

JAVASCRIPT/WEB TOOLING NOW AND TOMORROW

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aka.ms/js-web-tooling



**THE WEB
DEBUGGING
JOURNEY
HAS BEEN
ROUGH...**

alert()

document.write()

**Windows script debugger/Microsoft
Script Editor (Douglas Crockford only)**

Firebug

Developer Tools in browsers

**WE'RE
IN GOOD
SHAPE
THOUGH**



Evergreen browsers



Good Platform adoption



Open, extensible editors



Hosting with version control/hooks



Framework-a-minute

WAIT... WHAT IS ALL THIS???

The screenshot shows a browser's developer console with the following messages:

- Some messages have been moved to the Issues panel. [View issues](#)
- Tracking Prevention blocked a Script resource from loading <https://s.go-mpulse.net/boomerang/5GX6Z-TSK3U-2BF75-P7PTZ-QMLZM>.
- Failed to load resource: net::ERR_BLOCKED_BY_CLIENT [5GX6Z-TSK3U-2BF75-P7PTZ-QMLZM:1](#)
- Uncaught TypeError: require(...).pre is not a function [app.v20.js:3](#)
 - at Object.Proto.initApi ([app.v20.js:3](#))
 - at [app.v20.js:3](#)
 - at Function.<anonymous> ([app.v20.js:3](#))
 - at a ([app.v20.js:3](#))
 - at [app.v20.js:3](#)
 - at g ([app.v20.js:3](#))
 - at [app.v20.js:3](#)
 - at Object.c.runCallbackQueue ([app.v20.js:3](#))
 - at [app.v20.js:3](#)
 - at g ([app.v20.js:3](#))
- Failed to load resource: net::ERR_BLOCKED_BY_CLIENT [analytics.js:1](#)
- Tracking Prevention blocked a Script resource from loading <https://www.google-analytics.com/analytics.js>.
- Failed to load resource: net::ERR_BLOCKED_BY_CLIENT [embed-bc5abf432a.js:1](#)
- Tracking Prevention blocked an XHR request to <https://dpm.demdex.net/id?id=1&ver=1.9.0&fieldgroup=MC&rtbd=json&v...fy=1&orgid=17FC406C5357BA6E0A490D4D%40AdobeOrg&nsid=0&ts=1612963427398>.
- Failed to load resource: net::ERR_BLOCKED_BY_CLIENT [VisitorAPI.js:4](#)
- Failed to load resource: net::ERR_BLOCKED_BY_CLIENT dpm.demdex.net/id?id=1&ver=1.9.0&fieldgroup=MC&rtbd=json&v...fy=1&orgid=17FC406C5357BA6E0A490D4D%40AdobeOrg&nsid=0&ts=1612963427398
- No AdProvider for type "Triton" [raygun.js:1725](#)
- Could not find ad provider for "Triton". No pre-roll ad will be displayed. [embed-bc5abf432a.js:1](#)
- No AdProvider for type "Triton" [raygun.js:1725](#)
- Could not find ad provider for "Triton". No ad will be displayed at 876810ms [embed-bc5abf432a.js:1](#)



**DISAPPOINTING
CONSIDERING OUR
STATE OF TOOLING AND
DOCUMENTATION**

LOTS OF REASONS...

Forgiving browsers

Forgiving languages

Full Stackoverflow Development

Third party interference (ad packages, tracking)

Platform-by-committee

Focus on high-impact audience

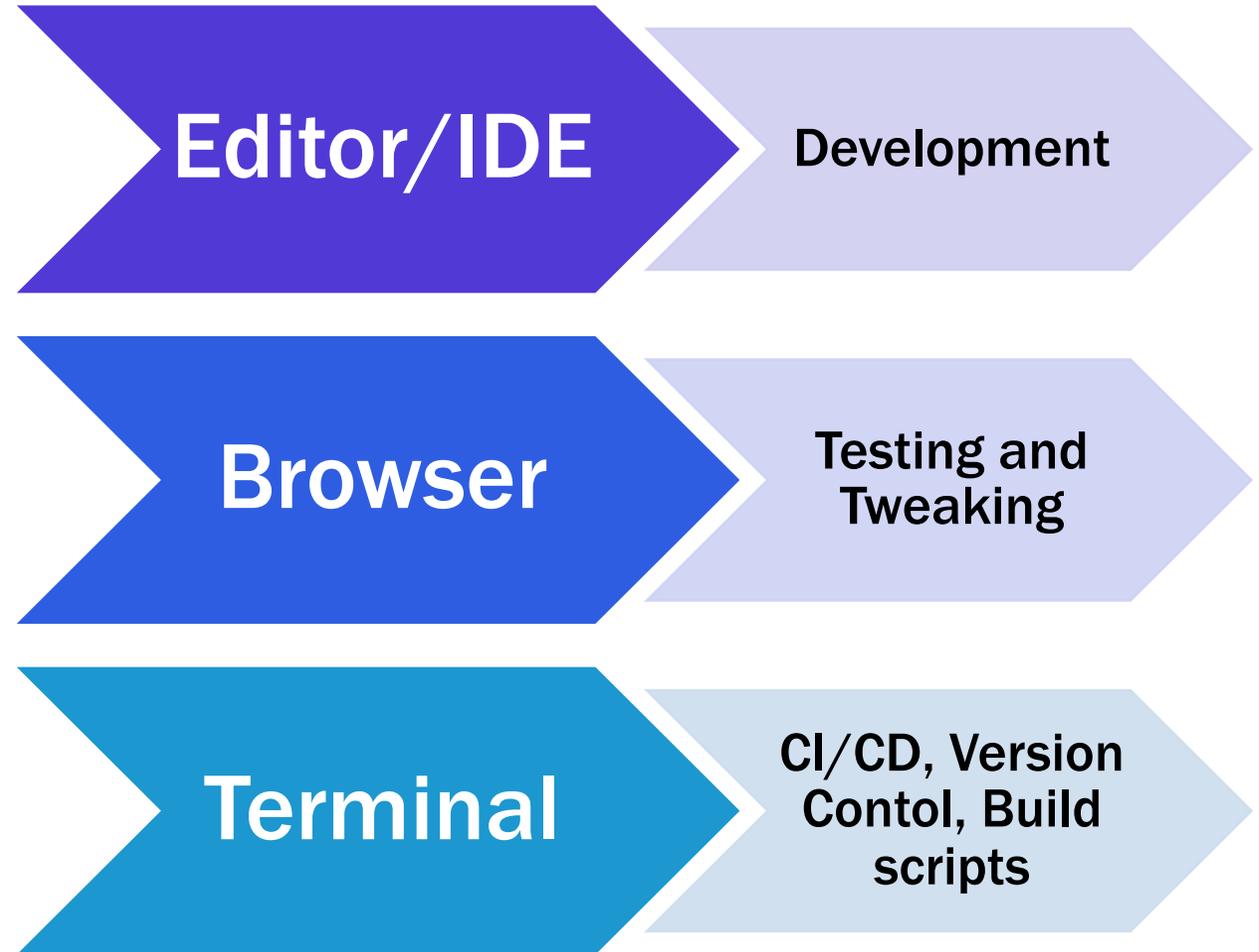
Developer tools are overwhelming



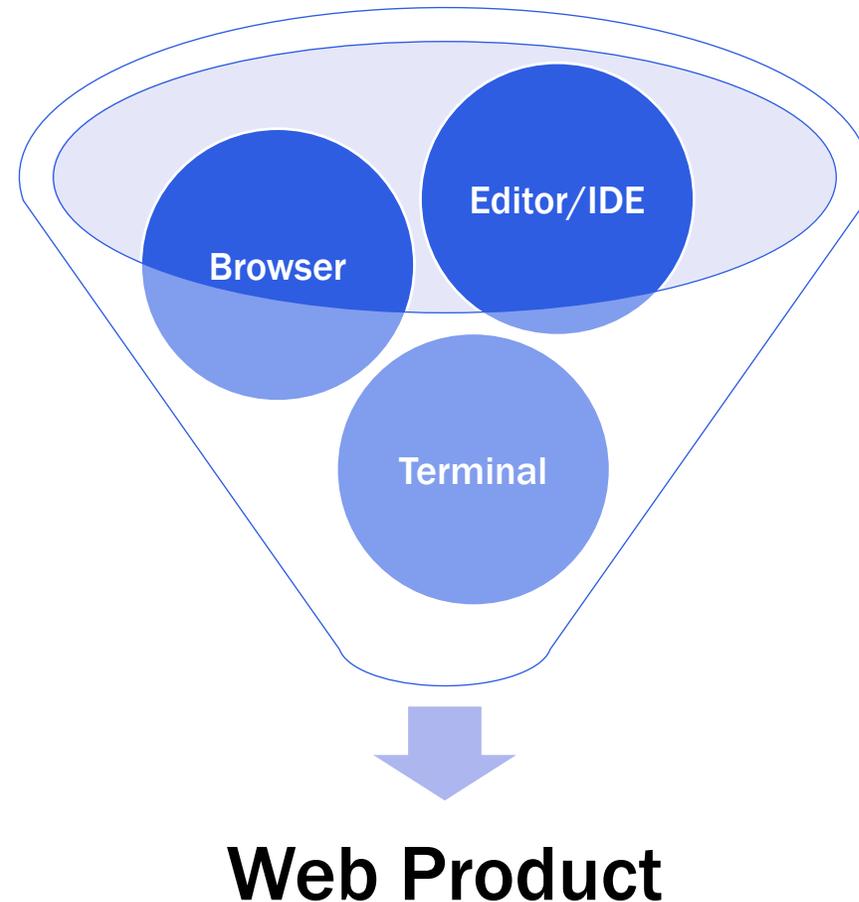


CONFUSING FOR BEGINNERS...

