

One Year

React Hooks

A (Critical) Review

Slides: <https://nils.buzz/react-meetup-hooks>

NILS HARTMANN

nils@nilshartmann.net

Developer, Architect, Trainer from Hamburg (Freelancer)

JavaScript, TypeScript
React
GraphQL
Java

Trainings, Workshops and
Coachings



2nd edition out in dec!

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Anyone NOT knowing what React Hooks are?

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(My assumption: almost noone)

REACT HOOKS

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Hooks 2 Minute intro

- add State, Lifecycle, Sideeffects in functional components
(almost no need for class components anylonger)

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- "Hooks into your components lifecycle"

REACT HOOKS

Anyone NOT knowing what React Hooks are?

Hooks 2 Minute intro

- add State, Lifecycle, Sideeffects in functional components
(almost no need for class components anylonger)
- "Hooks into your components lifecycle"
- Regular JavaScript functions...
 - ...but must start with 'use'
 - ...but must not be used in conditionals, for/loops, Class components
 - ...but behaviour is tied to React

REACT HOOKS

Hooks example

```
import React, { useState } from "react";

export default function SettingsForm(props) {

  const [favColor, setFavColor] = useState("blue");

  return <•••>
    <input value={favColor}
      onChange={e => setFavColor(e.target.value)} />
  <•••>
}
```

- **useState** returns value and setter-function
- When state changes, component re-renders
 - component function will run again

One Year
React Hooks

REACT HOOKS

One Year of Hooks...

There are some built-in Hooks, like

- **useState**
- **useReducer** handle state in a Redux-like way but only for one component
- **useEffect** for sideeffects (replaces lifecycle methods in classes)
- **useContext** to receive a Context object
- **useCallback/useMemo/useRef**: solve problems that arise due to using... Hooks

REACT HOOKS

One Year of Hooks...

Libraries ship with Hooks, like

- **Redux** (useSelector, useDispatch, useStore)
- **Router** (useHistory, useParams, useLocation)
- **Apollo Client** (useQuery, useMutation)
- **React Intl** (useIntl)
- **React i18n** (useTranslation)

REACT HOOKS

One Year of Hooks...

Libraries ship with Hooks, like

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- **React Intl** (useIntl)
- **React i18n** (useTranslation)

Community has them too,

- <https://usehooks.com>
- <https://nikgraf.github.io/react-hooks/>
- <https://www.hooks.guide/>

REACT HOOKS

One Year of Hooks...

...it seems, Hooks are *the new way* to go for React Apps
(Vue has them now, too btw)

But...

React Hooks

Good or Evil?

GOOD OR EVIL?

Who likes Hooks?

GOOD OR EVIL?

Who likes Hooks?

(My assumption: almost everyone)

GOOD OR EVIL?

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Who dislikes Hooks?

GOOD OR EVIL?

Who likes Hooks?

(My assumption: almost everyone)

Who dislikes Hooks?

(My assumption: almost noone)

GOOD OR EVIL?

Let's hear some more...



Philipp Spiess
@PhilippSpiess

React Hooks are awesome! 😍

I made: 📦 `useSubstate` - A lightweight hook to subscribe to your single app state



Works with your existing Redux store



.Concurrent React ready (avoids rendering stale state)



Avoids unnecessary re-renders

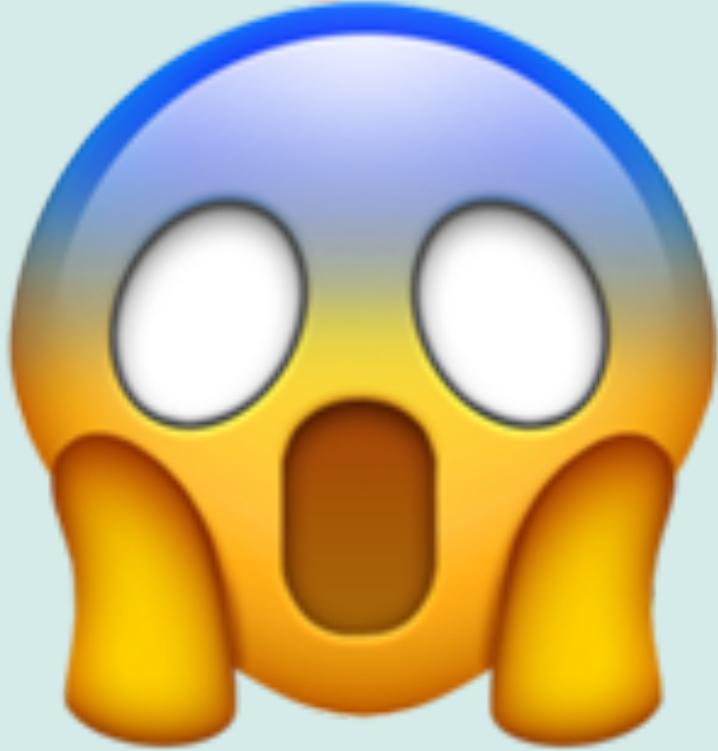
Check it out: [github.com/philipp-spiess...](https://github.com/philipp-spiess/useSubstate)

