# Introduction to NodeJS

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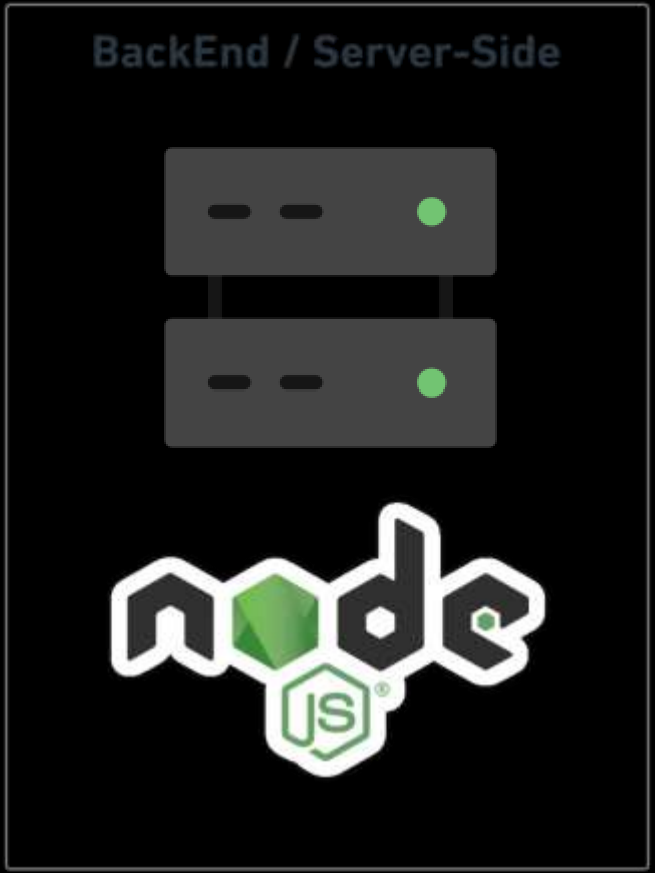
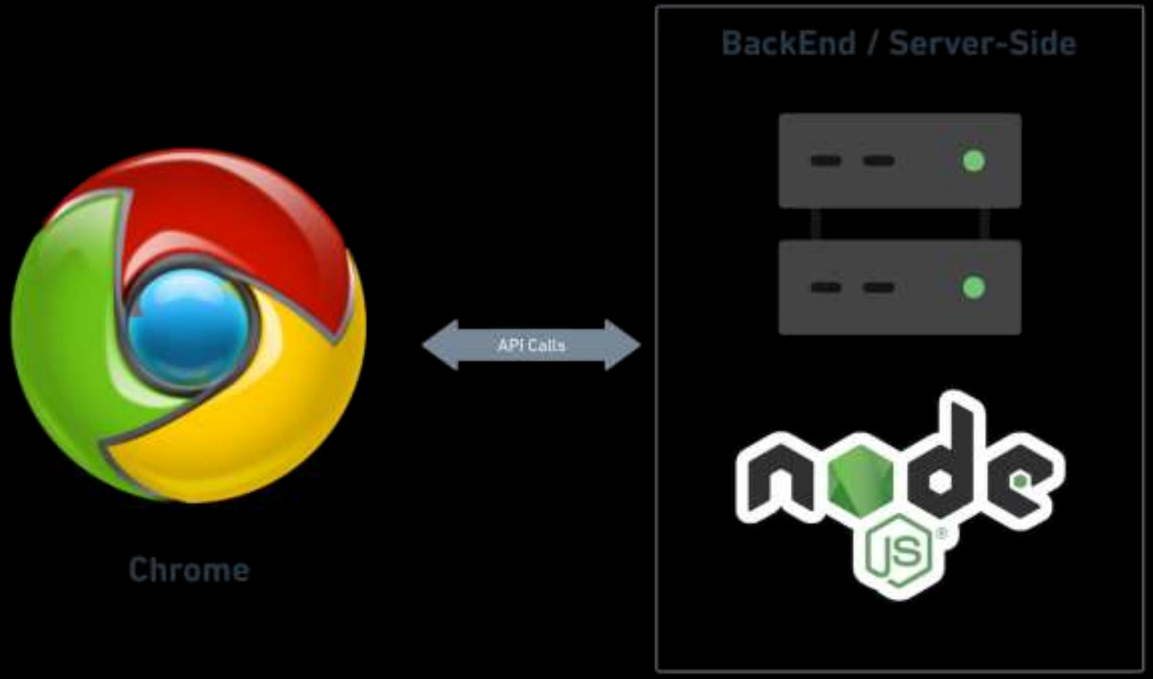


# 2. What is NodeJS

1. JavaScript Runtime: Node.js is an open-source, cross-platform runtime environment for executing JavaScript code outside of a browser.
2. NodeJs is a JavaScript in a different environment means Running JS on the server or any computer.
3. Built on Chrome's V8 Engine: It runs on the V8 engine, which compiles JavaScript directly to native machine code, enhancing performance.
4. V8 is written in C++ for speed.
5. V8 + Backend Features = NodeJs

# 2. What is NodeJS

1. Design: Features an event-driven, non-blocking I/O model for efficiency.
2. Full-Stack JavaScript: Allows using JavaScript on both server and client sides.
3. Scalability: Ideal for scalable network applications due to its architecture.
4. Versatility: Suitable for web, real-time chat, and REST API servers.



