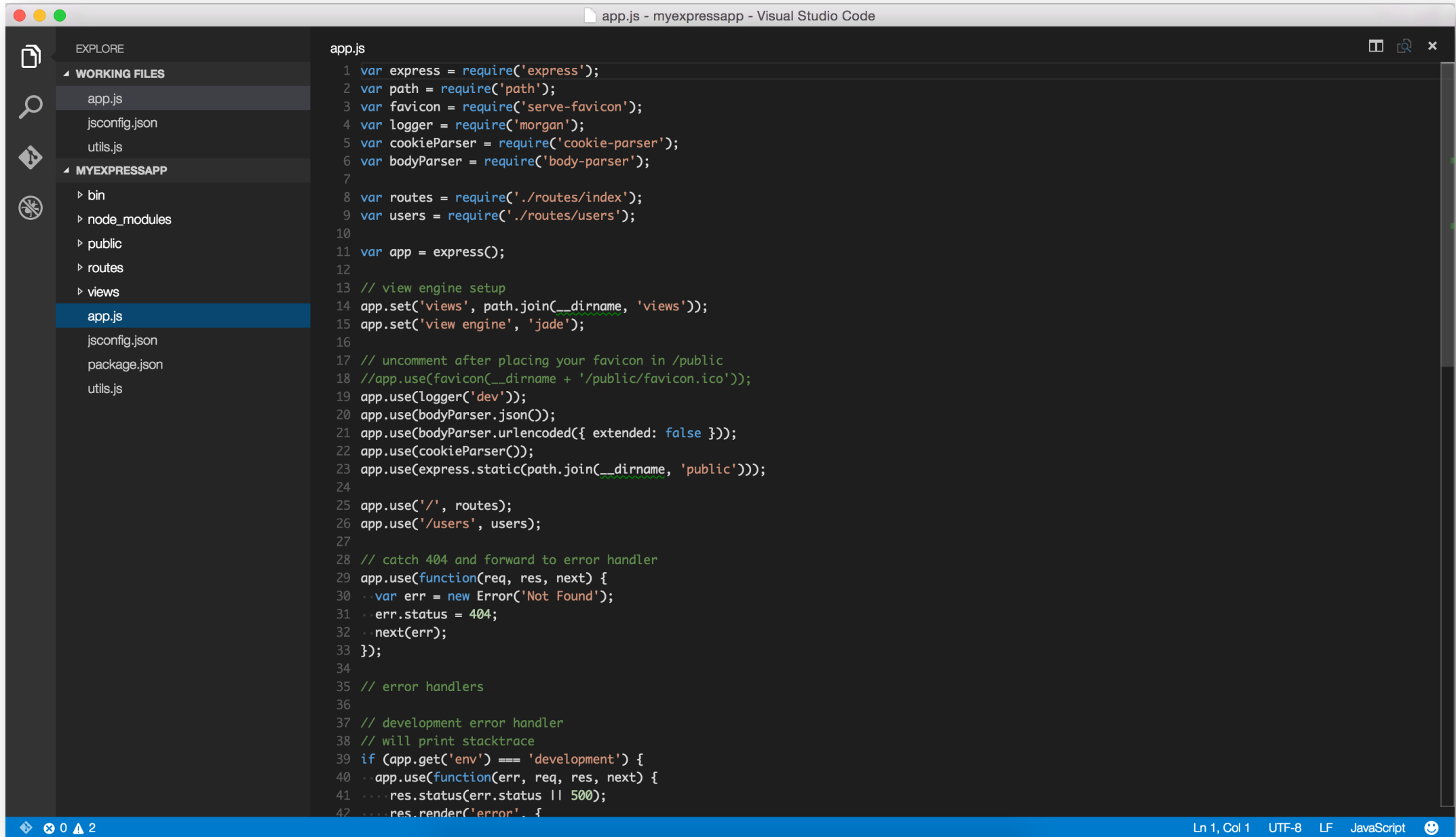


# Visual Studio Code

Shipping One of the Largest Microsoft  
JavaScript Applications

Alexandru Dima

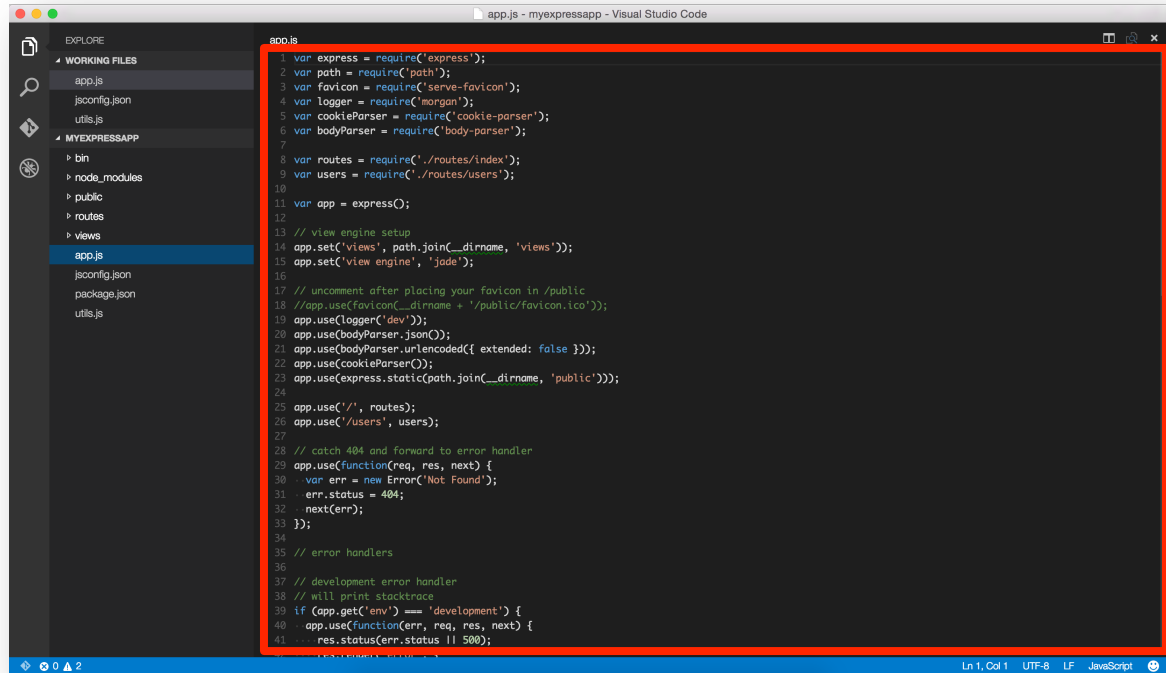
Microsoft



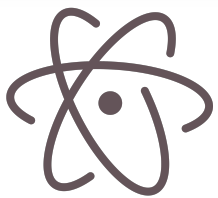
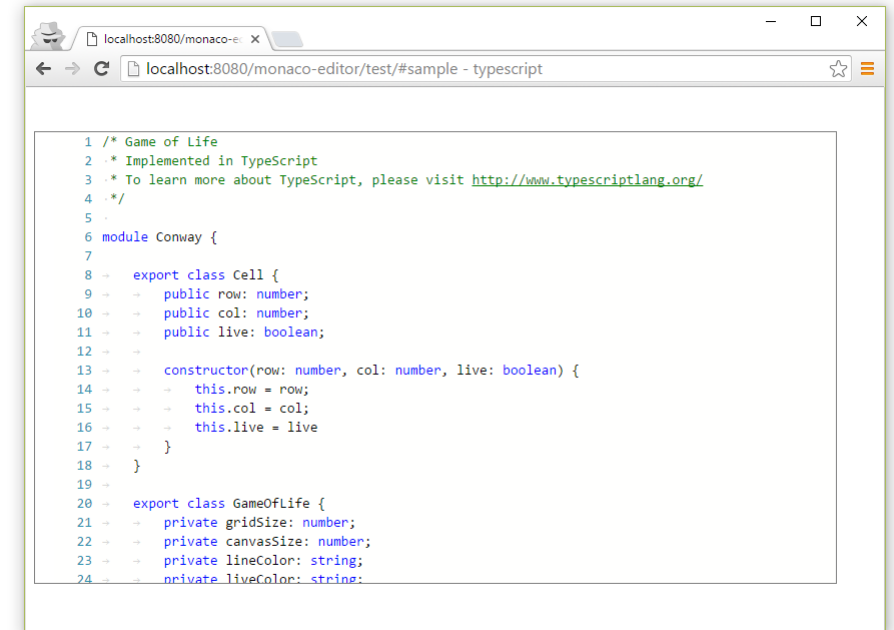
# What do we ship?



