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QCon 全球软件开发大会 【北京站】2016

向未来兼容

使用 ES2015+/TypeScript 开发 Node.js 项目

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Intemational Software Development Conference

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使用 ES2015+/TypeScript 开发 Node.js 项目

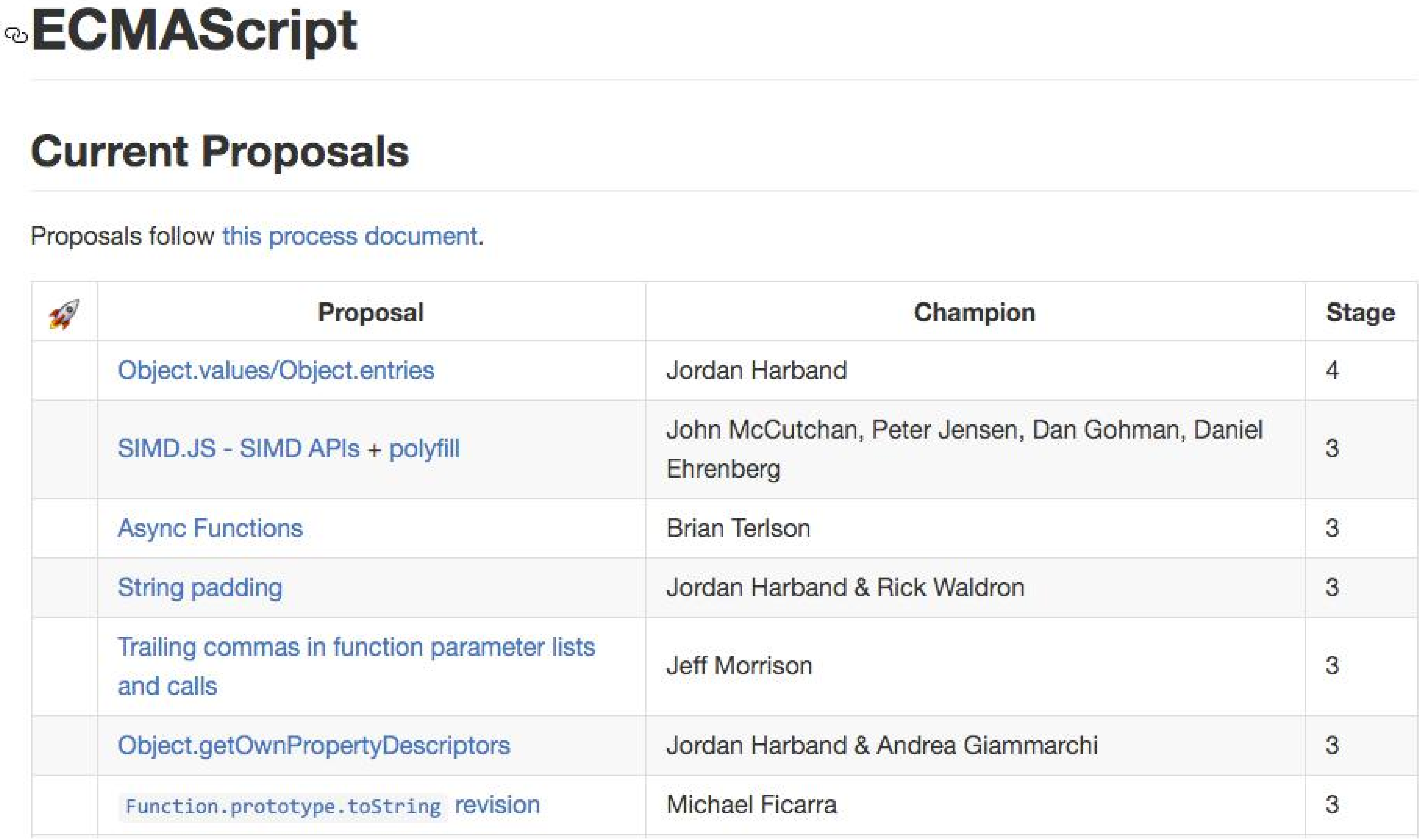
关于我

- 李成银
- 网名 welefen

ES2015 于 2015.6 正式发布

ES2015 特性

- arrows
- classes & modules
- template strings
- enhanced object literals
- default + rest + spread
- destructuring
- promises



ECMAScript

Current Proposals

Proposals follow this process document.

🚀	Proposal	Champion	Stage
	Object.values/Object.entries	Jordan Harband	4
	SIMD.JS - SIMD APIs + polyfill	John McCutchan, Peter Jensen, Dan Gohman, Daniel Ehrenberg	3
	Async Functions	Brian Terlson	3
	String padding	Jordan Harband & Rick Waldron	3
	Trailing commas in function parameter lists and calls	Jeff Morrison	3
	Object.getOwnPropertyDescriptors	Jordan Harband & Andrea Giammarchi	3
	`Function.prototype.toString` revision	Michael Ficarra	3

未来特性

- async/await
- decorators
- …

没有 Runtime 支持

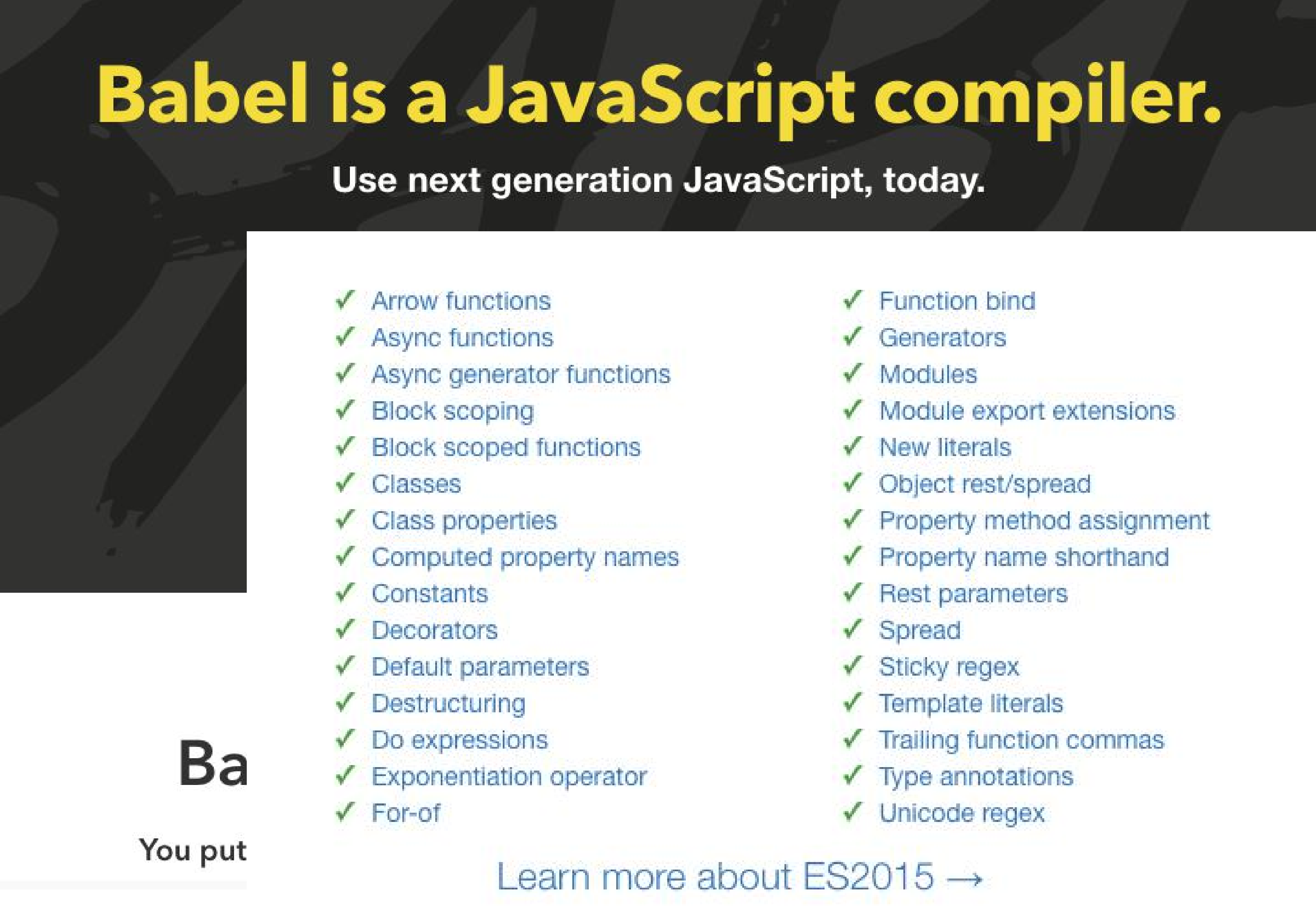
虽然 V8 支持越来越多的特性，但还没有全部支持

怎么办

- 升级 Node.js 到最新版本
- 开启 -- harmony
- 未支持的特性暂时不用

- 服务器上的 Node.js 不可能经常更新
- 一些通用的模块必须要兼容主流的版本

如何使用未来的特性？



Babel is a JavaScript compiler.

