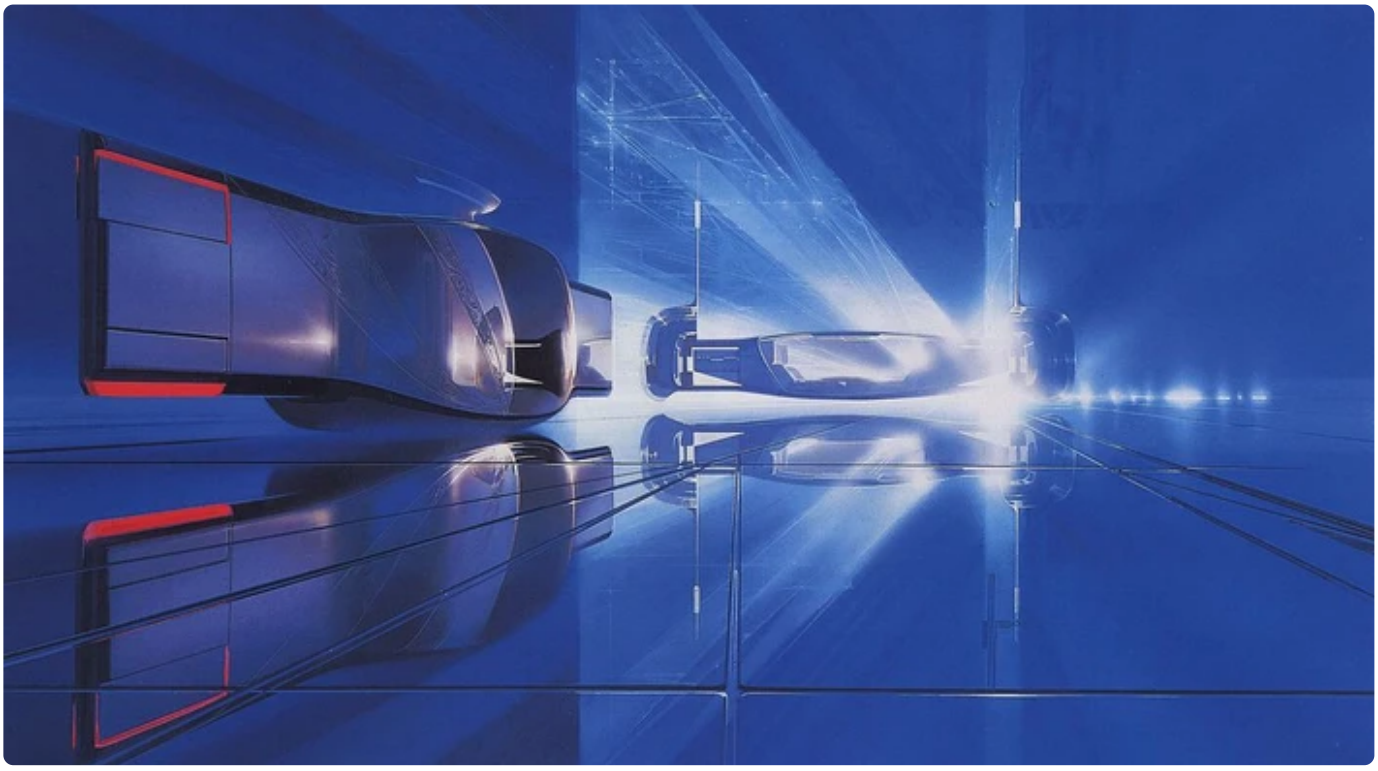

A Simple Explanation of React.useEffect()

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react hook useeffect

55 Comments

I am impressed by the expressiveness of React hooks. You can do so much by writing so little.

But the brevity of hooks has a price — they're relatively difficult to get started. Especially `useEffect()` — the hook that manages side-effects in functional React components.

In this post, you'll learn how and when to use `useEffect()` hook.

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1. *useEffect()* is for side-effects

A functional React component uses props and/or state to calculate the output. If the functional component makes calculations that don't target the output value, then these calculations are named *side-effects*.

Examples of side-effects are fetch requests, manipulating DOM directly, using timer functions like `setTimeout()`, and more.