Visual Studio Code



Monaco Editor



Electron



node.js

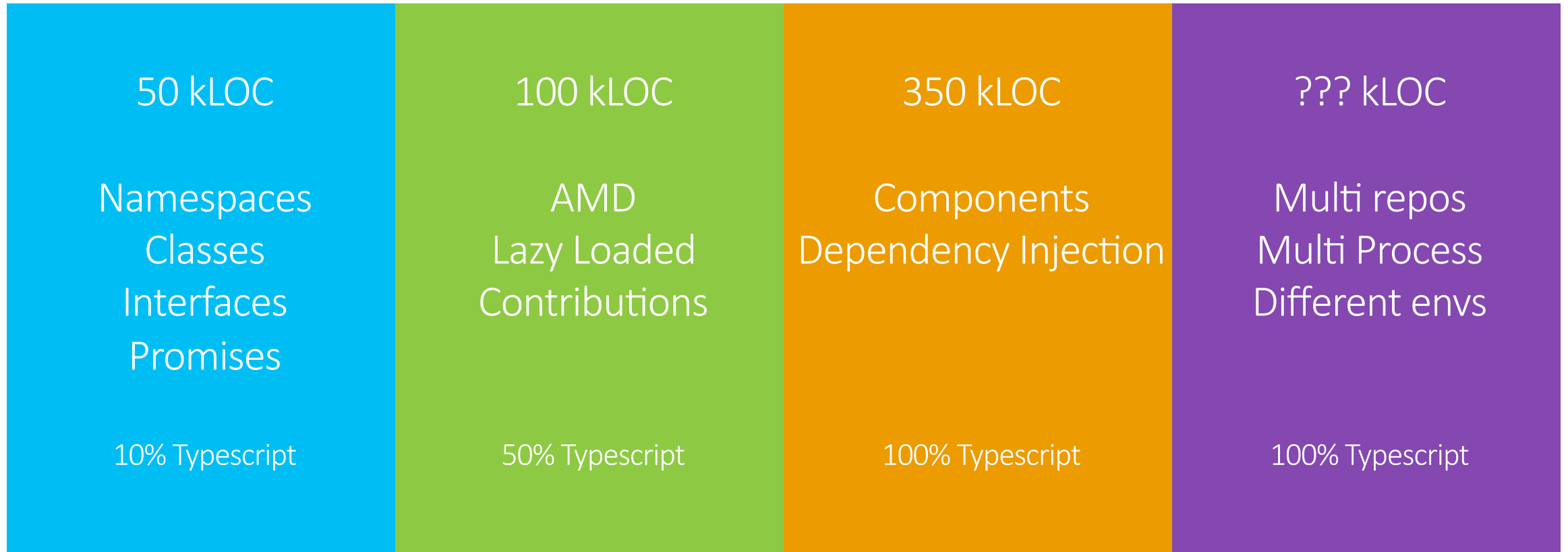


Chromium



Modern browsers

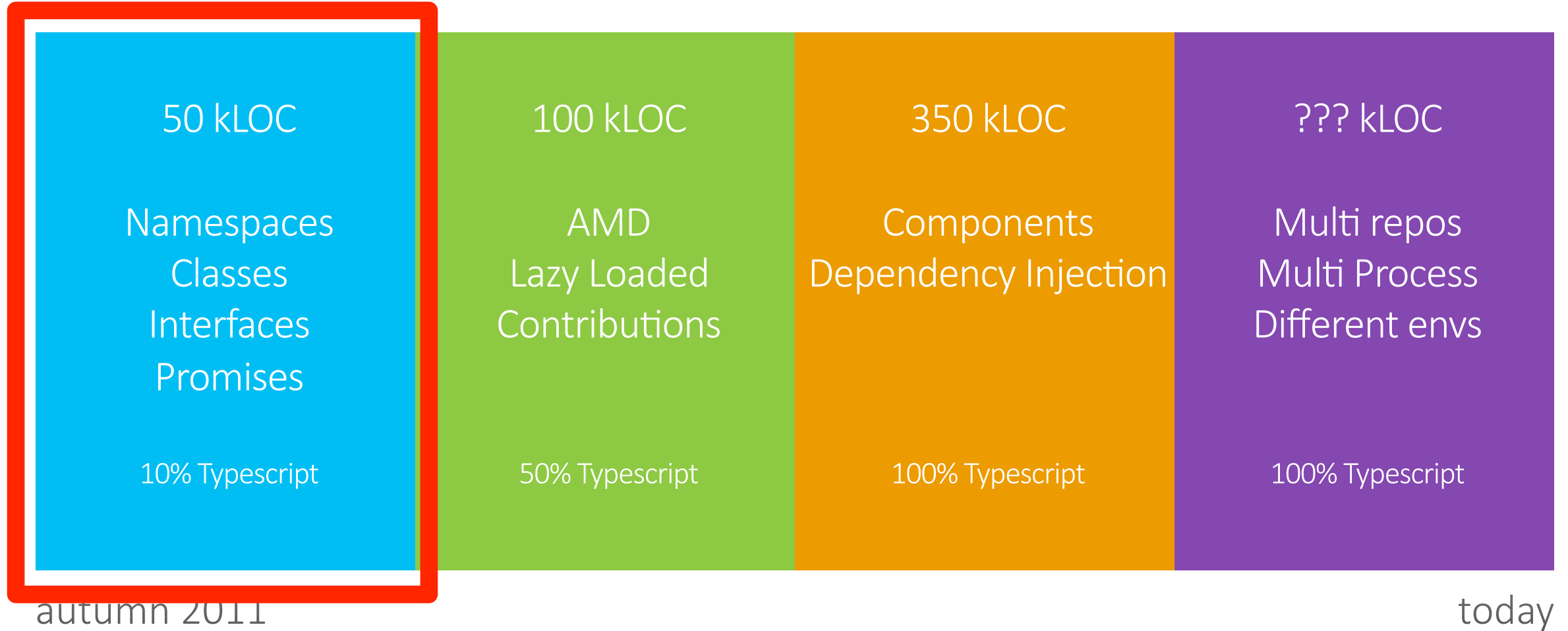
# Growing the code



autumn 2011

today

# Growing the code



I enjoy programming in JavaScript

# Pains

## Organizing a large and growing code base

Need to come up with “**compensating**” patterns for classes and modules/namespaces

## Refactoring JavaScript code is difficult

*“JavaScript code **rots** over time”*

*“Writing JavaScript code in a large project is like **carving code in stone**”*

## Describing APIs

Keep the description in sync with the implementation

# TypeScript to the rescue...

## Starts with JavaScript

All JavaScript code is TypeScript code, simply copy and paste

All JavaScript libraries work with TypeScript

## Optional static types, classes, modules

Structural typing and type inference

Enable scalable application development and excellent tooling

**Zero cost:** Static types completely disappear at run-time

## Ends with JavaScript

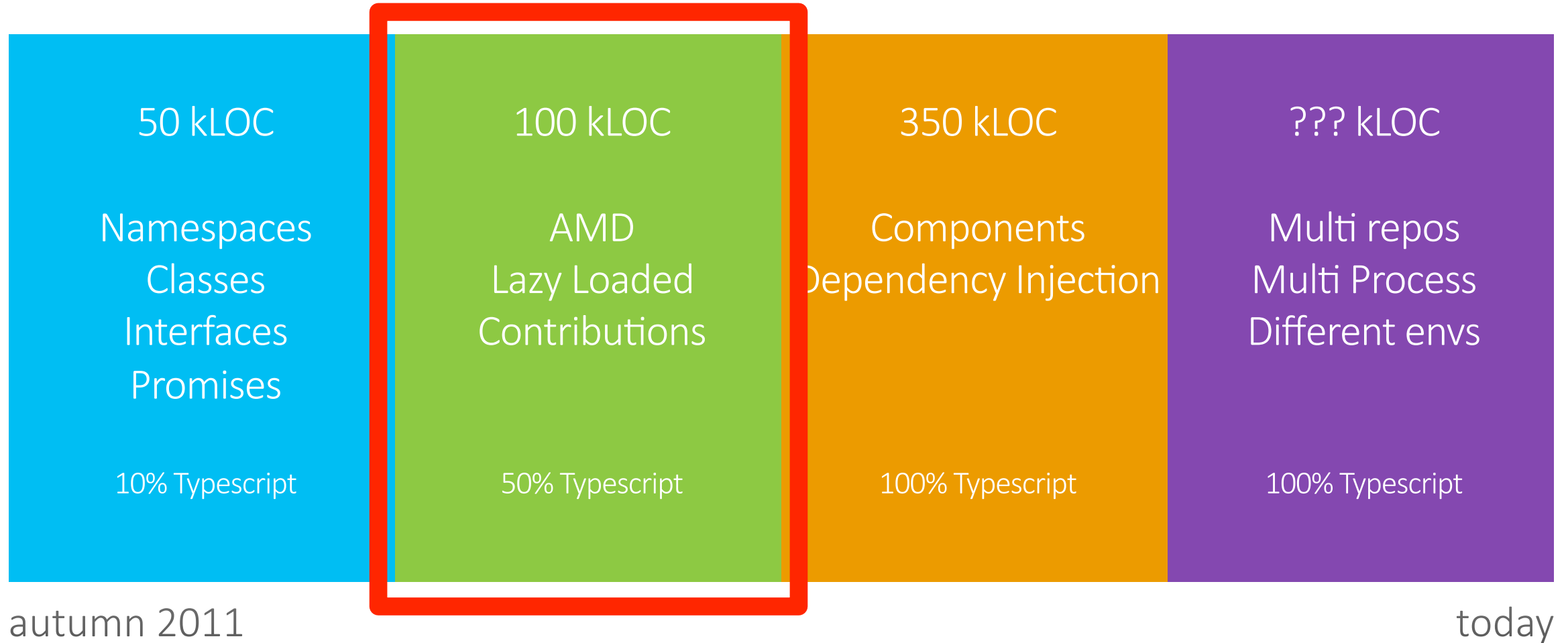
Compiles to idiomatic JavaScript

Runs in any browser or host, on any OS



# TypeScript Demo

# Growing the code



# Code Organization: Keep code structured

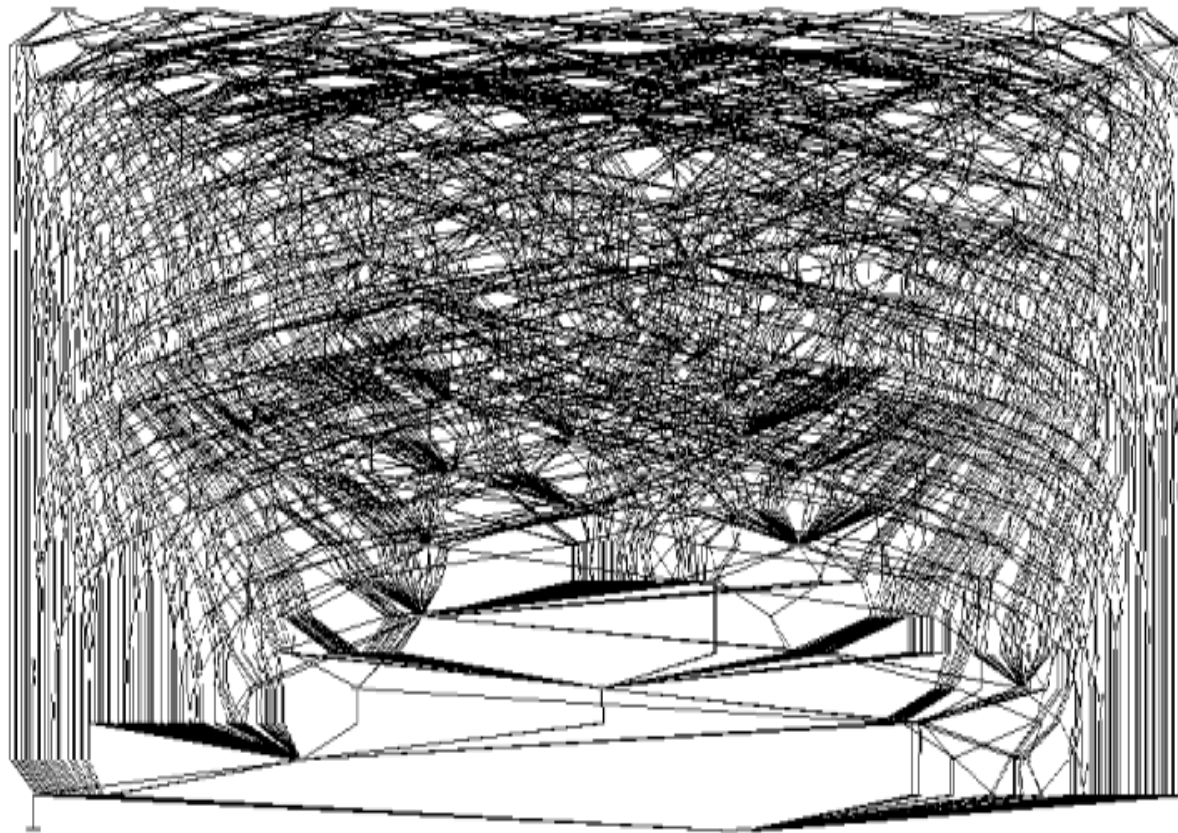
```
1 var Namespace = {};  
2 Namespace.Util = {};  
3 Namespace.Util.Strings = {};  
4 Namespace.Util.Strings.trim = function() {  
5     /* etc */  
6 }
```

Our namespaces were **global variables** and thereby open  
Namespaces have no relationship to the actual files on disk  
Renaming files or namespaces was a pain...  
We had cyclic dependencies without noticing...

