React.js for Today's World

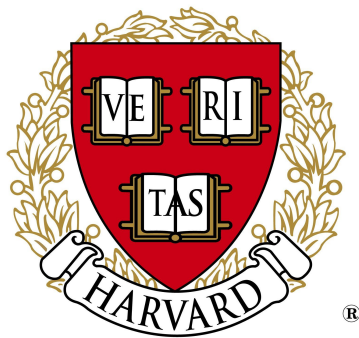Anthony Jesmok

Welcome and Thank You!

Attendees, nvisia, Colleagues and Nominators, Sponsors, And Everyone Else!

Who Am I?

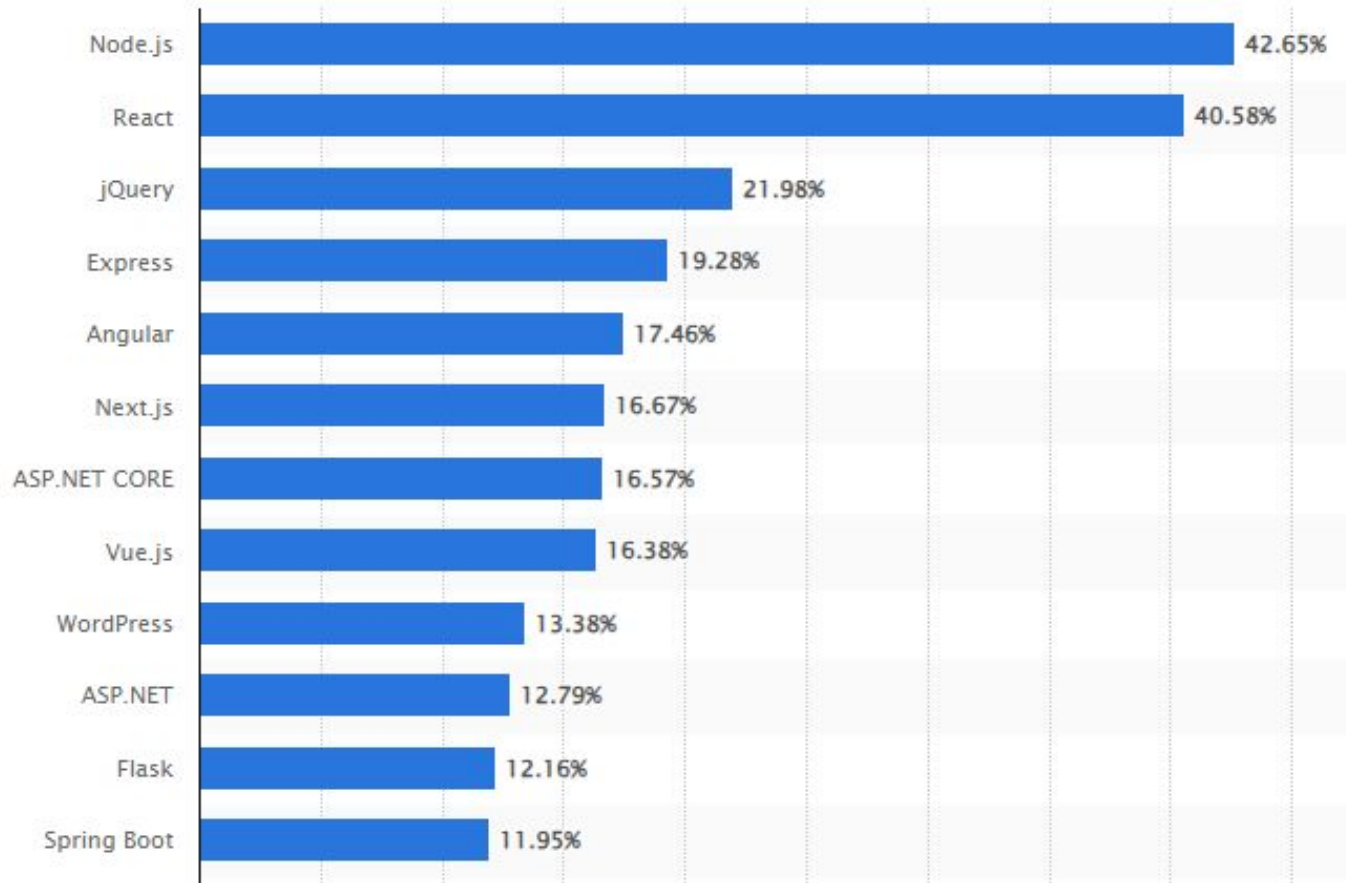# Today's Agenda

- **General Scope**
- Why Consider React?
- Core Pieces of React and Best Practices
- React 18 - What's New?
- Server-Side Rendering (Next.js)
- Open Discussion

- CommitStrip.com

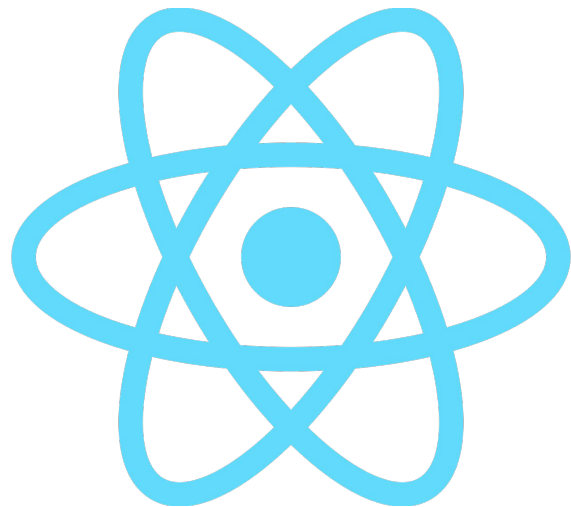| Framework	Percentage
Node.js	42.65%
React	40.58%
jQuery	21.98%
Express	19.28%
Angular	17.46%
