Mejorando la calidad de código con ECMA 6 y TypeScript

Víctor Orozco

@tuxtor

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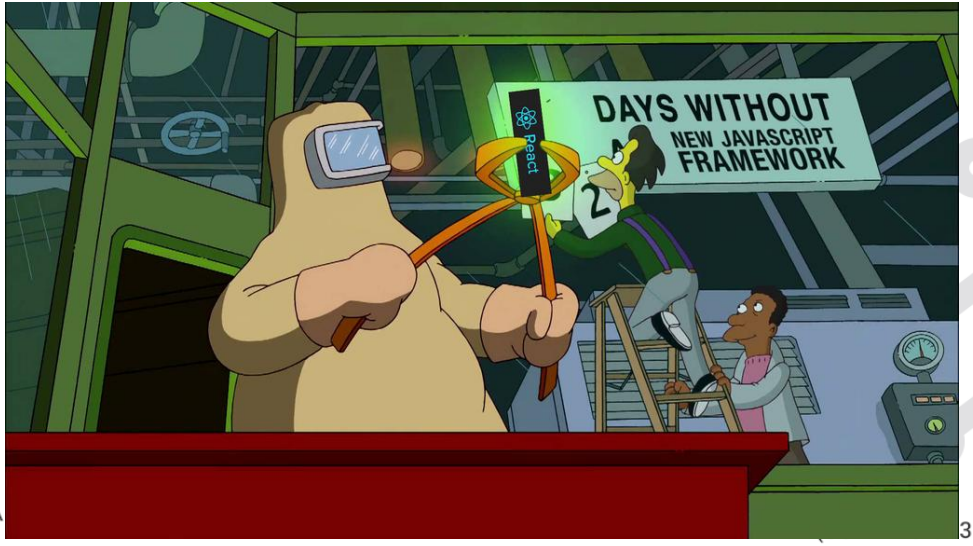
JavaScript



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Clientes JavaScript

1995-2012: JavaScript es malo! - Developer X con conocimientos de otro lenguaje que no sea JS.

- Orientado a hacks
- Imperativo (manipulación DOM)

- 2009: Node.js
- 2009: CoffeeScript
- 2011: Dart
- **2012: TypeScript**
- **2015: ECMA 6**

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Clientes JavaScript/HTML5

- Rich clients = HTML+JS+CSS3
- MVVM +- MVC del lado del cliente
- JSON/XML
- Rest - Request-response
- Websockets - Full duplex

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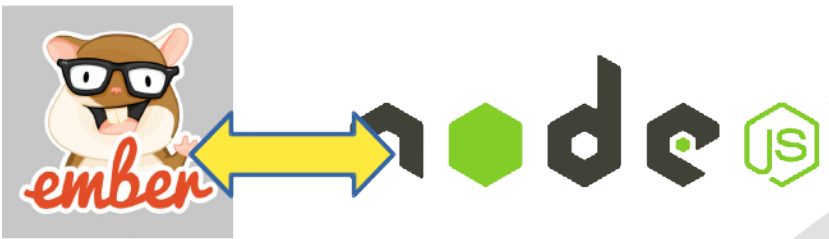
Arquitectura 2015



Arquitectura 2017

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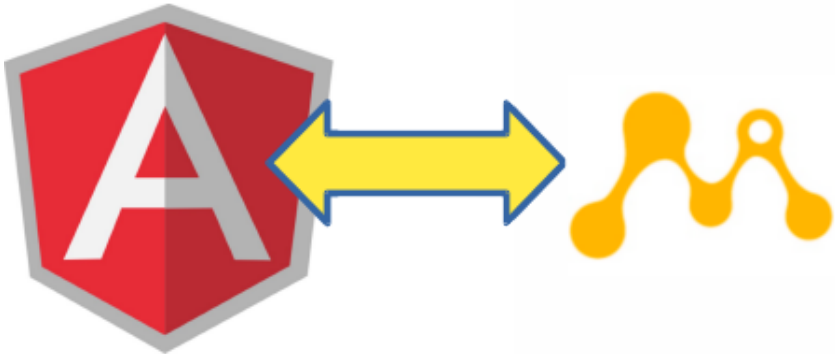
Arquitectura 2019



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- AJAX (Microsoft)
- jQuery, YUI, Dojo