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<https://twitter.com/philippspiess/status/1056981916489015296>



*"With Hooks,
React loses its innocence
and becomes Angular"*

Attendee of one of my workshops



Dan Abramov
@dan_abramov

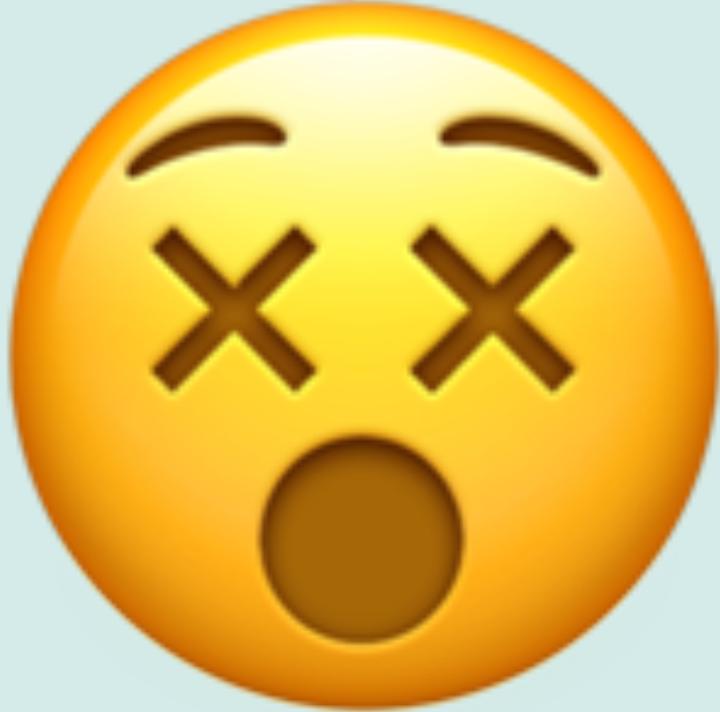


Hooks are weird

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https://twitter.com/dan_abramov/status/1056808552180793344



"Unsure..."

Me



Tom Dale
@tomdale



My feelings about React hooks are mixed, but I do feel strongly about one thing: there's no way React would have gained its current popularity if this was the starting place.

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SO... HOW ABOUT THIS?



Tom Dale
@tomdale



Old React was simple and fun and “just JavaScript.” New React is more powerful and more correct and better all around

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SO... HOW ABOUT THIS?



Tom Dale
@tomdale



Old React was simple and fun and “just JavaScript.” New React is more powerful and more correct and better all around—at the expense of becoming a weird magical meta-language on top of JavaScript.

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<https://twitter.com/tomdale/status/1170095532922064901>

SO... HOW ABOUT THIS?

A LOOK AT THE API

REACT HOOKS

A LOOK AT THE API

useContext to access React Context in your functional component

```
export default function SettingsForm(props) {  
  const contextValue = React.useContext(ThemeContext);  
  
  return <p>Your context color: {contextValue.color}</p>  
}
```

A LOOK AT THE API

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export default function SettingsForm(props) {  
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- **Noteable:** This is probably easy to understand:
I want to use context "ThemeContext" here in my component

A LOOK AT THE API

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export default function SettingsForm(props) {  
  const contextValue = React.useContext(ThemeContext);  
  
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}
```

- **Noteable:** This is probably easy to understand:
I want to use context "ThemeContext" here in my component
- **But:** if context changes, SettingsForm will automatically be re-executed!
Why? Because it's a ... Hook ("weird magical meta-language")
"Something" happens in the background to make that work
There is no indicator that this will happen. Syntactically "only" JavaScript

A LOOK AT THE API

useState for local State in your functional component