Next.js	16.67%
ASP.NET CORE	16.57%
Vue.js	16.38%
WordPress	13.38%
ASP.NET	12.79%
Flask	12.16%
Spring Boot	11.95%

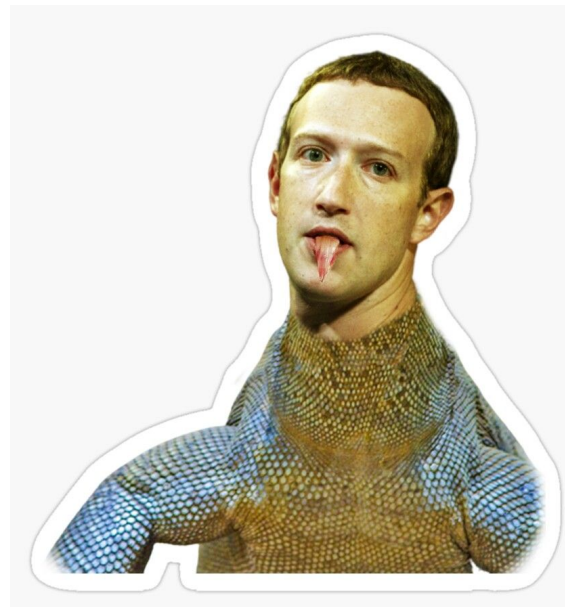React Is Kind of a Big Deal - Statista Web Frameworks Survey 2023

What Is React?

- A front-end library maintained by Meta.
- Launched in May 2013.
- Single-page applications.
- Declarative programming.
- Unopinionated and front-end only.
- Huge community.
- Extendable with libraries.
- Biggest Features:
  - Uses **components** to build user interfaces.
  - Maintains component state using the **Virtual DOM**.

