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CTeSP CURSOS TÉCNICOS SUPERIORES PROFISSIONAIS

Tecnologias e Programação de Sistemas de Informação

HTTP & RESTful APIS

Desenvolvimento Web - Back-End | David Jardim

Cofinanciado por:

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REGIÃO AUTÓNOMA DA MADEIRA

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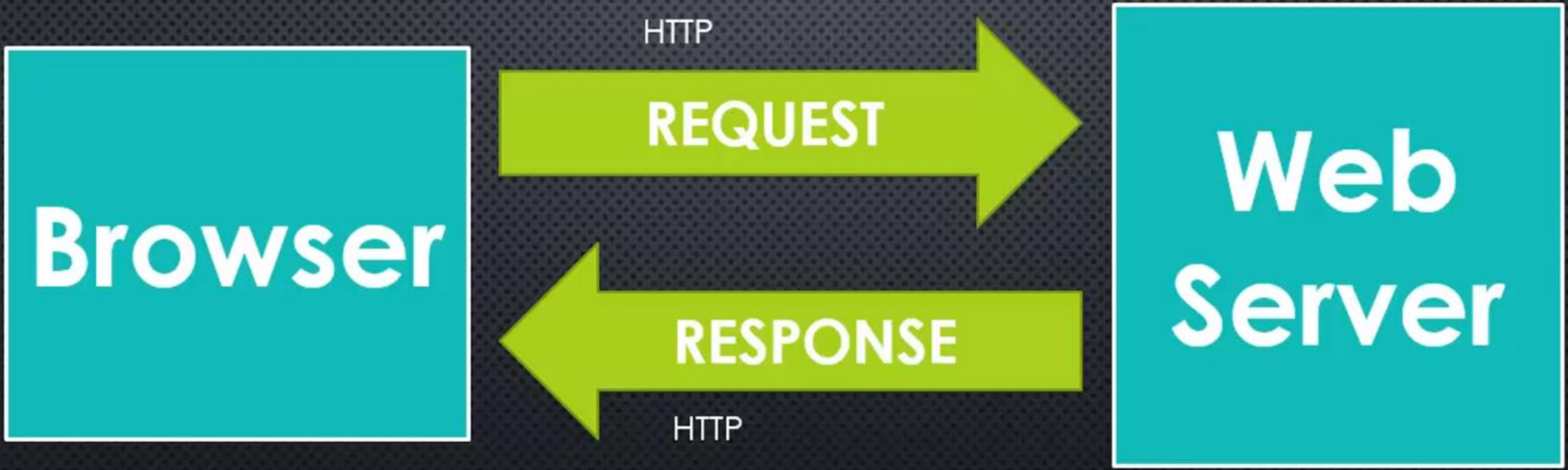
HTTP:
A SET OF RULES (AND A FORMAT) FOR DATA BEING TRANSFERRED ON THE WEB.

Stands for 'HyperText Transfer Protocol'. It's a format (of various) defining data being transferred via TCP/IP.

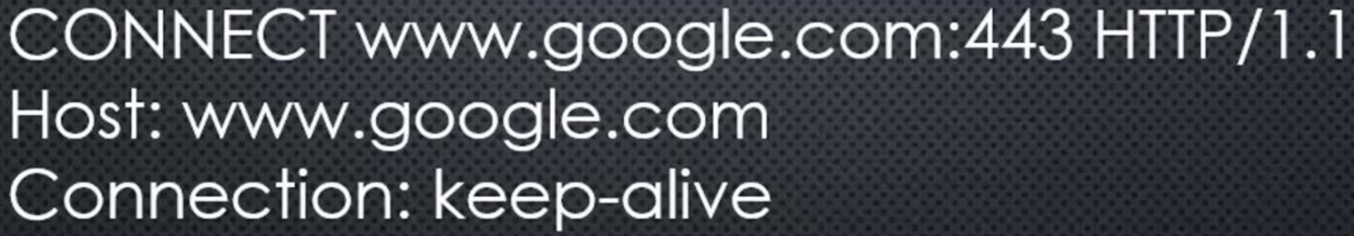
HTTP Methods

Following four HTTP methods are commonly used in REST based architecture

- **GET** - This is used to provide a read only access to a resource
- **POST** - This is used to create a new resource
- **DELETE** - This is used to remove a resource
- **PUT** - This is used to update a existing resource or create a new resource

