Node.JS

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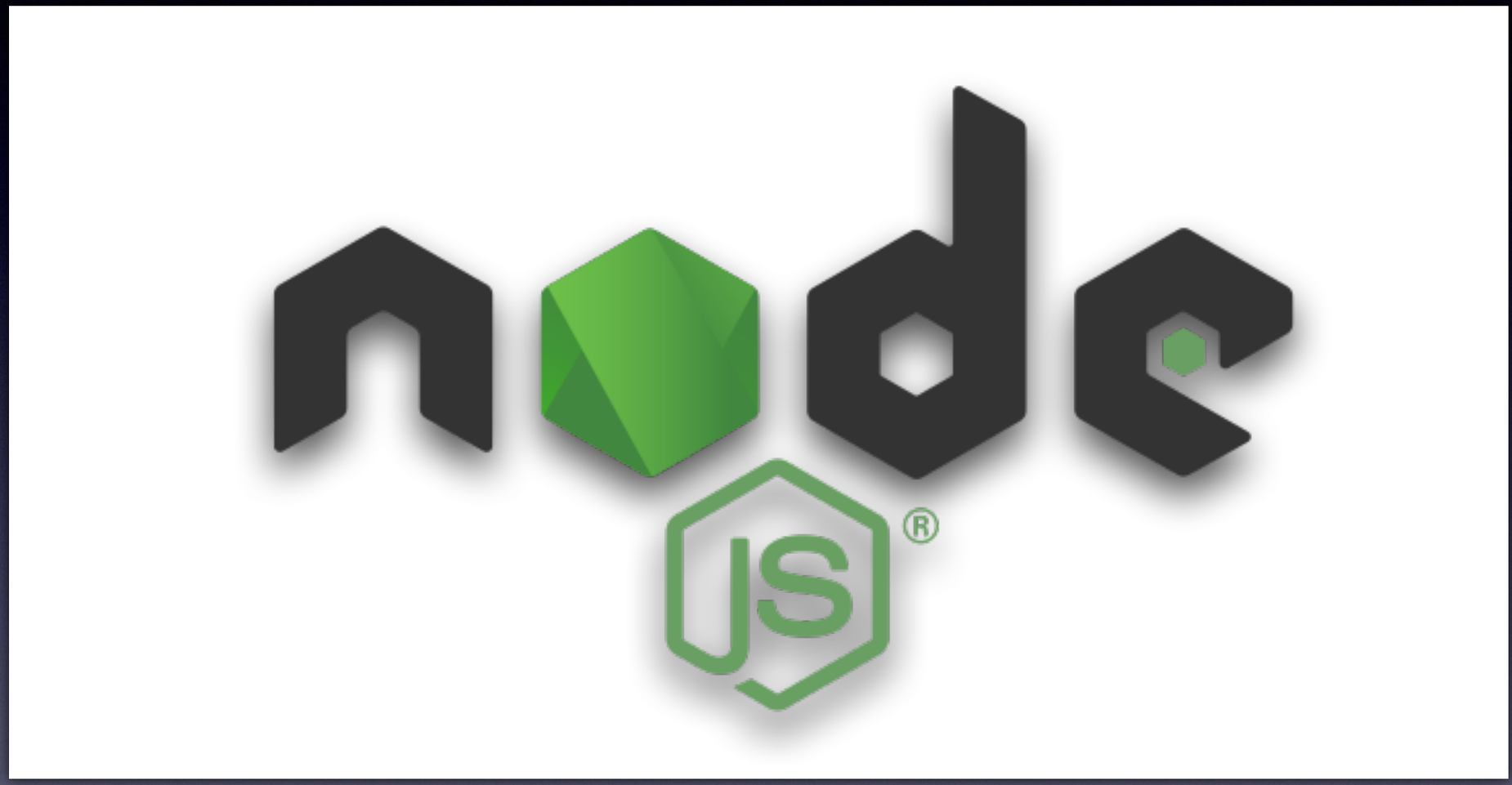
Node.JS Intro



A JS Runtime runtime built on Chrome V8

JS Prerequisites

- In JavaScript
    - Variable Hoisting
    - Events and Callbacks
    - Object and JSON
    - let, const, Arrow Functions, Template Literal