# Growing Pains: Managing dependencies

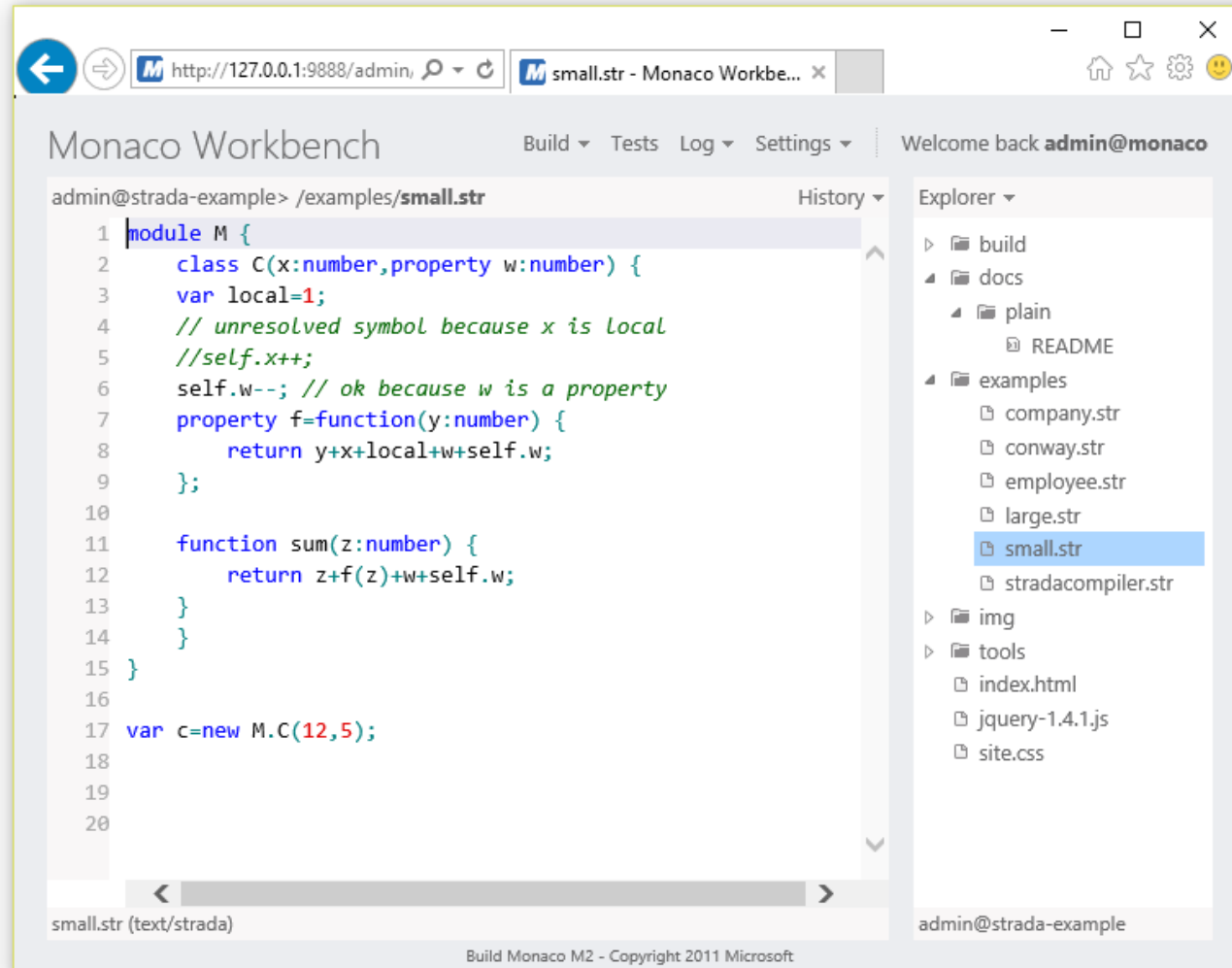
“...our dependency graph was such a mess that each area had a dependency on just about every other area.

-- Ashamed Developer



# Our source at the time

90%



# Module Systems to the rescue...

## AMD

```
1 define('module_id', [  
2     'dependency_id'  
3 ], function(dependency) {  
4     // code  
5  
6     return {  
7         // exports  
8     };  
9 });
```

## CommonJS

```
my_module.js  
1 var dependency = require('dependency_id');  
2  
3 // code  
4  
5 exports.myExports = {  
6     // exports  
7 }
```

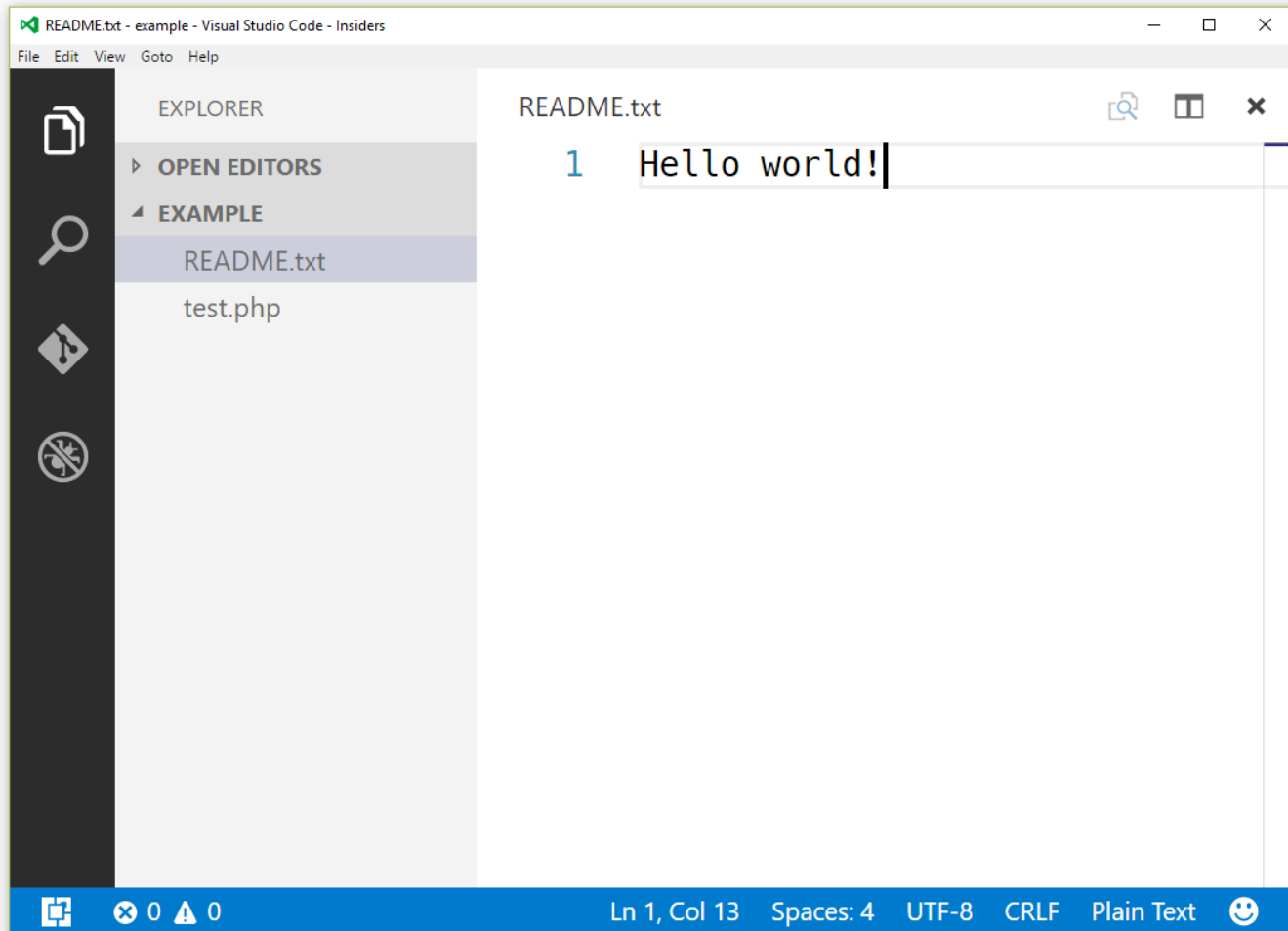
# TypeScript: First class module support

Supports both AMD and CommonJS with one syntax

```
1 import { Dependency } from "../dependency_id";  
2  
3 // code  
4  
5 export function helper() {  
6     // export  
7 }
```

Sharing code between AMD and CommonJS is easy

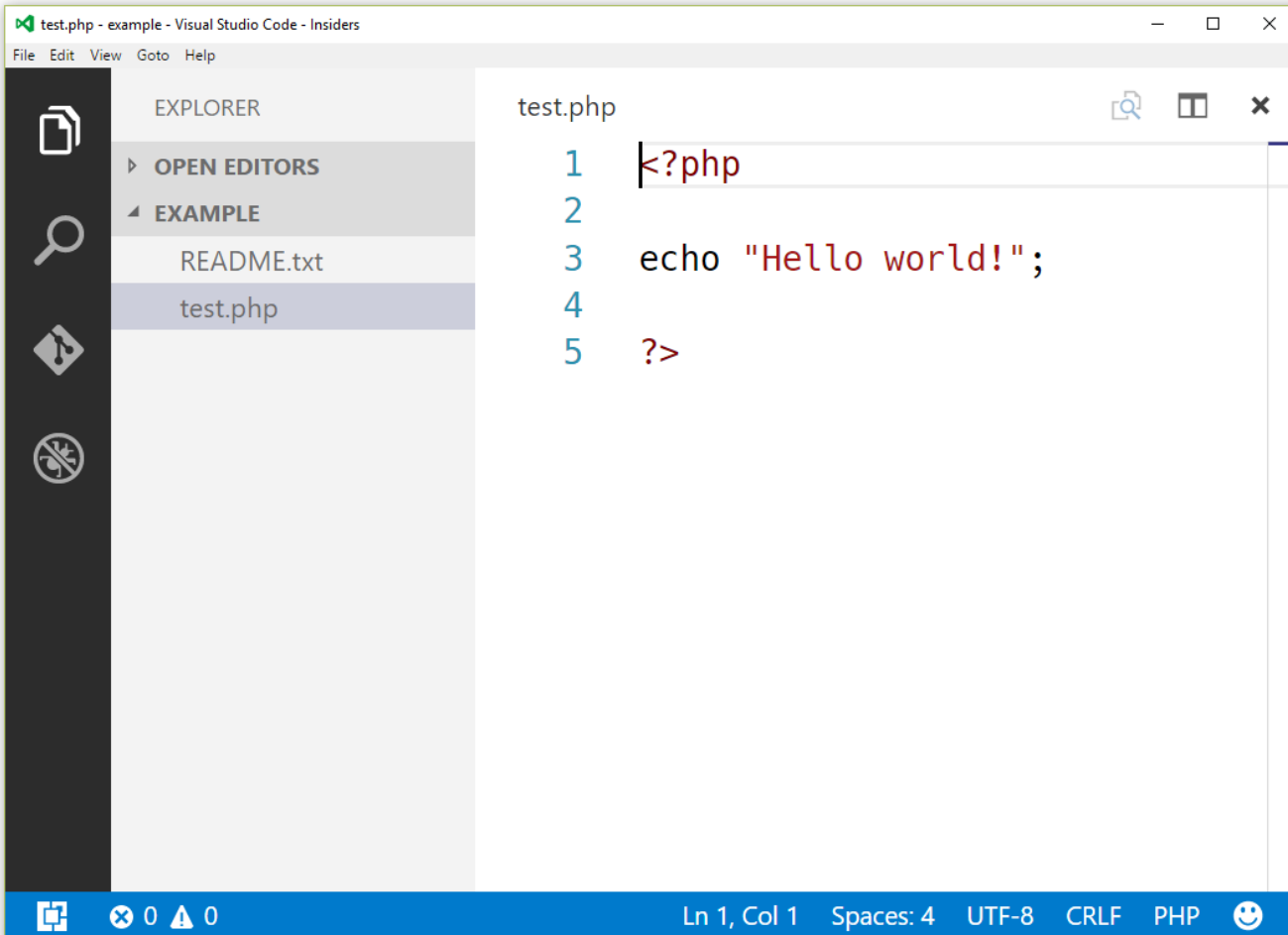
# Lazy code loading



```
1 // php.contribution.ts
2
3 ModesRegistry.registerMode({
4   → id: 'php',
5   → extensions: ['.php', '.php4', '.php5'],
6   → aliases: ['PHP', 'php'],
7   → mimetypes: ['application/x-php'],
8   → moduleId: 'vs/languages/php/common/php',
9   → ctorName: 'PHPMode'
10  });
11
12 // php.ts
13
14 export class PHPMode extends AbstractMode {
15
16   → constructor() {
17   →   → super('php');
18   → }
19
20   → // lots of code ...
21 }
```



