

Онлайн-IDE: как и зачем?



Ольга Лесникова



Voximplant frontend dev



<https://github.com/Geloosa>

ODE* (онлайн-IDE, веб-IDE) - IDE, которую можно запустить в браузере.

~~Linus Torvalds~~

*Online development environment

Кому нужна ODE?

- SaaS*-проекты для работы с кодом

*Software as a service

Кому нужна ODE?

- SaaS*-проекты для работы с кодом
 - онлайн-REPL

*Software as a service

Кому нужна ODE?

- SaaS*-проекты для работы с кодом
 - онлайн-REPL
 - хостинги кода

*Software as a service

Кому нужна ODE?

- SaaS*-проекты для работы с кодом
 - онлайн-REPL
 - хостинги кода
 - обучение программированию

*Software as a service

Кому нужна ODE?

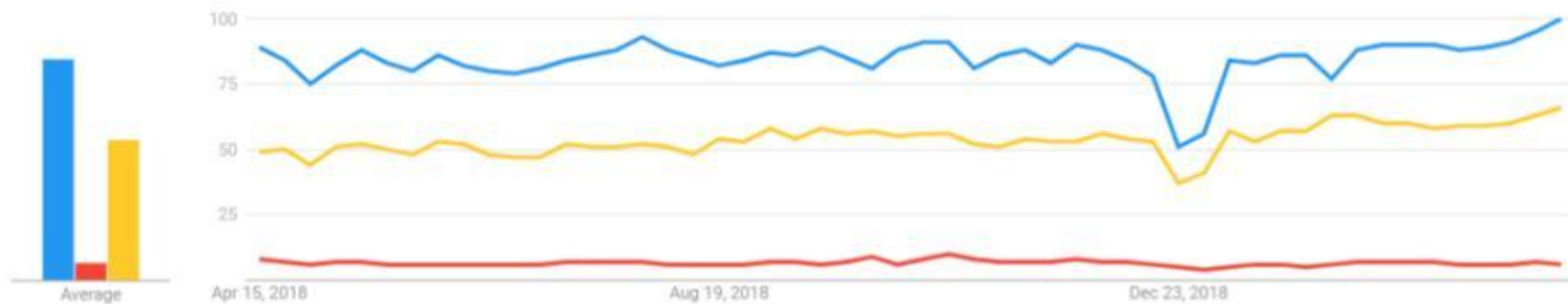
- SaaS*-проекты для работы с кодом
 - онлайн-REPL
 - хостинги кода
 - обучение программированию
 - облачные IDE

*Software as a service

● IntelliJ IDEA

● Cloud9 IDE

● Visual Studio Code



Кому нужна ODE?

