



MERN Stack

First DBMS Presentation

IT-A Batch 1 Group 5

What is MERN Stack

MERN stack is a collection of technologies that enables faster application development. It is used by developers worldwide. The main purpose of using MERN stack is to develop apps using JavaScript only. This is because the four technologies that make up the technology stack are all JS-based. Thus, if one knows JavaScript (and JSON), the backend, frontend, and database can be operated easily.



Why is it popular and widely used?

1. **Full-stack JavaScript Development:** MERN stack is that it allows developers to use JavaScript across the entire web application stack, from the front end to the back end. This means developers can write code in a single language, simplifying the development process
2. **Flexibility and Scalability:** MongoDB is a NoSQL database, which provides a flexible data model that can accommodate changes in application requirements.
3. **Active Community and Ecosystem:** MERN stack has a large and active community of developers, which means there are abundant resources, libraries, and frameworks available to support development
4. **Rapid Development and Code Reusability:** With React's component-based architecture, developers can create reusable UI components, saving time and effort in the development process.

MERN Stack full form:

M - MongoDB

E - ExpressJS

R - ReactJS

N - NodeJS



What does each component mean :

MongoDB:

- MongoDB is a NoSQL database used in MERN Stack that offers a number of benefits over traditional SQL databases.
- One of the main advantages of MongoDB is its flexibility, as it allows developers to store data in a variety of formats and easily make changes to the database schema as needed.
- MongoDB provides two types of data models: — Embedded data model and Normalized data model. Based on the requirement, you can use either of the models while preparing your document.
- **JSON** is an open standard file format and data interchange format that uses human-readable text to store and transmit data objects consisting of attribute–value pairs and arrays
- **BSON** is a computer data interchange format. The name "BSON" is based on the term JSON and stands for "Binary JSON". It is a binary form of JSON
- Basic CRUD operations (Create, Read, Update, Delete).



What does each component mean :

Express.js:

- Express is a web application framework that is used in MERN Stack to simplify the process of building web applications.
- It provides a set of tools and features that make it easier to handle HTTP requests, manage sessions, and handle errors.
- One of the key features of Express is its middleware system, which allows developers to add functionality to their applications without having to write additional code. This can include things like authentication, logging, and compression.
- We can setup express.js by running the following command in the backend directory of the project: 1. `npm init -y`, 2. `npm i express`
- Express has a robust routing system that makes it easy to handle different types of requests and map them to specific functions.

What does each component mean :

Node.js:

- Node.js is a JavaScript runtime that allows developers to use JavaScript on the server-side.
- This benefits developers as they can use the same language for both client-side and server-side programming, which can streamline the development process.
- **Event-driven, non-blocking I/O model:** In the event-driven model, Node.js operates based on events and event handlers. It employs an event loop, which continuously listens for events and triggers corresponding event handlers when events occur. This model allows Node.js to handle multiple concurrent connections efficiently without blocking the execution of other code.
- Setting up Node.js application: Install Node.js from <https://nodejs.org/>, initialize a new node
- NPM (Node Package Manager): Node Package Manager (npm) is the default package manager for Node.js. It is a command-line tool that allows developers to easily manage and install packages, libraries, and dependencies for their Node.js applications.

What does each component mean :

React:

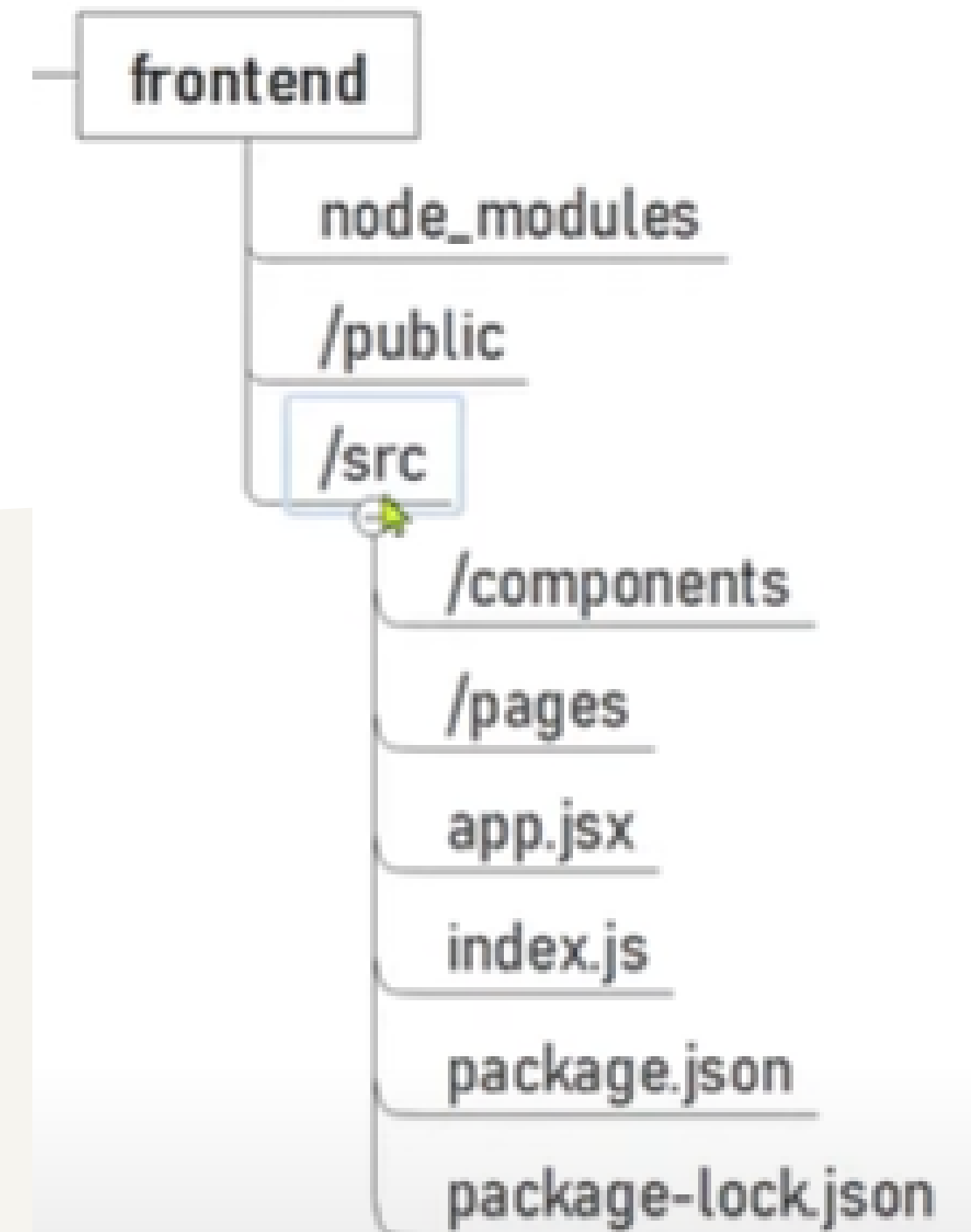
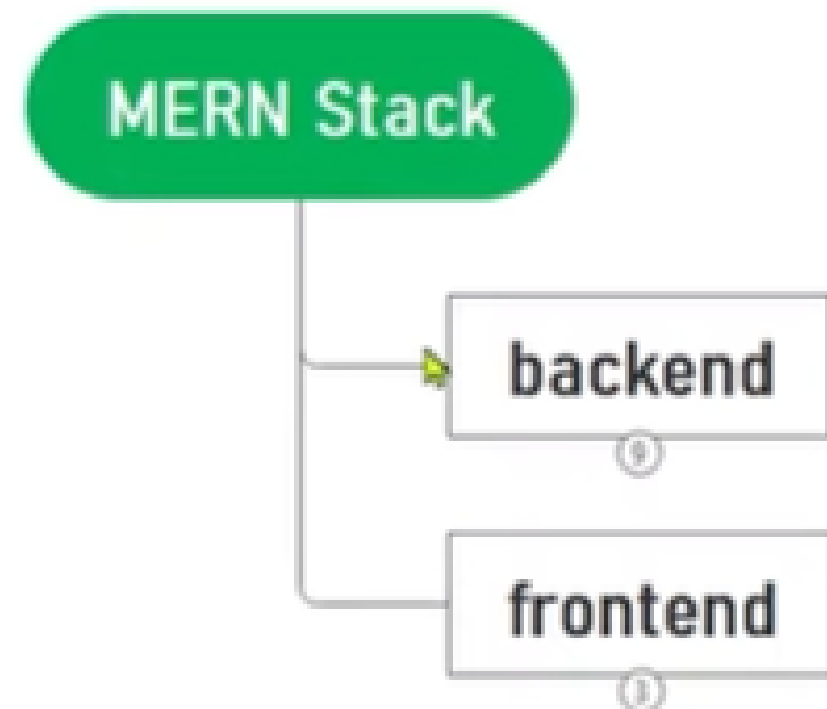
- All frontend templated are executed by a React App.
- React is a popular JavaScript library used in MERN Stack that makes building user interfaces easier and more efficient.
- One of the main benefits of React is its component-based architecture, which allows developers to break down complex UIs into smaller, reusable components.
- React Hooks are functions that allow you to use state and other React features in functional components. eg: useState - allows you to add state to functional components

Installation

1. Install VS code(IDE)
2. Install Node.js Environment
3. Install Mongo db Community
4. Install "create-react-app"
5. Create a project folder:
 - Frontend Folder
 - Backend Folder



Structure



MongoDB Linking / setup

- Step 1: Install required dependencies
- Step 2: Connect to MongoDB, using the command "npm i mongoose"
- Step 3: Define MongoDB schema/models
- Step 4: Implement CRUD operations
- Step 5: Integrate with frontend (React.js)



Advantages

1. Full-stack JavaScript
2. Scalability and Performance
3. Rapid Development
4. Code Reusability
5. Rich Ecosystem and Community Support
6. Flexibility and Isomorphic Applications
7. JSON-based Data Flow



Disadvantages

- 1. Learning Curve**
- 2. Complexity**
- 3. Scalability Limitations**
- 4. Immature Tooling**
- 5. Security Concerns**
- 6. Performance Trade-offs**
- 7. Compatibility and Versioning**



Online tutorials

- **1. MERN Stack Front To Back: Full Stack React, Redux & Node.js**
- **2. React, NodeJS, Express & MongoDB — The MERN Fullstack Guide**
- **3. Full-Stack Web Development with React Specialization — Coursera**
- **4. Building a Full-Stack App with React and Express — Pluralsight**
- **5. MERN Stack Master Course — Building your own Instagram**
- **6. MERN eCommerce From Scratch**



Any questions ?

