Modernes JavaScript mit ECMAScript 2015

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Slides: http://bit.ly/javaland16-es2015

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ECMAScript

aka

JavaScript

History

- ECMAScript 1: 1997
- ECMAScript 2: 1998 (alignment)
- ECMAScript 3: 1999 (regex, exceptions, ...)
- ECMAScript 4: killed in 2007
- ECMAScript 5: 2009 (strict mode, JSON, ...)
- ECMAScript 6: 2015 (major update)
- ECMAScript 7: 2016? (WIP)

Show me code!

Block Scope

ES5 Scoping

```
function someFunction() {

  for( var i = 0; i < 4; i++ ) {
    var j = i * i;
  }

  console.log( j );
  // > ?

}
```

ES5 Hosting

```
function someFunction() {

  var j;  // hoisting

  for( var i = 0; i < 4; i++ ) {
    j = i * i;
  }

  console.log( j );
  // > 9

}
```

ES2015 Block Scope

```
function someFunction() {

  for( var i = 0; i < 4; i++ ) {
    let j = i * i;
  }

  console.log( j );
  // > ReferenceError: j is not defined

}
```

ES2015 Constants

```
const users = [ "Christian" ];

users.push( "Jim" );
// > 2

users = [ "Bob" ];
// > SyntaxError: "users" is read-only
```

Recommendation

1. `const`
2. `let`
3. ~~`var`~~ (ignore)

Arrow Functions

ES5 Functions

```
var numbers = [ 1, 2, 3, 4, 5, 6, 7, 8, 9 ];

var odd = numbers.filter( function(n) {
  return n % 2 !== 0;
} );

console.log( odd );
// > [ 1, 3, 5, 7, 9 ]
```

ES2015 Arrow Functions

```
numbers.filter( n => {
  return n % 2 !== 0;
} );
// > [ 1, 3, 5, 7, 9 ]
```

```
numbers.filter( n => n % 2 !== 0 );
// > [ 1, 3, 5, 7, 9 ]
```

```
numbers.filter( n => n % 2 );
// > [ 1, 3, 5, 7, 9 ]
```

ES5 Callbacks

```
var ClickCounter = function() {

  this.count = 0;

  var _this = this;   // save 'this'
  $( "#some-button" ).click( function() {
    _this.count++;
  } );

};

var obj = new ClickCounter();
```

ES2015 Callbacks

```
var ClickCounter = function() {

  this.count = 0;


  $( "#some-button" ).click( () => {
    this.count++;
  } );

};

var obj = new ClickCounter();
```

Template Strings

ES5 String Concatenation

```
var name = "Christian";
var count = 213;

var message = "Hello " + name + ", you have "
    + count + " unread messages.";

console.log( message );
```

ES2015 Template Strings

```
const name = "Christian";
const count = 213;

const message =
    `Hello ${name}, you have ${count} messages.`;
```

```
const html =
    `<h1>Hello ${name}</h1>
     <p>
       You have ${count} unread messages
     </p>`;
```

ES2015 Template Strings

```
const name = "Christian";
const count = 213;
const total = 500;

const greeting =
    `Hello ${name.toUpperCase()}!`;

const message =
    `Unread ratio: ${ 100 * count / total }%`;
```

Collection Types

ES2015 Sets

```
const tags = new Set();

tags.add( "java" );
tags.add( "javascript" );
tags.add( "java" );

tags.size === 2;
// > true

tags.has( "java" );
// > true
```

ES2015 Maps

```
const map = new Map();

map.set( "hello", 42 );

map.size === 1;
// > true

map.get( "hello" );
// > 42

map.delete( "hello" );
// > true
```

ES5 Iteration

```
var primes = [ 3, 5, 7, 11, 13 ];

for( var i = 0; i < primes.length; i++ ) {
  console.log( primes[i] );
}

// ES5
primes.forEach( function(n) {
  console.log( n );
} );
```

ES2015 for..of

```
// arrays
const primes = [ 3, 5, 7, 11, 13 ];
for( let p of primes ) {
  console.log( p );
}

// collections
const set = new Set();
set.add( "foo" );
set.add( "bar" );
for( let s of set ) {
  console.log( s );
}
```

