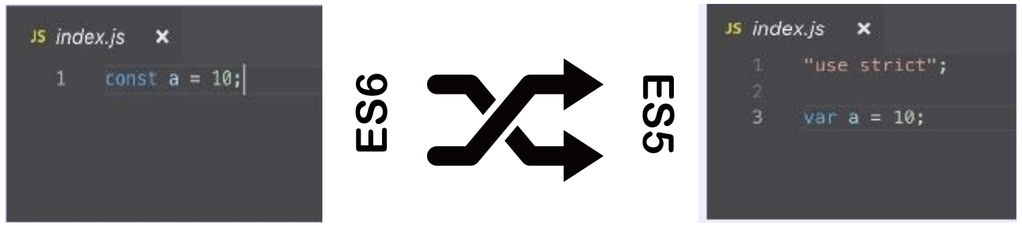


前端科普系列 ——

Babel：把 ES6 送上天的通天塔

1996.8

1997.7

2000

ECMAScript 6 正式发布
并且更名为
“ECMAScript 2015”

2015.6


BABEL
THE BIRTHPLACE
OF DIVERSITY

What`s Babel ?

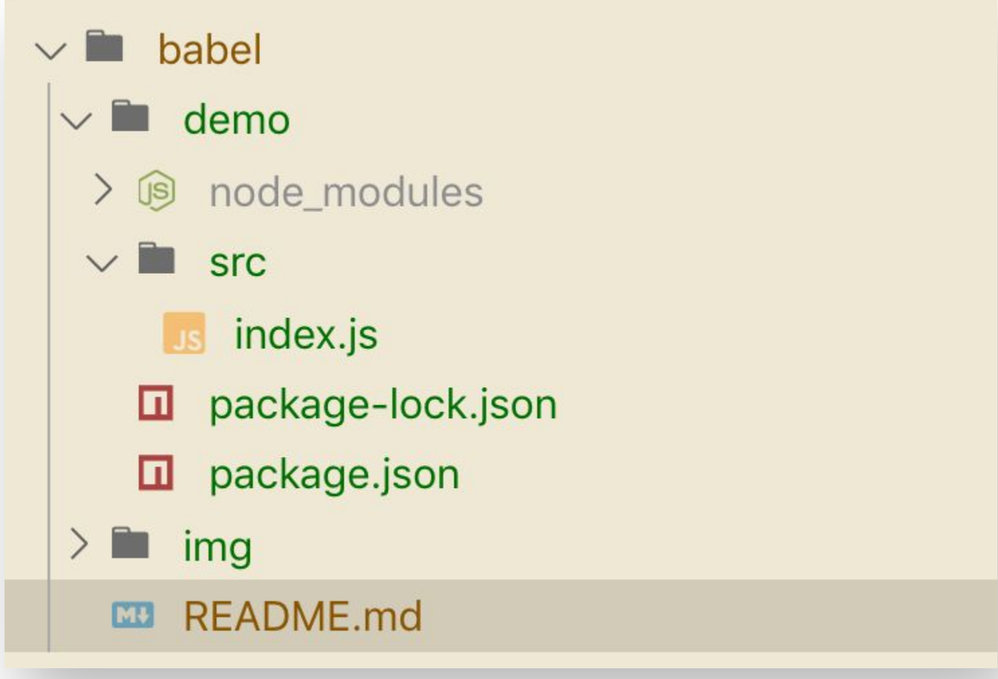
Babel is a JavaScript compiler.

Use next generation JavaScript, today.

How to use Babel ?

Shell

```shell
npm init -y
npm install --save-dev @babel/core @babel/cli @babel/preset-env
```


babel
demo
node_modules
src
index.js
package-lock.json
package.json
img
README.md

babel.config.js

```
const presets = [
  [
    '@babel/env',
    {
      debug: true
    }
  ]
]
const plugins = []
module.exports = { presets, plugins }
```

package.json

```
{
  "name": "demo",
  "version": "1.0.0",
  "scripts": {
    "babel": "babel src --out-dir dist"
  },
  "devDependencies": {
    "@babel/cli": "^7.8.4",
    "@babel/core": "^7.9.0",
    "@babel/preset-env": "^7.9.0"
  }
}
```

src/index.js

```
const add = (a, b) => a + b

const arr = [1, 2]
const hasThreee = arr.includes(3)
new Promise(resolve=>resolve(10))
```