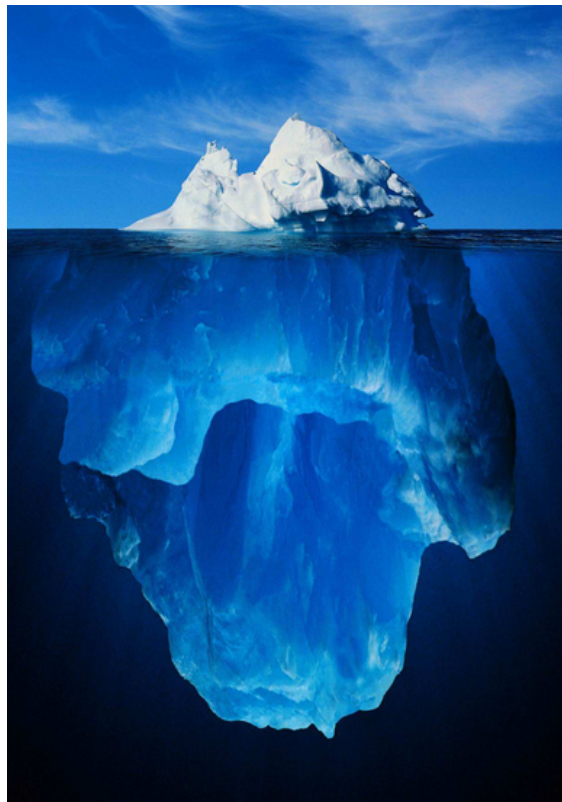
# Lazy code loading



```
1 // php.contribution.ts
2
3 ModesRegistry.registerMode({
4   → id: 'php',
5   → extensions: ['.php', '.php4', '.php5'],
6   → aliases: ['PHP', 'php'],
7   → mimetypes: ['application/x-php'],
8   → moduleId: 'vs/languages/php/common/php',
9   → ctorName: 'PHPMode'
10  });
```

```
12 // php.ts
13
14 export class PHPMode extends AbstractMode {
15
16   → constructor() {
17     → → super('php');
18   → }
19
20   → // lots of code ...
21 }
```

# Lazy code loading



```
1  // php.contribution.ts
2
3  ModesRegistry.registerMode({
4    → id: 'php',
5    → extensions: ['.php', '.php4', '.php5'],
6    → aliases: ['PHP', 'php'],
7    → mimetypes: ['application/x-php'],
8    → moduleId: 'vs/languages/php/common/php',
9    → ctorName: 'PHPMode'
10  });
11
12  // php.ts
13
14  export class PHPMode extends AbstractMode {
15
16    → constructor() {
17      → → super('php');
18    → }
19
20    → // lots of code ...
21  }
```

# CSS dependencies

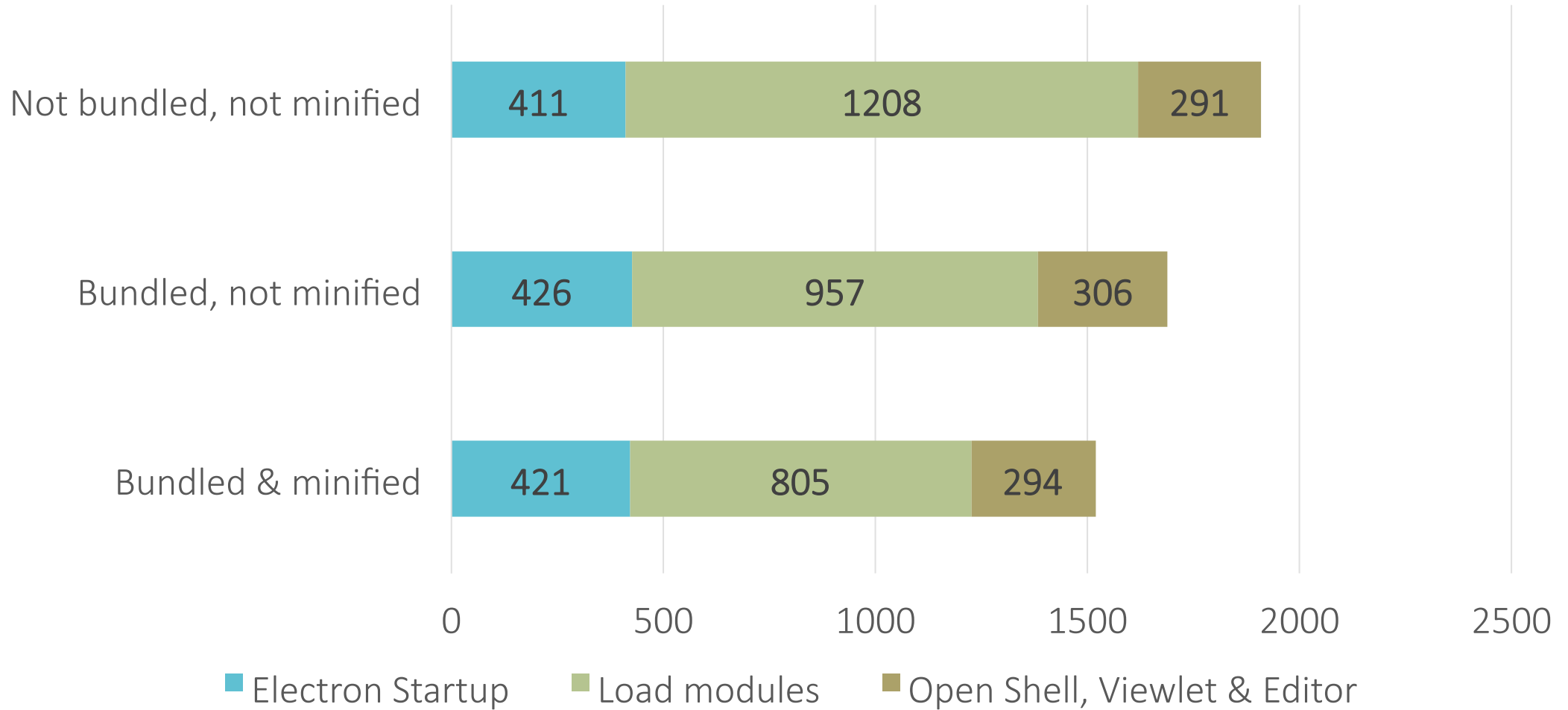
## AMD loader plugins

We implemented a css loader plugin, and TypeScript supports to generate non-TypeScript dependencies in the JavaScript code

```
1 // currentLineHighlight.ts
2
3 import 'vs/css!./currentLineHighlight';
4 import {ViewOverlay} from '...';
5
6 export class CurrentLineHighlight extends ViewOverlay {
7     ...// ...
8 }
9
```

```
1 /* currentLineHighlight.css */
2
3 .monaco-editor .current-line {
4     → display: block;
5     → position: absolute;
6     → left: 0;
7     → top: 0;
8     → box-sizing: border-box;
9 }
```

# Performance: Bundle & Minify your Code



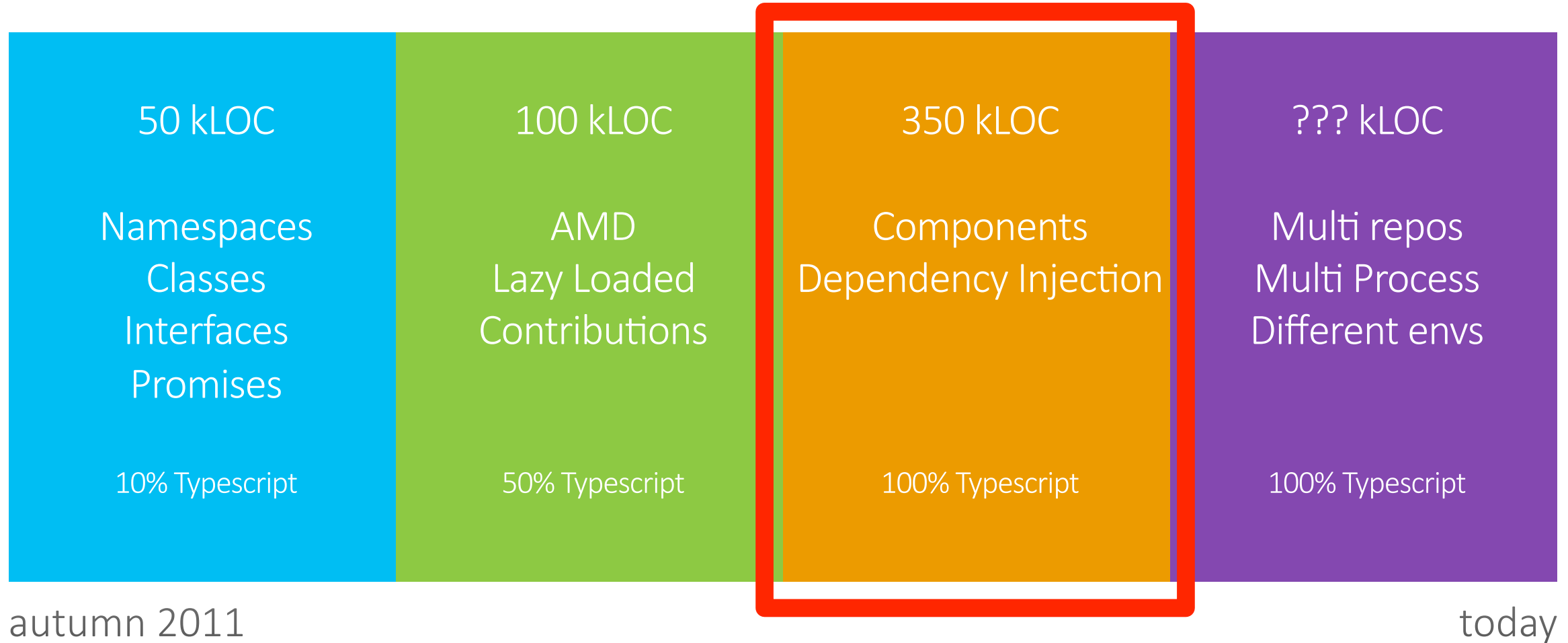
Minify everything (600): <https://top.fse.guru/nodejs-a-quick-optimization-advice-7353b820c92e#.p52jv6nys>

# Post Module System Migration

“ *It feels like fresh showered.  
Self contained modules, no  
more cycles, no more globals,  
clean file system structure.*

--Happy Developer

# Growing the code



# 100% TypeScript

Migration happened out of developer will

Migration is code clean-up but real work...

My velocity around 300 LOCs per hour

## Team specific rules

- No implicit 'anys'

- No missing return types

- JSDoc comments

- No unused variables

# Towards 100% TypeScript



*In JavaScript, you really are at the mercy of your ability to **spell**:*

```
delete this.markers[range.statMarkerId];
```



*Soon enough, I realized how inconsistent I was, the same data was flowing around in at least 3 different formats...*



# Components

We consume:

typescriptServices.js & typescriptServices.d.ts

We ship:

monaco-editor.js & monaco.d.ts

vscode.d.ts - defines our extension API

```
1  declare module monaco.editor {  
2  
3      /**  
4       * Create a new editor under `domElement`.  
5       * `domElement` should be empty (not contain other dom nodes).  
6       * The editor will read the size of `domElement`.  
7       */  
8      export function create(element: HTMLElement, options: IEditorConstructionOptions,  
9
```

# Dependency Injection

Constructor service injection in many places

```
1  export class GoToDefinitionAction extends DefinitionAction {
2
3  →  public static ID = 'editor.action.goToDeclaration';
4
5  →  constructor(
6  →  →  descriptor: editorCommon.IEditorActionDescriptorData,
7  →  →  editor: editorCommon.ICommonCodeEditor,
8  →  →  @IMessageService messageService: IMessageService,
9  →  →  @IEditorService editorService: IEditorService
10 →  ) {
11 →  →  super(descriptor, editor, messageService, editorService, new DefinitionActionConfig());
```

# Dependency Injection



The screenshot shows a code editor window titled "fib.js - colors - Code - OSS Dev". The editor displays a JavaScript file named "fib.js" with the following code:

```
1  
2  
3 function fib(n) {  
4   if (n <= 1) {  
5     return 1;  
6   }  
7   return fib(n-1) + fib(n-2);  
8 }  
9  
10 var N = 0;  
11 setInterval(function() {  
12   console.log(`computing fib(${N})`);  
13   console.log(` = ${fib(N)}`);  
14   N += 20;  
15 }, 1000);
```

An error message is displayed at the top: "Error Could not find definition!". The error is located on line 13, column 22, where the code is `console.log(` = ${fib(N)}`);`. The status bar at the bottom indicates "Ln 13, Col 22", "Spaces: 2", "UTF-8", "CRLF", and "JavaScript".