Use next generation JavaScript, today.

- ✓ Arrow functions
- ✓ Async functions
- ✓ Async generator functions
- ✓ Block scoping
- ✓ Block scoped functions
- ✓ Classes
- ✓ Class properties
- ✓ Computed property names
- ✓ Constants
- ✓ Decorators
- ✓ Default parameters
- ✓ Destructuring
- ✓ Do expressions
- ✓ Exponentiation operator
- ✓ For-of
- ✓ Function bind
- ✓ Generators
- ✓ Modules
- ✓ Module export extensions
- ✓ New literals
- ✓ Object rest/spread
- ✓ Property method assignment
- ✓ Property name shorthand
- ✓ Rest parameters
- ✓ Spread
- ✓ Sticky regex
- ✓ Template literals
- ✓ Trailing function commas
- ✓ Type annotations
- ✓ Unicode regex

Learn more about ES2015 →

Ba

You put

编译引入的问题

- 编译慢的问题
- 性能问题
- 如何实时编译
- 报错信息定位到源代码
- 断点调试
- 编译出错后如何快速提示

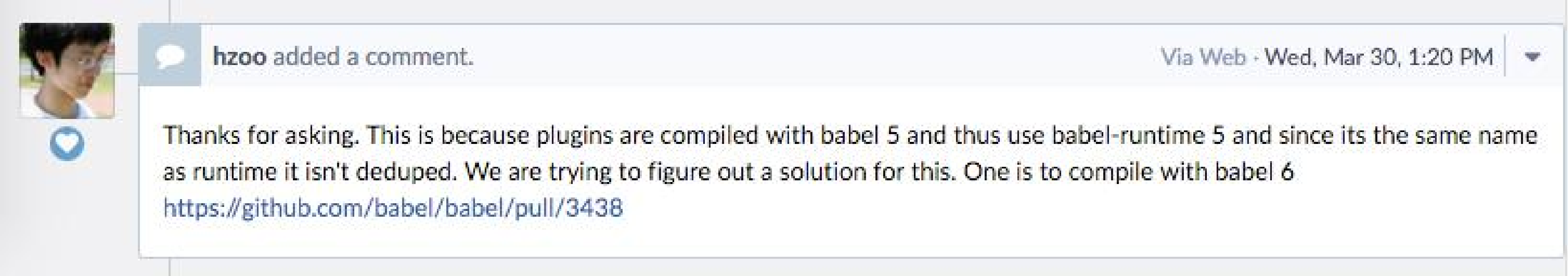
编译慢的问题

升级到 npm3

npm3 使用打平的方式组织依赖的模块

等待官方升级依赖的 babel-runtime 版本

现在 babel 里依赖的 babel-runtime 还是 5，导致无法被打平



hzoo added a comment.

Via Web · Wed, Mar 30, 1:20 PM

Thanks for asking. This is because plugins are compiled with babel 5 and thus use babel-runtime 5 and since its the same name as runtime it isn't deduped. We are trying to figure out a solution for this. One is to compile with babel 6 https://github.com/babel/babel/pull/3438

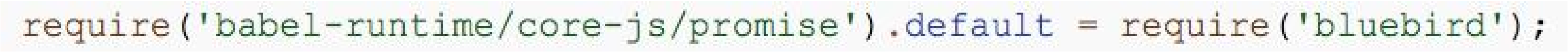
https://phabricator.babeljs.io/T7252

性能问题

使用 es2015-loose

松散模式性能更高，部分是 6x

使用 bluebird 替代 Promise



```
require('babel-runtime/core-js/promise').default = require('bluebird');
```

bluebird 的性能是原生 Promise 的 3x

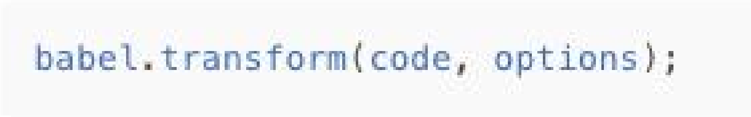
https://github.com/petkaantonov/bluebird/wiki/Optimization-killers

如何实时编译

babel --watch

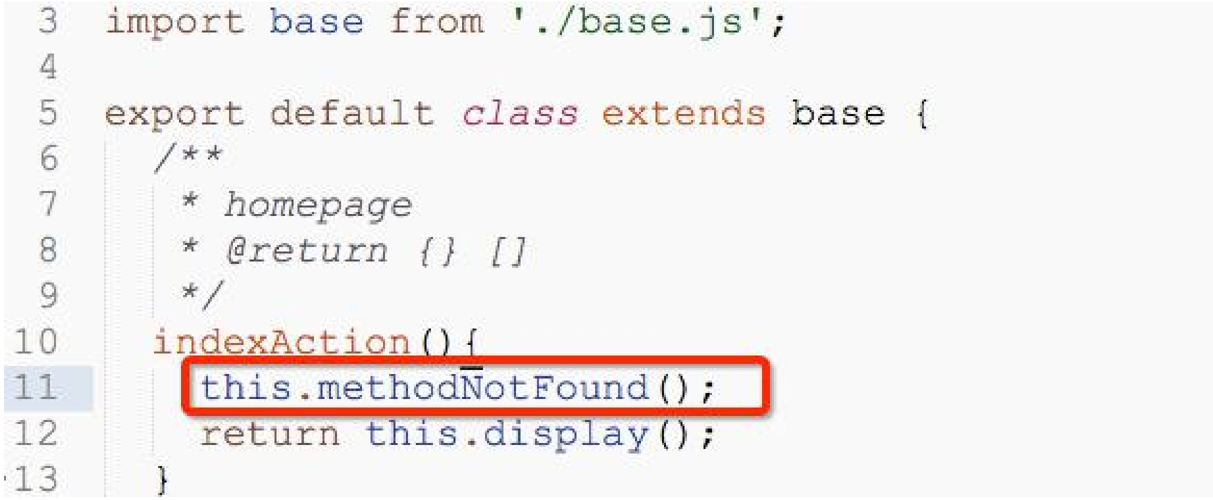
如果通过 samba 或者 sftp 方式开发时，有时候编译文件内容会有为空的问题

调用接口编译

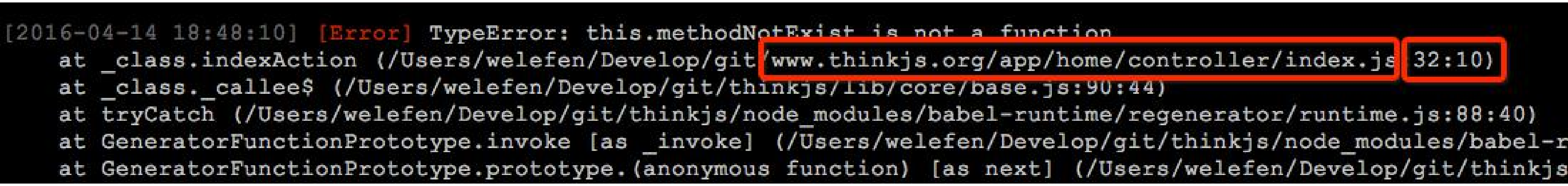


```
babel.transform(code, options);
```

报错信息定位到源代码



```
import base from './base.js';

export default class extends base {
  /**
   * homepage
   * @return {} []
   */
  indexAction(){
    this.methodNotFound();
    return this.display();
  }
```