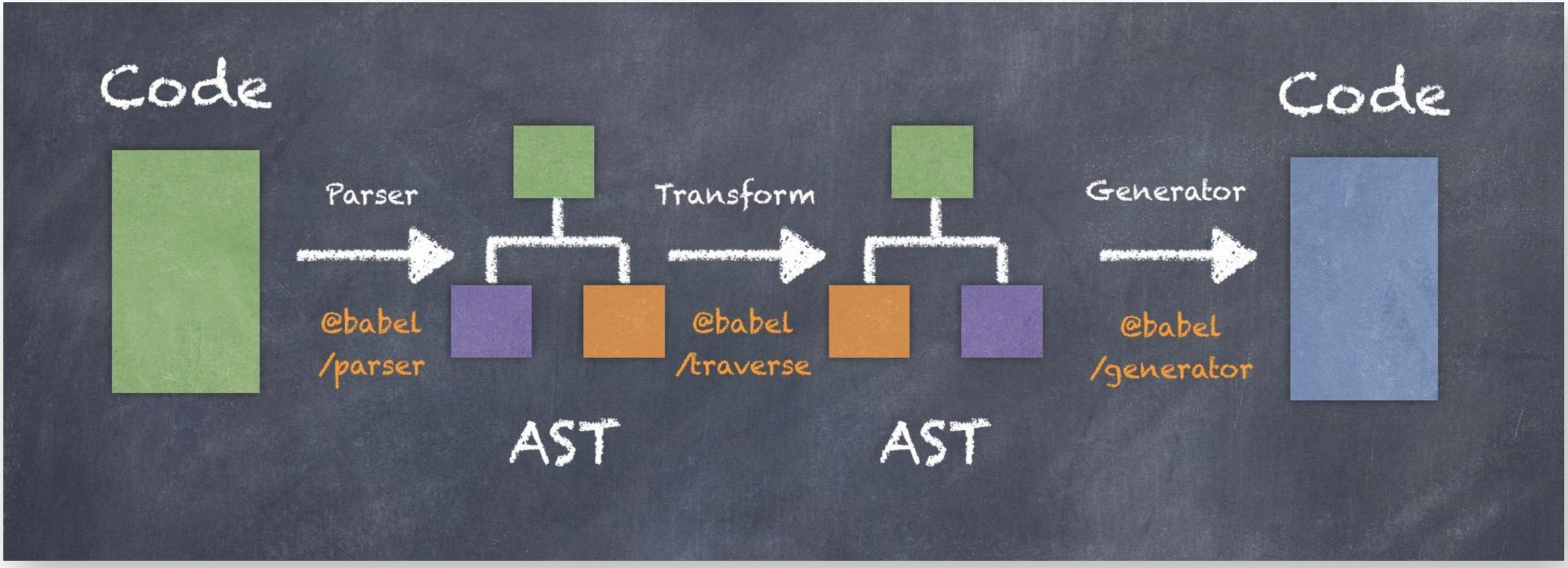
dist/index.js

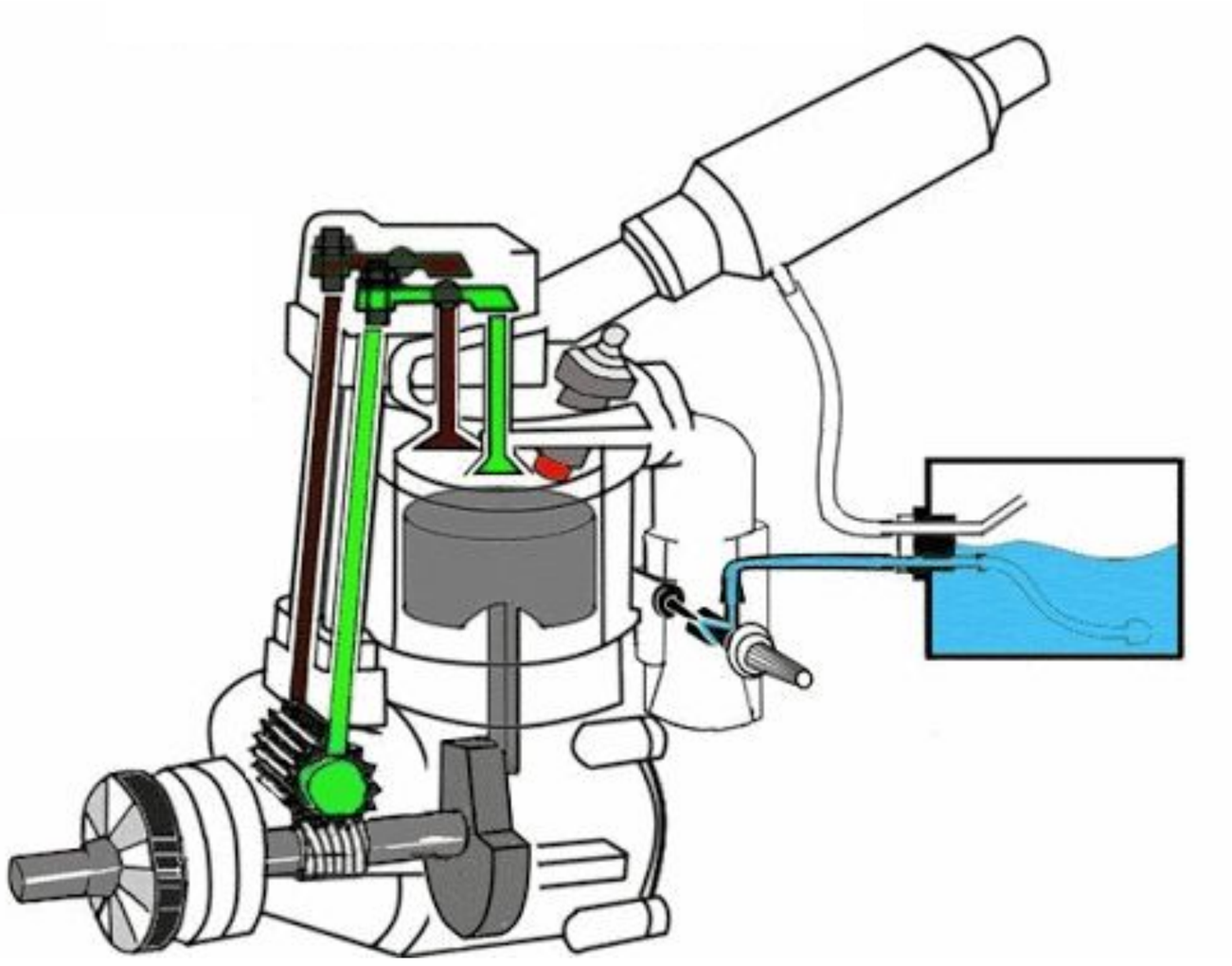
```
var add = function add(a, b) {
  return a + b;
};

var arr = [1, 2];
var hasThreee = arr.includes(3);
new Promise(function (resolve) {
  return resolve(10);
});
```

