Redux без копипаста

#митап_за_чашкой_чая

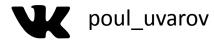




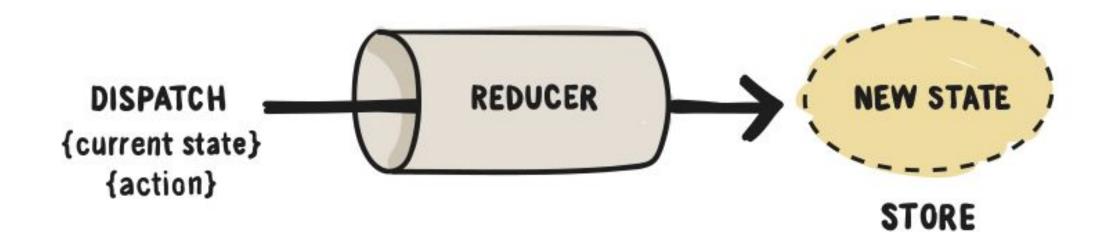
Pavel Uvarov, Software Engineer at Epam Ryazan

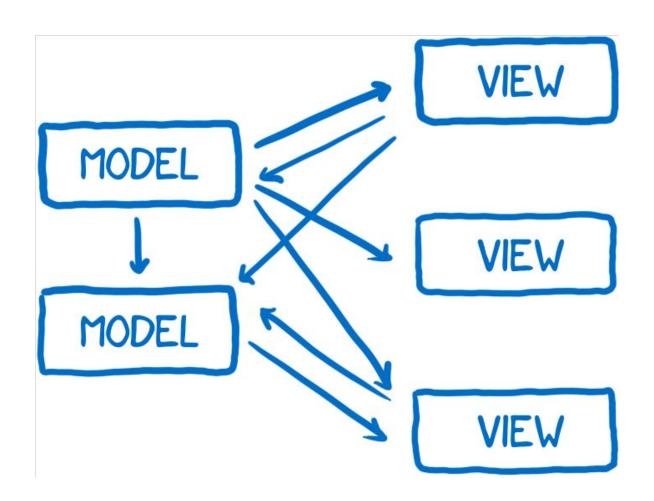
pavel_uvarov@epam.com





Redux is a predictable state container





What I like about Redux?

- Predictable state management
- Global state
- Immutability
- A lot of middleware
- Easy to use
- Easy to test
- Time traveling
- Dev tools
- Big community



What we don't like about Redux

- "Configuring a Redux store is too complicated"
- "I have to add a lot of packages to get Redux to do anything useful"
- "Redux requires too much boilerplate code"



Iframe React App

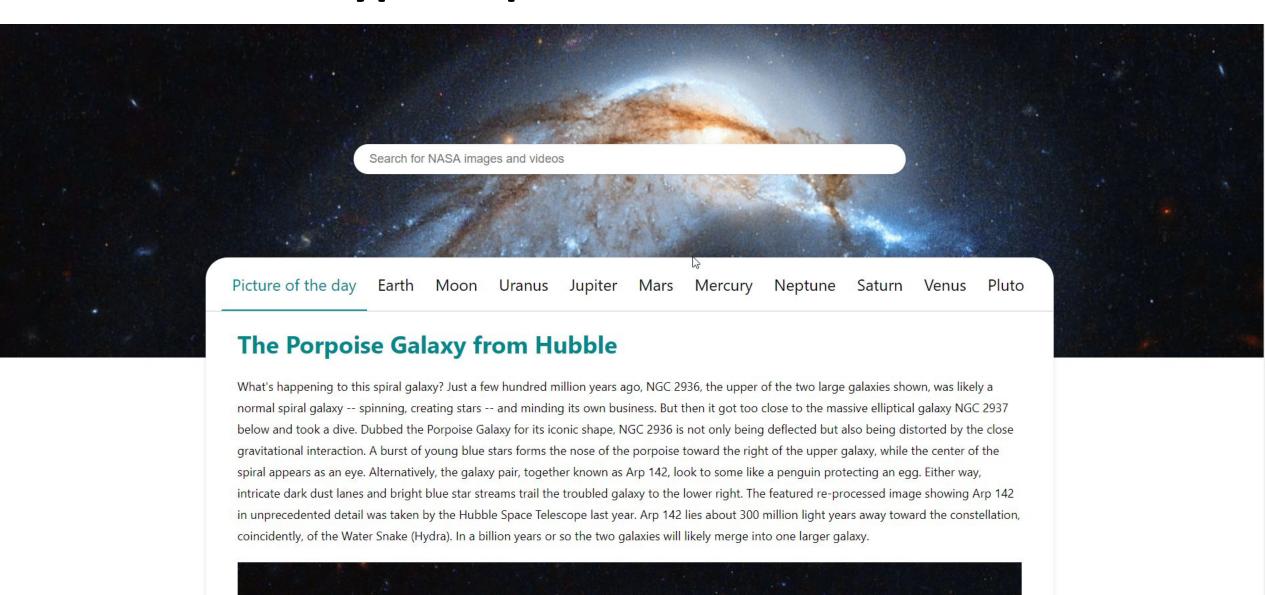
```
Post message
{
    type: "SHOW_SUPPORT_PAGE",
    payload: { ... }
}
```