# 3. NodeJs Features

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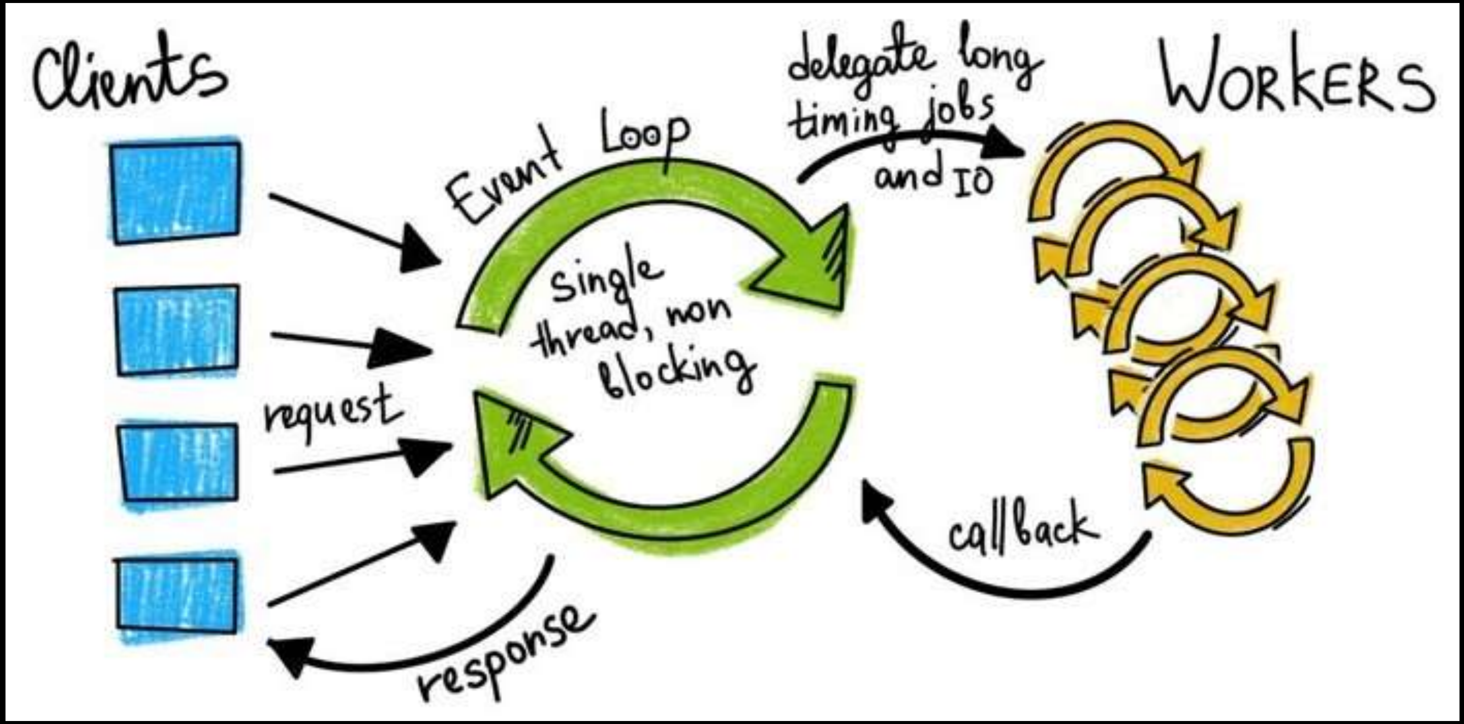
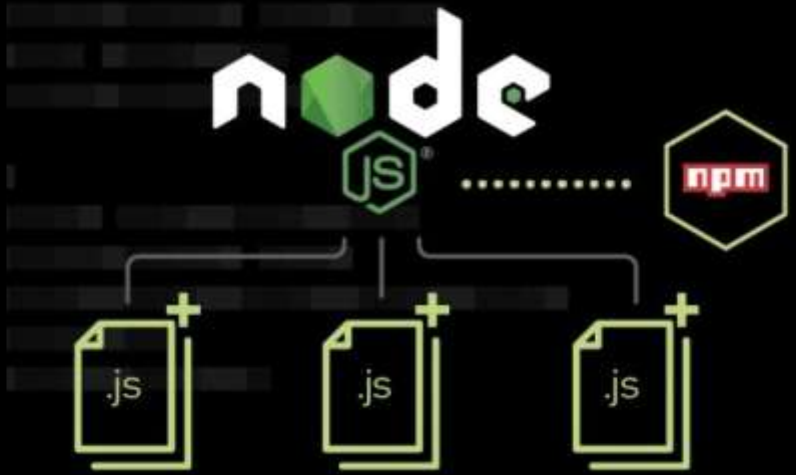


1. Non-blocking I/O: Designed to perform non-blocking operations by default, making it suitable for I/O-heavy operations.
2. Networking Support: Supports TCP/UDP sockets, which are crucial for building lower-level network applications that browsers can't handle.

# 3. NodeJs Features

(Added)



1. File System Access: Provides APIs to read and write files directly, which is not possible in browser environments for security reasons.
2. Server-Side Capabilities: Node.js enables JavaScript to run on the server, handling HTTP requests, file operations, and other server-side functionalities.
3. Modules: Organize code into reusable modules using require().

