

ES6: THE FUTURE OF JAVASCRIPT

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AGENDA

- What is it?
- ES6 Additions
 - Sugar
 - Built-in Lib Improvements
 - Promises
 - Generators
 - Classes
 - Modules
- How Can I Use This Right Now?

WHAT IS ECMASCRIPT?

- ECMAScript is the international standard that defines JavaScript (and languages like ActionScript have implemented it as well).
- It's up to each browser vendor to implement the standard
- ES6 has been in the works in some form or another since 2008. It was "feature frozen" in Aug. 2014; the spec is in the process of being finalized, with a target publish date in June 2015.
- Major browsers have already rolled out many of the proposed features in preparation.

**SO LET'S LOOK AT
SOME OF WHAT WE'LL
BE GETTING WITH
ES6...**



BUT FIRST...

ah, almost. There are a few, uh, provis

Ah, a couple of quid pro quo.

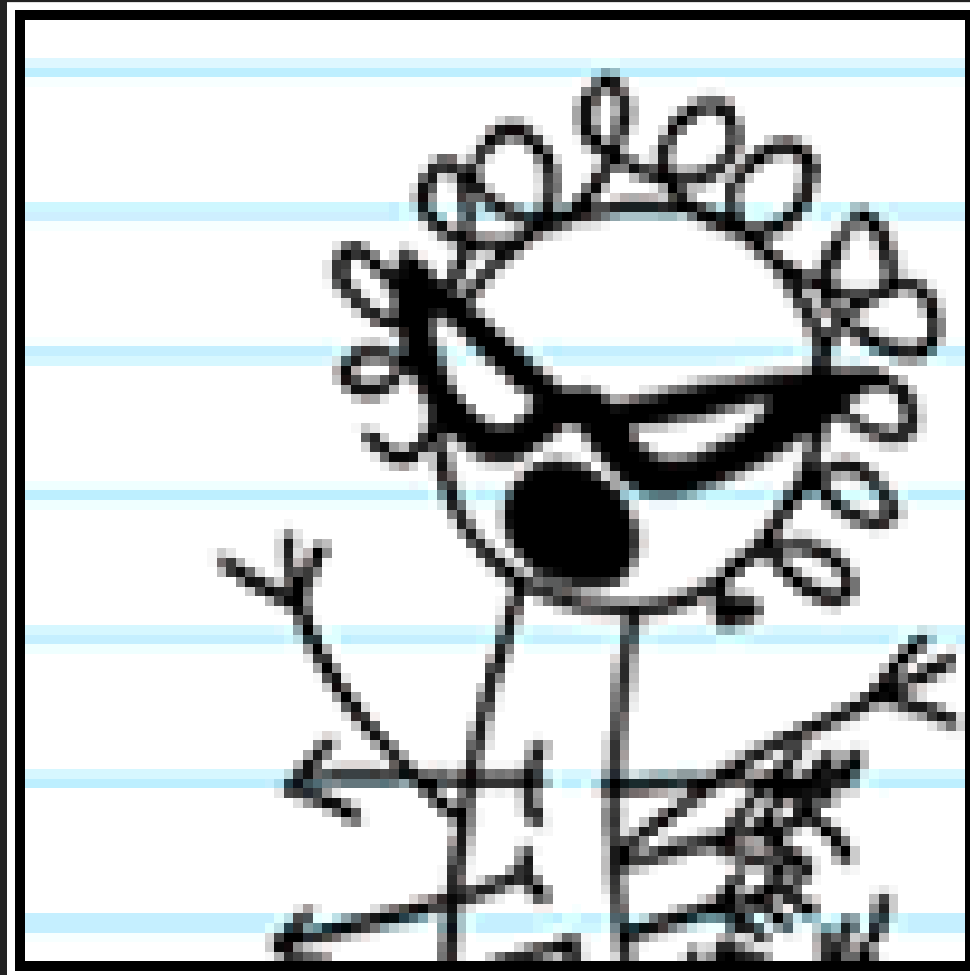
PROVISOS

- Totally backwards-compatible. If you just HAAAATE all of this, you don't have to use any of it!
- This presentation is nowhere near an exhaustive list; just hitting some of what I consider the highlights in ~15 minutes.

SUGAR



ARROW FUNCTIONS



ARROW FUNCTIONS

TAKE THIS:

```
var add = function (a, b) {  
  return a + b;  
}
```

AND TURN IT INTO THIS:

```
var add = (a, b) => a + b;
```

A man with brown hair, wearing a white dress shirt and a dark tie, is shown from the chest up. He has a wide-eyed, enthusiastic expression and is pointing his index fingers upwards with both hands. The background consists of a yellow wall and white horizontal blinds on the left side.

