



KEEPING SSR COOL WITH REACT HYDRATION

MONICA POWELL

React Rally 2020



www.monica.dev |  @waterproofheart

HI, I'M MONICA



I'm a software engineer who enjoys building technology that elevates people whether that's increasing access to e-books, creating tools for Meetup's community organizers or sending curated career opportunities to diverse job-seekers at scale. I'm also passionate about making open-source more accessible and recently became an inaugural GitHub Star 



OVERVIEW

The purpose of this talk is to share some helpful things to keep in mind to render a seamless experience as a Server-Side Rendered (SSR) site transitions from a window-less (server) environment to a browser.



WHAT IS SERVER-SIDE RENDERING (SSR)?

A server generates the initial HTML that loads in a browser. Frameworks like NextJS and GatsbyJS support SSR out-of-the box

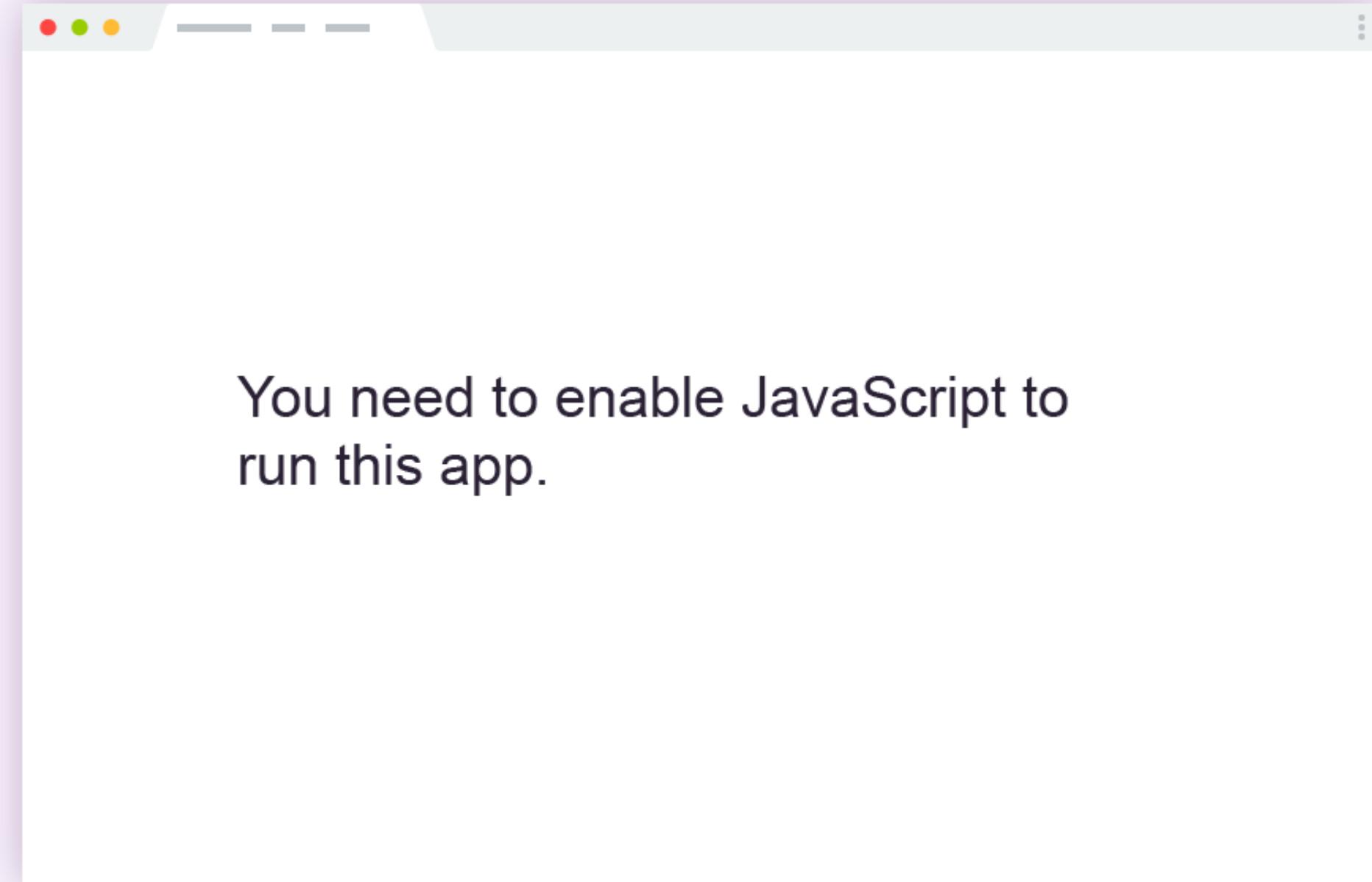


WHY SERVER-SIDER RENDERING (SSR)?

