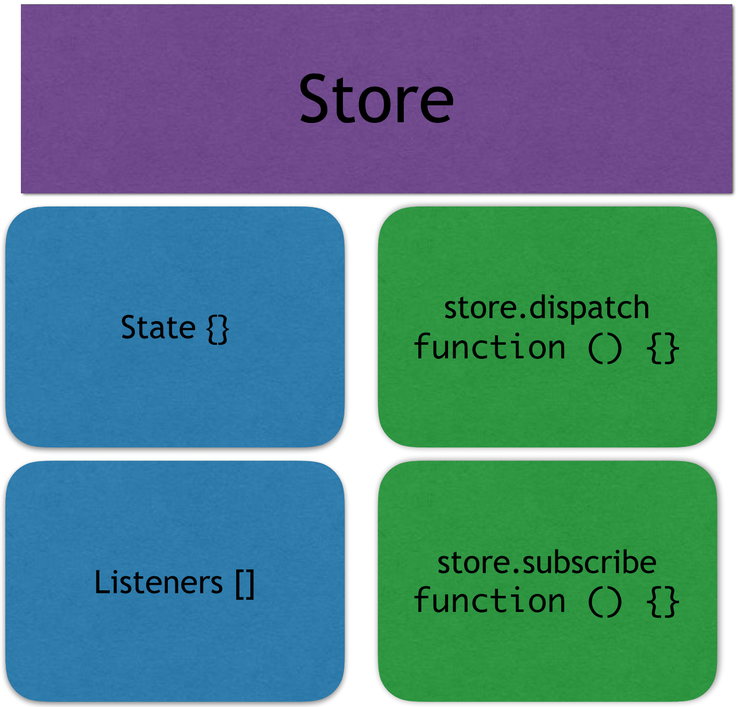
Action

```
{
  type: ADD_ALBUM,
  newAlbum: {
    id: 6,
    name: “4:44”,
    artist: “Jay-Z”
  }
}
```

“Action Type”

store.dispatch

The ONLY way to send an action to the store, so that it can update the state



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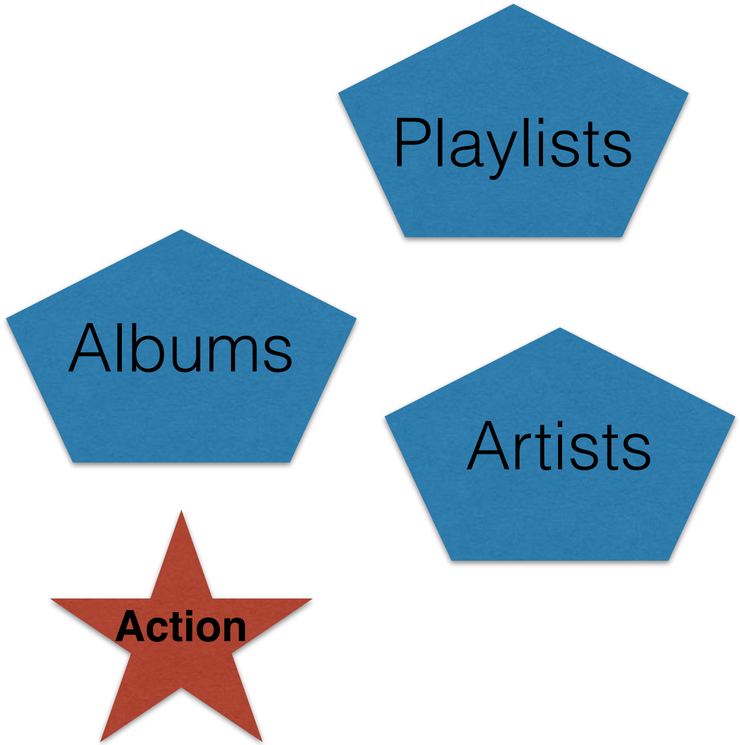

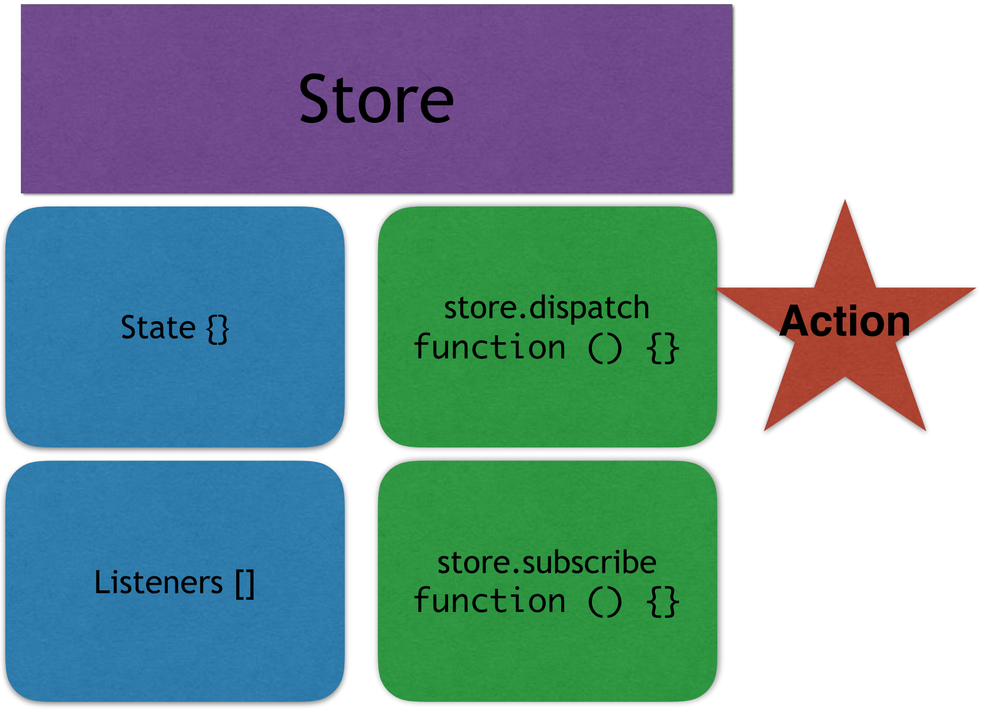

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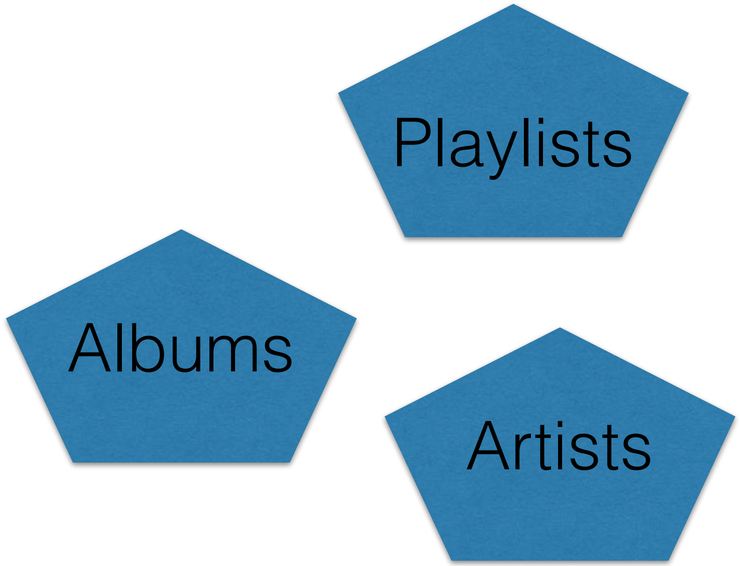

