

# Core Redux API

## Installing Redux

The `redux` package is added to a project by first installing it with `npm`.

Some of the resources imported from `redux` are:

```
createStore  
  
combineReducers
```

```
npm install redux
```

## Create the Redux Store

The `createStore()` helper function creates and returns a Redux `store` object that holds and manages the complete state tree of your app. The only required argument is a reducer function, which is called every time an action is dispatched.

The `store` object returned has three key methods that ensure that all interactions with the application state are executed through the `store`:

```
store.getState()  
  
store.dispatch(action)  
  
store.subscribe(listener)
```

```
const initialState = 0;  
const countUpReducer = (  
  state = initialState,  
  action  
) => {  
  switch (action.type) {  
    case 'increment':  
      return state += 1;  
    default:  
      return state;  
  }  
};  
  
const store  
= createStore(countUpReducer);
```

## The `getState()` Method

The `getState()` method of a Redux `store` returns the current state tree of your application. It is equal to the last value returned by the `store`'s reducer.

In the one-way data flow model (store → view → action → store), `getState` is the only way for the view to access the store's state.

The state value returned by `getState()` should not be modified directly.

```
const initialState = 0;
const countUpReducer = (
  state = initialState,
  action
) => {
  switch (action.type) {
    case 'increment':
      return state += 1;
    default:
      return state;
  }
};

const store
= createStore(countUpReducer);

console.log(store.getState());
// Output: 0
```

## The `dispatch()` Method

The `dispatch(action)` method of a Redux `store` is the only way to trigger a state change. It accepts a single argument, `action`, which must be an object with a `type` property describing the change to be made. The `action` object may also contain additional data to pass to the reducer, conventionally stored in a property called `payload`.

Upon receiving the `action` object via `dispatch()`, the store's reducer function will be called with the current value of `getState()` and the `action` object.

```
const initialState = 0;
const countUpReducer = (
  state = initialState,
  action
) => {
  switch (action.type) {
    case 'increment':
      return state += 1;
    case 'incrementBy':
      return state += action.payload;
    default:
      return state;
  }
};

const store
= createStore(countUpReducer);

store.dispatch({ type: 'increment' });
// state is now 1.

store.dispatch({ type: 'incrementBy'
                  payload: 3 });
// state is now 4.
```

## The subscribe() Method

The `subscribe(listener)` method of a Redux `store` adds a callback function to a list of callbacks maintained by the `store`. When the `store`'s state changes, all of the *listener* callbacks are executed. A function that unsubscribes the provided callback is returned from `subscribe(listener)`.

Often, `store.getState()` is called inside the subscribed callback to read the current state tree.

## Action Creators

An *action creator* is a function that returns an action, an object with a `type` property and an optional `payload` property. They help ensure consistency and readability when supplying an action object to `store.dispatch()`, particularly when a `payload` is included.

```
const printCurrentState = () => {
  const state = store.getState()
  console.log(`state: ${state}`);
}

store.subscribe(printCurrentState);
```

```
// Creates an action with no payload.
const clearTodos = () => {
  return { type: 'clearTodos' };
}

store.dispatch(clearTodos());
```

```
// Creates an action with a payload.
const addTodo = todo => {
  return {
    type: 'addTodo',
    payload: {
      text: todo
      completed: false
    }
  }
};

store.dispatch(addTodo('Sleep'));
```

## Slices

A *slice* is the portion of Redux code that relates to a specific set of data and actions within the `store`'s state.

A *slice reducer* is the reducer responsible for handling actions and updating the data for a given slice. This allows for smaller reducer functions that focus on a slice of state.

Often, the actions and reducers that correspond to the same slice of the state are grouped together into a single file.

```
/*
This state has two slices:
1) state.todos
2) state.filter
*/
const state = {
  todos: [
    {
      text: 'Learn React',
      completed: true
    },
    {
      text: 'Learn Redux',
      completed: false
    },
  ],
  filter: 'SHOW_COMPLETED'
}

/*
This slice reducer handles only
the state.todos slice of state.
*/
const initialTodosState = [];
const todosReducers = (
  state=initialTodosState,
  action
) => {
  switch (action.type) {
    case 'todos/clearTodos':
      return [];
    case 'todos/addTodo':
      return [...state, action.payload];
    default:
      return state;
  }
};
```

## The `combineReducers()` Function

The `combineReducers()` helper function accepts an object of slice reducers and returns a single “root” reducer. The keys of the input object become the names of the slices of the `state` and the values are the associated slice reducers.

The returned root reducer can be used to create the `store` and, when executed, delegates actions and the appropriate slices of state to the slice reducers and then recombines their results into the next `state` object.

```
const rootReducer = combineReducers({
  todos: todosReducer,
  filter: filterReducer
})
```

## Introduction To Redux

A React application can share multiple points of data across components. In many cases managing the data shared can become a complex task.

Redux is a library for managing and updating application state. It provides a centralized “store” for state that is shared across your entire application, with rules ensuring that the state can only be updated in a predictable fashion using events called “actions”.

Redux works well with applications that have a large amount of global `state` that is accessed by many of the application’s components. The goal of Redux is to provide scaleable and predictable state management.

## Store

In Redux, a *store* is a container that holds and manages your application’s global state.

The `store` is the center of every Redux application. It has the ability to update the global state and subscribes elements of an application’s UI to changes in the state. Accessing the state should never be done directly and is achieved through functions provided by the `store`.

## Actions

In Redux, an *action* is a plain JavaScript object that represents an intention to change the store's state. Action objects must have a `type` property with a user-defined string value that describes the action being taken.

Optional properties can be added to the action object. One common property added is conventionally called `payload`, which is used to supply data necessary to perform the desired action.

```
/*
Basic action object for a shopping list
that removes all items from the list
*/
const clearItems = {
  type: 'shopping/clear'
}

/*
Action object for a shopping list
that adds an item to the list
*/
const addItem = {
  type: 'shopping/addItem',
  payload: 'Chocolate Cake'
}
```

## Reducers

A *reducer* (also called a *reducing function*) is a plain JavaScript function that accepts the store's current `state` and an `action` and returns the new `state`. Reducers calculate the new `state` based on the action it receives. Reducers are the only way the store's current `state` can be changed within a Redux application. They are an important part of Redux's one-way data flow model.

```
/*
  A reducer function that handles
  2 actions
  or returns the current state as
  a default
*/

const shoppingReducer = (
  state = [],
  action
) => {
  switch (action.type) {
    case "shopping/clear":
      return [];
    case "shopping/addItem":
      return [
        ...state,
        action.payload];
    default:
      /*
        If the reducer doesn't care
        about this action type, return
        the existing state unchanged
      */
      return state;
  }
}
```