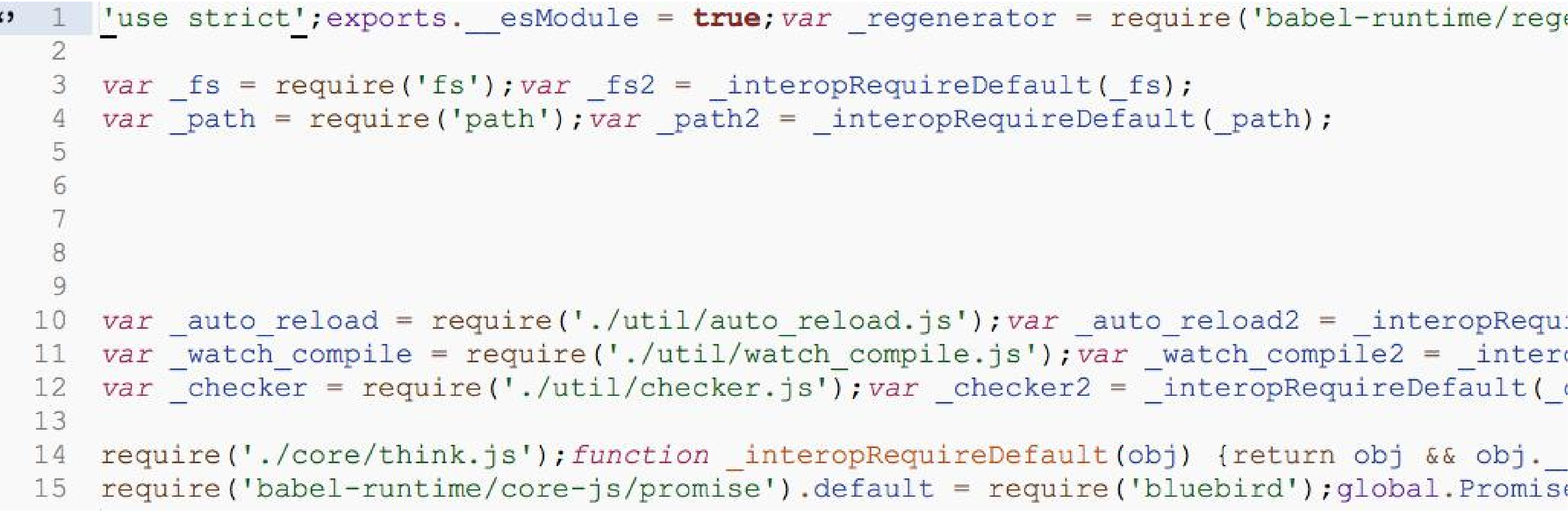


```
[2016-04-14 18:48:10] [Error] TypeError: this.methodNotExist is not a function
    at _class.indexAction (/Users/welefen/Develop/git/www.thinkjs.org/app/home/controller/index.js:32:10)
    at _class._callee$ (/Users/welefen/Develop/git/thinkjs/lib/core/base.js:90:44)
    at tryCatch (/Users/welefen/Develop/git/thinkjs/node_modules/babel-runtime/regenerator/runtime.js:88:40)
    at GeneratorFunctionPrototype.invoke [as _invoke] (/Users/welefen/Develop/git/thinkjs/node_modules/babel-r
    at GeneratorFunctionPrototype.prototype.(anonymous function) [as next] (/Users/welefen/Develop/git/thinkjs
```

报错信息定位到源代码

babel --retain-lines

导致编译后的代码完全不可读；有些情况下定位不准

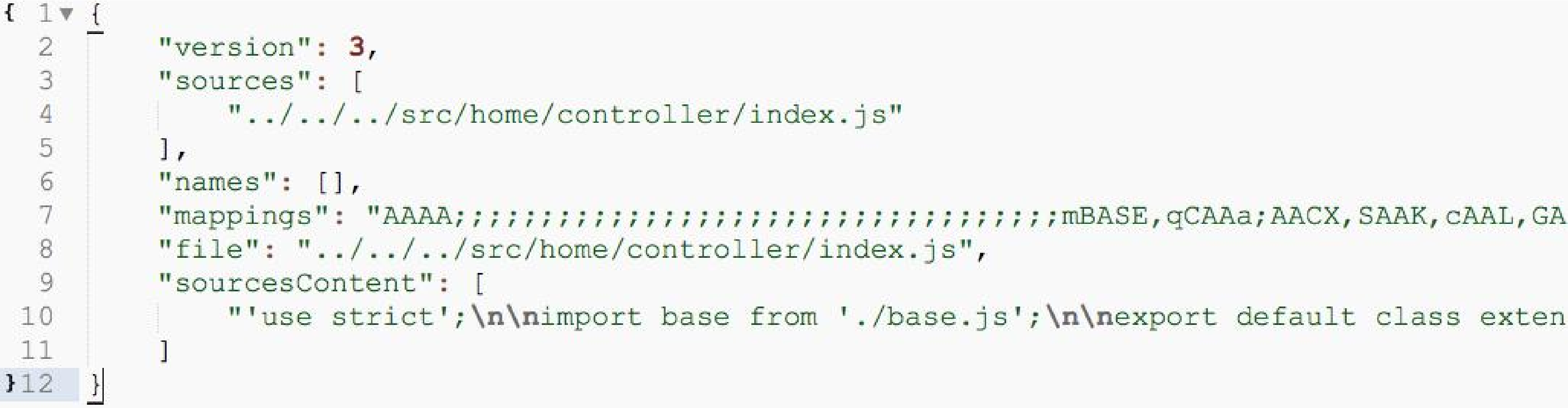


```
'use strict';exports.__esModule = true;var _regenerator = require('babel-runtime/rege

var _fs = require('fs');var _fs2 = _interopRequireDefault(_fs);
var _path = require('path');var _path2 = _interopRequireDefault(_path);






var _auto_reload = require('./util/auto_reload.js');var _auto_reload2 = _interopRequ
var _watch_compile = require('./util/watch_compile.js');var _watch_compile2 = _inter
var _checker = require('./util/checker.js');var _checker2 = _interopRequireDefault(_

require('./core/think.js');function _interopRequireDefault(obj) {return obj && obj._
require('babel-runtime/core-js/promise').default = require('bluebird');global.Promis
```

报错信息定位到源代码

babel --sourceMap

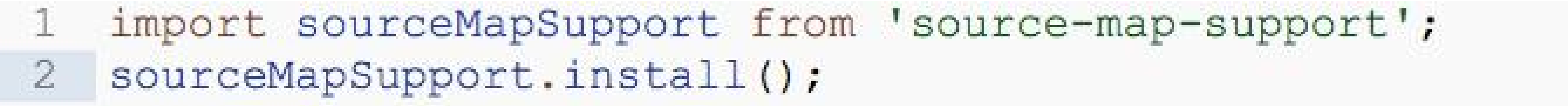
生成对应的 .map 文件，分析 Error message，将行和列改写为源代码里的位置



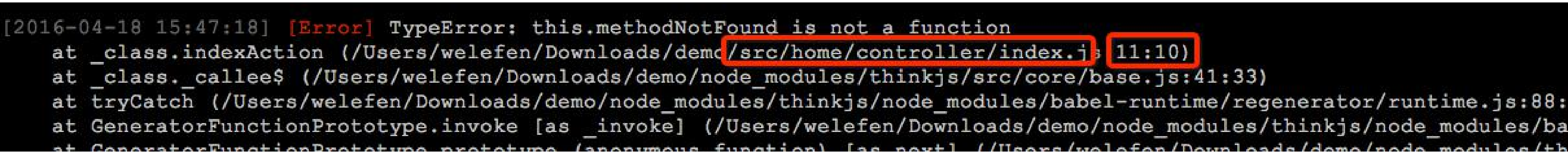
```
{
    "version": 3,
    "sources": [
        "../../../src/home/controller/index.js"
    ],
    "names": [],
    "mappings": "AAAA;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;mBASE,qCAAa;AACX,SAAK,cAAL,GA
    "file": "../../../src/home/controller/index.js",
    "sourcesContent": [
        "'use strict';\n\nimport base from './base.js';\n\nexport default class exten
    ]
}
```