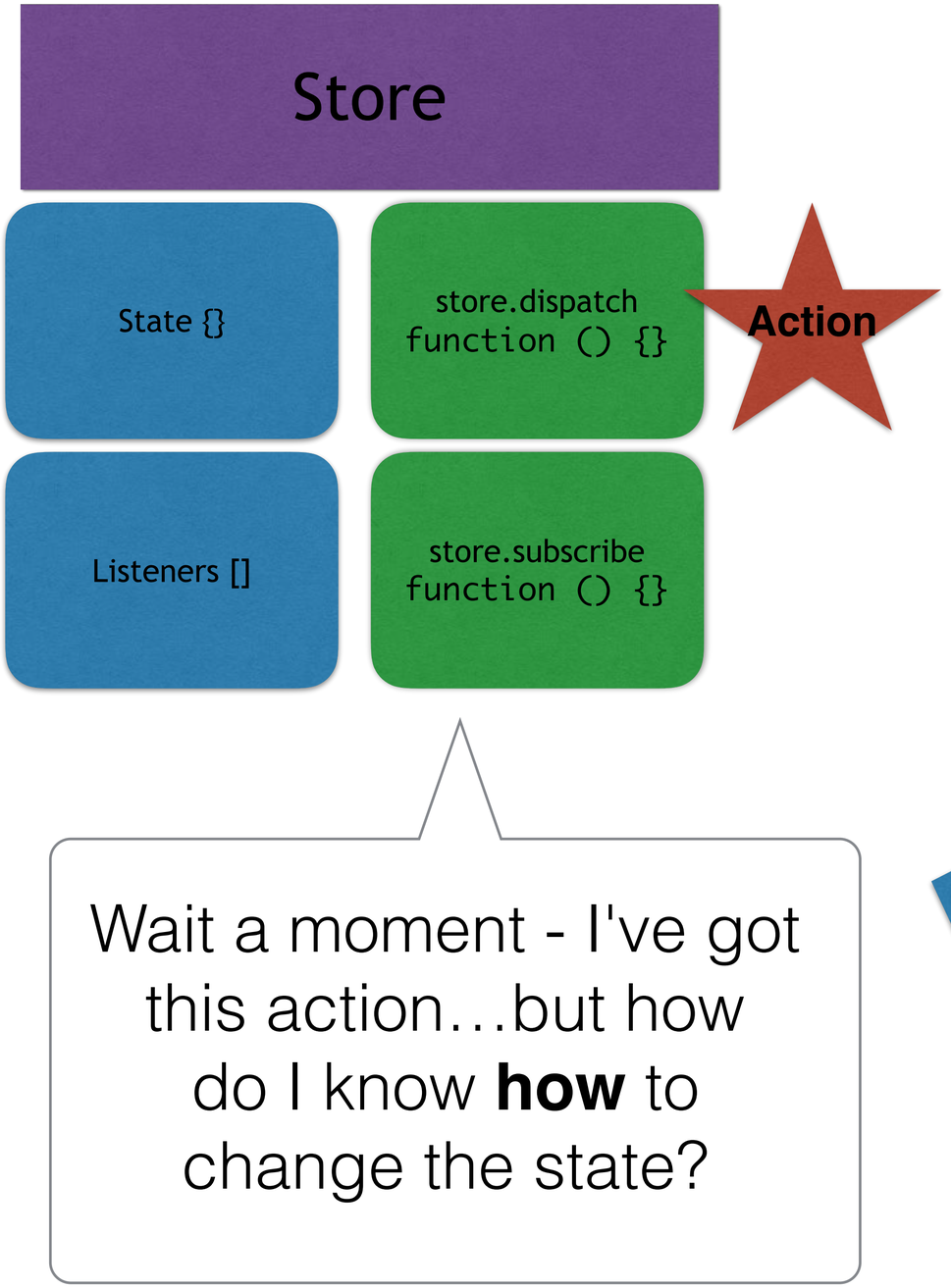

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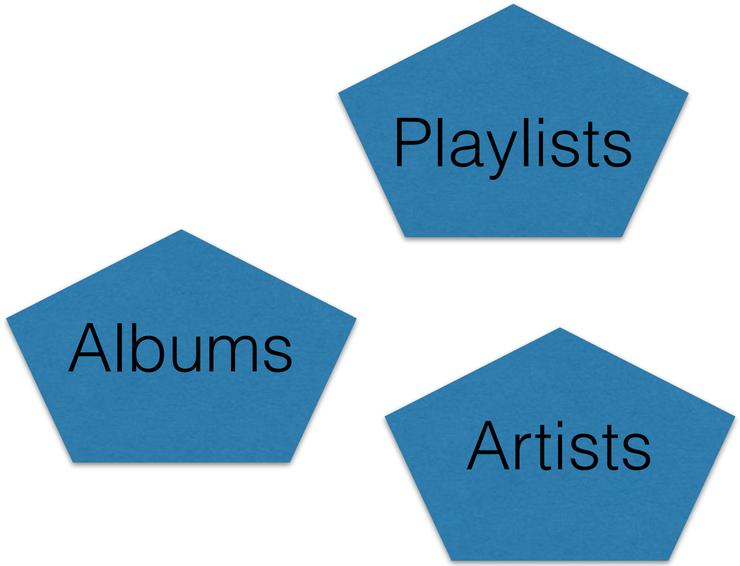

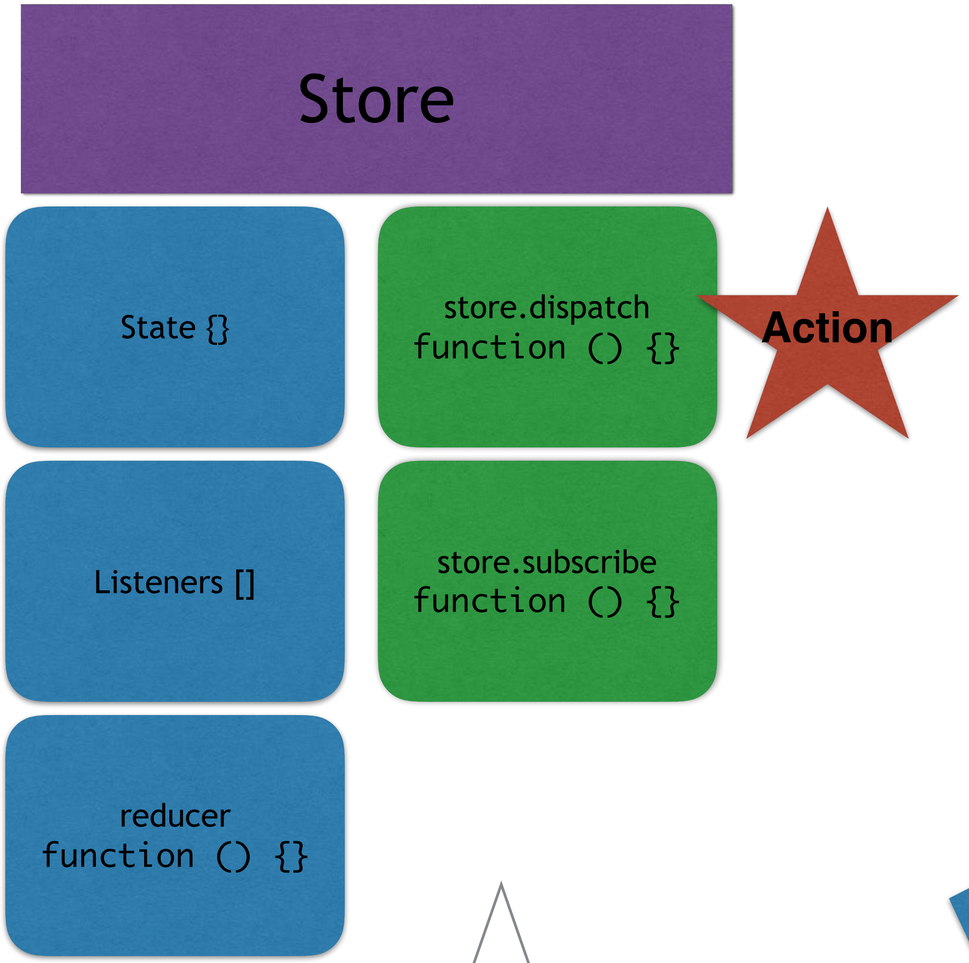

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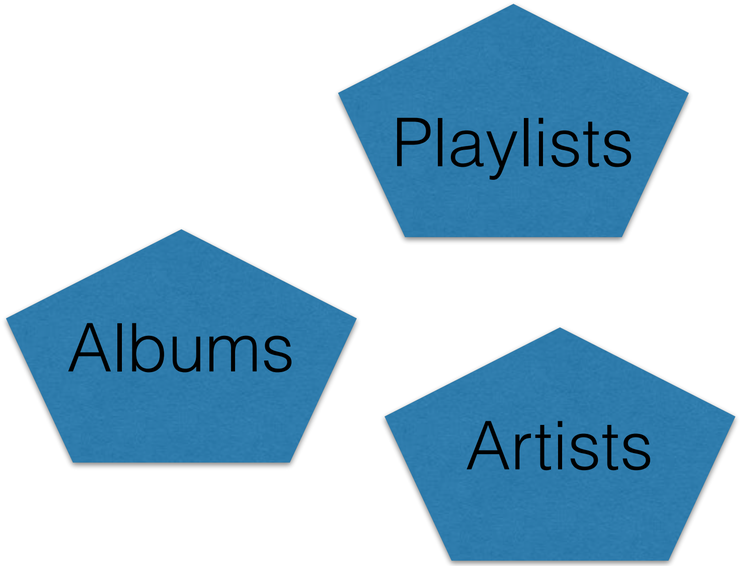


Reducer

```
function reducer (prevState, action) {

  // returns a NEW state object
  // based on the previous state
  // and the action

}
```

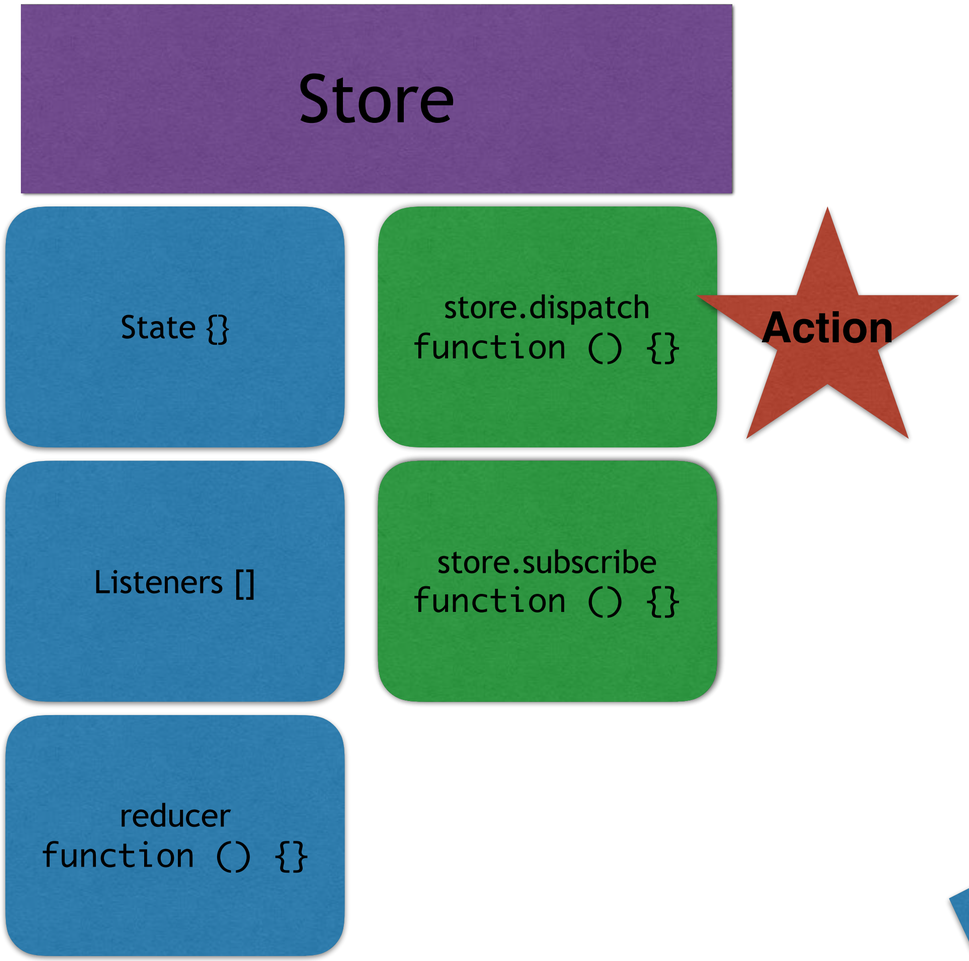
Reducer

```
function reducer (prevState, action) {

  const newState = Object.assign({}, prevState)

  switch (action.type) {
    case ADD_ALBUM:
      newState.albums = newState.albums.concat(action.newAlbum)
      return newState
    default:
      return prevState
  }

}
```



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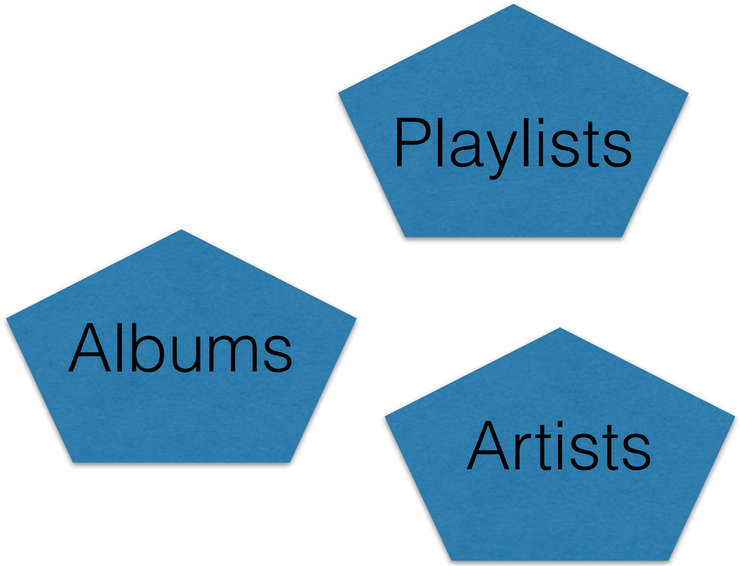