# Dependency Injection



# Dependency Injection

```
c:\Alex\src\vscode>scripts\test.bat
```

```
.....  
.....  
.....  
.....
```

```
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....
```

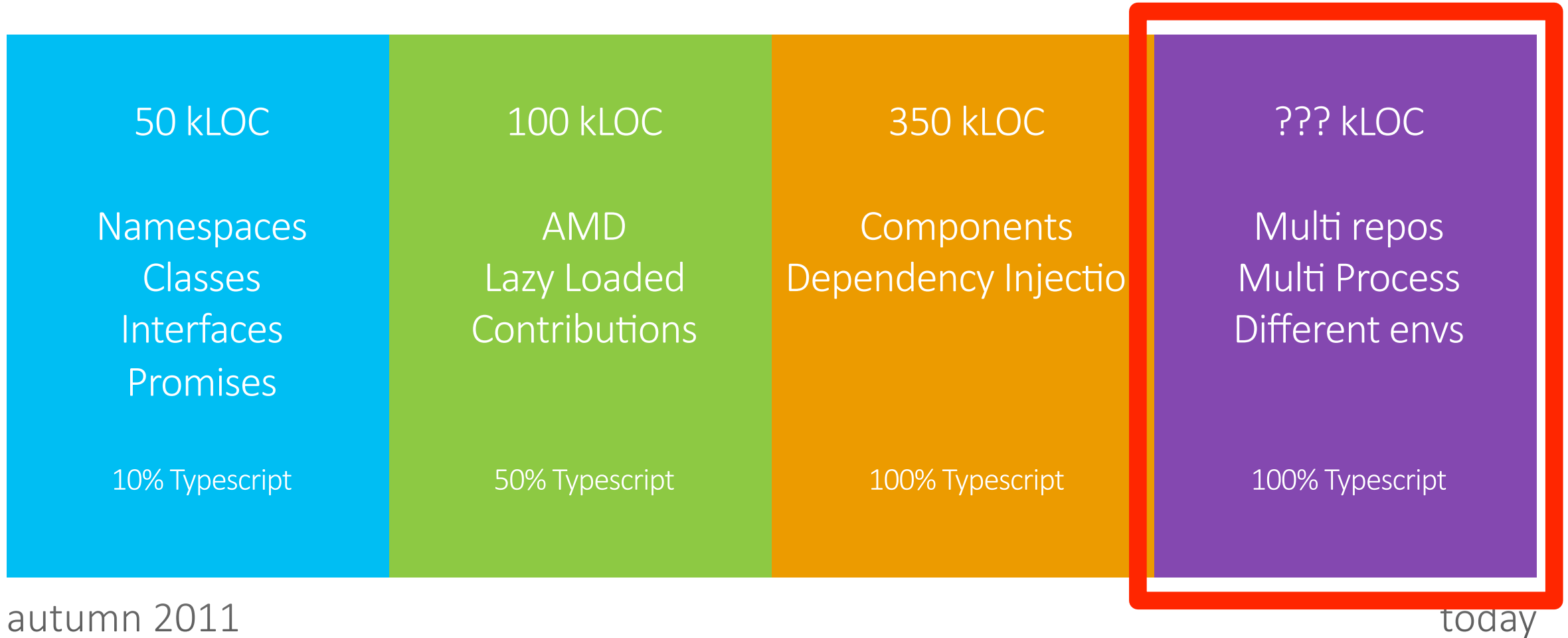
```
2092 passing (10s)  
5 failing
```

```
1) ExtHostLanguageFeatures Definition, data conversion:
```

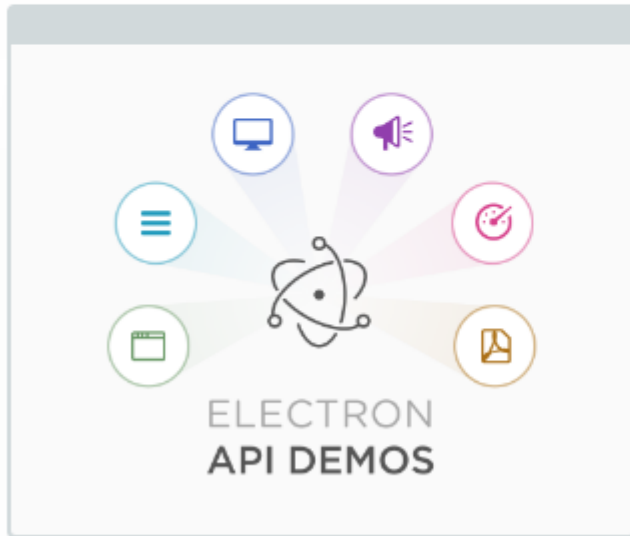
```
    Error: Could not find definition!
```

```
      at Object.getDeclarationsAtPosition (c:\Alex\src\vscode\out\vs\editor\contrib\
```

# Growing the code




# Electron Demo



## Explore the Electron APIs

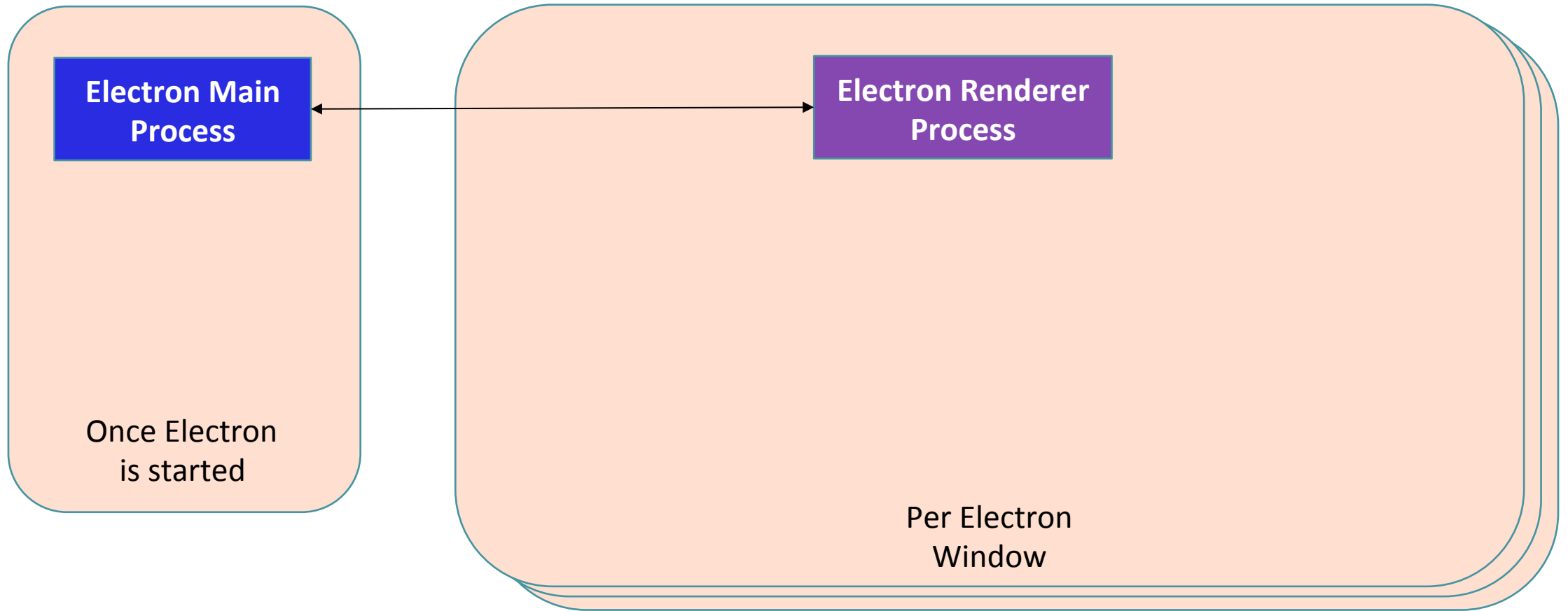
The [Electron API Demos app](#) interactively demonstrates the most important features of the Electron API. See what's possible with Electron with sample code and helpful tips for building your app.

 [Download for Windows](#)

[View all releases on GitHub](#)