SSR apps tend to have faster initial loading times and better SEO than client-side only apps.



WHAT IS CLIENT-SIDE RENDERING (CSR)?

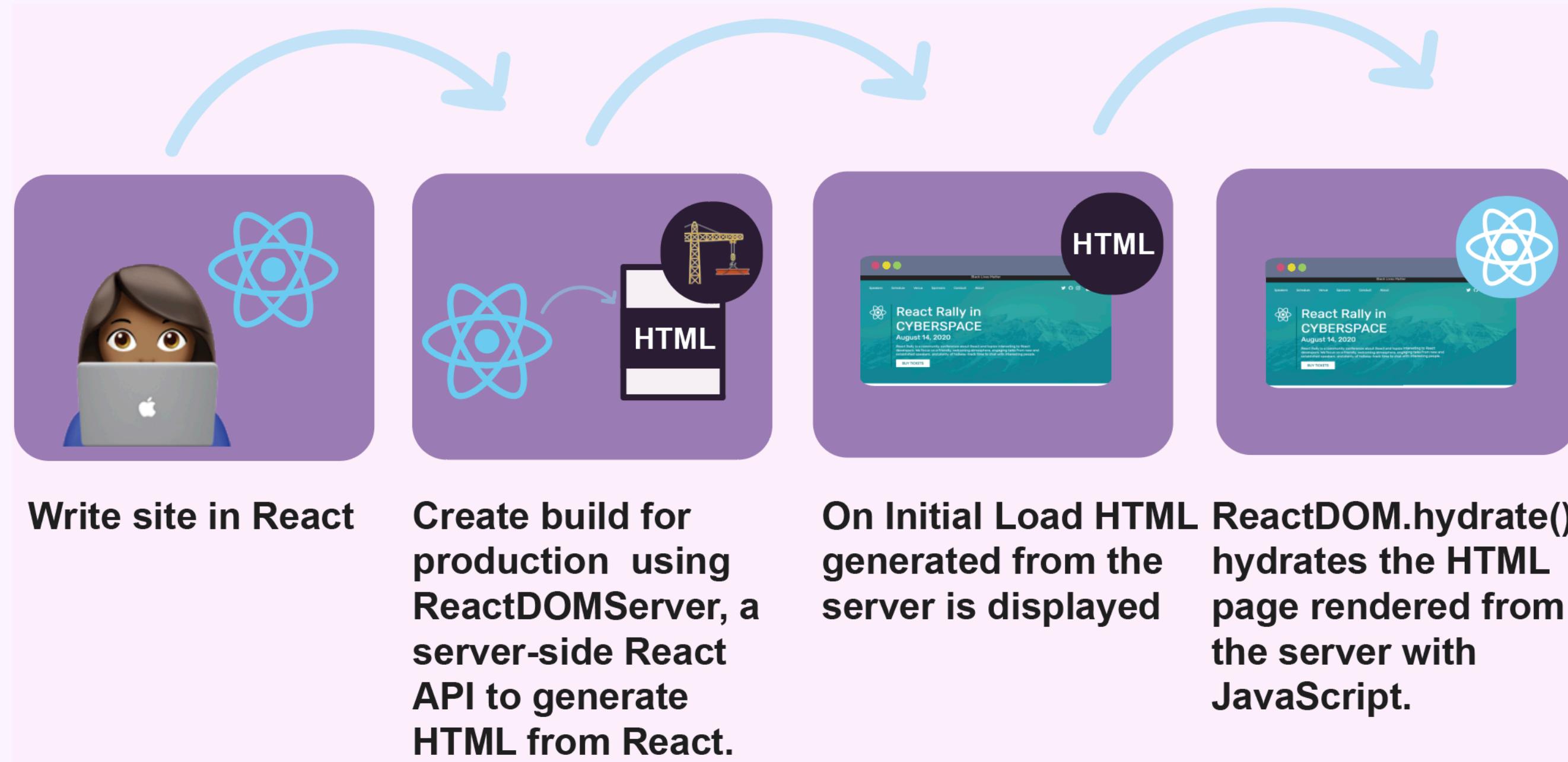


CLIENT-SIDE RENDERED INITIAL DOM

```
● ● ●  
  
<html>  
  <head><!-- SEO/Metadata here --></head>  
  <body>  
    <div>You need to enable JavaScript to run this app.</div>  
    <div id="root"></div>  
    <script><!-- all of the JavaScript --></script>  
    <script src="/static/js/2.6158a3d8.chunk.js"></script>  
    <script src="/static/js/main.ba831a9f.chunk.js"></script>  
  </body>  
</html>
```



OVERVIEW OF SSR (IN STATIC CONTEXT)



TOGGGLING JAVASCRIPT

MONICA POWELL

Software engineer, content creator &
Community organizer



Hi! I'm a software engineer who is passionate about making open-source more accessible, spreading technology to elevate people, and building community. You can find me teaching web development on [Egghead](#), contributing to open-source projects like [NYPL-Simplified](#) and [Gatsby](#), and co-leading [React Ladies](#), a community I founded for women and non-binary React developers.

Recent Writing

[View All Writing](#)[How To Create A GitHub Profile README](#)[Exploring Art Direction With Gatsby-Image](#)[Initial Thoughts On Migrating from gatsby-transformer-remark to gatsby-plugin-mdx](#)[Unleash Your CSS Superpowers with CSS Variables](#)

SSR vs CSR [Grey's Anatomy](#)
[Lorem Ipsum Generator](#)

How many paragraphs should be generated?

4
0

[Generate Lorem Ipsum](#)

Grey's Anatomy Lorem Ipsum Generator

By: [Monica Powell](#) • [View Code](#)



[www.monica.dev](#) | [@waterproofheart](#)

