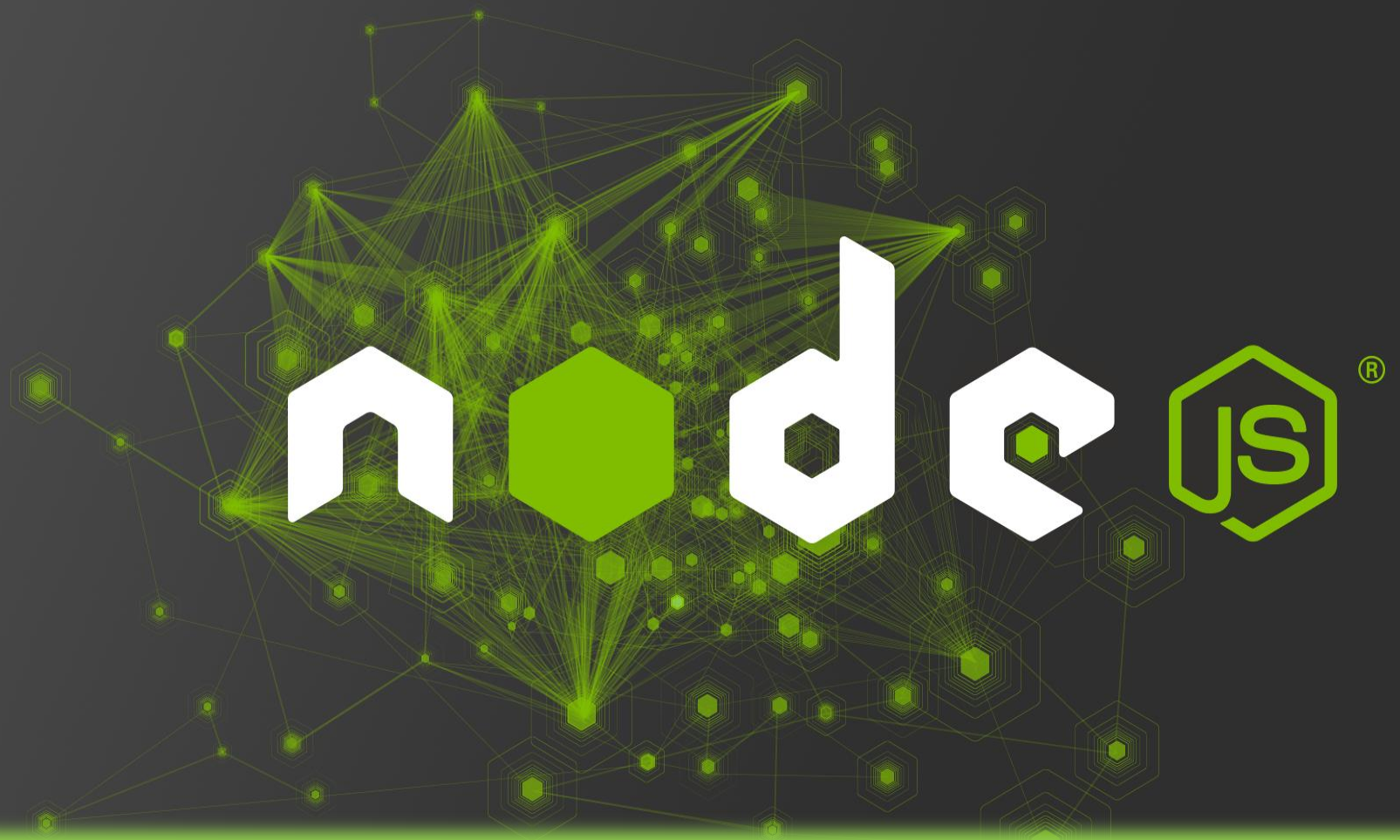


Learning server side JavaScript

Eman Fathi

Conents

Day1 : Installation ,Nodejs structure and Module Basics

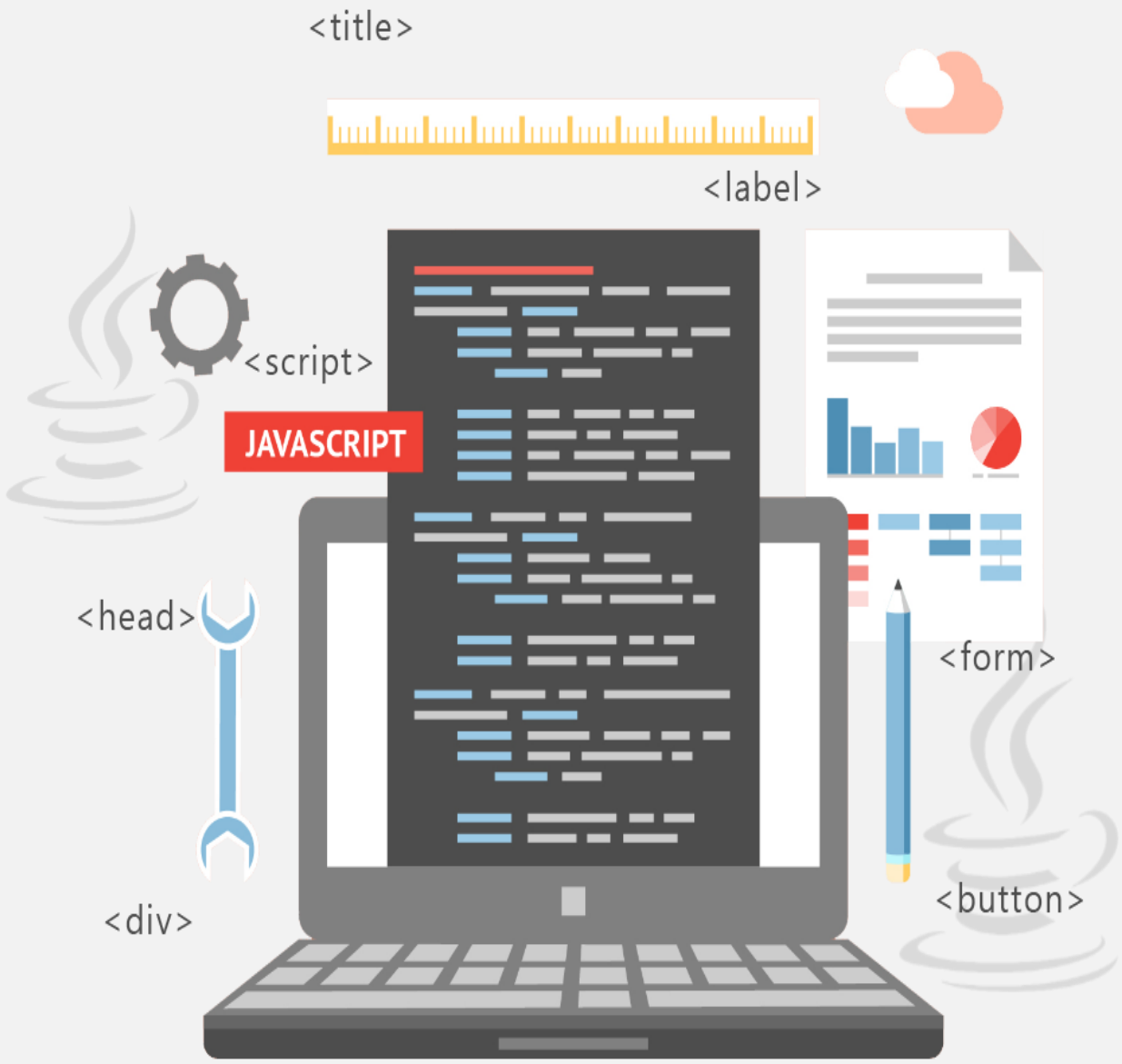
Day 2 : Express web framework with MVC (REST API)