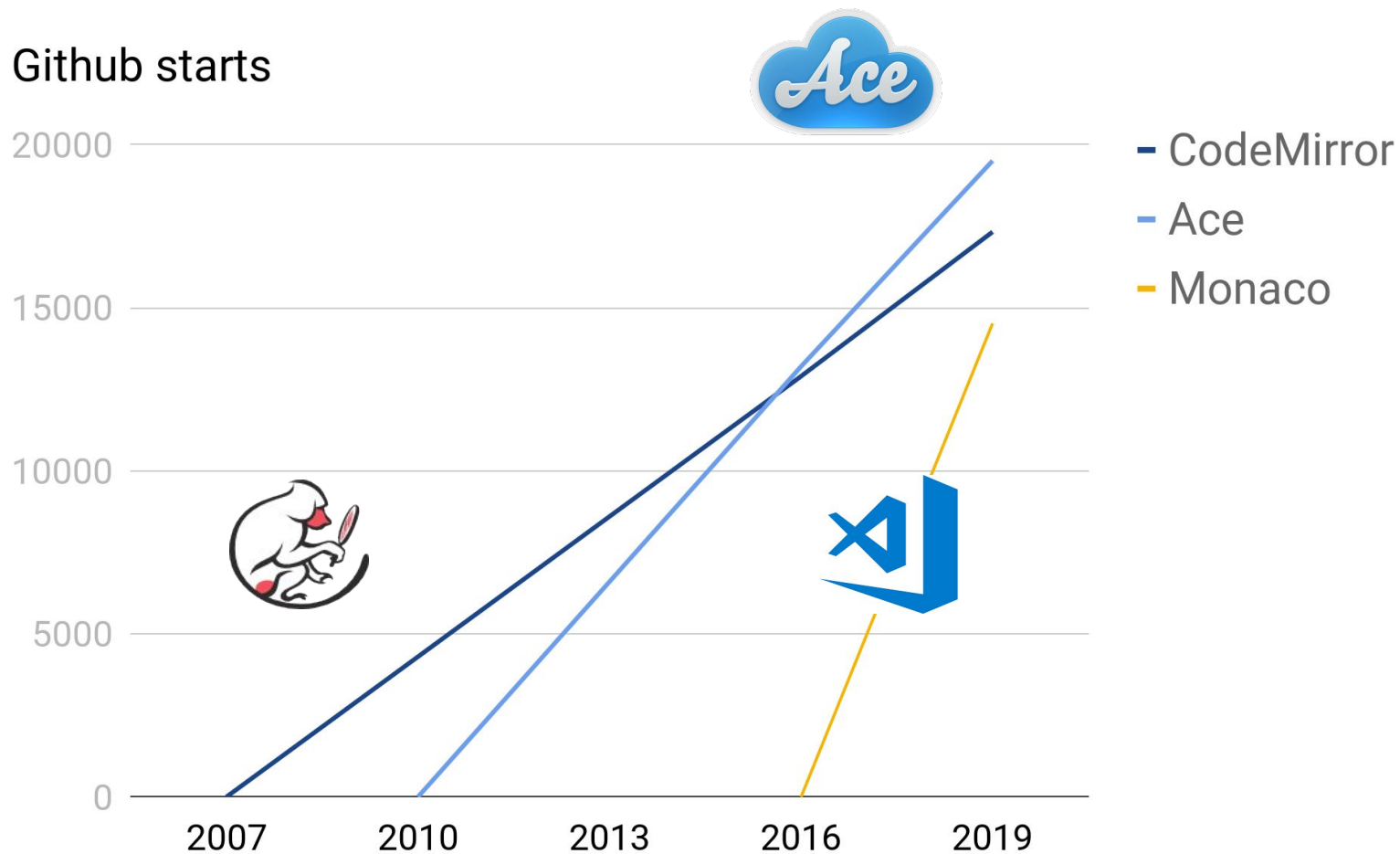
- SaaS-проекты для работы с кодом
 - онлайн-REPL
 - хостинги кода
 - обучение программированию
 - облачные IDE
- PaaS*-проекты

*Platform as a service



Какую библиотеку
использовать?

Github starts



CodeMirror

Ace

Monaco



3.5+

3.0+

4.0+



8.0+

8.0+

11.0+



4.0+

5.2+

?