This tool will change the way you work with Redux

- 2-3x less code
- Strictly typed out of the box
- Reducer and action creation all in one
- You won't hate Redux so much after

Special thanks to Yakov Zhmurov

React Redux Typescript + NASA API (nasa-app-react.netlify.app)





Too much boilerplate...

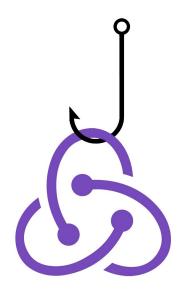
```
export const SEARCH_PAGE_NASA_REQUEST = 'SEARCH_PAGE_NASA_REQUEST';
export const SEARCH PAGE NASA SUCCESS = 'SEARCH PAGE NASA SUCCESS';
export const SEARCH PAGE NASA ERROR = 'SEARCH PAGE NASA ERROR';
export const SEARCH PAGE SET SEARCH = 'SEARCH PAGE SET SEARCH';
export const searchPageRequest = (): PageRequest ⇒ ({
    type: SEARCH_PAGE_NASA_REQUEST,
});
export const searchPageSuccess = ({ data }): PageSuccess ⇒ ({
    type: SEARCH PAGE NASA SUCCESS,
   payload: {
        data,
});
export const setSearch = ({ search }: { search: string }): SetSearch ⇒ ({
    type: SEARCH_PAGE_SET_SEARCH,
    payload: {
        search,
});
export const searchPageError = ({ error }): PageError ⇒ ({
    type: SEARCH PAGE NASA ERROR,
    payload: {
```

```
const getState = (state: AppState) ⇒ state.searchPage;
export const selectData = createSelector(getState, (state) ⇒ state.data);
export const selectSearch = createSelector(getState, (state) ⇒ state.search);
export const selectIsLoading = createSelector(
    getState,
    (state) ⇒ state.isLoading
);
```

```
const SearchReducer = (state = initState, action: ActionsTypes) ⇒ {
   switch (action.type) {
        case SEARCH_PAGE_NASA_REQUEST: {
            return {
                isLoading: true,
            };
        case SEARCH_PAGE_NASA_SUCCESS: {
            return {
                 ... state,
                isLoading: false,
                data: action.payload.data,
            };
        case SEARCH_PAGE_SET_SEARCH: {
            return {
                 ... state,
                isLoading: false,
                search: action.payload.search,
            };
        case SEARCH_PAGE_NASA_ERROR: {
            return {
                 ... state,
                isLoading: false,
                error: action.payload.error,
            };
        default:
            return state;
```

Less pain with React Redux Hooks

```
function SearchPage() {
    const dispatch = useDispatch();
    const data = useSelector(selectData);
    const search = useSelector(selectSearch);
   const searchDebounce = useDebounce(search);
    const isLoading = useSelector(selectIsLoading);
    const querySearch = useQuerySearch();
    useEffect(() \Rightarrow \{
        dispatch(fetchSearchData({ search: searchDebounce }));
    }, [dispatch, searchDebounce]);
    useEffect(() \Rightarrow \{
        if (!search & querySearch) {
            dispatch(setSearch({ search: querySearch }));
    }, []);
    return data?.items?.length | isLoading? (
        <CardGrid items={data?.items} isLoading={isLoading} />
        <Placeholder>No results found.</Placeholder>
    );
export default SearchPage;
```

