

Information Technologies for Industrial Engineers

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JavaScript Frameworks

What is a framework?

- A framework is a library that offers **opinions** about how software gets built.
- These opinions allow for **predictability** and **homogeneity** in an application.
 - Predictability allows software to scale to an enormous size and still be maintainable.
 - Predictability and maintainability are essential for the health and longevity of software.

Imperative and declarative programming

- **Imperative**
 - Tell a computer how to do something.
- **Declarative**
 - Describe to a computer what you want.

To do this

- List 1
- List 2
- List 3

Imperative programming

- JavaScript

```
const ul = document.createElement("ul");
for (let i = 1; i < 4; i++) {
  const li = document.createElement("li");
  li.textContent = `List ${i}`;
  ul.appendChild(li);
}
document.body.appendChild(ul);
```

Declarative

- Just use HTML

```
<ul>  
  <li>List 1</li>  
  <li>List 2</li>  
  <li>List 3</li>  
</ul>
```

But...

- `HTML` only works for static site.
- For dynamic web application, a **framework** can help us write code more **declaratively**.

Vanilla JS or Framework?

- Vanilla JS
 - A less complex site, for example a personal to-do list or a site that displays mostly static content
- Framework
 - A large site with a complex UI. Frameworks provide solutions to common problems that would take an absurd amount of time and patience to implement with pure JavaScript.

Stack-Overflow survey 2023

<https://survey.stackoverflow.co/2023/#section-most-popular-technologies-web-frameworks-and-technologies>