# 3. NodeJs Features
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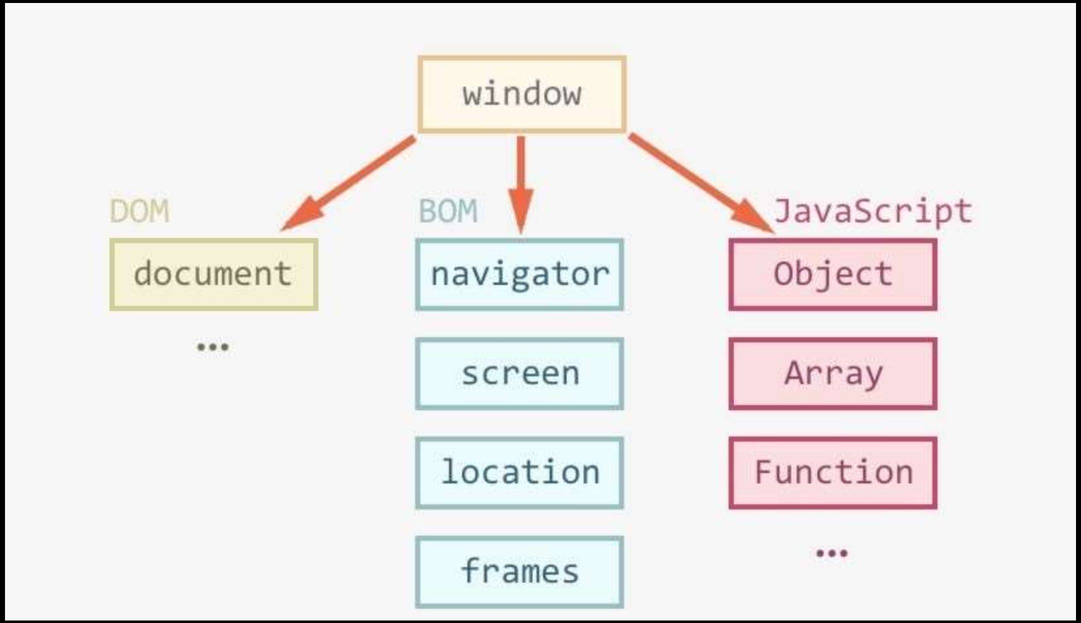

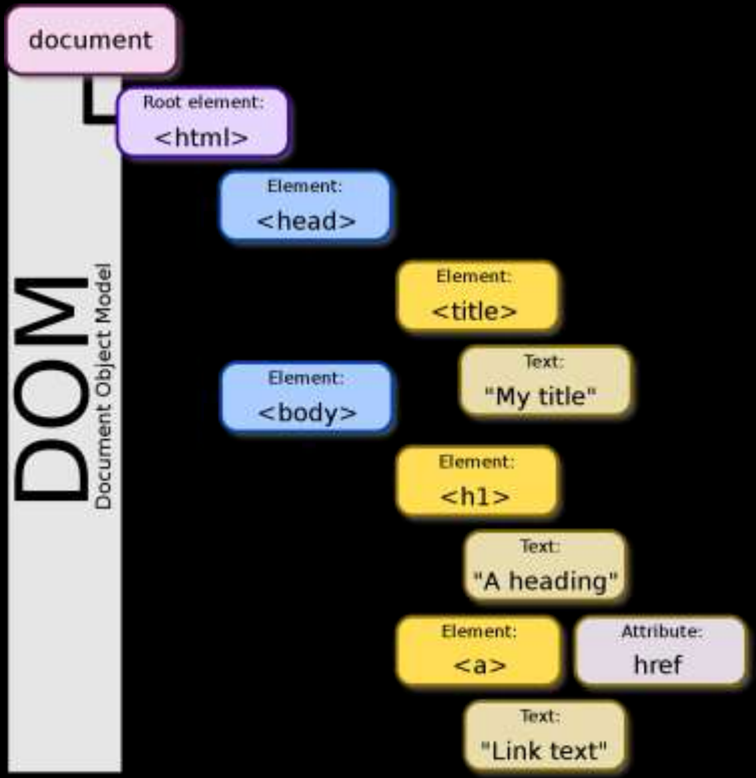

1. Window Object: The global window object, which is part of web browsers, is absent in Node.js.
2. DOM Manipulation: Node.js does not have a built-in Document Object Model (DOM), as it is not intended to interact with a webpage's content.
3. BOM (Browser Object Model): No direct interaction with things like navigator or screen which are part of BOM in browsers.