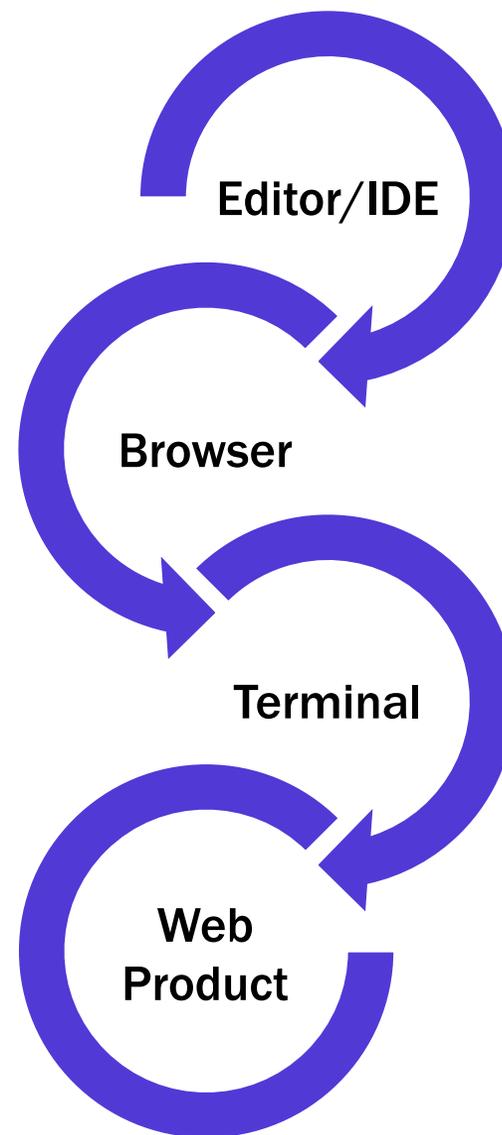
THE TRINITY OF WEB DEVELOPMENT



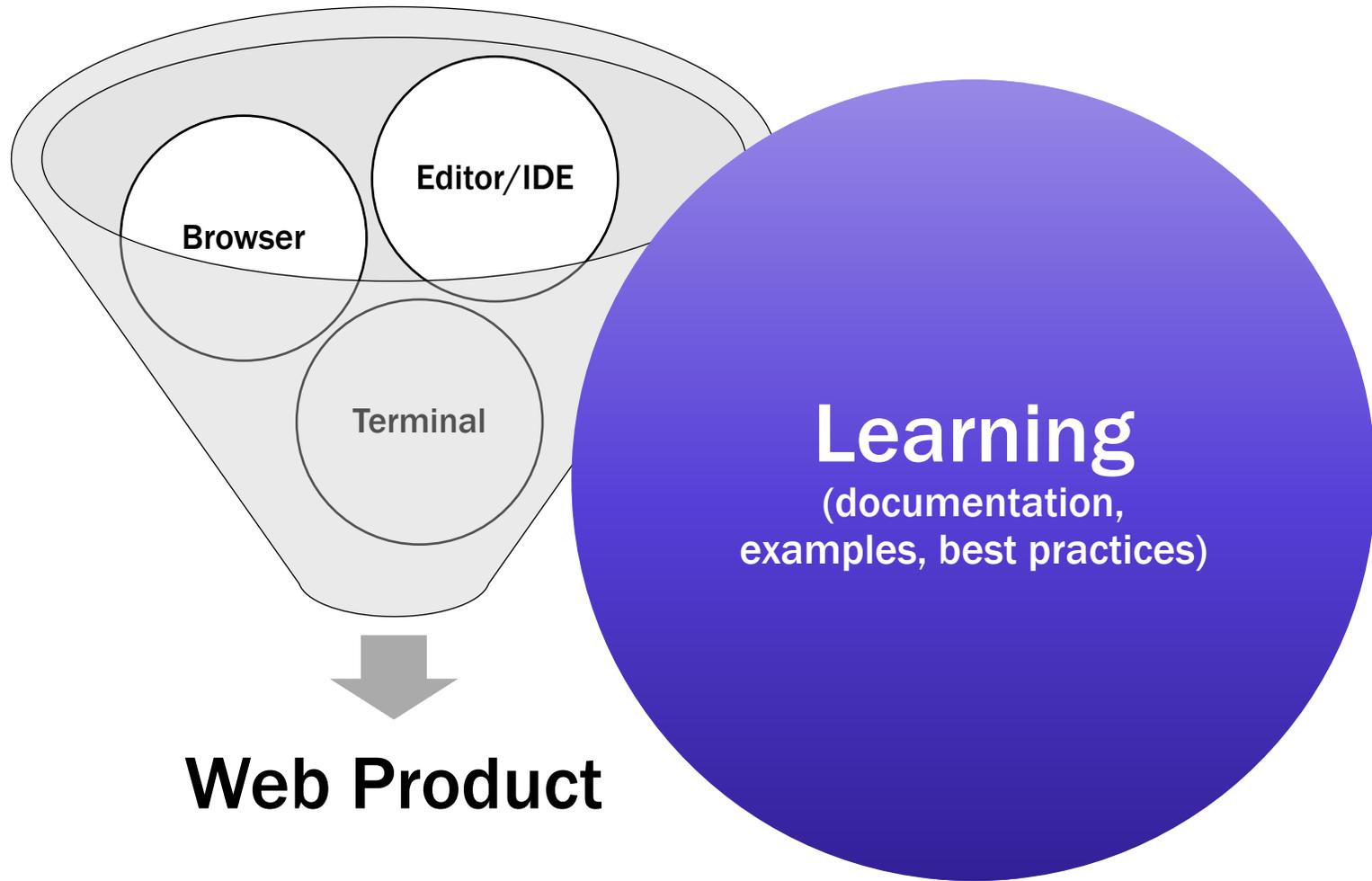
**AN OPPORTUNITY
TO GET BOGGED
DOWN IN
CUSTOMISATION**



AN ENDLESS CYCLE OF CONTEXT SWITCHING



**AND THE
FORGOTTEN
PART...**



**DEVELOPER TOOLS SHOULDN'T REQUIRE EXPERT KNOWLEDGE.
USING THEM SHOULD MAKE YOU AN EXPERT OVER TIME.**



BEST PRACTICES AND DOCUMENTATION SHOULD BE PART OF THE TOOL, NOT SOMETHING YOU NEED TO FIND ELSEWHERE.



A wide-angle photograph of a wooden boardwalk winding through a grassy dune landscape. The boardwalk is made of light-colored wooden planks and curves gently to the right. The surrounding area is covered in tall, green grasses and low-lying vegetation. In the background, there are rolling sand dunes under a cloudy, overcast sky. The overall mood is serene and natural.

**LET'S GET ONTO THE
JOURNEY...**

NOISE REDUCTION

CONSOLE FILTERING

The screenshot shows the Chrome DevTools Console interface. At the top, the 'Console' tab is active, with 'Elements' and 'Sources' tabs visible. The console toolbar shows 1 error, 1 warning, and 244 messages. Below the toolbar, the 'Filter' input is empty, and the 'All levels' dropdown is set to 'All levels'. The left sidebar shows a summary of messages: 3 messages, No user messages, 1 error, 1 warning, No info, and 1 verbose. The main console area displays the following messages:

- Some messages have been moved to the Issues panel. [View issues](#)
- [Violation] Forced reflow while executing JavaScript took 34ms
- ▶ GET http://www.google-analytics.com/collect?v=1&v=j86&a=1335581580&t=pageview...5921&tid=UA-77058918-12&_gid=1104497371.1605525921>m=2ou9g1&z=1583416869 net::ERR_BLOCKED_BY_CLIENT
- Tracking Prevention blocked an Image [\(index\):1](#) resource from loading https://www.google-analytics.com/collect?v=1&v=j86&a=1335581580&t=pageview...5921&tid=UA-77058918-12&_gid=1104497371.1605525921>m=2ou9g1&z=1583416869

ISSUE REPORTING

The screenshot shows the Chrome DevTools Console interface. At the top, the 'Console' tab is active, with 'Elements' and 'Sources' tabs visible. A notification bar at the top right shows 1 error, 1 warning, and 244 messages. The console content is filtered to show 3 messages. The first message is a blue notification: 'Some messages have been moved to the Issues panel.' with a 'View issues' button. Below this, a yellow warning message states: '[Violation] Forced reflow while executing JavaScript took 34ms'. The next message is a red error: 'GET http://www.google-analytics.com/collect?v=1&v=j86&a=1335581580&t=pageview...5921&tid=UA-77058918-12&gid=1104497371.1605525921>m=2ou9g1&z=1583416869 net::ERR_BLOCKED_BY_CLIENT'. The final message is a yellow warning: 'Tracking Prevention blocked an Image resource from loading https://www.google-analytics.com/collect?v=1&v=j86&a=1335581580&t=pageview...5921&tid=UA-77058918-12&gid=1104497371.1605525921>m=2ou9g1&z=1583416869'.

Console Elements Sources >> 1 1 244

top Filter All levels

3 messages

No user messages

1 error

1 warning

No info

1 verbose

Some messages have been moved to the Issues panel. [View issues](#)

[Violation] Forced reflow while executing JavaScript took 34ms

GET <http://www.google-analytics.com/collect?v=1&v=j86&a=1335581580&t=pageview...5921&tid=UA-77058918-12&gid=1104497371.1605525921>m=2ou9g1&z=1583416869> net::ERR_BLOCKED_BY_CLIENT

Tracking Prevention blocked an Image resource from loading <https://www.google-analytics.com/collect?v=1&v=j86&a=1335581580&t=pageview...5921&tid=UA-77058918-12&gid=1104497371.1605525921>m=2ou9g1&z=1583416869> (index):1

WEBHINT: TESTING AND BEST PRACTICES

Testing tool to check web projects for:

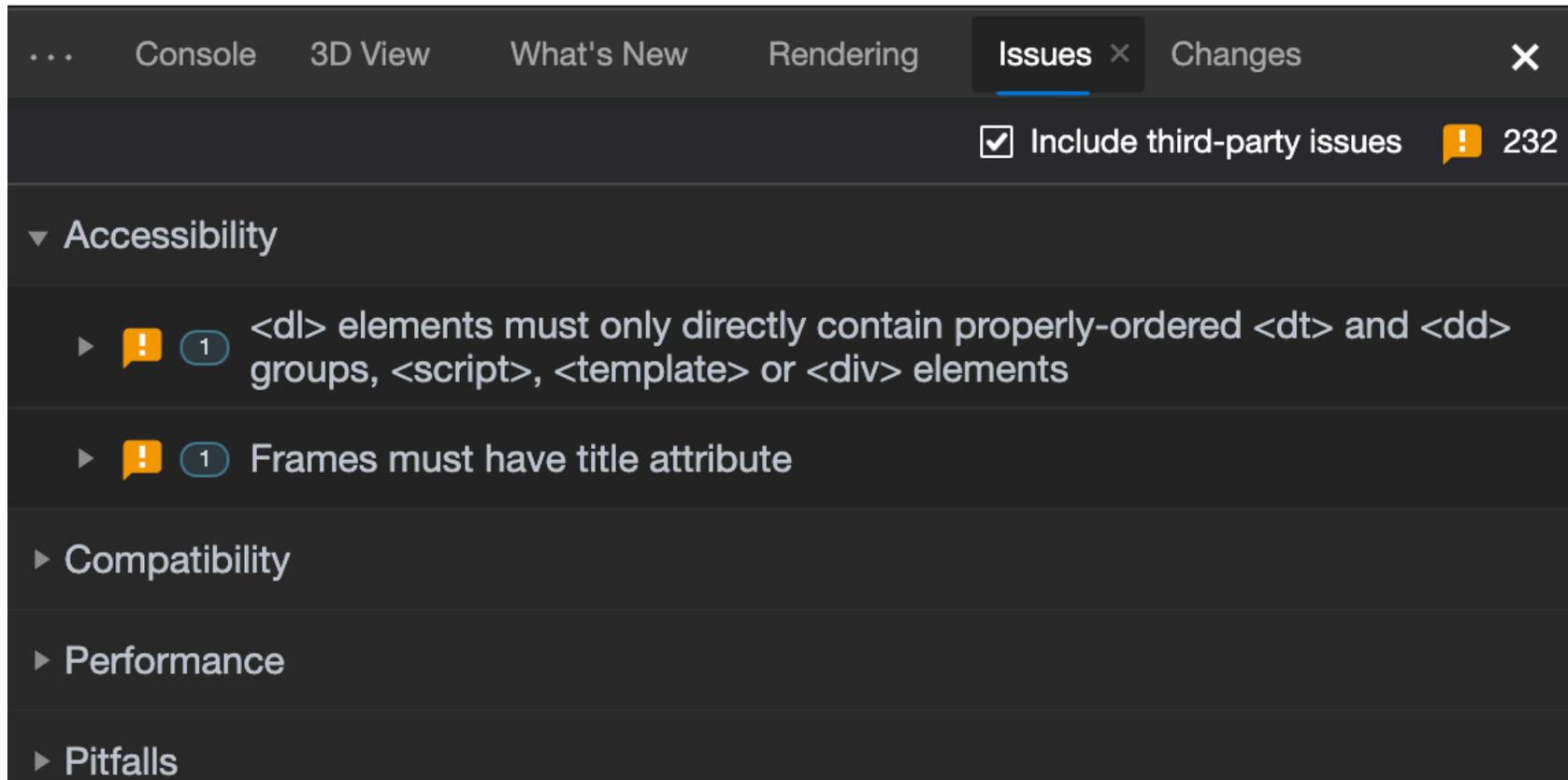
- Accessibility issues
- Performance problems
- App readiness
- Compatibility with standards
- Common pitfalls to avoid
- Security issues