Default & Rest Params
Spread Operator

Default Parameter

```
function add( a, b = 10 ) {
  return a + b;
}

console.log( add( 3, 5 ) );
// > 8

console.log( add( 3 ) );
// > 13
```

Rest Parameter

```
function format( message, ...params ) {
  for( let p of params ) {
    message = message.replace( /\?/, p );
  }
  return message;
}

format( "Die Summe von ? und ? ist ?", 3, 7, 10 );
// > Die Summe von 3 und 7 ist 10
```

Spread Operator

```
console.log( Math.max( 1, 5, 2, 3 ) );
// > 5
```

```
const numbers = [ 1, 5, 2, 3 ];

console.log( Math.max(...numbers) );
// > 5
```

Classes

ES5: Constructor Functions

```
var Person = function( name ) {
  this.name = name;
}

Person.prototype.greet = function() {
  return "Hello " + this.name;
}

var christian = new Person( "Christian" );

christian.greet();   // > Hello Christian
```

ES2015 Classes

```
class Person {

  constructor( name ) {
    this.name = name;
  }

  greet() {
    return "Hello " + this.name;
  }
}

const christian = new Person("Christian");

christian.greet();   // > Hello Christian
```

ES2015 Inheritance

```
class Developer extends Person {

  constructor( name, languages ) {
    super( name );
    this.languages = languages;
  }

  getLanguages() {
    return this.languages.join( ", " );
  }
}

const christian = new Developer( "Christian",
    [ "Java", "JavaScript" ] );
```

Modules

Export / Import

```
// math.js
export function max(a, b) {
  return a > b ? a : b;
}

export const PI = 3.14156;
```

```
import { max, PI } from "./math.js";

max(9, 13) === 13;           // > true
PI === 3.14156;              // > true
```

Export / Import

```
// math.js
export function max(a, b) {
  return a > b ? a : b;
}

export const PI = 3.14156;
```

```
import * as math from "./math.js";

math.max(9, 13) === 13   // > true
math.PI === 3.14156      // > true
```

Default Exports

```
// person.js
export default class Person {

  constructor(name) {
    this.name = name;
  }

}
```

```
import Person from "./person.js";

const christian = new Person("Christian");
```

Generators

Generators

```
function* sequence( max ) {
  let i = 1;
  while( i <= max ) {
    yield i;
    i++;
  }
}

let gen = sequence( 3 );

gen.next(); // > { value: 1, done: false }
gen.next(); // > { value: 2, done: false }
gen.next(); // > { value: 3, done: false }
gen.next(); // > { value: undefined, done: true }
```