Copyright to "Grey's Anatomy" is held by various outside entities and is provided here for educational purposes only.

MONICA POWELL

Software engineer, content creator &
Community organizer



Hi! I'm Monica! I'm a software engineer who is passionate about making open-source more accessible, technology to elevate people, and building community. You can find me teaching web development on [Egghead](#), contributing to open-source projects like [NYPL-Simplified](#) and [Gatsby](#), and being part of [React Ladies](#), a community I founded for women and non-binary React developers.

Recent Writing

[View All Writing](#)[How To Create A GitHub Profile README](#)[Exploring Art Direction With Gatsby-Image](#)[Initial Thoughts On Migrating from gatsby-transformer-remark to gatsby-plugin-mdx](#)[Unleash Your CSS Superpowers with CSS Variables](#)

Grey's Anatomy Lorem Ipsum Generator

How many paragraphs should be generated?

4

[Generate Lorem Ipsum](#)

Grey's Anatomy Lorem Ipsum Generator

By: [Monica Powell](#) • [View Code](#)

[www.monica.dev](#)

@waterproofheart

Copyright to "Grey's Anatomy" is held by various outside entities and is provided here for educational purposes only.

IT LOOKS GREAT IN DEVELOPMENT...WHAT

COULD GO WRONG?



- ▶ Layout shifts that only appear in production
- ▶ Errors that only appear at build-time



MISSING DATA ON SERVER-SIDE !

- ▶ User or browser-specific data is not available in the server when static HTML for the site is generated (i.e., window size, authentication status, local storage etc)
- ▶ Static-site-generation (SSG) is when all of the pages for a site are generated at build time