11.5+

9.2+

15.0+

Поддержка языков

CodeMirror

>100

Ace

>120

Monaco

>20

+ к вашему толстому клиенту

CodeMirror

Ace

Monaco

+165 KiB

+12.4 MiB

+2.58 MiB

+5.2 MiB воркеров

+ к вашему толстому клиенту

CodeMirror

Ace

Monaco

+165 KiB

+12.4 MiB

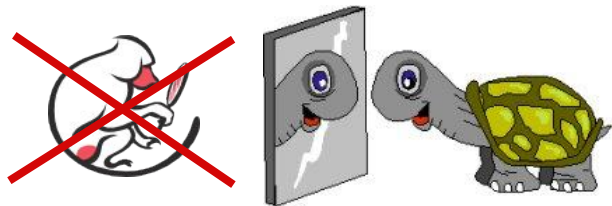
+2.58 MiB



+~10 MiB

+5.2 MiB воркеров

CodeMirror



Monaco



Service workers

\m/

Ace



Service workers

\m/



*Hey guys! We have a bug report here.
And a feature request by the way.*





*Hey guys! We have a bug report here.
And a feature request by the way.*





*Hey guys! We have a bug report here.
And a feature request by the way.*

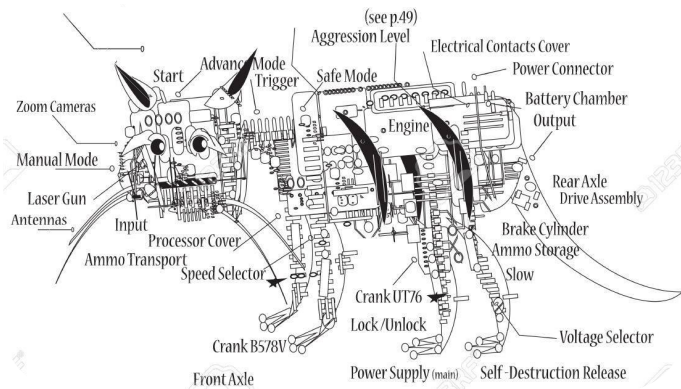




*Hey guys! We have a bug report here.
And a feature request by the way.*

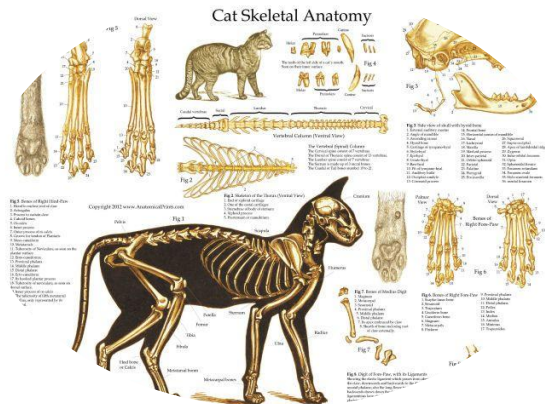






Проще, быстрее, надежнее

Проще:



Быстрее: full-featured by default

Надежнее:



Что умеет ODE в 2019-м?

- подсветка и **проверка синтаксиса**, темы
- сворачивание строк, отступы
- горячие клавиши
- подсказки и автокомплит
- **CodeLens**
- продвинутый поиск по коду
- **инструменты рефакторинга** и форматирования
- дифф-режим и инструмент для мержа
- **minimap** и **маркеры на скролле**
- API для реализации табов и сплит-режима
- API для дебагера

Monaco Editor



```
npm i -S monaco-editor  
npm i -D monaco-editor-webpack-plugin
```

```
// webpack.config.js  
const MonacoWebpackPlugin =  
require('monaco-editor-webpack-plugin');  
  
module.exports = {  
  // ...  
  plugins: [  
    // ...  
    new MonacoWebpackPlugin()  
  ]  
};
```



```
// webpack.config.js
const MonacoWebpackPlugin =
require('monaco-editor-webpack-plugin');

module.exports = {
  // ...
  plugins: [
    // ...
    new MonacoWebpackPlugin({
      // папка, куда собирать скрипты воркеров
      output: '',
      languages: ['markdown'],
      features: ['format', 'contextmenu']
    })
  ]
};
```



4:59



4:59

```
<!-- OR ANY OTHER AMD LOADER HERE INSTEAD OF loader.js -->
<script src="../../node_modules/monaco-editor/min/vs/loader.js"></script>
<script>
    require.config({
        paths: { 'vs': '../node_modules/monaco-editor/min/vs' }
    });
</script>
```