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Clave MVVM

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Clave MVVM

Clientes JavaScript - Resumen

- **JS, TS**, Dart, CoffeeScript (lenguajes)
- **Angular**, Nuxt.js (frameworks)
- **Webpack**, Parcel, Brocoli (SCM)
- **npm**, yarn (Dependencias)

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TS

TypeScript

- Microsoft
- Transpila TS -> JS
- Idea general: JS + Tipos + ES.Next
- Todo código JS es código TS valido
- El código JS es difícil de escalar a menos que sean genios

TypeScript vs JavaScript

- debug
- Autocompetion
- Refactoring
- Navegación en los IDEs
- Linting

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TypeScript transpiler

- Resultado final es JS idiomatico
- Por defecto siempre produce salida
- Superset
- Tipado estático

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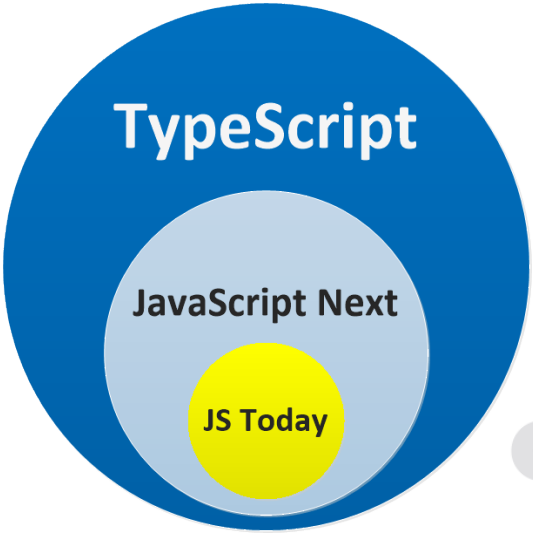
TS vs JS



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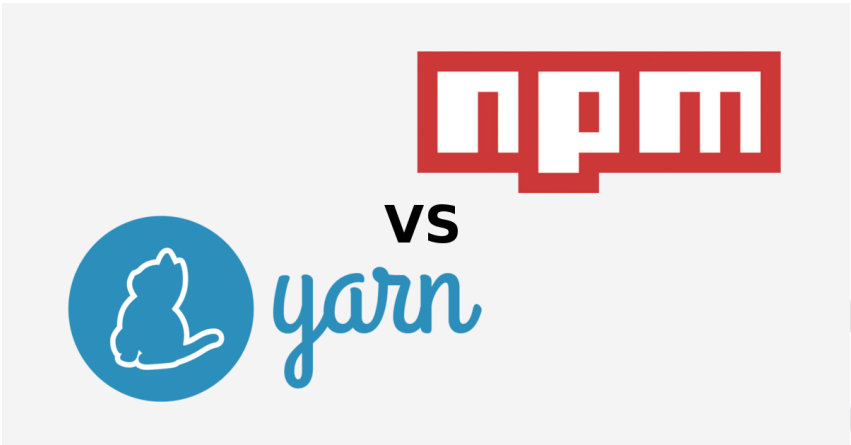
JS en CLI



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TypeScript instalación

- Node.js
- Gestor de paquetes
- Editor o IDE (VSCode/IntelliJ IDEA)

```
npm install -g typescript
npm view typescript version
```

Luego

```
tsc -v
```

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1. tsc
2. Webpack
3. ng-cli

TypeScript - Ejercicio 1

```
tsc ex1.ts
```

```
1 var a = 123
2 a.trim()
```

TypeScript - Ejercicio 1

```
tsc ex1.ts --watch
```

```
1 var a : string = 123
2 a.trim()
```

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TypeScript

- Type annotations
- Type inference
- Compile time type checking
- Optional and default params
- Classes
- Interfaces
- Structural typing
- Arrow function expression

- Enums
- Generics
- Modules
- Tuple types
- Union types and type guards

TypeScript - Típos

- Object - any
- void - void
- boolean - boolean
- integer, double . . . - number
- String, char - string
- Type[] - type[]

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NPM

NPM

- Package manager
- Task runner (invoker)
- Fuerte por la comunidad Node.js
- package.json

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```
mkdir ex2
cd ex2
npm init
```

Package.json

NPM - Package.json

