# **Next.js Notes**

# Chapter 1 —> Birth

## **JavaScript Evolution**

- Created by Brendan Eich (1995) at Netscape.
- Next.js was created in 2016 by Vercel (led by Guillermo Rauch) to address React's limitations.
- Framework progression: jQuery → Angular → Node.js → React.js → Next.js

## **Hello World Example**

- Vanilla JS: Verbose DOM manipulation.
- **jQuery**: Simplified syntax.
- Angular/React: More code for this example but scalable in "bigger picture" (component-based).

## Why Modern Frameworks?

- Component Architecture: Reusable UI pieces (e.g., buttons).
- **Virtual DOM**: Efficient UI updates (only changes rendered).
- **Ecosystem**: Strong community, documentation, and tools.
- Modern frameworks improve efficiency, scalability, and performance.

# Chapter 2 —> Introduction

**Next.js** is a **full-stack web framework** built on top of **React.js** or simply we can say it's a React framework. While React is a **UI library** that focuses on building components, Next.js extends it into a complete framework for building **production-grade web applications**.

#### What is a Framework?

- A framework serves as a tool equipped with predefined rules and conventions that offer a structured approach for building applications.
- Handles database integration, routing, authentication, etc.
- Helps developers focus on writing application logic rather than low-level setups.

## **Key features of Next.js:**

- 1. Solves React limitations (SEO, routing, performance)
- 2. Built-in features:
  - File-based routing
  - Efficient code splitting
  - Hybrid rendering (SSR/SSG)
  - Built-in optimizations (images, fonts, SEO)
  - HMR (Hot Module Replacement)
  - API Routes (backend)
  - Built-in support for Sass
  - CSS modules
  - Data fetching choice (SSG, SSR, ISR)
  - Error handling
  - Metadata API (For SEO)
  - Internationalization(support for any spoken language), etc.

## Why Use a React Framework like Next.js?

- 1. Less Tooling Time
  - No need to configure bundlers, compilers, formatters, etc.
  - Built-in support for routing, rendering, auth, and more.
  - Focus more on business logic and React code.

#### 2. Easy Learning Curve

- Easier to learn if you're already familiar with React.
- Includes backend features but without complex setup (no routing config needed).

#### 3. Improved Performance

- Built-in SSR (Server-Side Rendering) & SSG (Static Site Generation).
- Automatic code splitting for faster page loads and better UX.
- React has introduced React Server Components for SSR, but Next.js automates the setup.

Follows "Convention over Configuration" = less boilerplate code.

#### 4. SEO Advantage

- React.js renders everything on the client side, sending a minimal initial HTML response from the server. The server sends a minimal HTML file code and a JavaScript file that the browser executes to generate the HTML —hard for search engines to crawl.
- Next.js sends **full HTML file** and minimal JavaScript code to render only the content requiring client-side interaction.
- This improves:
  - Visibility
  - Ranking
  - Traffic
  - User trust

## When to Use Next.js over React

Choose **Next.js** when:

You care about SEO

- You want **fast page loads** (via SSR/SSG)
- You don't want to configure everything yourself
- You want an all-in-one full-stack React framework
- You need routing, data fetching, and backend API in one codebase

#### Choose **React (only)** when:

- You're building a simple SPA or PWA
- You need complete control over the setup
- You're integrating into an existing app (e.g., with a non-React backend)