报错信息定位到源代码

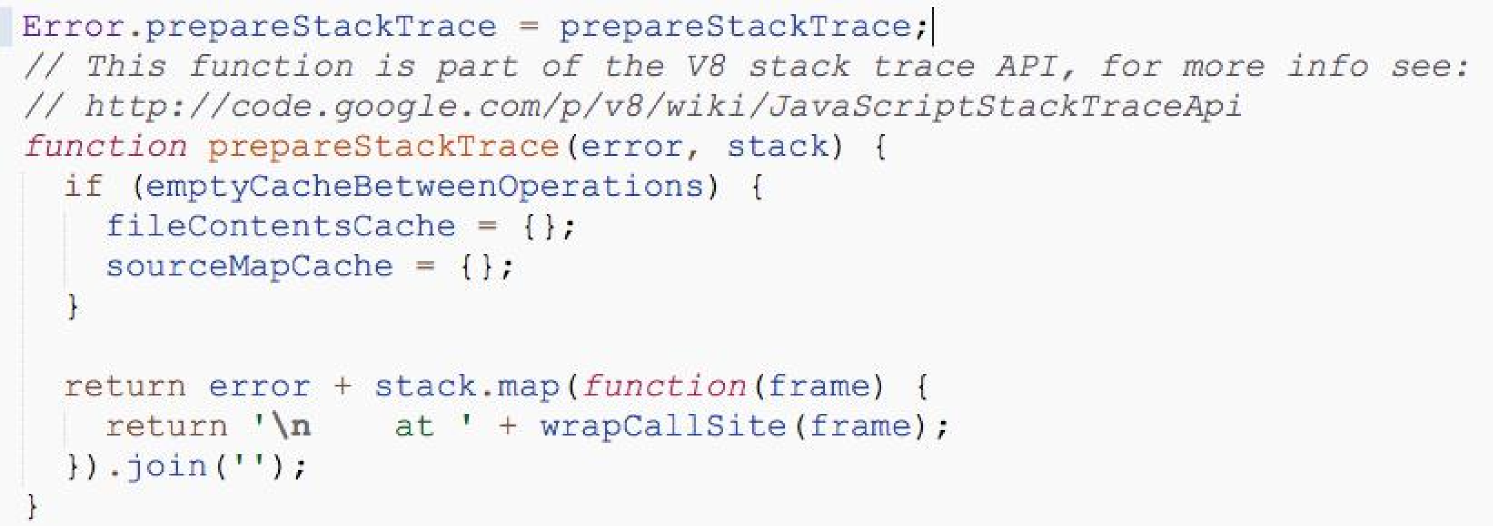
借助 source-map-support 模块



```
import sourceMapSupport from 'source-map-support';
sourceMapSupport.install();
```



```
[2016-04-18 15:47:18] [Error] TypeError: this.methodNotFound is not a function
    at _class.indexAction (/Users/welefen/Downloads/demo/src/home/controller/index.js:11:10)
    at _class._callee$ (/Users/welefen/Downloads/demo/node_modules/thinkjs/src/core/base.js:41:33)
    at tryCatch (/Users/welefen/Downloads/demo/node_modules/thinkjs/node_modules/babel-runtime/regenerator/runtime.js:88:
    at GeneratorFunctionPrototype.invoke [as _invoke] (/Users/welefen/Downloads/demo/node_modules/thinkjs/node_modules/ba
    at GeneratorFunctionPrototype.prototype.(anonymous function) [as next] (/Users/welefen/Downloads/demo/node_modules/th
```

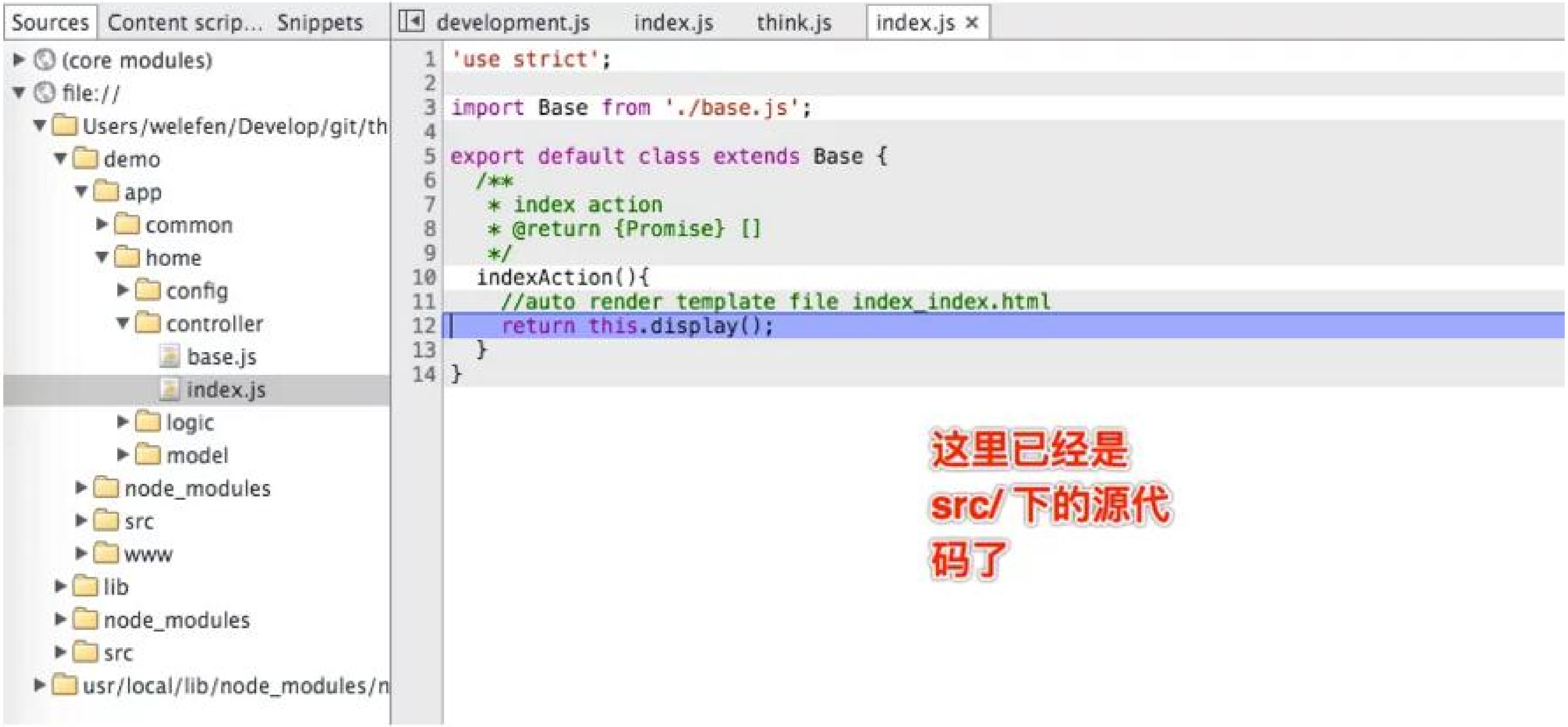


```
Error.prepareStackTrace = prepareStackTrace;
// This function is part of the V8 stack trace API, for more info see:
// http://code.google.com/p/v8/wiki/JavaScriptStackTraceApi
function prepareStackTrace(error, stack) {
  if (emptyCacheBetweenOperations) {
    fileContentsCache = {};
    sourceMapCache = {};
  }

  return error + stack.map(function(frame) {
    return '\n    at ' + wrapCallSite(frame);
  }).join('');
}
```

断点调试

借助 SourceMap

node-inspector、WebStorm、VS Code 等都支持借助 SourceMap 来断点调试源代码



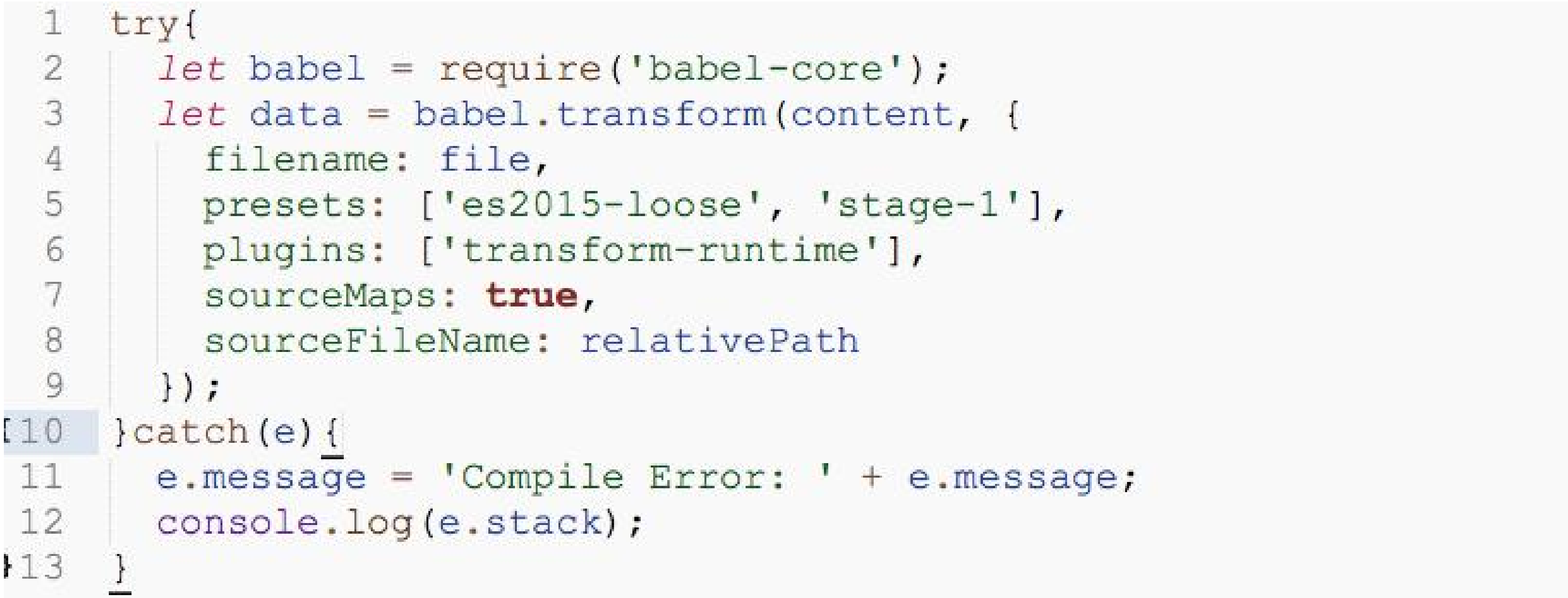
```
'use strict';

import Base from './base.js';

export default class extends Base {
  /**
   * index action
   * @return {Promise} []
   */
  indexAction(){
    //auto render template file index_index.html
    return this.display();
  }
}
```