Online service (webhint.io) or NPM package to integrate in other tools

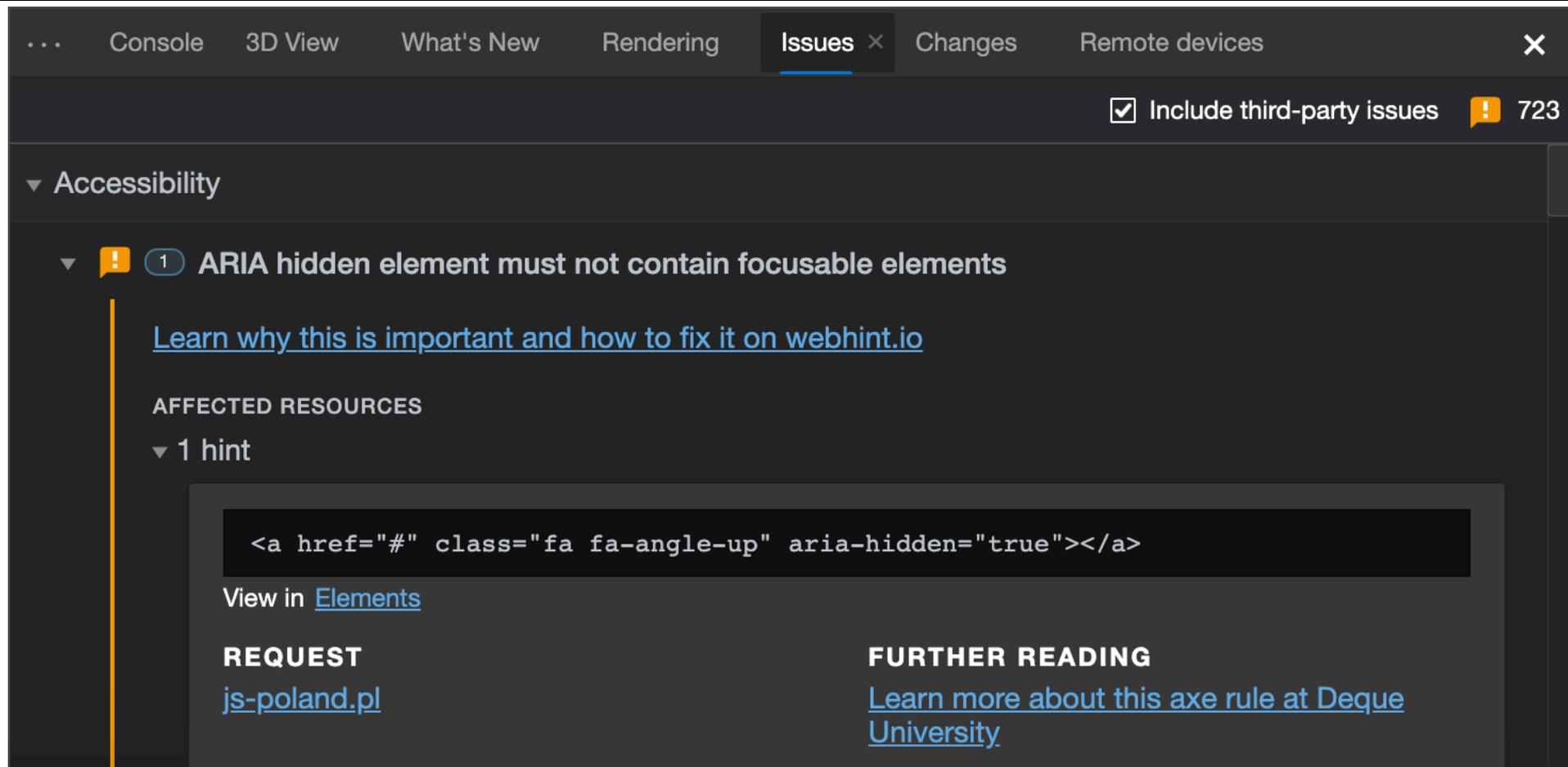
Highly customisable



ISSUES BY TYPE, OPTION TO EXCLUDE 3RD PARTY ISSUES



IN-CONTEXT DOCUMENTATION WITH “LEARN MORE” LINKS...



The screenshot shows the Chrome DevTools Issues panel. The 'Issues' tab is active, and the 'Accessibility' category is expanded. A single error is listed: 'ARIA hidden element must not contain focusable elements'. Below the error title is a blue link: 'Learn why this is important and how to fix it on webhint.io'. Underneath, the 'AFFECTED RESOURCES' section shows '1 hint'. A code snippet is displayed in a dark box: ``. Below the code, there are two columns: 'REQUEST' with a link to 'js-poland.pl' and 'FURTHER READING' with a link to 'Learn more about this axe rule at Deque University'.

... Console 3D View What's New Rendering Issues × Changes Remote devices ×

Include third-party issues  723

▼ Accessibility

▼  1 ARIA hidden element must not contain focusable elements

[Learn why this is important and how to fix it on webhint.io](#)

AFFECTED RESOURCES

▼ 1 hint

```
<a href="#" class="fa fa-angle-up" aria-hidden="true"></a>
```

View in [Elements](#)

REQUEST
[js-poland.pl](#)

FURTHER READING
[Learn more about this axe rule at Deque University](#)

MISTAKE PREVENTION

JS fonts.js

JS logogen.js ×

<> index.html

<> rip.html

logogen

js > JS logogen.js > <function>

```
62   white:    [255, 255, 255, 255],
63   red:      [104, 55, 43, 255],
64   cyan:     [112, 164, 178, 255],
65   purple:   [111, 61, 134, 255],
66   green:    [77, 141, 67, 255],
67   blue:     [53, 40, 121, 255],
68   yellow:   [184, 199, 111, 255],
69   orange:   [111, 79, 37, 255],
70   brown:    [67, 57, 0, 255],
71   lightred: [154, 103, 89, 255],
72   darkgrey: [68, 68, 68, 255],
73   grey:     [108, 108, 108, 255],
74   lightgreen: [154, 210, 132, 255],
75   lightblue: [108, 94, 181, 255],
76   lightgrey: [149, 149, 149, 255]
```

PROBLEMS 2

OUTPUT

DEBUG CONSOLE

...

Filter. E.g.: text, **/*.ts, !**/node_module

✕ <> rip.html 1

⊗ ^ 'viewport' meta element was not specified.
(meta-viewport) webhint [1, 1]

✕ <> index.html 1

⚠ ^ 'a[download]' is not supported by Internet Explorer, iOS Safari.
(compat-api/html) webhint [88, 6]

WEBHINT IN VISUAL STUDIO CODE PANEL

```
index.html — logo-o-matic
s fonts.js
<> index.html >
81
82
83
84
85
86
87
88
89
90
91
92
```

<a>

If the a element has an href attribute, then it represents a hyperlink (a hypertext anchor) labeled by its contents.

[MDN Reference](#)

'a[download]' is not supported by Internet Explorer, iOS Safari.
(compat-api/html) webhint

< Peek Problem (⌘F8) No quick fixes available

```
<a id="save" href="" download="">
<svg height='100%' width='100%' fill="#ffffff"
viewBox="0 0 847 847" x="0px" y="0px" aria-labelledby="sav
<title id="savetitle">Save</title>
<g>
```

LIVE LINTING IN CODE

LITTLE TOUCHES THAT GO A LONG WAY...

```
const doFormStuff = (ev) => {  
  
};
```

LITTLE TOUCHES THAT GO A LONG WAY...

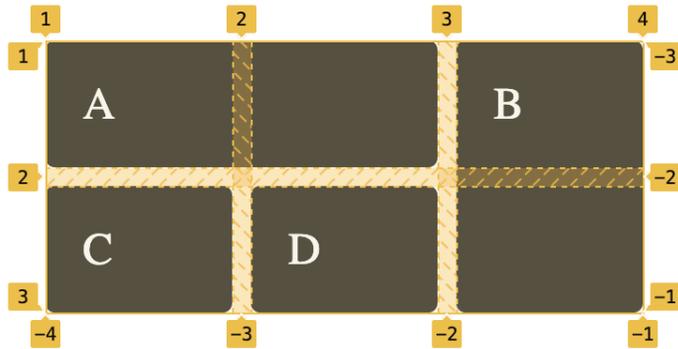
```
const doFormStuff = (ev) => {  
  
};
```

```
const doFormStuff = (ev) => {  
  
};
```

```
document.querySelector('form').  
  |  addEventListener('submit', doFormStuff);
```

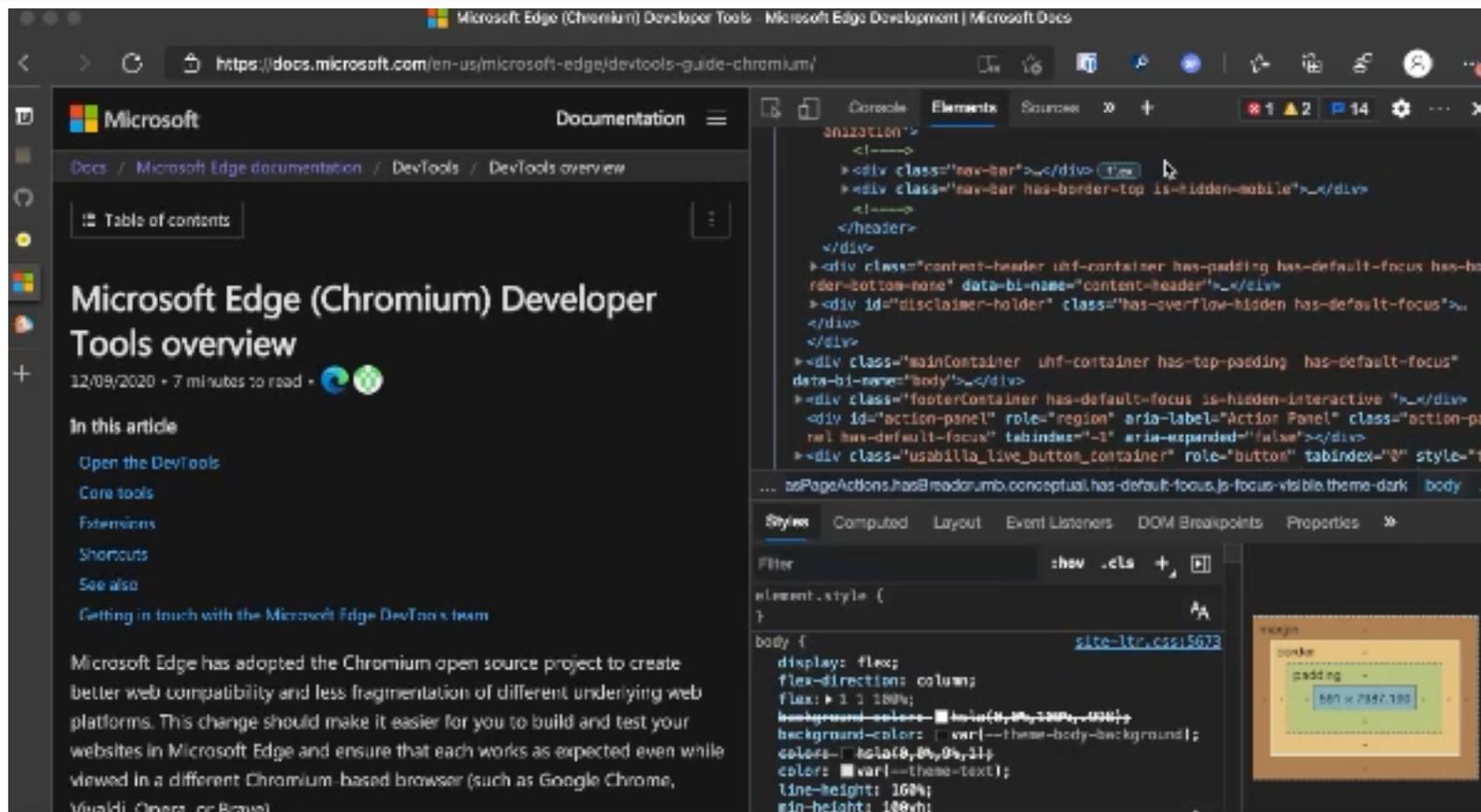
VISUAL TOOLS AND WORKFLOWS

VISUAL GUIDES AND SOURCE INDICATORS (CSS GRID)



```
Console Elements Sources Network >> 5  
<!DOCTYPE html>  
<html>  
  <head>...</head>  
  <body>  
    ... <div class="wrapper"> grid == $0  
      <div class="box a">A</div>  
      <div class="box b">B</div>  
      <div class="box c">C</div>  
      <div class="box d">D</div>  
    </div>  
  </body>  
</html>  
  
html body div.wrapper  
  
Styles Computed Layout Event Listeners DOM Breakpoints Properties  
Filter :hov  
element.style {  
}  
  
.wrapper {  
  display: grid;  
  grid-gap: 10px;  
  grid-template-columns: [col1-start] 100px [col2-start] 100px [col3-start] 100px [col3-end];  
  grid-template-rows: [row1-start] auto [row2-start] auto [row2-end];  
  background-color: #fff;  
  color: #444;  
}
```

VISUAL GUIDES AND SOURCE INDICATORS (CSS FLEXBOX)



The screenshot displays the Microsoft Edge Developer Tools interface. The top panel shows the address bar with the URL `https://docs.microsoft.com/en-us/microsoft-edge/devtools-guide-chromium/`. The main content area displays the "Microsoft Edge (Chromium) Developer Tools overview" page, dated 12/09/2020, with a 7-minute read time. The "In this article" section lists links for "Open the DevTools", "Core tools", "Extensions", "Shortcuts", and "See also".