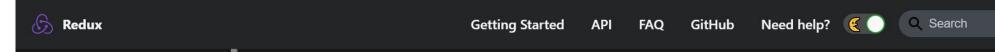


Even more with Typescript...

```
You, 18 days ago | 1 author (You)
interface PageRequest {
    type: typeof SEARCH_PAGE_NASA_REQUEST;
You, 18 days ago | 1 author (You)
interface PageSuccess {
    type: typeof SEARCH PAGE NASA SUCCESS;
    payload: {
         data: LibraryResponse;
    };
You, 18 days ago | 1 author (You)
interface SetSearch {
    type: typeof SEARCH_PAGE_SET_SEARCH;
    payload: {
         search: string;
    };
You, 18 days ago | 1 author (You)
interface PageError {
    type: typeof SEARCH_PAGE_NASA_ERROR;
    payload: {
         error: any;
    };
```

```
TS actions.ts
TS actionsCreators.ts
TS constants.ts
TS reducer.ts
TS selectors.ts
```





Introduction

Basic Tutorial

Advanced Tutorial

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Recipes

Recipes: Index

Configuring Your Store

Usage With TypeScript

Migrating to Redux

Using Object Spread Operator

Reducing Boilerplate

Server Rendering

Writing Tests

Computing Derived Data

Implementing Undo

Reducing Boilerplate

Redux is in part inspired by Flux, and the most common complaint about Flux is how it makes you write a lot of boilerplate. In this recipe, we will consider how Redux lets us choose how verbose we'd like our code to be, depending on personal style, team preferences, longer term maintainability, and so on.

Actions

Action Creators

Generating Action Creators

Async Action Creators

Reducers

Generating Reducers

#Actions

Actions are plain objects describing what happened in the app, and serve as the sole way to

describe an intention to mutate 1 dispatch is not boilerplate, but

There are frameworks claiming to terms of being predictable, this is plain object actions, it is impossil reloading with time travel. If you

```
const ADD_TODO = 'ADD_TODO'
const EDIT_TODO = 'EDIT_TODO'
const REMOVE_TODO = 'REMOVE_TODO'

export const addTodo = makeActionCreator(ADD_TODO, 'text')
export const editTodo = makeActionCreator(EDIT_TODO, 'id', 'text')
export const removeTodo = makeActionCreator(REMOVE_TODO, 'id')
```

There are also utility libraries to aid in generating action creators, such as redux-act and redux-actions. These can help reduce boilerplate code and enforce adherence to standards such as Flux Standard Action (FSA).

redux-act / redux-actions

```
export interface SearchPageSuccessPayload
    data: LibraryResponse;
You, 6 minutes ago | 1 author (You)
export interface SetSearchPayload {
    search: string;
You, 6 minutes ago | 1 author (You)
export interface SearchPageErrorPayload {
    error: string;
export const searchPageError = createAction<SearchPageErrorPayload>(
    'SEARCH PAGE NASA SUCCESS'
export const searchPageRequest = createAction('SEARCH PAGE NASA REQUEST');
export const searchPageSuccess = createAction<SearchPageSuccessPayload>(
    'SEARCH PAGE NASA ERROR'
export const setSearch = createAction<SetSearchPayload>(
    'SEARCH PAGE SET SEARCH'
```

```
const initState: SearchPageState = {
    data: null,
    isLoading: true,
    error: null,
    search: '',
export default handleActions<SearchPageState>(
        [searchPageRequest]: (state) \Rightarrow ({ ... state, isLoading: true }),
         [searchPageSuccess]: (state, payload: SearchPageSuccessPayload) ⇒ ({
             ... state, You, 10 minutes ago - Uncommitted changes
            data: payload.data,
         [searchPageError]: (state, payload: SearchPageErrorPayload) <math>\Rightarrow ({
             ... state,
            error: payload.error,
        }),
        [setSearch]: (state, payload: SetSearchPayload) ⇒ ({
             ... state,
            search: payload.search,
        }),
    initState
```

Solutions to reduce boilerplate

Search Page store (Typescript)

	Lines (with Prettier)	Symbols	Additional size (kB)
raw redux	152	3844	-
redux-act	99 (1,5x less)	2680 (1,4x less)	143
redux-actions	98 (1,5x less)	2695 (1,4x less)	84.5

Redux Toolkit (@reduxjs/toolkit)

createSlice - a function that accepts an initial state, an object full of reducer functions, and a "slice name", and automatically generates action creators and action types that correspond to the reducers and state.

```
function createSlice({
    // An object of "case reducers". Key names will be used to generate actions.
    reducers: Object<string, ReducerFunction | ReducerAndPrepareObject>
    // The initial state for the reducer
    initialState: any,
    // A name, used in action types
    name: string,
    // An additional object of "case reducers". Keys should be other action types.
    extraReducers?:
    | Object<string, ReducerFunction>
    | ((builder: ActionReducerMapBuilder<State>) => void)
})
```