这里已经是 src/ 下的源代码了

编译出错后快速提示

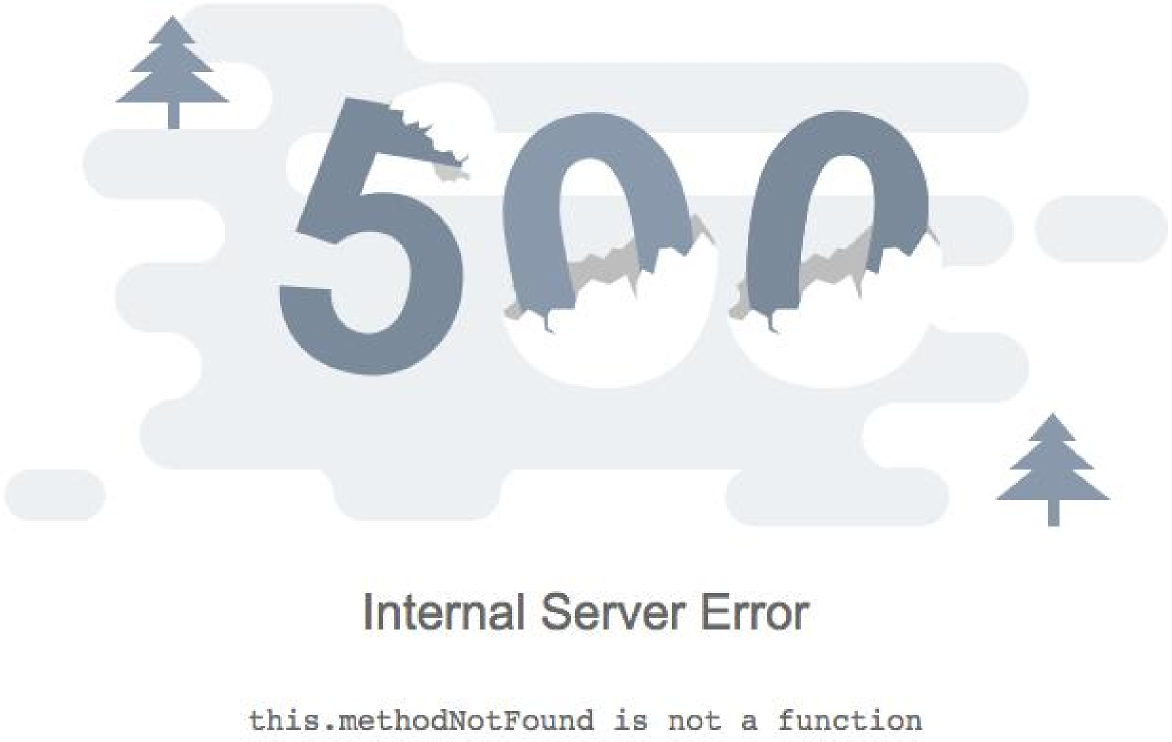
Babel 命令行编译只会把错误信息打印在控制台

调用接口编译



```
try{
  let babel = require('babel-core');
  let data = babel.transform(content, {
    filename: file,
    presets: ['es2015-loose', 'stage-1'],
    plugins: ['transform-runtime'],
    sourceMaps: true,
    sourceFileName: relativePath
  });
}catch(e){
  e.message = 'Compile Error: ' + e.message;
  console.log(e.stack);
}
```