Day 3 : connect to mongo Database with mongoose

Day 4 : Uploading Images and JWT Authentication

Day 5 : Authorization

Day 6: Views



Server Side JavaScript

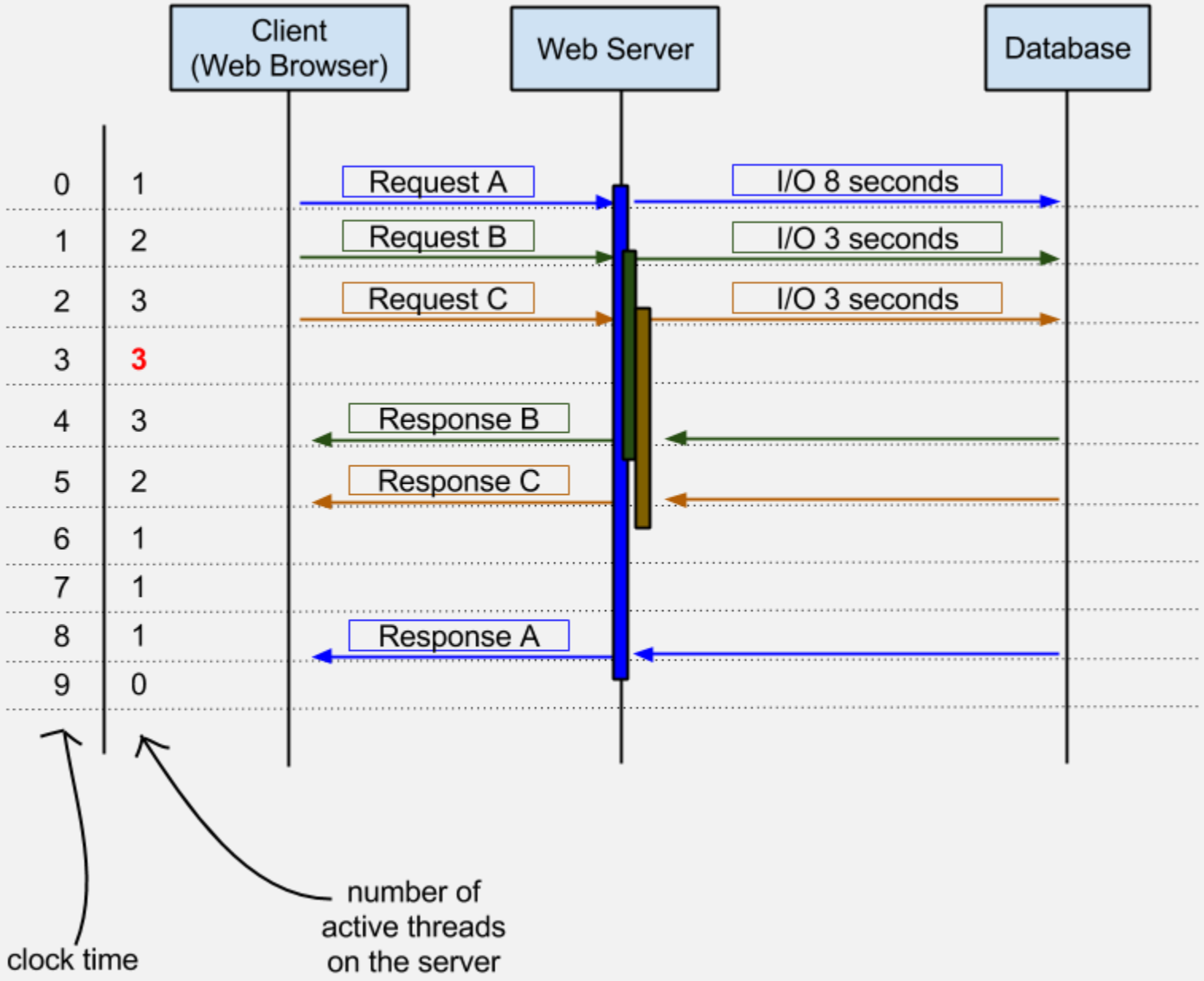
"What's a browser language doing on the server?".

JavaScript every where

JavaScript is a programming language, just like any other language, and the better question to ask is