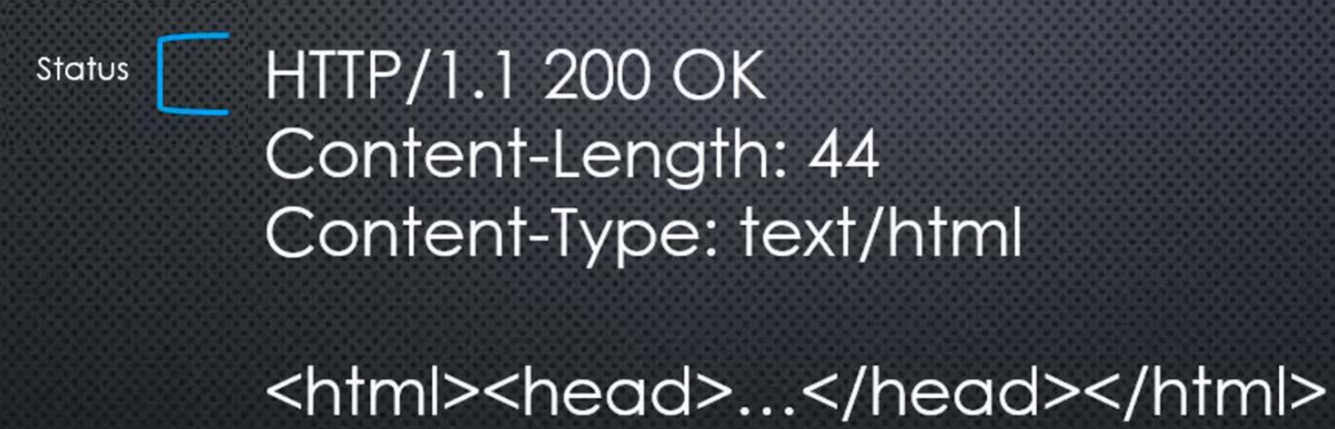

HTTP
REQUEST
Browser
Web Server
RESPONSE
HTTP

HTTP REQUEST



```
CONNECT www.google.com:443 HTTP/1.1
Host: www.google.com
Connection: keep-alive
```

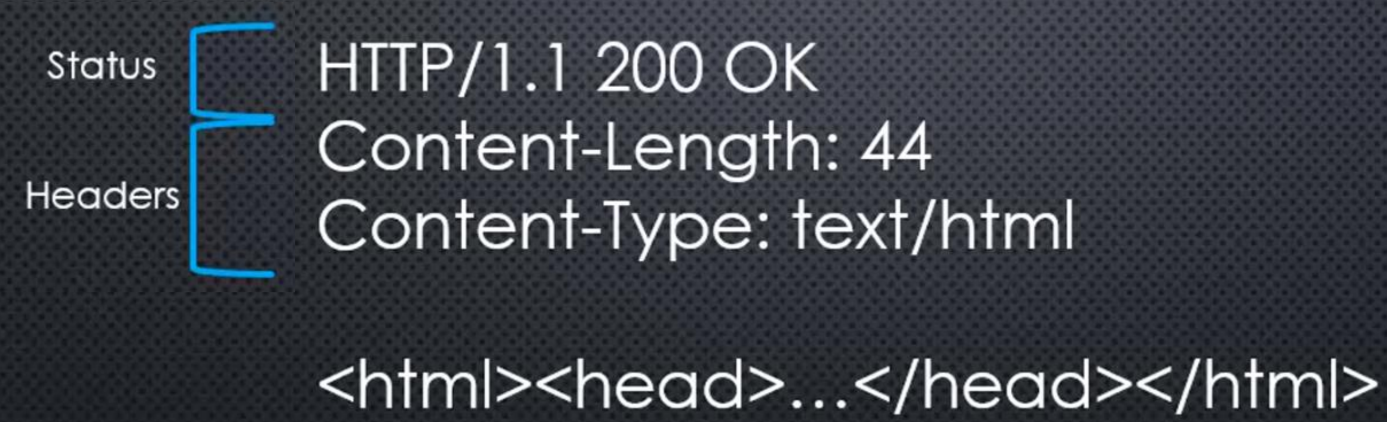
HTTP RESPONSE



```
HTTP/1.1 200 OK
Content-Length: 44
Content-Type: text/html

<html><head>…</head></html>
```