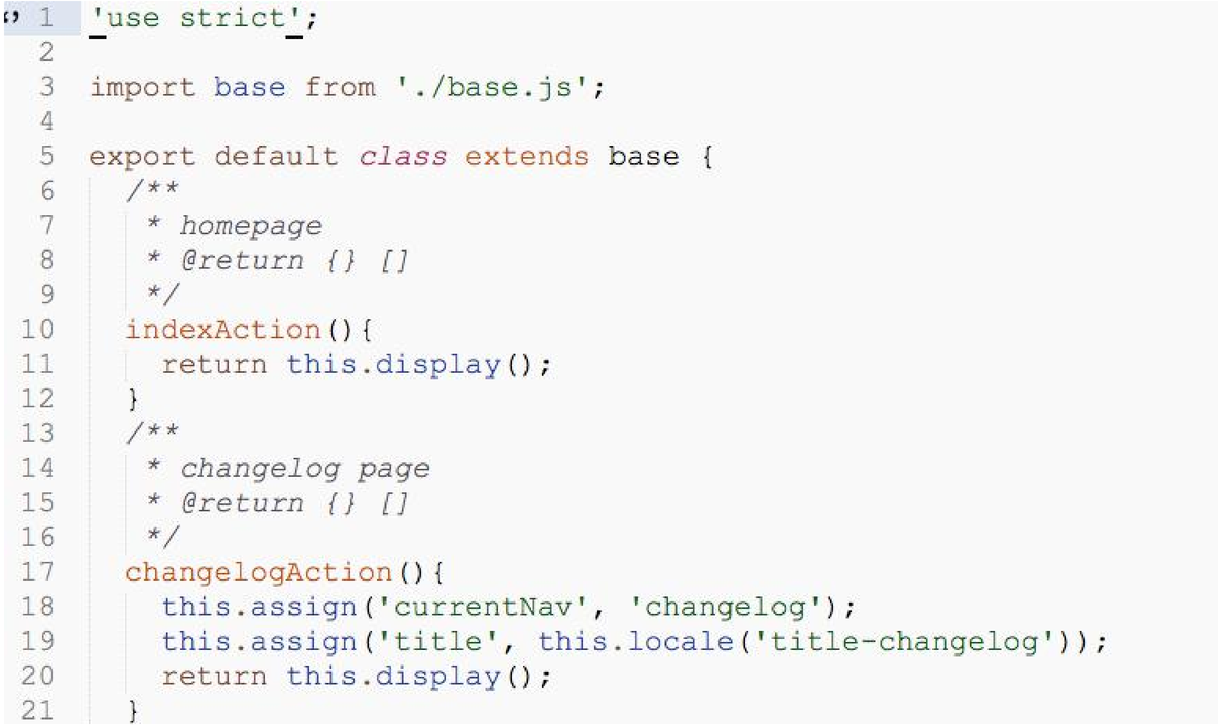
编译出错后快速提示



Internal Server Error

```
this.methodNotFound is not a function
```

整合



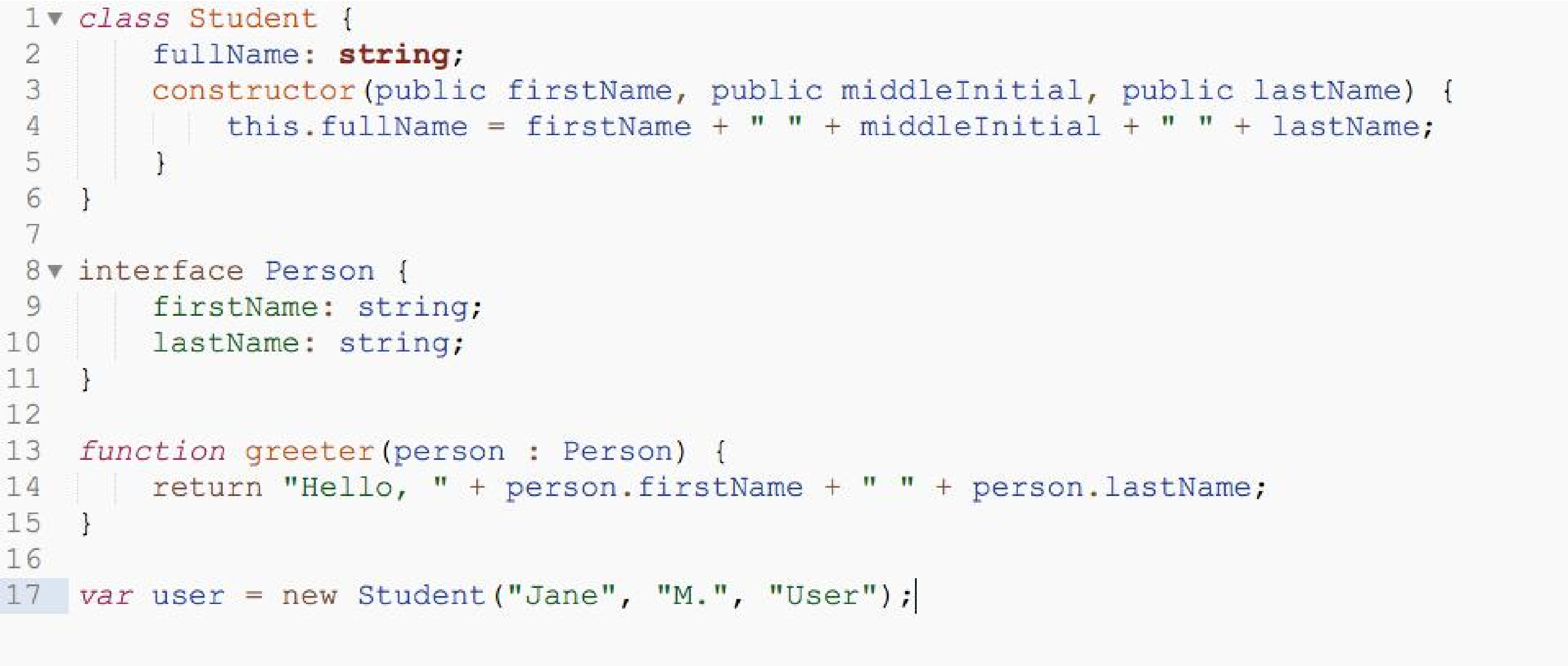
```
'use strict';

import base from './base.js';

export default class extends base {
  /**
   * homepage
   * @return {} []
   */
  indexAction(){
    return this.display();
  }
  /**
   * changelog page
   * @return {} []
   */
  changelogAction(){
    this.assign('currentNav', 'changelog');
    this.assign('title', this.locale('title-changelog'));
    return this.display();
  }
```

- 整合自动编译、自动更新、启动服务到一个脚本里
- 开发时执行 npm start 即可

TypeScript

TypeScript is a typed superset of JavaScript that compiles to plain JavaScript

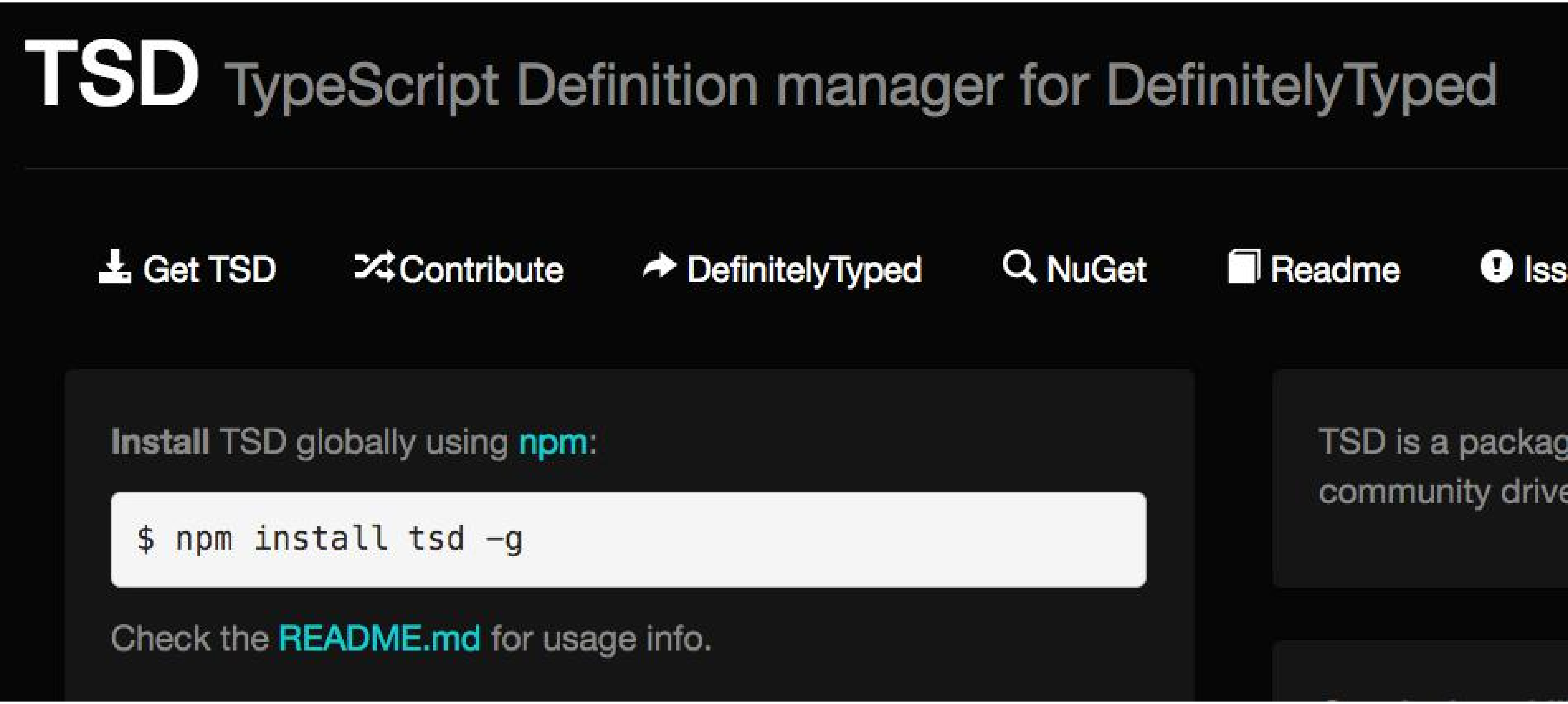
https://www.typescriptlang.org/



```
class Student {
    fullName: string;
    constructor(public firstName, public middleInitial, public lastName) {
        this.fullName = firstName + " " + middleInitial + " " + lastName;
    }
}

interface Person {
    firstName: string;
    lastName: string;
}

function greeter(person : Person) {
    return "Hello, " + person.firstName + " " + person.lastName;
}

var user = new Student("Jane", "M.", "User");
```

tsc foo.ts -t ES6

第三方模块



TSD TypeScript Definition manager for DefinitelyTyped

Install TSD globally using npm:

```
$ npm install tsd -g
```

Check the README.md for usage info.