The right-hand side of the image shows the "Elements" and "Styles" panels. The "Elements" panel displays the DOM tree with the following structure:

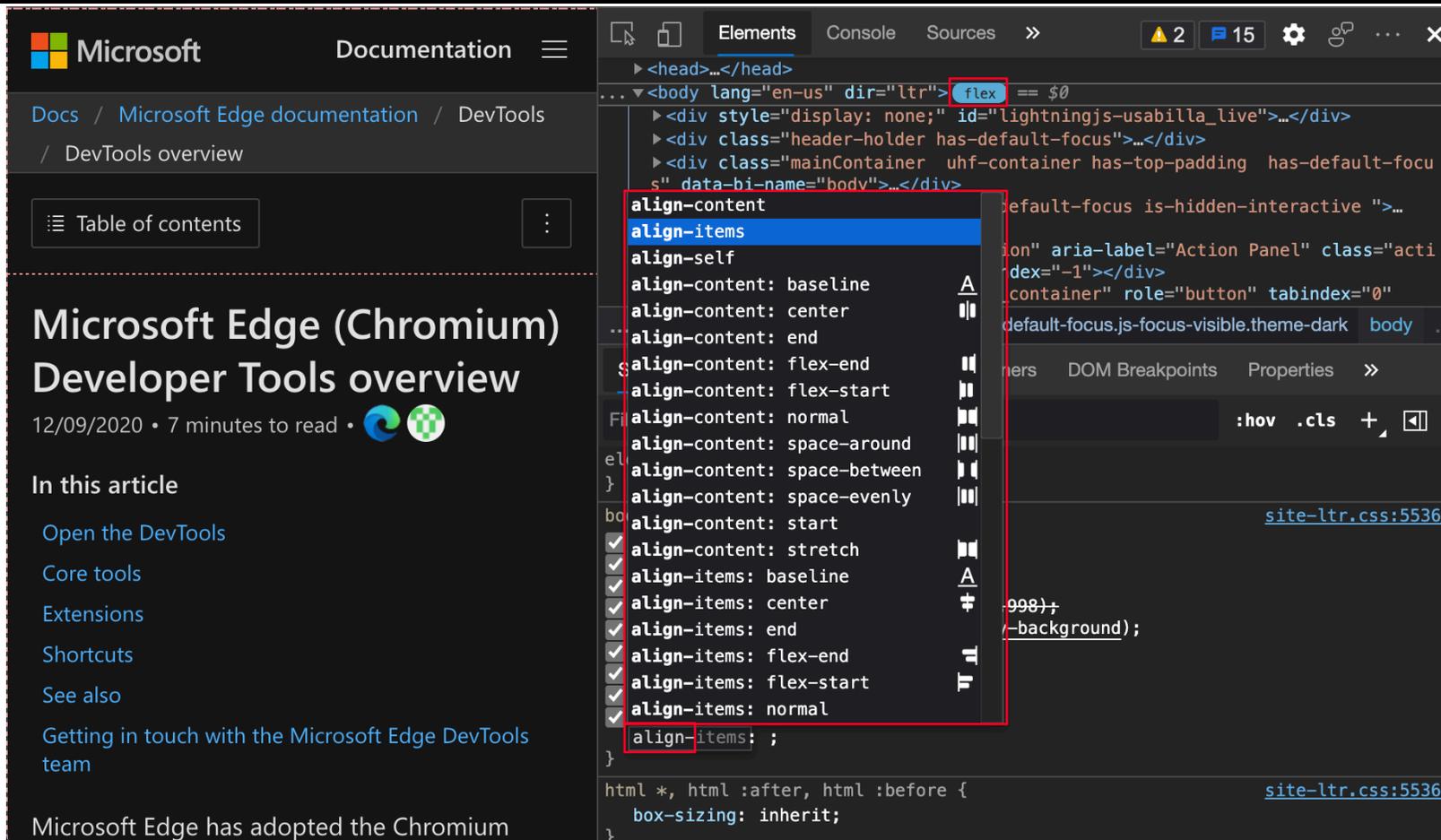
```
animation->
<!-->
<div class="nav-bar"></div>
<div class="nav-bar has-border-top is-hidden-mobile"></div>
<!-->
</header>
</div>
<div class="content-header uhf-container has-padding has-default-focus has-border-bottom-none" data-bi-name="content-header"></div>
<div id="disclaimer-holder" class="has-overflow-hidden has-default-focus"></div>
</div>
<div class="mainContainer uhf-container has-top-padding has-default-focus" data-bi-name="body"></div>
<div class="footerContainer has-default-focus is-hidden-interactive"></div>
<div id="action-panel" role="region" aria-label="Action Panel" class="action-panel has-default-focus" tabindex="1" aria-expanded="false"></div>
<div class="usability_live_button_container" role="button" tabindex="8" style="t
```

The "Styles" panel shows the computed styles for the selected element:

```
element.style {
}
body {
  display: flex;
  flex-direction: column;
  flex: 1 1 100%;
  background-color: #1a1a1a;
  background-color: var(--theme-body-background);
  color: #cccccc;
  color: var(--theme-text);
  line-height: 160%;
  min-height: 100vh;
```

A visual guide is shown on the right, illustrating the flexbox layout with a central "padding" area and a "margin" area.

VISUAL GUIDES AND SOURCE INDICATORS (CSS FLEXBOX)



The screenshot displays the Microsoft Edge Developer Tools interface. On the left, the 'Documentation' pane shows the 'Microsoft Edge (Chromium) Developer Tools overview' page, dated 12/09/2020. The main content area shows the 'Elements' panel with a list of HTML elements. The 'align-items' property is highlighted in the 'align-content' dropdown menu, which is open. The dropdown menu lists the following options:

- align-content
- align-items
- align-self
- align-content: baseline
- align-content: center
- align-content: end
- align-content: flex-end
- align-content: flex-start
- align-content: normal
- align-content: space-around
- align-content: space-between
- align-content: space-evenly
- align-content: start
- align-content: stretch
- align-items: baseline
- align-items: center
- align-items: end
- align-items: flex-end
- align-items: flex-start
- align-items: normal
- align-items: ;

The 'align-items: ;' option is currently selected. The 'Console' panel is also visible, showing the 'site-ltr.css:5536' file.

VISUAL GUIDES AND SOURCE INDICATORS (WEB TYPOGRAPHY)

The screenshot displays the Microsoft Edge browser interface with the DevTools developer tools open. On the left, the 'Documentation' pane shows the 'Microsoft Edge (Chromium) Developer Tools overview' page, dated 12/09/2020. The main content area shows the 'Elements' pane with a tree view of the page's DOM. A 'Font Family' dialog box is overlaid on the right side of the Elements pane, featuring a 'Font Family' dropdown menu and a 'CSS Properties' section with sliders and dropdowns for 'Font Size', 'Line Height', 'Font Weight', and 'Spacing'. Below the dialog, the 'Styles' pane shows the computed styles for the selected element, including 'display: flex', 'flex-direction: column', and 'background-color: var(--theme-body-background)'. A 'Font Editor' button is visible in the bottom right corner of the Styles pane.

**MAKING IT EASIER TO
GO DEEPER**

BREAKPOINTS > CONSOLE.LOG()



You can set breakpoints in the editor in the browser



You can also set breakpoints in your text editor (f.e. Visual Studio Code)



They are more work upfront than a `console.log()` - but worth it.

BREAKPOINTS > CONSOLE.LOG()

- Your code execution is paused
 - errors can't slip through
- You get an end-to-end picture of what is happening
- You are not likely to litter the web with yet another console message that end users should never see

DOM BREAKPOINTS

Task:

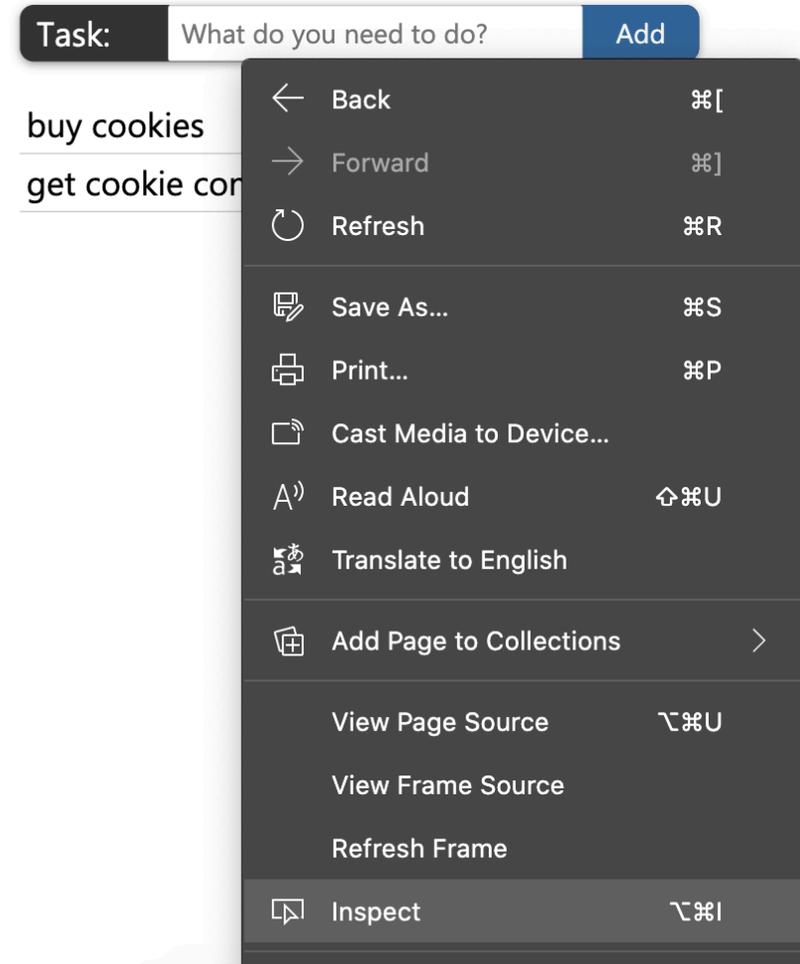
What do you need to do?