DEBUGGING SSG HYDRATION ISSUES

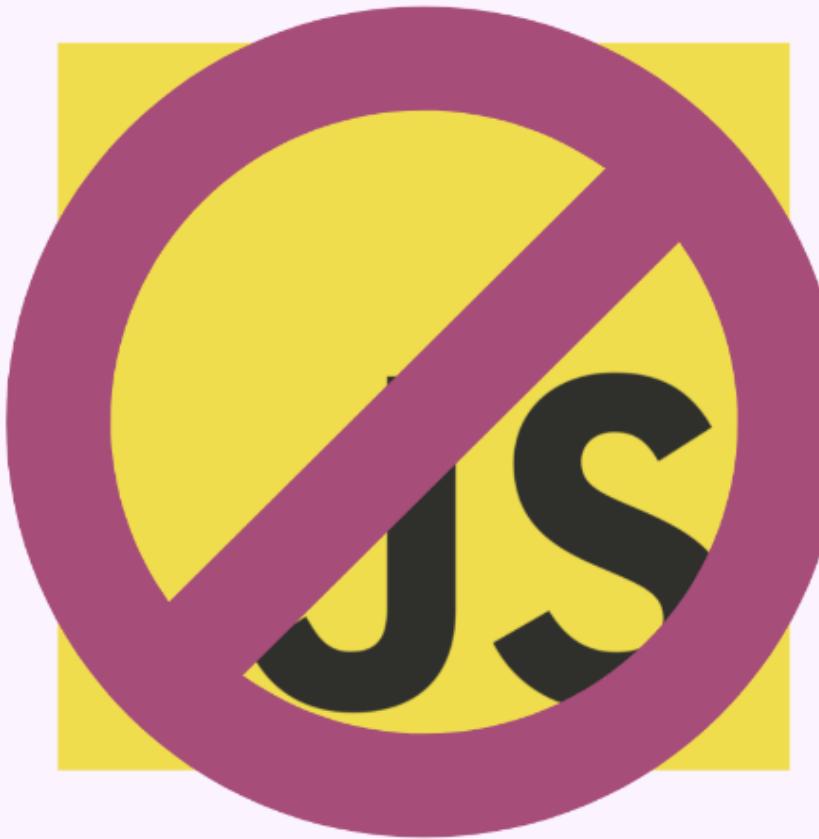


www.monica.dev |  @waterproofheart

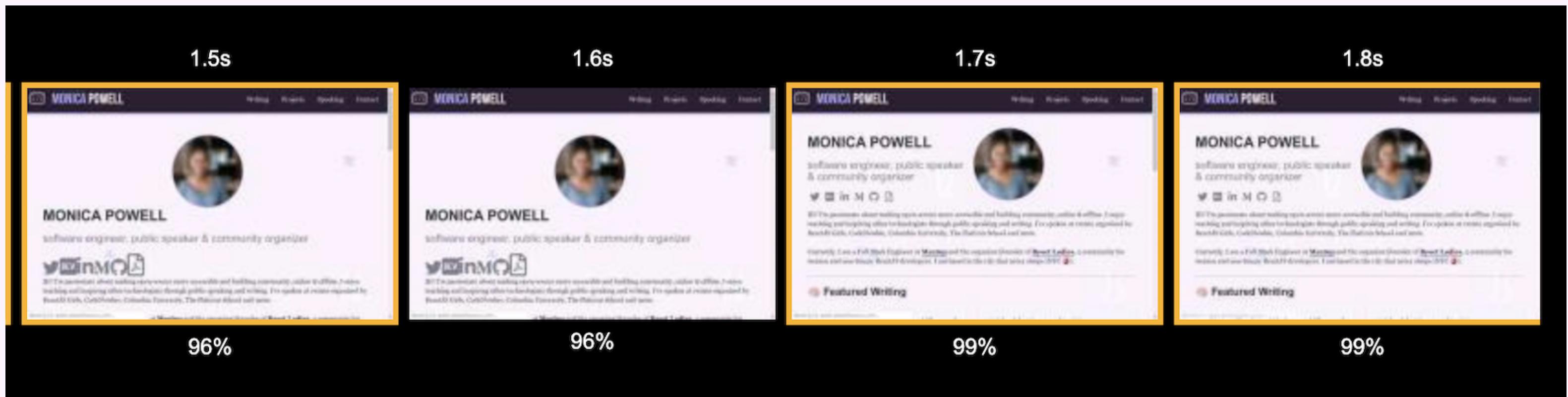
DEBUGGING SSG HYDRATION ISSUES



- ▶ Disable JavaScript
- ▶ View filmstrips to see how the website hydrates