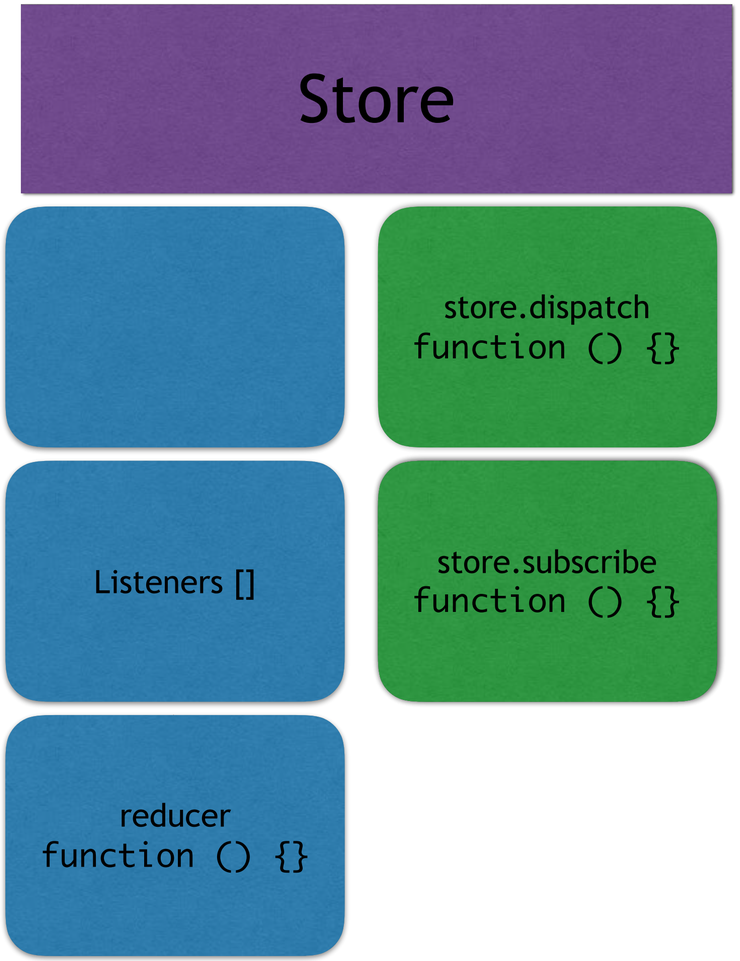

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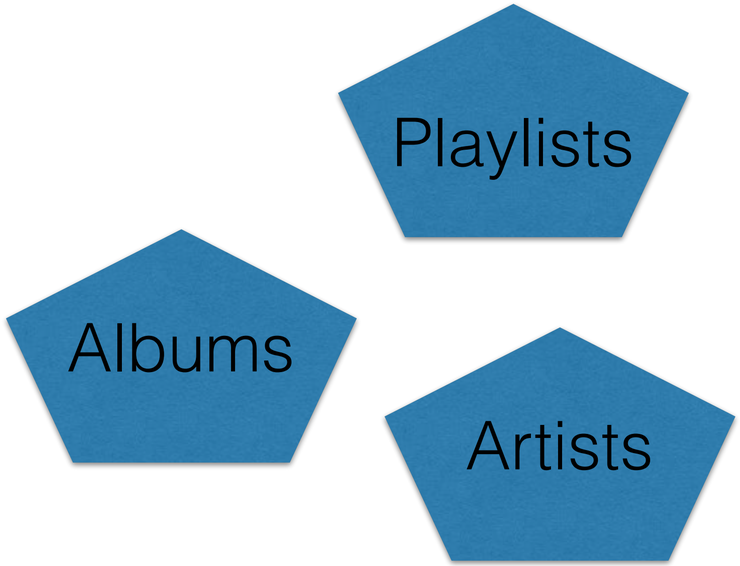

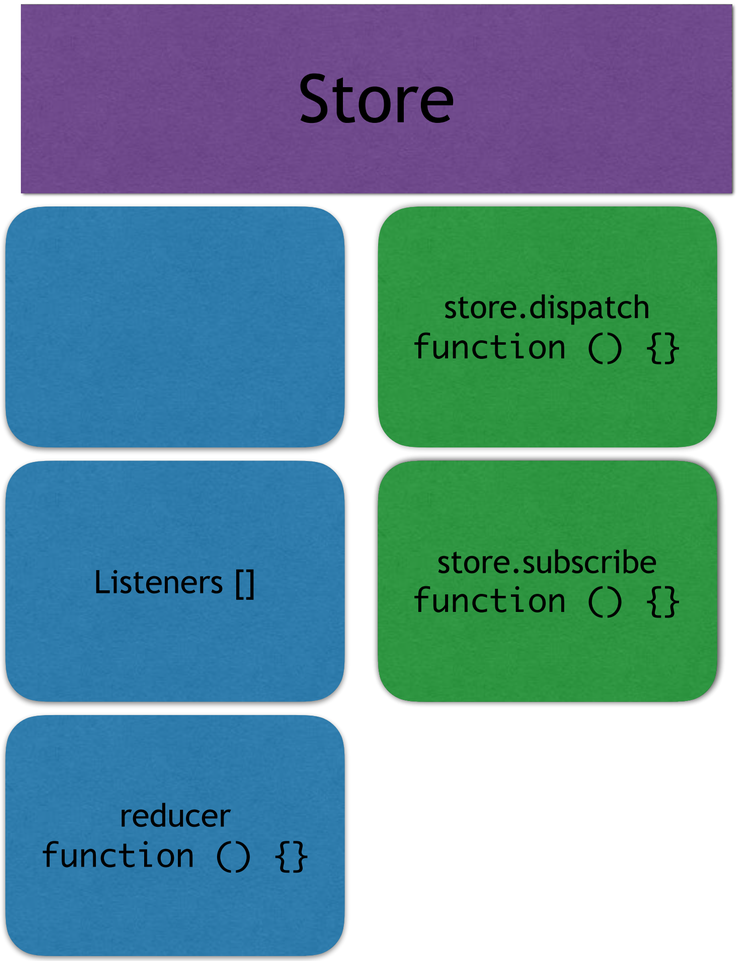

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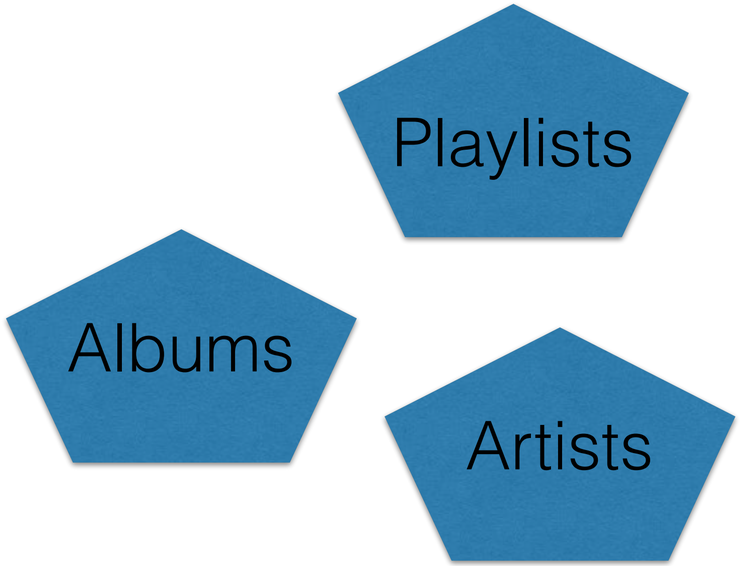

