

Fullstack Development

Data Fetching in React (SPA)

Method 1: `useEffect`

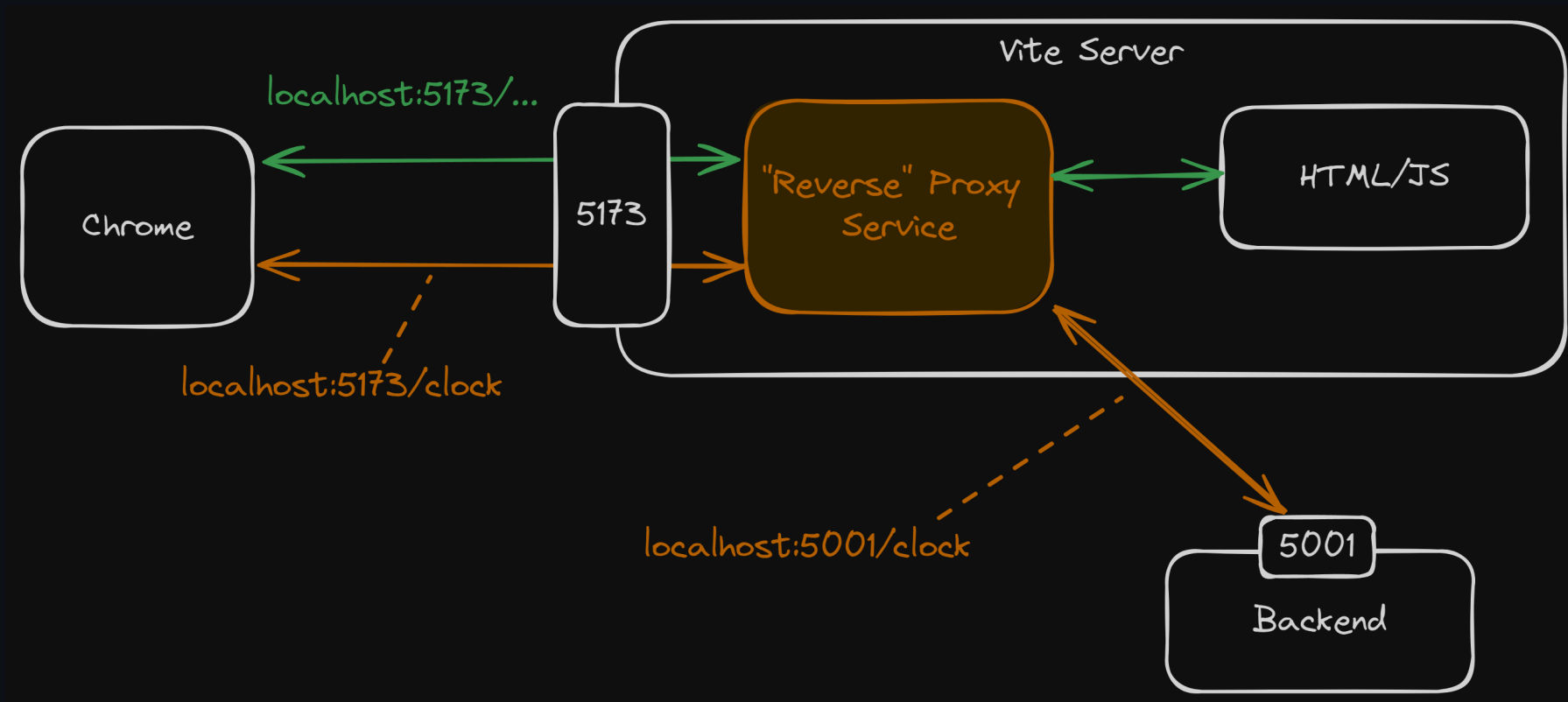
Setup

- `git clone -b useeffect https://github.com/fullstack-67/df-http.git df-http`
- `git checkout -t origin/useeffect`