HTTP RESPONSE



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HTTP/1.1 200 OK
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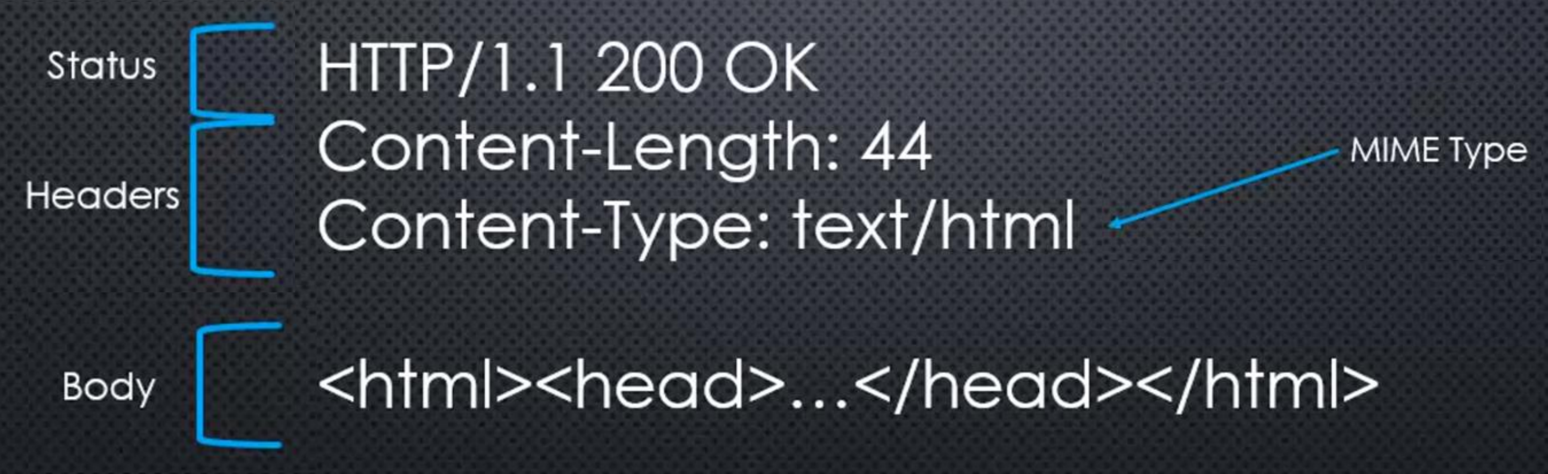
HTTP RESPONSE



```
HTTP/1.1 200 OK
Content-Length: 44
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<html><head>…</head></html>
```