TSD is a packag community drive

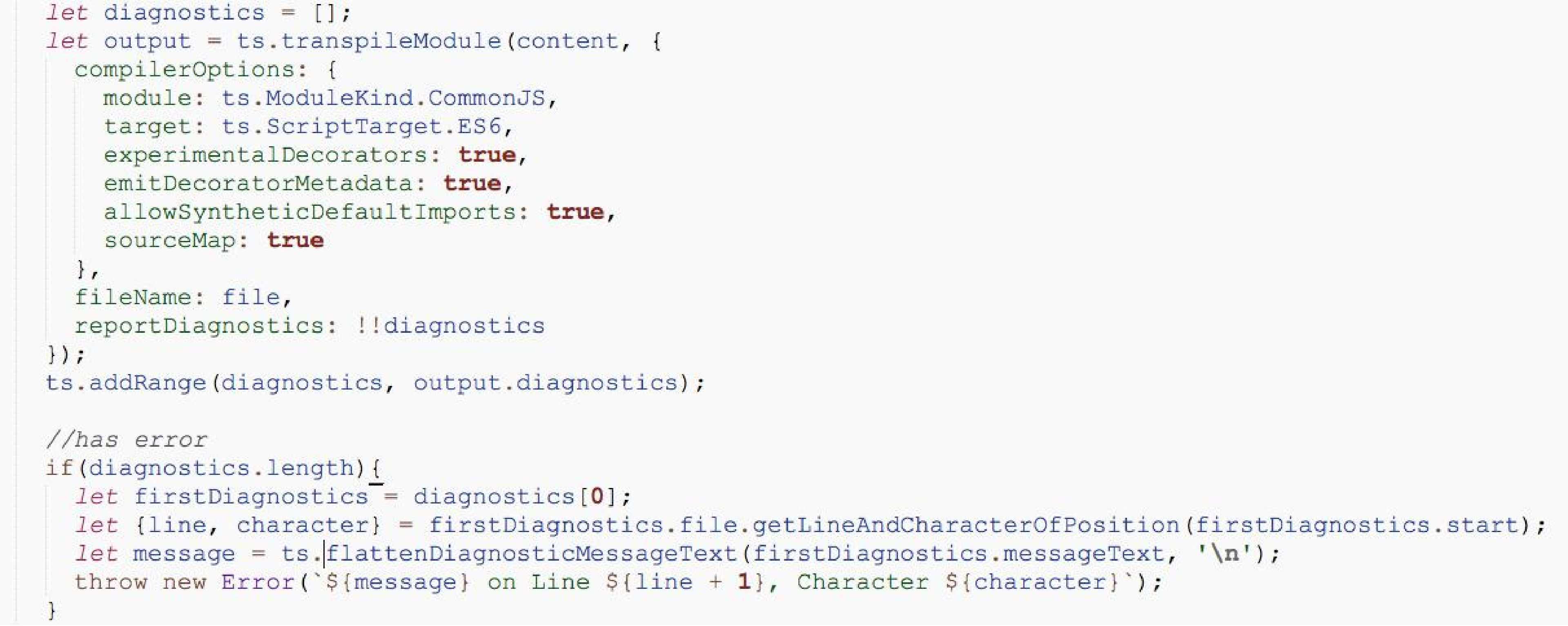
http://definitelytyped.org/tsd/

带来的问题

- 使用 async/await 等特性必须用 ES6 模式
- ES6 模式下 ES6 特性不再编译（class 特性需要编译）

先用 tsc 编译，再用 Babel 编译

调用接口编译



```
let diagnostics = [];
let output = ts.transpileModule(content, {
  compilerOptions: {
    module: ts.ModuleKind.CommonJS,
    target: ts.ScriptTarget.ES6,
    experimentalDecorators: true,
    emitDecoratorMetadata: true,
    allowSyntheticDefaultImports: true,
    sourceMap: true
  },
  fileName: file,
  reportDiagnostics: !!diagnostics
});
ts.addRange(diagnostics, output.diagnostics);

//has error
if(diagnostics.length){
  let firstDiagnostics = diagnostics[0];
  let {line, character} = firstDiagnostics.file.getLineAndCharacterOfPosition(firstDiagnostics.start);
  let message = ts.flattenDiagnosticMessageText(firstDiagnostics.messageText, '\n');
  throw new Error(`${message} on Line ${line + 1}, Character ${character}`);
}
```

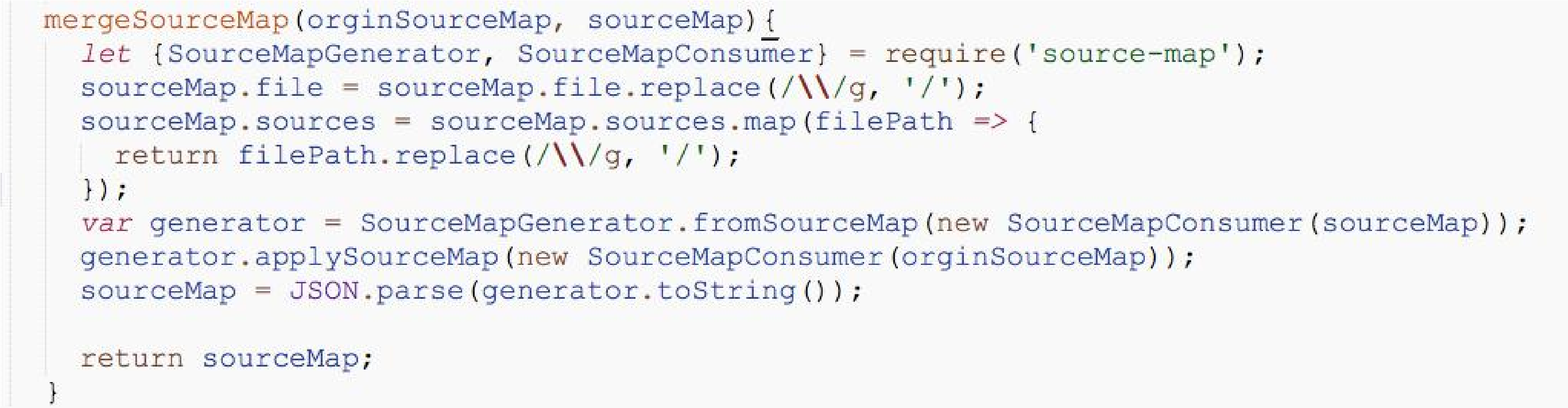
编译为 ES6 代码

新的问题

tsc 编译一份 SourceMap，Babel 再编译一份 SourceMap

导致最后的报错信息定位不准

合并 SourceMap



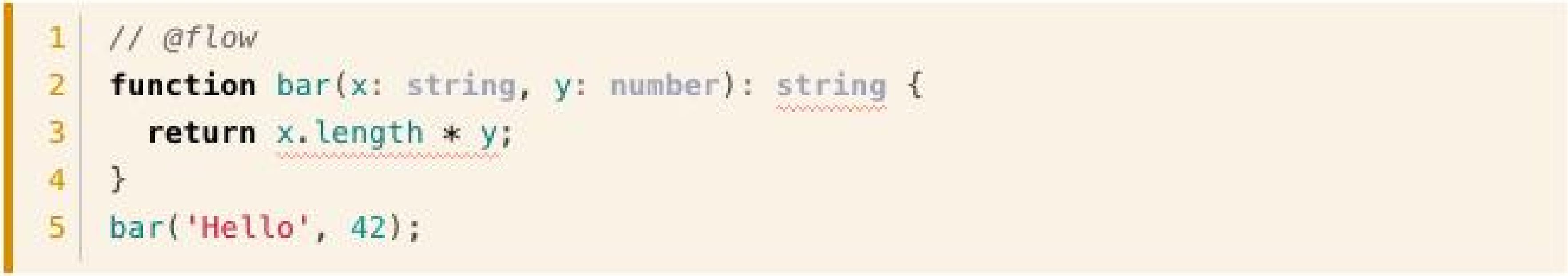
```
mergeSourceMap(orginSourceMap, sourceMap){
  let {SourceMapGenerator, SourceMapConsumer} = require('source-map');
  sourceMap.file = sourceMap.file.replace(/\\/g, '/');
  sourceMap.sources = sourceMap.sources.map(filePath => {
    return filePath.replace(/\\/g, '/');
  });
  var generator = SourceMapGenerator.fromSourceMap(new SourceMapConsumer(sourceMap));
  generator.applySourceMap(new SourceMapConsumer(orginSourceMap));
  sourceMap = JSON.parse(generator.toString());

  return sourceMap;
}
```

注意：生成的 SourceMap 里 file 和 sources[0] 地址必须完全相同

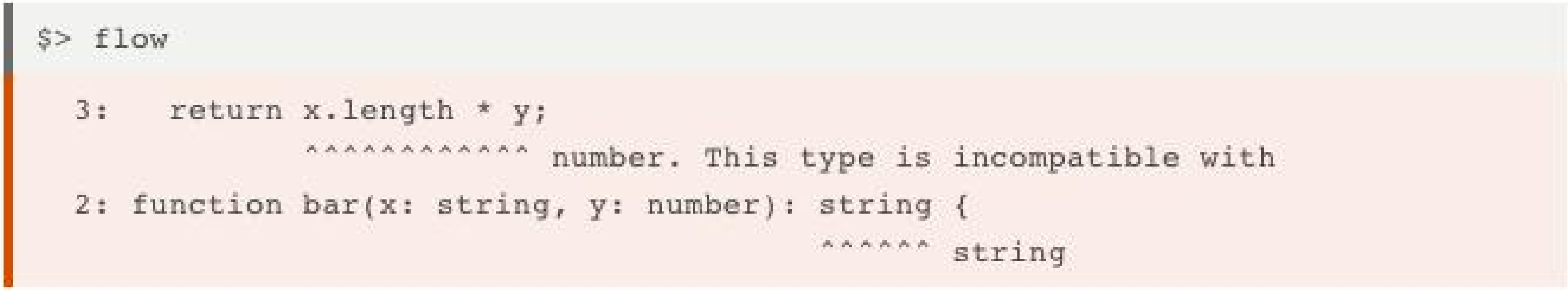
Flow

Flow is a static type checker, designed to quickly find errors in JavaScript applications