"Why should JavaScript remain trapped inside browsers?"


Ryan Dahl
Nod.js creator 2009
Software Engineer @ Joyent



Multi-Threading Server

V8 Google chrome JavaScript Engine

V8 is Google's open source high-performance JavaScript engine, written in C++.

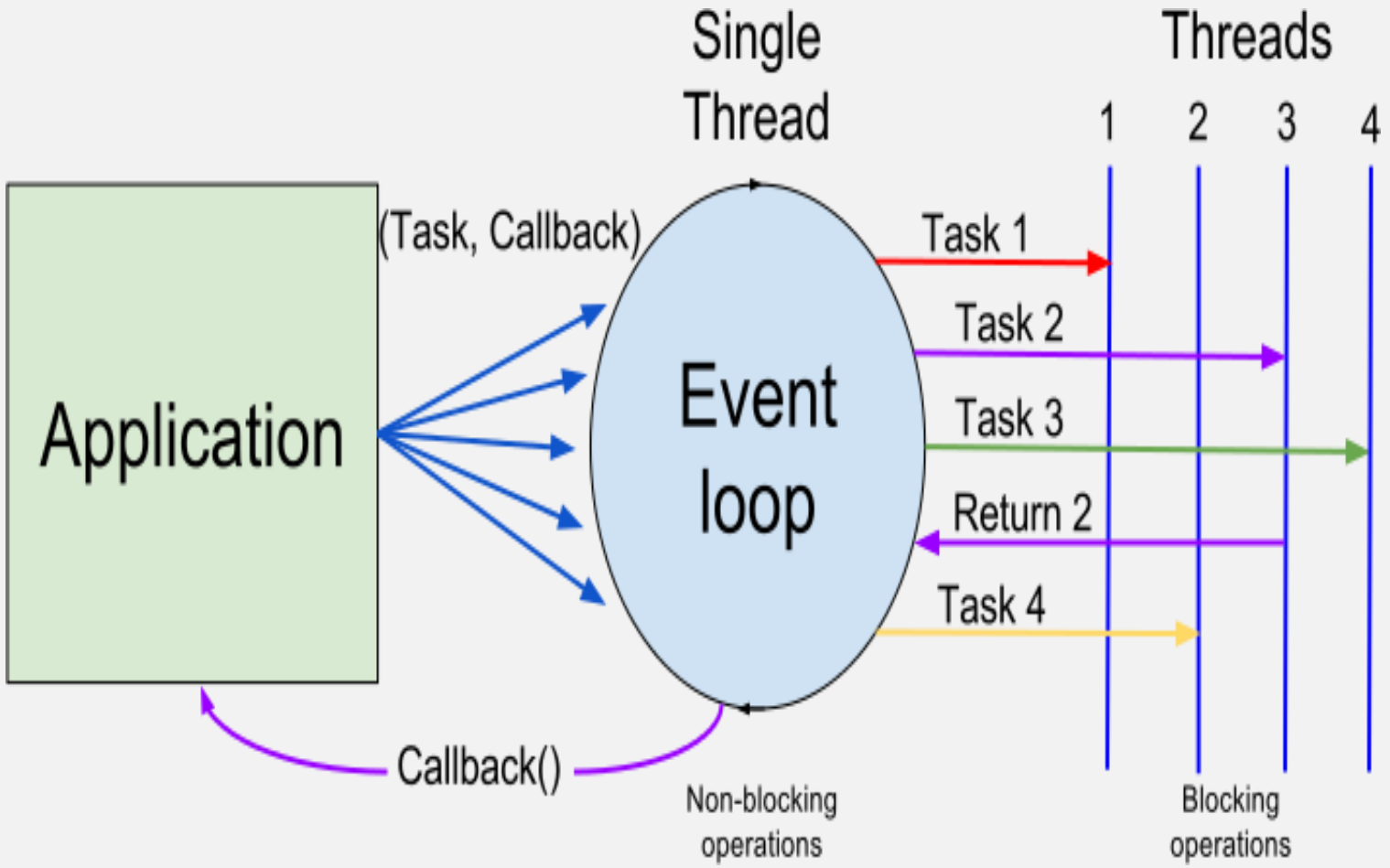
It compiles the JavaScript code into machine code at execution by implementing a JIT compiler .