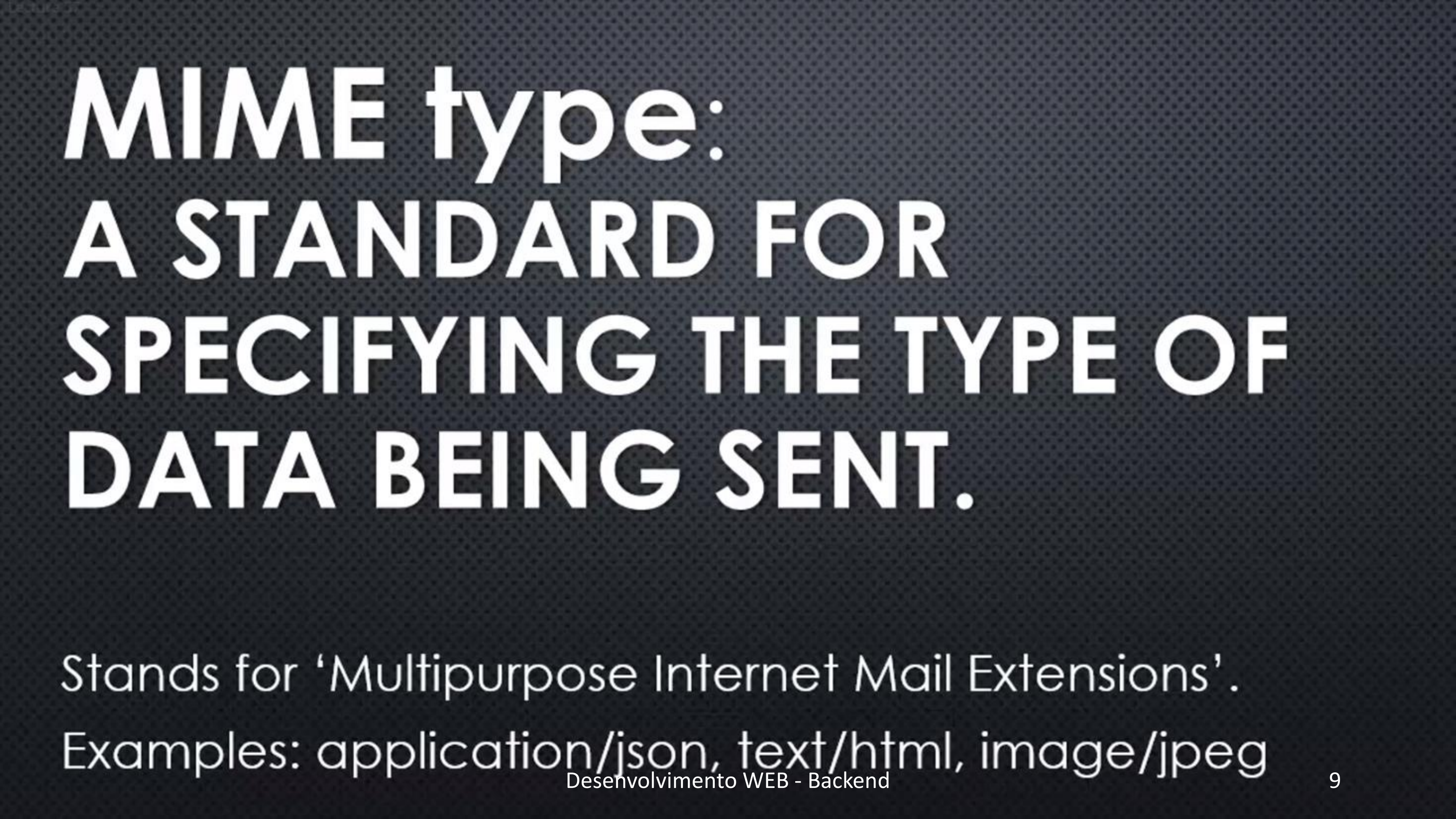

MIME type: A STANDARD FOR SPECIFYING THE TYPE OF DATA BEING SENT.

Stands for ‘Multipurpose Internet Mail Extensions’.

Examples: application/json, text/html, image/jpeg

REST: AN ARCHITECTURAL STYLE FOR BUILDING APIs.

Stands for ‘Representational State Transfer’. We decide that HTTP verbs and URLs mean something.

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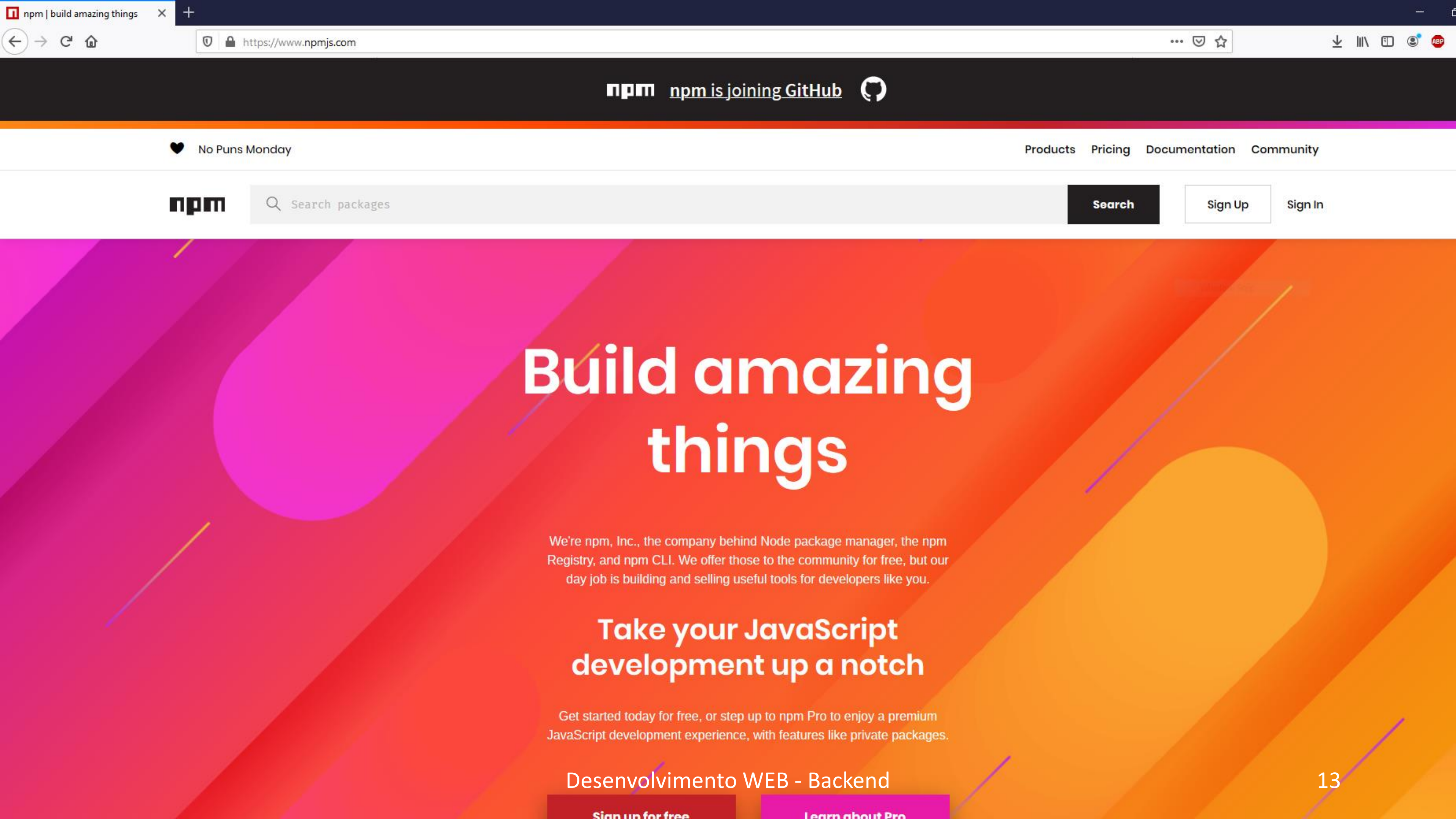
REST Architecture