# 3. NodeJs Features

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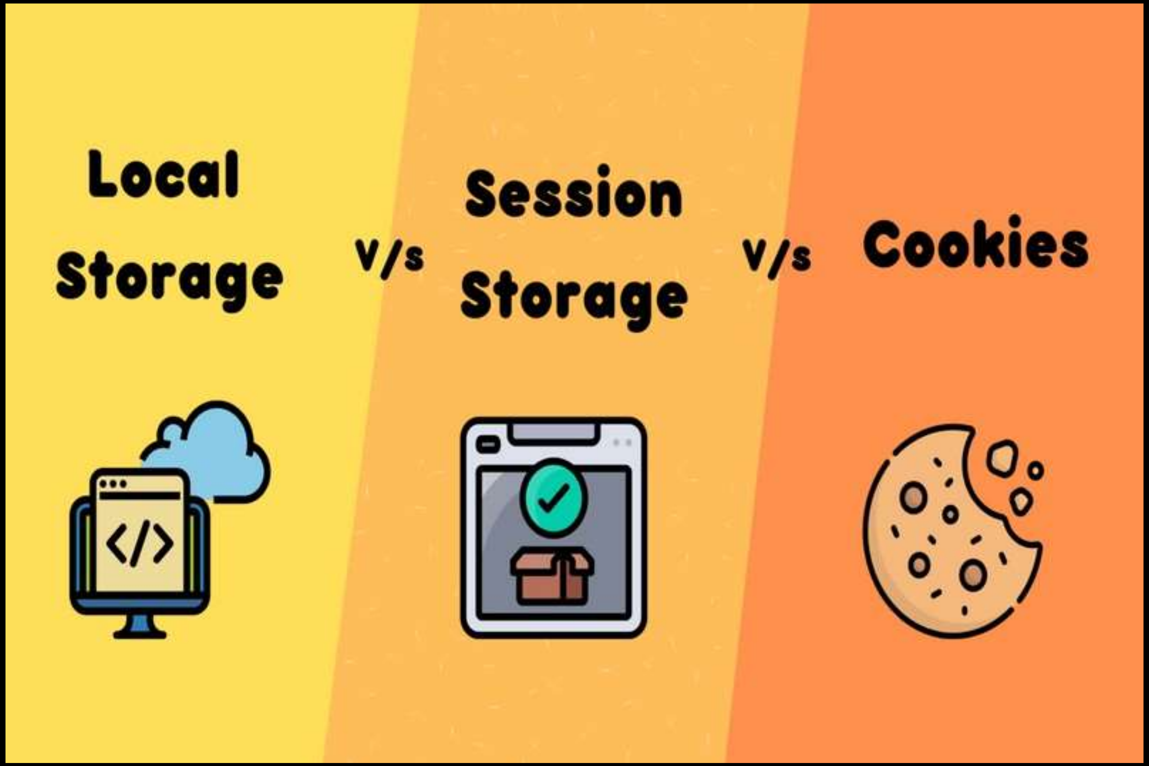
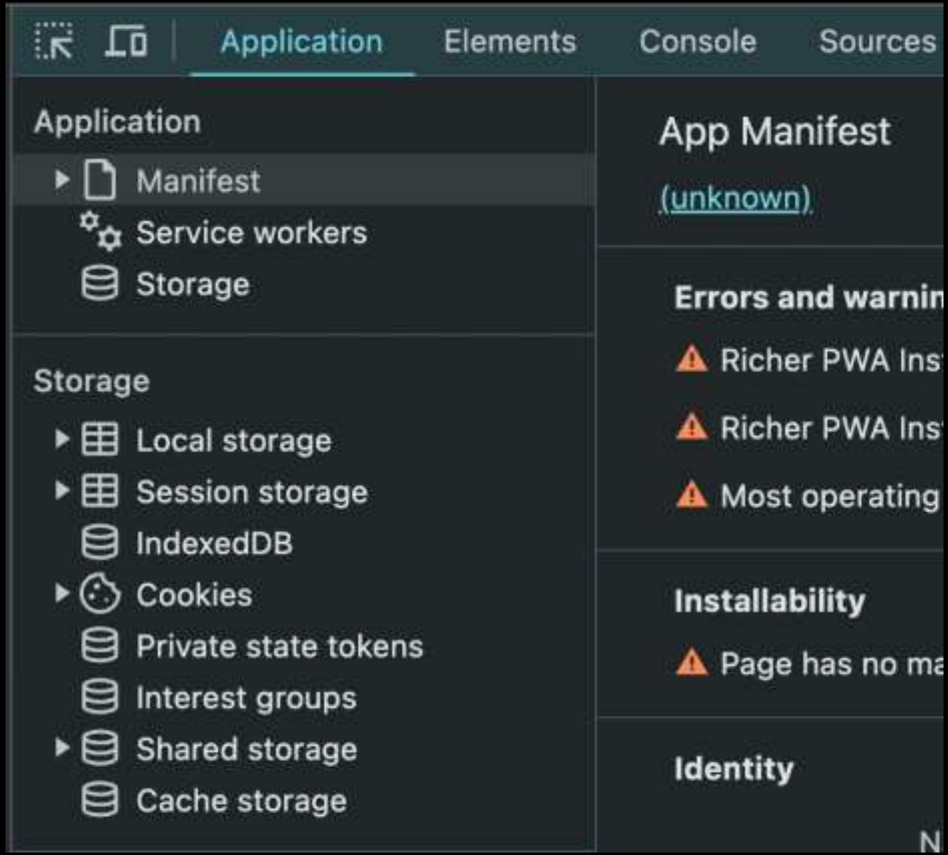
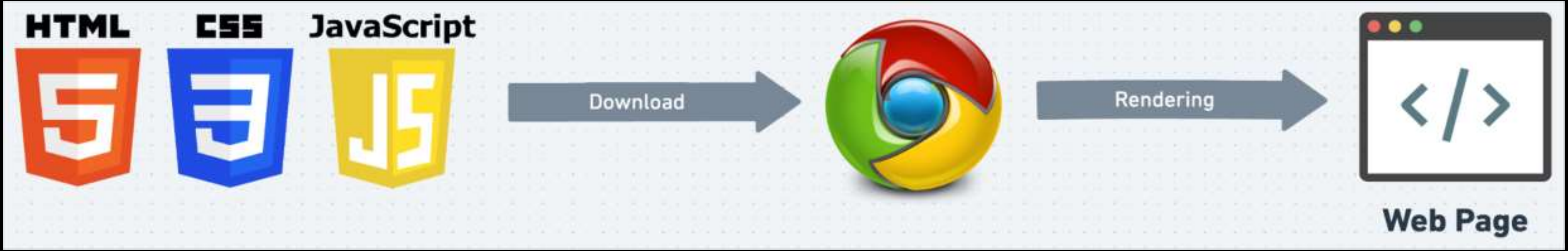




Web-Specific APIs: APIs like localStorage, sessionStorage, and browser-based fetch are not available in Node.js.

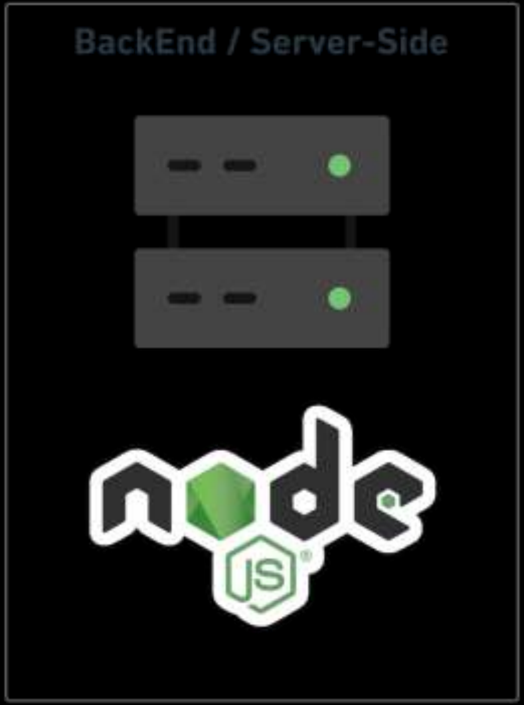
# 4. JavaScript on Client



1. Displays Web Page: Turns HTML code into what you see on screen.
2. User Clicks: Helps you interact with the web page.
3. Updates Content: Allows changes to the page using JavaScript.
4. Loads Files: Gets HTML, images, etc., from the server.