Essential JS

• Variable Hoisting	• http://jsbin.com/fuyahi/2/edit?js,console
• Events	• http://jsbin.com/niqifo/24/edit?html,js,console,output
• Callbacks	• http://jsbin.com/tamaqak/1/edit?js,console
• Objects	• http://jsbin.com/xubego/23/edit?js,console,output
• JSON	• https://jsonplaceholder.typicode.com/users
• let	• https://jsonplaceholder.typicode.com/users
• const	• http://jsbin.com/tazizuf/edit?js,console
• Template Literal	• http://jsbin.com/zevaqay/3/edit?js,console
• Arrow Functions	• http://jsbin.com/bawibax/2/edit?js,console

V8 Engine

- Google's open source high-performance JavaScript engine
- written in C++; used in Google Chrome and Node.JS
- V8 compiles JavaScript directly to native machine code before executing it

JS in Server Side

What JS needs to become Server Side Script?

- JS needs to Accept Requests and Send Responses
- JS needs to communicate over Internet
- JS should deal with Files and File System
- JS should deal with Databases

Synchronous

- JS in Synchronous
- Executes only one process at a time
- V8 is also Synchronous

Asynchronous

- Executing more than one process simultaneously

- Node.JS is Asynchronous

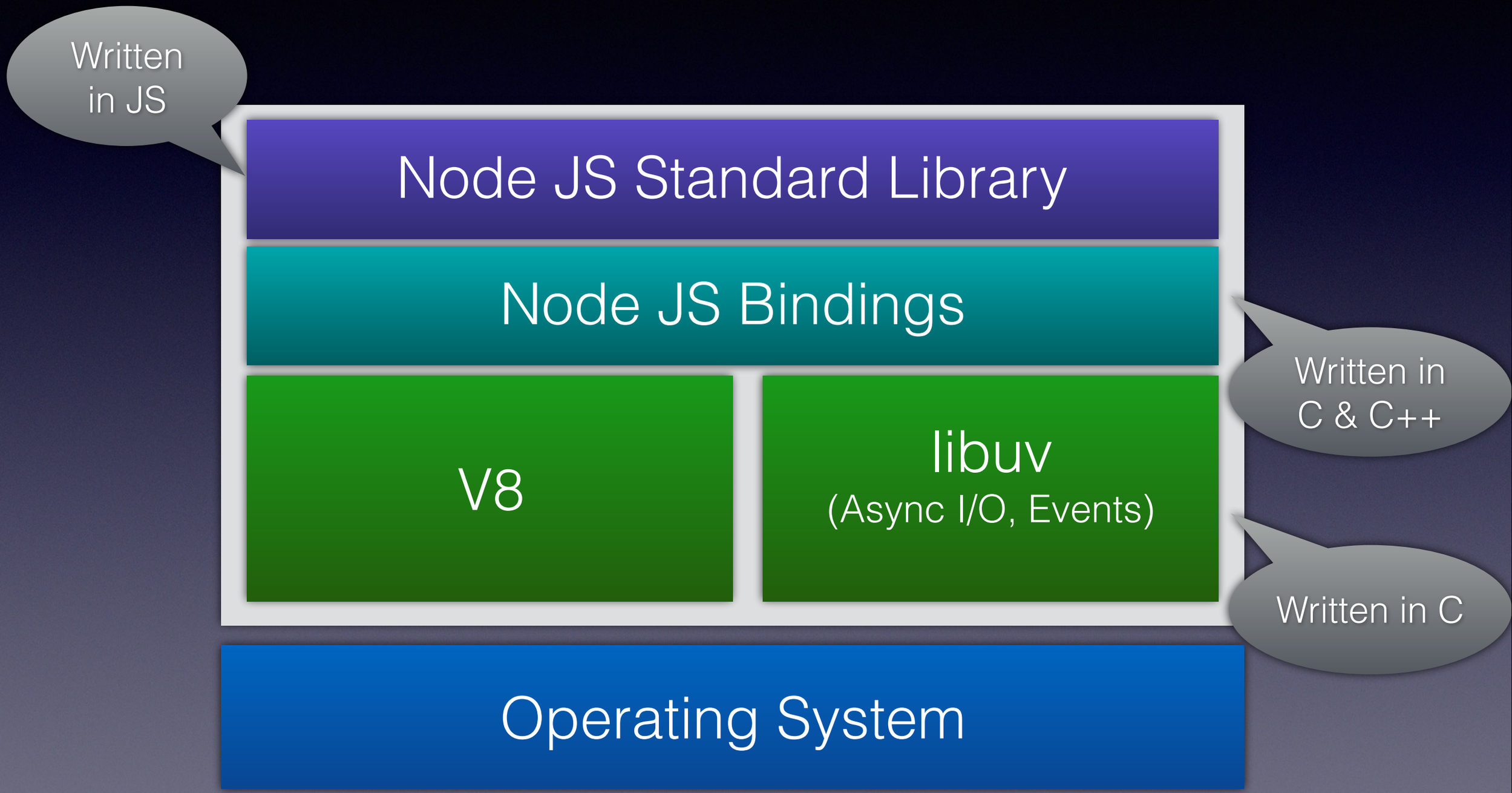
First Node Program

Running in NodeJS Terminal

```
> node

    > console.log("Success");
```

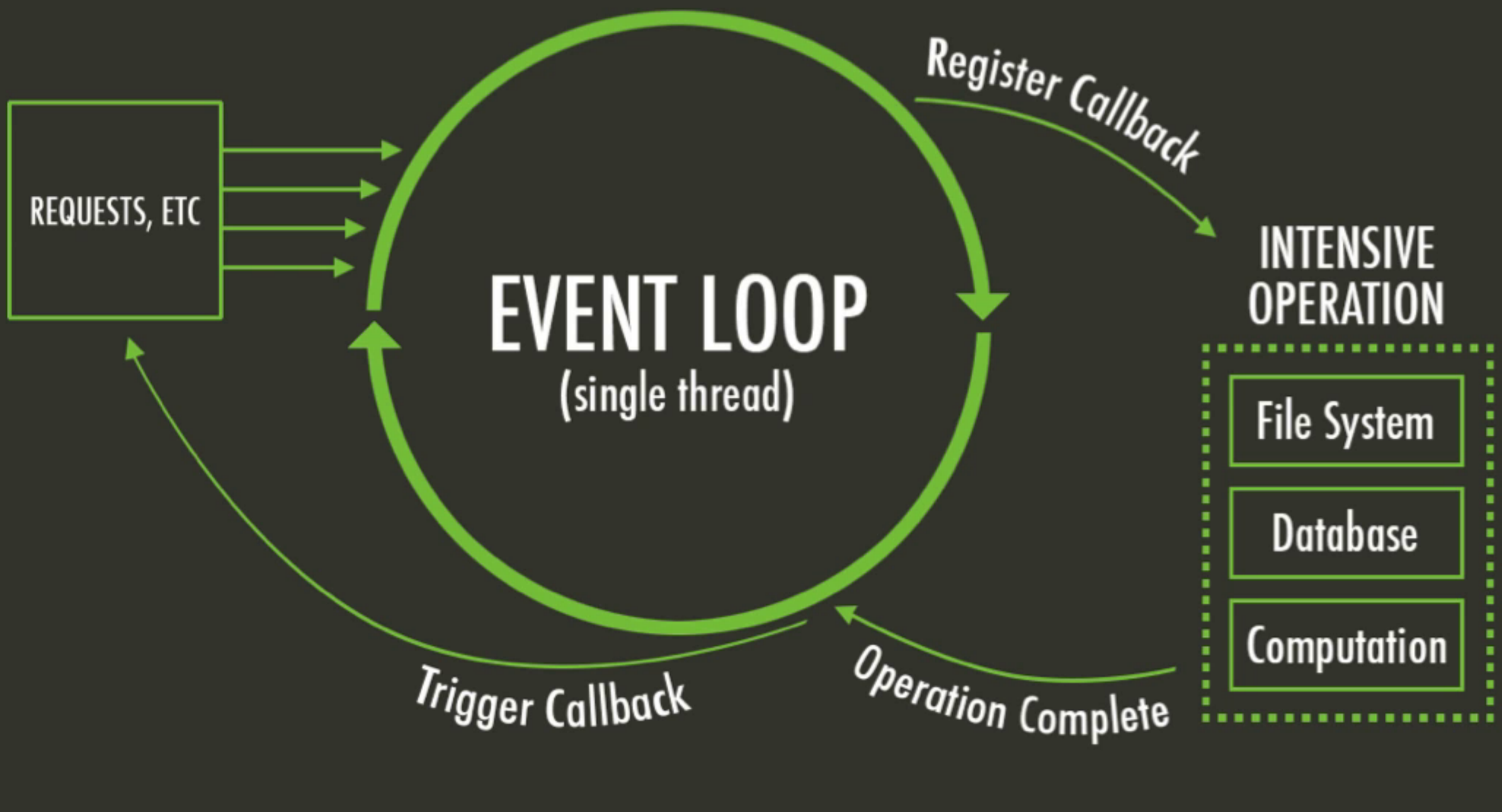
Node.JS Architecture



Events and Event Emitter

```
var fs = require('fs');
var file = fs.createReadStream('./test.txt');
file.on('error', function(err) {
  console.log('Error '+err);