```
export default function SettingsForm(props) {  
  const [ favColor, setFavColor ] = useState("red");  
  
  return <input value={favColor}  
            onChange={e => setFavColor(e.target.value)} />  
}
```

A LOOK AT THE API

useState for local State in your functional component

```
export default function SettingsForm(props) {  
  const [ favColor, setFavColor ] = React.useState("red");  
  
  return <input value={favColor}  
            onChange={e => setFavColor(e.target.value)} />  
}
```

- **Noteable:** Return Value
 - what is this? Tuple! (btw: I think Tuples will make it to JavaScript)
 - unusual (yet), but elegant, allows to name my variables as I want them to

A LOOK AT THE API

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 - unusual (yet), but elegant, allows to name my variables as I want them to
- **Noteable:** initial value, used only once even if this function is run on each render
Why? Because it's a ... Hook ("weird magical meta-language")

A LOOK AT THE API

useState for local State in your functional component

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export default function SettingsForm(props) {  
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- **Noteable:** Return Value
 - what is this? Tuple! (btw: I think Tuples will make it to JavaScript)
 - unusual (yet), but elegant, allows to name my variables as I want them to
- **Noteable:** initial value, used only once even if this method is run on each render
 - Why? Because it's a ... Hook ("weird magical meta-language")
- **Noteable:** setter-Function leads to re-render
 - Why? Because it's a ... Hook ("weird magical meta-language")

A LOOK AT THE API

A timer...

```
export default function App() {
  const [running, setRunning] = useState(false);

  useEffect(() => {
    const id = setTimeout(() => setRunning(false), 2000);

    setRunning(true);
    return () => clearTimeout(id);
  }, []);

  return <button onClick={cancel}>Running: {running.toString()}</button>;
}
```

A LOOK AT THE API

useRef: for fixing problems introduced by Hooks

- We want to cancel the running timeout
- Somehow need to get access to the cleanup function or the id

```
export default function App() {
  const [running, setRunning] = useState(false);

  function cancel() { 🤔 }

  useEffect(() => {
    const id = setTimeout(() => setRunning(false), 2000);

    setRunning(true);
    return () => clearTimeout(id);
  }, []);

  return <button onClick={cancel}>Running: {running.toString()}</button>;
}
```

The diagram illustrates the flow of state and effect cleanup. It starts with the declaration of `running` and `setRunning`. An arrow points from the assignment of `id` in the `useEffect` hook to the `setRunning` call. Another arrow points from the `return` statement of the `useEffect` hook to the `clearTimeout(id)` call, which is highlighted with a purple box.

A LOOK AT THE API

useRef: Remember Class Components?



Dan Abramov (on a vacation)
@dan_abramov

Hooks tip: something.current (a ref value) is just like
this.something in a class (an instance field).

```
/* in a function */  
const X = useRef()  
X.current // can read or write
```



"weird magical meta-language"

```
/* in a class */  
this.X // can read or write
```



JavaScript Standard

Hope that helps your mental model for mutable values!

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4:18 vorm. · 6. Mai 2019 · [Twitter Web App](#)

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A LOOK AT THE API

useRef: for fixing problems introduced by Hooks

- We want to cancel the running timeout
- Somehow need to get access to the cleanup function or the id

```
export default function App() {  
  const [running, setRunning] = useState(false);  
  const timerRef = useRef();  
  function cancel() { clearTimeout(timerRef.current); }
```

```
useEffect(() => {  
  const id = setTimeout(() => setRunning(false), 2000);  
  timerRef.current = id;  
  setRunning(true);  
  return () => clearTimeout(id);  
}, []);
```

```
return <button onClick={cancel}>Running: {running.toString()}</button>;  
}
```

USING HOOKS

HOW DOES IT LOOK TO USE HOOKS?

USING HOOKS

Using Hooks: this is simple...

```
import React, { useState } from "react";

export default function SettingsForm(props) {

  const [ favColor, setFavColor ] = useState("blue");
  return <input value={favColor} onChange={...} />
}
```

USING HOOKS

Using Hooks: let's add context...

```
import React, { useState, useContext } from "react";

export default function SettingsForm(props) {

  const login = useContext(LoginContext);

  const [ favColor, setFavColor ] = useState("blue");
  return <input value={favColor} onChange={...} />
}
```

USING HOOKS

Using Hooks: and now... boom!