@reduxjs/toolkit - createSlice

```
You, 2 minutes ago | 1 author (You)
export interface SearchPageSuccessPayload {
    data: LibraryResponse;
}

You, 2 minutes ago | 1 author (You)
export interface SetSearchPayload {
    search: string;
}

You, 2 minutes ago | 1 author (You)
export interface SearchPageErrorPayload {
    error: string;
}

type ReducerSlice<Payload = any> = CaseReducer<
    SearchPageState,
    PayloadAction<Payload>
>;
```

```
const loadRequest: ReducerSlice = (state) ⇒ ({
     ... state,
    isLoading: true,
});
const loadSuccess: ReducerSlice<SearchPageSuccessPayload> = (
    state.
    { payload }
) \Rightarrow (\{
     ... state,
    data: payload.data,
const loadError: ReducerSlice<SearchPageErrorPayload> = (
    { payload }
) \Rightarrow (\{
     ... state.
    error: payload.error,
});
const setSearch: ReducerSlice<SetSearchPayload> = (state, \{ payload \}) \Rightarrow (\{ (state, \{ payload \}) \})
     ... state,
    search: payload.search,
});
const { actions, reducer } = createSlice({
    initialState,
    name: 'SEARCH PAGE',
    reducers:
         loadRequest,
         loadSuccess,
        loadError,
        setSearch,
```

Solutions to reduce boilerplate

Search Page store (Typescript)

	Lines (with Prettier)	Symbols	Package size
raw redux	152	3844	_
redux-act	99 (1,5x less)	2680 (1,4x less)	143 kB
redux-actions	98 (1,5x less)	2695 (1,4x less)	84.5 kB
@reduxjs/toolkit	103 (1,5x less)	2311 (1,7x less)	1.36 MB

@reduxjs/toolkit - createSlice + createAsyncThunk

```
import { createAsyncThunk } from '@reduxjs/toolkit';

export const fetchSearchData = createAsyncThunk(
    'SEARCH_PAGE_DATA',
    async (search: string) \Rightarrow {
        const res = await Axios.get(`${API_URL}?q=${search}`);
        return res.data?.collection as LibraryResponse;
    }
);
```

dispatch(fetchSearchData('sun'))

```
const setSearch: ReducerSlice<SetSearchPayload> = (state, \{ payload \}) \Rightarrow (\{ payload \})
     ... state,
    search: payload.search,
});
const { actions, reducer } = createSlice({
     initialState,
    name: 'SEARCH PAGE',
    reducers: {
         setSearch,
    extraReducers: (builder) ⇒ {
         builder.addCase(fetchSearchData.pending, (state) ⇒ ({
             ... state,
             isLoading: false,
         }));
         builder.addCase(fetchSearchData.fulfilled, (state, action) ⇒ ({
              ... state,
             data: action.payload,
             isLoading: false,
         }));
         builder.addCase(fetchSearchData.rejected, (state, action) ⇒ ({
             ... state,
             error: action.payload,
             isLoading: false,
        }));
```

Redux Toolkit Type safety

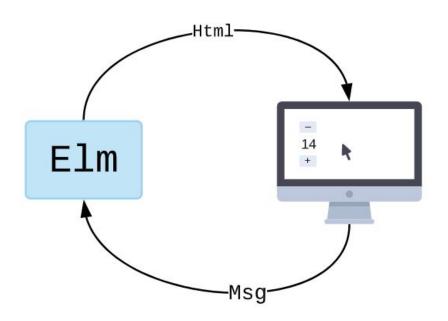
```
const usersSlice = createSlice({
 name: 'users',
 initialState,
 reducers: {
   // fill in primary logic here
 },
 extraReducers: builder => {
   builder.addCase(fetchUserById.pending, (state, action) => {
   })
```

Solutions to reduce boilerplate

Search Page store (Typescript)

	Lines (with Prettier)	Symbols	Package size
raw redux	152	3844	_
redux-act	99 (1,5x less)	2680 (1,4x less)	143 kB
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@reduxjs/toolkit	80 (1,9x less)	2189 (1,8x less)	1.36 MB

Elm is a functional language that compiles to JavaScript. It has a strong emphasis on simplicity and quality tooling.