<http://electron.atom.io/>

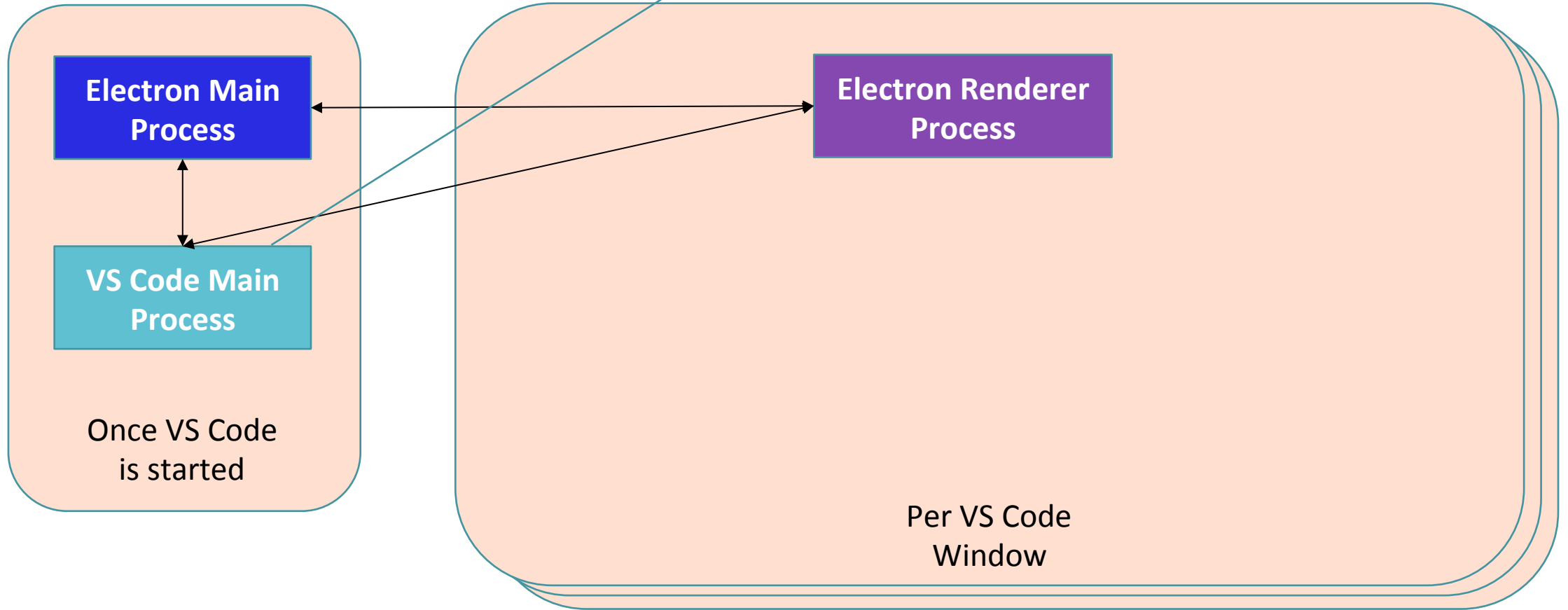
# Execution environments



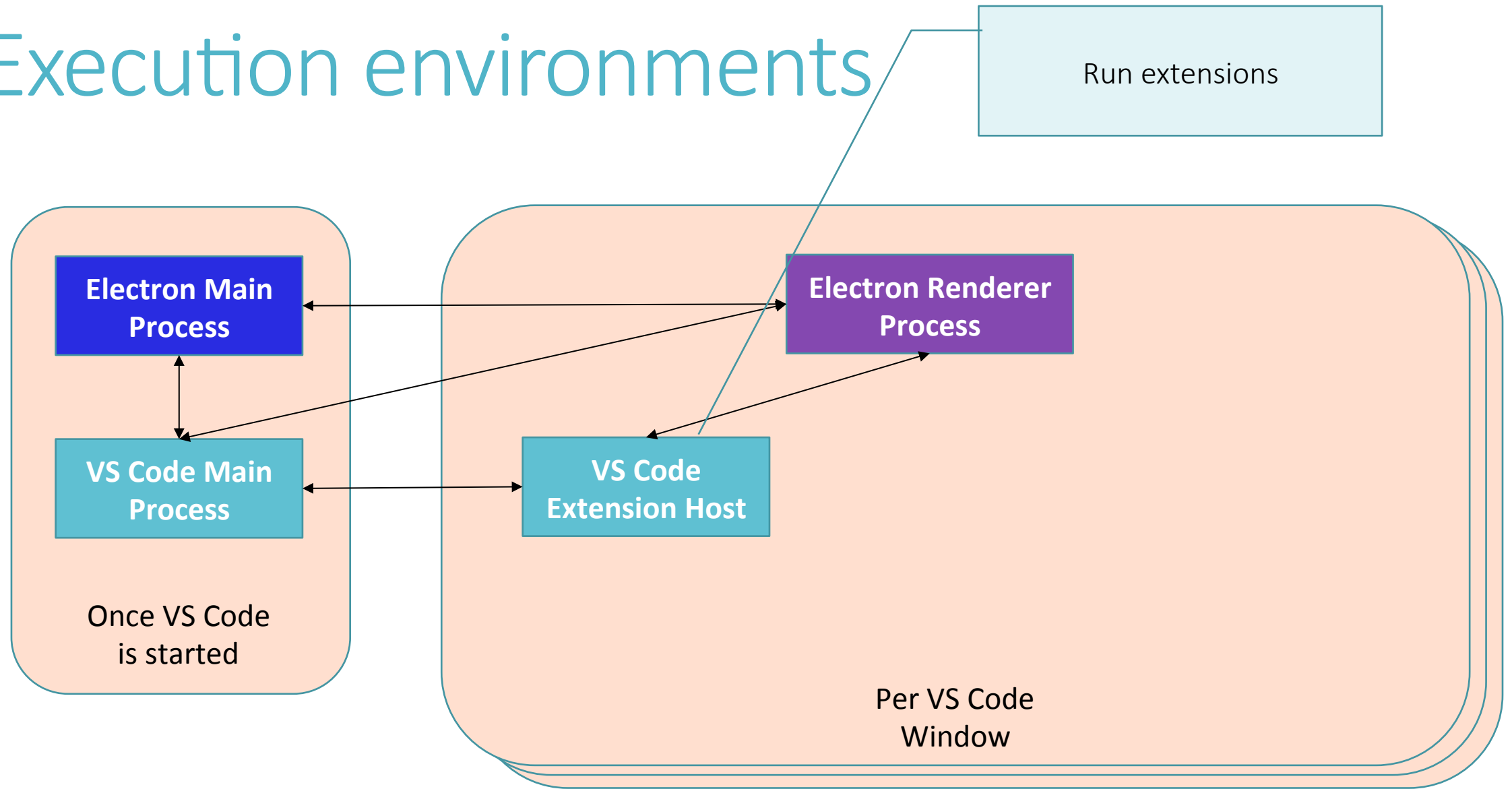


# Execution environments

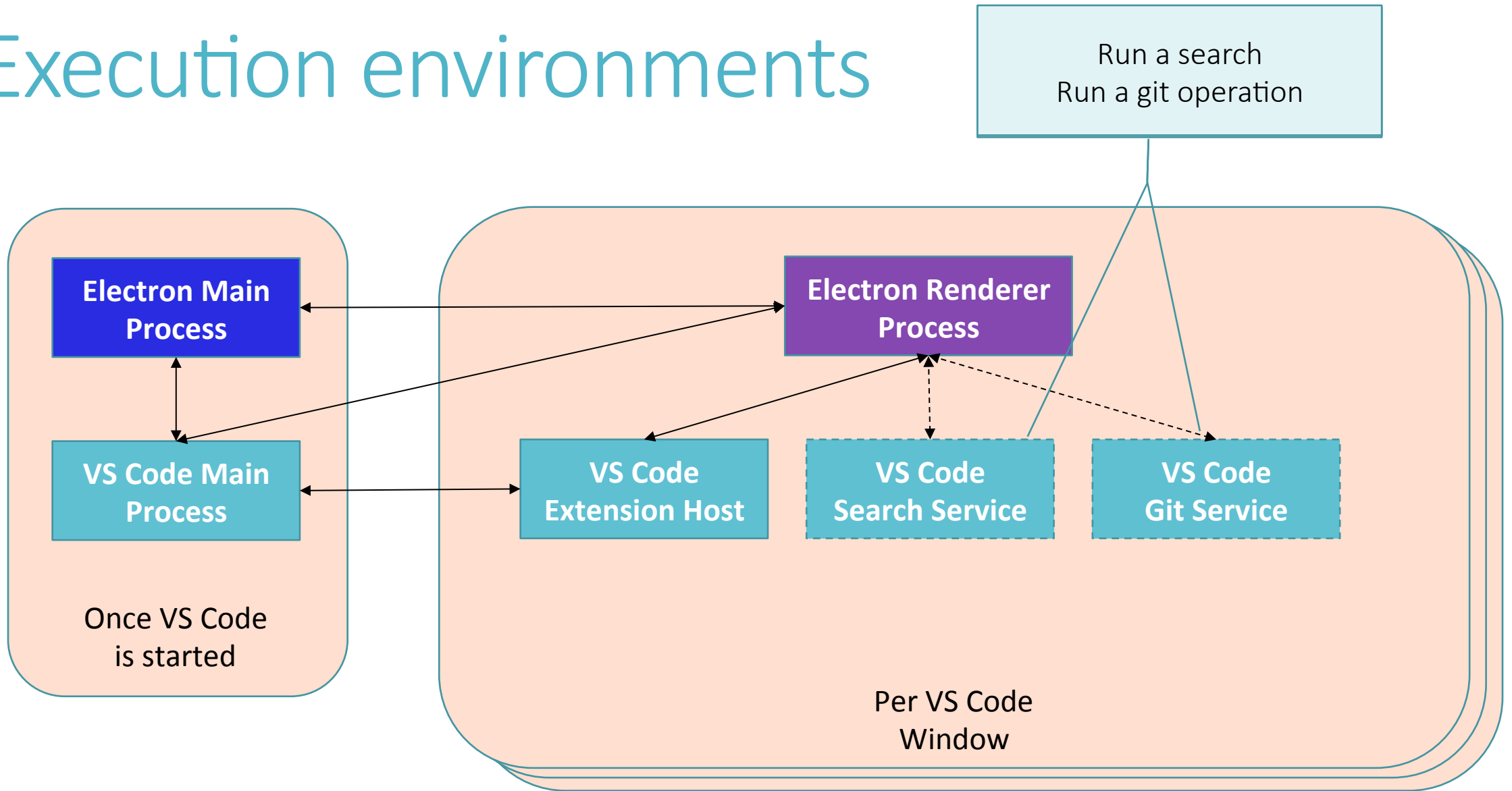
Check for updates  
Manage extensions



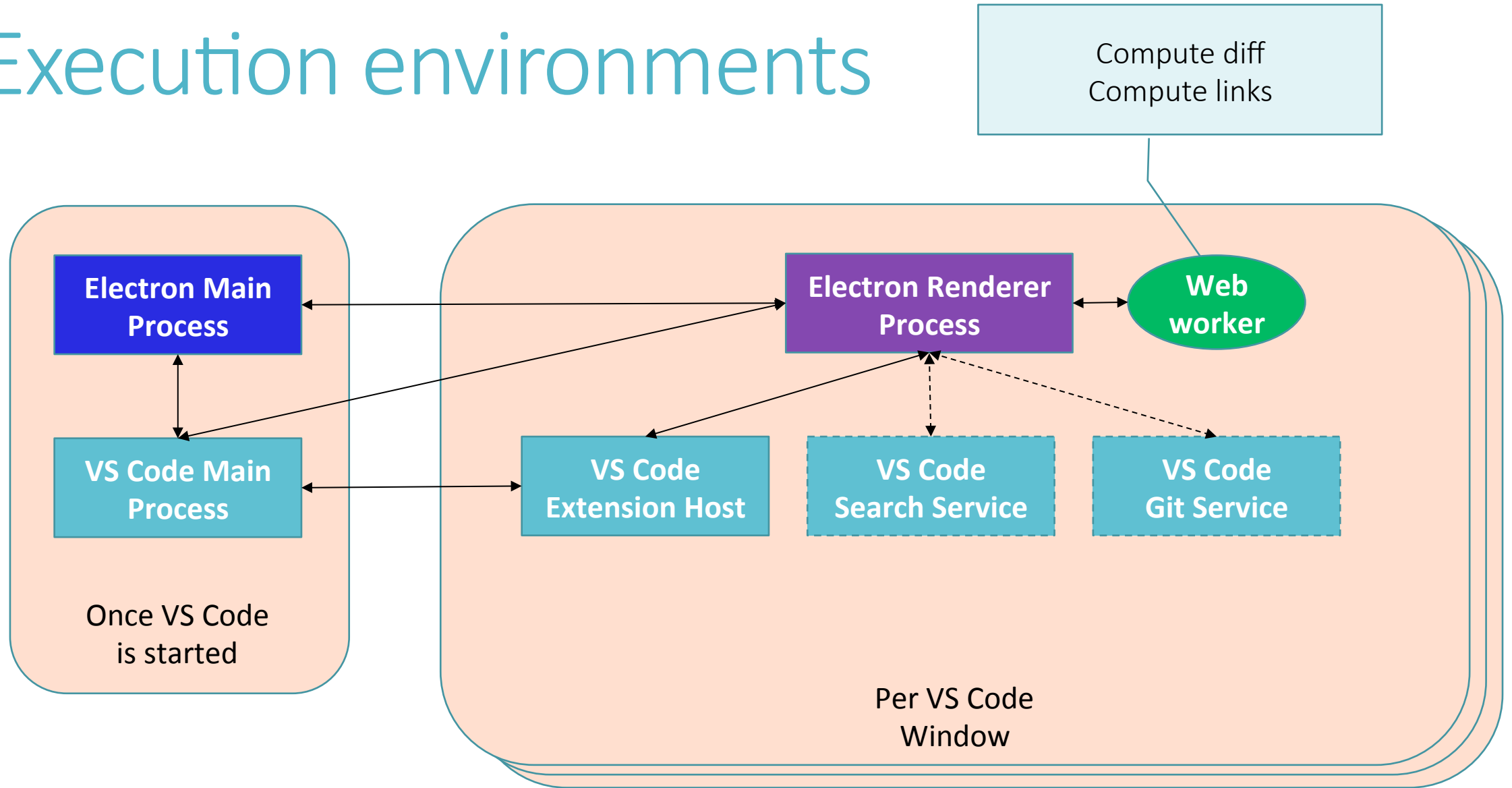
# Execution environments



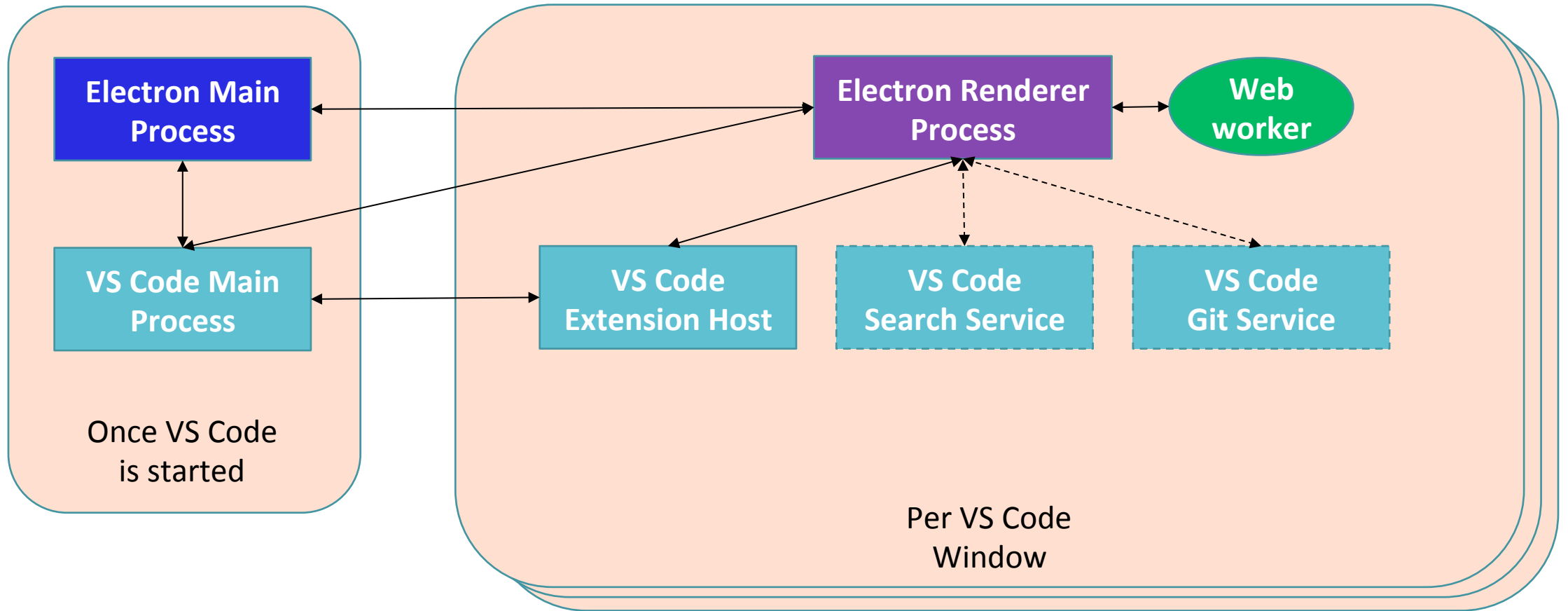
# Execution environments



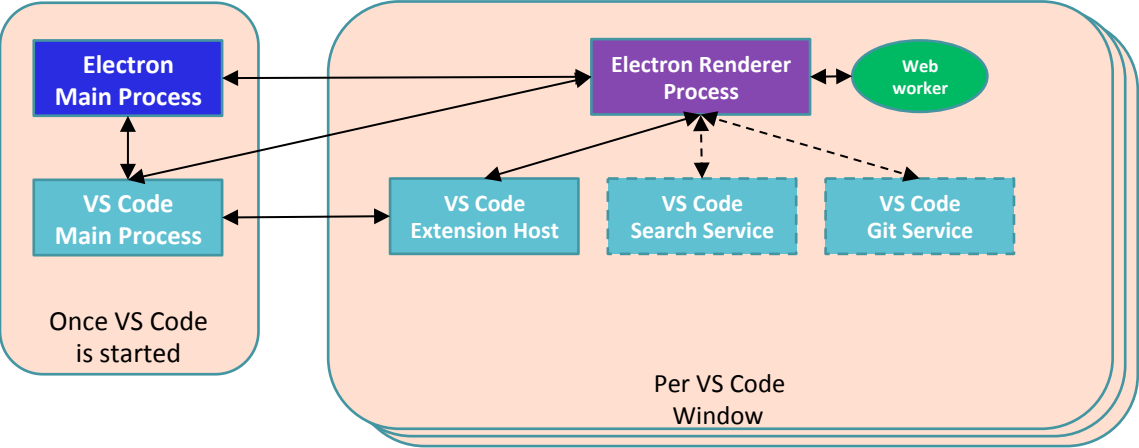
# Execution environments



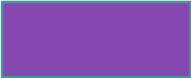




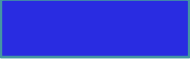


# Execution environments



# Execution environments



-  ES5 + node.js
-  ES5 + node.js + electron (main)
-  ES5 + node.js + electron (renderer) + browser
-  ES5 + web worker

	Folder path	Runtime	Allowed to depend on
	common	ES5	-
	node	ES5 + node.js	common
	browser	ES5 + browser	common
	electron-main	ES5 + node.js + electron (main)	common, node
	electron-browser	ES5 + node.js + electron (renderer) + browser	common, node, browser
	worker	ES5 + web worker	common

Demo developing vscode

# Performance: Virtual scrolling

```
2  * Implemented in TypeScript
3  * To learn more about TypeScript, please visit http://
4  */
5
6  module Conway {
7
8    export class Cell {
9      public row: number;
10     public col: number;
11     public live: boolean;
12
13     constructor(row: number, col: number, live: boolean) {
14       this.row = row;
15       this.col = col;
16       this.live = live;
17     }
18   }
19
20   export class GameOfLife {
21     private gridSize: number;
22     private canvasSize: number;
23     private lineColor: string;
24     private liveColor: string;
25     private deadColor: string;
26     private initialLifeProbability: number;
27     private animationRate: number;
28     private cellSize: number;
29     private context: CanvasRenderingContext2D;
```

```
▼ <div class="view-lines" role="presentation" aria-hidden="true" style="position: absolute; font-family: monospace; font-size: 12px; line-height: 15px; width: 796px; height: 2260px;">
  ▶ <div linenumber="2" style="top:15px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="3" style="top:30px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="4" style="top:45px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="5" style="top:60px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="6" style="top:75px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="7" style="top:90px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="8" style="top:105px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="9" style="top:120px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="10" style="top:135px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="11" style="top:150px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="12" style="top:165px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="13" style="top:180px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="14" style="top:195px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="15" style="top:210px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="16" style="top:225px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="17" style="top:240px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="18" style="top:255px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="19" style="top:270px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="20" style="top:285px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="21" style="top:300px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="22" style="top:315px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="23" style="top:330px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="24" style="top:345px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="25" style="top:360px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="26" style="top:375px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="27" style="top:390px;height:15px;" class="view-line">...</div>
  ▶ <div linenumber="28" style="top:405px;height:15px;" class="view-line">...</div>
</div>
<div class="contentWidgets"></div>
```



# Minified code: an editor's worst nightmare

# Minified code: an editor's worst nightmare

# What's in 42 lines?

3409 spans (~tokens)

[illegible]

281 spans (~tokens)

```

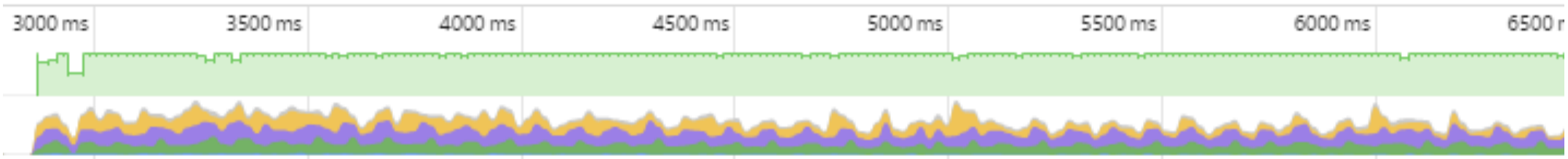
1 /*!
2  * jQuery JavaScript Library v2.2.3
3  * http://jquery.com/
4  *
5  * Includes Sizzle.js
6  * http://sizzlejs.com/
7  *
8  * Copyright jQuery Foundation and other contributors
9  * Released under the MIT license
10 * http://jquery.org/license
11 *
12 * Date: 2016-04-05T19:36:2Z
13 */
14
15 (function( global, factory ) {
16
17     if ( typeof module === "object" && typeof module.exports === "object" ) {
18         // For CommonJS and CommonJS-like environments where a proper `window`
19         // is present, execute the factory and get jQuery.
20         // For environments that do not have a `window` with a `document`