- REST stands for REpresentational State Transfer.
- REST is web standards based architecture and uses HTTP Protocol.
- Every component is a resource and a resource is accessed by a common interface using HTTP standard methods.

REST Architecture

- REST APIs use **Uniform Resource Identifiers** (URIs) to address resources
- RESTful URI should refer to a resource that is a thing (noun) instead of referring to an action (verb)

```
http://api.example.com/device-management/managed-devices/{device-id}
http://api.example.com/user-management/users/{id}
http://api.example.com/user-management/users/admin
```



Build amazing things

We're npm, Inc., the company behind Node package manager, the npm Registry, and npm CLI. We offer those to the community for free, but our day job is building and selling useful tools for developers like you.

Take your JavaScript development up a notch

Get started today for free, or step up to npm Pro to enjoy a premium JavaScript development experience, with features like private packages.

Node packet manager

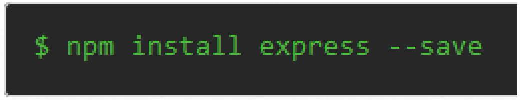
- npm is a package manager for the JavaScript programming language
- It is the default package manager for the JavaScript runtime environment Node.js
- It consists of a command line client, also called npm, and an online database of public and paid-for private packages, called the npm registry
- npm can install packages in local or global mode. In local mode, it installs the package in a node_modules folder in your parent working directory

Creating package.json file

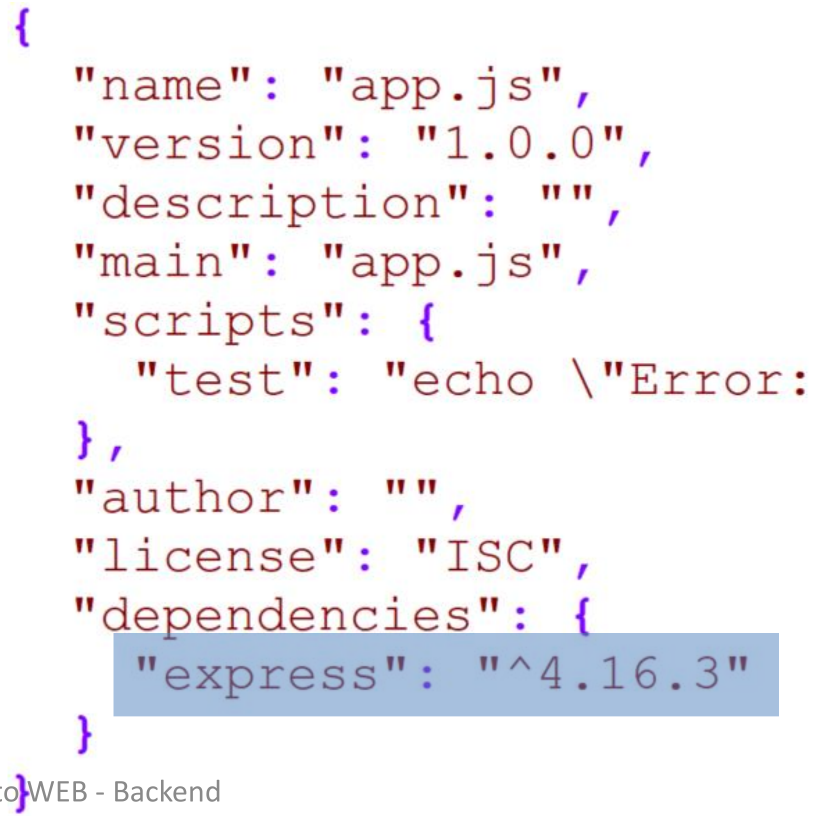
```
$ mkdir project && cd project

$ npm init
package name: (project)
version: (1.0.0)
description: Demo of package.json
entry point: (index.js)
test command:
git repository:
keywords:
author:
license: (ISC)
```

```
{
  "name": "project",
  "version": "1.0.0",
  "description": "",
  "main": "index.js",
  "scripts": {
    "test": "echo \"E
  },
  "author": "",
  "license": "ISC"
}
```