Usage:

1- chrome browser

2- V8 is the core of node.js

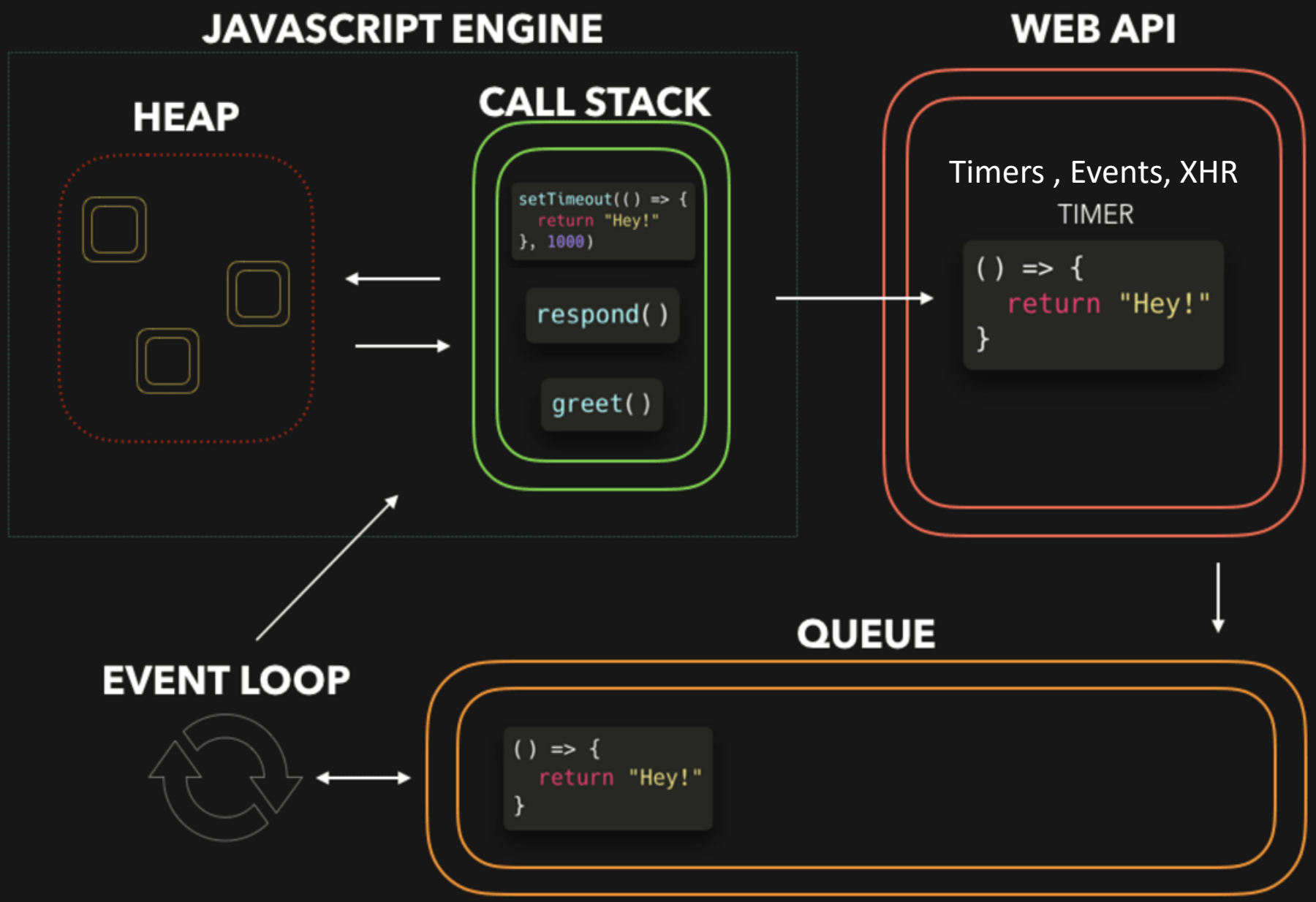
3-Underlying component for ATOM and Visual Studio code text editors