<https://github.com/Microsoft/monaco-editor-samples>

📁 .vscode	Initial version
📁 browser-amd-diff-editor	Reorganize, add webpack sample
📁 browser-amd-editor	added title
📁 browser-amd-iframe	Reorganize, add webpack sample
📁 browser-amd-localized	Reorganize, add webpack sample
📁 browser-amd-monarch	Reorganize, add webpack sample
📁 browser-amd-requirejs	Add requirejs sample
📁 browser-amd-shared-model	Reorganize, add webpack sample
📁 browser-esm-parcel	Improve parcel sample
📁 browser-esm-webpack-small	Update deps
📁 browser-esm-webpack	Update deps
📁 browser-script-editor	Reorganize, add webpack sample
📁 browser-undo-redo-controls	Add undo redo example
📁 electron-amd	The sample should be javascript
📁 nwjs-amd-v2	Reorganize, add webpack sample
📁 nwjs-amd	Reorganize, add webpack sample



```
// html, шаблон или функция для рендера  
<div ref='editor' class='editor'></div>
```

```
// в файле компонента или теге script
```

```
<script>
```

```
import {editor} from 'monaco-editor';
```

```
export default class Monaco extends Vue {  
  private editor = null;
```

```
  mounted() {
```

```
    this.editor = editor.create(this.$refs.editor);
```

```
  }
```

```
}
```

```
</script>
```



3:59

```
const config = {  
  value: `function hello() {alert('Hello panda!');}`,  
  language: 'javascript',  
  theme: 'vs-dark',  
  wordWrap: 'on'  
};
```



3:59

```
this.editor = editor.create(this.$refs.editor, config);
```

```
fetch(`/path/my-file.js`)  
  .then(resp => this.editor.setValue(resp.text()))  
  .catch(() => {});
```

```
1  /* Game of Life
2   * Implemented in TypeScript
3   * To learn more about TypeScript, please visit http://www.typescriptlang.org/
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;
```



3:00

Go to Definition	Ctrl+F12
Peek Definition	Alt+F12
Find All References	Shift+F12
Go to Symbol...	Ctrl+Shift+O
<hr/>	
Change All Occurrences	Ctrl+F2
Format Document	Shift+Alt+F
Format Selection	Ctrl+K Ctrl+F
Show diff	Ctrl+Shift+D
<hr/>	
Cut	
Copy	
<hr/>	
Command Palette	F1

Add Cursor Above	Ctrl+Alt+UpArrow
Add Cursor Below	Ctrl+Alt+DownArrow
Add Cursors to Line Ends	Shift+Alt+I
Add Line Comment	Ctrl+K Ctrl+C
Add Selection To Next Find Match	Ctrl+D
Add Selection To Previous Find Match	
Change All Occurrences	Ctrl+F2
Command Palette	F1
Copy	
Copy Line Down	Shift+Alt+DownArrow
Copy Line Up	Shift+Alt+UpArrow
Copy With Syntax Highlighting	



```
// interface Tab {  
//     id: number  
//     model: editor.ITextModel | null  
//     initialValue: string  
//     value: string  
//     active: boolean  
// }
```

```
private switchTab(tabId) {  
    this.tabs = this.tabs.map(tab => ({  
        ...tab,  
        active: tab.id === tabId,  
        model: tab.active ? this.editor.getModel() : tab.model  
    }));  
    this.editor.setModel(  
        this.tabs.find(tab => tab.active).model  
    );  
    this.editor.focus();  
}
```



2:59

```
// interface File {  
//     id: number  
//     name: string  
//     script: string  
//     lang: string  
// }
```

```
private openFile(file) {  
    const model = editor.createModel(file.script, file.lang);  
  
    this.addTab(file); // some street magic  
    this.editor.setModel(model);  
    this.editor.focus();  
}
```



2:59

callsrv x incoming-call x outgoing-call * x

Shared

11

12

13

14

15

16

17

2

3

7

8

callsrv

fd

incoming-call

outcoming-call

video-conf

1

require(Modules.ASR);

2

3

VoxEngine.addListener(AppEvents.CallAlerting, e => {

4

e.call.startEarlyMedia();