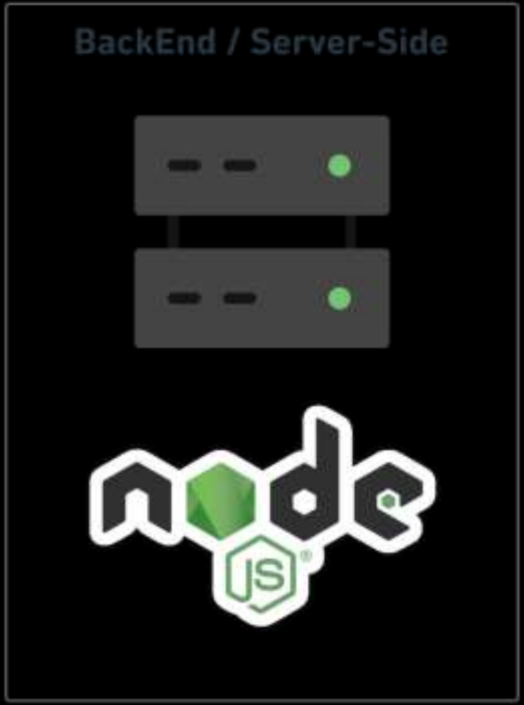
# 5. JavaScript on Server

1. Database Management: Stores, retrieves, and manages data efficiently through operations like CRUD (Create, Read, Update, Delete).
2. Authentication: Verifies user identities to control access to the system, ensuring that users are who they claim to be.
3. Authorization: Determines what authenticated users are allowed to do by managing permissions and access controls.
4. Input Validation: Checks incoming data for correctness, completeness, and security to prevent malicious data entry and errors.
5. Session Management: Tracks user activity across various requests to maintain state and manage user-specific settings.



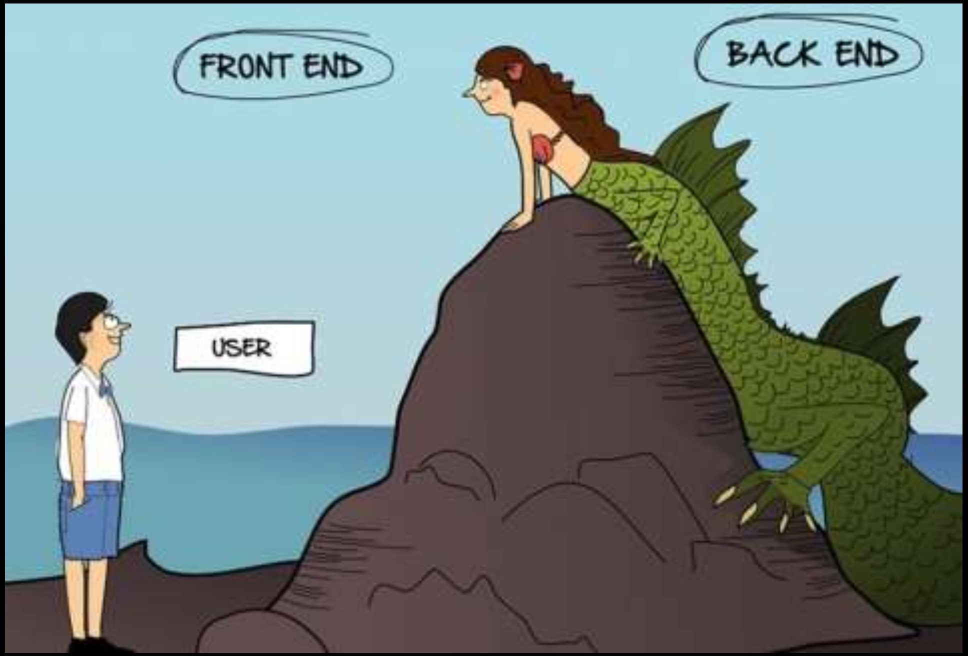
# 5. JavaScript on Server

6. API Management: Provides and handles interfaces for applications to interact, ensuring smooth data exchange and integration.
7. Error Handling: Manages and responds to errors effectively to maintain system stability and provide useful error messages.
8. Security Measures: Implements protocols to protect data from unauthorized access and attacks, such as SQL injection and cross-site scripting (XSS).
9. Data Encryption: Secures sensitive information by encrypting data stored in databases and during transmission.
10. Logging and Monitoring: Keeps records of system activity to diagnose issues and monitor system health and security.