Before: Styled icons with CSS from Font Awesome NPM Package

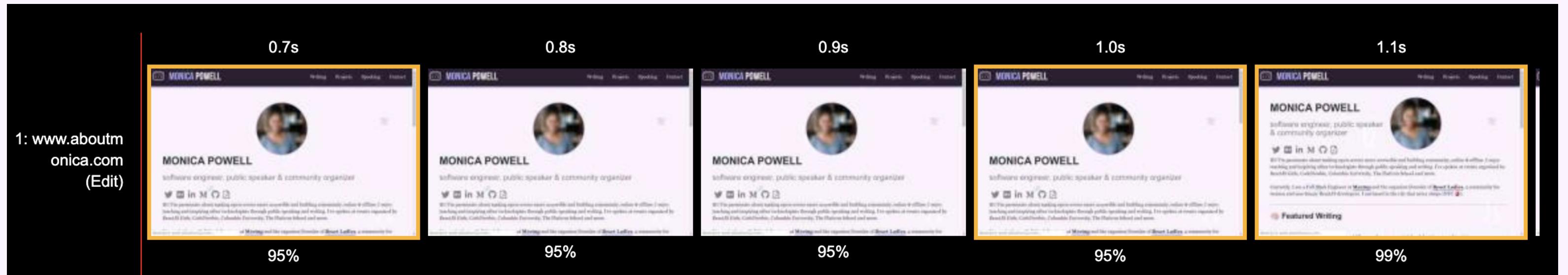


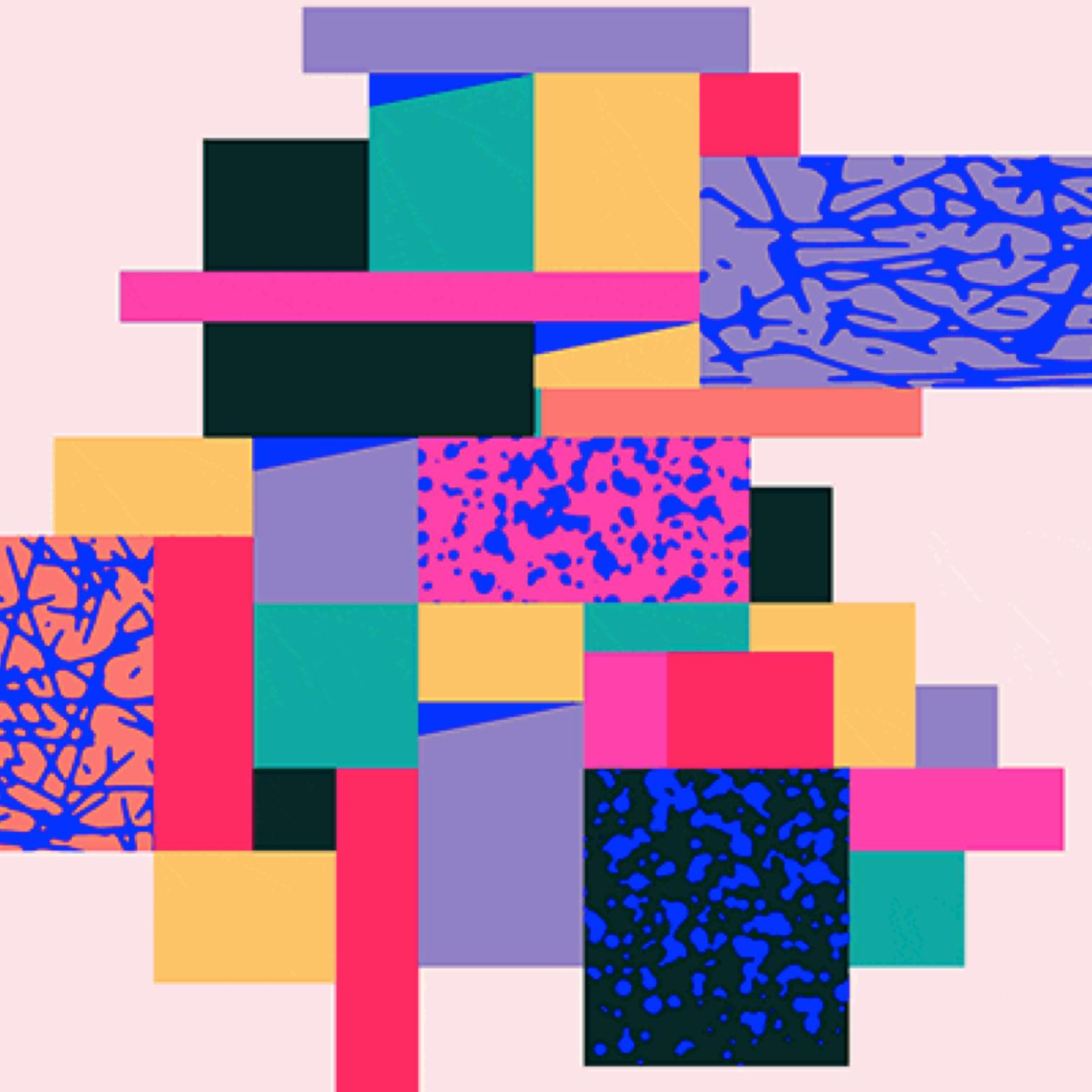
SOLUTION FOR ICONS RESIZING ON LOAD

- ▶ Replicate the final styling with local CSS without relying on FontAwesome's external CSS which required JavaScript to be applied