5

e.call.say("To be, or not to be--that is the question: Whether 'tis nobler in the mind to suffer The slings and arrows of outrageous fortune Or to take arms against a sea of troubles And by opposing end them. To die, to sleep-- No more--and by a sleep to say we end The heartache, and the thousand natural shocks That flesh is heir to. 'Tis a consummation Devoutly to be wished. To die, to sleep-- To sleep--perchance to dream: ay, there's the rub, For in that sleep of death what dreams may come When we have shuffled off this mortal coil, Must give us pause. There's the respect That makes calamity of so long life.", Language.US_ENGLISH_FEMALE);

6

e.call.record({transcribe: true, language: ASRLanguage.ENGLISH_US});

7

});

2:00

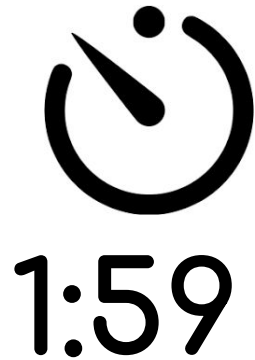
Строка 7, колонка 4


```
<div ref='diffEditor' class='popup'  
  v-if='diffEditor.getModel() !== null'></div>
```

```
mounted() {  
  this.diffEditor = editor.createDiffEditor(  
    this.$refs.'diffEditor'  
  );  
}
```

```
private showDiff(tab) {  
  this.diffEditor.setModel({  
    original: editor.createModel(tab.initialValue),  
    modified: editor.createModel(tab.value)  
  });  
}
```

```
private closeDiff() { this.diffEditor.setModel(null); }
```



☐ Inline diff

```
1 /*
2  @ Microsoft. All rights reserved.
3
4  This library is supported for use in Windows T
5
6  Build: 6.2.8100.0
7  Version: 0.5
8 */
9
```

```
10 (function (global, undefined) {
11     "use strict";
12-   undefinedVariable = {};
13-   undefinedVariable.prop = 5;
14
15     function initializeProperties(target, member
16         var keys = Object.keys(members);
17         var properties;
18         var i, len;
```

```
1 /*
2  @ Microsoft. All rights reserved.
3
4  This library is supported for use in Windows T
5
6  Build: 6.2.8100.0
7  Version: 0.5
8 */
9
```

```
10+// Here are some inserted lines
11+// with some extra comments
12+
```

```
13 (function (global, undefined) {
14     "use strict";
15+   var definedVariable = {};
16+   definedVariable.prop = 5;
17
18     function initializeProperties(target, member
19         var keys = Object.keys(members);
20         var properties;
21         var i, len;
```



1:00

```
this.diffEditor.updateOptions({renderSideBySide: true});
```



1:00

```
1 1 /*
2 2   @ Microsoft. All rights reserved.
3 3
4 4   This library is supported for use in Windows Tailored Apps only.
5 5
6 6   Build: 6.2.8100.0
7 7   Version: 0.5
8 8 */
9 9
10+ 10+// Here are some inserted lines
11+ 11+// with some extra comments
12+
10 13 (function (global, undefined) {
11 14     "use strict";
12 15     undefinedVariable = {};
13 16     undefinedVariable.prop = 5;
14 17
15+ 15+    var definedVariable = {};
16+ 16+    definedVariable.prop = 5;
17 17
18 18     function initializeProperties(target, members) {
19 19         var keys = Object.keys(members);
```

[outcoming-call]

incoming-call

[callsrv]

[13]

[17]

[video-conf]

▼ Watch 1



response: <not defined>



▼ Call stack

Empty call stack

▼ Breakpoints 2

outcoming-call:2

const numberToCall = "+7926175781"



outcoming-call:5

out.addEventListener(CallEvents.C



All scripts are readonly in debug mode.



```
1  VoxEngine.addEventListener(AppEvents.Started, (e) => {
2      const numberToCall = "+71234567890";
3      const confirmedCallerId = "+1234567890";
4      const out = VoxEngine.callPSTN(numberToCall, confirmedCallerId);
5      out.addEventListener(CallEvents.Connected, () => {
6          out.say("New blood joins this earth And quickly he's subdued Through constant pain disgrace The
              young boy learns their rules.", Language.US_ENGLISH_FEMALE);
7      });
8
9      out.addEventListener(CallEvents.Disconnected, VoxEngine.terminate);
10 });
```

Line 6, column 1

Connected to server. Waiting for a call session to start.

