Introduction to MERN Stack

Agenda

In this session, we will discuss:

- Introduction to MERN Stack
- Need of MERN Stack
- React for Front-end Scripting
- Node and Express for Server-side Scripting
- MongoDB for storing Data
- Integrating as a Web Application

Introduction to MERN Stack

- **MERN** stands for MongoDB, Express, React, and Node.
  - MongoDB - Document Database
  - Express.js - A server-side Node JS Web Framework
    - Server-side refers to the programming and processing that occur on the web server.
    - A web framework is a set of software components, tools, and libraries that provide developers with a standard way to build web applications.
  - React.js - A client-side JavaScript library
    - Client-side refers to the programming and processing that occur on the user's computer.
    - A library is a collection of pre-written code that can be reused by software developers to add functionality to their applications.

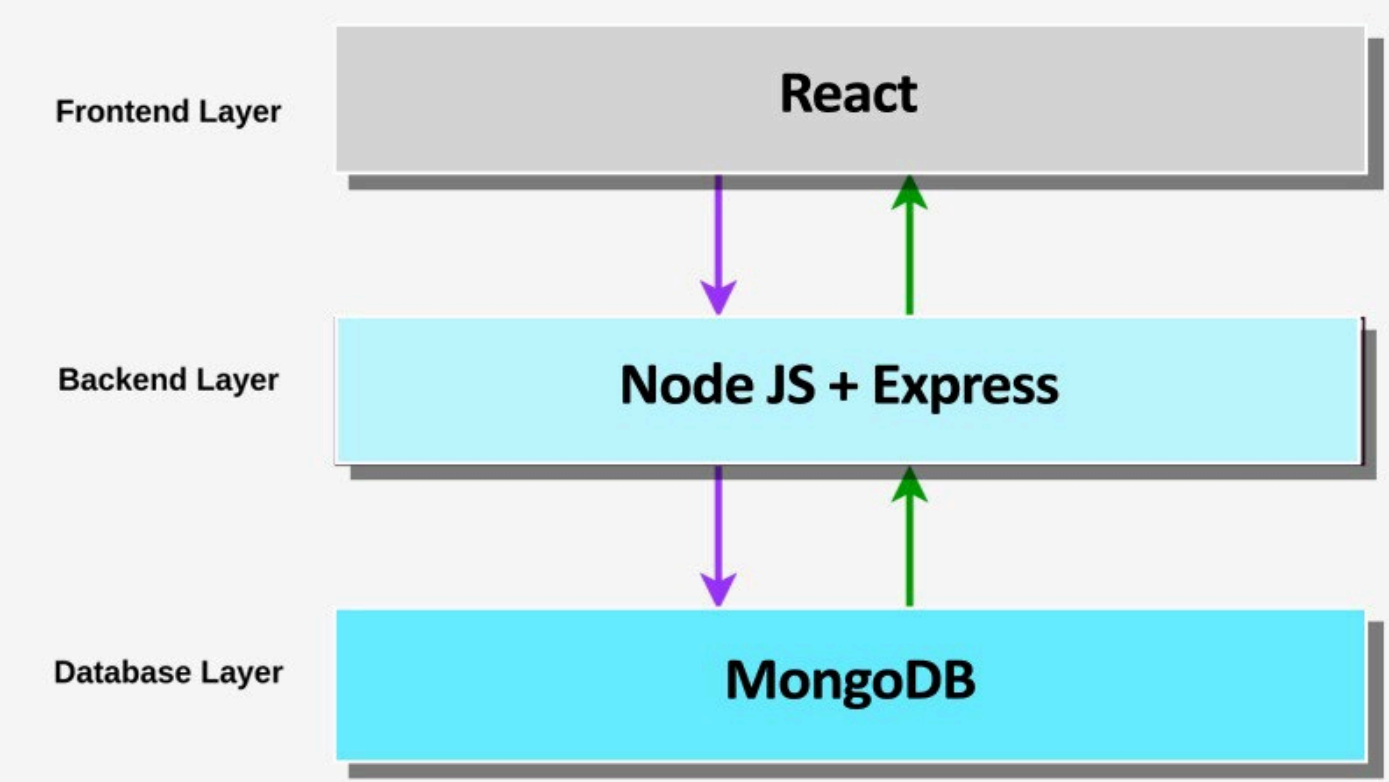
Introduction to MERN Stack

- Node.js - Premier JavaScript Web Server. It’s a runtime environment.
  - It allows developers to build scalable, high-performance, and event-driven web applications using JavaScript on the server side.
  - A runtime environment (RTE) is a software platform that provides an environment in which programs can be executed.
- One of the **most popular** stacks used for web development.
- Uber, Netflix, LinkedIn, and NASA are a few of the organizations that use MERN Stack for building **scalable full-stack applications.**
- The MERN stack is popular due to its flexibility and scalability.

Need of MERN Stack

- UI rendering and performance, Cost-effective, and Open source
- Ease in switching between Client and Server
- Effective for developing Single Page Web Applications (SPA)
- One of the key benefits of the MERN stack is the ability to build end-to-end web applications using a unified language and development environment.
- MERN stack also Has a large and active community of developers, providing access to a wide range of tools, resources, and support.

MERN Stack



React for Front-end Scripting

- React.js is the top layer of the MERN stack and a popular front-end JS library for building dynamic and interactive user interfaces.
- A declarative JavaScript library for developing dynamic client-side HTML applications
- Highly flexible, it allows developers to create reusable and scalable UI
- Based on components => EX: reusable
- Helps in creating sophisticated interfaces
- Connects basic components with backend data and renders these as HTML
- Manages stateful, data-driven interfaces with little effort and code
- Like any good web framework, it supports forms, error handling, events, lists, etc.