State management with Elm

Password password ->

PasswordAgain password ->

{ model | passwordAgain = password }

```
type alias Model =
                                type Msg
  { name : String
                                 = Name String
  , password : String
                                  Password String
                                  | PasswordAgain String
  , passwordAgain : String
                                update : Msg -> Model -> Model
                                update msg model =
init : Model
                                  case msg of
init =
                                    Name name ->
  Model "" "" ""
                                     { model | name = name }
```

```
view : Model -> Html Msg
                                      view model =
                                        div []
                                          [ viewInput "text" "Name" model.name Name
                                          , viewInput "password" "Password" model.password Password
                                          , viewInput "password" "Re-enter Password" model.passwordAgain PasswordAgain
                                          , viewValidation model
                                      viewInput : String -> String -> String -> (String -> msg) -> Html msg
                                      viewInput t p v toMsg =
                                        input [ type_ t, placeholder p, value v, onInput toMsg ] []
{ model | password = password }
```

ELM:

update : Msg -> Model -> Model

JS:

const update = action => State => NewState

Wouldn't that be great....

```
const initialState = {
   name: ",
   password: "
const setName = ({ value }) => state => ({ ...state, name: value })
const setPassword = ({ value }) => state => ({ ...state, password : value
})
```

Wouldn't that be even greater....

```
const initialState = {
    name: ",
    password: "
}
const setName = ({ value }) => state => ({ ...state, name: value })
const setPassword = ({ value }) => state => ({ ...state, password : value })
```

Reducer

Action Creators

Types inference

Redux-blaze

```
import { buildReducer } from "redux-blaze";
import { combineReducers } from 'redux'

export const { actionCreators, reducer: filtersReducer } = buildReducer(initialState, {
    setMySearch: ({ search }) /* <- payload */ => state => ({ ...state, search }),
    setCategory: ({ category }) => state => ({ ...state, category }),
    setSort: ({ sort }) => state => ({ ...state, sort }),
}, {
    prefix: 'MY_FILTER',
});
```

```
// dispatch an action:
dispatch(actionCreators.setCategory({category: 'my category'}))
type: "MY_FILTER_SET_CATEGORY"
category: 'my category'
}
```

redux-blaze buildReducer

```
const { bind, actionCreators, reducer } = buildReducer(
   initialState,
   {
      loadRequest,
      loadSuccess,
      loadError,
   },
   { prefix }
);
```

- reducer ready to use autogenerated reducer
- actionCreators ready to use strictly typed actions
- bind return function for binding actions to dispatch

Easy to create High-order Reducers

```
const loadRequest: Reducer<{}> = () \Rightarrow (s) \Rightarrow ({ ... s, isLoading: true });
const loadSuccess: Reducer<{ data: TModel }> = ({ data }) \Rightarrow (s) \Rightarrow ({
                                          data,
                                        error: false,
});
const loadError: Reducer<\{ error: any \} > = (\{ error \}) \Rightarrow (s) \Rightarrow (\{ error \}) 
                                           error,
});
const { bind, actionCreators, reducer } = buildReducer(
                                             initialState,
                                                                                       loadRequest,
                                                                                       loadSuccess,
                                                                                         loadError,
                                                { prefix }
```

```
const fetchData = (... args) \Rightarrow async (dispatch) \Rightarrow {
   const { loadError, loadRequest, loadSuccess } = bind(dispatch);
   loadRequest({});
   try {
      const data = await fetcher(... args);
      loadSuccess({ data: mutate(data) });
   } catch (error) {
      loadError({ error });
   }
};
```

createReduxFetcher

```
import { API_URL } from './constants';
import { createReduxFetcher } from '../createReduxFetcher';
import { LibraryResponse } from '../../models';
import Axios from 'axios';

export const EarthFetcher = createReduxFetcher<LibraryResponse>({
    fetcher: () \Rightarrow Axios.get(API_URL),
    getState: (state) \Rightarrow state.earthPage,
    mutate: (res) \Rightarrow res.data?.collection,
    prefix: 'EARTH_PAGE',
}); You, 18 days ago - add redux-blaze

export default EarthFetcher.reducer;
```

```
import React from 'react';
import CardGrid from '../../components/ImagesGrid';
import { EarthFetcher } from '../../store/EarthPage/reducer';

function EarthPage() {
   const { data, isLoading } = EarthFetcher.useData();

   return <CardGrid items={data?.items} isLoading={isLoading} />;
}

export default EarthPage;
```

react-redux-blaze - createReduxFetcher

```
export const JupiterFetcher = createReduxFetcher<LibraryResponse>({
    fetcher: () \Rightarrow Axios.get(API_URL),
        getState: (state) \Rightarrow state.jupiterPage,
        mutate: (res) \Rightarrow res.data?.collection,
        prefix: 'JUPITER_PAGE',
});
```

```
function JupiterPage() {
    const { data, isLoading } = JupiterFetcher.useData();

    return <CardGrid items={data?.items} isLoading={isLoading} />;
}
```