Debug console



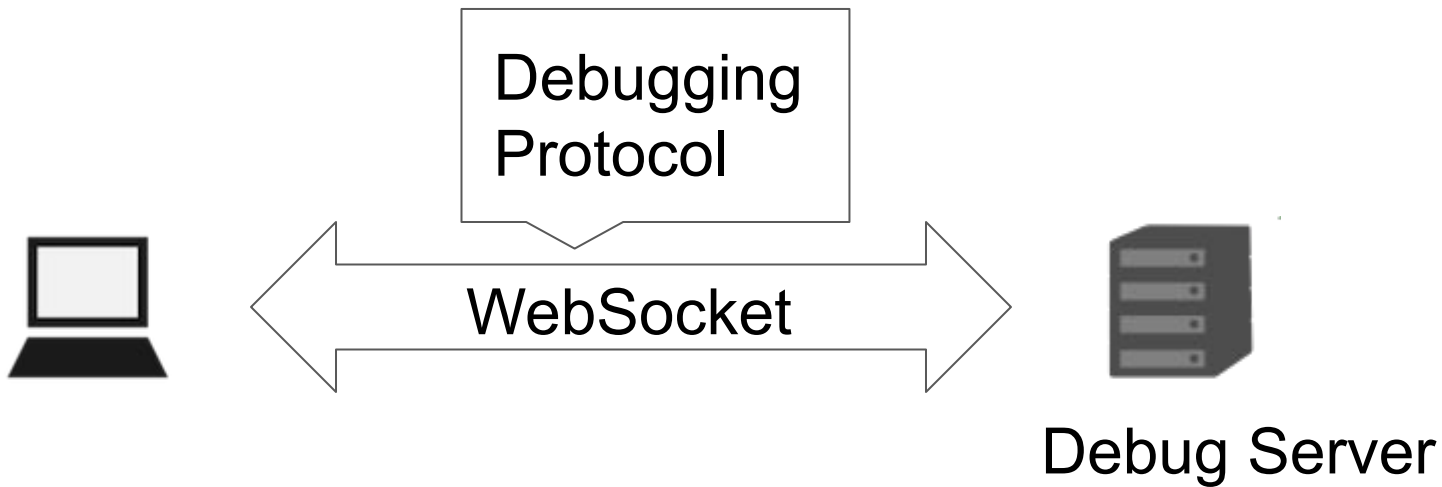
```
import {editor, Range} from 'monaco-editor';

private breakpointDecorations = []; // string[]

private renderBreakpoints(newPoints, oldPoints) {
  const newDecorations = newPoints.map(line => ({
    range: new Range(line, 1, line, 1),
    options: {
      isWholeLine: true,
      className: 'breakpoint-line',
      glyphMarginClassName: 'breakpoint'
    }
  }));

  this.breakpointDecorations = this.editor.deltaDecorations(
    this.breakpointDecorations, newDecorations
  );
}
```





Quit debugger



```
callsrv  outcoming-call  [video-conf]
1  require("conference");
2
3  let conf;
4  let partsCounter = 0;
5
6  const checkForTermination = () => {
7    if (partsCounter === 0) {
8      conf.stop();
9      conf = null;
10   }
11 };
12
13 trace(partsCounter);
14
15 VoxEngine.addEventListener(AppEvents.Started, () => {
16   conf = VoxEngine.createConference({hd_audio: true});
17
18   conf.addEventListener(ConferenceEvents.Stopped, () => {
19     Logger.write('Conference was stopped!');
20     VoxEngine.terminate();
21   });
22
23   conf.addEventListener(ConferenceEvents.Started, (e) => {
24     Logger.write(`Conference started ID: ${e.conference.getId()}`);
25   });
26 });
27
28 VoxEngine.addEventListener(AppEvents.CallAlerting, (e) => {
29   e.call.addEventListener(CallEvents.Disconnected, () => {
```

Line 33, column 1

Scenario execution is paused.