Wait, Meta…

- Yes, React was originally built for Facebook.
- Meta engineers maintain React alongside the community.
- This has caused controversy because:
  - Meta's interests may change.
  - Numerous licensing fiascos.
    - Patent Rights
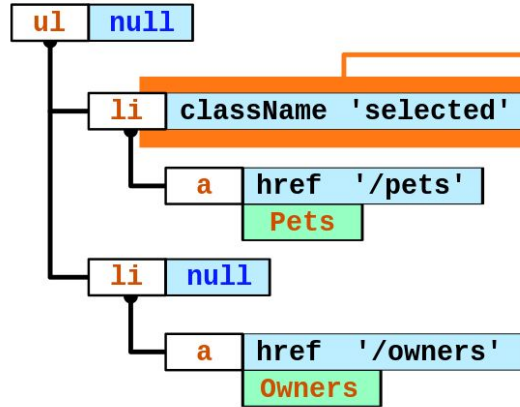 - Mark Zuckerberg could be a lizard person.

React Components - A Basic Example Using Functions

```
function ProfilePage(props) {
  const showMessage = () => {
    alert('Followed ' + props.user);
  };

  const handleClick = () => {
    setTimeout(showMessage, 3000);
  };

  return (
    <button onClick={handleClick}>Follow</button>
  );
}
```
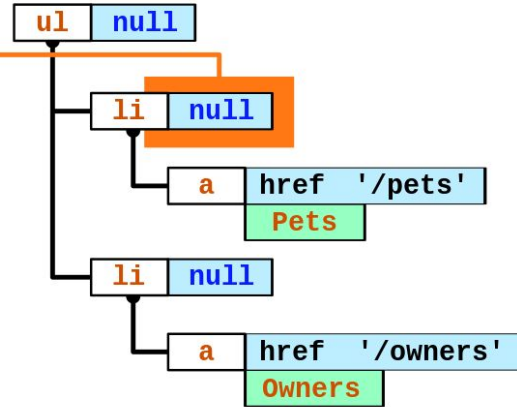
- Reusable and Stackable
  - Unidirectional Data Flow- NOT MVC!
- Uses JavaScript Imports and Exports
- Returns JSX
- Handlers

Virtual DOM - Only Send To DOM What Changed

Old V

ul	null

li	className 'selected'

a	href '/pets'

Pets

li	null

a	href '/owners'

Owners

New V

ul	null

li	null

a	href '/pets'

Pets

li	null

a	href '/owners'

Owners

Real DOM

```
<ul>
  <li> class="selected">
    <a href="/pets">Pets</a>
  </li>
  <li>
    <a href="/owners">Owners</a>
  </li>
</ul>
```

- Wikipedia

Hooks

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

function Example() {
  // Declare a new state variable, which we'll call "count"
  const [count, setCount] = useState(0);

  return (
    <div>
      <p>You clicked {count} times</p>
      <button onClick={() => setCount(count + 1)}>
        Click me
      </button>
    </div>
  );
}
```

- Used only with functional components.
- Allow you to "hook" into the Virtual DOM process.
- State management and side effects.
- Libraries!

- Simply-How.com

Routing - Linking Our Components to URLs

```
function App() {
  return (
    <Router>
    <div>
        <h2>React Router Step By Step Tutorial</h2>
        <nav>
        <ul>
          <li><Link to={'/'} > Home </Link></li>
          <li><Link to={'/contact'} >Contact</Link></li>
          <li><Link to={'/about'} >About</Link></li>
          <li><Link to={'/services'} >Services</Link></li>
        </ul>
        </nav>
        <Switch>
            <Route path = "/" exact component = {Home}></Route>
            <Route path = "/contact" component = {Contact}></Route>
            <Route path = "/about" component = {About}></Route>
            <Route path = "/services" component = {Services}></Route>
        </Switch>
      </div>
      </Router>
  );
}
```

- Java Guides

- React does not come with routing!
- Most popular one is React Router.
- Root component contains routes defined in JSX.

React Router

Concurrent Rendering - New for React 18

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

function MyComponent() {
  const [isPending, startTransition] = useTransition({ timeoutMs: 1000 });

  function handleClick() {
    startTransition(() => {
      // write logic to perform some state updates or async operations here
    });
  }

  return (
    <button onClick={handleClick}>
      {isPending ? 'Loading...': 'Click me!'}
    </button>
  );
}
```

-OpenReplay

- Huge improvement to the Virtual DOM.
- Components can now render without interrupting the user experience.
- Hooks for tying into these processes.
  - Loading text, etc.