How does Babel work ?

- workflow
- components


Code
Parser
@babel
/parser
AST
Transform
@babel
/traverse
AST
Generator
@babel
/generator
Code



@babel/core

the core of transformer for AST

@babel/cli

a built-in CLI to compile files from the command line

@babel/plugin-xxx

plugin for corresponding syntax in transformation

@babel/preset-env

plugins to use, avoid configuration one by one

~~@babel/polyfill~~ --> core-js

use to polyfill features, but has been deprecated

@babel/plugin-transform-runtime

re-use of Babel's injected helper code to save on codesize, to create a sandboxed environment avoid global pollution

@babel/preset-env

```
> babel src --out-dir dist

@babel/preset-env: `DEBUG` option

Using targets:
{}

Using modules transform: auto

Using plugins:
```

```
{ SyntaxError: /Users/kongchuiliang/Documents/front-end/babel/demo/src/index.js: Support for the experimental syntax 'classProperties' isn't currently enabled (4:12):

  2 |
  3 | class Person {
> 4 |   static a = 'a';
    |            ^
  5 |   static b;
  6 |   name = 'morrain';
  7 |   age = 18

Add @babel/plugin-proposal-class-properties (https://git.io/vb4SL) to the 'plugins' section of your Babel config to enable transformation.
    at Parser._raise (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:742:17)
    at Parser.raiseWithData (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:735:17)
    at Parser.expectPlugin (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:8762:18)
    at Parser.parseClassProperty (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:12110:12)
    at Parser.pushClassProperty (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:12070:30)
    at Parser.parseClassMemberWithIsStatic (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:12003:14)
    at Parser.parseClassMember (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:11940:10)
    at withTopicForbiddingContext (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:11885:14)
    at Parser.withTopicForbiddingContext (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:10956:14)
    at Parser.parseClassBody (/Users/kongchuiliang/Documents/front-end/babel/demo/node_modules/@babel/parser/lib/index.js:11862:10)
  loc: Position { line: 4, column: 11 },
  pos: 55,
  missingPlugin: [ 'classProperties' ],
  code: 'BABEL_PARSE_ERROR' }
```

```
  transform-new-target {}
  transform-regenerator {}
  transform-member-expression-literals {}
  transform-property-literals {}
  transform-reserved-words {}
  transform-modules-commonjs {}
  proposal-dynamic-import {}

Using polyfills: No polyfills were added, since the `useBuiltIns` option was not set.
Successfully compiled 1 file with Babel.
```

Shell

```shell
npm install --save-dev @babel/plugin-proposal-class-properties
```

babel.config.js

```babel.config.js
const presets = [
  [
    '@babel/env',
    {
      debug: true
    }
  ]
]
const plugins = ['@babel/plugin-proposal-class-properties']
module.exports = { presets, plugins }
```

`targets`

`string | Array<string> | { [string]: string }`, defaults to `{}`.