```
{
    "name": "ex2",
    "version": "1.0.0",
    "description": "Foo package",
    "main": "index.js",
    "scripts": {
        "test": "echo \"Error: no test specified\" && exit 1
            "
    },
    "author": "",
    "license": "ISC"
}
```

NPM - Paquetes

https://npmjs.org

```
npm install cowsay
ls -l node_modules
```

TypeScript - Ejercicio 3

cowsay.ts

```
1 var cowsay = require("cowsay");
2
3 console.log(cowsay.say({
4     text : "I'm a moooodule",
5     e : "oO",
6     T : "U "
7 }));
```

```
node cowsay.js
```

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NPM - Resumen

- npm install
- npm install -g
- npm install –save
- require();
- npm uninstall

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ECMAScript 6 + TS

http://es6-features.org/

Classes

```
1  class Car {
2      constructor(color, doorQty) {
3          this.color = color;
4          this.doorQty = doorQty;
5      }
6
7      run(){
8          console.log('I am the '+ this.color + ' car and I have ' + this.
               doorQty + ' doors')
9      }
10 }
11
12 var c1 = new Car("Red", 4);
13 c1.run();
```

Classes TS

```
1  class Car {
2      color: string;
3      doorQty: number;
4      constructor(color:string, doorQty: number) {
5          this.color = color;
6          this.doorQty = doorQty;
7      }
8      run(){
9          console.log(`I am the ${this.color} car and I have ${this.doorQty}
               doors`)
10     }
11 }
12
13 var c1 = new Car("Red", 4);
14 c1.run();
```

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Arrow function

```
1  function ScopeTest(tuxAge){
2      this.tuxAge = tuxAge;
3      this.increaseAge = function(){
4          console.log("incrementando edad");
5          this.tuxAge++;
6      }
7  }
8
9  var sTest = new ScopeTest(10);
10 setTimeout(sTest.increaseAge,1000);
11 setTimeout(function(){console.log(sTest.tuxAge)},2000);
```

Arrow function

```
1  function ScopeTest(tuxAge){
2      var self = this;
3      this.tuxAge = tuxAge;
4      this.increaseAge = function(){
5          console.log("incrementando edad");
6          self.tuxAge++;
7      }
8  }
9
10 var sTest = new ScopeTest(10);
11 setTimeout(sTest.increaseAge,1000);
12 setTimeout(function(){console.log(sTest.tuxAge)},2000);
```

Arrow function

```
1  function ScopeTest(tuxAge){
2      this.tuxAge = tuxAge;
3      this.increaseAge = () => { //Arrow function
4          console.log("incrementando edad");
5          this.tuxAge++;
6      }
7  }
8
9  var sTest = new ScopeTest(10);
10 setTimeout(sTest.increaseAge,1000);
11 setTimeout(function(){console.log(sTest.tuxAge)},2000);
```

Rest parameters

```
1 function iTakeItAll(first, second, ...allOthers) {
2     console.log(allOthers);
3 }
4 iTakeItAll('foo', 'bar');
5 iTakeItAll('foo', 'bar', 'bas', 'qux');
```

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let

```
1  function scopeTest(){
2      var info = 123;
3      if(true){
4          var info = 456;
5      }
6      console.log(info);
7  }
8  scopeTest();
```

const

```
1 const constante = 12345
2
3 const foo = { bar: 123 };
4 foo.bar = 456;
```

Block scoped

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Destructuring

```
1  var rect = { x: 0, y: 10, width: 15, height: 20 };
2
3  var {x, y, width, height} = rect;
4  console.log(x, y, width, height);
5
6  var {w, x, ...remaining} = {w: 1, x: 2, y: 3, z: 4};
7  console.log(w, x, remaining);
```

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Spread operator

Como argumentos

```
1 function foo(x, y, z) { }
2 var args = [0, 1, 2];
3 foo(...args);
```

Como arreglo (destructuring)

```
1 var list = [1, 2];
2 list = [...list, 3, 4];
3 console.log(list);
```

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TS

Compilation context

- Colección de archivos a ser analizados por tsc
- tsc –init
- tsconfig.json

Compilation context

```
{
    "include":[
        "./folder"
    ],
    "exclude":[
        "./folder/**/*.spec.ts",
        "./folder/someSubFolder"
    ]
}
```