Automatic Batching - New for React 18

```
// Before: only React events were batched.
setTimeout(() => {
  setCount(c => c + 1);
  setFlag(f => !f);
  // React will render twice, once for each state update (no batching)
}, 1000);

// After: updates inside of timeouts, promises,
// native event handlers or any other event are batched.
setTimeout(() => {
  setCount(c => c + 1);
  setFlag(f => !f);
  // React will only re-render once at the end (that's batching!)
}, 1000);
```

-React Blog

- Another improvement to the Virtual DOM.
- React intelligently groups events that cause re-rendering.
- Virtual DOM only has to re-render once with all the changes applied.
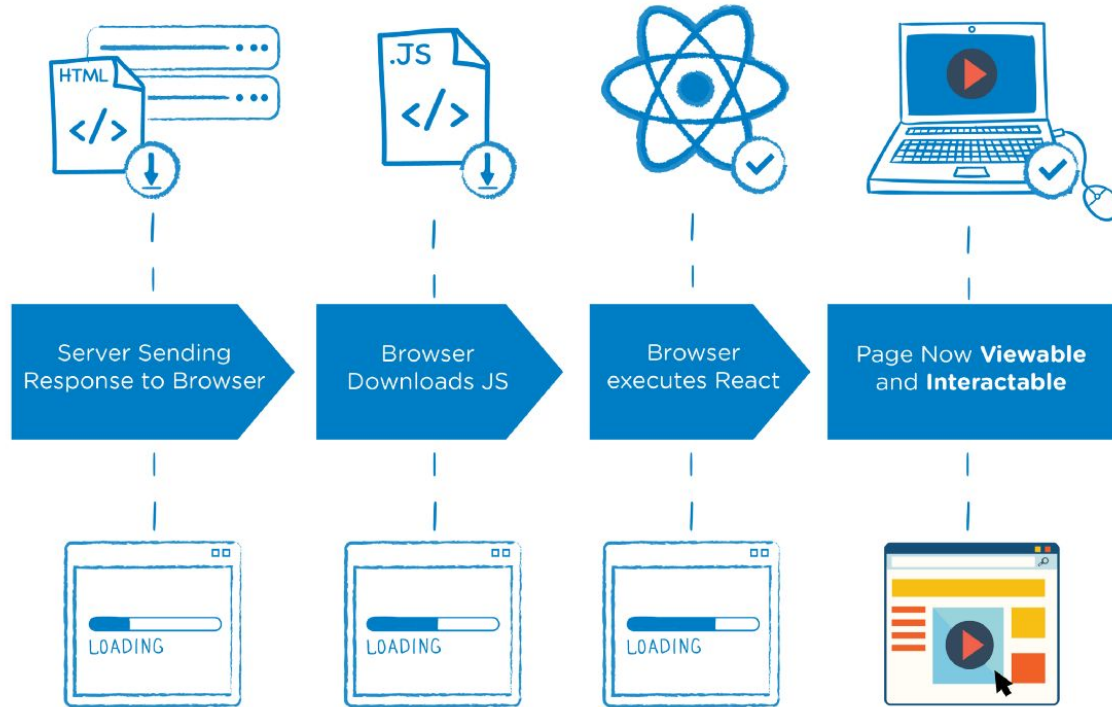
Suspense - New for React 18

```
<Suspense fallback={<Spinner />}>
  <Comments />
</Suspense>
```
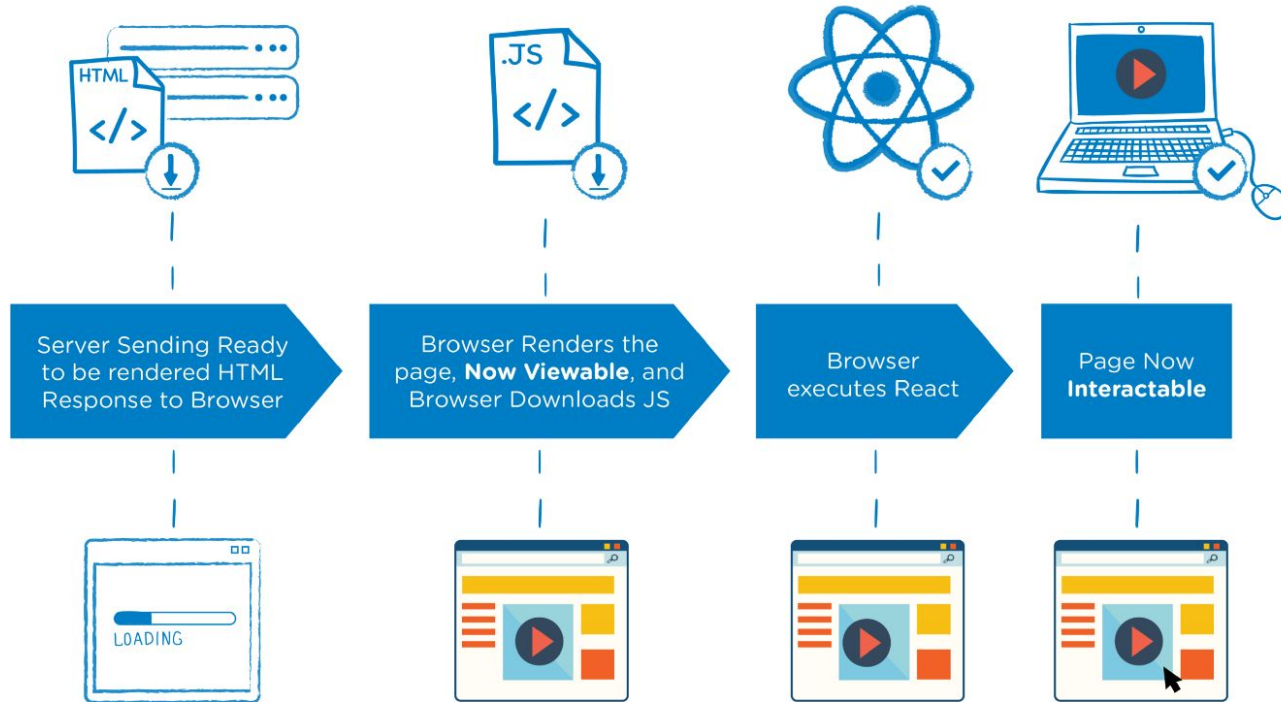
-React Blog