21         // (such as Node.js), expose a factory as module.exports.
22         // This accutates the need for the creation of a real `window`.
23         // e.g. var jQuery = require("jquery")(window);
24         // See ticket #14549 for more info.
25         module.exports = global.document ?
26             factory( global, true ) :
27             function( w ) {
28                 if ( !w.document ) {
29                     throw new Error( "jQuery requires a window with a document" );
30                 }
31                 return factory( w );
32             };
33     } else {
34         factory( global );
35     }
36
37 // Pass this if window is not defined yet
38 }(typeof window !== "undefined" ? window : this, function( window, noGlobal ) {
39
40 // Support: Firefox 18+
41 // Can't be in strict mode, several libs including ASP.NET trace
42 // the stack via arguments.caller.caller and Firefox dies if

```

# Get to know your tools: Scrolling Performance

The Timeline shows the big picture:

- Loading
- Scripting
- Rendering
- Painting
- Other
- Idle



But Chrome Developer Tools has a few hidden gems:



# Get to know your tools: Scrolling Performance

## Monaco Editor Debug

Template Y\_BigCSS Ballistic scroll

```
1 #wrapper .w12,#wrapper.w12{min-width:972px;width:81em}.pa{margin:0 auto;padding:0 .5em}.pa #area1,.pa #area2,.pa #area3
{float:left}.pa #subfoot{clear:both}.pa #area2,.pa #area3{margin-left:1em}.pa #page:after{clear:both;content:".";
display:block;height:0;visibility:hidden}#wrapper{padding:0 0;text-align:left;margin:0 auto}#wrapper .w1{min-width:70px;
width:5.833em}#wrapper .w2{min-width:152px;width:12.667em}#wrapper .w3{min-width:234px;width:19.5em}#wrapper .w3 .w50
{min-width:111px;width:9.25em}#wrapper .w4{min-width:316px;width:26.333em}#wrapper .w4 .w33{min-width:97px;width:8.083em}
#wrapper .w4 .ce3.w33{min-width:98px;width:8.167em}#wrapper .w5{min-width:398px;width:33.167em}#wrapper .w5 .w33
{min-width:124px;width:10.333em}#wrapper .w5 .ce2.w33,#wrapper .w5 .ce3.w33{min-width:125px;width:10.417em}#wrapper .w5
.w50{min-width:193px;width:16.083em}#wrapper .w6{min-width:480px;width:40em}#wrapper .w7{min-width:562px;width:46.833em}
#wrapper .w7 .w33{min-width:179px;width:14.917em}#wrapper .w7 .ce3.w33{min-width:180px;width:15em}#wrapper .w7 .w50
{min-width:275px;width:22.917em}#wrapper .w8{min-width:644px;width:53.667em}#wrapper .w8 .w33{min-width:206px;
width:17.167em}#wrapper .w8 .ce1.w33,#wrapper .w8 .ce3.w33{min-width:206px;width:17.167em}#wrapper .w9{min-width:726px;
width:60.5em}#wrapper .w9 .w50{min-width:357px;width:29.75em}#wrapper .w10{min-width:808px;width:67.333em}#wrapper .w10
.w33{min-width:261px;width:21.75em}#wrapper .w10 .ce3.w33{min-width:262px;width:21.833em}#wrapper .w11{min-width:890px;
width:74.167em}#wrapper .w11 .w33{min-width:288px;width:24em}#wrapper .w11 .ce2.w33,#wrapper .w11 .ce3.w33
{min-width:289px;width:24.083em}#wrapper .w11 .w50{min-width:439px;width:36.583em}#wrapper .w12{min-width:972px;
width:81em}#head{min-width:972px;background:transparent}#nav{min-width:972px;background:transparent}#content
{background: #fff}#foot{min-width:972px;background:transparent}.wings{background-color: #009ad9;min-width:81em;width:100%
#nav .wings{height:1.667em}#doublerownav .wings{height:3.75em}body{color: #333;font-family:arial,sans-serif;font-size:75%;
line-height:1.33em;margin:0;padding:0;text-align:center}a.more,div.br *,.cotb *,.coss *{font-family:arial,sans-serif}
@media print{form,object{display:none}}a,a:link,a:visited{color: #333;text-decoration:none}a:hover,a: hover span
{color: #000;text-decoration:underline}a img{border:none}input,select,textarea{font-size:15px;line-height:normal}big,
div.h2,div.h3,h1,h2,h3,h4,h5,h6,small{font-family:arial,sans-serif;font-size:100%;margin:0;padding:0}.cf:after,ul.cf
li:after,.ro:after{clear:both;content:".";display:block;height:0;visibility:hidden}.none{display:none}#area1 .ro .co,
#area2 .ro .co{margin:.667em}body.ukhp{background: #deded url(../i/9e/d11d472df557c51b75b9f0b27752e0.gif) repeat-x
center top}#page{background-color: #fff;min-width:972px;background:transparent}#wrapper .msnfoot1{margin:0}#area2 .ro .w4
.co3b2 .br2{min-width:100px;width:8.333em}#wrapper .actfeed1 .ac-head,#wrapper .actfeed1 .ac-status{border-color: #e2f1d4}
.headerbar1 .websearch2 .opt,.headerbar1 .websearch2 .opt span,.headerbar1 .websearch2 label{color: #fff}.headerbar1
.websearch2 .scopes span{color: #c1c1c1}#wrapper .searchbar3{padding:5px 0}.ebay1 .simple8 input.image{float:right;
margin-top:0}.headerbar3 .websearch2 input.text{width:322px}#head:after,#page:after,#foot:after{clear:both;content:".";
display:block;height:0;visibility:hidden}#area1 .co,#area2 .co,#wrapper #area1 .cogr,#wrapper #area2 .cogr{margin:.667em}
#wrapper.w12,#head.w12,#foot.w12,#nav.w12,#page.w12{width:81.667em;min-width:980px}#subhead.w12{width:81em;
min-width:972px}#foot.w12{background-color: #fff}body.cogba{background: #deded url
```