Installing Packages in Local Mode

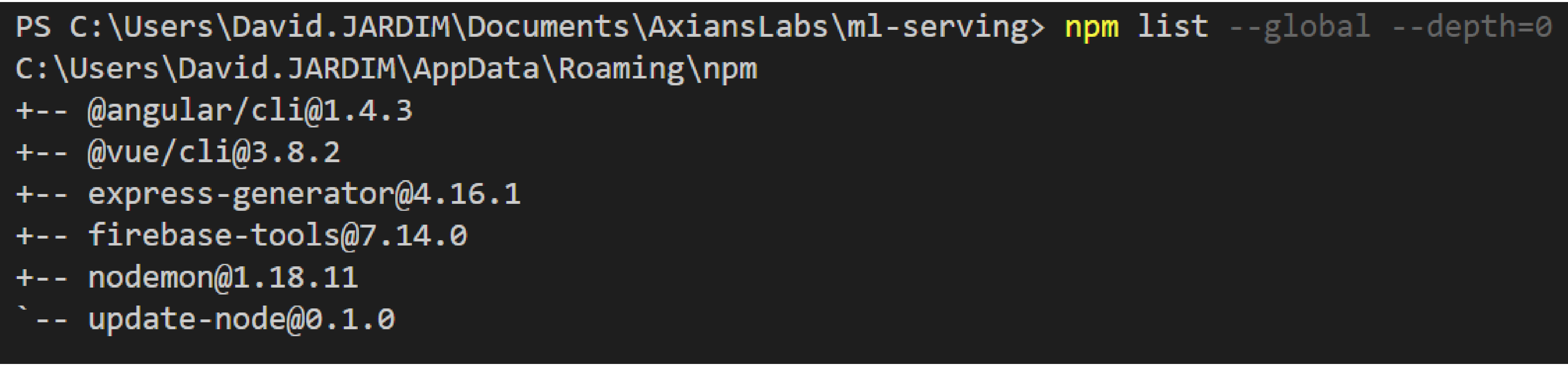


```
$ npm install express --save
```

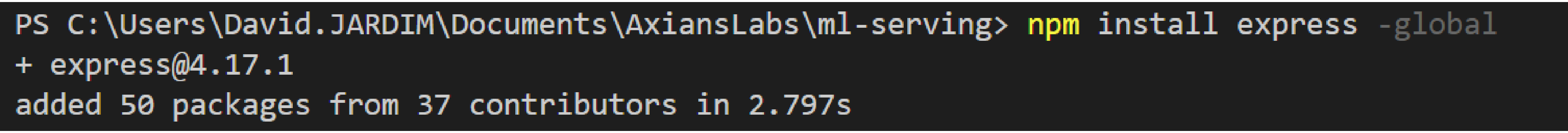


```
{
  "name": "app.js",
  "version": "1.0.0",
  "description": "",
  "main": "app.js",
  "scripts": {
    "test": "echo \"Error:
  },
  "author": "",
  "license": "ISC",
  "dependencies": {
    "express": "^4.16.3"
  }
}
```

Listing and Installing Packages in Global Mode



```
PS C:\Users\David.JARDIM\Documents\AxiansLabs\ml-serving> npm list --global --depth=0
C:\Users\David.JARDIM\AppData\Roaming\npm
+-- @angular/cli@1.4.3
+-- @vue/cli@3.8.2
+-- express-generator@4.16.1
+-- firebase-tools@7.14.0
+-- nodemon@1.18.11
`-- update-node@0.1.0
```



```
PS C:\Users\David.JARDIM\Documents\AxiansLabs\ml-serving> npm install express -global
+ express@4.17.1
added 50 packages from 37 contributors in 2.797s
```

Express Framework

- Express is a minimal and flexible Node.js web application framework that provides a robust set of features for web and mobile applications
- HTTP utility methods and middleware
- https://expressjs.com

Express 4.16.3

Fast, unopinionated, minimalist web framework for Node.js

Create a Server in Express

```
// import express module
const express = require('express');
const app = express();

//Binds and listens for connections on the specified host and port.
var server = app.listen(8081, function () {

    var host = server.address().address
    var port = server.address().port

    console.log("Example app listening at http://%s:%s", host, port)
  })
```