Node.js

- Node.js is an open-source, cross-platform runtime environment allowing developers to run JavaScript code outside a web browser.
- Node.js is built on top of the Google Chrome V8 engine and provides an event-driven, non-blocking I/O model that makes it lightweight and efficient.
- One of the main features of Node.js is its ability to handle many concurrent connections without the overhead of traditional threading models.
- Node.js uses an event-driven architecture that allows it to handle many I/O operations at once without blocking the execution of other code. This makes Node.js ideal for building scalable, real-time applications that require high performance and low latency.

Node.js

- In addition to its core capabilities, Node.js also has a rich ecosystem of modules and packages that can be easily installed and used in applications. These modules cover a wide range of functionality, including server-side rendering, database integration, authentication, and more.
- Overall, Node.js provides a powerful and flexible platform for building server-side applications with JavaScript. Its lightweight and efficient architecture, combined with its large ecosystem of modules and packages, make it a popular choice for building scalable, real-time applications.

Node and Express for Server-side Scripting

- Express.js is a server-side framework.
- Express.js is a lightweight and flexible Node.js web application framework that simplifies the process of building web applications and APIs.
- It functions inside a node.js server.
- It forms the backend layer in the MERN stack, which is a step below the frontend.
- It is described as a "fast, highly flexible, simple web framework for Node.js."
- It offers robust models to manage HTTP requests and responses and URL routing.

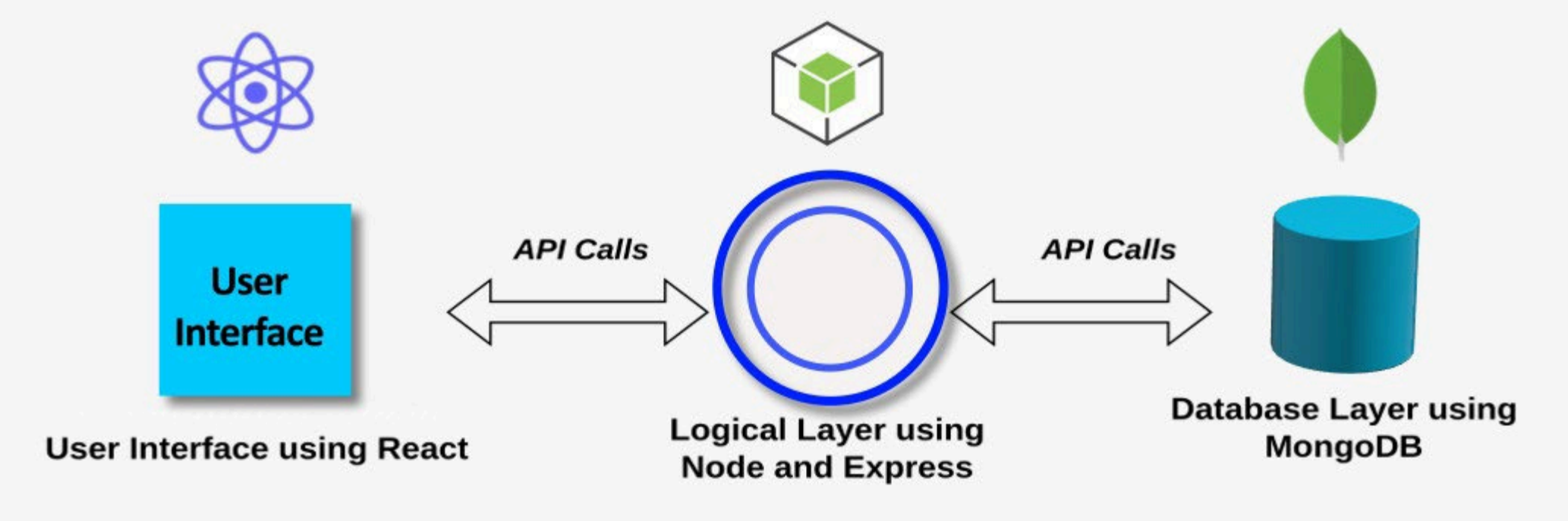
Node and Express for Server-side Scripting

- Express.js provides a wide range of features and tools for creating dynamic and robust web applications, including middleware support, routing, templating, and more.
    - Middleware is a software component that sits between the web server and the application, providing an extra layer of processing for incoming and outgoing requests.
- Express.js also supports a wide range of plugins and modules, making it easy to integrate with other frameworks and tools.

MongoDB for storing Data

- Almost all applications store data. Generally, a database is used to store the data.
- MongoDB is a NoSQL database.
- It stores data in JSON-like documents, which allows for flexible and scalable data storage and retrieval.
    - JSON is a text-based format that is used to transmit data between web browsers and servers, as well as between different software applications.
- This data can be in the form of user profiles, content, comments, uploads, events, etc.
- MongoDB supports dynamic schemas, making it easier for developers to work with data and modify schemas without changing the entire structure of the database.
- A typical flow of an application:
    - React.js generates a JSON object.
    - JSON object is passed on to the node.js server.
    - The server finally saves the object in MongoDB.

Integrating as a Web Application



Summary

A brief recap:

- MERN is one of the most popular stacks for web development due to its flexibility and scalability.
- React is used for frontend development, Node and Express are used for backend development, and MongoDB is used at the database layer.
- MongoDB supports dynamic schemas, making it easier for developers to work with data and modify schemas without the need to change the entire structure of the database.
- Express.js is a lightweight and flexible Node.js web application framework that simplifies the process of building web applications and APIs.
- React is a popular front-end JS library for building dynamic and interactive user interfaces.
- Node.js is an open-source, cross-platform runtime environment allowing developers to run JavaScript code outside a web browser.