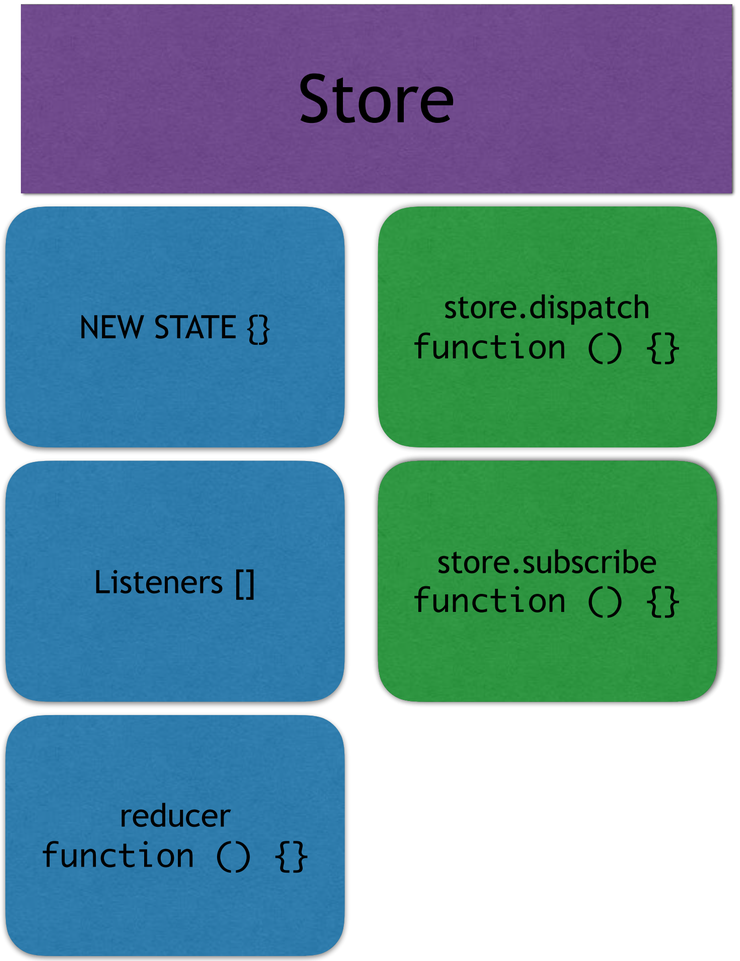

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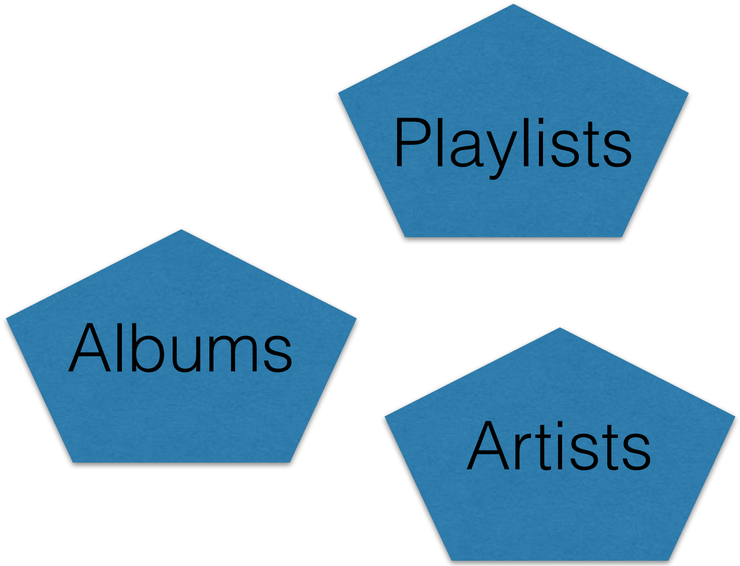
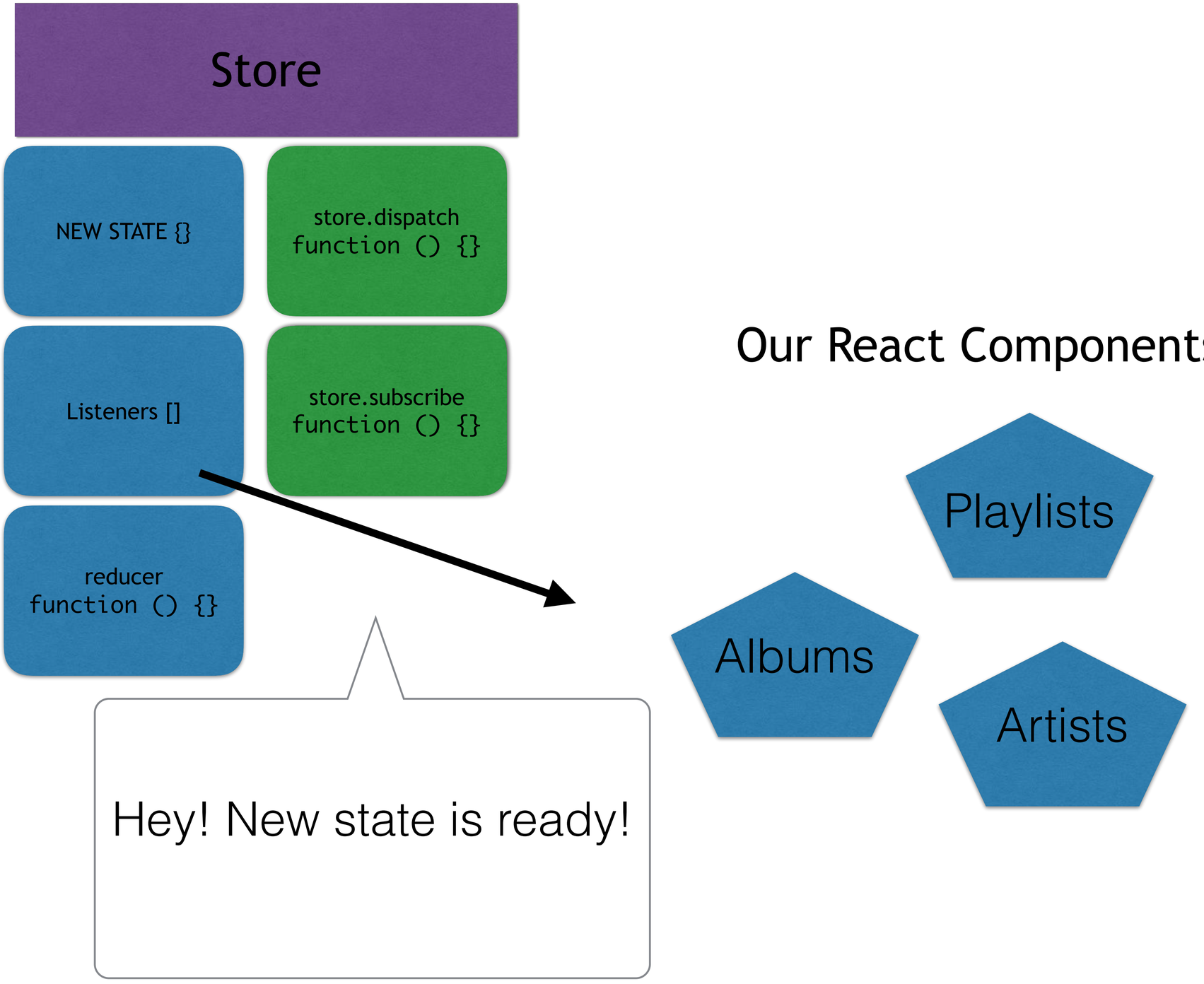
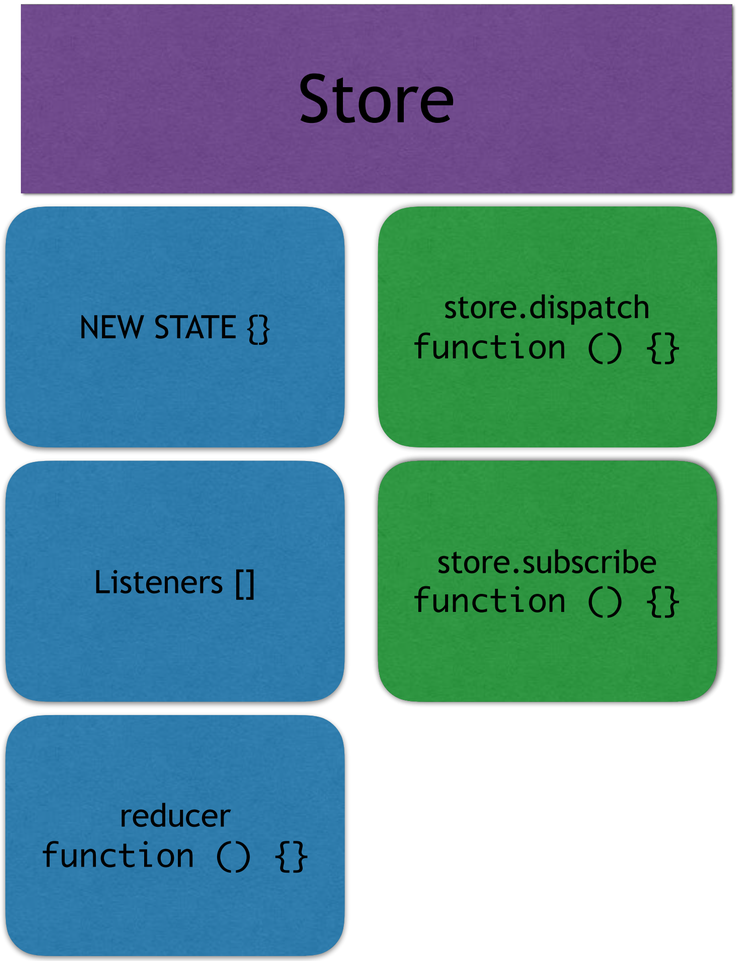



Store
NEW STATE {}
store.dispatch
function () {}
Listeners []
store.subscribe
function () {}
reducer
function () {}
Hey! New state is ready!
Our React Components
Playlists
Albums
Artists



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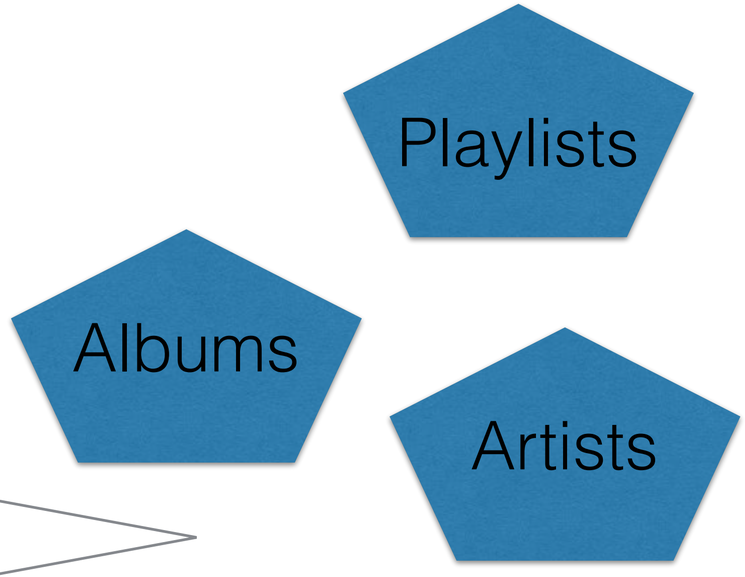
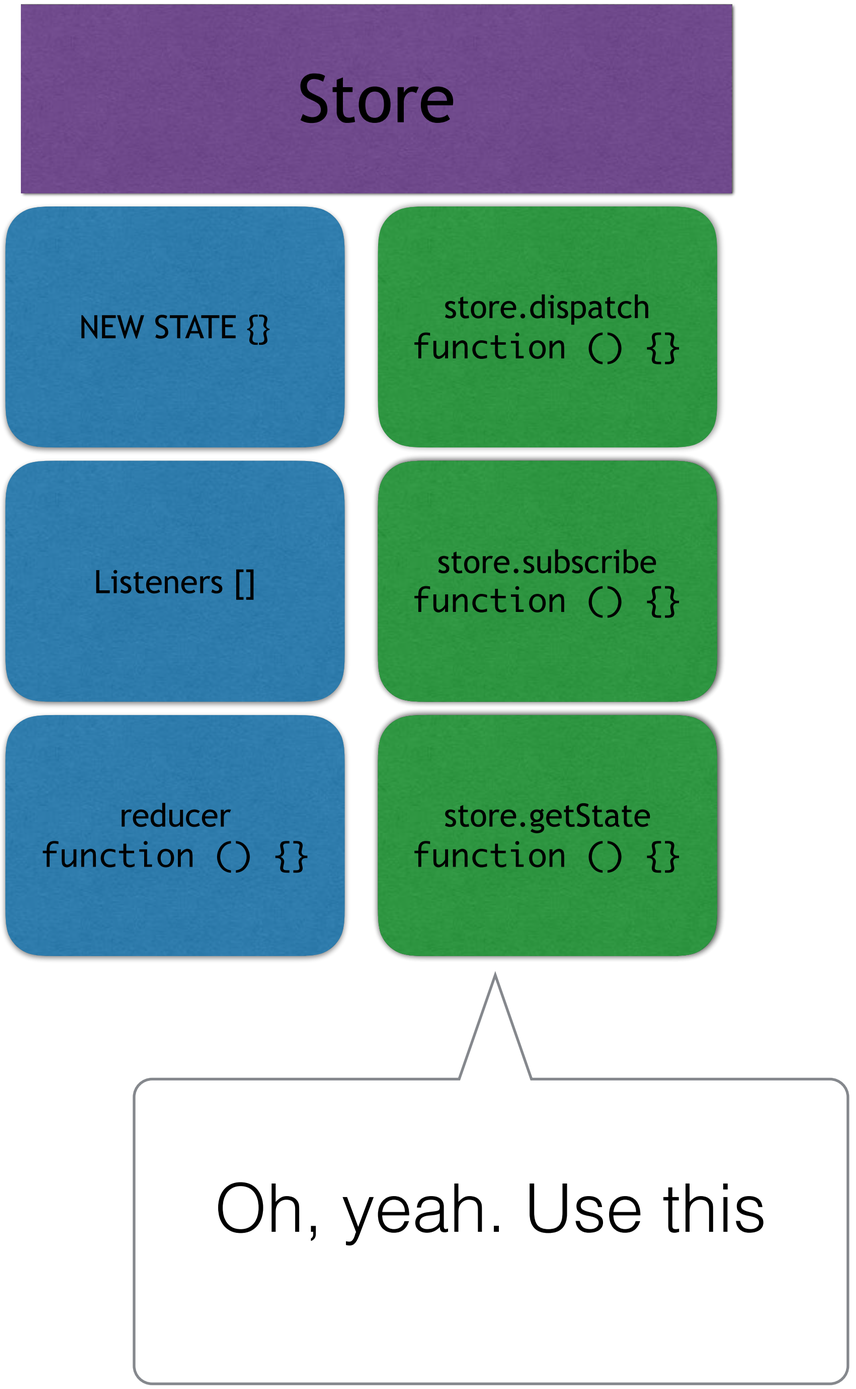