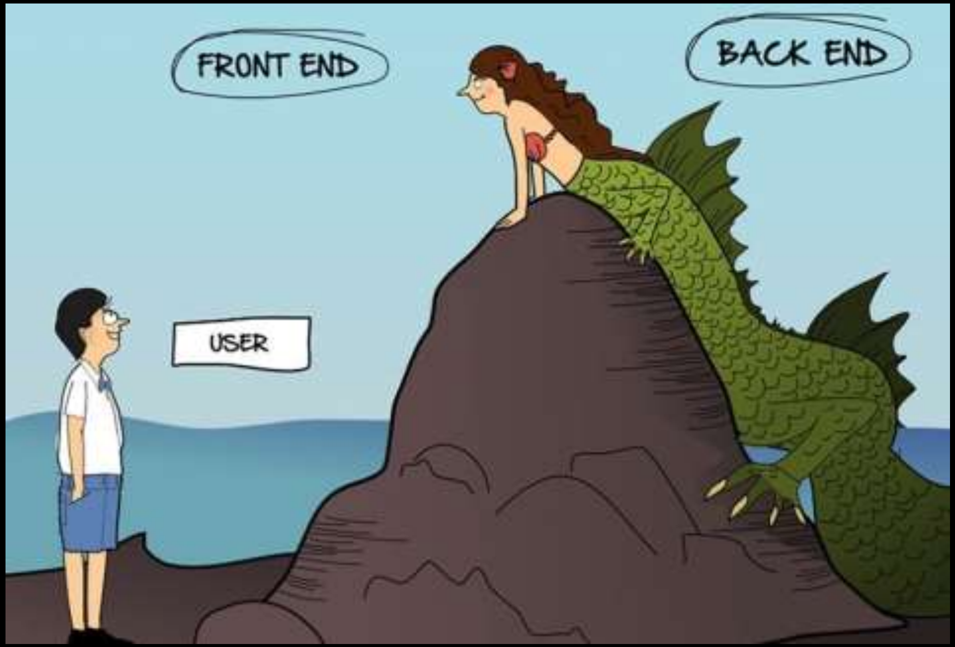
# 6. Client Code vs Server Code

1. User/client can't access server code directly.
2. Client must raise requests for particular APIs to access certain features or data.
3. Environment Access: Server-side JavaScript accesses server features like file systems and databases.
4. Security: Server-side code can handle sensitive operations securely, while client-side code is exposed and must manage security risks.
5. Performance: Heavy computations are better performed on the server to avoid slowing down the client.



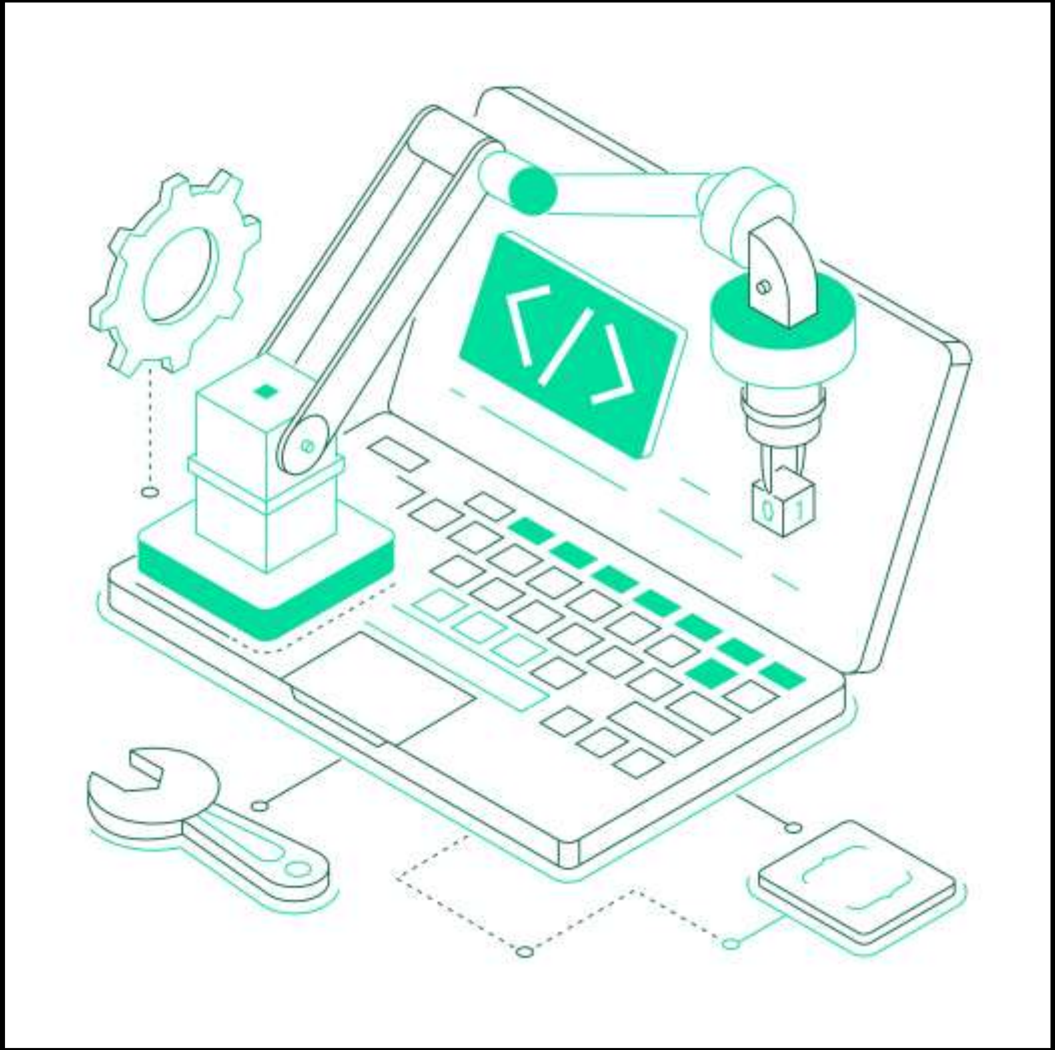
# 6. Client Code vs Server Code

6. Resource Utilization: Servers generally offer more powerful processing capabilities than client devices.
7. Data Handling: Server-side can directly manage large data sets and database interactions, unlike client-side JavaScript.
8. Asynchronous Operations: Server-side JavaScript is optimized for non-blocking I/O to efficiently manage multiple requests.
9. Session Management: Servers handle sessions and user states more comprehensively.
10. Scalability: Server-side code is designed to scale and handle requests from multiple clients simultaneously.