Node.js Single-Thread Server

Sever side JavaScript is:
Single-Threaded
Non-blocking
Asynchronous Language

- ✓ JavaScript is synchronous (one process at a time)
- ✓ JavaScript can run as asynchronous :
  - Callback functions
  - Promises
  - Async/await




```
function greet() {
  return "Hello!"
}

function respond() {
  return setTimeout(() => {
    return "Hey!"
  }, 1000))
}

greet()
respond()
```

Nodejs Creation

- ✓Sever side JavaScript
- ✓Built on Google's V8 JavaScript Engine
- ✓Single-threading, Event loop, non-blocking IO System
- ✓CommonJs Module System
- ✓Written in C++ & javascript

NodeJs Creation

2009: Node.js was originally written by Ryan Dahl
supported only Linux and Mac OS

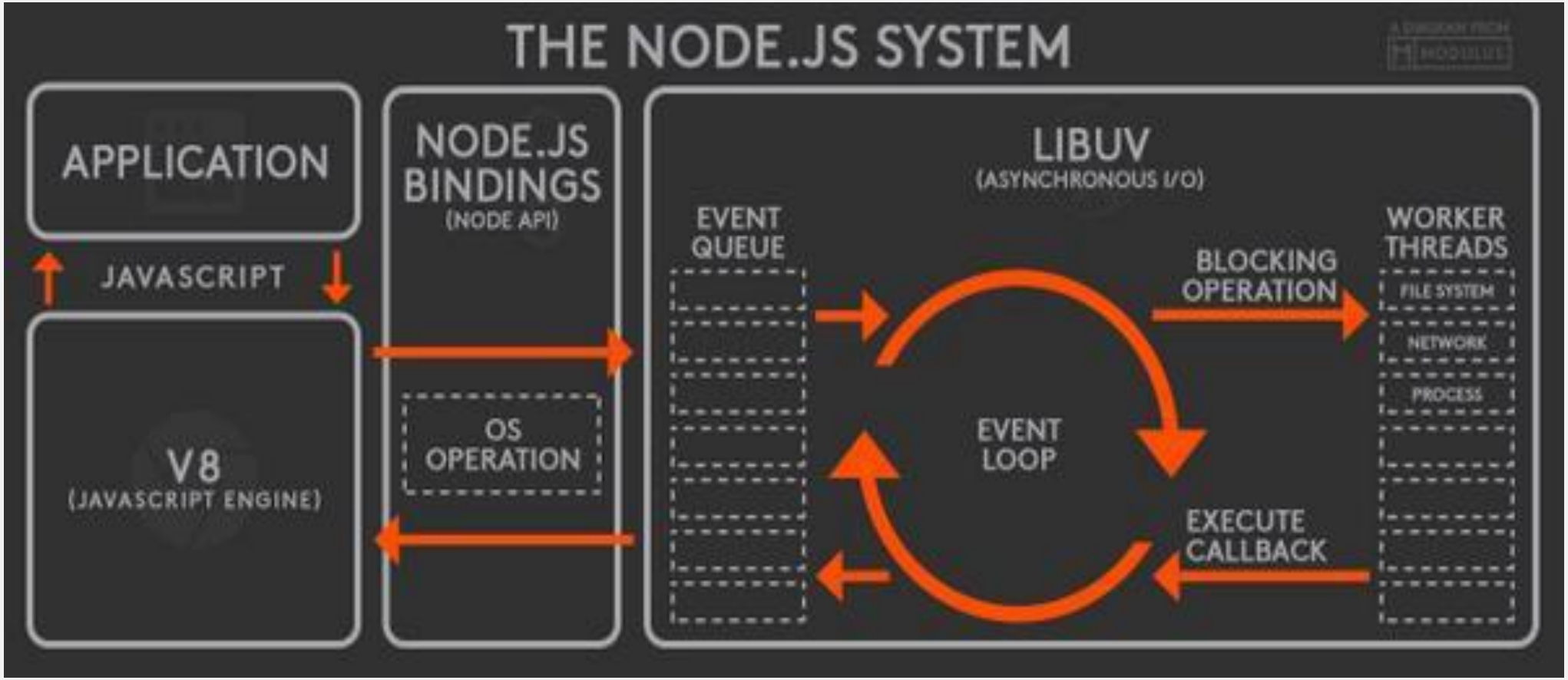
2011: Node Package Manager (NPM) created
and first windows version of nodejs released

