Introduction to Node.js

Overview and Key Features of Node.js

1. Node.js Overview

- - Node.js is a JavaScript runtime environment that allows executing JavaScript on the server side.
- - Built on the V8 engine, it provides fast and efficient code execution.
- - Created by Ryan Dahl in 2009 to simplify asynchronous handling on web servers.

2. Key Features of Node.js

- - **Event-Driven and Asynchronous I/O**: Ideal for handling large-scale applications with asynchronous processing.
- - **Single Threaded**: Uses an event loop for managing async tasks with low resource consumption.
- - **Cross-Platform Support**: Operates on various operating systems like Windows, macOS, and Linux.

3. Advantages of Node.js

- - **High Performance Asynchronous Processing**: Maximizes performance for network applications.
- - **Scalability**: Expandable through various modules and libraries (NPM).
- - **JavaScript Integration**: Allows the same language on both client and server sides.

4. Disadvantages of Node.js

- - **Reduced Performance for CPU-Intensive Tasks**: Single-threaded design limits CPU-heavy processing.
- - **Security Limitations**: Requires careful security management due to extensive use of open-source modules.

5. Node.js Use Cases

- - **Real-Time Applications**: Chat applications, real-time feeds, and collaboration tools.

- - **API Servers**: Ideal for RESTful and GraphQL API development.

- - **E-commerce Platforms**: Efficiently manages high traffic in online shopping servers.

6. Installation & Basic Example

- - **Installing Node.js**: Install via official website or package manager.
- - **Basic Code Example**:
- ```javascript
- const http = require('http');
- const server = http.createServer((req, res) => {
-     res.statusCode = 200;
-     res.setHeader('Content-Type', 'text/plain');
-     res.end('Hello, World!\n');
- });
- server.listen(3000, () => {
-     console.log('Server running at http://127.0.0.1:3000/');
- });
- ```

7. Popular Node.js Frameworks

- - **Express.js**: Lightweight framework ideal for API server development.
- - **NestJS**: TypeScript-based framework beneficial for structured project management.