Add

buy cookies

get cookie consent

DOM BREAKPOINTS



Task:

buy cookies

get cookie consent

li 490.39 x 42

ACCESSIBILITY

Name

Role listitem

Keyboard-focusable



```
<!DOCTYPE html>
<html lang="en">
  <head>...</head>
  <body>
    <form>
      <div class="searchbar">...</div>
      <ul id="tasks">
        <li>...</li>
        <li == $0
          <label>
            <input type="checkbox" value="get cookie consent">
            <span>get cookie consent</span>
            <button data-task="get cookie consent">x</button>
          </label>
        </li>
      </ul>
    </form>
  </body>
</html>
```

html body form ul#tasks li label span

Styles Event Listeners DOM Breakpoints Properties Accessibility

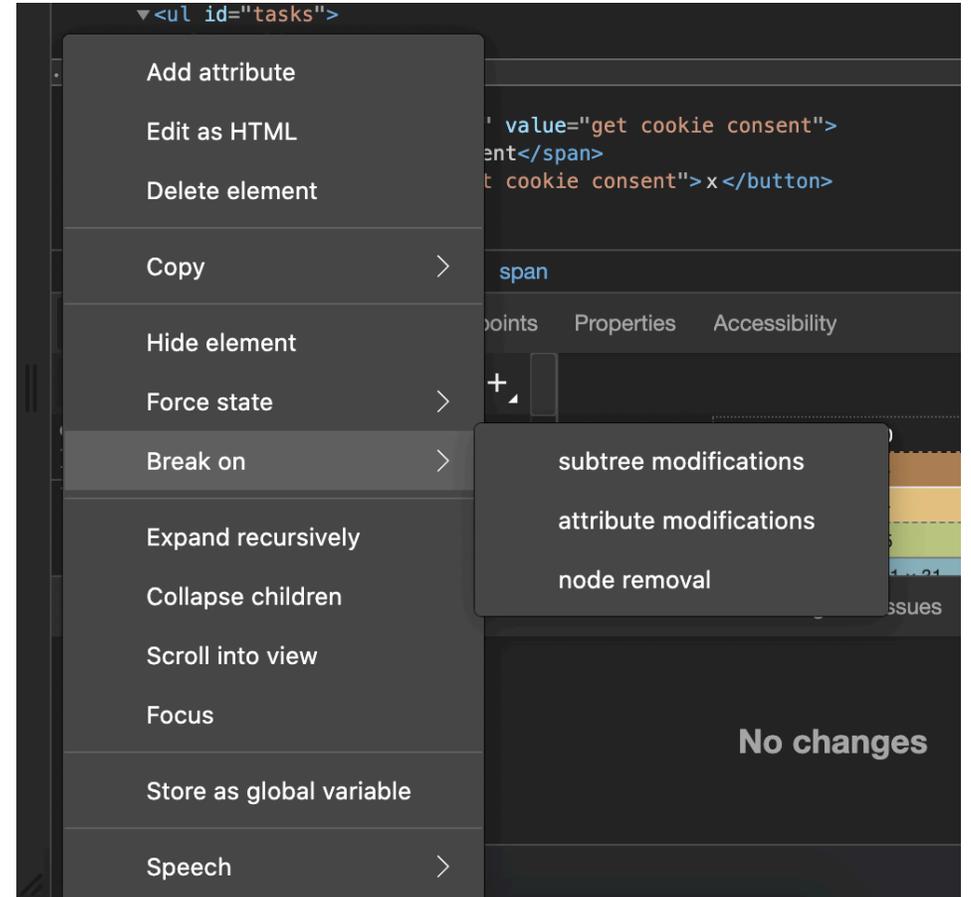
Filter :hov .cls +

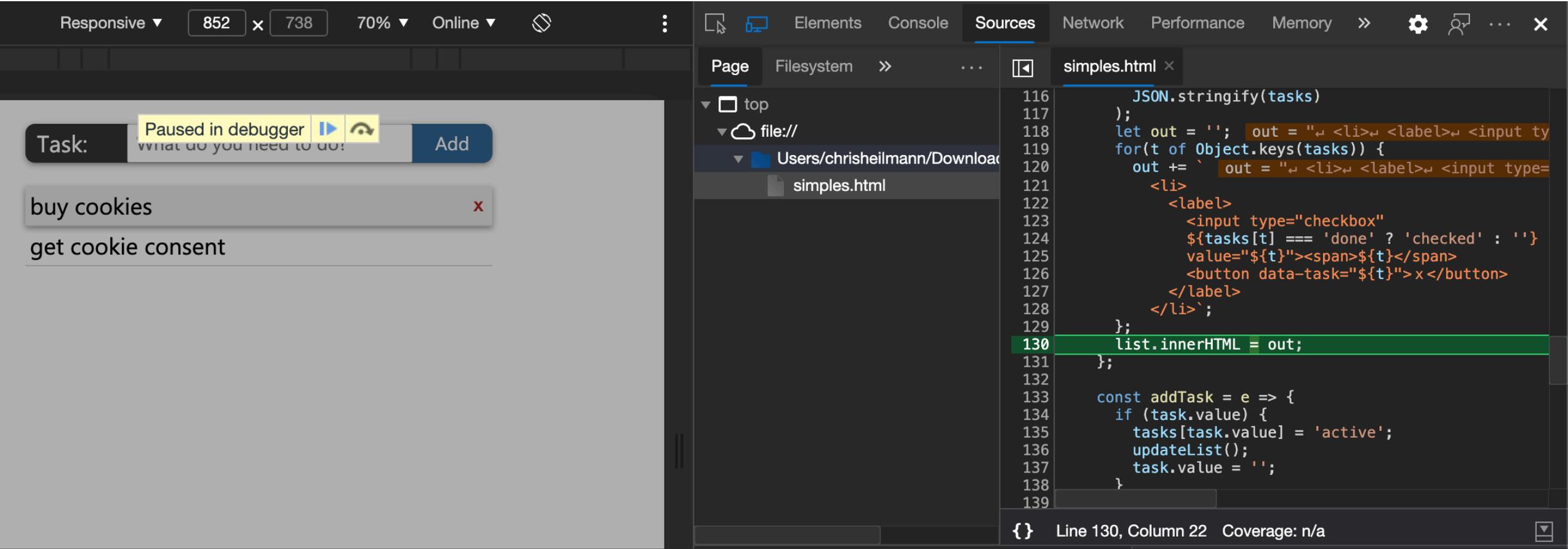
```
element.style {
}

li {
  list-style: none;
  padding: 5px;
  line-height: 1.2;
```



DOM BREAKPOINTS





DOM BREAKPOINTS

The image shows the Chrome DevTools Sources panel. The top navigation bar includes tabs for Elements, Console, Sources, Network, Performance, Memory, Application, Security, Lighthouse, and Layers. The Sources panel is open to a file named 'simples.html'. The left sidebar shows the file system structure, including 'top', 'file://', 'Users/chrisheilmann/Downloads', and 'simples.html'. The main editor area displays JavaScript code with a breakpoint set at line 144, column 13. The code is as follows:

```
142   const changeTask = e => { e = MouseEvent {isTrusted: true, scre
143     let t = e.target; t = button {disabled: false, form: form, fo
144     if (t.dataset.task) {
145       delete tasks[t.dataset.task];
146       updateList();
147       e.preventDefault();
148     }
149     if (t.nodeName.toLowerCase()=== 'input') {
150       tasks[t.value] = t.checked ? 'done' : 'active';
151       updateList();
152       e.preventDefault();
153     }
154   }
155
156
```

The right sidebar shows the Call Stack with the current function 'changeTask' at 'simples.html:144'. The Scope panel shows the local variables: 'e' (MouseEvent {isTrusted: t...}), 't' (button), and 'this' (undefined). The bottom status bar indicates the current position: '{ } Line 144, Column 13 Coverage: n/a'.

DOM BREAKPOINTS

AVOIDING CONTEXT SWITCHING

SOURCE CONTROL



▼ mouse-... master ↻ ✓ ↺ ...

▼ vscode... master* ↻ ✓ ↺ ...

Message (⌘Enter to commit o...)

▼ Changes

1

{} package-lock.json ~/Do... M

DME.md

mpr.css

<> index.html

JS mpr.js



LICENSE



JS mpr.js > [⌘] mpr > <function> > [⌘] writePathData

```

139 const recordPath = e => {
140   if (paint) {
141     let x = getxy(e).x;
142     let y = getxy(e).y;
143     recording.style.left = x + cpos.x + 10 + "px";
144     recording.style.top = y + cpos.y + 10 + "px";
145     if (oldx > 0 && oldy > 0) {
146       if (Math.abs(oldx-x) < threshold &&
147           Math.abs(oldy-y) < threshold) {
148         return false;
149       }
150     }
151     paths[path].push(x/2|0,y/2|0);
152     paintline(x, y);
153     o.innerHTML = paths[path].length + ' new points';

```

TERMINAL

PROBLEMS

61



1: bash



The default interactive shell is now zsh.
 To update your account to use zsh, please run `chsh -s /bin/zsh`.
 For more details, please visit <https://support.apple.com/kb/HT208050>.

chrisheilmann at Chriss-MBP in ~/Downloads/codes/mouse-path-recorder on master

SOURCE CONTROL   ...▼ mouse-...  master  ✓  ...▼ vscode...  master*  ✓  ...

Message (⌘Enter to commit o...

▼ Changes

1

{ } package-lock.json ~/Do... M

JS mpr.js > [ⓧ] mpr >  <function> > [ⓧ] writePathData

```
139 const recordPath = e => {
140   if (paint) {
141     let x = getxy(e).x;
142     let y = getxy(e).y;
143     recording.style.left = x + cpos.x + 10 + "px";
144     recording.style.top = y + cpos.y + 10 + "px";
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146       if (Math.abs(oldx-x) < threshold &&
147           Math.abs(oldy-y) < threshold) {
148         return false;
149       }
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152     paintline(x, y);
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```

TERMINAL

PROBLEMS

61

1: bash

The default interactive shell is now zsh.
To update your account to use zsh, please run `chsh -s /bin/zsh`.
For more details, please visit <https://support.apple.com/kb/HT208050>.

chrisheilmann at Chriss-MBP in ~/Downloads/codes/mouse-path-recorder on master

SOURCE CONTROL



DME.md

mpr.css

<> index.html

JS mpr.js



LICENSE



▼ mouse-... ⓘ master ↻ ✓ ↺ ...

▼ vscode... ⓘ master* ↻ ✓ ↺ ...

Message (⌘Enter to commit o...

▼ Changes

1

{ } package-lock.json ~/Do... M

JS mpr.js > [⌘] mpr > <function> > [⌘] writePathData

138

139

140

141

142

143

144

145

146

147

148

149

150

151

152

153