After: Styling icons locally and disable Font Awesome's CSS





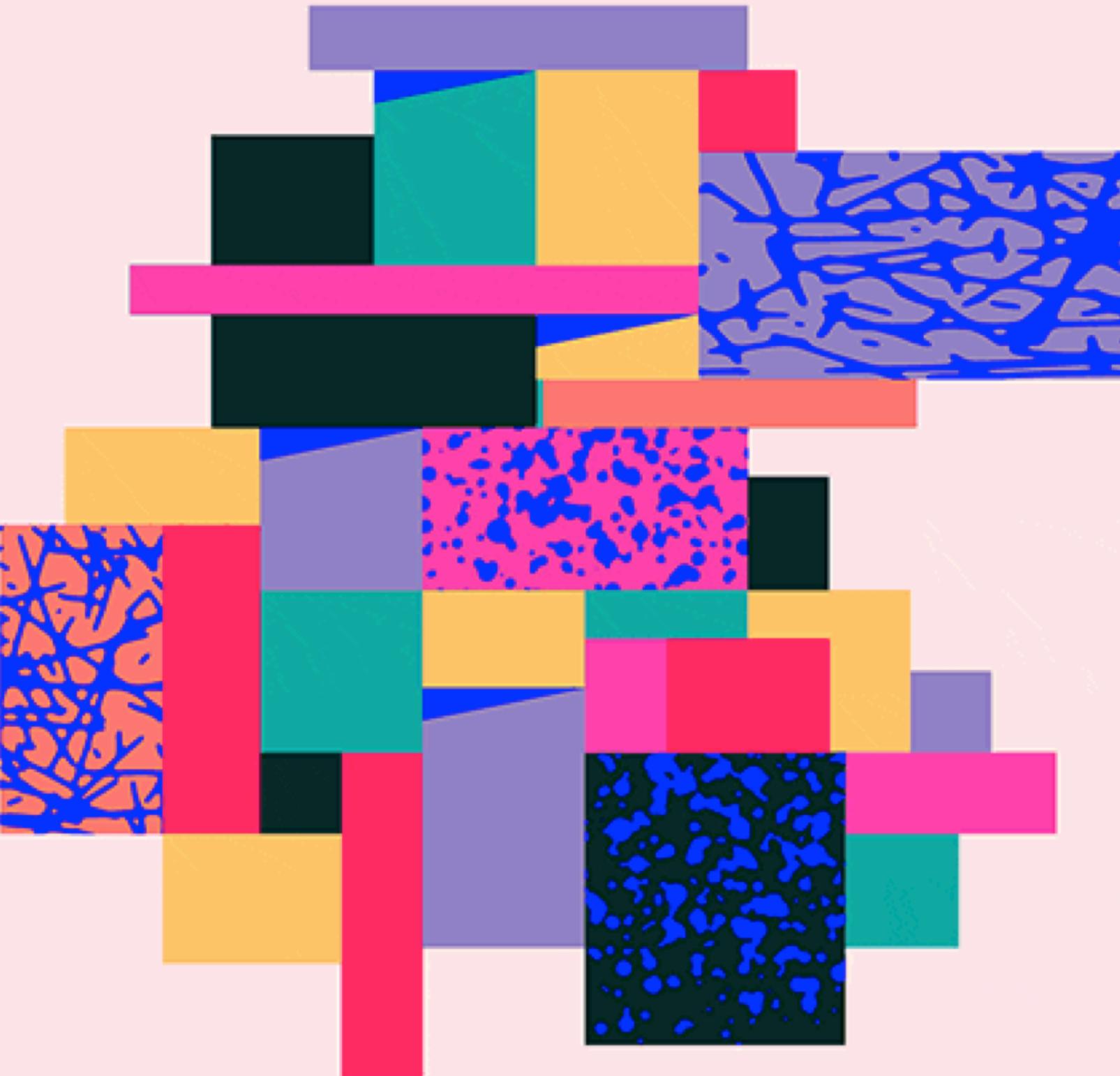
IMMUTABLE LAYOUT

- ▶ Avoid unnecessary layout shifts during page load

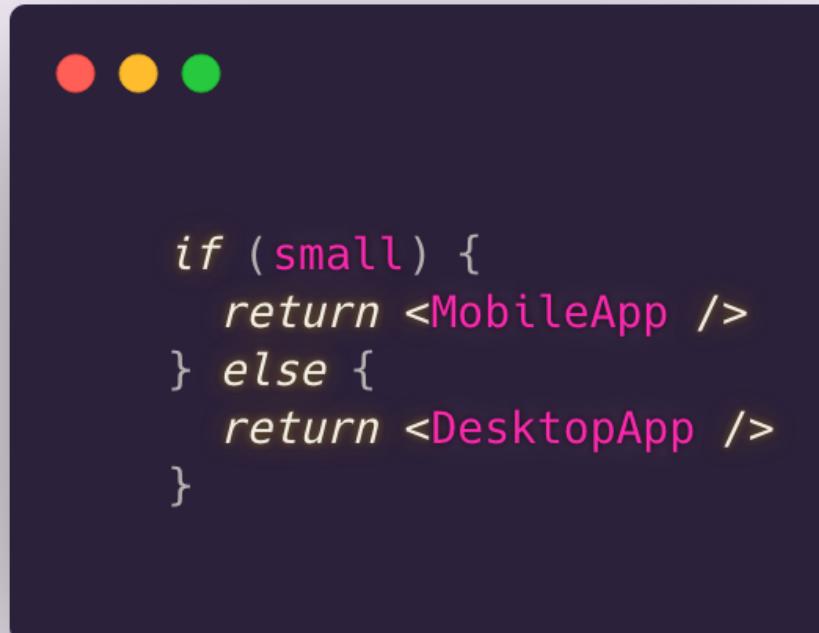


IMMUTABLE LAYOUT

- ▶ Implement layouts with placeholder/gap for expected client-side content
- ▶ Use CSS instead of JS to handle the layout of the page



CONDITIONAL RENDERING IS NOT YOUR FRIEND



```
if (small) {  
    return <MobileApp />  
} else {  
    return <DesktopApp />  
}
```



CONDITIONAL RENDERING IS NOT YOUR FRIEND

- ▶ With the `matchMedia()` Web API you can't reliably detect the browser size in the server which leads to strange layout shifts when the initial positioning is incorrect.



CONDITIONAL RENDERING IS NOT YOUR FRIEND

- ▶ Use CSS media queries directly or a library like arts/fresnel that wraps all Media components in CSS.



```
import React from "react"
import ReactDOM from "react-dom"
import { createMedia } from "@artsy/fresnel"

const { MediaContextProvider, Media } = createMedia({
    breakpoints: {
        sm: 0,
        md: 768
    },
})

const App = () => (
    <MediaContextProvider>
        <Media at="sm">
            <MobileApp />
        </Media>
        <Media greaterThan="sm">
            <DesktopApp />
        </Media>
    </MediaContextProvider>
)

ReactDOM.render(<App />, document.getElementById("react"))
```



ERROR: WINDOW IS UNDEFINED



ERROR: WINDOW IS UNDEFINED

When building a site you might run into the window is undefined or document is undefined error. This happens when logic within an app assume the **browser** window is defined in a **server**



ERROR: WINDOW IS UNDEFINED

Your first inclination to resolve the undefined Window error might be to write something like:



```
typeof window !== undefined ? // render component : // return null
```



ERROR: WINDOW IS UNDEFINED



However, ReactDOM.hydrate:
expects that the rendered content is **identical**
between the server and the client.

✖️ does not guarantee that attribute differences
will be patched up in case of mismatches.