Debug console

partsCounter
0

>

Watch 2

- conf: undefined
- checkForTermination: Function
checkForTermination()
name: "checkForTermination"
- Call stack
 - video-conf:16
 - Breakpoints 4
 - video-conf:33
setTimeout(checkForTerminatio
 - video-conf:3
let conf;
 - video-conf:4
let partsCounter = 0;
 - video-conf:16
conf = VoxEngine.createConference



Ложечка дегтя в Монасо

- глючат стили в некоторых местах

Ложечка дегтя в Monaco

- глючат стили в некоторых местах
- не у всех параметров есть описание в доке

Ложечка дегтя в Monaco

- глючат стили в некоторых местах
- не у всех параметров есть описание в доке
- **не все из дефолтной комплектации можно выключить**

Ложечка дегтя в Monaco

- глючат стили в некоторых местах
- не у всех параметров есть описание в доке
- не все из дефолтной комплектации можно выключить
- смешение глобальных и локальных настроек

- смешение глобальных и локальных настроек

```
const editor1 = monaco.editor.create(  
  document.getElementById("editor1"),  
  {language: 'javascript', theme: 'vs-dark'}  
);
```

//тема изменится у editor1 и editor2

```
const editor2 = monaco.editor.create(  
  document.getElementById("editor2"),  
  {language: 'javascript', theme: 'vs'}  
);
```

```
1 VoxEngine.forwardCallToUser((call1, call2) => {  
2   call1.record();  
3   call2.record({ video: true });  
4 }, true);  
5
```

➤ смешение глобальных и локальных настроек

Line 3, column 8

video-conf x

```
1 require("conference");  
2  
3 let conf;  
4 let partsCounter = 0;  
5  
6 const checkForTermination = () => {  
7   if (partsCounter === 0) {  
8     conf.stop();  
9     conf = null;  
10  }  
11 };  
12  
13 trace(partsCounter);  
14  
15 VoxEngine.addListener(AppEvents.Started, () => {  
16   conf = VoxEngine.createConference({hd_audio: true});  
17  
18   conf.addListener(ConferenceEvents.Stopped, () => {  
19     Logger.write('Conference was stopped!');  
20   });  
21 });
```

Line 9, column 17

Ложечка дегтя в Monaco

- глючат стили в некоторых местах
- не у всех параметров есть описание в доке
- не все из дефолтной комплектации можно выключить
- смешение глобальных и локальных настроек
- для подсказок и автокомплита в небраузерных языках нужен сервер или воркер + asm

