

Tecnologias e Programação de Sistemas de Informação

# Asynchronous VS Synchronous in Node and Websockets

Desenvolvimento Web - Back-End | David Jardim

Cofinanciado por:

# ASYNCHRONOUS: MORE THAN ONE PROCESS RUNNING SIMULTANEOUSLY

Node does things asynchronously. V8 does not.

# SYNCHRONOUS: ONE PROCESS EXECUTING AT A TIME

*Javascript* is synchronous. Think of it as only one line of code executing at a time.

NodeJS is asynchronous.



# **CALLBACK: A FUNCTION PASSED TO SOME OTHER FUNCTION, WHICH WE ASSUME WILL BE INVOKED AT SOME POINT**

The function 'calls back' invoking the function you give it when it is done doing its work.

## Callback Example

```
1 function greet(callback) {  
2     console.log('Hello!');  
3     callback();  
4 }  
5  
6 greet(function() {  
7     console.log('The callback was invoked!');  
8 });
```

## Callback Example

```
1 function greet(callback) {  
2     console.log('Hello!');  
3     callback();  
4 }  
5  
6 greet(function() {  
7     console.log('The callback was invoked!');  
8 });  
9  
10 greet(function() {  
11     console.log('A different callback was invoked!');  
12 });
```

## Callback Example

```
1 function greet(callback) {  
2     console.log('Hello!');  
3     var data = {  
4         name: 'John Doe'  
5     };  
6  
7     callback(data);  
8 }  
9  
10 greet(function(data) {  
11     console.log('The callback was invoked!');  
12 });
```



# NON-BLOCKING: DOING OTHER THINGS WITHOUT STOPPING YOUR PROGRAMMING FROM RUNNING

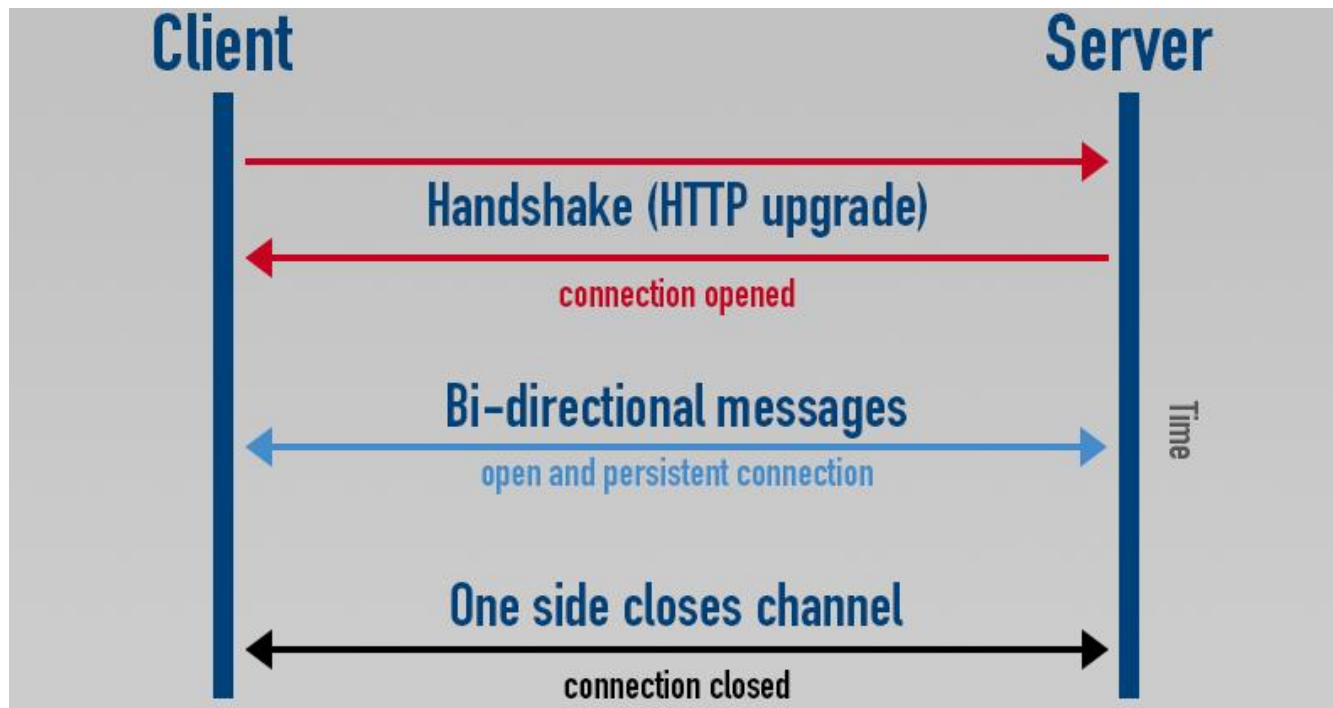
This is made possible by Node's doing things asynchronously.



## Websockets

- **WebSocket is a communications protocol** that provides a full-duplex communication channels **over a single TCP connection** established **between a web browser (client) and a web server**
- Enable web applications to maintain bidirectional communications with server-side processes
- This allows the server to **send content to the browser without being called by the client**, pushing data through the opened connection

## Websockets communication



# Websockets in Node



socket.io

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## SOCKET.IO 2.0 IS HERE

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```
~/Projects/tweets/index.js

1. var io = require('socket.io')(80);
2. var cfg = require('./config.json');
3. var tw = require('node-tweet-stream')(cfg);
4. tw.track('socket.io');
5. tw.track('javascript');
6. tw.on('tweet', function(tweet){
7.   io.emit('tweet', tweet);
8. });
```



## Socket.IO in Node

- Socket.IO is composed of two parts:
  - A server that integrates with (or mounts on) the Node.JS HTTP Server: `socket.io`
  - A client library that loads on the browser side: `socket.io-client`



## Socket.IO in Node and Express

```
// express server
var server = app.listen(3000, function () {
  var host = server.address().address
  var port = server.address().port
  console.log("Example app listening at http://%s:%s", host, port);
});

var io = require('socket.io')(server);
```

## Register the event 'connection'

```
io.on('connection', function (socket) {  
  console.log("New User Connected");  
  console.log(socket.id);  
  //default username  
  socket.username = "Anonymous";  
});
```

Nome do  
Evento

## Register custom events on the socket

```
io.on('connection', function (socket) {  
  console.log("New User Connected");  
  //default username  
  socket.username = "Anonymous";  
  
  //listen on new_message  
  socket.on('send_message', (data) => {  
    //broadcast the new message  
    io.sockets.emit('broadcast_message', { message: data.message, username: socket.username });  
  });  
});
```

## Connect to the server and send events (Client-side)

```
//make connection  
var socket = io.connect('http://localhost:3000')
```

Endereço  
do Servidor

```
//Emit message  
send_message.click(function () {  
  |  socket.emit('send_message', { message: message.val() })  
})
```

Nome do  
Evento

Objeto  
enviado





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