```
{
    "files":[
        "./some/file.ts"
    ]
}
```

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Declaration spaces

Type declaration space

```
1 class Tuz {};
2 interface Tux {};
3 type Penguin = {};
```

Pueden ser usados como tipos

```
1 var foo: Tuz;
2 var bar: Tux;
3 var bas: Penguin;
```

Declaration spaces

Variable declaration space

```
1 class Tuz {};
2 var someTuz =Tuz;
3 var someOtherVar = 123;
```

Pueden ser usados como tipos

```
1 var foo = 123;
2 var bar: foo; // ERROR
```

Modulos

- AMD - RequireJS, solamente para browser
- CommonJS - Node.js
- SystemJS - superado por ES6 modules
- ES6 modules

Al utilizar módulos, se hace obligatorio el uso de un bundler para paginas web

Modulos TS

- Basado en ES6 modulos
- Global module
- File module
- globals.d.ts

File module

uno.ts

```
1 export var penguin = "Tucs";
```

dos.ts

```
1 import { penguin } from "./penguin";
2 var bar = penguin;
3 console.log(bar)
```

Modules - Alias

Export

```
1 let someVar = 123;
2 export { someVar as aDifferentName };
```

Import

```
1 import { someVar as aDifferentName } from './foo';
```

Modules - Default

Export

```
1 export default someVar = 123;
2 export default function someFunction() { }
3 export default class SomeClass { }
```

Import

```
1 import someLocalNameForThisFile from "../foo";
```

Modules - Resolución

- Por path
- Node
  - ./node_modules/something/foo
  - ../node_modules/something/foo
  - Hasta llegar a /

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TS - Más tipos

Tipos - inline

```
1 var person: {
2     firstName: string;
3     secondName: string;
4 };
5 person = {
6     firstName: 'John',
7 };
```

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Tipos - any

```
1 var penguin: any;
2
3 // Takes any and all types
4 penguin = 'Tuz';
5 penguin = 123;
```

Tipos - Generics

```
1  function reverse<T>(items: T[]): T[] {
2      var toreturn = [];
3      for (let i = items.length - 1; i >= 0; i--) {
4          toreturn.push(items[i]);
5      }
6      return toreturn;
7  }
```

Tipos - Union Type

```
1  function printText(text: string[]|string) {
2      var line = '';
3      if (typeof command === 'string') {
4          console.log(text.trim());
5      } else {
6          console.log(text.join(' '));
7      }
8  }
```

Tipos - Intersection Type

```
1 function extend<T, U>(first: T, second: U): T & U {
2     return { ...first, ...second };
3 }
4
5 const x = extend({ a: "hello" }, { b: 42 });
```

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Tipos - Tuple Type

```
1  var nameNumber: [string, number];
2
3  nameNumber = ['Jenny', 8675309];
4
5  nameNumber = ['Jenny', '867-5309'];
```

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WebApps

Frameworks

- Angular
- Vue
- React
- Nest

Si es JS, es TS

MicroEjemplo

```
ng new ex6
cd new ex6
ng serve --open
```

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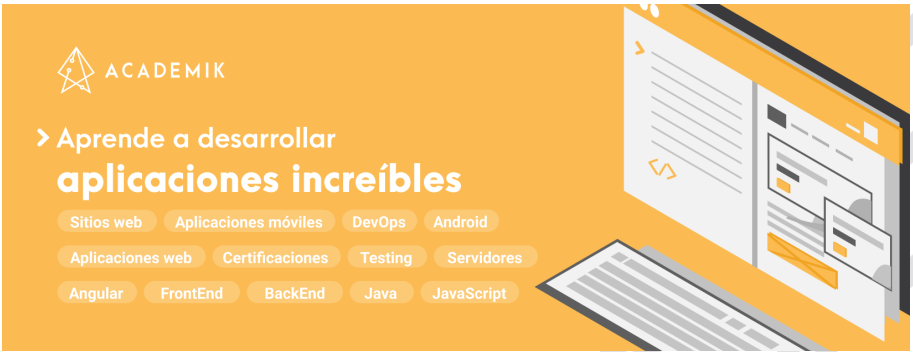

Víctor Orozco

- vorozco@nabenik.com
- @tuxtor
- http://vorozco.com
- http://tuxtor.shekalug.org

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Escríbenos a cursos@academik.io

www.academik.io