  throw err;
});
file.on('data', function(data) {
  console.log('Data '+data);
});
file.on('end', function(){
  console.log('Finished reading all of the data');
});
```

Non-blocking I/O



Blocking or Sync I/O

Demo

Non-blocking or Async I/O

Demo

Event Loop & Event Emitter

Demo

Introduction to NPM

- Node Package Manager
- http://npmjs.com - A Central repository of Node.JS Packages
- Install package(s) using

  'npm install package-name'

Creating a new Node Project

```
> npm init
```

package.json

walkthrough

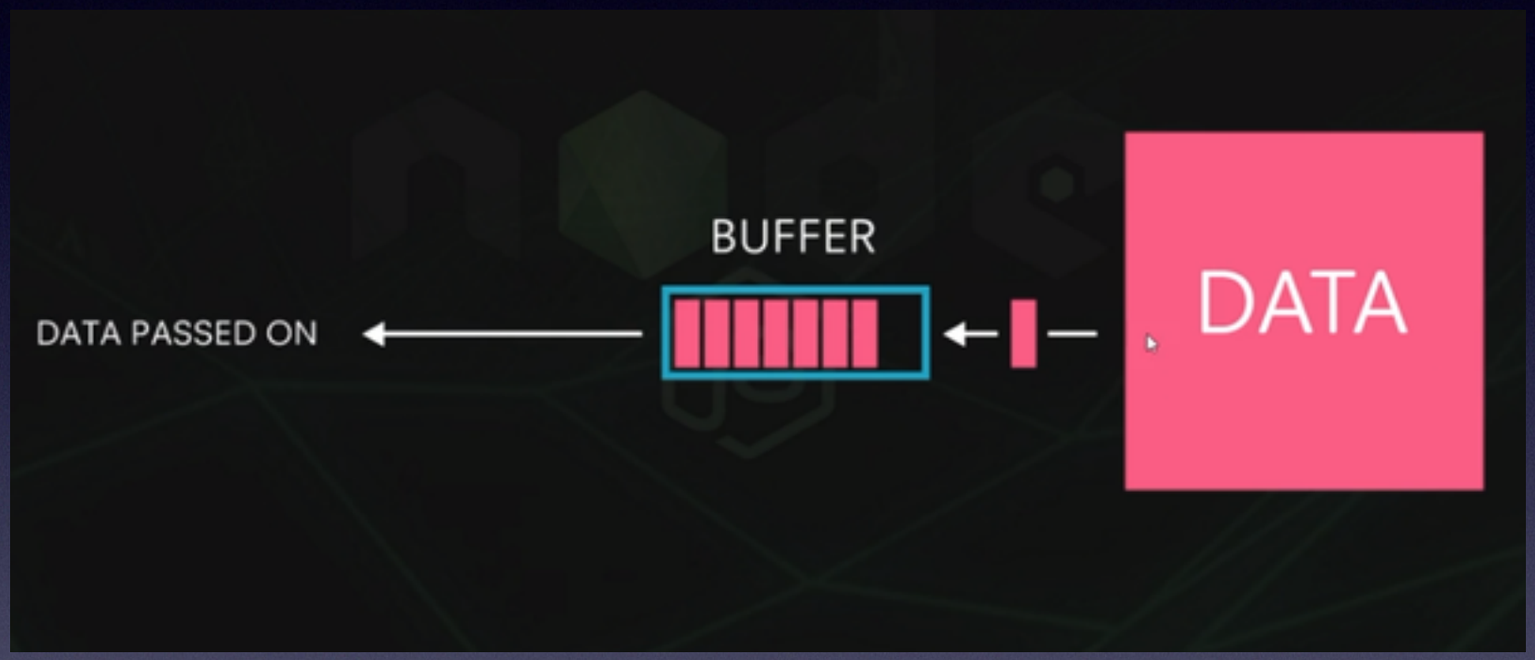
File System

- var fs = require('fs');
    - fs.path()
    - fs.mkdir()
    - fs.rmdir()
    - fs.rename()
    - fs.open()
    - fs.read()
    - fs.write() and many more are there