React

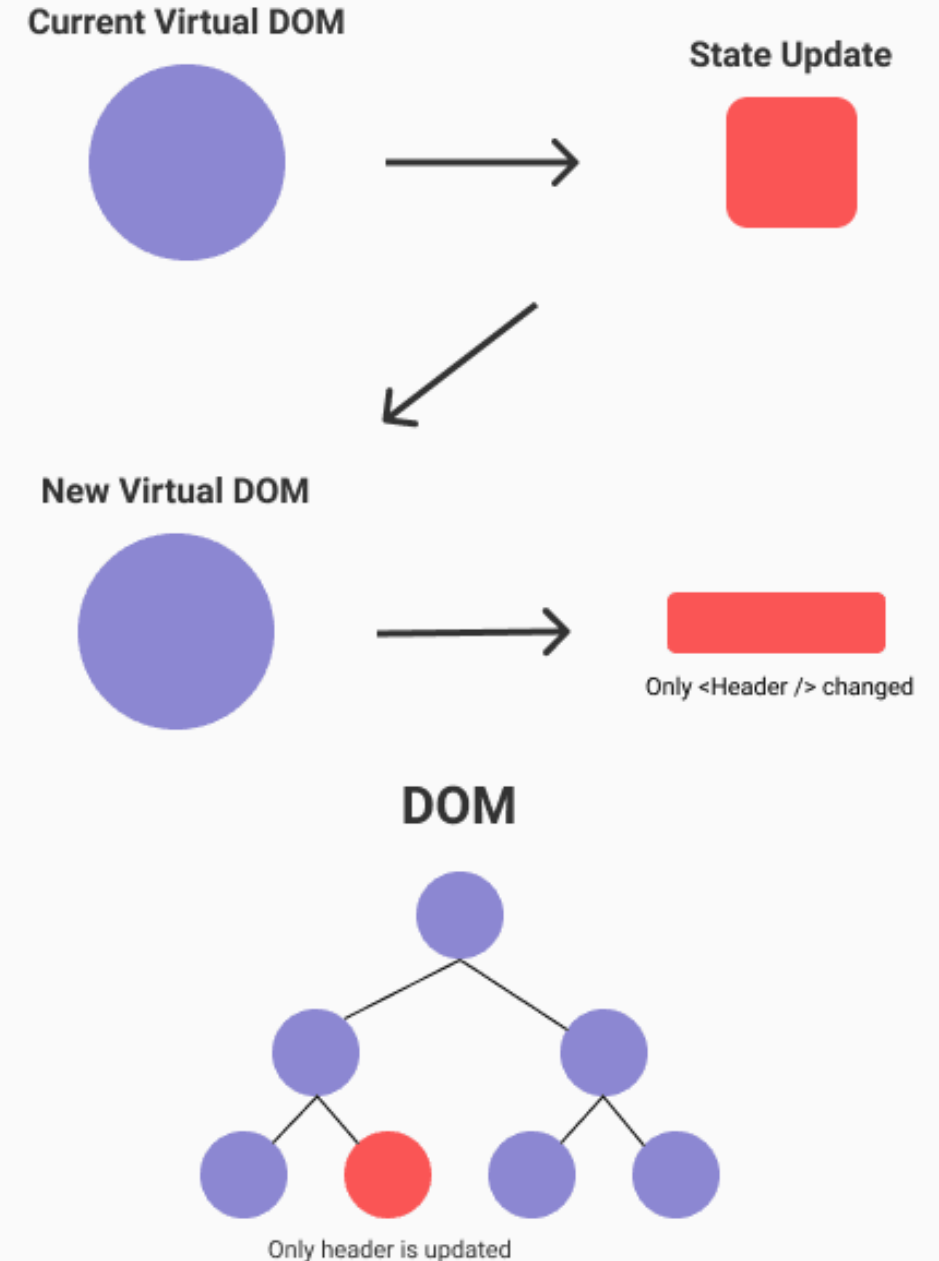
JSX

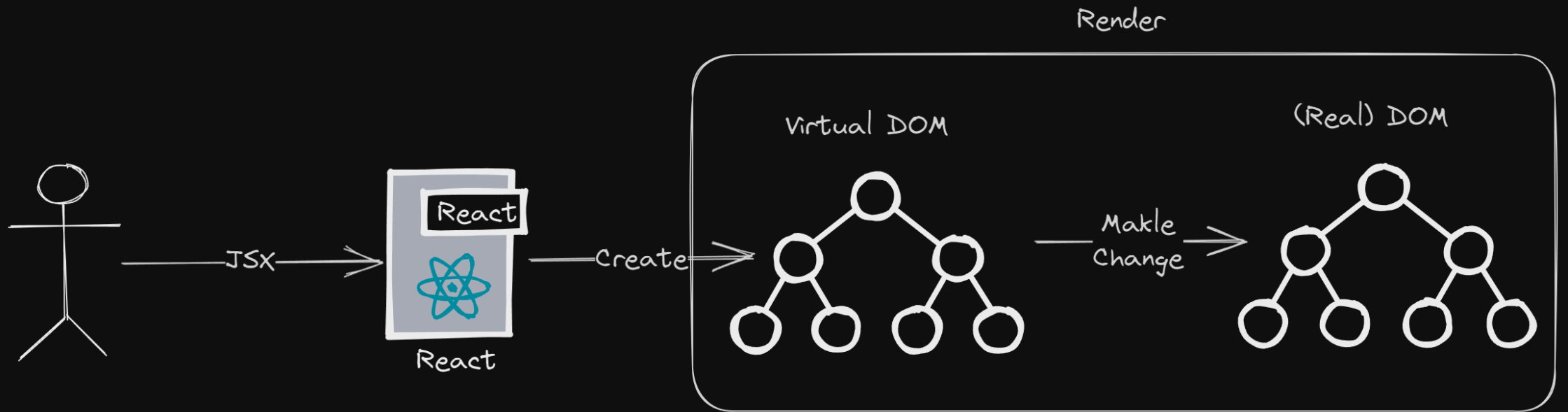
```
const element = <h1>Hello, world!</h1>;
```

- This is neither a string nor HTML.
- It is called JSX, and it is a syntax extension to JavaScript. - - This tells React to describe what the UI should look like.
- JSX produces React "elements".
- [Source](#)

Virtual DOM

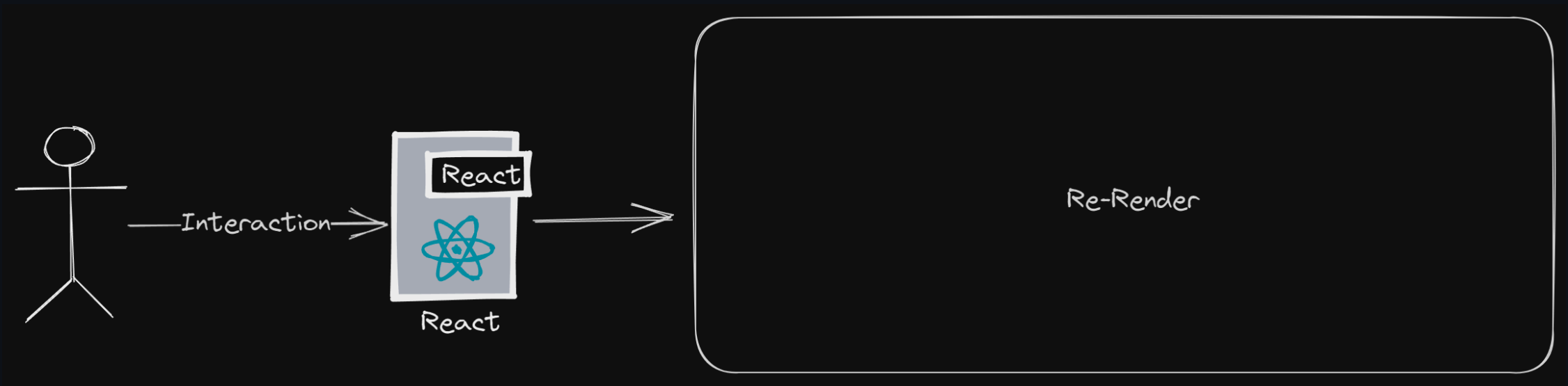
- Virtual DOM (VDOM) represents the DOM tree in memory.
- VDOM performs calculations and decides which elements of the actual DOM should be mutated.
 - Faster performance.
- [Source](#)





Rendering process

- Rendering is a process that is triggered by a change of state in some component of your application, when a state change occurs React.
- See illustration in [Source](#).



Get started with `react`

- `npm create vite@latest`
 - `Project name`: `my-app` (any name)
 - `Select a framework`: `React`
 - `Select a variant`: `Typescript + SWC`
- `cd my-app`
- `npm run dev`

Build


- `npm run build`

Preview

- `npm run preview`

Optional

- If you want to preview the build with `live server` you need to set this setting in `vite.config.ts`.

```
export default defineConfig({  
  plugins: [react()],  
  base: "./",   
});
```

- Then run `npm run build`.

Deploy

- Deploy `./dist` folder to Netlify.

Online IDE

- <https://stackblitz.com/>
- <https://codesandbox.io/>