- All data keeps in redux global store
- Strictly typed
- Autogenerated reducer
- Handles loading and error states
- **useData** hook
- Built in data selector
- Prefetching data

Another example "Earth page"

Search for INASA images and videos Picture of the day Earth Moon Uranus Jupiter Mars Mercury Neptune Saturn Venus Pluto A Waterspout in Florida What's happening over the water? Pictured here is one of the better images yet recorded of a waterspout, a type of tornado that occurs over water. Waterspouts are spinning columns of rising moist air that typically form over warm water. Waterspouts can be as dangerous as tornadoes and can feature wind speeds over 200 kilometers per hour. Some waterspouts form away from thunderstorms and even during relatively fair weather. Waterspouts may be relatively transparent and initially visible only by an unusual pattern they create on the water. The featured image was taken in 2013 July near Tampa Bay, Florida. The Atlantic Ocean off the coast of Florida is arguably the most active area in the world for waterspouts, with hundreds forming each year. Experts Debate: How will humanity first discover extraterrestrial life?

```
import axios from 'axios';
import {
                                                                    const initState: EarthPageState = {
    earthPageError,
   earthPageRequest,
                                                                        data: null,
   earthPageSuccess,
                                                                        isLoading: true,
  from './actionsCreators';
                                                                        error: null,
import { API URL } from './constants';
                                                                    const EarthReducer = (state = initState, action: ActionsTypes) ⇒ {
export const fetchEarthData = () \Rightarrow async (dispatch) \Rightarrow {
                                                                        switch (action.type) {
    dispatch(earthPageRequest());
                                                              Reque
                                                                            case EARTH PAGE NASA REQUEST: {
    try {
       const res = await axios.get(API URL);
                                                                                return {
       dispatch(earthPageSuccess({ data: res.data?.collection }));
                                                                                     ... state,
    } catch (error) {
                                                                                     isLoading: true,
       earthPageError({ error });
                                                              }): P
                                                                                };
                                                                            case EARTH_PAGE_NASA_SUCCESS: {
                            data,
                                                                                return {
                         },
                                                                                     ... state,
                                                                                     isLoading: false,
           You, 24 da
                                                                                    data: action.payload.data,
           interfa
                    export const earthPageError = ({ error }): Pa
                                                                                };
                tyr
                        type: EARTH_PAGE_NASA_ERROR,
                pay
                        payload: {
                                                                            case EARTH_PAGE_NASA_ERROR: {
                            error,
                                                                                return {
                };
                        },
                                                                                     ... state,
                    });
                                                                                     icloading: falco
                                                        const getState = (state: AppState) ⇒ state.earthPage;
                    export type ActionsTypes = PageRe
                                                        export const selectData = createSelector(getState, (state) ⇒ state.data);
export const EARTH PAGE NASA REQUEST = 'EARTH PA
export const EARTH_PAGE_NASA_SUCCESS = 'EARTH_PA export const selectIsLoading = createSelector(
                                                             getState,
export const EARTH PAGE NASA ERROR = 'EARTH PAGE
                                                             (state) \Rightarrow state.isLoading
```

Redux-blaze

```
export const SearchFetcher = createReduxFetcher<LibraryResponse>({
    fetcher: (search) ⇒ Axios.get(`${API URL}?q=${search}`),
    getState: (state) ⇒ state.searchPage.model,
    mutate: (res) ⇒ res?.data?.collection,
    prefix: 'SEARCH PAGE',
});
const SearchFiltersInitialState: SearchFiltersState = {
    search: ''.
};
const setSearch = (a: { search: string }) \Rightarrow (s): SearchFiltersState \Rightarrow ({
   search: a.search,
});
const clearSearch = () ⇒ setSearch({ search: '' });
export const SearchPageFilters = buildReducer(
   SearchFiltersInitialState,
        setSearch,
        clearSearch,
     prefix: 'SEARCH PAGE FILTERS' }
export default combineReducers({
    filters: SearchPageFilters.reducer,
   model: SearchFetcher.reducer,
```