```
const recordPath = e => {
```

```
  if (paint) {
```

```
    let x = getxy(e).x;
```

```
    let y = getxy(e).y;
```

```
    recording.style.left = x + cpos.x + 10 + "px";
```

```
    recording.style.top = y + cpos.y + 10 + "px";
```

```
    if (oldx > 0 && oldy > 0) {
```

```
      if (Math.abs(oldx-x) < threshold &&
```

```
          Math.abs(oldy-y) < threshold) {
```

```
        return false;
```

```
      }
```

```
    }
```

```
    paths[path].push(x/2|0,y/2|0);
```

```
    paintline(x, y);
```

```
    o.innerHTML = paths[path].length + ' new points';
```

TERMINAL

PROBLEMS

61



1: bash



The default interactive shell is now zsh.

To update your account to use zsh, please run `chsh -s /bin/zsh`.

For more details, please visit <https://support.apple.com/kb/HT208050>.

chrisheilmann at Chriss-MBP in ~/Downloads/codes/mouse-path-recorder on master

BROWSERS CAN BE AUTOMATED...

developer.microsoft.com/en-us/microsoft-edge/tools/webdriver/



[Home](#) \ [Tools](#) \ [WebDriver](#)

WebDriver

Close the loop on your developer cycle by automating testing of your website in Microsoft Edge with Microsoft WebDriver



Microsoft Edge

WebDriver for Microsoft Edge will work with the stable channel and all insider channels

- Download the correct Microsoft WebDriver version for your build of Microsoft Edge.

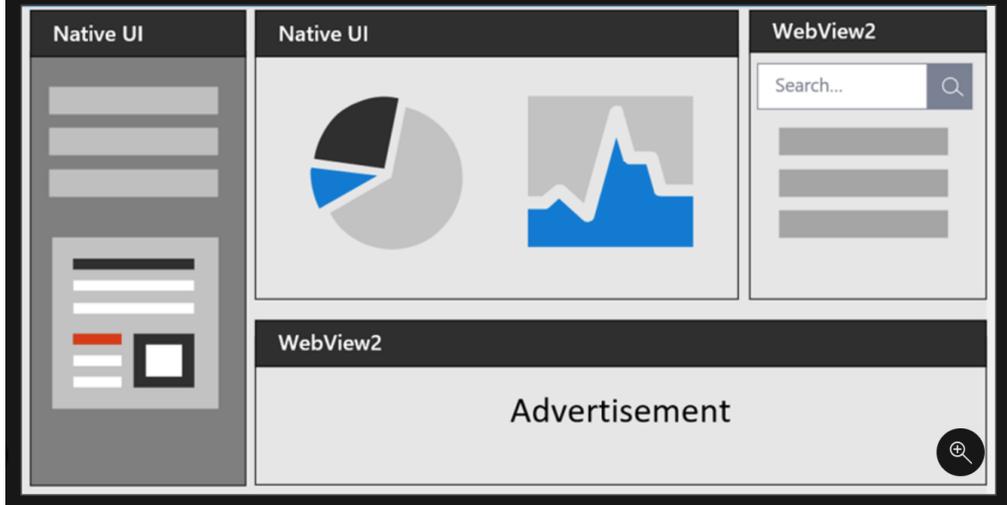
BROWSERS CAN BE EMBEDDED...

docs.microsoft.com/en-us/microsoft-edge/webview2/

Introduction to Microsoft Edge WebView2

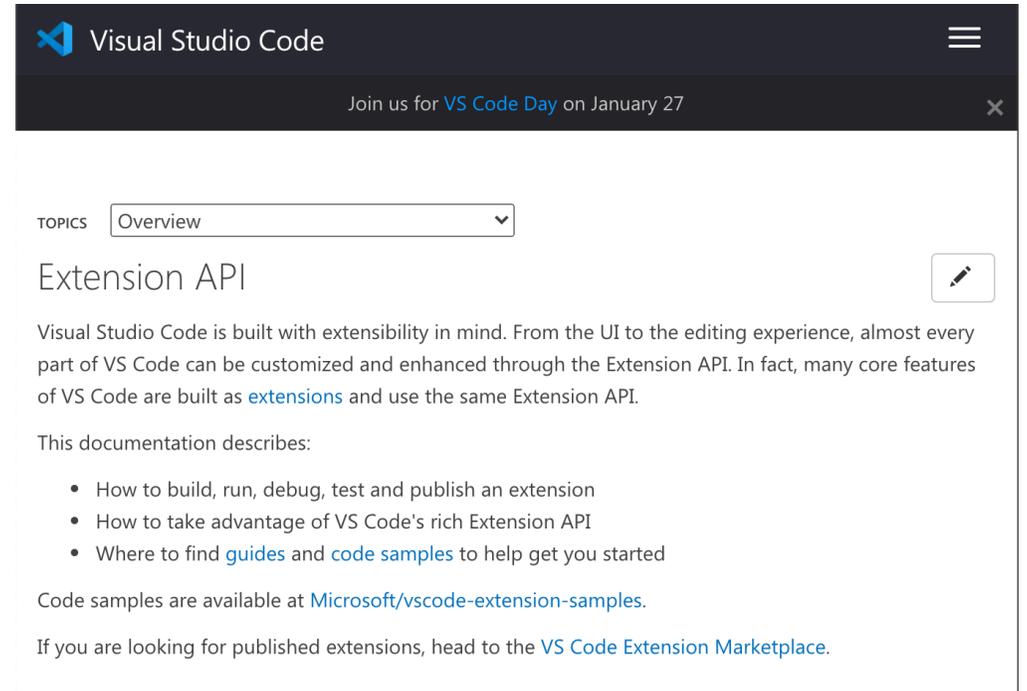
11/19/2020 • 2 minutes to read •  +2

The Microsoft Edge WebView2 control enables you to embed web technologies (HTML, CSS, and JavaScript) in your native applications. The WebView2 control uses [Microsoft Edge \(Chromium\)](#) as the rendering engine to display the web content in native applications. With WebView2, you may embed web code in different parts of your native application, or build the entire native application within a single WebView. For information on how to start building a WebView2 application, navigate to [Get Started](#).



VISUAL STUDIO CODE ALLOWS FOR EXTENSIONS...

code.visualstudio.com/api



The screenshot shows the Visual Studio Code documentation page for the Extension API. At the top, there is a dark header with the Visual Studio Code logo and the text "Visual Studio Code". Below the header, there is a notification banner that says "Join us for VS Code Day on January 27". The main content area has a "TOPICS" section with a dropdown menu currently set to "Overview". The title "Extension API" is displayed in a large font, followed by a paragraph of introductory text. Below this, there is a section titled "This documentation describes:" followed by a bulleted list of three items. At the bottom, there are two more paragraphs of text, one mentioning "Code samples are available at Microsoft/vscode-extension-samples" and the other mentioning "If you are looking for published extensions, head to the VS Code Extension Marketplace".

Visual Studio Code

Join us for [VS Code Day](#) on January 27

TOPICS

Extension API

Visual Studio Code is built with extensibility in mind. From the UI to the editing experience, almost every part of VS Code can be customized and enhanced through the Extension API. In fact, many core features of VS Code are built as [extensions](#) and use the same Extension API.

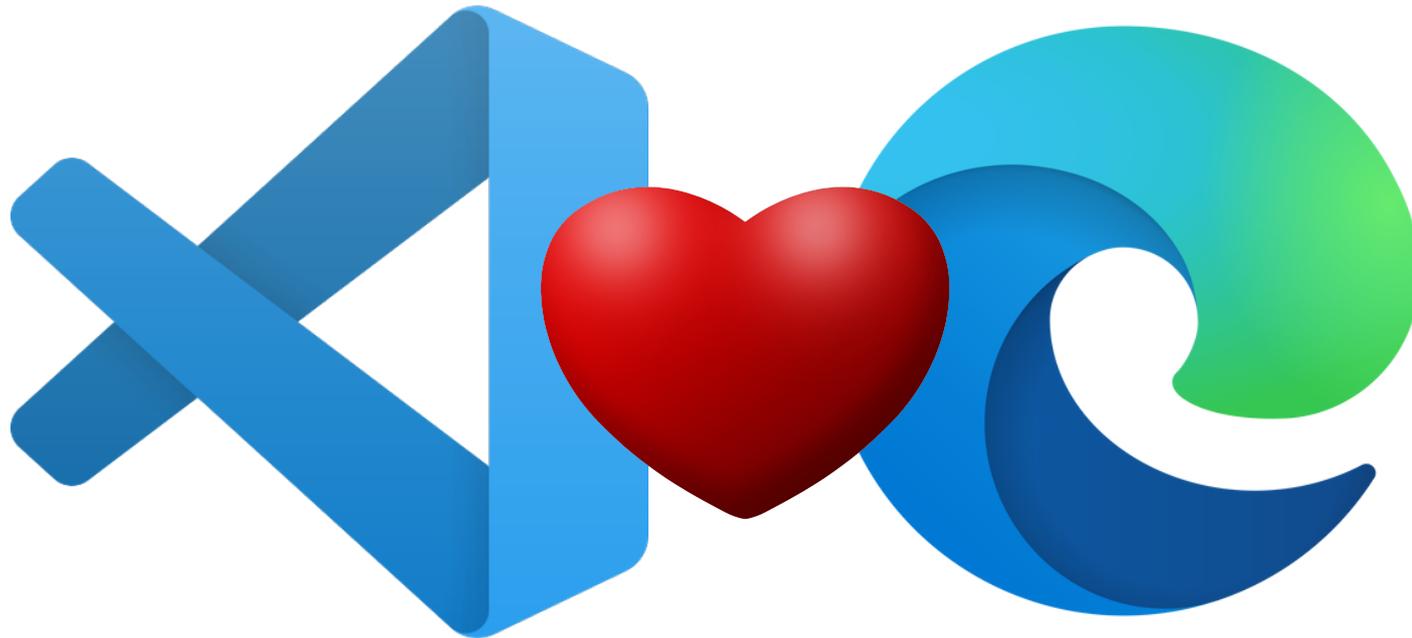
This documentation describes:

- How to build, run, debug, test and publish an extension
- How to take advantage of VS Code's rich Extension API
- Where to find [guides](#) and [code samples](#) to help get you started

Code samples are available at [Microsoft/vscode-extension-samples](#).

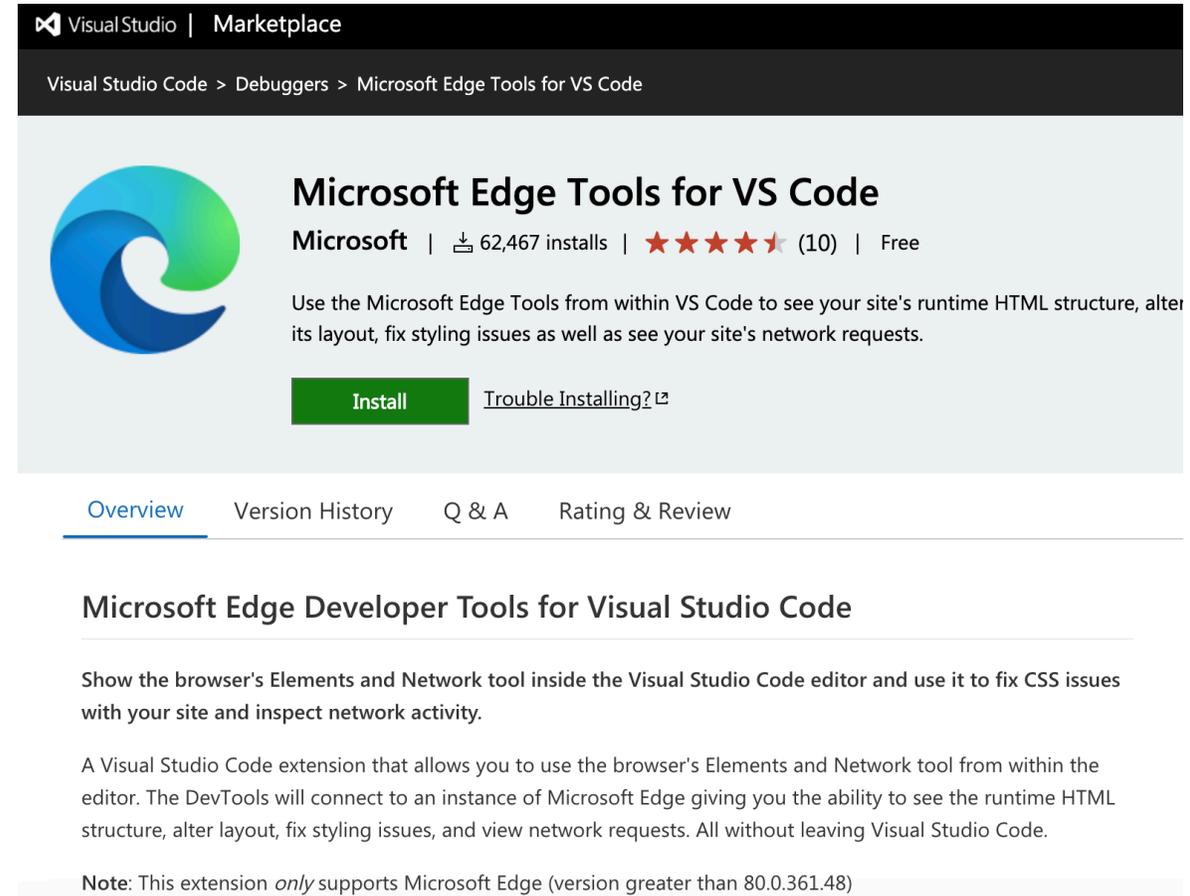
If you are looking for published extensions, head to the [VS Code Extension Marketplace](#).

SO, WHY DON'T WE MERGE THE TWO?



MICROSOFT EDGE TOOLS FOR VS CODE

aka.ms/devtools-for-code



Visual Studio | Marketplace

Visual Studio Code > Debuggers > Microsoft Edge Tools for VS Code



Microsoft Edge Tools for VS Code

Microsoft | 📄 62,467 installs | ★★★★★ (10) | Free

Use the Microsoft Edge Tools from within VS Code to see your site's runtime HTML structure, alter its layout, fix styling issues as well as see your site's network requests.

[Install](#) [Trouble Installing? 🗨️](#)

[Overview](#) [Version History](#) [Q & A](#) [Rating & Review](#)

Microsoft Edge Developer Tools for Visual Studio Code

Show the browser's Elements and Network tool inside the Visual Studio Code editor and use it to fix CSS issues with your site and inspect network activity.

A Visual Studio Code extension that allows you to use the browser's Elements and Network tool from within the editor. The DevTools will connect to an instance of Microsoft Edge giving you the ability to see the runtime HTML structure, alter layout, fix styling issues, and view network requests. All without leaving Visual Studio Code.

Note: This extension *only* supports Microsoft Edge (version greater than 80.0.361.48)

ELEMENTS FOR MICROSOFT ... + ↻



aka.ms/devtools-for-code

Show All Commands `Ctrl + Shift + P`

Go to File `Ctrl + P`

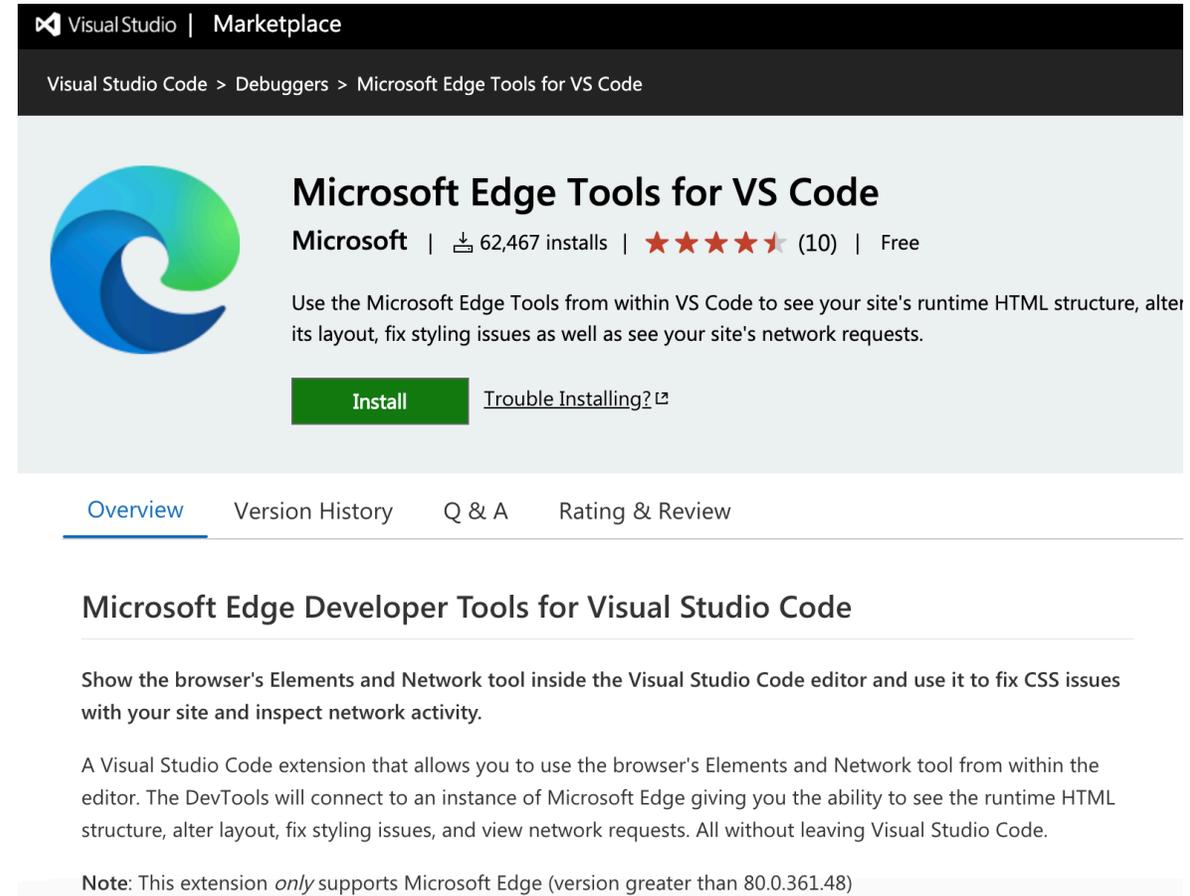