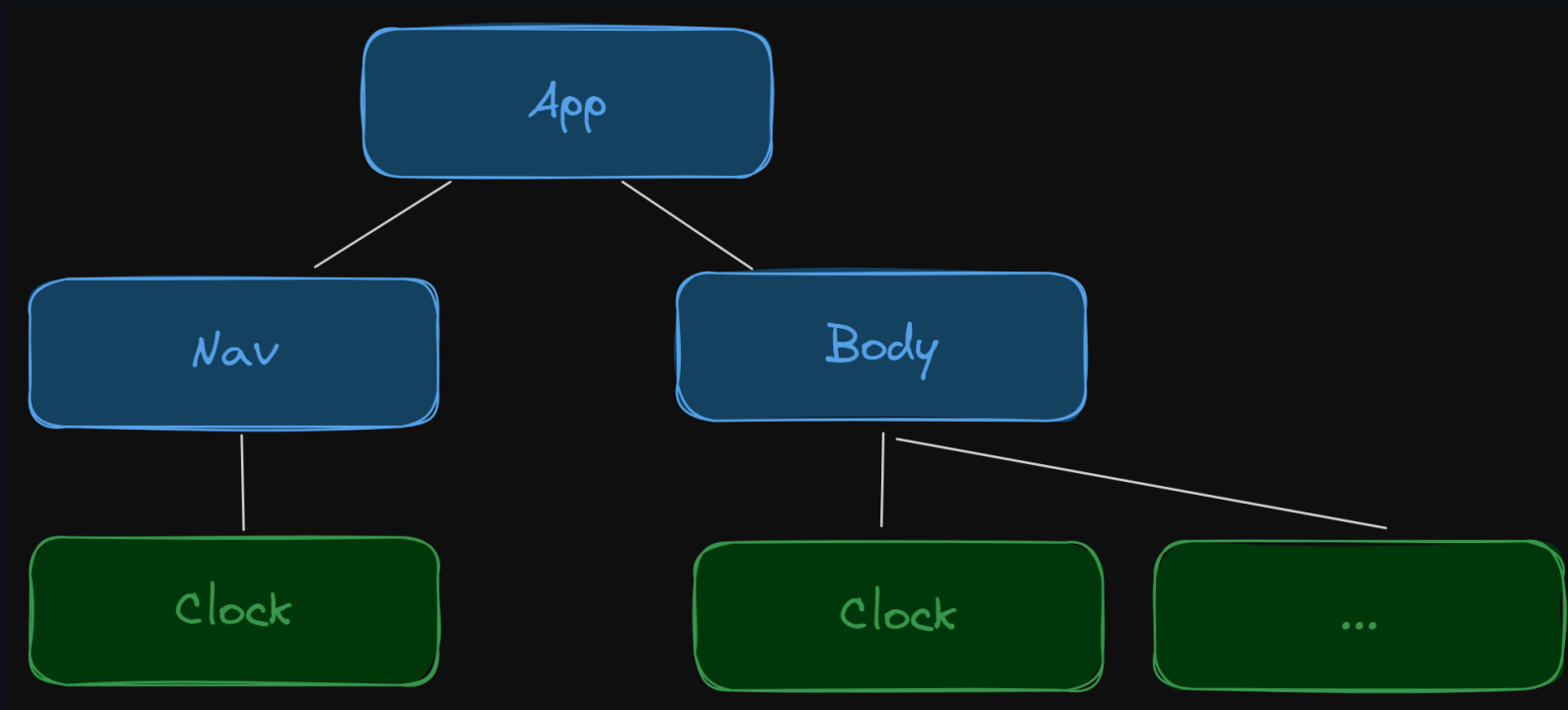
Backend / Frontend

- `cd backend` / `cd frontend`
- `pnpm i`
- `npm run dev`

Application architecture



Frontend component tree



```
./src/components/Clock.tsx
```

```
const Clock: FC<Props> = () => {  
  const [clock, setClock] = useState("");  
  const refetch = () => {  
    // Fetching logic  
  };  
  useEffect(() => {  
    refetch();  
  }, []);  
  // return JSX  
};
```

useEffect

- Good
 - No external library required
- Bad
 - Confusing to write
- Comment
 - States are all local.
 - Notice data fetching from each component instance (many times).

Method 2: `useEffect` + Custom hook

Setup

- `git checkout -t origin/custom-hook`

./src/hooks/useClock.ts

```
function useClock() {  
  const [clock, setClock] = useState("");  
  const refetch = () => {  
    // Fetching logic  
  };  
  useEffect(() => {  
    refetch();  
  }, []);  
  
  return { clock, refetch };  
}
```