The component rendering and side-effect logic are *independent*. It would be a mistake to perform side-effects directly in the body of the component, which is primarily used to compute the output.

How often the component renders isn't something you can control — if React wants to render the component, you cannot stop it.

```
function Greet({ name }) {
  const message = `Hello, ${name}!`; // Calculates output

  // Bad!
  document.title = `Greetings to ${name}`; // Side-effect!

  return <div>{message}</div>;       // Calculates output
```

```
}
```

How to decouple rendering from the side-effect? Welcome `useEffect()` — the hook that runs side-effects independently of rendering.

```
import { useEffect } from 'react';

function Greet({ name }) {
  const message = `Hello, ${name}!`;   // Calculates output

  useEffect(() => {
    // Good!
    document.title = `Greetings to ${name}`; // Side-effect!
  }, [name]);

  return <div>{message}</div>;         // Calculates output
}
```

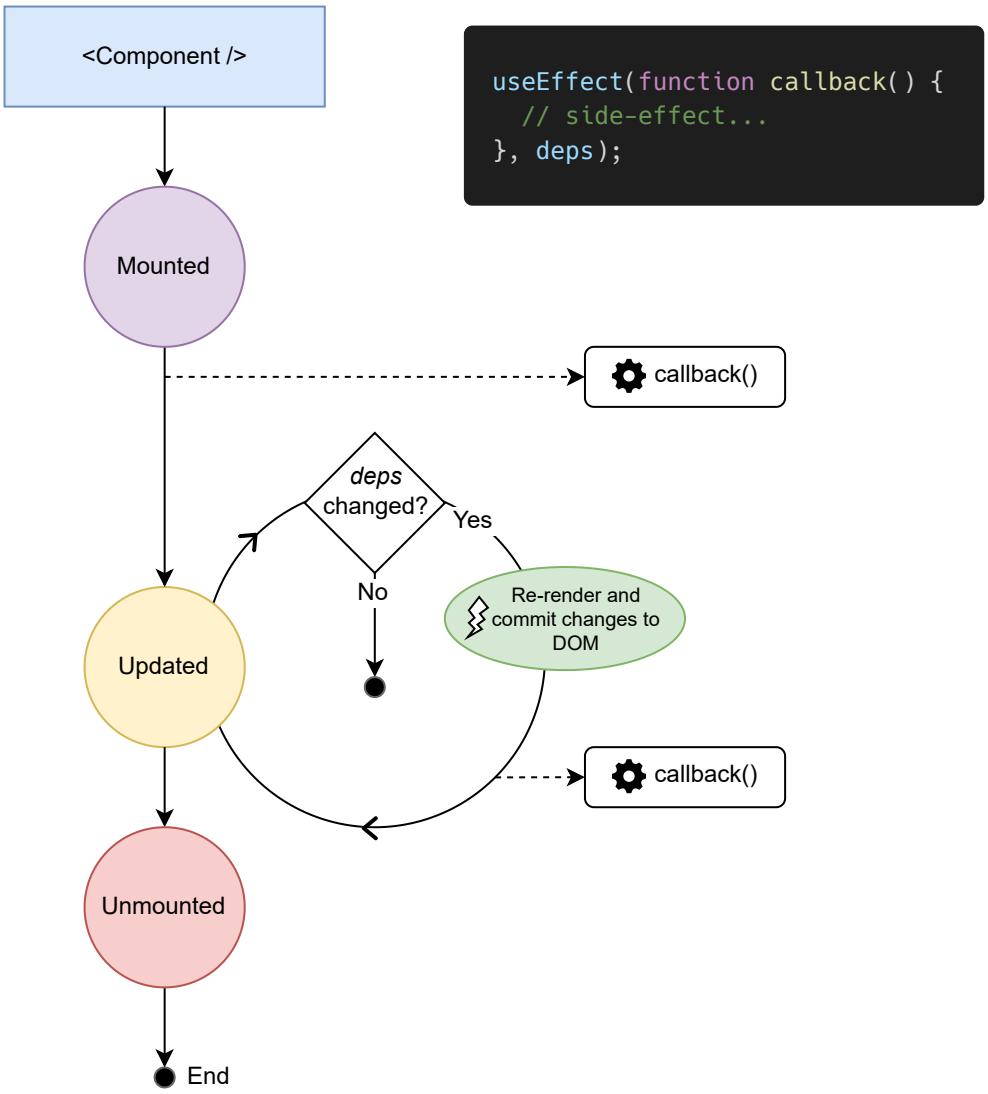
`useEffect()` hook accepts 2 arguments:

```
useEffect(callback[, dependencies]);
```

- `callback` is the function containing the side-effect logic. `callback` is executed right after changes were being pushed to DOM.
- `dependencies` is an optional array of dependencies. `useEffect()` executes `callback` only if the dependencies have changed between renderings.