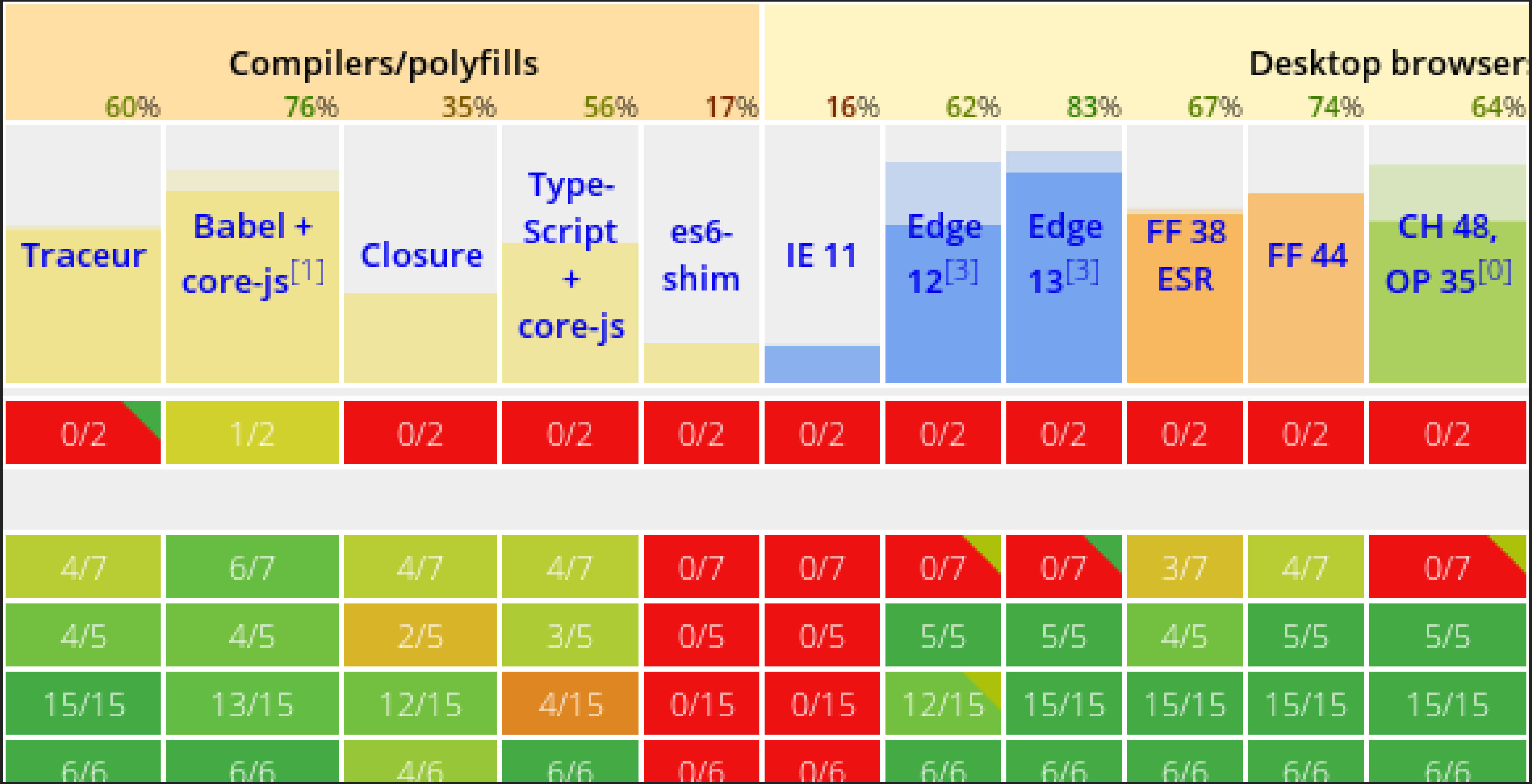
Generators

```
function* sequence( max ) {
  let i = 1;
  while( i <= max ) {
    yield i;
    i++;
  }
}

for( let i of sequence(10) ) {
  console.log(i);
}
```

Can I use this stuff?