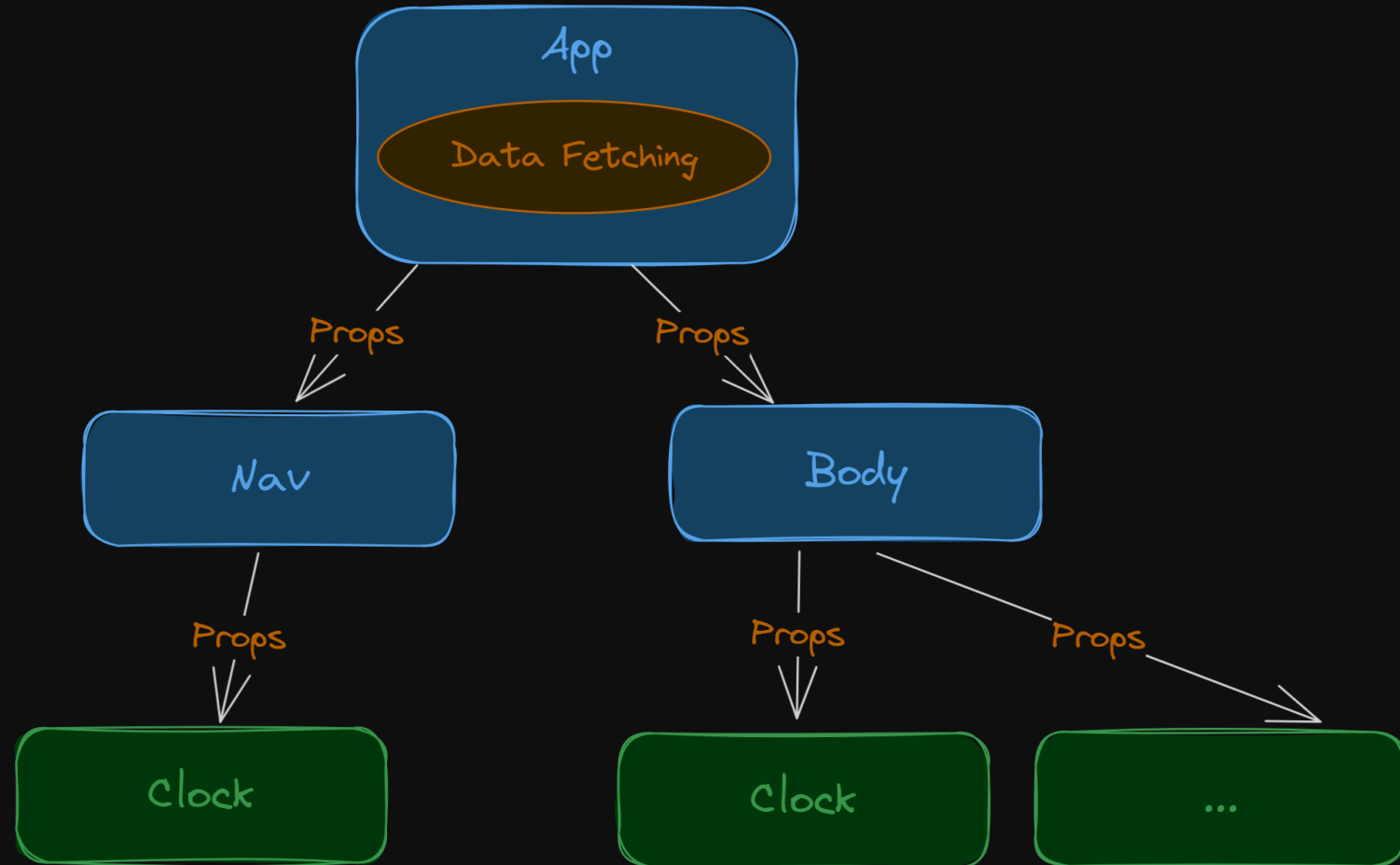
useEffect + Custom hook

- Good
 - Logic encapsulation
 - Cleaner components
- Comment
 - States are still all local.