LEXICAL "THIS"

This guy!

THE PROBLEM

```
function Person() {  
    // The Person() constructor defines `this` as itself.  
    this.age = 0;  
  
    setInterval(function growUp() {  
        // In nonstrict mode, the growUp() function defines `this`  
        // as the global object, which is different from the `this`  
        // defined by the Person() constructor.  
        this.age++;  
    }, 1000);  
}  
  
var p = new Person();
```

UNTIL NOW, WE GOT AROUND IT BY DOING THIS...

```
function Person() {  
  var self = this; // Some choose `that` instead of `self`.  
                  // Choose one and be consistent.  
  self.age = 0;  
  
  setInterval(function growUp() {  
    // The callback refers to the `self` variable of which  
    // the value is the expected object.  
    self.age++;  
  }, 1000);  
}
```

BUT IN ES6, IT'S ALL GOOD...

```
function Person() {  
  this.age = 0;  
  
  setInterval(() => {  
    this.age++; // |this| properly refers to the person object  
  }, 1000);  
}  
  
var p = new Person();
```



A bright green tennis ball is positioned in the center of the frame, resting on the white strings of a tennis racket. The racket's frame is visible at the bottom, showing a dark mesh. The background is a solid, deep blue. The text "LET, CONST, AND BLOCK SCOPE" is overlaid in white, bold, sans-serif capital letters across the middle of the image.

LET, CONST, AND BLOCK SCOPE

FUNCTIONAL SCOPE

```
function () {  
  for (var i = 0; i < 5; i++) {  
    //...  
  }  
  // Will print 5, even though  
  // we're outside of the block  
  // in which i was declared.  
  console.log(i);  
}
```

BLOCK SCOPING WITH "LET"

```
function () {  
  for (let i = 0; i < 5; i++) {  
    //...  
  }  
  // ReferenceError: i is not defined  
  console.log(i);  
}
```


CONSTANTS

```
function () {  
  const hooray = 'Hooray!';  
  hooray = 'Boo!';  
  
  // In strict mode, you'll get  
  // TypeError: Assignment to constant variable.  
  // In non-strict mode, prints 'Hooray!'  
  console.log(hooray);  
}
```

A close-up photograph of a person's hand playing a guitar. The hand is positioned on the fretboard, with fingers pressing down on the strings. The guitar has a dark wood body and a light-colored fretboard. The text "TEMPLATE STRINGS" is overlaid in white, bold, sans-serif capital letters across the center of the image.

TEMPLATE STRINGS

WHAT WE DO NOW...

```
var name = 'Roger';  
var job = 'Shrubber';  
console.log('My name is ' + name + '. I am a ' + job +  
            '.\n They call me "' + name + ' the ' + job + '".');  
// My name is Roger. I am a Shrubber.  
// They call me "Roger the Shrubber".
```

IN ES6...

```
var name = 'Roger';  
var job = 'Shrubber';  
console.log(`My name is ${name}. I am a ${job}.  
            They call me "${name} the ${job}".`);  
// My name is Roger. I am a Shrubber.  
// They call me "Roger the Shrubber".
```

FEATURES

- Interpolation with \${}
- Multiline
- No need to escape special characters

A close-up photograph of a single slice of golden-brown toast resting on a white plate. A butter knife is positioned diagonally across the toast, with a pat of yellow butter being spread onto its surface. The background is a soft-focus white surface.

**DEFAULT PARAMS,
SPREAD, & REST**

DEFAULT PARAMS

```
var f = function (x, y=12) {  
  return x + 7;  
}  
  
// Or, using an arrow function...  
var f = (x, y=12) => x + y;  
  
console.log(f(3)); // 15
```

SPREAD OPERATOR

```
function addThree(x, y, z) {  
  return x + y + z;  
}  
var nums = [1, 2, 3];  
addThree(...nums); // returns 6  
  
var parts = ['shoulder', 'knees'];  
var lyrics = ['head', ...parts, 'and', 'toes'];
```

SPREAD OPERATOR

```
// A better "push"  
// ES5 way to add to existing array  
var arr1 = [0, 1, 2];  
var arr2 = [3, 4, 5];  
// Append all items from arr2 onto arr1  
Array.prototype.push.apply(arr1, arr2);  
  
// ES6 way  
var arr1 = [0, 1, 2];  
var arr2 = [3, 4, 5];  
arr1.push(...arr2);
```