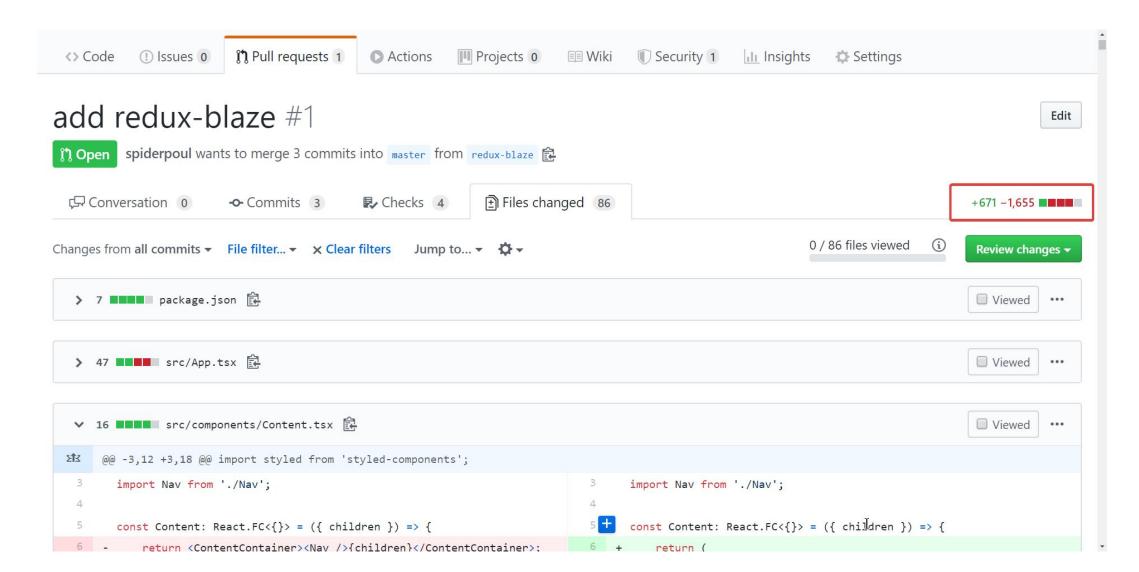
```
function SearchPage() {
    const dispatch = useDispatch();
    const search = useSelector(selectSearch);
    const searchDebounce = useDebounce(search);
    const querySearch = useQuerySearch();
    const { setSearch } = SearchPageFilters.bind(dispatch);
    const { data, isLoading } = SearchFetcher.useData(searchDebounce);
    useEffect(() \Rightarrow \{
        if (!search & querySearch) {
            dispatch(setSearch({ search: guerySearch }));
    }, []);
    return data?.items?.length | isLoading? (
        <CardGrid items={data?.items?.slice(0, 10)} isLoading={isLoading} />
        <Placeholder>No results found.</Placeholder>
    );
```

Solutions to reduce boilerplate

Search Page store (Typescript)

	Lines (with Prettier)	Symbols	Package size
raw redux	152	3844	-
redux-act	99 (1,5x less)	2680 (1,4x less)	143 kB
redux-actions	98 (1,5x less)	2695 (1,4x less)	84.5 kB
@reduxjs/toolkit	80 (1,9x less)	2189 (1,8x less)	1.36 MB
redux-blaze	43 (3,5x less)	1309 (2.9x less)	22 kB

After refactoring with redux-blaze



createSlice vs redux-blaze

Pros:

- Customization

Cons:

- Overcomplicated typing for TS
- Poor type inference
- Complicated configs
- Read a lot of documentation before use

Redux-blaze

- Easy to understand and use
- Easy to use with Typescript
- Intellisense works even with plain JS!
- 2-3x less code
- Strictly typed out of the box
- Light-weight!



