**NodeJS**

Nodejs is a cross platform, open-source JavaScript runtime environment that can run on windows, macOS, Unix, Linux and more

“NodeJs is event-driven, single-threaded, and non-blocking runtime environment for executing javascript code outside of a web browser. It operates on non-blocking I/O model, where I/O operations are performed asynchronously, allowing the runtime to handle multiple concurrent takes efficiently.”

**Event-driven**

In NodeJS, the execution of code is driven by events. Event is essentially a signal that a certain condition has been met or action has occurred. Instead of following a sequential flow of execution, NodeJS application respond to events and execute associated event handlers. This model is particularly suitable for I/O-intensive application where waiting for response from external resources would otherwise block the execution

**Non-blocking I/O**

NodeJs uses non-blocking I/O operation to handle multiple concurrent tasks without waiting for each operation to complete before starting the next one. When I/O operation is initiated, NodeJS doesnt wait for it to finish; instead, it continues executing other tasks. When the I/O operation completes, a callback function is invoked to handle the result. This approach allows nodejs to handle large number of concurrent connections efficiently, making it suitable for building scalable network application

**Single-threaded**

NodeJS operates on a single-threaded event loop architecture. Unlike traditional multi-threaded servers, where each connection typically requires a new thread, NodeJS runs all I/O operations on a single thread. This means that a single NodeJS process can handle many concurrent connections without the overhead of creating and managing multiple threads. It is important to note that nodejs does use threads internally for some tasks such as file system, but these are managed by the runtime and not exposed to the developer

const fs = require('fs');

// Event-driven: Read file asynchronously

fs.readFile('example.txt', 'utf8', (err, data) => {

  if (err) {

    console.error('Error reading file:', err);

    return;

  }

  console.log('File content:', data);

});

console.log('Reading file...');

// Non-blocking I/O: While file is being read, Node.js can execute other tasks

for (let i = 0; i < 1000000; i++) {

  // Simulate CPU-bound task

}

Nodejs was initially written by Ryan Dahl in 2009. I takes chrome v8 engine and embed with c++. its development and maintenance was led by Dahl and later sponsored by Joynet

NodeJS widely adopted platform for building server-side and networking applications

We can run JavaScript outside the browser

JavaScript can talk to native machine because of c++

We can create webservers in JavaScript