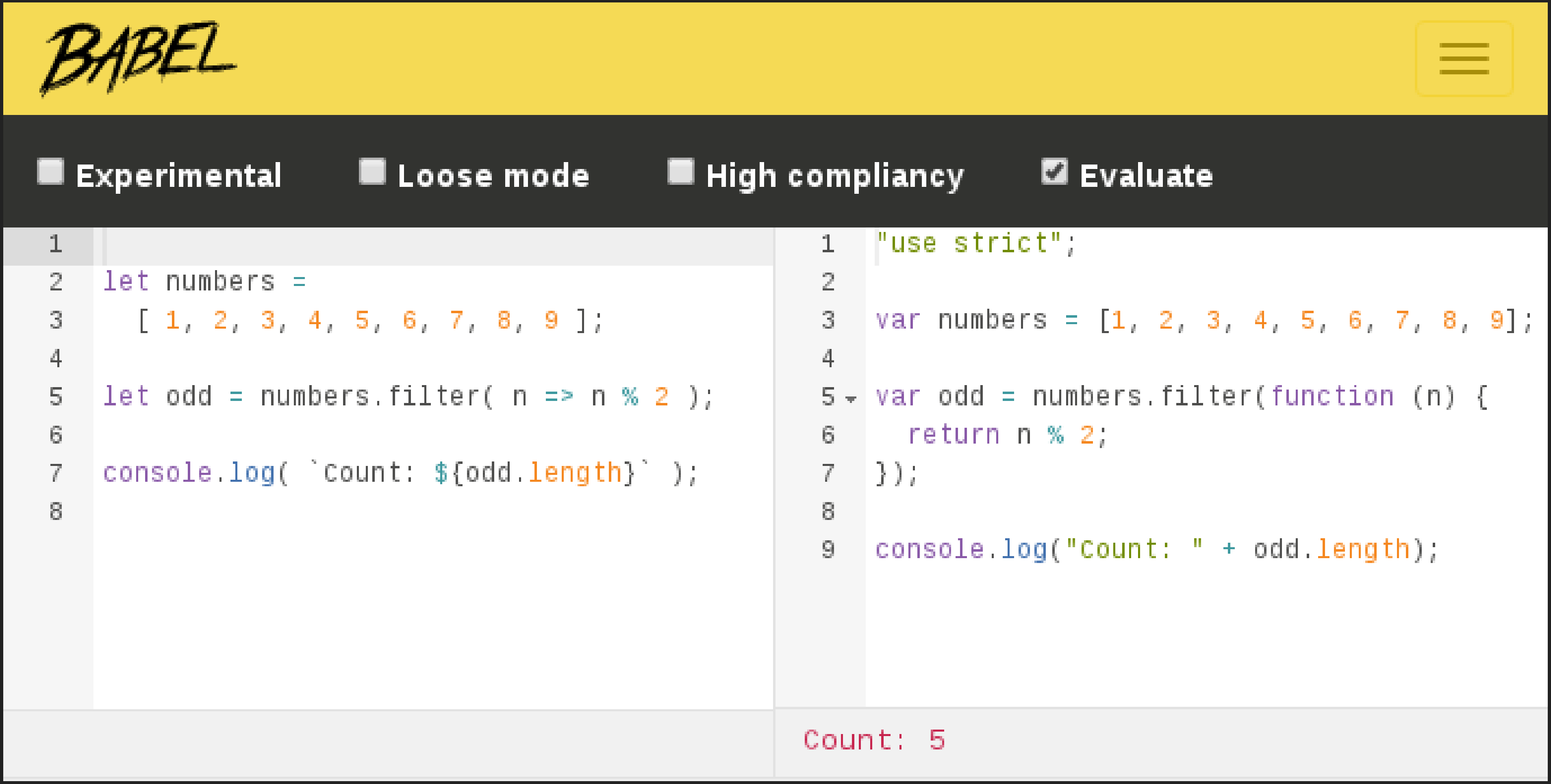
ES2015 Compatibility



Compilers/polyfills					Desktop browser					
60%	76%	35%	56%	17%	16%	62%	83%	67%	74%	64%
Traceur	Babel + core-js[1]	Closure	Type-Script + core-js	es6-shim	IE 11	Edge 12[3]	Edge 13[3]	FF 38 ESR	FF 44	CH 48, OP 35[0]
0/2	1/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2	0/2
4/7	6/7	4/7	4/7	0/7	0/7	0/7	0/7	3/7	4/7	0/7
4/5	4/5	2/5	3/5	0/5	0/5	5/5	5/5	4/5	5/5	5/5
15/15	13/15	12/15	4/15	0/15	0/15	12/15	15/15	15/15	15/15	15/15
6/6	6/6	4/6	6/6	0/6	0/6	6/6	6/6	6/6	6/6	6/6

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

Babel REPL



[ ] Experimental [ ] Loose mode [ ] High compliancy [✓ Evaluate]

```

let numbers =
  [ 1, 2, 3, 4, 5, 6, 7, 8, 9 ];

let odd = numbers.filter( n => n % 2 );

console.log( `Count: ${odd.length}` );

```

```
"use strict";

var numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9];

var odd = numbers.filter(function (n) {
  return n % 2;
});

console.log("Count: " + odd.length);
```

```
Count: 5
```

https://babeljs.io/repl/

Java Integration

https://github.com/chkal/frontend-boilerplate

- Apache Maven
- node.js / npm
- Webpack / Babel / TypeScript
- Karma / Jasmine

Danke!

Fragen?

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