بسم الله الرحمن الرحيم

Techniques and tools used in application

Techniques and tools used in application development

- **Internet Technology :**

  The Internet is defined as an electronic communications network that connects the computer network, public network connecting millions of computers around the world. It consists of millions of governments, academic, commercial and small government networks. The Internet is at the same time a global broadcasting capability, an information dissemination mechanism and a medium for cooperation and interaction between individuals and their computers without regard to their geographical location, Today, the Internet has a great deal of data and services, and perhaps the most commonly used today is web pages and phone applications.

- **BlockChain :**

  Blockchain is a decentralized and encrypted system for recording and storing information across a network of interconnected computers. The data is organized into a series of blocks linked together in a chain, with each block being connected to the previous block using cryptographic techniques. This creates a secure and transparent record of transactions or data stored on the blockchain. The decentralized nature of blockchain

ensures that no single entity has control over the entire system, enhancing security and trust in the network,
In the development this web Application, the choice of a suitable blockchain framework is critical to ensure that the underlying technology aligns with the project's goals and requirements. After careful consideration and evaluation of various blockchain frameworks, we have selected Hyperledger Fabric for the following reasons: Scalability , Privacy and Confidentiality , Smart Contract Support ,

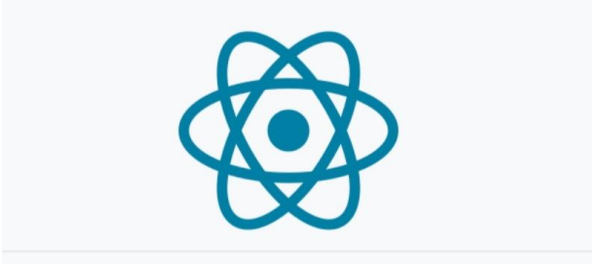
- **Visual Studio Code :**

  Visual studio code provides fast tools also have many package for many program language that needed to create this web Application. Also it provides many advantages such as ease of use, and the presence of great content to learn to use the program.

- **Smart contract :**

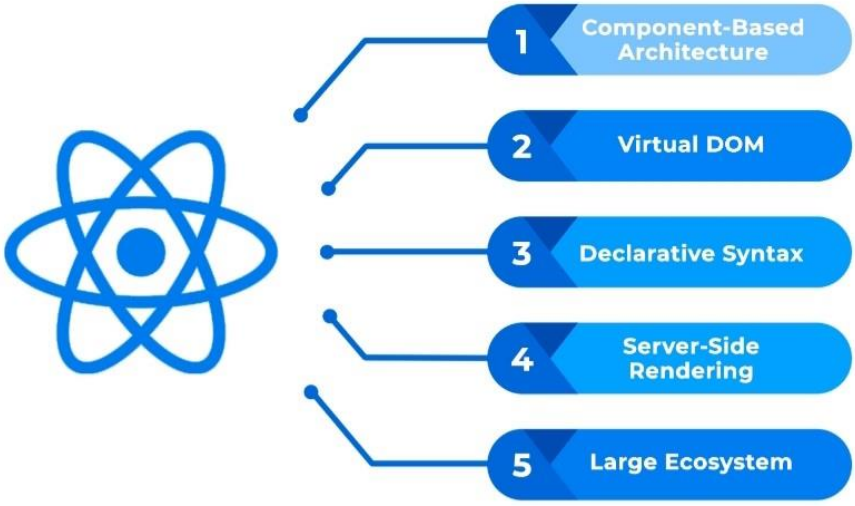
  Smart contracts are self-executing contracts with the terms of the agreement directly written into code. In the context of Project , smart contracts facilitate automated and secure execution of predefined business logic on the blockchain. This ensures transparency, immutability, and trust in the execution of transactions. In the development of Our Project , the decision to use Java as the programming language for writing smart contracts on the Hyperledger Fabric .

- **React.js :**



React, is an open-source JavaScript library developed and maintained by Facebook. It is widely used for building user interfaces. It follows a declarative and component-based approach, allowing developers to describe how the UI should look based on the current state of the application. This makes it easier to build and maintain complex UIs by breaking them down into smaller, reusable components. React.js efficiently updates and renders the UI by using a virtual representation of the actual DOM, resulting in improved performance and a smoother user experience.

What Make React Unique ?



Component-Based Architecture :
React 's component-based architecture promotes modularity and reusability. This allows for the creation of encapsulated UI components, making it easier to manage and scale the frontend as the project evolves. The component-based approach also facilitates collaboration among developers, as different parts of the UI can be developed independently.

Virtual DOM for Efficient Rendering :
React 's Virtual DOM ensures efficient rendering of UI components by minimizing actual DOM manipulations. This results in improved

performance and a smoother user experience, crucial aspects for Project to provide a responsive and scalable frontend.

Declarative Syntax :
React 's declarative syntax simplifies the process of building interactive user interfaces. The ability to describe the desired UI state and let React handle the updates efficiently aligns with the project's goal of creating a responsive and user-friendly interface.

Server-side rendering :
(SSR) is indeed a feature of React that contributes to its uniqueness and provides certain advantages. While SSR itself is not unique to React, the way React handles server-side rendering and its integration with the virtual DOM and component lifecycle make it a notable feature.

Rich Ecosystem :
React.js is part of a rich ecosystem of tools and libraries, such as React Router for navigation and Redux for state management. This ecosystem provides a well-established foundation for building complex and feature-rich user interfaces, meeting the diverse needs of Project.

Compatibility with Web3 Libraries:
React seamlessly integrates with various Web3 libraries, making it easier to incorporate blockchain functionality into our project. This compatibility reduces development time and effort, enabling us to focus on the unique aspects of our application.

State Management:
The flux architecture and the introduction of hooks in React simplify state management. In the decentralized environment of Web3, where data flow can be complex, React 's state management capabilities streamline the handling of application state, leading to better predictability and maintainability.

- **JavaScript Programming Language :**

JavaScript is a high-level, versatile, and widely used programming language that is primarily known for its role in building dynamic and interactive web applications. It is a core technology for web development and is supported by all major web browsers.

- **JavaScript Features :**

Client-Side Scripting:
On the client side, JavaScript is commonly used to enhance the interactivity of web pages. It can dynamically modify content, handle user input, and communicate with servers asynchronously using technologies like AJAX (Asynchronous JavaScript and XML).

Server-Side Development:
With the introduction of environments like Node.js, JavaScript can now be used for server-side development as well. This enables developers to use JavaScript for both client-side and server-side scripting, providing a more unified development experience.

Asynchronous Programming:
JavaScript is designed to handle asynchronous programming through features like callbacks, Promises, and async/await. This is crucial for handling tasks such as fetching data from servers without blocking the execution of other operations.

Support write Smart Contract in Hyperledger Fabric :
Smart contracts written in JavaScript for Hyperledger Fabric run on the Node.js runtime. Node.js is a JavaScript runtime that allows developers to execute JavaScript code outside the context of a web browser. It provides features such as asynchronous I/O, making it well-suited for server-side applications, including smart contract development in the context of Hyperledger Fabric.