http://flowtype.org/

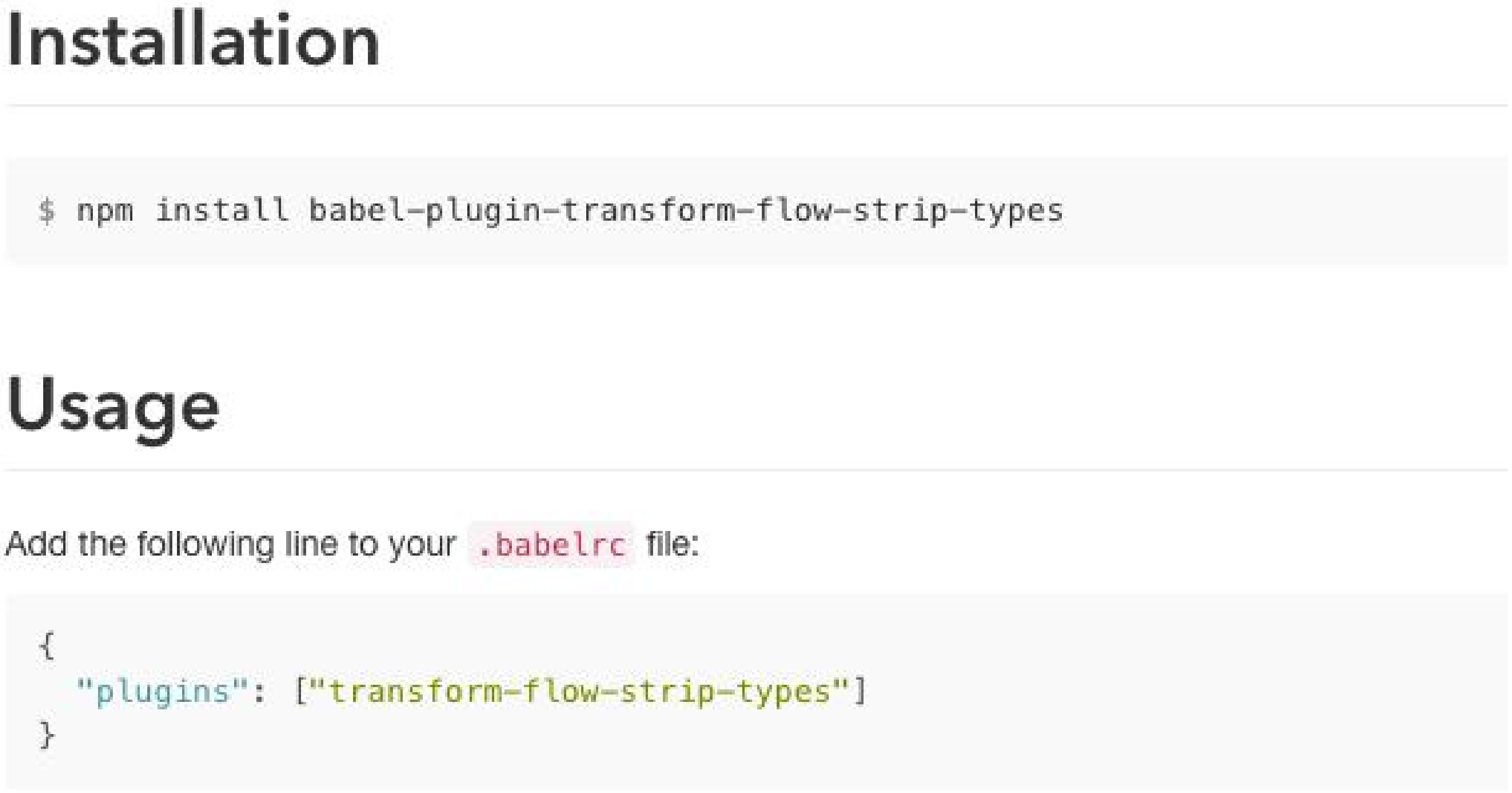


```
// @flow
function bar(x: string, y: number): string {
  return x.length * y;
}
bar('Hello', 42);
```



```
$> flow
```

```
  3:   return x.length * y;
              ^^^^^^^^^^^^ number. This type is incompatible with
  2: function bar(x: string, y: number): string {
                                         ^^^^^^ string
```



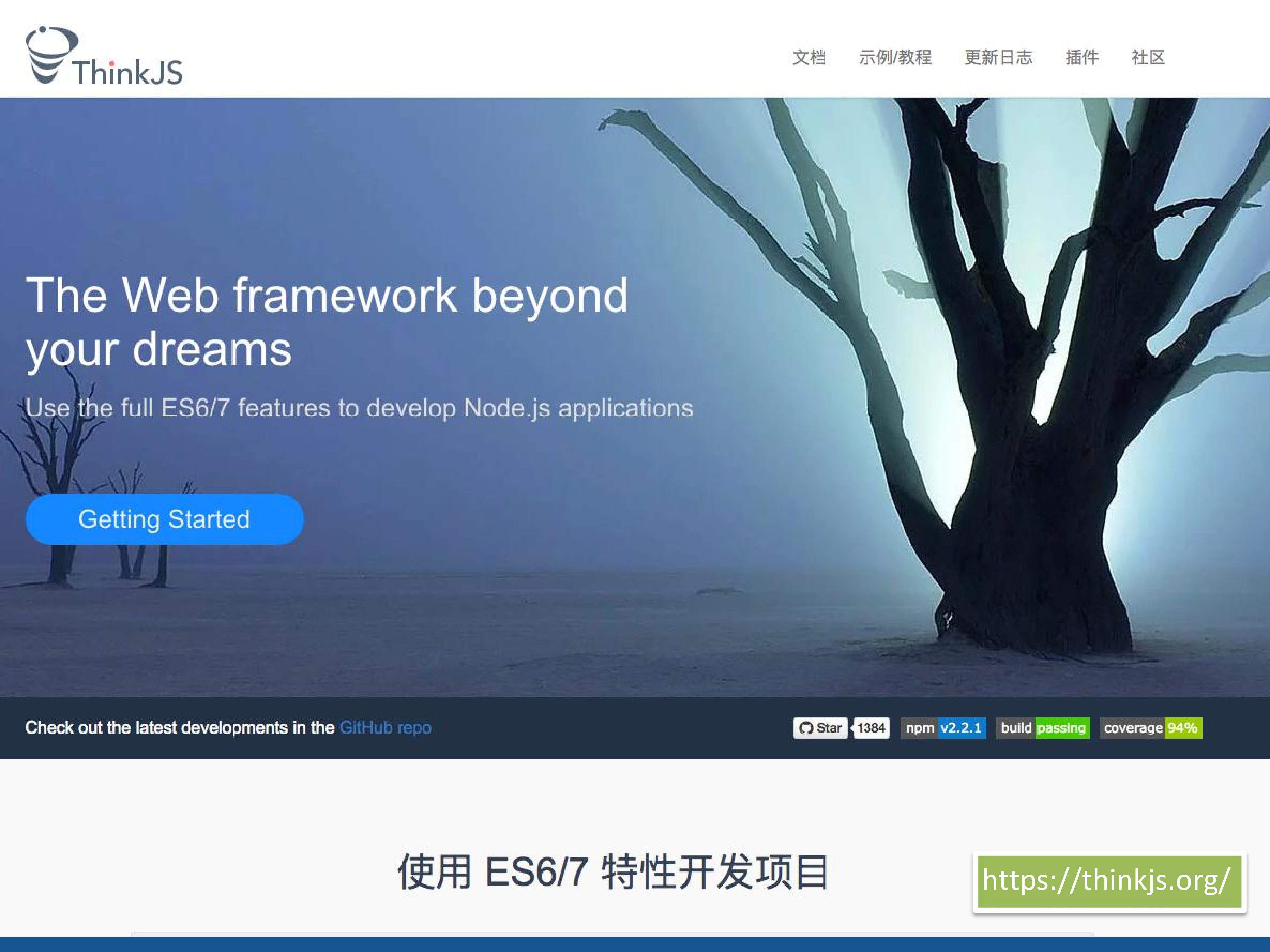
Installation

```
$ npm install babel-plugin-transform-flow-strip-types
```

Usage

Add the following line to your `.babelrc` file:

```
{
  "plugins": ["transform-flow-strip-types"]
}
```



The Web framework beyond your dreams

Use the full ES6/7 features to develop Node.js applications

Check out the latest developments in the GitHub repo

使用 ES6/7 特性开发项目

https://thinkjs.org/

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THANKS!