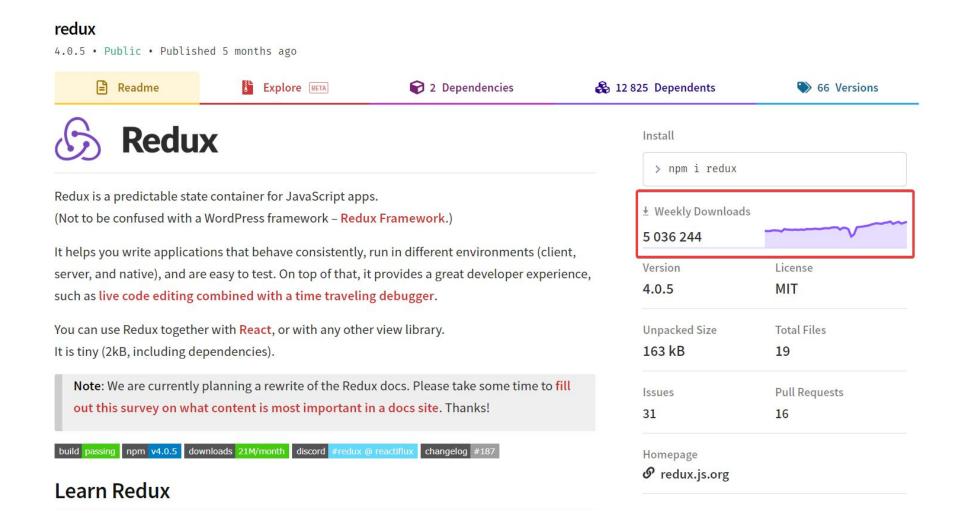


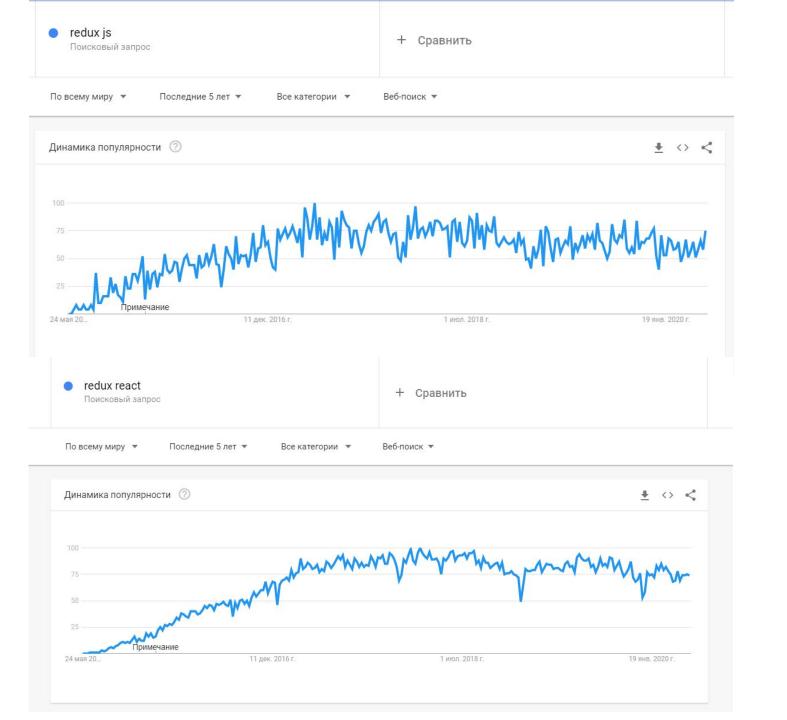
```
nst initState: EarthPageState = {
import {
    earthPageError,
                                                                             ): PageRequ };
   earthPageRequest,
                                                                                          const EarthReducer = (state = initState, action: ActionsTypes) ⇒ {
   earthPageSuccess,
 from './actionsCreators';
                                                                                                case EARTH PAGE NASA REQUEST: {
import { API URL } from './constants';
                                                                                                case EARTH_PAGE_NASA_SUCCESS: {
    dispatch(earthPageRequest());
        const res = await axios.get(API URL);
        dispatch(earthPageSuccess({ data: res.data?.collection })); error }): P.
                                                                                                case EARTH_PAGE_NASA_ERROR: {
    } catch (error) {
        earthPageError({ error });
                                                                                         const getState = (state: AppState) ⇒ state.earthPage;
                                                                                         export const selectData = createSelector(getState, (state) ⇒ state.da
                                                                                         export const selectIsLoading = createSelector(
                                        export type ActionsTypes = PageRequest | Pa
                    error: any;
```

```
export const SearchFetcher = createReduxFetcher<LibraryResponse>({
    fetcher: (search) \Rightarrow Axios.get(`${API_URL}?q=${search}`),
    getState: (state) \Rightarrow state.searchPage.model,
    mutate: (res) \Rightarrow res?.data?.collection,
    prefix: 'SEARCH_PAGE',
});
```

```
export const SearchPageFilters = buildReducer(
    SearchFiltersInitialState,
    {
        setSearch,
        clearSearch,
        },
        { prefix: 'SEARCH_PAGE_FILTERS' }
);
```

Is Redux alive?





Should we use Redux in 2020 for React Apps?

I'd use Redux (with redux-blaze) for:

- complex apps (a lot of forms, filters and etc.) and teams more 4-5 members
- Instead of multiple React Contexts

If no reason for Redux:

- React Hooks
- Hooks for Fetching (SWR, React Query)

redux-blaze

https://github.com/spiderpoul/redux-blaze

https://github.com/spiderpoul/react-redux-blaze

Nasa App

https://nasa-app-react.netlify.app/

https://github.com/spiderpoul/nasa-app-react/tree/redux-blaze

https://github.com/spiderpoul/nasa-app-react/tree/redux

https://github.com/zeit/swr

https://github.com/tannerlinsley/react-query

Спасибо за внимание!