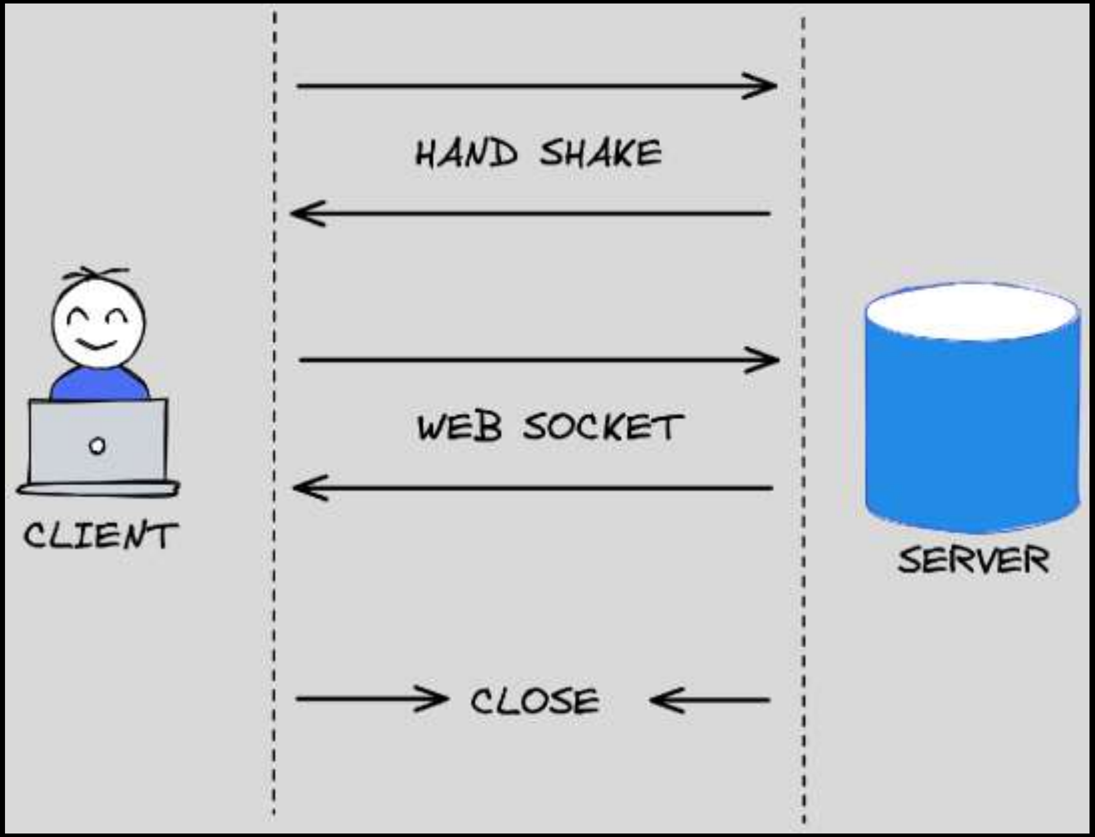


## 7. Other uses of NodeJs

1. Local Utility Scripts: Automates tasks and processes files locally, like using shell scripts but with JavaScript.
2. Internet of Things (IoT): Develops server-side applications for IoT devices, managing communications and data processing.
3. Scripting for Automation: Automates repetitive tasks in software development processes, such as testing and deployment.