Cool! …can you give it to us?



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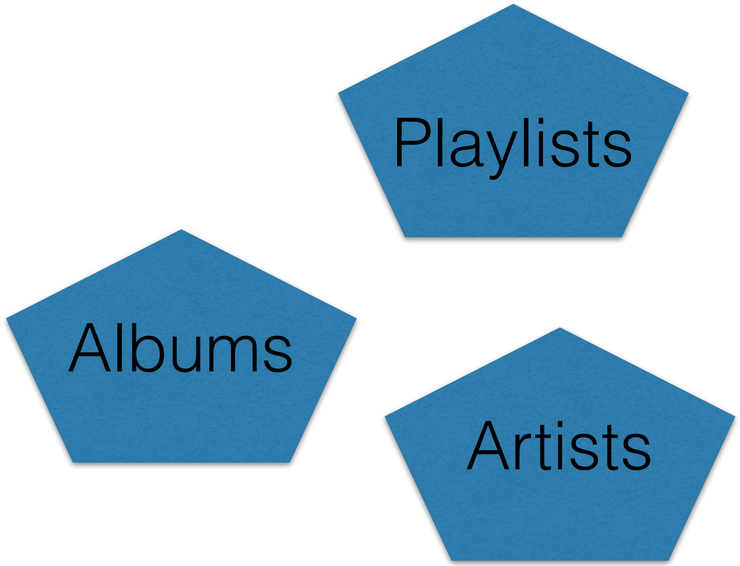

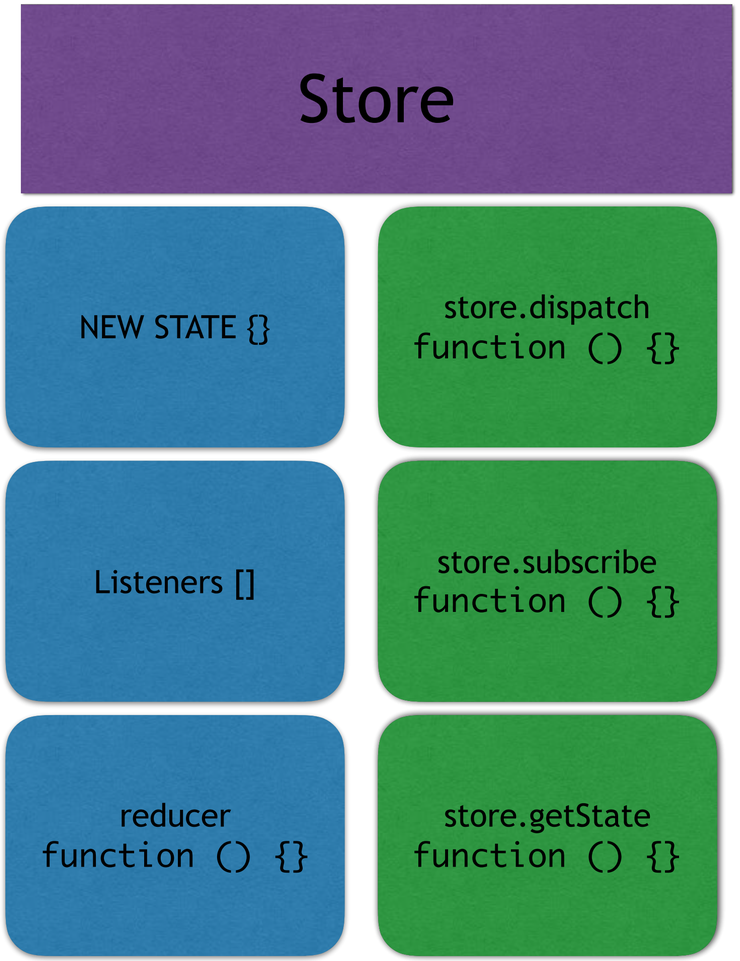

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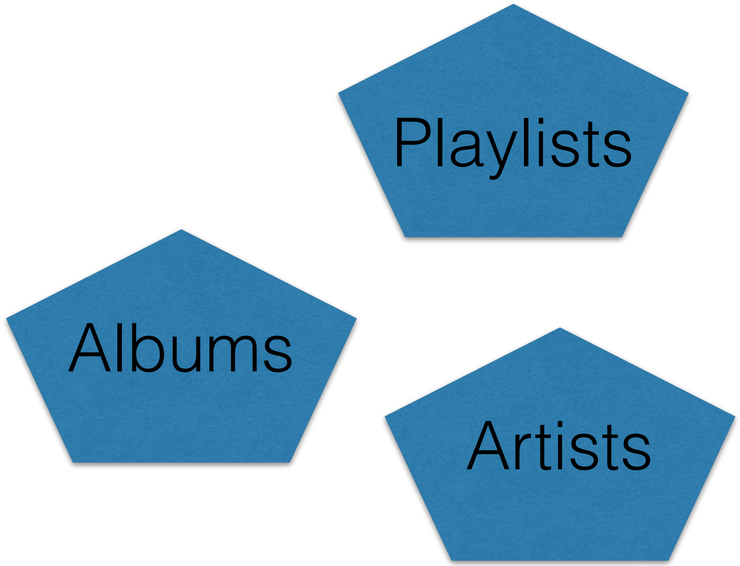
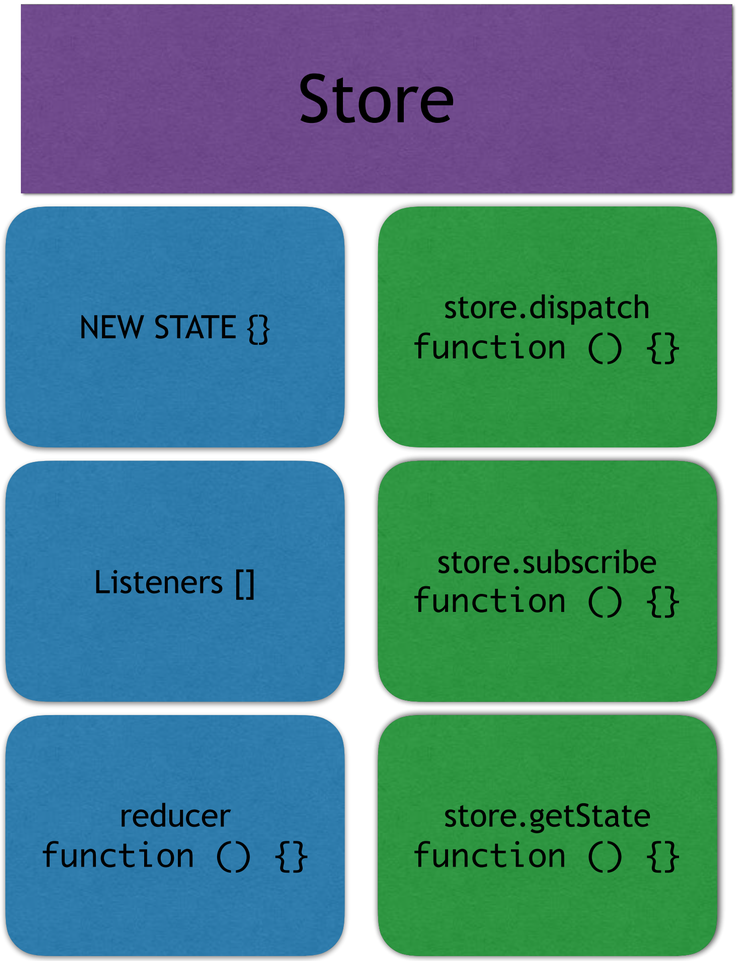
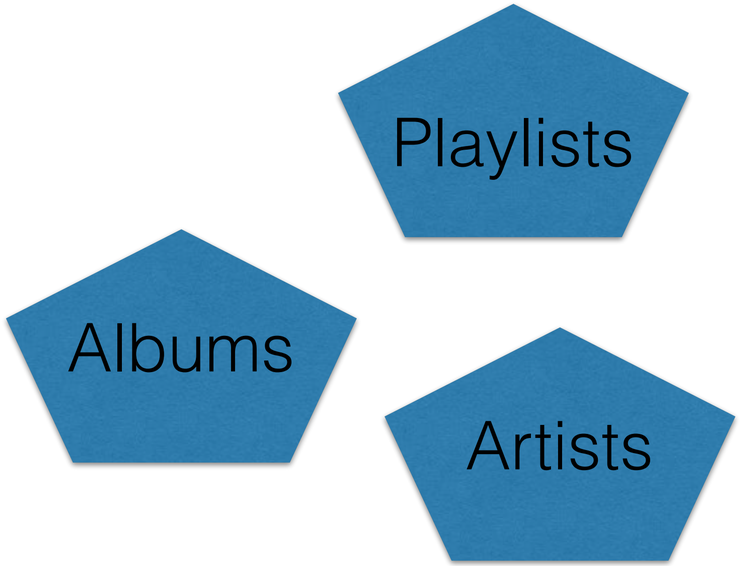


Re-render with new state!