Custom languages

```
JavaScript CSS HTML ▶ Run
1 // Register a new language
2 monaco.languages.register({ id: 'mySpecialLanguage' });
3
4 // Register a tokens provider for the language
5 monaco.languages.setMonarchTokensProvider('mySpecialLanguage', {
6   tokenizer: {
7     root: [
8       [/\[error.*/, "custom-error"],
9       [/\[notice.*/, "custom-notice"],
10      [/\[info.*/, "custom-info"],
11      [/\[a-zA-Z 0-9:]+\]/, "custom-date"],
12     ]
13   }
14 });
15
16 // Define a new theme that contains only rules that match this language
17 monaco.editor.defineTheme('myCoolTheme', {
18   base: 'vs',
19   inherit: false,
20   rules: [
21     { token: 'custom-info', foreground: '808080' },
22     { token: 'custom-error', foreground: 'ff0000', fontStyle: 'bold' },
23     { token: 'custom-notice', foreground: 'FFA500' },
24     { token: 'custom-date', foreground: '008080' },
25   ]
26 });
27
28 // Register a completion item provider for the new language
29 monaco.languages.registerCompletionItemProvider('mySpecialLanguage', {
30   provideCompletionItems: () => {
31     var suggestions = [{
32       label: 'simpleText',
33       kind: monaco.languages.CompletionItemKind.Text,
34       insertText: 'simpleText'
35     }];
36   }
37 });
```

```
1 [Sun Mar 7 16:02:00 2004] [notice] Apache/1.3.29 (Unix) configured --
2 [Sun Mar 7 16:02:00 2004] [info] Server built: Feb 27 2004 13:56:37
3 [Sun Mar 7 16:02:00 2004] [notice] Accept mutex: sysvsem (Default: sy
4 [Sun Mar 7 16:05:49 2004] [info] [client xx.xx.xx.xx] (104)Connectio
5 [Sun Mar 7 16:45:56 2004] [info] [client xx.xx.xx.xx] (104)Connectio
6 [Sun Mar 7 17:13:50 2004] [info] [client xx.xx.xx.xx] (104)Connectio
7 [Sun Mar 7 17:21:44 2004] [info] [client xx.xx.xx.xx] (104)Connectio
8 [Sun Mar 7 17:23:53 2004] statistics: Use of uninitialized value in c
9 [Sun Mar 7 17:23:53 2004] statistics: Can't create file /home/httpd/
10 [Sun Mar 7 17:27:37 2004] [info] [client xx.xx.xx.xx] (104)Connectio
11 [Sun Mar 7 17:31:39 2004] [info] [client xx.xx.xx.xx] (104)Connectio
12 [Sun Mar 7 17:58:00 2004] [info] [client xx.xx.xx.xx] (104)Connectio
13 [Sun Mar 7 18:00:09 2004] [info] [client xx.xx.xx.xx] (104)Connectio
14 [Sun Mar 7 18:10:09 2004] [info] [client xx.xx.xx.xx] (104)Connectio
15 [Sun Mar 7 18:19:01 2004] [info] [client xx.xx.xx.xx] (104)Connectio
16 [Sun Mar 7 18:42:29 2004] [info] [client xx.xx.xx.xx] (104)Connectio
17 [Sun Mar 7 18:52:30 2004] [info] [client xx.xx.xx.xx] (104)Connectio
18 [Sun Mar 7 18:58:52 2004] [info] [client xx.xx.xx.xx] (104)Connectio
19 [Sun Mar 7 19:03:58 2004] [info] [client xx.xx.xx.xx] (104)Connectio
20 [Sun Mar 7 19:08:55 2004] [info] [client xx.xx.xx.xx] (104)Connectio
21 [Sun Mar 7 20:04:35 2004] [info] [client xx.xx.xx.xx] (104)Connectio
22 [Sun Mar 7 20:11:33 2004] [info] [client xx.xx.xx.xx] (104)Connectio
23 [Sun Mar 7 20:12:55 2004] [info] [client xx.xx.xx.xx] (104)Connectio
24 [Sun Mar 7 20:25:31 2004] [info] [client xx.xx.xx.xx] (104)Connectio
25 [Sun Mar 7 20:44:48 2004] [info] [client xx.xx.xx.xx] (104)Connectio
26 [Sun Mar 7 20:58:27 2004] [info] [client xx.xx.xx.xx] (104)Connectio
27 [Sun Mar 7 21:16:17 2004] [error] [client xx.xx.xx.xx] File does not
28 [Sun Mar 7 21:20:14 2004] [info] [client xx.xx.xx.xx] (104)Connectio
29 [Sun Mar 7 21:31:12 2004] [info] [client xx.xx.xx.xx] (104)Connectio
30 [Sun Mar 7 21:39:55 2004] [info] [client xx.xx.xx.xx] (104)Connectio
31 [Sun Mar 7 21:44:10 2004] [info] [client xx.xx.xx.xx] (104)Connectio
32 [Mon Mar 8 01:35:13 2004] [info] [client xx.xx.xx.xx] (104)Connectio
33 [Mon Mar 8 01:47:06 2004] [info] [client xx.xx.xx.xx] (104)Connectio
34 [Mon Mar 8 01:59:13 2004] [info] [client xx.xx.xx.xx] (104)Connectio
```



< The end />



olesnikova@voximplant.com