2013: MEAN stack by *Valeri Karpov*

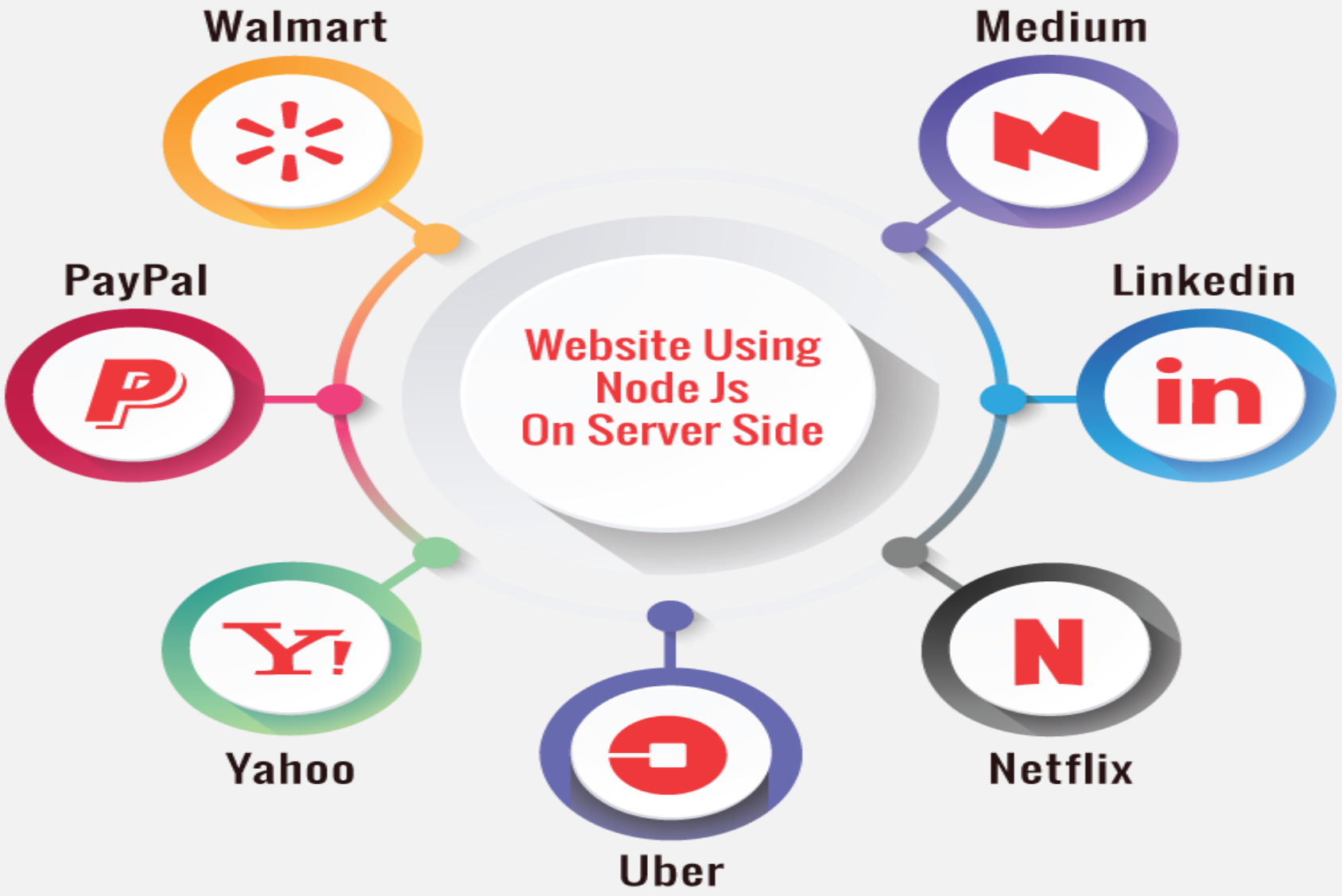
2014 : io.js project forked

2015: Node.js 4.0 released including ES6 features

LIBUV


THE NODE.JS SYSTEM
APPLICATION
JAVASCRIPT
V8
(JAVASCRIPT ENGINE)
NODE.JS
BINDINGS
(NODE API)
OS
OPERATION
LIBUV
(ASYNCHRONOUS I/O)
EVENT
QUEUE
EVENT
LOOP
BLOCKING
OPERATION
EXECUTE
CALLBACK
WORKER
THREADS
FILE SYSTEM
NETWORK
PROCESS