Describes the environments you support/target for your project.

This can either be a browserslist-compatible query (with caveats):

JSON Copy

```
{
  "targets": "> 0.25%, not dead"
}
```

Or an object of minimum environment versions to support:

JSON Copy

```
{
  "targets": {
    "chrome": "58",
    "ie": "11"
  }
}
```

Only compile syntaxes which are not supported by your target environment

If no targets specified, @babel/preset-env will transform all ECMAScript 2015+ code by default

@babel/polyfill

src/index.js

```
const add = (a, b) => a + b

const arr = [1, 2]
const hasThreee = arr.includes(3)
new Promise(resolve=>resolve(10))
```

dist/index.js

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

var arr = [1, 2];
var hasThreee = arr.includes(3);
new Promise(function (resolve) {
  return resolve(10);
});
```

syntax + built-in

syntax

class

const

...

=>

import

let

built-in

Object.assign

Promise

Array.prototype.inclueds

Array.from

WeakMap

🚨 As of Babel 7.4.0, `@babel/polyfill` has been deprecated in favor of directly including `core-js` to polyfill ECMAScript features

babel.config.js

```
const presets = [
  [
    '@babel/env',
    {
      debug: true,
      useBuiltIns: 'usage',
      corejs: 3
    }
  ]
]
```

src/index.js

```
const arr = [1, 2]
const hasThreee = arr.includes(3)
new Promise(resolve=>resolve(10))
```

dist/index.js

```
require("core-js/modules/es6.promise");
require("core-js/modules/
                    es7.array.includes");
var arr = [1, 2];
var hasThreee = arr.includes(3);
new Promise(function (resolve) {
  return resolve(10);
});
```

@babel/plugin-transform-runtime

src/index.js

```
class Person {
  static a = 1;
  static b;
  name = 'morrain';
  age = 18
}
```

dist/index.js

```
function _classCallCheck(ins, Constructor) {...}
function _defineProperty(obj, key, value) {...}
var Person = function Person() {
  _classCallCheck(this, Person);
  _defineProperty(this, "name", 'morrain');
  _defineProperty(this, "age", 18);
};
_defineProperty(Person, "a", 1);
_defineProperty(Person, "b", void 0);
```

Shell

```shell
npm install --save-dev @babel/plugin-transform-runtime
npm install --save @babel/runtime
```

src/index.js

```js
class Person {
  static a = 1;
  static b;
  name = 'morrain';
  age = 18
}
```

dist/index.js

```js
var _classCallCheck =
require("@babel/runtime/helpers/classCallCheck")
var _defineProperty =
require("@babel/runtime/helpers/defineProperty")
var Person = function Person() {
  _classCallCheck(this, Person);
  _defineProperty(this, "name", 'morrain');
  _defineProperty(this, "age", 18);
};
_defineProperty(Person, "a", 1);
_defineProperty(Person, "b", void 0);
```

the built-ins `core-js` provides such as Promise, Set and Map, will pollute the global scope

```
Object.defineProperty(Array.prototype, 'includes', function(){
  ...
})
```

Shell

```
npm uninstall @babel/runtime
```

```
var _promise = _interopRequireDefault(require("@babel/runtime-corejs3/core-js-stable/promise"));

var _includes = _interopRequireDefault(require("@babel/runtime-corejs3/core-js-stable/instance/includes"));

var ac
  retu
};

var arr = [1, 2];
var hasThreee = (0, _includes["default"])(arr).call(arr, 3);
new _promise["default"](function (resolve) {
  return resolve(10);
});
```

but it doesn't consider target environments

Rethink polyfilling story

- Currently
- Concepts

Currently Babel has three different ways to inject core-js polyfills in the source code:

- By using @babel/preset-env's useBuiltIns: "entry" option, it is possible to inject polyfills for every ECMAScript functionality not natively supported by the target browsers;
- By using useBuiltIns: "usage", Babel will only inject polyfills for unsupported ECMAScript features but only if they are actually used in the input souce code;
- By using @babel/plugin-transform-runtime, Babel will inject ponyfills (which are "pure" and don't pollute the global scope) for every used ECMAScript feature supported by core-js. This is usually used by library authors.

Polyfil

- entry
  @babe
- usage
  @babe
- usage
  @babe

ills:

babel.config.js

```
const targets = ['>1%']
const presets = [
  [
    '@babel/env',
    {
      debug: true
    }
  ]
]
const plugins = ['@babel/plugin-proposal-class-properties']
const polyfills = [
  [
    'corejs3',
    {
      method: 'usage-pure'
    }
  ]
]
module.exports = { targets, presets, plugins, polyfills }
```

Q & A

敬请期待~~~~~

前端科普系列 之《ESLint:如何守住优雅的护城河》