Our React Components



Re-render with new state!

The Store

External Methods

Internal

The Store

External Methods

getState()

Internal

The Store

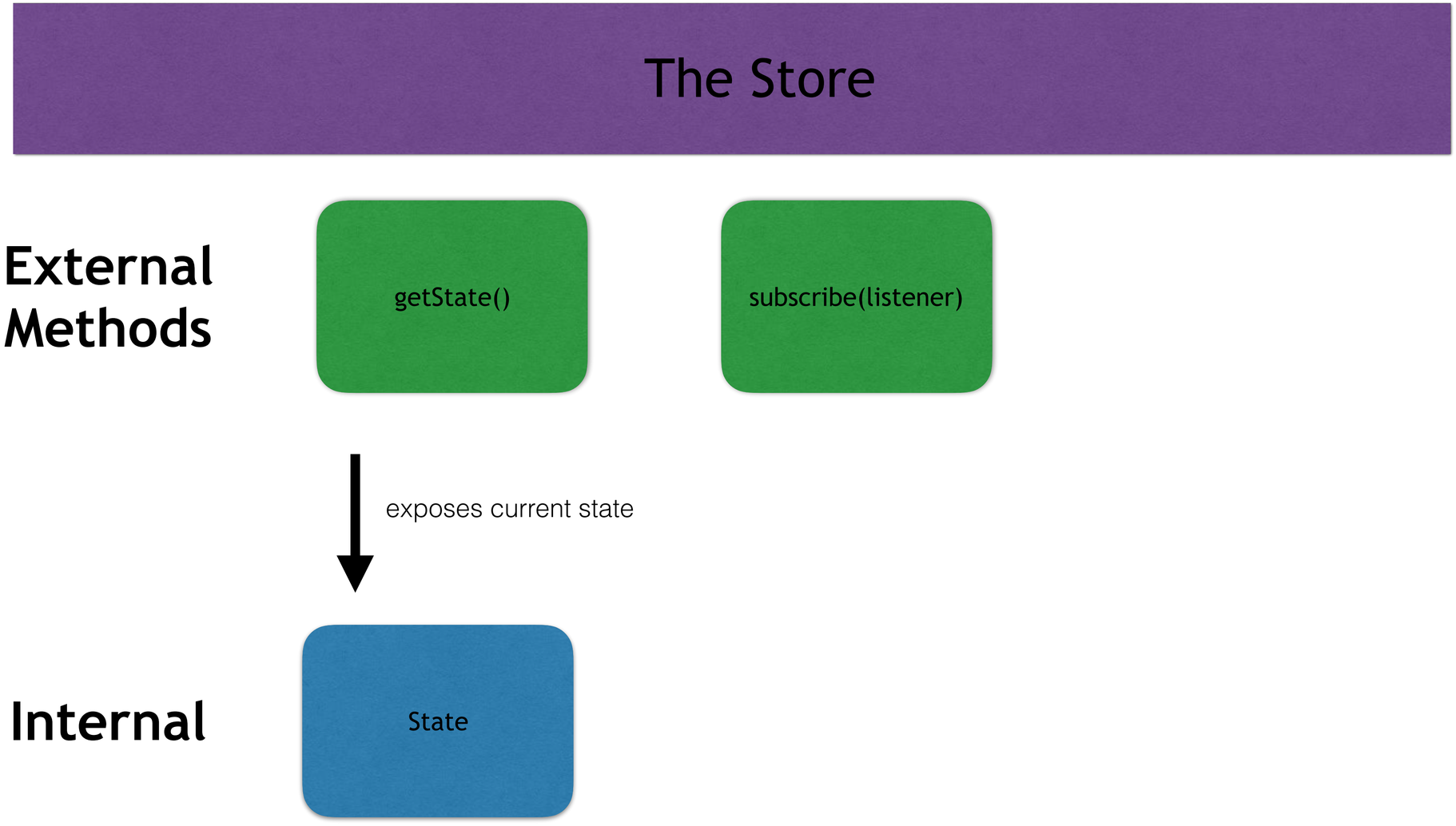
External Methods

getState()

exposes current state

Internal

State


The Store
External Methods
getState()
subscribe(listener)
exposes current state
Internal
State

The Store

External Methods

getState()

subscribe(listener)