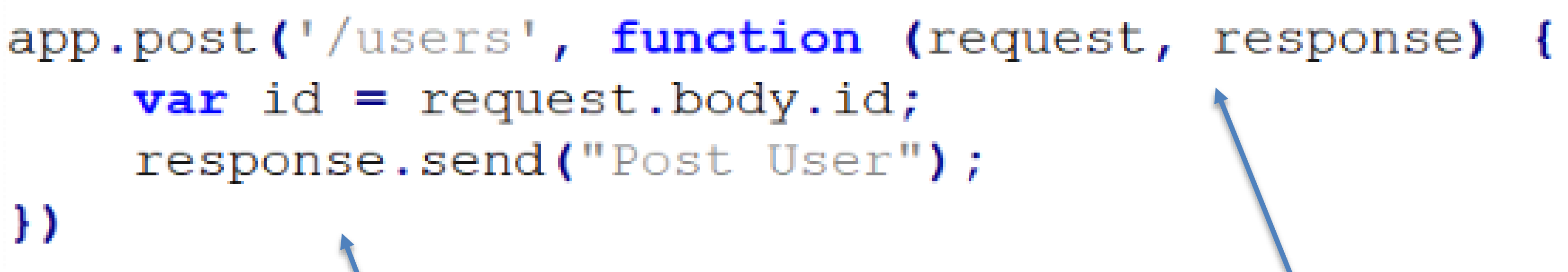
Route HTTP GET Requests in Express

The root path for which the middleware function is invoked

```
app.get('/', function(request, response){
    response.send("Hello World");
});
```

Callback to be invoked

Route HTTP POST Requests in Express



```
app.post('/users', function (request, response) {
    var id = request.body.id;
    response.send("Post User");
})
```

HTTP response and request

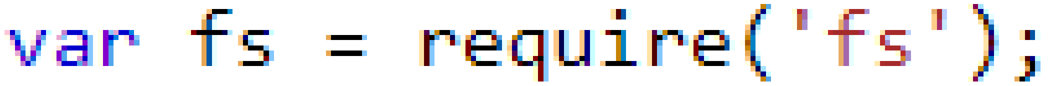
Send response

Route HTTP DELETE Requests in Express

```
app.delete('/users/:id', function (request, response) {
    var id = request.params.id;
    response.send("Delete User");
})
```

File Handling in Node.js

- Common use for the File System module:
  - Read files
  - Create files
  - Update files
  - Delete files
  - Rename files



```
var fs = require('fs');
```

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Read files in Node.js

- Node has several methods available for reading files
- https://nodejs.org/api/fs.html
- Read files synchronous or assynchronous

```
var html = fs.readFileSync("./index.html", 'utf-8');
```