```
import React, { useState, useContext } from "react";

export default function SettingsForm(props) {

  const login = useContext(LoginContext);

  if (!login.loggedIn) {
    return <Redirect to="/login" />
  }

  const [ favColor, setFavColor ] = useState("blue");
  return <input value={favColor} onChange={...} />
}
```



Why? Because it's a ... Hook ("weird magical meta-language")
Hooks must always be called in the same order

USING HOOKS

...and another one: useHistory from React Router

```
import { useHistory } from "react-router-dom";\n\nexport default function SettingsForm(props) {\n\n    function saveAndRedirect() {\n        saveSettings().then(\n            () => useHistory().push("/home")\n        );\n    }\n\n    return <•••><button onClick={saveAndRedirect}>Save</button><•••>\n}
```



USING HOOKS

...this works

```
import { useHistory } from "react-router-dom";

export default function SettingsForm(props) {
  const history = useHistory();
  function saveAndRedirect() {
    saveSettings().then(
      () => history.push("/home") ←—————
    );
  }
}

return <•••><button onClick={saveAndRedirect}>Save</button><•••>
}
```



Might not be big difference, but...

USING HOOKS

Might not be a big difference, but...

- you have to know where you can use Hooks
- forces you to structure your code in exactly this way
- it's not "standard javascript"
- we even have/need a linter for Rules of Hooks

USING HOOKS

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- you have to know where you can use Hooks
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Do you remember why React doesn't add a template language?

USING HOOKS

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Do you remember why React doesn't add a template language?

- To enable us to use our "favorite" language: JavaScript
 - no need to learn a new language...

USING HOOKS

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- you have to know where you can use Hooks
- forces you to structure your code in exactly this way
- it's not "standard javascript"
- we even have/need a linter for Rules of Hooks

Do you remember why React doesn't add a template language?

- To enable us to use our "favorite" language: JavaScript
 - no need to learn a new language...

Does that mean Hooks (or React) are evil?

- No, but... they have their "price" (as classes have)
- It's "rethinking" again

Consequences

OF USING HOOKS

CONSEQUENCES

Can Custom Hooks replace existing patterns?

- Custom Hooks are another way for reusable logic
 - Replacement for HOCs?
 - Replacement for Render Properties?
- **But...**

CONSEQUENCES

Example: "old" React Router (with **render prop**)

```
// App.js
<Route path="/settings/:id"
      render={({match}) => <SettingsForm settingsId={match.params.id} />}
```

CONSEQUENCES

Example: "old" React Router (with **render prop**)

```
// App.js
<Route path="/settings/:id"
      render={({match}) => <SettingsForm settingsId={match.params.id} />}
```



```
// SettingsForm.js
export default function SettingsForm( {settingsId} ) {

  // do something with settingsId
  return ...;
}
```

Noteable:

- SettingsForm does not know anything about Router
- Routing "Logic" (Params, Routes, ...) are at *one* place (good imho)

CONSEQUENCES

Example: React Router with *new Route API* and **useParams**

```
// App.js
<Route path="/settings/:id"><SettingsForm /></Route>
```

← new Router
5.2 API
no render prop anymore!

CONSEQUENCES

Example: React Router with *new Route API* and **useParams**

```
// App.js
<Route path="/settings/:id"><SettingsForm /></Route> ← new Router  
5.2 API  
no render-Prop anymore

// SettingsForm.js
import { useParams } from "react-router-dom";

export default function SettingsForm( ) {
  const { settingsId } = useParams();

  // do something with settingsId
  return •••;
}
```

Noteable:

- SettingsForm knows about Router API and Routing "Logic" (which Params)
- What about "Colocation"?

CONSEQUENCES

What about this one?

(from: <https://twitter.com/Wolverineks/status/1177818104048472065>)

```
function RouterContext({ children }) {  
  return children({  
    history: useHistory(),  
    params: useParams(),  
    ...  
  });  
}
```

CONSEQUENCES

What about this one?

(from: <https://twitter.com/Wolverineks/status/1177818104048472065>)

```
function RouterContext({ children }) {  
  return children({  
    history: useHistory(),  
    params: useParams(),  
    ...  
  });  
}  
  
<Route path="/settings/:id">  
  <RouterContext>  
    {({ params }) => <SettingsForm settingsId={params.id} />}  
  </RouterContext>  
</Route>
```

Noteable: welcome back, render properties!



But at least SettingsForm is Router-free

CONSEQUENCES

Example: Redux `useDispatch` and `useSelector` instead of `connect`