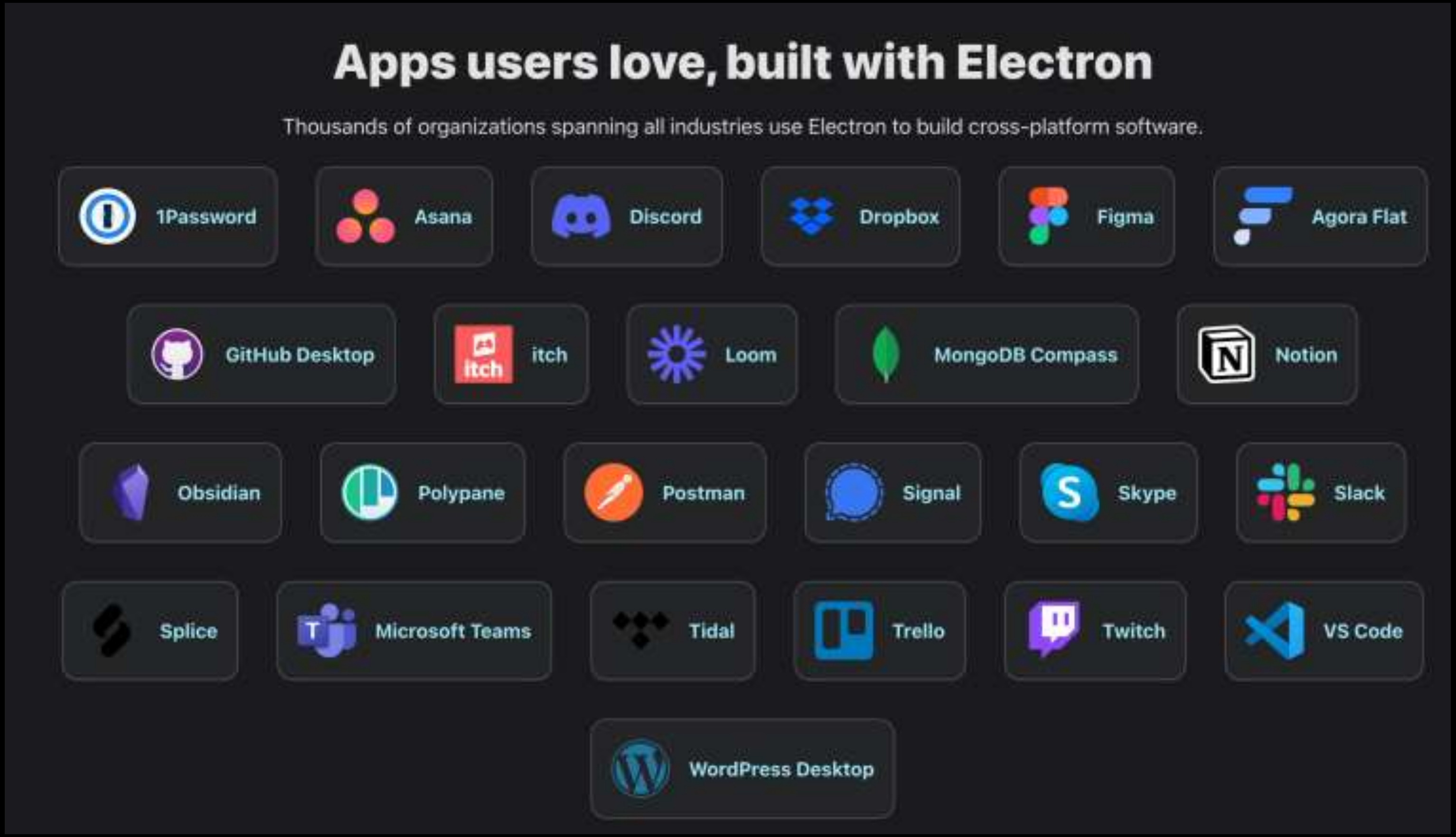


# 7. Other uses of NodeJs



Real-Time Applications: Efficiently manages real-time data applications, such as chat apps and live updates, using WebSockets.

# 7. Other uses of NodeJs



Apps users love, built with Electron

Thousands of organizations spanning all industries use Electron to build cross-platform software.

1Password · Asana · Discord · Dropbox · Figma · Agora Flat

GitHub Desktop · itch · Loom · MongoDB Compass · Notion

Obsidian · Polypane · Postman · Signal · Skype · Slack

Splice · Microsoft Teams · Tidal · Trello · Twitch · VS Code

WordPress Desktop

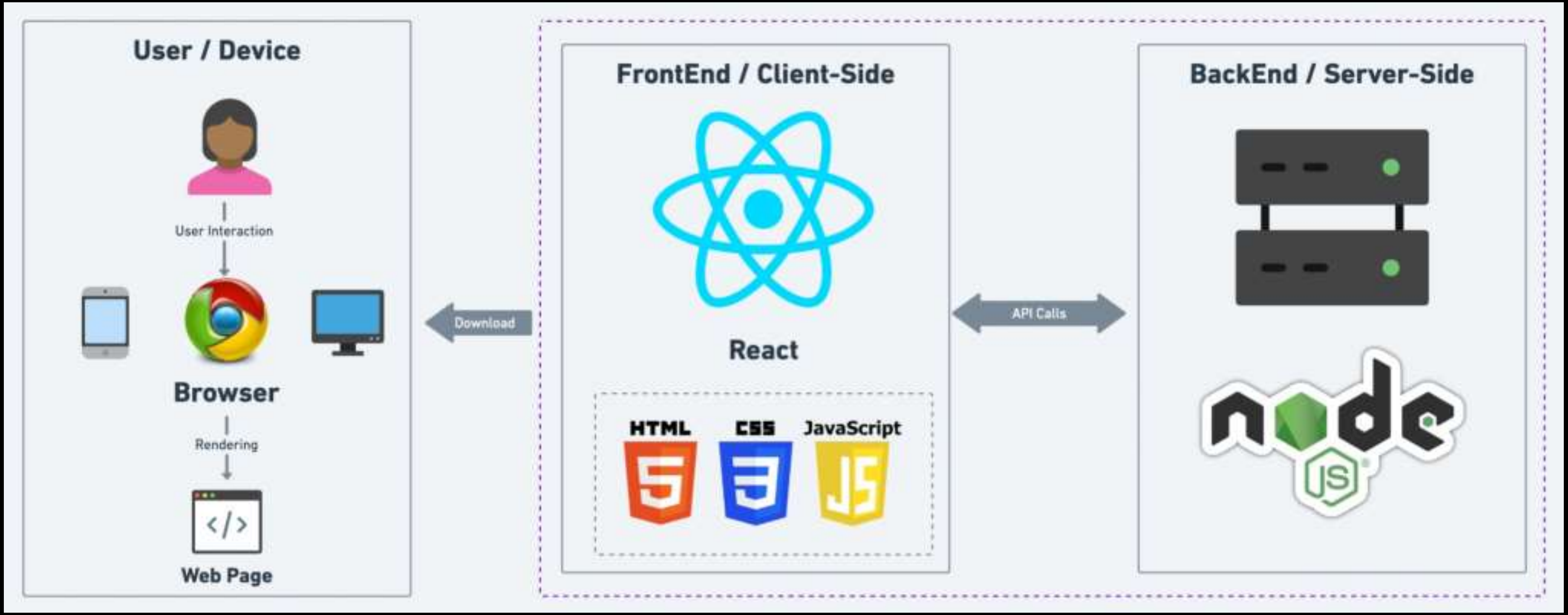
Desktop Applications: Creates cross-platform desktop applications using frameworks like Electron.

# 7. Other uses of NodeJs

Build Tools: Powers build processes for front-end technologies using tools like:

- Webpack
- Grunt
- Gulp
- Browserify
- Brunch
- Yeoman

# 8. Server architecture with NodeJs



Nodejs server will:

1. Create server and listen to incoming requests
2. Business logic: validation, connect to db, actual processing of data
3. Return response HTML, JSON, CSS, JS