



React

Introduction to React

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What is React?

React is an open-source JavaScript library for building user interfaces, especially for single-page applications. It allows developers to create reusable UI components, making development efficient and scalable.

Who Created React?







React was created by Jordan Walke, a software engineer at Facebook, in 2011. It was first deployed on Facebook's news feed in 2011 and later on Instagram in 2012. Facebook officially made React open-source in 2013.

Why Use React?

React is widely used because:

- **Component-Based:** Code is divided into reusable components.
- **Virtual DOM:** Efficiently updates only the necessary parts of the UI.
- **Declarative UI:** simplifies the creation of dynamic applications.
- **Fast Performance:** Uses a virtual DOM for efficient rendering.
- **Strong Community Support:** Large developer community and ecosystem.
- **Easy to Learn:** Uses JavaScript and JSX (JavaScript XML).

React vs Other Front-End Frameworks

Feature	React 	Angular 	Vue.js 
Type	Library	Framework	Framework
Developed By	Facebook	Google	Evan You
Learning Curve	Easy	Medium	Easy
Performance	High	High	High
Virtual DOM	 Yes	 No	 Yes
Size	Small	Large	Small
State Management	Hooks, Context API	RxJS, Services	Vuex

Virtual DOM vs Real DOM

What is the Real DOM?

- The Document Object Model (DOM) represents the structure of a web page.
- Updating elements in the real DOM is slow because the entire page re-renders.

What is the Virtual DOM?

- The Virtual DOM is a lightweight copy of the real DOM.
- React updates only the changed elements, improving performance.
- Faster rendering → React updates UI efficiently without unnecessary re-renders.

Key Features of React








- JSX (JavaScript XML) – Syntax extension that looks like HTML in JavaScript.
- Components – Reusable UI building blocks.
- State & Props – Efficient data management and sharing.
- Hooks – Functional components can manage state using useState, useEffect, etc.
- React Router – Enables navigation in single-page applications.
- Server-Side Rendering (SSR) – Improves SEO and performance with frameworks like Next.js.

Who Uses React?








- Facebook – React was originally developed by Facebook.
- Instagram – Uses React for web and mobile UI.
- Netflix – Uses React to optimize rendering performance.
- WhatsApp – Uses React for its web application.
- Airbnb – React improves UI interactivity and scalability.
- Uber – Uses React for dynamic UI components.
- Amazon – React helps with performance optimization.

React vs Traditional JavaScript

React:

-  Uses Virtual DOM → Faster UI updates.
-  Component-based architecture → Reusable and modular code.
-  Uses JSX (JavaScript + XML) for better readability.
-  Efficient state management with hooks (useState, useEffect).
-  Declarative UI → Focus on what should happen, not how.
-  Built-in support for SPA (Single Page Applications).
-  Strong ecosystem with tools like React Router, Redux, and Next.js.

Traditional JavaScript:

-  Uses Real DOM, which is slower for frequent updates.
-  UI updates require manual DOM manipulation (document.getElementById(), innerHTML).
-  No built-in support for component-based development.
-  Complex state management, requiring workarounds like global variables.
-  Imperative UI → Developers must specify step-by-step instructions.
-  Managing large applications can be difficult and error-prone.
-  No direct support for SPAs, requires additional frameworks.

What Can You Build with React?

- Single Page Applications (SPA)
- Dashboards and Admin Panels
- E-commerce Websites
- Social Media Platforms
- Progressive Web Apps (PWAs)
- Mobile Apps (React Native)

Summary & What's Next?

- React is a powerful front-end library for building modern applications.
- It was created by Facebook and is widely adopted by tech giants.
- React's Virtual DOM, component-based approach, and performance benefits make it a top choice.
- Next Topic: Setting Up React – Installing Node.js, Create React App, and project structure.