Sever side JavaScript is Single-Threaded Non-blocking Asynchronous Language

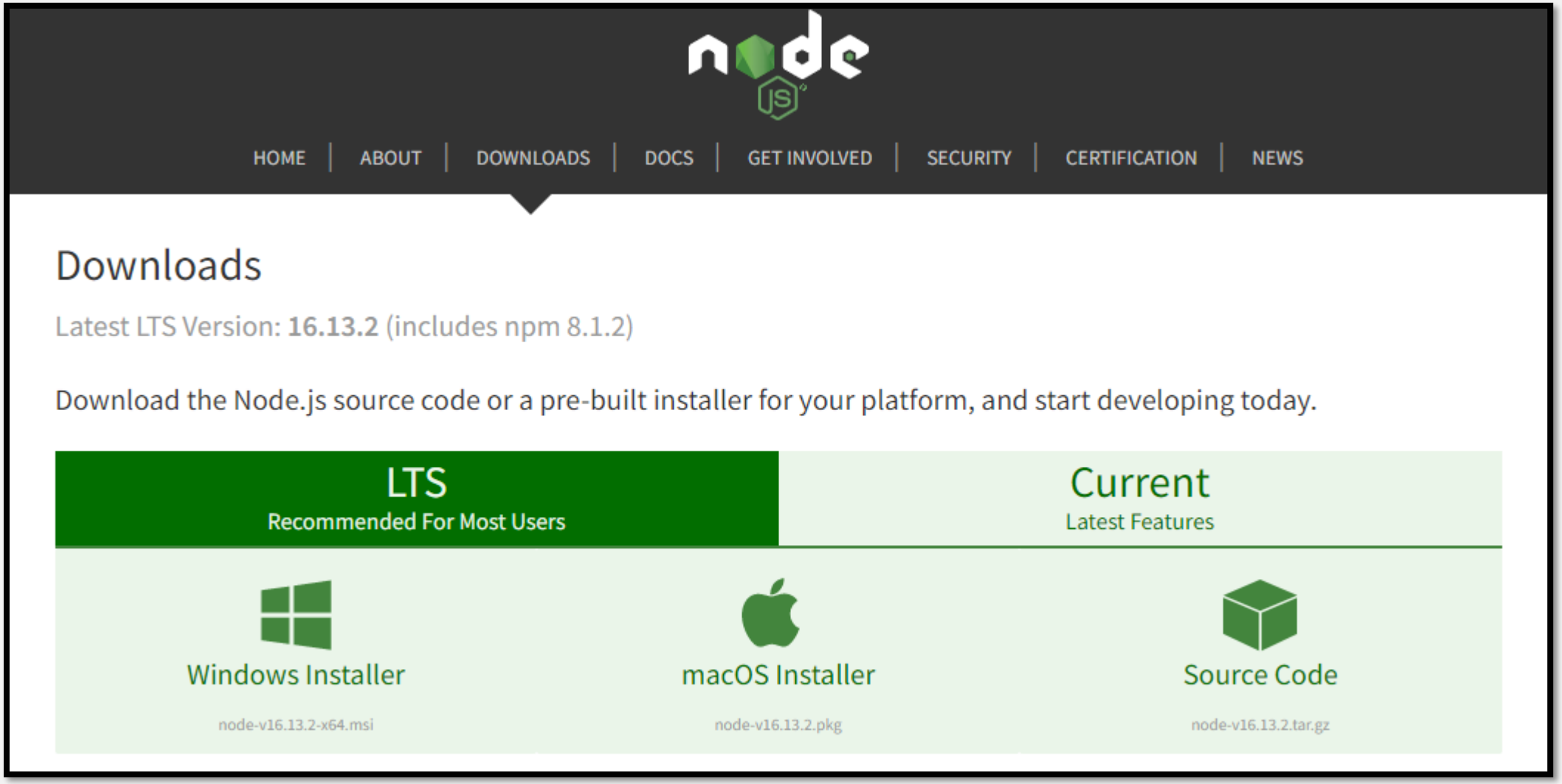

Walmart
Medium
PayPal
Website Using
Node Js
On Server Side
Linkedin
Yahoo
Uber
Netflix

What Does JavaScript need to run as Server?

- ✓Organize code into reusable code.
- ✓Dealing with the requests over the internet .
- ✓Ability to accept request and send responses back to the client.
- ✓Ability to deal with files(html,xml..)
- ✓Ability to deal with databases.

Nodejs Server Installation

Installing Node.js



Running Windows power Shell (cmd)

```
C:\Users\ITI>node --version
v16.13.1

C:\Users\ITI>npm --version
8.1.2
```

Node.js REPL

Node.js comes with virtual environment called **REPL** (Node shell). REPL stands for **R**ead-**E**val-**P**rint-**L**oop. It is a quick and easy way to test simple Node.js/JavaScript code.