REST PARAMETERS

```
function sortRestArgs(...theArgs) {  
  return theArgs.sort();  
}  
  
console.log(sortRestArgs(5,3,7,1)); // 1,3,5,7  
  
function add(...nums) {  
  return nums.reduce(function (a, b) {  
    return a + b;  
  });  
}  
  
console.log(add(1,2,3,4)); // 10
```



BUILT-IN LIBRARY IMPROVEMENTS

ARRAYS

```
var nums = [1, 2, 3, 4, 5];  
var sum = 0;  
for (let i of nums) {  
    sum += i;  
}  
console.log(sum) // 15
```

```
Array.from(document.querySelectorAll('*')) // Returns a real Array  
[0, 0, 0].fill(7, 1) // [0,7,7]  
[1, 2, 3].find(x => x == 3) // 3  
[1, 2, 3].findIndex(x => x == 2) // 1  
["a", "b", "c"].entries() // iterator [0, "a"], [1,"b"], [2,"c"]  
["a", "b", "c"].keys() // iterator 0, 1, 2  
["a", "b", "c"].values() // iterator "a", "b", "c"
```

MAPS & SETS

```
// Sets
var s = new Set();
s.add("hello").add("goodbye").add("hello");
s.size === 2;
s.has("hello") === true;
```

```
// Maps
var m = new Map();
m.set("hello", 42);
m.set(s, 34);
m.get(s) === 34;
```

STRINGS

```
var getty = 'Four score and seven years ago';

console.log(getty.includes('ore')); // true
console.log(getty.startsWith('Five')); // false
console.log(getty.endsWith('go')); // true

var ha = "HA";
for (let i of ha) {
  console.log(i);    // Will print 'H', then 'A'
}

console.log(ha.repeat(4)); // 'HAHAHAHA'
```

A group of four men in suits are celebrating in front of a modern building. They are all cheering with their arms raised. The man on the far left is wearing a dark suit and has his arms raised high. The man next to him is wearing a blue suit and is also cheering. The man in the center is wearing a dark suit and has his arms raised. The man on the far right is wearing a brown suit and is also cheering. The building behind them has large glass windows and a large number 4 logo on the wall. The word "PROMISES" is written in large white letters across the center of the image.

PROMISES

WHERE WE ARE NOW:

CALLBACKS

```
doThings(function (result) {  
  doMoreThings(result, function (more) {  
    pyramidOfDoom(more, function () {  
      alsoKnownAs(function () {  
        callbackHell('aaaaaaaaah!');  
      });  
    });  
  });  
});
```

PROMISES!

```
doThings().then( result => {  
    return doMoreThings(result);  
}).then(() => {  
    return doEvenMoreThings();  
}).then(() => {  
    return rockOn();  
}).catch( err => {  
    console.error(err); // If anything went wrong with any of  
                        // the calls, the whole chain fails.  
});;
```


Sometimes we may want to make a bunch of async requests simultaneously, then once all of them return something, proceed.

```
Promise.all([doStuff(), doMoreStuff(), doEvenMoreStuff()])
  .then( results => {
    console.log(results[0]); // Result of doStuff()
    console.log(results[1]); // Result of doMoreStuff()
    console.log(results[2]); // Result of doEvenMoreStuff()
  })
  .catch( err => {
    console.error(err);
  });
```

GENERATORS

The image has a dark, moody aesthetic. A bright, white lightning bolt with multiple branches descends from the top left corner towards the center. In the lower half of the image, there is a dark, rounded, metallic-looking object, possibly a generator component, which is partially illuminated by a bright light source, creating a strong vertical highlight and some horizontal reflections. The overall background is a deep, dark blue or black.

**THEY'RE A LITTLE
TOUGH TO EXPLAIN,
SO....**

https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Statements/function*



Paladin

Enter the new
member's name.

CLASSES

| Character | Name | AC | Hit | Cnd | SpPt | C |
|-----------|------|----|-----|-----|------|---|
|-----------|------|----|-----|-----|------|---|



THE CURRENT WAY(S)

```
var Person = function (firstName) {  
    this.firstName = firstName;  
};  
  
Person.prototype.sayHello = function() {  
    console.log("Hello, I'm " + this.firstName);  
};  
  
var person1 = new Person("Alice");  
var person2 = new Person("Bob");  
  
// call the Person sayHello method.  
person1.sayHello(); // Hello, I'm Alice  
person2.sayHello(); // Hello, I'm Bob
```

THE CURRENT WAY(S)

```
var person = {  
  name: 'Bob',  
  sayHello: function () {  
    return "Hello, I'm " + this.name;  
  }  
};  
  
console.log(person.sayHello()); // Hello, I'm Bob
```