# A few translate3d's later...

## Monaco Editor Debug

```
Template Y_BigCSS Ballistic scroll
1 #wrapper .w12,#wrapper.w12{min-width:972px;width:81em}.pa{margin:0 auto;padding:0 .5em}.pa #area1,.pa #area2,.pa #area3
{float:left}.pa #subfoot{clear:both}.pa #area2,.pa #area3{margin-left:1em}.pa #page:after{clear:both;content:".";
display:block;height:0;visibility:hidden}#wrapper{padding:0 0;text-align:left;margin:0 auto}#wrapper .w1{min-width:70px;
width:5.833em}#wrapper .w2{min-width:152px;width:12.667em}#wrapper .w3{min-width:234px;width:19.5em}#wrapper .w3 .w50
{min-width:111px;width:9.25em}#wrapper .w4{min-width:316px;width:26.333em}#wrapper .w4 .w33{min-width:97px;width:8.083em}
#wrapper .w4 .ce3.w33{min-width:98px;width:8.167em}#wrapper .w5{min-width:398px;width:33.167em}#wrapper .w5 .w33
{min-width:124px;width:10.333em}#wrapper .w5 .ce2.w33,#wrapper .w5 .ce3.w33{min-width:125px;width:10.417em}#wrapper .w5
.w50{min-width:193px;width:16.083em}#wrapper .w6{min-width:480px;width:40em}#wrapper .w7{min-width:562px;width:46.833em}
#wrapper .w7 .w33{min-width:179px;width:14.917em}#wrapper .w7 .ce3.w33{min-width:180px;width:15em}#wrapper .w7 .w50
{min-width:275px;width:22.917em}#wrapper .w8{min-width:644px;width:53.667em}#wrapper .w8 .w33{min-width:206px;
width:17.167em}#wrapper .w8 .ce1.w33,#wrapper .w8 .ce3.w33{min-width:206px;width:17.167em}#wrapper .w9{min-width:726px;
width:60.5em}#wrapper .w9 .w50{min-width:357px;width:29.75em}#wrapper .w10{min-width:808px;width:67.333em}#wrapper .w10
.w33{min-width:261px;width:21.75em}#wrapper .w10 .ce3.w33{min-width:262px;width:21.833em}#wrapper .w11{min-width:890px;
width:74.167em}#wrapper .w11 .w33{min-width:288px;width:24em}#wrapper .w11 .ce2.w33,#wrapper .w11 .ce3.w33
{min-width:289px;width:24.083em}#wrapper .w11 .w50{min-width:439px;width:36.583em}#wrapper .w12{min-width:972px;
width:81em}#head{min-width:972px;background:transparent}#nav{min-width:972px;background:transparent}#content
{background:#fff}#foot{min-width:972px;background:transparent}.wings{background-color:#009ad9;min-width:81em;width:100%
}#nav .wings{height:1.667em}#doublerownav .wings{height:3.75em}body{color:#333;font-family:arial,sans-serif;font-size:75%;
line-height:1.33em;margin:0;padding:0;text-align:center}.a.more,.div.br *,.cotb *,.coss *(font-family:arial,sans-serif)
@media print{form,object{display:none}}a,a:link,a:visited{color:#333;text-decoration:none}a:hover,a:hover span
{color:#000;text-decoration:underline}a img{border:none}input,select,textarea{font-size:15px;line-height:normal}big,
div.h2,div.h3,h1,h2,h3,h4,h5,h6,small{font-family:arial,sans-serif;font-size:100%;margin:0;padding:0}.cf:after,ul.cf
li:after,.ro:after{clear:both;content:".";display:block;height:0;visibility:hidden}.none{display:none}#area1 .ro .co,
#area2 .ro .co{margin:.667em}body.ukhp{background:#deded url(../i/9e/d11d472df557c51b75b9f0b27752e0.gif) repeat-x
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.co3b2 .br2{min-width:100px;width:8.333em}#wrapper .actfeed1 .ac-head,#wrapper .actfeed1 .ac-status{border-color:#e2f1d4}
.headerbar1 .websearch2 .opt,.headerbar1 .websearch2 .opt span,.headerbar1 .websearch2 label{color:#fff}.headerbar1
.websearch2 .scopes span{color:#c1c1c1}#wrapper .searchbar3{padding:5px 0}.ebay1 .simple8 input.image{float:right;
margin-top:0}.headerbar3 .websearch2 input.text{width:322px}#head:after,#page:after,#foot:after{clear:both;content:".";
display:block;height:0;visibility:hidden}#area1 .co,#area2 .co,#wrapper #area1 .cogr,#wrapper #area2 .cogr{margin:.667em}
#wrapper.w12,#head.w12,#foot.w12,#nav.w12,#page.w12{width:81.667em;min-width:980px}#subhead.w12{width:81em;
min-width:972px}#foot.w12{background-color:#fff}body.cogb{background:#deded url
```

BEFORE

BEFORE

AFTER



## Monaco Editor Debug

```
Template Y_BigCSS Ballistic scroll
1 #wrapper .w12,#wrapper.w12{min-width:972px;width:81em}.pa{margin:0 auto;padding:0 .5em}.pa #area1,.pa #area2,.pa #area3
{float:left}.pa #subfoot{clear:both}.pa #area2,.pa #area3{margin-left:1em}.pa #page:after{clear:both;content:".";
display:block;height:0;visibility:hidden}#wrapper{padding:0 0;text-align:left;margin:0 auto}#wrapper .w1{min-width:70px;
width:5.833em}#wrapper .w2{min-width:152px;width:12.667em}#wrapper .w3{min-width:234px;width:19.5em}#wrapper .w3 .w50
{min-width:111px;width:9.25em}#wrapper .w4{min-width:316px;width:26.333em}#wrapper .w4 .w33{min-width:97px;width:8.083em}
#wrapper .w4 .ce3.w33{min-width:98px;width:8.167em}#wrapper .w5{min-width:398px;width:33.167em}#wrapper .w5 .w33
{min-width:124px;width:10.333em}#wrapper .w5 .ce2.w33,#wrapper .w5 .ce3.w33{min-width:125px;width:10.417em}#wrapper .w5
.w50{min-width:193px;width:16.083em}#wrapper .w6{min-width:480px;width:40em}#wrapper .w7{min-width:562px;width:46.833em}
#wrapper .w7 .w33{min-width:179px;width:14.917em}#wrapper .w7 .ce3.w33{min-width:180px;width:15em}#wrapper .w7 .w50
{min-width:275px;width:22.917em}#wrapper .w8{min-width:644px;width:53.667em}#wrapper .w8 .w33{min-width:206px;
width:17.167em}#wrapper .w8 .ce1.w33,#wrapper .w8 .ce3.w33{min-width:206px;width:17.167em}#wrapper .w9{min-width:726px;
width:60.5em}#wrapper .w9 .w50{min-width:357px;width:29.75em}#wrapper .w10{min-width:808px;width:67.333em}#wrapper .w10
.w33{min-width:261px;width:21.75em}#wrapper .w10 .ce3.w33{min-width:262px;width:21.833em}#wrapper .w11{min-width:890px;
width:74.167em}#wrapper .w11 .w33{min-width:288px;width:24em}#wrapper .w11 .ce2.w33,#wrapper .w11 .ce3.w33
{min-width:289px;width:24.083em}#wrapper .w11 .w50{min-width:439px;width:36.583em}#wrapper .w12{min-width:972px;
width:81em}#head{min-width:972px;background:transparent}#nav{min-width:972px;background:transparent}#content
{background:#fff}#foot{min-width:972px;background:transparent}.wings{background-color:#009ad9;min-width:81em;width:100%
}#nav .wings{height:1.667em}#doublerownav .wings{height:3.75em}body{color:#333;font-family:arial,sans-serif;font-size:75%;
line-height:1.33em;margin:0;padding:0;text-align:center}.a.more,.div.br *,.cotb *,.coss *(font-family:arial,sans-serif)
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{color:#000;text-decoration:underline}a img{border:none}input,select,textarea{font-size:15px;line-height:normal}big,
div.h2,div.h3,h1,h2,h3,h4,h5,h6,small{font-family:arial,sans-serif;font-size:100%;margin:0;padding:0}.cf:after,ul.cf
li:after,.ro:after{clear:both;content:".";display:block;height:0;visibility:hidden}.none{display:none}#area1 .ro .co,
#area2 .ro .co{margin:.667em}body.ukhp{background:#deded url(../i/9e/d11d472df557c51b75b9f0b27752e0.gif) repeat-x
center top}#page{background-color:#fff;min-width:972px;background:transparent}#wrapper .msnfoot1{margin:0}#area2 .ro .w4
.co3b2 .br2{min-width:100px;width:8.333em}#wrapper .actfeed1 .ac-head,#wrapper .actfeed1 .ac-status{border-color:#e2f1d4}
.headerbar1 .websearch2 .opt,.headerbar1 .websearch2 .opt span,.headerbar1 .websearch2 label{color:#fff}.headerbar1
.websearch2 .scopes span{color:#c1c1c1}#wrapper .searchbar3{padding:5px 0}.ebay1 .simple8 input.image{float:right;
margin-top:0}.headerbar3 .websearch2 input.text{width:322px}#head:after,#page:after,#foot:after{clear:both;content:".";
display:block;height:0;visibility:hidden}#area1 .co,#area2 .co,#wrapper #area1 .cogr,#wrapper #area2 .cogr{margin:.667em}
#wrapper.w12,#head.w12,#foot.w12,#nav.w12,#page.w12{width:81.667em;min-width:980px}#subhead.w12{width:81em;
min-width:972px}#foot.w12{background-color:#fff}body.cogb{background:#deded url
```

AFTER

- Loading
- Scripting
- Rendering
- Painting
- Other
- Idle

# Resources

VS Code <https://github.com/Microsoft/vscode>

TypeScript <https://www.typescriptlang.org/>

Electron <http://electron.atom.io/>

gulp-tsb <https://github.com/jriecken/gulp-tsb>

Twitter [@code](#)