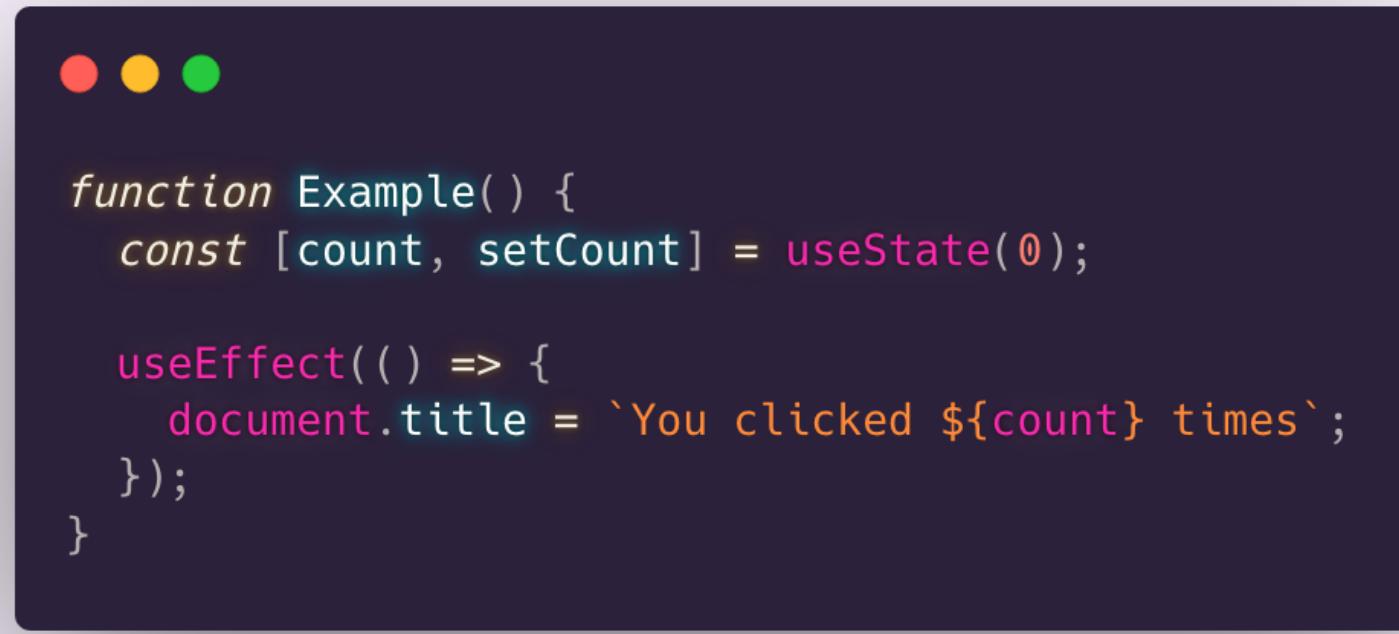


ERROR: DOCUMENT IS UNDEFINED

- ▶ Avoid reconciliation error when ReactDOM.hydrates a site from HTML -> React.
- ▶ Wrap React that can only render when Window or document is defined in useEffect which only fires after the component has mounted.



ERROR: DOCUMENT IS UNDEFINED



A screenshot of a dark-themed browser window. At the top left are three circular window control buttons: red, yellow, and green. The main content area contains the following JavaScript code:

```
function Example() {
  const [count, setCount] = useState(0);

  useEffect(() => {
    document.title = `You clicked ${count} times`;
  });
}
```

(example from React docs)



"JavaScript is a powerful language that can do some incredible things, but it's incredibly easy to jump to using it too early in development, when you could be using HTML and CSS instead..."

-- Iain Bean, Your blog doesn't need a JavaScript framework



...Consider the rule of least power: Don't use the more powerful language (JavaScript) until you've exhausted the capabilities of less powerful languages (HTML)."

-- Iain Bean, Your blog doesn't need a JavaScript framework



SUMMARY

- ▶ In a Server-Side Rendered context it's important to consider how the page loads and what data is or is not available on initial page load.
- ▶ CSS is a better tool for managing responsiveness
- ▶ Reference browser specific elements like document or window directly within useEffect() to



FURTHER READING

- ▶ <https://www.gatsbyjs.org/docs/react-hydration/>
- ▶ <https://joshwcomeau.com/react/the-perils-of-rehydration/>
- ▶ <https://reactjs.org/docs/reconciliation.html>
 - ▶ <https://www.webpagetest.org/>
 - ▶ <https://github.com/artsy/fresnel>



THANK YOU!

SEE YOU IN CYBERSPACE



@waterproofheart



www.monica.dev



www.monica.dev | @waterproofheart