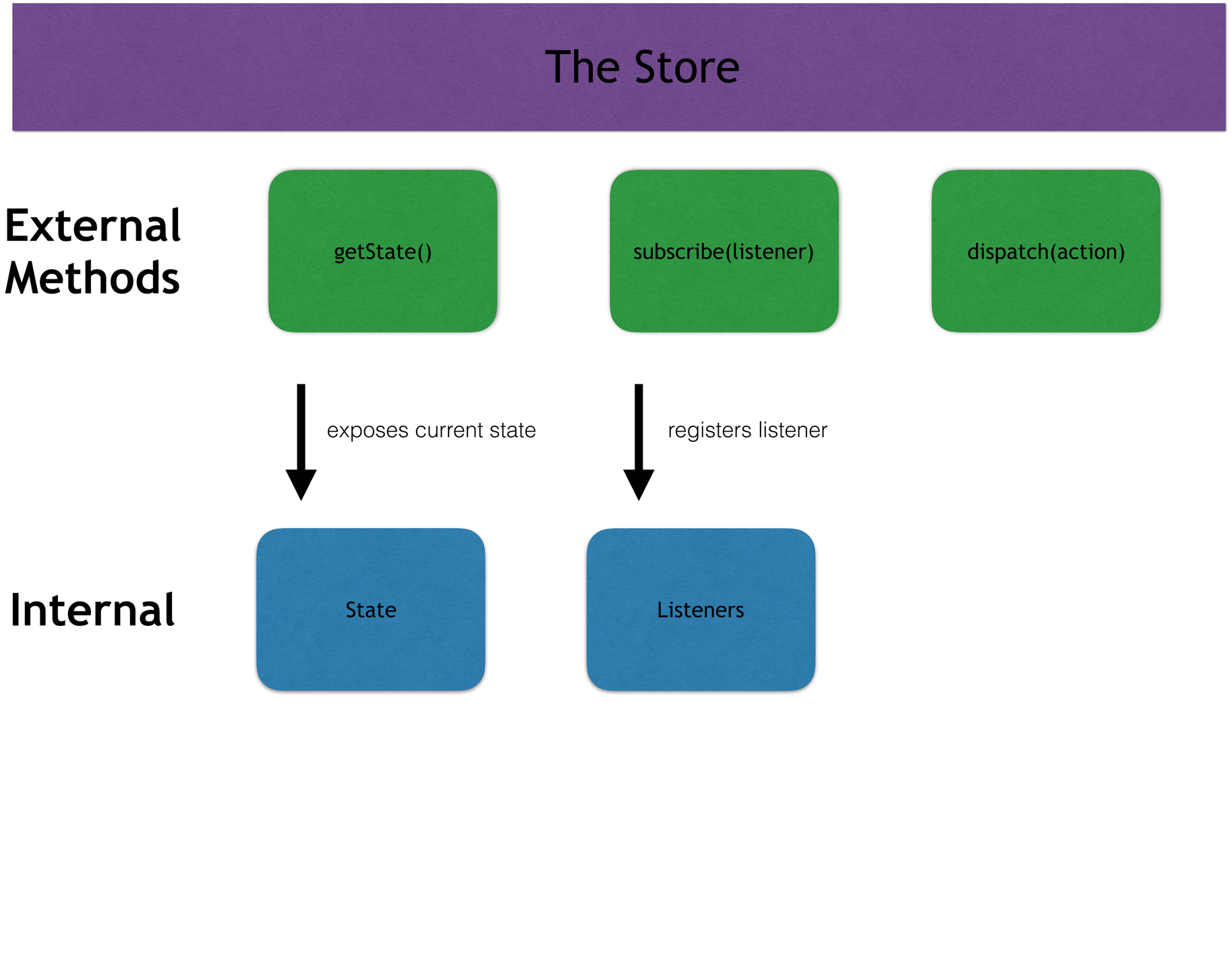
exposes current state

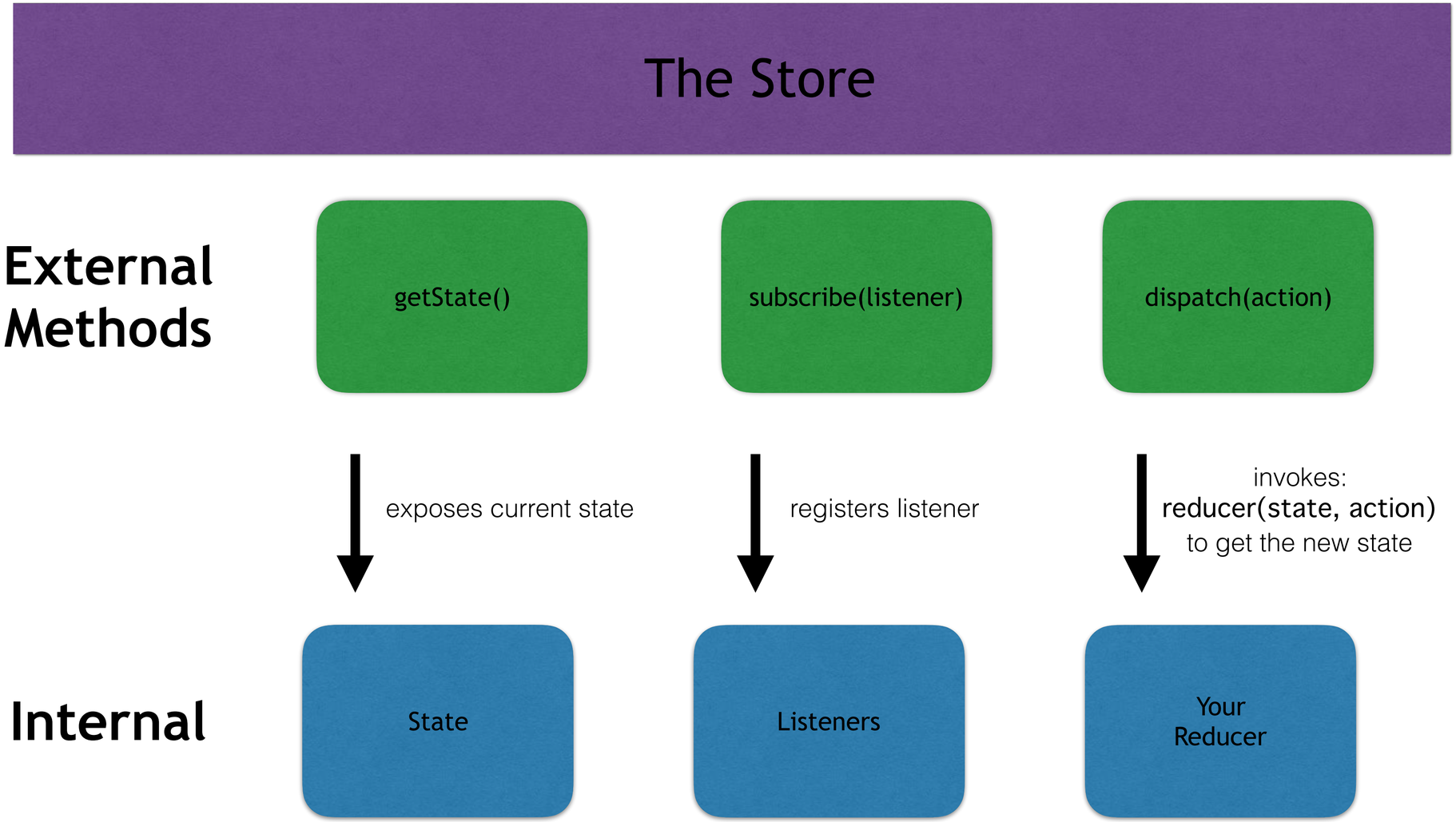
registers listener

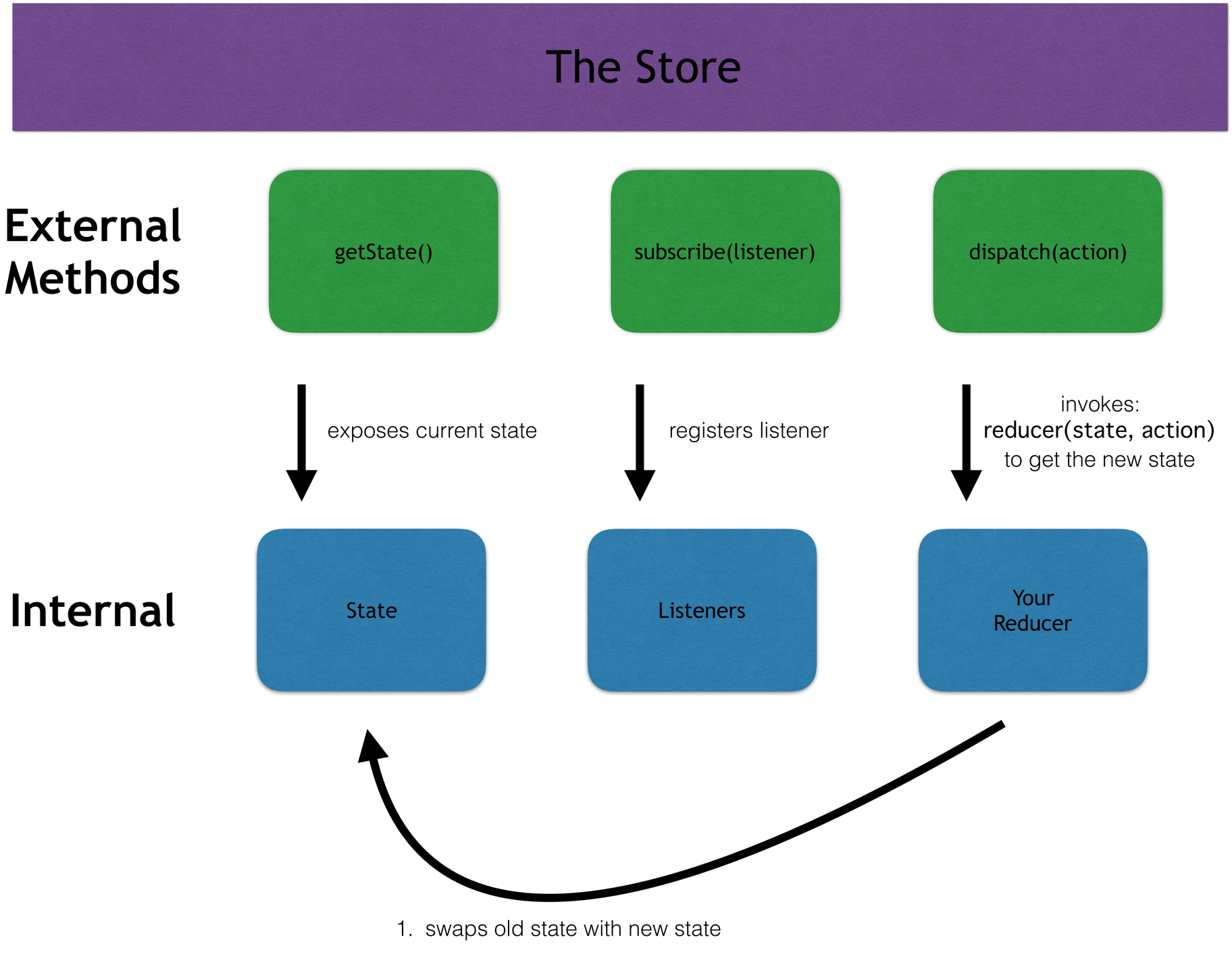
Internal

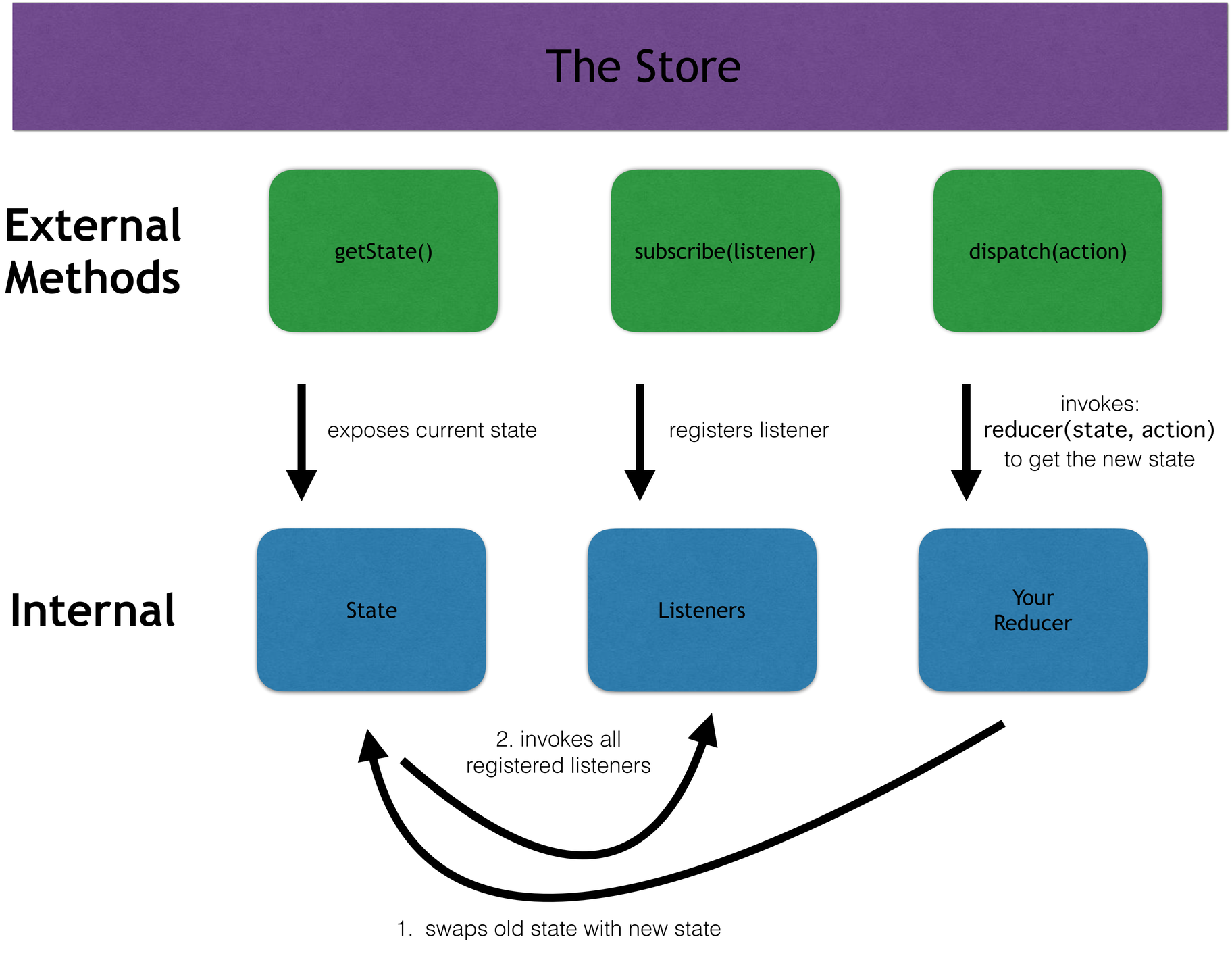
State

Listeners


The Store
External Methods
getState()
subscribe(listener)
dispatch(action)
exposes current state
registers listener
Internal
State
Listeners


The Store
External Methods
getState()
subscribe(listener)
dispatch(action)
exposes current state
registers listener
invokes:
reducer(state, action)
to get the new state
Internal
State
Listeners
Your Reducer


The Store
External Methods
getState()
subscribe(listener)
dispatch(action)
exposes current state
registers listener
invokes:
reducer(state, action)
to get the new state
Internal
State
Listeners
Your Reducer
1. swaps old state with new state