```
import { useDispatch, useSelector } from "react-redux";

export default function SettingsForm(props) {
  const favColor = useSelector(state => state.theme.favColor);
  const dispatch = useDispatch();

  const setNewColor = (r,g,b) => dispatch(actions.setNewColor(r,g,b));

  return <•••><ColorPicker onSet={setNewColor}/><•••>
}
```

CONSEQUENCES

Example: Redux `useDispatch` and `useSelector` instead of `connect`

```
import { useDispatch, useSelector } from "react-redux";

export default function SettingsForm(props) {
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  return <•••><ColorPicker onSet={setNewColor}><•••>
}
```

- **Consequences:**

- We now have only one component, have seen that already
- the component is bound to Redux, have seen that already

CONSEQUENCES

Example: Redux `useDispatch` and `useSelector` instead of `connect`

```
import { useDispatch, useSelector } from "react-redux";

export default function SettingsForm(props) {
  const favColor = useSelector(state => state.theme.favColor);
  const dispatch = useDispatch();
    might "force" re-rendering of the ColorPicker component
  const setNewColor = (r,g,b) => dispatch(actions.setNewColor(r,g,b));
}

return <•••><ColorPicker onSet={setNewColor}/><•••>
}
```

- **Consequences:**
 - We now have only one component, have seen that already
 - the component is bound to Redux, have seen that already
 - **But:** it also has different rendering behaviour (compared to connect)

CONSEQUENCES

We can fix this:

```
import { useDispatch, useSelector } from "react-redux";

export default function SettingsForm(props) {
  const favColor = useSelector(state => state.theme.favColor);
  const dispatch = useDispatch();

  const setNewColor = React.useCallback(
    (r,g,b) => dispatch(actions.setNewColor(r,g,b)),
    [ dispatch ]
  );

  return <•••><ColorPicker onSet={setNewColor}/><•••>
}
```

CONSEQUENCES

We can fix this:

```
import { useDispatch, useSelector } from "react-redux";

export default function SettingsForm(props) {
  const favColor = useSelector(state => state.theme.favColor);
  const dispatch = useDispatch();

  const setNewColor = React.useCallback(
    (r,g,b) => dispatch(actions.setNewColor(r,g,b)),
    [ dispatch ] ← remember the dependency array? 🤝
  );

  return <•••><ColorPicker onSet={setNewColor}/><•••>
}
```

- "Nice!" (Fortunately we only have *one* callback function here...)

CONSEQUENCES

Is this really a problem?

- This problem is not related to Redux only
- In most cases not as performance might be good enough to re-render all the time, so useCallback (and useMemo) is not a must
- But this is – esp. for beginners – not easy to understand (call me a beginner)
- BTW: I wonder how many CPU engery is wasted due to billions of unneccessary function executions in React Apps world wide 😎

One Year React Hooks

Summary

ONE YEAR REACT HOOKS

Summary

ONE YEAR REACT HOOKS

Summary

- **If you're already using React, use Hooks.**
 - They will stay. It's the "New React". Classes will lose their relevance.
 - For (experienced) React developers they are a good innovation
 - We will see how Hooks-based architectures evolve

ONE YEAR REACT HOOKS

Summary

- **If you're already using React, use Hooks.**
 - They will stay. It's the "New React". Classes will lose their relevance.
 - For (experienced) React developers they are a good innovation
 - We will see how Hooks-based architectures evolve
- **However:**
 - While technically standard JavaScript functions, their usage is not
 - They are more like an own "magical meta-language" for React
 - Selling point "you only have to know JavaScript to learn React" is not valid anymore (if it has ever been)

ONE YEAR REACT HOOKS

Summary

- **If you're already using React, use Hooks.**
 - They will stay. It's the "New React". Classes will lose their relevance.
 - For (experienced) React developers they are a good innovation
 - We will see how Hooks-based architectures evolve
- **However:**
 - While technically standard JavaScript functions, their usage is not
 - They are more like an own "magical meta-language" for React
 - Selling point "you only have to know JavaScript to learn React" is not valid anymore (if it has ever been)
- **For people not familiar with React/new to React**
 - Hooks might scare people
 - As React becomes a little less "JS Standard", People might consider alternatives, like Web Components (Standard!)
 - We're still far away from "React Best Practices"



Thanks a lot!
What do you think?

Slides: <https://nils.buzz/react-meetup-hooks>