Node.js REPL important commands

Command	Description
.save filename	Save current Node REPL session to a file.
.load filename	Load the specified file in the current Node REPL session.
ctrl + c	Terminate the current command.
ctrl + c (twice)	Exit from the REPL.
ctrl + d	Exit from the REPL.
.break	Exit from multiline expression.
.clear	Exit from multiline expression.

Node.js Global Objects

Objects that are available globally on the **global** namespace. We can use those objects immediately on JavaScript file without requiring anything.

- ✓ console
- ✓ __dirname
- ✓ __filename
- ✓ exports
- ✓ module
- ✓ setInterval
- ✓ setTimeout
- ✓ process

Node.js Global Objects

In browsers, the top-level scope is the global scope. This means that within the browser **var X** will define a new global variable. In Node.js this is different. The top-level scope is not the **global** scope; **var X** inside a Node.js module will be **local** to that module.

```
console.log("Hello") === global.console.log("Hello"); //true

let instructorName="Eman"; //local to the module
course="NodeJs"; //added to global object

console.log(global.course); //"NodeJs"
console.log(global.instructorName); //undefined
```

Node.js Global Objects

One important object that is available globally is **process** object. It contains functionality that allows dealing with current process instance (get environment information, environment variables, communicate with terminal or parent processes) .
By using process object , any information can be available when application starts.

```
process.env ;// all environment information
process.env.lang ;// 'en_US.UTF-8'
process.exit(-1) //exit current process
```

- ✓Organize code into reusable code.
- ✓Dealing with the requests over the internet .
- ✓Ability to accept request and send responses back to the client.
- ✓Ability to deal with files(html,xml..)
- ✓Ability to deal with databases.

NodeJs Modules

Node.js Modules

Before writing Node.js applications, you must learn about Node.js **modules** and **packages**. Modules and packages are the building blocks for breaking down your application into smaller pieces. Every JavaScript file used in Node.js is itself a module

"Modules are the basic building block for constructing Node.js applications."

Node.js's module implementation is strongly inspired by, but not identical to, the **CommonJS** module specification.

Node.js does not support ES2015 modules but **Babel** supports transpiling ES2015 modules to Node.js modules. Starting with version **8.5.0**, Node.js supports ES modules natively, behind a command line option.

Defining a module

There are essentially two elements to interact with modules: **require** and **exports**.

The **require** function searches for modules, loading the module definition into the Node.js runtime, and makes its functions available. Anything assigned to a field of the **exports** object is available to other pieces of code, and everything else is hidden. The exports object is what's returned by **require('./module')**.

Defining a module

```
let ProjectId=30;
let projectDuration="20 Weeks";
exports.projectDuration= projectDuration;
exports.projectSupervisor="Eman fathi";
exports.projectData=function(){ return {ProjectId} }
```

Module1.js

```
let module1Values=require("./module1");
let InstructorName=module1Values.projectSupervisor;
let ProjectNumber=module1Values.projectDuration;
module1Values.projectData();
```

Module2.js

node.js™

+

npm

npm – Node Package Manager

Its' purpose is publishing and distributing Node.js packages over the Internet using a simple command-line interface. With npm, you can quickly **find** packages to serve specific purposes, **download** them, **install** them, and **manage** packages you've already installed.

The **npm package** defines a **package format** for Node.js largely based on the CommonJS package specification. It uses the same **package.json** file that's supported natively by Node.js, but with additional fields to build in additional functionality.

Website :https://npmjs.org

NPM, Inc. [US] | https://www.npmjs.com

Not Parents' Money

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npm

Search packages

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Build amazing things

npm is the package manager for JavaScript and the world's largest software registry. Discover packages of reusable code — and assemble them in powerful new ways.

Sign up

Installing an npm package

In Dependencies:

npm install express –save

In DevDependencies:

npm install express –save-dev

The named module is installed in node_modules in the current directory.

Globally:

If you instead want to install a module globally, add the -g option:

npm install noedmon -g

The npm package format – Package.json

An **npm** package is a directory structure with a **package.json** file describing the package.

A basic package.json file is as follows:

```
{  "name": "packageName",
   "version": "1.0",
   "main": "mainModuleName.js",
   "scripts": {
              "start": "node mainModuleName.js",
              }
}
```

The file is in JSON format, which, as a JavaScript programmer, you should be familiar with.

Module identifiers and path names

There are three types of module identifiers: relative, top-level and core

- ✓ **Relative module identifiers:** These begin with ./ or ../ That is, a module identifier beginning with ./ is looked for in the current directory; whereas, one starting with ../ is looked for in the parent directory.
- ✓ **Top-level module identifiers:** These begin with none of those strings and are just the module name. These must be stored in a node_modules directory, and the Node.js runtime has a nicely flexible algorithm for locating the correct node_modules directory.
- ✓ **Core modules :** exists where nodejs installed

Thank You!