Put your side-effect logic into the `callback` function, then use the `dependencies` argument to control when you want the side-effect to run. That's the sole purpose of `useEffect()`.

useEffect() Hook



For example, in the previous code snippet you saw the `useEffect()` in action:

```
useEffect(() => {
  document.title = `Greetings to ${name}`;
}, [name]);
```

The *document title update* is the side-effect because it doesn't directly calculate the component output. That's why document title update is placed in a callback and supplied to `useEffect()`.

Also, you don't want the document title update to execute every time `Greet` component renders. You just want it executed when `name` prop changes — that's the reason you supplied `name` as a dependency to `useEffect(callback, [name])`.

2. Dependencies argument

`dependencies` argument of `useEffect(callback, dependencies)` lets you control when the side-effect runs. When dependencies are:

A) Not provided: the side-effect runs after *every* rendering.

```
import { useEffect } from 'react';

function MyComponent() {
  useEffect(() => {
    // Runs after EVERY rendering
  });
}
```

B) An empty array `[]`: the side-effect runs *once* after the initial rendering.

```
import { useEffect } from 'react';

function MyComponent() {
  useEffect(() => {
    // Runs ONCE after initial rendering
  }, []);
}
```

C) Has props or state values `[prop1, prop2, ..., state1, state2]`: the side-effect runs *only when any depenendecy value changes*.

```
import { useEffect, useState } from 'react';

function MyComponent({ prop }) {
  const [state, setState] = useState('');
  useEffect(() => {
    // Runs ONCE after initial rendering
    // and after every rendering ONLY IF `prop` or `state` changes
  }, [prop, state]);
}
```

Let's detail into the cases B) and C) since they're used often.

3. Component lifecycle

3.1 Component did mount

Use an empty dependencies array to invoke a side-effect once after component mounting:

```
import { useEffect } from 'react';

function Greet({ name }) {
  const message = `Hello, ${name}!`;

  useEffect(() => {
    // Runs once, after mounting
    document.title = 'Greetings page';
  }, []);

  return <div>{message}</div>;
}
```

`useEffect(..., [])` was supplied with an empty array as the dependencies argument. When configured in such a way, the `useEffect()` executes the callback *just once*, after initial mounting.

Even if the component re-renders with different `name` property, the side-effect runs only once after the first render:

```
// First render
<Greet name="Eric" />   // Side-effect RUNS

// Second render, name prop changes
<Greet name="Stan" />   // Side-effect DOES NOT RUN

// Third render, name prop changes
<Greet name="Butters"/> // Side-effect DOES NOT RUN
```

Try the demo.

3.2 Component did update

Each time the side-effect uses props or state values, you must indicate these values as dependencies:

```
import { useEffect } from 'react';
```

```
function MyComponent({ prop }) {
  const [state, setState] = useState();

  useEffect(() => {
    // Side-effect uses `prop` and `state`
  }, [prop, state]);

  return <div>....</div>;
}
```

The `useEffect(callback, [prop, state])` invokes the `callback` after the changes are being committed to DOM and *if and only if* any value in the dependencies array `[prop, state]` has changed.

Using the dependencies argument of `useEffect()` you control when to invoke the side-effect, independently from the rendering cycles of the component. Again, *that's the essence of `useEffect()` hook.*

Let's improve the `Greet` component by using `name` prop in the document title:

```
import { useEffect } from 'react';

function Greet({ name }) {
  const message = `Hello, ${name}!`;

  useEffect(() => {
    document.title = `Greetings to ${name}`;
  }, [name]);

  return <div>{message}</div>;
}
```

`name` prop is mentioned in the dependencies argument of `useEffect(..., [name])`. `useEffect()` hook runs the side-effect after initial rendering, and on later renderings only if the `name` value changes.

```
// First render
<Greet name="Eric" />   // Side-effect RUNS

// Second render, name prop changes
<Greet name="Stan" />   // Side-effect RUNS

// Third render, name prop doesn't change
<Greet name="Stan" />   // Side-effect DOES NOT RUN

// Fourth render, name prop changes
```

```
<Greet name="Butters"/> // Side-effect RUNS
```

Try the demo.