Buffers

- Buffer is designed to handle raw binary data.
- Buffer is a container outside V8 (raw memory allocated) for storing raw bytes
- A byte = eight bits, and a bit is just a 0 or a 1. So a byte might look like 10101010
- The Buffer class is a global class in Node.js

Buffer - Illustration



Example: Buffering Videos

Buffer Example

Demo

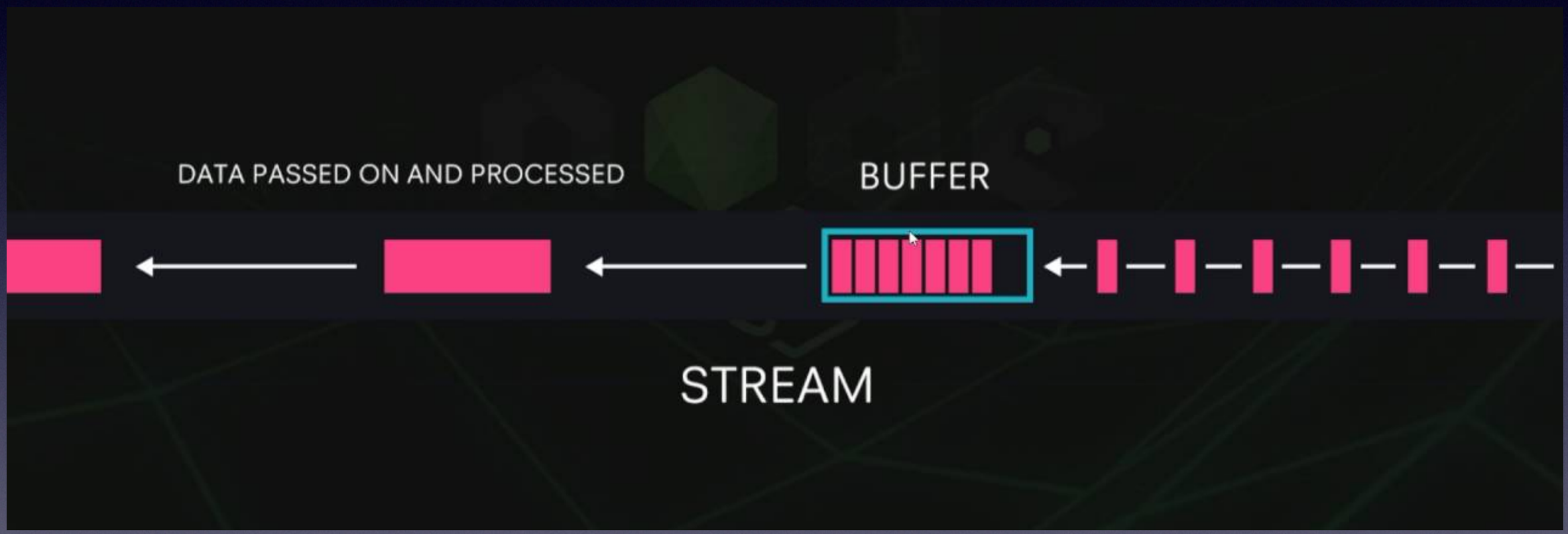
Streams

- A stream is an interface for working with streaming data in Node.js.

- The stream module provides a base API that makes it easy to build objects that implement the stream interface.

- Streams are objects that let you read data from a source or write data to a destination in **continuous** fashion.

Streams - Illustration



Types of Streams API's

Readable	Writable	Duplex	Transform
Streams used for read operation	Streams used for write operation	Streams used for both.	Output is in some way related to the input

Common Stream Events

- data -- when the data is available to read
- end -- when there is nothing more to read
- error -- when the reading/writing resulted in error
- finish -- when the operation is over