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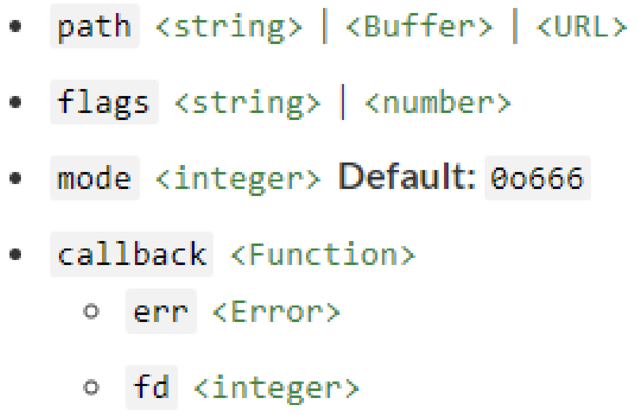
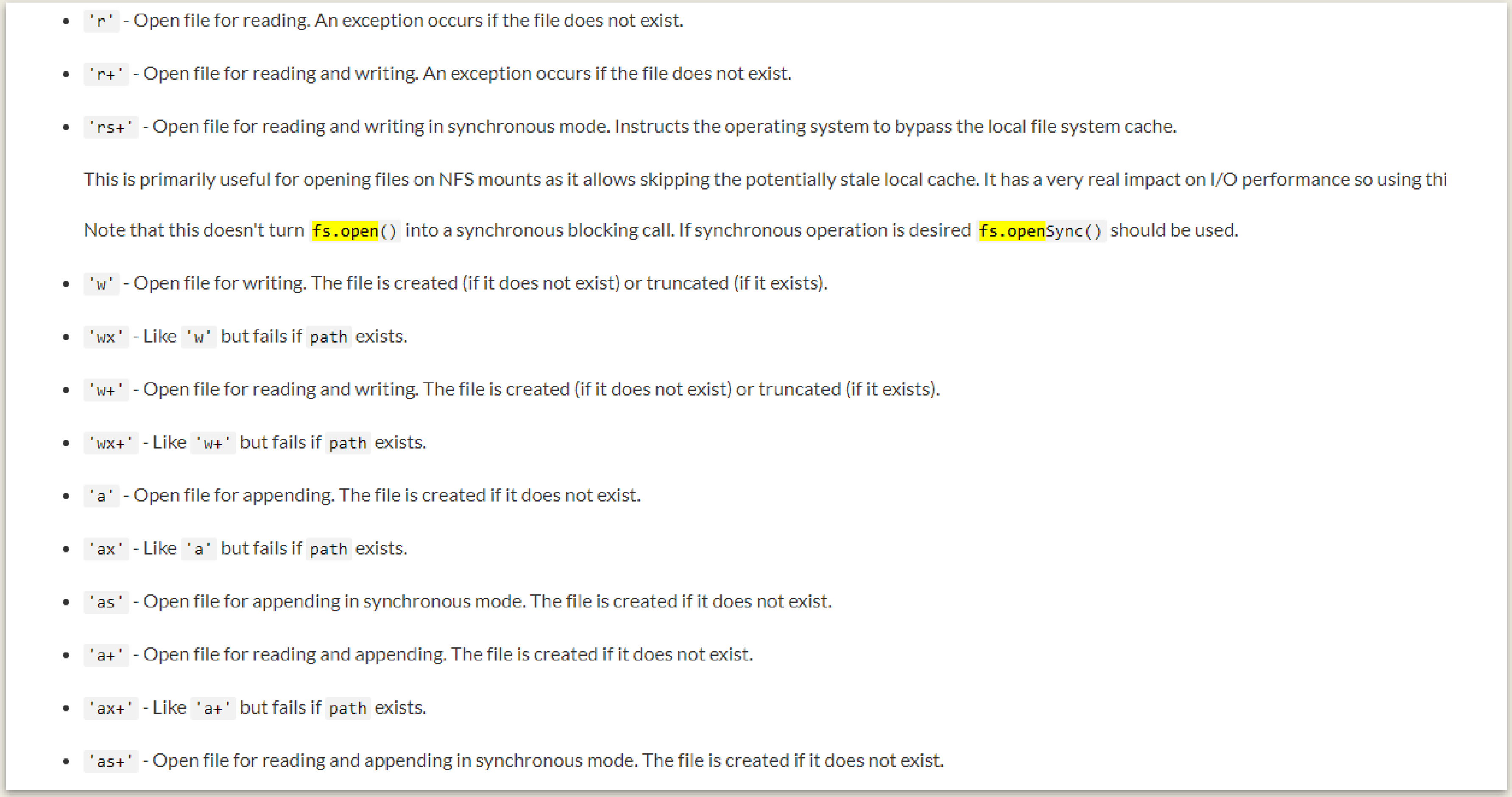
Create/write files Node.js

- The File System module has several methods for creating new files:
  - `fs.appendFile()`
  - `fs.open()`
  - `fs.writeFile()`



- `path` <string> | <Buffer> | <URL>
- `flags` <string> | <number>
- `mode` <integer> Default: `0o666`
- `callback` <Function>
  - `err` <Error>
  - `fd` <integer>



- `'r'` - Open file for reading. An exception occurs if the file does not exist.
- `'r+'` - Open file for reading and writing. An exception occurs if the file does not exist.
- `'rs+'` - Open file for reading and writing in synchronous mode. Instructs the operating system to bypass the local file system cache.

  This is primarily useful for opening files on NFS mounts as it allows skipping the potentially stale local cache. It has a very real impact on I/O performance so using thi

  Note that this doesn't turn `fs.open()` into a synchronous blocking call. If synchronous operation is desired `fs.openSync()` should be used.
- `'w'` - Open file for writing. The file is created (if it does not exist) or truncated (if it exists).
- `'wx'` - Like `'w'` but fails if `path` exists.
- `'w+'` - Open file for reading and writing. The file is created (if it does not exist) or truncated (if it exists).
- `'wx+'` - Like `'w+'` but fails if `path` exists.
- `'a'` - Open file for appending. The file is created if it does not exist.
- `'ax'` - Like `'a'` but fails if `path` exists.
- `'as'` - Open file for appending in synchronous mode. The file is created if it does not exist.
- `'a+'` - Open file for reading and appending. The file is created if it does not exist.
- `'ax+'` - Like `'a+'` but fails if `path` exists.
- `'as+'` - Open file for reading and appending in synchronous mode. The file is created if it does not exist.

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