Find in Files `Ctrl + Shift + F`

Start Debugging `F5`

Toggle Terminal `Ctrl + ``

WHAT YOU CAN DO NOW...

- Inspect, edit and tweak the DOM structure of the product you build using the tools
- Inspect Network requests
- Interact with the browser inside VS Code
- Sync changes with your code (setting up Sourcemaps/Watchers)
- Choose the version of Edge you want to have in the tool
- Choose an own browser window or a headless version (embedded in the extension)



Visual Studio | Marketplace

Visual Studio Code > Debuggers > Microsoft Edge Tools for VS Code

 **Microsoft Edge Tools for VS Code**
Microsoft | 📄 62,467 installs | ★★★★★ (10) | Free

Use the Microsoft Edge Tools from within VS Code to see your site's runtime HTML structure, alter its layout, fix styling issues as well as see your site's network requests.

[Install](#) [Trouble Installing? 🗨️](#)

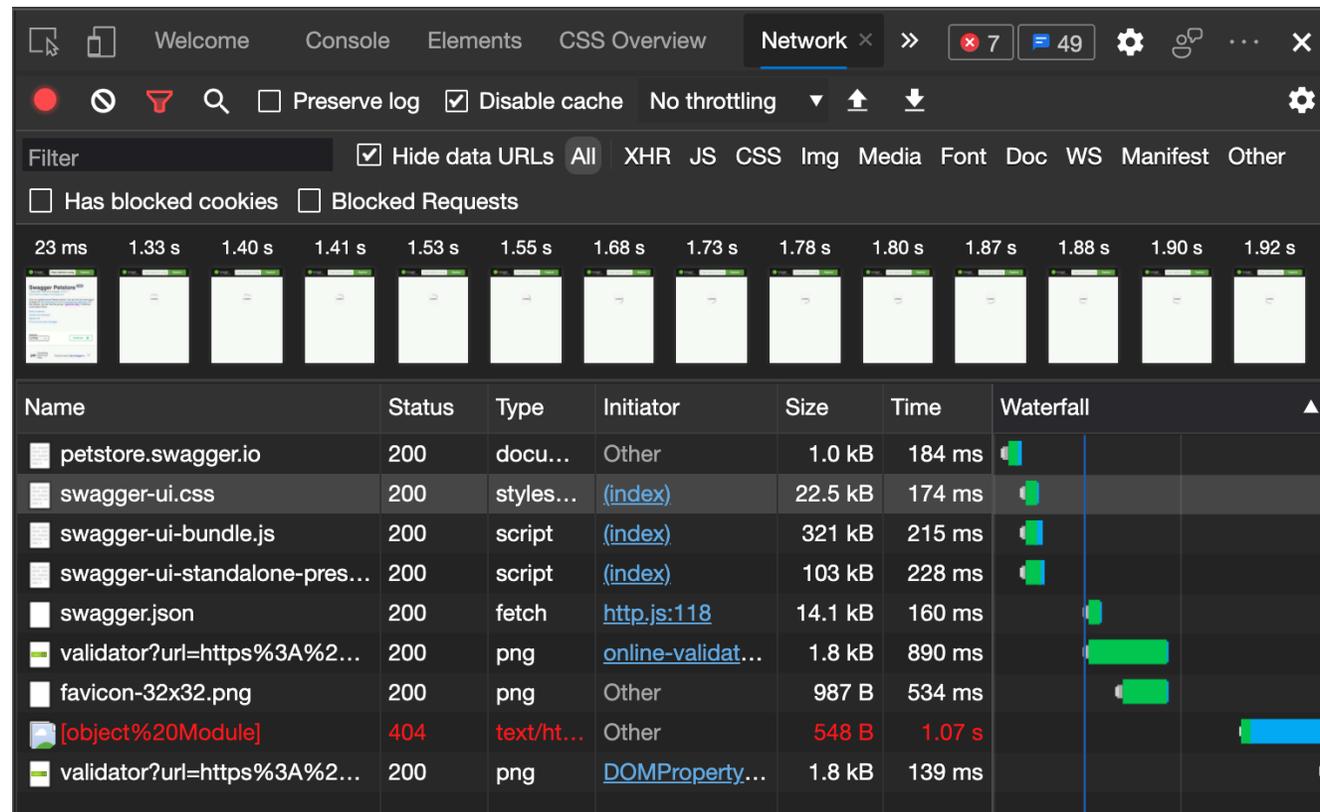
[Overview](#) [Version History](#) [Q & A](#) [Rating & Review](#)

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Note: This extension *only* supports Microsoft Edge (version greater than 80.0.361.48)



ANOTHER CONTEXT?

NETWORK INSPECTION NOT ENOUGH?

aka.ms/networkconsole

The screenshot shows the Chrome DevTools Network tab. At the top, there are tabs for 'Welcome', 'Console', 'Elements', 'CSS Overview', and 'Network'. The 'Network' tab is active, showing a list of network requests. The table below has columns for Name, Status, Type, Initiator, Size, Time, and Waterfall. A context menu is open over the 'petstore.swagger.io' request, listing options: 'Open in new tab', 'Open in Sources panel', 'Edit and Resend', 'Clear browser cache', 'Clear browser cookies', and 'Copy'.

Name	Status	Type	Initiator	Size	Time	Waterfall
petstore.swagger.io	200	docu...	Other	1.0 kB	184 ms	
swagger-ui.css	200	styles...	(index)	22.5 kB	174 ms	
swagger-ui-bund...						
swagger-ui-stand...						
swagger.json						
validator?url=http...						
favicon-32x32.png						
[object%20Modu...						
validator?url=http...						

Read how we're responding to the COVID-19 outbreak, and get resources to help >



Stay connected at work and home

Respond and adapt with helpful tools and resources from Microsoft

Business resources >

Home and family resources >

Choose your Microsoft 365

Shop Surface devices

Buy Xbox games and consoles

Shop Windows 10

Find your next PC

Shop Business

Elements Sources Console Performance **Network** Memory Application Security

Preserve log Disable cache Online

Filter Hide data URLs All XHR JS CSS Img Media Font Doc WS Manifest Other Has blocked cookies Blocked Requests

Name	Method	Status	Type	Initiator	Size	Time	Waterfall
v1?\$mscomCookies=true&ext-javascr...	POST	200	json	/onerfstatics/marke...	0 B	56 ms	
v1?\$mscomCookies=true&ext-javascr...	POST	(pending)	text/plain;...	/onerfstatics/marke...	0 B	Pending	
v1?\$mscomCookies=true&ext-javascr...	POST	(pending)	text/plain;...	/onerfstatics/marke...	0 B	Pending	
en-us/	GET	200	document	Other	41.7 kB	402 ms	
v1?\$mscomCookies=true&ext-javascr...	POST	(pending)	text/plain;...	/onerfstatics/marke...	0 B	Pending	
mwfmdl2-v3.54.woff2	GET	200	font	(index)	23.5 kB	67 ms	
e3-082b89?ver=2.0	GET	200	script	(index)	30.4 kB	116 ms	
1e-fd610f?ver=2.0	GET	200	script	(index)	21.8 kB	122 ms	
social?apiVersion=1.0	GET	200	script	(index)	28.4 kB	347 ms	
social?apiVersion=1.0&include base=tr...	GET	200	stylesheet	(index)	45.0 kB	325 ms	

120 requests 1.5 MB transferred 4.1 MB resources Finish: 31.86 s DOMContentLoaded: 1.62 s Load: 2.02 s

Console Network Console

GET https://www.microsoft.com/en-us/ *

GET https://www.microsoft.com/en-us/

Query Headers Auth Body Fetch

Key	Value
Computed URL: https://www.microsoft.com/en-us/	

Press 'Send' to issue the request.



WANT TO LOOK UNDER THE HOOD?

W3C Working Draft

TABLE OF CONTENTS

- 1 Introduction
- 2 Foreground Color: the 'color' property
- 3 Representing Colors: the <color> type
 - 3.1 Accessibility and Conveying Information By Color
 - 3.2 Color Spaces of Untagged Colors
 - 3.3 Resolving <color> Values
- 4 sRGB Colors
 - 4.1 The RGB functions: 'rgb()' and 'rgba()'
 - 4.2 The RGB hexadecimal notation: '#RRGGBB'
- 5 Color Keywords
 - 5.1 Named Colors
 - 5.2 System Colors
 - 5.3 The 'transparent' keyword
 - 5.4 The 'currentcolor' keyword
- 6 HSL Colors: 'hsl()' and 'hsla()' functions
 - 6.1 Converting HSL colors to sRGB colors

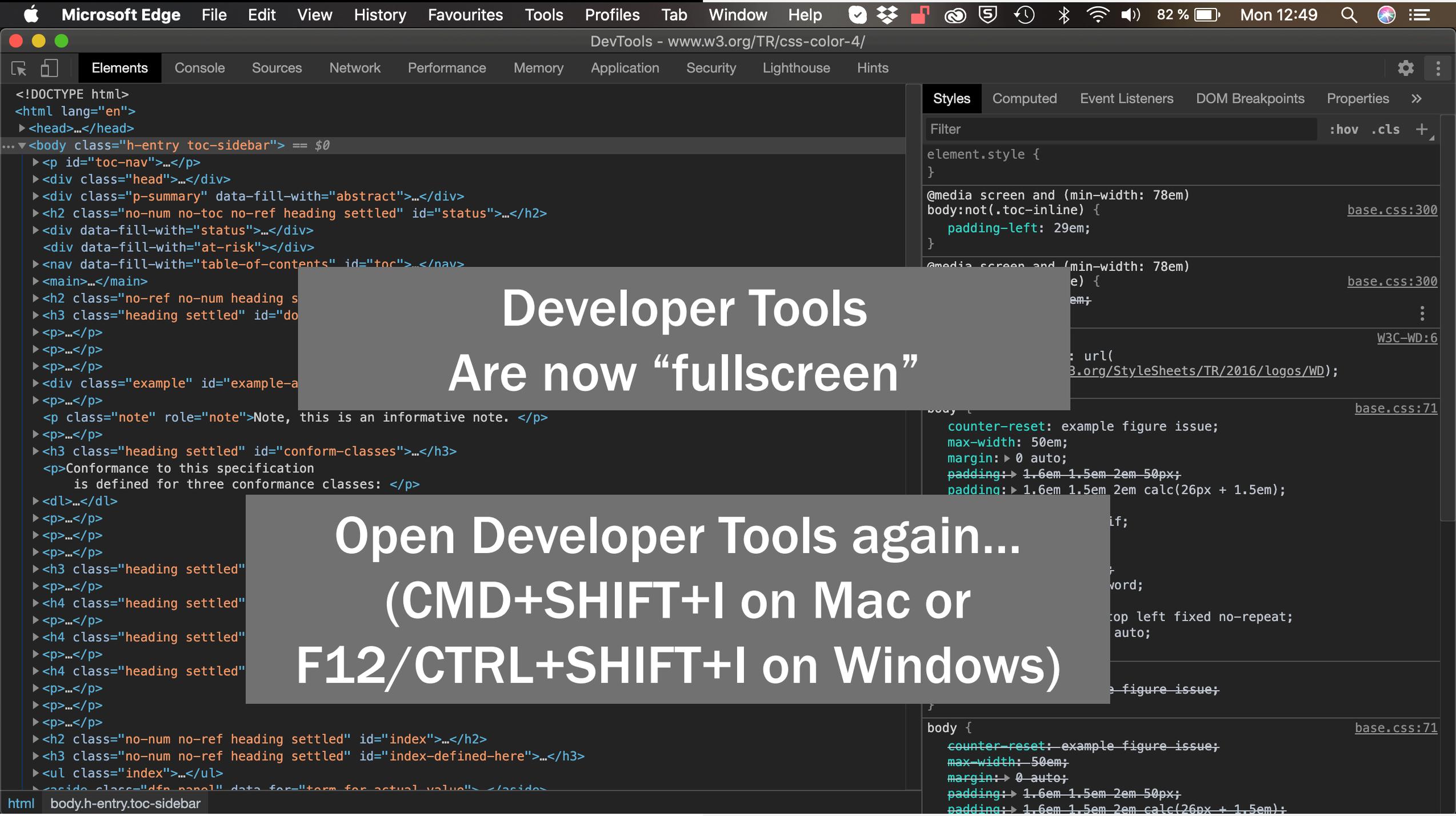
Authors *may* also use these keywords at any time, but *should* be careful to use the colors in [matching background-foreground pairs](#) to ensure appropriate contrast, as any particular contrast relationship across non-matching pairs (e.g. 'Canvas' and 'ButtonText') is not guaranteed.

The `<system-color>` keywords are defined as follows:

- 'Canvas'
Background of application content or documents.
- 'CanvasText'
Text in application content or documents.
- 'LinkText'
Text in non-active, non-visited links.
- 'VisitedText'

Open Developer Tools
(CMD+SHIFT+I on Mac or
F12/CTRL+SHIFT+I on

- 'Field'
Background of input fields
- 'FieldText'
Text in input fields.



Developer Tools
Are now "fullscreen"

Open Developer Tools again...
(CMD+SHIFT+I on Mac or
F12/CTRL+SHIFT+I on Windows)