Method 3: `useEffect` + Prop drilling

Prop drilling

Change



useEffect + Prop drilling

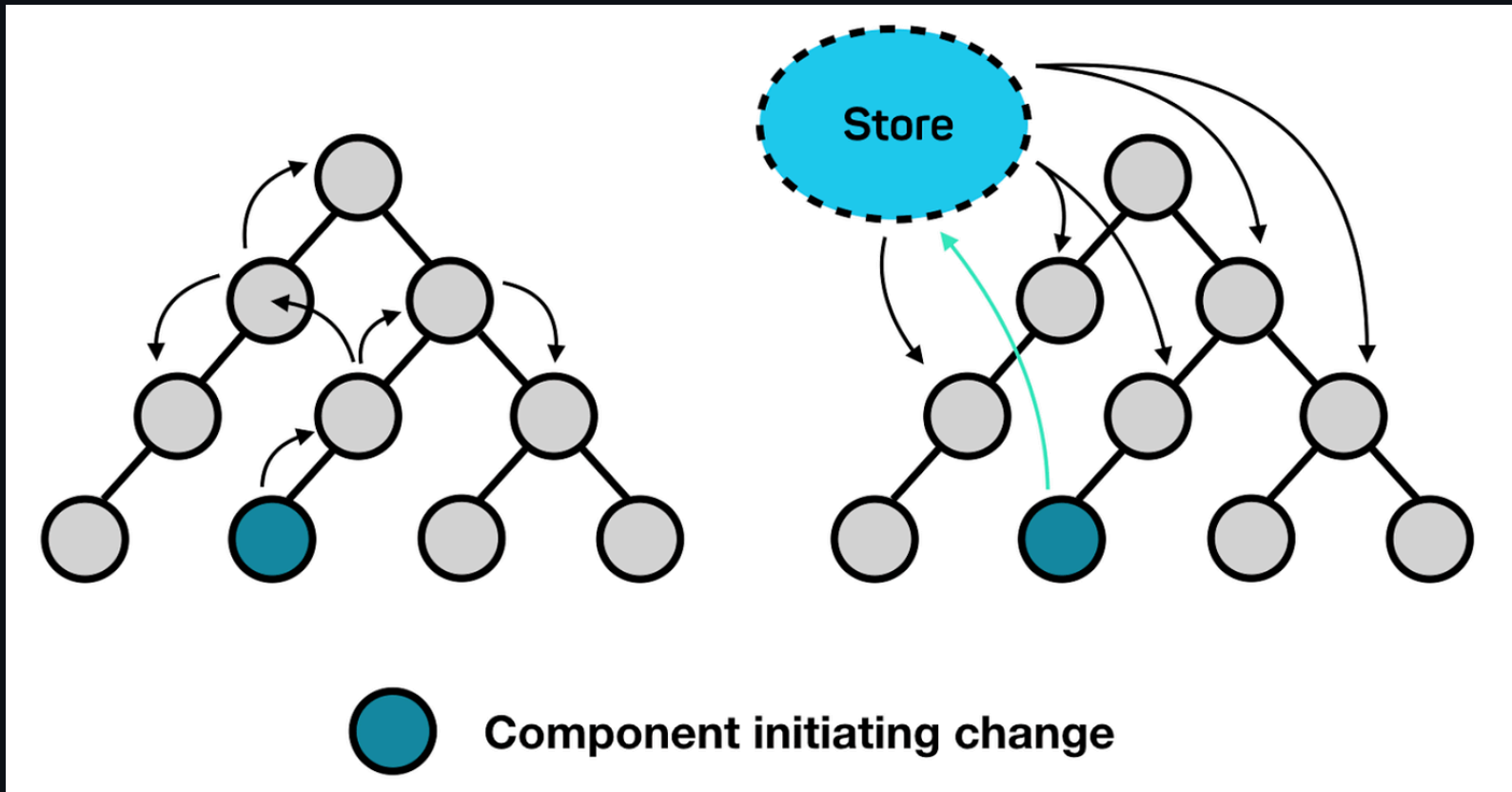
- Good
 - No external library required
 - Pure components
- Bad
 - Impractical for deep-nested components.
 - Fetching logic is too "far" from the view (JSX).
- Comment
 - Notice that we don't have to separately fetch data foreach component anymore (good).

Method 4: `useEffect` + Global store

Global store pattern

What does using a global store solve?

- Multiple copies of states
- Prop drilling
- Unnecessary re-render



Global store libraries / API

- React Context
- Redux
- Jotai
- Zustand

React Context

- Native API
- Fine, but...

```
const App = () => {  
  // ... some code  
  return (  
    <>  
      <ReduxProvider value={store}>  
        <ThemeProvider value={theme}>  
          <OtherProvider value={otherValue}>  
            <OtherOtherProvider value={otherOtherValue}>  
              {/** ... other providers*/}  
              <HellProvider value={hell}>  
                <HelloWorld />  
              </HellProvider>  
              {/** ... other providers*/}  
            </OtherOtherProvider>  
          </OtherProvider>  
        </ThemeProvider>  
      </ReduxProvider>  
    </>  
  );  
};
```

Redux

- Powerful
- Has Redux Dev Tool
- Can be used standalone
- Too much boiler plate for small projects



The official, opinionated, batteries-included toolset for efficient Redux development

Get Started



Simple

Includes utilities to simplify common use cases like **store setup**, **creating reducers**, **immutable update logic**, and more.



Opinionated

Provides **good defaults for store setup out of the box**, and includes **the most commonly used Redux addons built-in**.