The Store
External Methods
getState()
subscribe(listener)
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exposes current state
registers listener
invokes:
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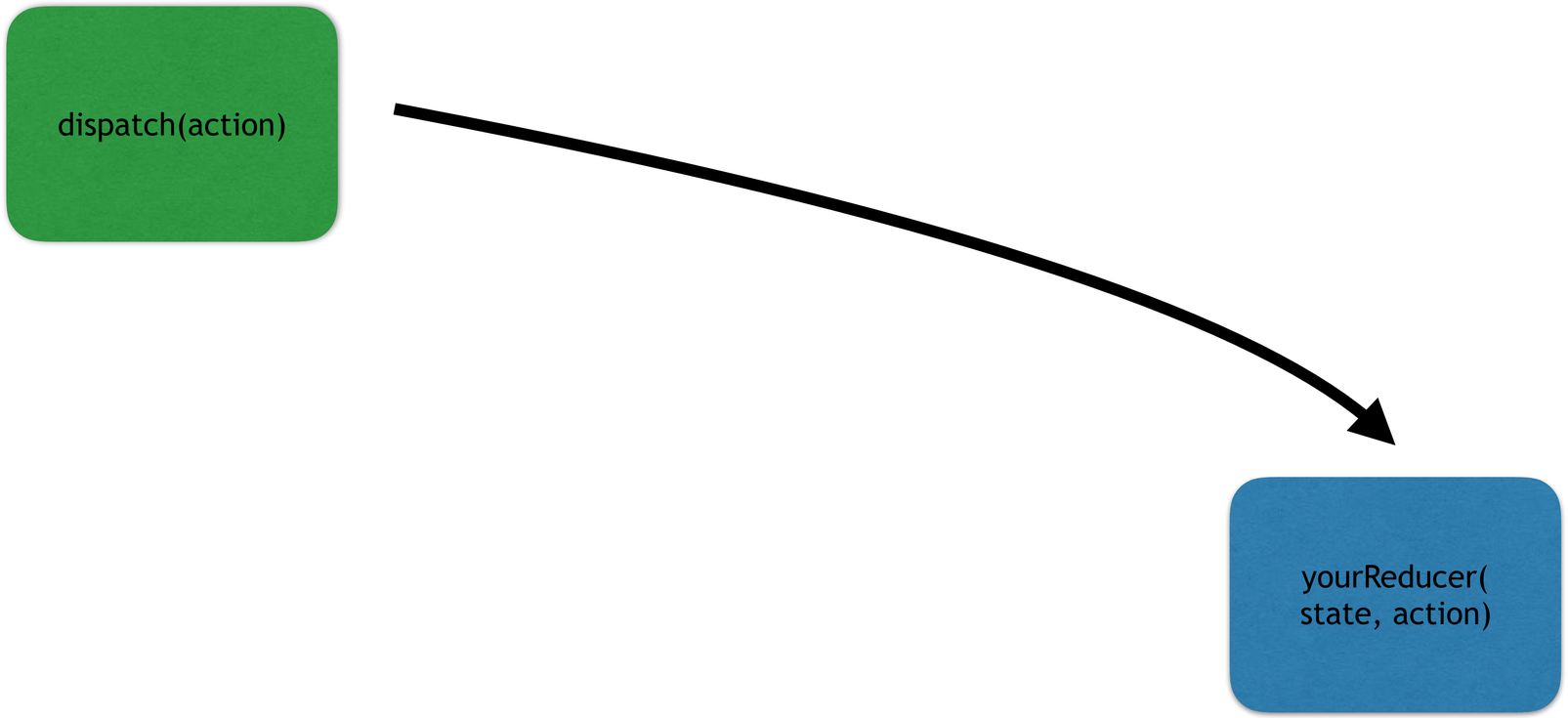
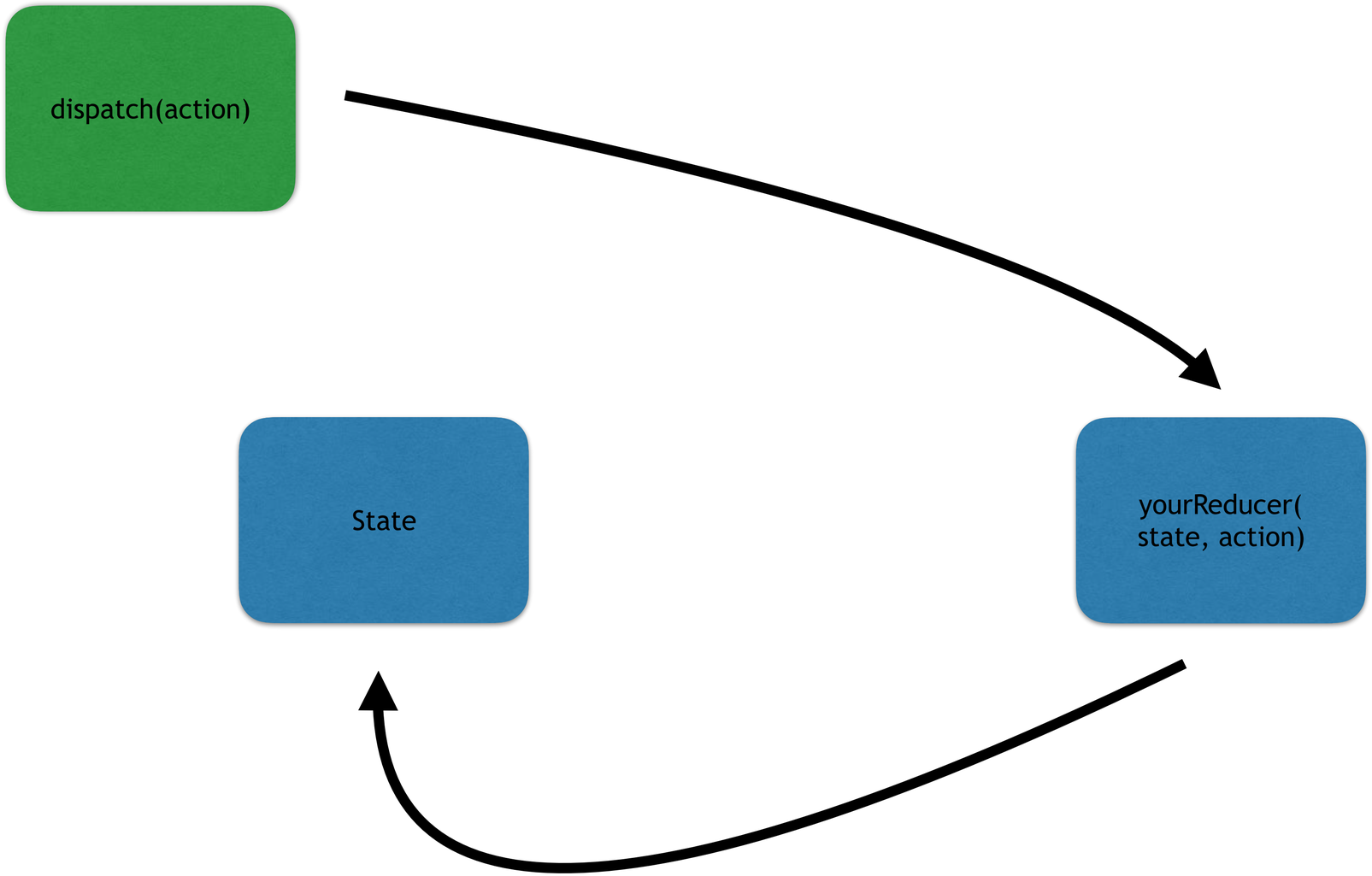
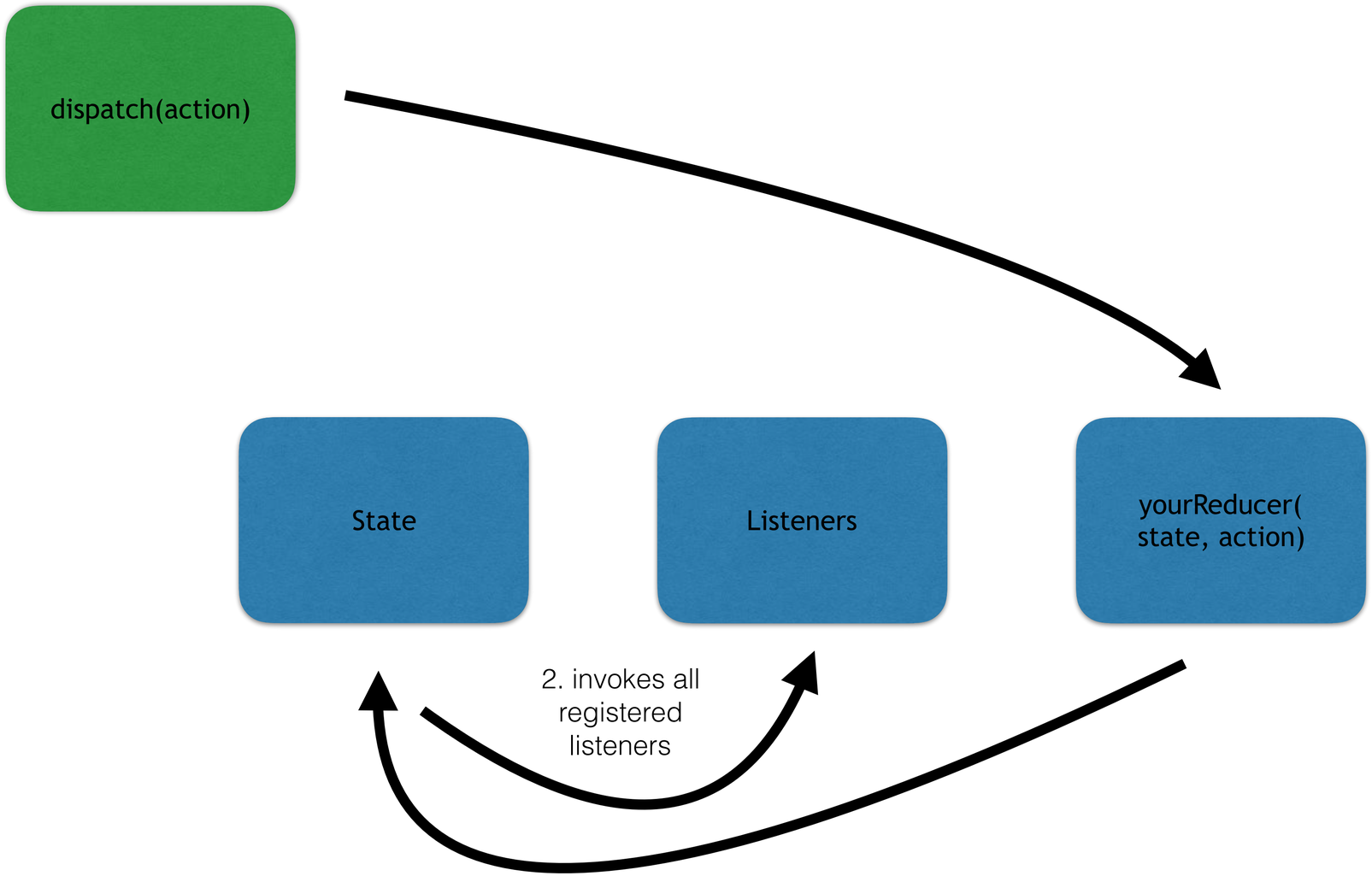
Internal
State
Listeners
Your Reducer
2. invokes all registered listeners
1. swaps old state with new state


dispatch(action)


dispatch(action)
yourReducer(
state, action)



1. swaps old state with new state


dispatch(action)
State
Listeners
yourReducer(
state, action)
2. invokes all
registered
listeners
1. swaps old state with new state