```

<!DOCTYPE html>
<html lang="en">
  <head>...</head>
  <body class="h-entry toc-sidebar"> == $0
    <p id="toc-nav">...</p>
    <div class="head">...</div>
    <div class="p-summary" data-fill-with="abstract">...</div>
    <h2 class="no-num no-toc no-ref heading settled" id="status">...</h2>
    <div data-fill-with="status">...</div>
    <div data-fill-with="at-risk"></div>
    <nav data-fill-with="table-of-contents" id="toc">...</nav>
    <main>...</main>
    <h2 class="no-ref no-num heading settled" id="conformance">...</h2>
    <h3 class="heading settled" id="document-conventions">...</h3>
    <p>...</p>
    <p>...</p>
    <p>...</p>
    <div class="example" id="example-ae2">
      <p>...</p>
      <p class="note" role="note">Note, th
    <p>...</p>
    <h3 class="heading settled" id="conf
      <p>Conformance to this specification
        is defined for three conformance
    <dl>...</dl>
    <p>...</p>
    <p>...</p>
    <p>...</p>
    <h3 class="heading settled" id="conf
    <p>...</p>
    <h4 class="heading settled" id="conf
    <p>...</p>
    <h4 class="heading settled" id="conf
    <p>...</p>
    <h4 class="heading settled" id="conf
    <p>...</p>
    <p>...</p>
    <p>...</p>
    <p>...</p>
    <h2 class="no-num no-ref heading settled" id="index">...</h2>
    <h3 class="no-num no-ref heading settled" id="index-defined-here">...</h3>
    <ul class="index">...</ul>
    <aside class="dfn-panel" data-for="term-for-actual-value">...</aside>
  </body>
</html>

```

```

DevTools - devtools://devtools/bundled/devtools_app.html?remoteBase=https://devtools.azureedge.net/serve_file/@34...
Elements Console Sources Network Performance Memory Application Security Lighthouse
top Filter Default levels
Main._createAppUI: 50.18603515625ms main.js:31
Main._showAppUI: 78.2470703125ms main.js:31
Main._initializeTarget: 54.614990234375ms main.js:31
Main._lateInitialization: 4.332763671875ms main.js:31

```

You now can debug the developer tools with developer tools (I changed to light mode to make it obvious which are which)

`while(🐢) {go(deeper)}`

Elements Console Sources Network Performance Memory

span.tabbed-pane-header-tab-titl 44.23 x 15 e

DevTools - devtools://devtools/bundled/devtools_app.html?remoteBase=https://devtools.azureedge.net/serve_file/@34b9...

Elements Console Sources Network Performance Memory Application Security Lighthouse

```

<div class="tabbed-pane-header-tabs" role="tablist" aria-label="Panels" style>
  ><div class="tabbed-pane-header-tab" id="tab-elements" role="tab" aria-selected="false" aria-label="Elements" style="cursor: pointer; width: 73px;">...</div>
  ><div class="tabbed-pane-header-tab selected" id="tab-console" role="tab" aria-selected="true" aria-label="Console" style="cursor: pointer; width: 68px;" tabindex="0">
    <span class="tabbed-pane-header-tab-title">Console</span> == $0
  </div>
  ><div class="tabbed-pane-header-tab" id="tab-sources" role="tab" aria-selected="false" aria-label="Sources" style="cursor: pointer; width: 68px;">...</div>
  ><div class="tabbed-pane-header-tab" id="tab-network" role="tab" aria-selected="false" aria-label="Network" style="cursor: pointer; width: 69px;">...</div>
  ><div class="tabbed-pane-header-tab" id="tab-timeline" role="tab" aria-selected="false" aria-label="Performance" style="cursor: pointer; width: 93px;">...</div>
  ><div class="tabbed-pane-header-tab" id="tab-heap_profiler" role="tab" aria-selected="false" aria-label="Memory" style="cursor: pointer; width: 68px;">...</div>
  ><div class="tabbed-pane-header-tab" id="tab-resources" role="tab" aria-selected="false" aria-label="Application" style="cursor: pointer; width: 84px;">...</div>
  ><div class="tabbed-pane-header-tab" id="tab-security" role="tab" aria-selected="false" aria-label="Security" style="cursor: pointer; width: 67px;">...</div>
  ><div class="tabbed-pane-header-tab" id="tab-lighthouse" role="tab" aria-selected="false" aria-label="Lighthouse" style="cursor: pointer; width: 83px;">...</div>
</div>
<div class="tabbed-pane-content">...</div>
</div>
<div class="widget vbox flex-auto view-container overflow-auto" tabindex="-1" role="tabpanel" aria-label="Console panel">...</div>
</div>
</div>
</div>

```

Styles >>

```

:hov .cls +
element.style {
}

```

ui/tabbedP...
.tabbed-pane-header-tab-title {
text-overflow: ellipsis; overflow: hidden;}

ui/inspect...
* {
box-sizing: border-box;}

ui/inspect...
* {
min-width: 0; min-height: 0;}

Inherited from...

Style Attribute {
cursor: pointer; width: 68px;}

tabbedPane...
.tabbed-pane-header-

Lots of fun bits to discover
(and report if you find a problem)

... div div div div div #shadow-root div div div div #tab-console span.tabbed-pane-header-tab-title

WHAT'S NEXT? YOU TELL US!

microsoft / [vscode-edge-devtools](#) Watch 19 Star 284 Fork 27

[Code](#) [Issues 31](#) [Pull requests 3](#) [Actions](#) [Projects](#) [Wiki](#) [Security](#) [Insights](#) [Settings](#)

Filters Labels 17 Milestones 4 [New issue](#)

<input type="checkbox"/>	31 Open 72 Closed	Author	Label	Projects	Milestones	Assignee	Sort
<input type="checkbox"/>	Add documentation on syncing code from vscode to extension #258 opened 2 days ago by mliao95 1.1.3						
<input type="checkbox"/>	Ctrl + R instruction in Network Panel does not work bug #256 opened 10 days ago by mliao95						
<input type="checkbox"/>	Enable a changelog button on the target list enhancement good first issue						

github.com/microsoft/vscode-edge-devtools

DETAILED DEVELOPER TOOLS EXPLAINERS

github.com/MicrosoftEdge/MSEdgeExplainers

DevTools 

We love our developer tools! Checkout these cool innovations being designed for the developer tools:

- [3D View](#)
- [CSS Grid Tooling](#)
- [Customizable Keyboard Shortcuts](#)
- [Dual-screen Emulation](#)
- [High Contrast Simulation](#)
- [Infobar UI Refresh](#)
- [Localization](#)
- [Redux for State](#)
- [Service Worker Improvements](#)
- [Settings Discoverability and Telemetry](#)
- [Settings Search](#)
- [Stackable Overlays](#)
- [webhint](#)

THANKS!

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