Powerful

Takes inspiration from libraries like Immer and Autodux to let you **write "mutative" immutable update logic**, and even **create entire "slices" of state automatically**.



Effective

Lets you focus on the core logic your app needs, so you can **do more work with less code**.

You Might Not Need Redux



Dan Abramov · [Follow](#)

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42K



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People often choose Redux before they need it. “What if our app doesn’t scale without it?” Later, developers frown at the indirection Redux introduced to their code. “Why do I have to touch three files to get a simple feature working?” Why indeed!

Zustand

- Minimalist
- Use Redux-style (flux principle)
- No provider

Jotai

- Another cool library but I never used it.

Setup

- `git checkout -t origin/zustand`
- `pnpm i`

Store

```
./src/stores/useGlobalStore.ts
```

```
import { create } from "zustand";

interface Store {
  clock: string;
  setClock: (c: string) => void;
}

const useGlobalStore = create<Store>((set) => ({
  clock: "",
  setClock: (c) => set(() => ({ clock: c })),
}));
```

```
./src/components/Clock.tsx
```

```
import useGlobalStore from "../stores/useGlobalStore";

const Clock: FC<Props> = () => {
  // No useState now
  const [clock, setClock] = useGlobalStore((state) => [
    state.clock,
    state.setClock,
  ]);
  const refetch = () => {
    // Fetching logic
  };
  useEffect(() => {
    if (initialFetch) refetch();
  }, []);

  // return JSX
};
```

useEffect + Global store

- Good
 - Shared state.
 - Less network requests
- Bad
 - Not pure components

Method 5: React Query + Custom hook

Reach Query

- Data-fetching + state management library
- Highly recommended!

Setup

- `git checkout -t origin/react-query`
- `pnpm i`

Provider

./src/main.tsx

```
import { QueryClient, QueryClientProvider } from "@tanstack/react-query";
import { ReactQueryDevtools } from "@tanstack/react-query-devtools";

// Create a client
const queryClient = new QueryClient();

createRoot(document.getElementById("root")!).render(
  <StrictMode>
    <QueryClientProvider client={queryClient}>
      <App />
      <ReactQueryDevtools initialIsOpen={false} />
    </StrictMode>
  );
```

./src/hooks/useClock.ts

```
import { useQuery } from "@tanstack/react-query";

function getClock() {
  // Return promise
}

function useClock() {
  const query = useQuery({
    // Options
  });

  return { clock: query.data ?? "", refetch: query.refetch };
}

export default useClock;
```

Note

- Try inspect `query` object.
- Try navigate away and refocus the tab.
- Try option `refetchInterval`
- Try using the dev tool.

React Query + Custom hook

- Good
 - Do I have to repeat myself?
- Bad
 - A little bit of setup / learning curve
- Note
 - Use it please.

Real-time

Options

- Websocket
- Server-sent events

Websocket

- Protocol that establishes a full-duplex communication channel over a single TCP connection
 - Send data to the browser + receive data from the browser (bi-directional)
- Can transmit both binary data and UTF-8.
- Usage
 - Chat application

Server-send events

- SSE establishes a long-open HTTP channel from server to client.
 - Data only flows from a server to clients (uni-directional)
- Usage
 - Online stock quotes
 - Timeline or feed view

Advantages of SSE over Websockets:

- Transported over simple HTTP instead of a custom protocol
 - Simpler protocol
- Can be poly-filled with javascript to "backport" SSE to browsers that do not support it yet.
- Built in support for re-connection and event-id
- No trouble with corporate firewalls doing packet inspection

Advantages of Websockets over SSE:

- Real time, two directional communication.
- Native support in more browsers
- Only WS can transmit both binary data and UTF-8
 - SSE is limited to UTF-8.

SSE Gotchas

- Limited number of open connections
 - Maximum of 6 tabs per browser + domain
 - Browser restriction, not server

Method 6: Websocket

Setup

- `git clone -b main https://github.com/fullstack-67/df-websocket.git df-websocket`

Backend / Frontend

- `cd backend` / `cd frontend`
- `pnpm i`
- `npm run dev`

Method 7: Server-sent events

Setup

- `git clone -b main https://github.com/fullstack-67/df-sse.git df-sse`

Backend / Frontend

- `cd backend` / `cd frontend`
- `pnpm i`
- `npm run dev`

Todo apps (SSE)

- `git clone -b todo https://github.com/fullstack-67/df-sse.git df-sse`

Backend / Frontend

- `cd backend` / `cd frontend`
- `pnpm i`
- `npm run dev`