5. Side-effect cleanup

Some side-effects need cleanup: close a socket, clear timers.

If the `callback` of `useEffect(callback, deps)` returns a function, then `useEffect()` considers this as an *effect cleanup*:

```
useEffect(() => {
  // Side-effect...

  return function cleanup() {
    // Side-effect cleanup...
  };
}, dependencies);
```

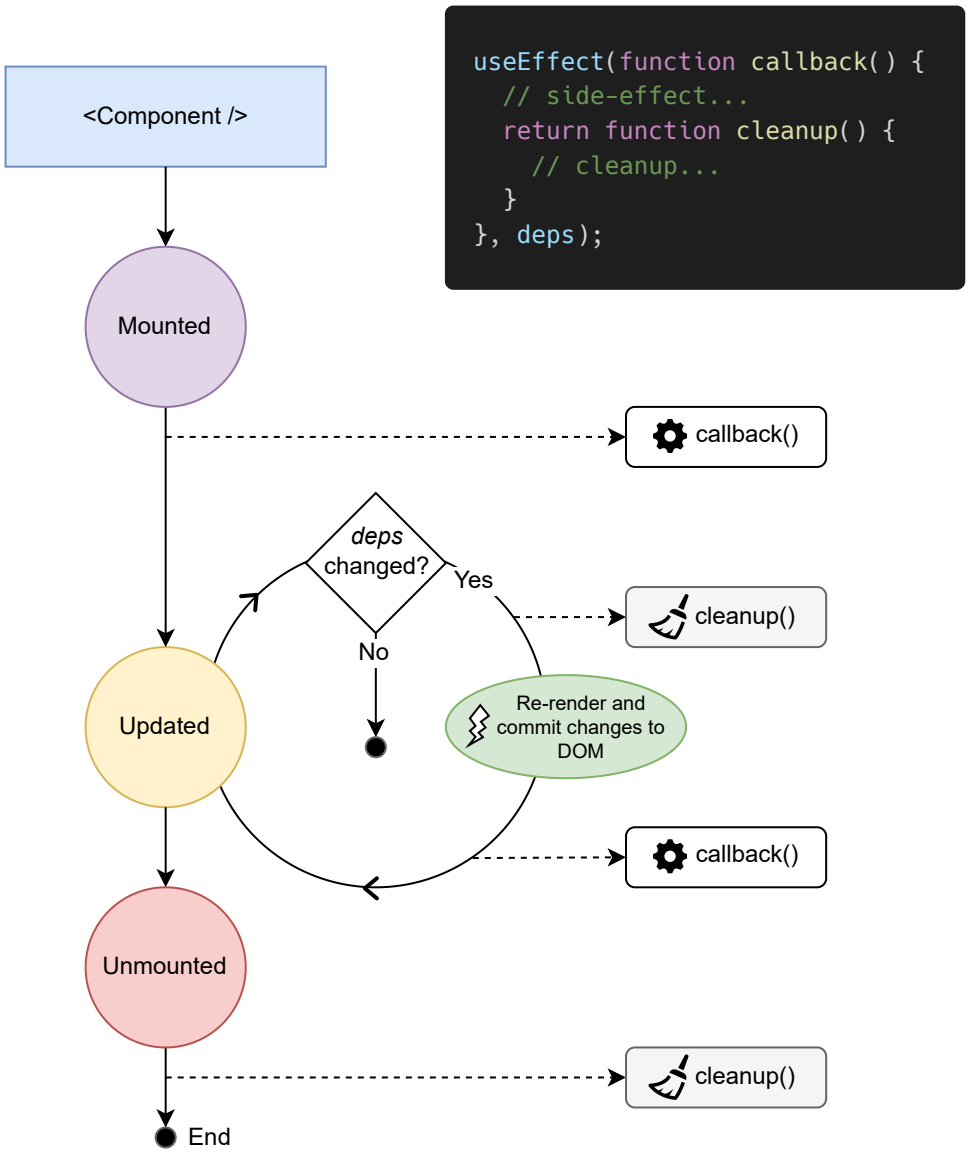
Cleanup works the following way:

A) After initial rendering, `useEffect()` invokes the callback having the side-effect. `cleanup` function is *not invoked*.