THE ES6 WAY

```
class Person {  
  constructor (name) {  
    this.name = name;  
  }  
  
  sayHello() {  
    return `Hello, I'm ${this.name}`;  
  }  
}  
  
var adam = new Person('Adam');  
console.log(adam.sayHello()); // Hello, I'm Adam
```

THE ES6 WAY (CONT.)

```
class Vehicle {
  constructor(name) {
    this.kind = 'Vehicle';
    this.name = name;
  }
  printName() {
    console.log(this.name);
  }
}

class Car extends Vehicle {
  constructor(name) {
    super(name); //call the parent method with super
    this.kind = 'Car';
  }
}
```




MODULES

MAKE GIES AT GIESOLIE.COM

CURRENT METHODS

We can do this in Node...

```
// Inside file printer.js
module.exports = {
  print: function (thingToPrint) {
    console.log(thingToPrint);
  }
}

// Inside some other file...
var printer = require('printer');
printer.print('hooray for modularity!'); // hooray for modularity!
```

CURRENT METHODS

We can do the same in the browser using one of these:

RequireJS: <http://requirejs.org/>

Browserify: <http://browserify.org/>

Webpack: <http://webpack.github.io/>

BUT ES6 HAS MODULES BUILT-IN!

```
// Inside file printer.js
export class Printer {
  print (thingToPrint) {
    console.log(thingToPrint);
  }
}

// Inside some other file...
import * as printer from 'printer';
printer.print('hooray for modularity!'); // hooray for modularity!
```

PARTIAL IMPORTS

```
// Inside file triathlon.js
export function run () {
  console.log('Running!');
}
export function bike () {
  console.log('Biking!');
}
export function swim () {
  console.log('Swimming!');
}

// Inside some other file...
import {swim} from 'triathlete';
swim(); // Swimming!
```

A medium shot of actor Chris Pratt in a white dress shirt and a dark striped tie. He has a wide-eyed, open-mouthed expression of shock or surprise. The background is dark and out of focus, with a blue light source visible on the right. Large white text is overlaid on the image.

HOW CAN I GET ALL
THIS RIGHT NOW?!

SUPPORT

Some features already have great browser support.
("for...of" array iteration, template strings, promises)

<https://kangax.github.io/compat-table/es6/>

SUPPORT

Who's already using it?

- [IO.js](#) (fork of NodeJS)
- [Aurelia](#) (created by some members of the Angular 2.0 team)
- [Angular 2.0](#)
- [ReactJS v0.13 beta](#) Supports ES6 classes. Planning for full ES6 support soon.

ES6 final spec is expected to be approved in June. After that, it's up to the browsers to implement.

**BUT IF YOU DON'T
WANT TO WAIT, YOU
CAN USE...**

"TRANSPILERS"

BABEL (FORMERLY KNOWN AS 6-TO-5)

- Runs as one of your gulp/grunt/etc. build tasks
<https://babeljs.io>

TRACEUR

- Embedded as a runtime script
- Compiles to ES5 when page loads
<https://github.com/google/traceur-compiler>

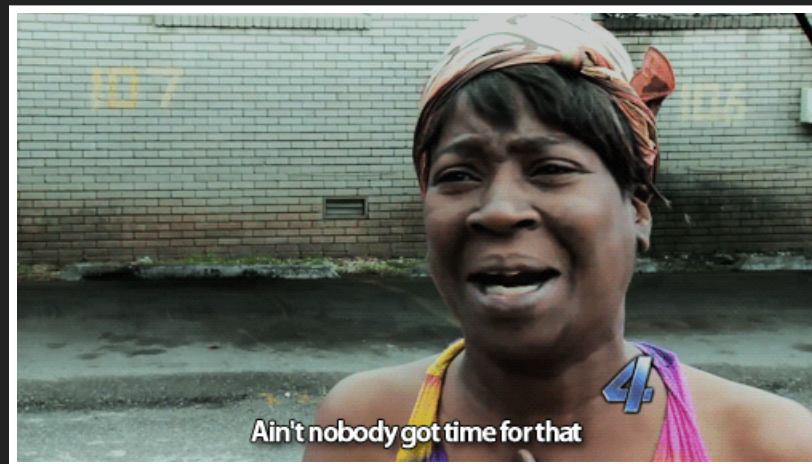
MORE INFO

<https://github.com/lukehoban/es6features>

https://developer.mozilla.org/en-US/docs/Web/JavaScript/New_in_JavaScript

ES6 Playground: <https://babeljs.io/repl/>

Some of the code samples in this presentation may or may not have been lifted directly from these sites, because when it comes to contriving examples...





Well, I guess that's everything.