



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

MODERN WEB APPLICATION DEVELOPMENT

Kallamadi Shivani, N Naveen Kumar

Student, Associate Professor
M.Tech Software Engineering,
School of Information Technology JNTUH, Hyderabad, India

Abstract: Software which runs on a web browser is called web applications. Normal software programs run on a local system or natively on the operating system. The two different types of approaches available for web application development are traditional way and the modern approach called Single Page Applications (SPAs). SPAs perform most of their logic using web browser and communicate using Application Programming Interface (APIs). Today's web applications have higher user expectations and greater demands than ever before. There are many methods involved in building web applications. One among them is using MERN stack to develop web applications. MERN stack is the abbreviation for Mongo DB, Express JS, React JS and Node Js.

Using this method, frontend is designed using React JS one of the popular Single Page Application framework, backend or APIs are created using Express and Node JS and the database used here is MongoDB. Mongo DB is a document based database which can hold data in the form of JSON structure.

I. INTRODUCTION

Web applications are computer programs that the customer runs in an internet browser, it incorporates the client-side user interface. There are generally two approaches for building a web application, one is the traditional way and the other is the single page applications. The traditional way involves writing different pages for different tasks and deploying all of them at a single instance. A server takes care of all these pages, written pages and pass it to the client or customers browser as and when required. Single page applications (SPAs) perform most of their logic on the web browser, communicating with the web server primarily using web application programming interfaces.

MERN stack introduction:

MERN stands for MongoDB, Express JS, React JS and Node JS after the four key technologies that make up the stack. MongoDB is document based, Express JS is a Node JS framework used to write the API calls, React is a client side java script framework and Node is the premier JavaScript web server.

Express and Node make up the middle or application tier and Express.js is a server-side web framework, Node is the popular and powerful JavaScript server platform.

II. MERN Architecture:

The MERN architecture allows you to easily construct a 3 tier architecture consisting of a frontend, backend and database entirely using JavaScript and JSON.

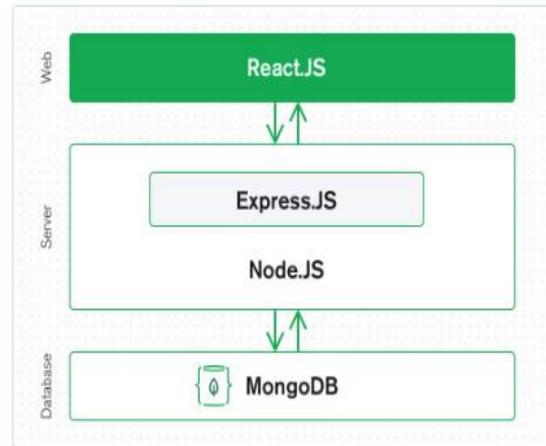


Fig.1. MERN Architecture

Introduction to ReactJS:

React is a frontend and open source JavaScript library for building user interfaces based on UI components. It is maintained by a community of individual developers, Meta (formerly Facebook). React is used to develop single page web applications or mobile applications which are rendered based on the state. React mainly works on the state management principle and sends the state to the DOM so that it will render on the browser. A virtual DOM is used by the React to display data on the browser. React uses JSX syntax, a specially made syntax using JavaScript and is an extension of XML.

React components can be divided into two types – class-based and functional components. Life cycle methods are used in class based components where as hooks are used in functional components. Life cycle methods are used to achieve the control of data flow and rendering.

Introduction to NodeJS:

Node.js is a backend server which is also an open-source, cross-platform JavaScript runtime environment that runs on a special V8 engine. Node.js uses JavaScript to write command-line tools and server-side scripting. Node has an event-driven architecture which is capable of asynchronous I/O. These design choices aim to optimize throughput, scalability in web applications with many input, output operations, as well as for real-time web applications.

Node.js enables development of fast web servers in JavaScript which is achieved with the help of its event-driven programming. Node.js helps developers to create salable servers without using threading, this can be achieved by the callbacks to signal the completion of the task. Node.js was built on the top of Google's V8 engine since it was open-sourced under the BSD license. Node is proficient with internet fundamentals such as HTTP, DNS and TCP.

Technical details of NodeJS are

- **Threading** – Uses a single thread event loop, using non-blocking I/O calls allowing it to support tens of thousands of concurrent connections without incurring the cost of thread context switching
- **V8 engine** – V8 is the JavaScript execution engine which was initially built for Google chrome. This engine converts JavaScript code into native machine code at runtime.
- **Package Management** – Node has a pre-installed package manager called npm
- **Unified API** – NodeJS can be combined with a browser, a database that supports JSON data. It supports server-side development patterns such as MVC, MVP, MVVM etc.
- **Event Loop** – Node event loop does not need to be called explicitly, instead callbacks are defined and the server automatically enters the event loop at the end of the callback definition. Node exits the event loop when there are no further callbacks to be performed.

Introduction to MongoDB:

Mongo DB is a document-oriented, cross-platform, source available database program. It is classified a NoSQL database program, Mongo DB uses JSON like documents with optional schemas. It supports a varied variety of searches like field, range query, and regular expression searches. Documents in Mongo DB can be indexed with primary and secondary indices.

III. Conclusion:

MERN stack gives many advantages while developing web applications. These are a few advantages of MREN stack and are one of the major reasons for increasing use of the MERN stack.

They are as follows:

- Open-source technology
- Free templates are available online
- Allows us to build faster
- Easy to use
- Full stack development
- Great community support
- Offers native experience to the users