B) On later renderings, before invoking the next side-effect callback, `useEffect()` *invokes* the `cleanup` function from the previous side-effect execution (to clean up everything after the previous side-effect), then runs the current side-effect.

C) Finally, after unmounting the component, `useEffect()` *invokes* the cleanup function from the latest side-effect.

useEffect() Hook




```
useEffect(function callback() {
  // side-effect...
  return function cleanup() {
    // cleanup...
  }
}, deps);
```

Let's see an example when the side-effect cleanup is useful.

The following component `<RepeatMessage message="My Message" />` accepts a prop `message`. Then, every 2 seconds the `message` prop is logged to console:

```
import { useEffect } from 'react';

function RepeatMessage({ message }) {
  useEffect(() => {
    setInterval(() => {
      console.log(message);
    }, 2000);
  }, [message]);
```

```
  return <div>I'm logging to console "{message}"</div>;
}
```

Try the demo.

Open the demo and type some messages. The console logs every 2 seconds any message that's been ever typed into the input. However, you need to log only the latest message.

That's the case to clean up the side-effect: cancel the previous timer when starting a new one. Let's return a cleanup function that stops the previous timer before starting a new one:

```
import { useEffect } from 'react';

function RepeatMessage({ message }) {
  useEffect(() => {
    const id = setInterval(() => {
      console.log(message);
    }, 2000);
    return () => {
      clearInterval(id);
    };
  }, [message]);

  return <div>I'm logging to console "{message}"</div>;
}
```

Try the demo.

Open the demo and type some messages. You'll see that each 2 seconds only the latest message logs to console. Which means that all of the previous timers were cleanup.

6. *useEffect()* in practice

6.1 Fetching data

`useEffect()` can perform data fetching side-effect.

The following component `FetchEmployees` fetches the employees list over the network:

```
import { useEffect, useState } from 'react';

function FetchEmployees() {
  const [employees, setEmployees] = useState([]);

  useEffect(() => {
    async function fetchEmployees() {
      const response = await fetch('/employees');
      const fetchedEmployees = await response.json(response);
      setEmployees(fetchedEmployees);
    }

    fetchEmployees();
  }, []);

  return (
    <div>
      {employees.map(name => <div>{name}</div>)}
    </div>
  );
}
```

`useEffect()` starts a fetch request by calling `fetchEmployees()` async function after the initial mounting.

When the request completes, `setEmployees(fetchedEmployees)` updates the `employees` state with the just fetched employees list.

Note that the `callback` argument of `useEffect(callback)` cannot be an `async` function. But you can always define and then invoke an `async` function inside the callback itself:

```
function FetchEmployees() {
  const [employees, setEmployees] = useState([]);

  useEffect(() => {  // <--- CANNOT be an async function
    async function fetchEmployees() {
      // ...
    }
    fetchEmployees(); // <--- But CAN invoke async functions
  }, []);

  // ...
}
```

To run the fetch request depending on a prop or state value, simply indicate the required dependency in the dependencies argument: `useEffect(fetchSideEffect, [prop, stateValue])`.

7. Conclusion

`useEffect(callback, dependencies)` is the hook that manages the side-effects in functional components. `callback` argument is a function to put the side-effect logic. `dependencies` is a list of dependencies of your side-effect: being props or state values.

`useEffect(callback, dependencies)` invokes the `callback` after initial mounting, and on later renderings, if any value inside `dependencies` has changed.

The next step to mastering `useEffect()` is to understand and avoid the infinite loop pitfall.

Still have questions about `useEffect()` hook? Ask in the comments below!

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About Dmitri Pavlutin

Tech writer and coach. My daily routine consists of (but not limited to) drinking coffee, coding, writing, coaching, overcoming boredom 😉.

Recommended reading:

Use React.memo() wisely

react memoization

Your Guide to React.useCallback()

react memoization