- Handle content that is not ready to be displayed yet.
- Spinners, progress bars, etc.
- Had limited availability in previous releases.
- Gateway to the next big trend in React.

CSR

Server Sending Response to Browser → Browser Downloads JS → Browser executes React → Page Now **Viewable** and **Interactable**

-Yudhajit Adhikary

SSR

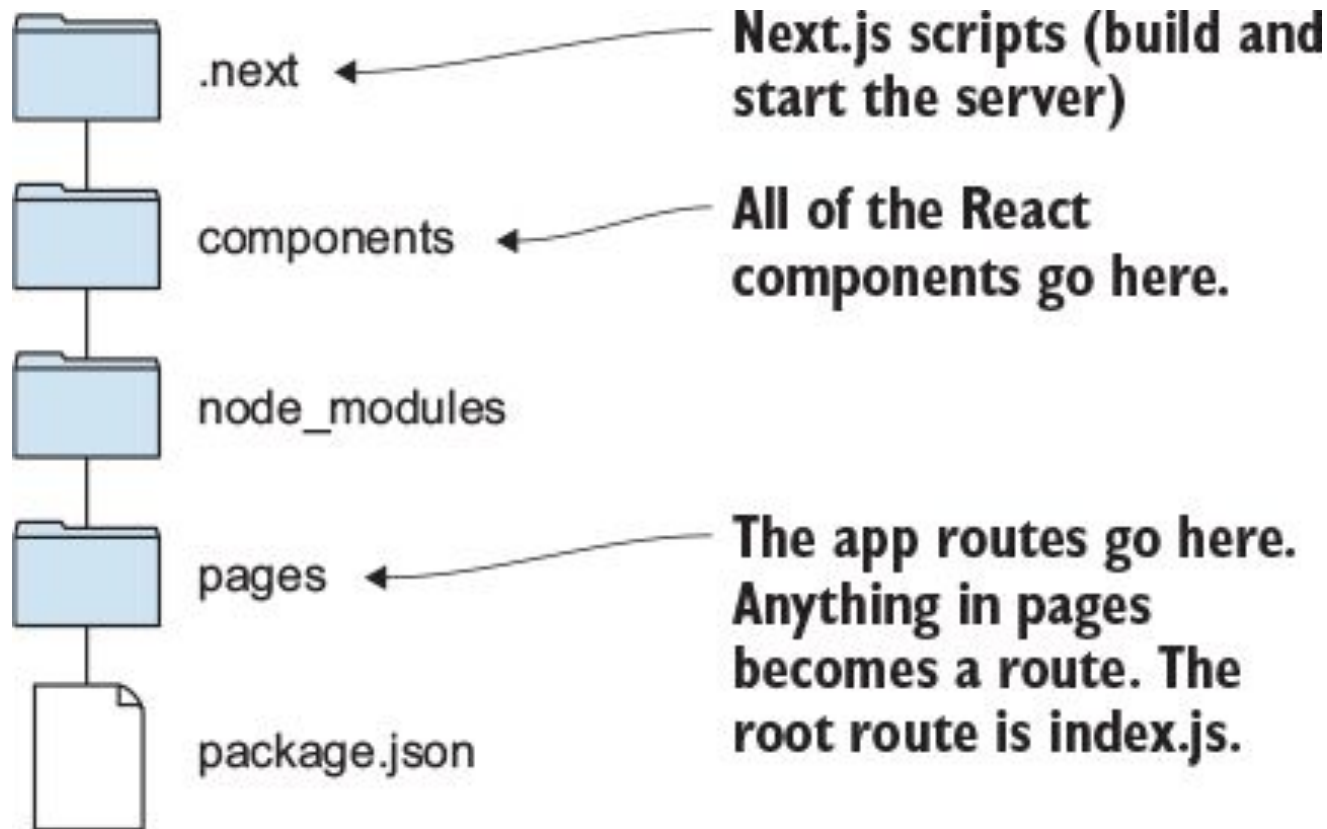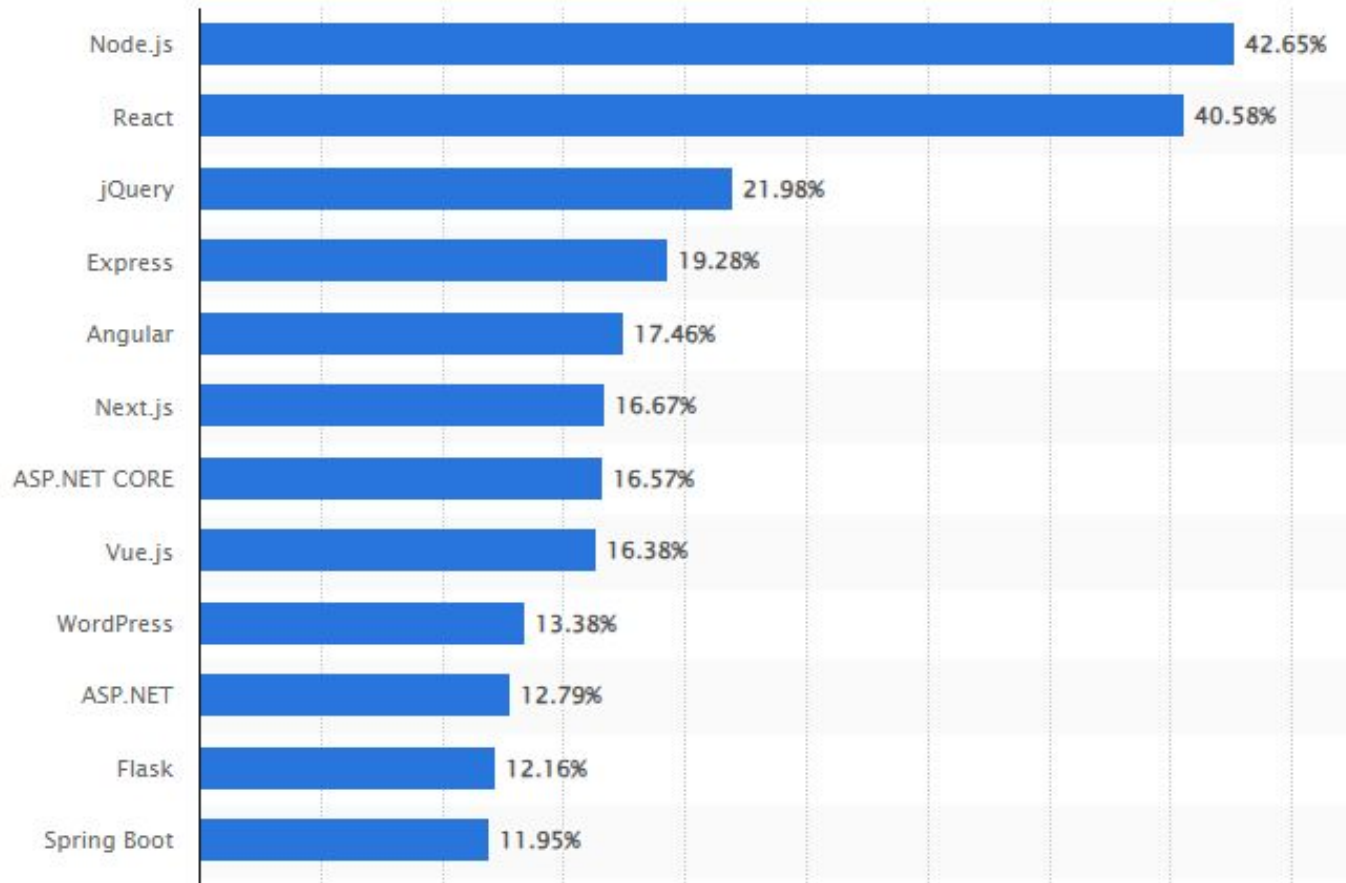| Server Sending Ready to be rendered HTML Response to Browser | Browser Renders the page, **Now Viewable**, and Browser Downloads JS | Browser executes React | Page Now **Interactable** |

LOADING

-Yudhajit Adhikary

NEXT.JS

- React + Optimized Additional Features + Rust Compiled Into JavaScript
- Launched in 2016, Significant Features Launched in 2021+
- Built-In Optimizations In Exchange For Opinionated Philosophies
  - Automatic SSR and CSR (Isomorphic Rendering)
  - Serverless, Node.js and Static JS
  - Fetching
  - Minimization of All Code
  - Routing

.next ← **Next.js scripts (build and start the server)**

components ← **All of the React components go here.**

node_modules

pages ← **The app routes go here. Anything in pages becomes a route. The root route is index.js.**

package.json

-Elyse K. Gordon - An Example of Next.js Opinionation

Next.js Is Kind of a Big Deal - Statista Web Frameworks Survey 2023

NEXT.JS

- Maintained by Vercel, a Cloud services provider.
- Contributors Include Google and Netlify
- Recommended by Meta in React Docs for SSR.
- Used By Companies Including:
  - The Washington Post
  - Nike
  - Apple
  - Walmart
  - Starbucks
- Bills Itself as "React for the Enterprise"

Open Discussion: What Would You Like to Talk About?

Thank You!

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