

ELECTRON PRO-TIPS™

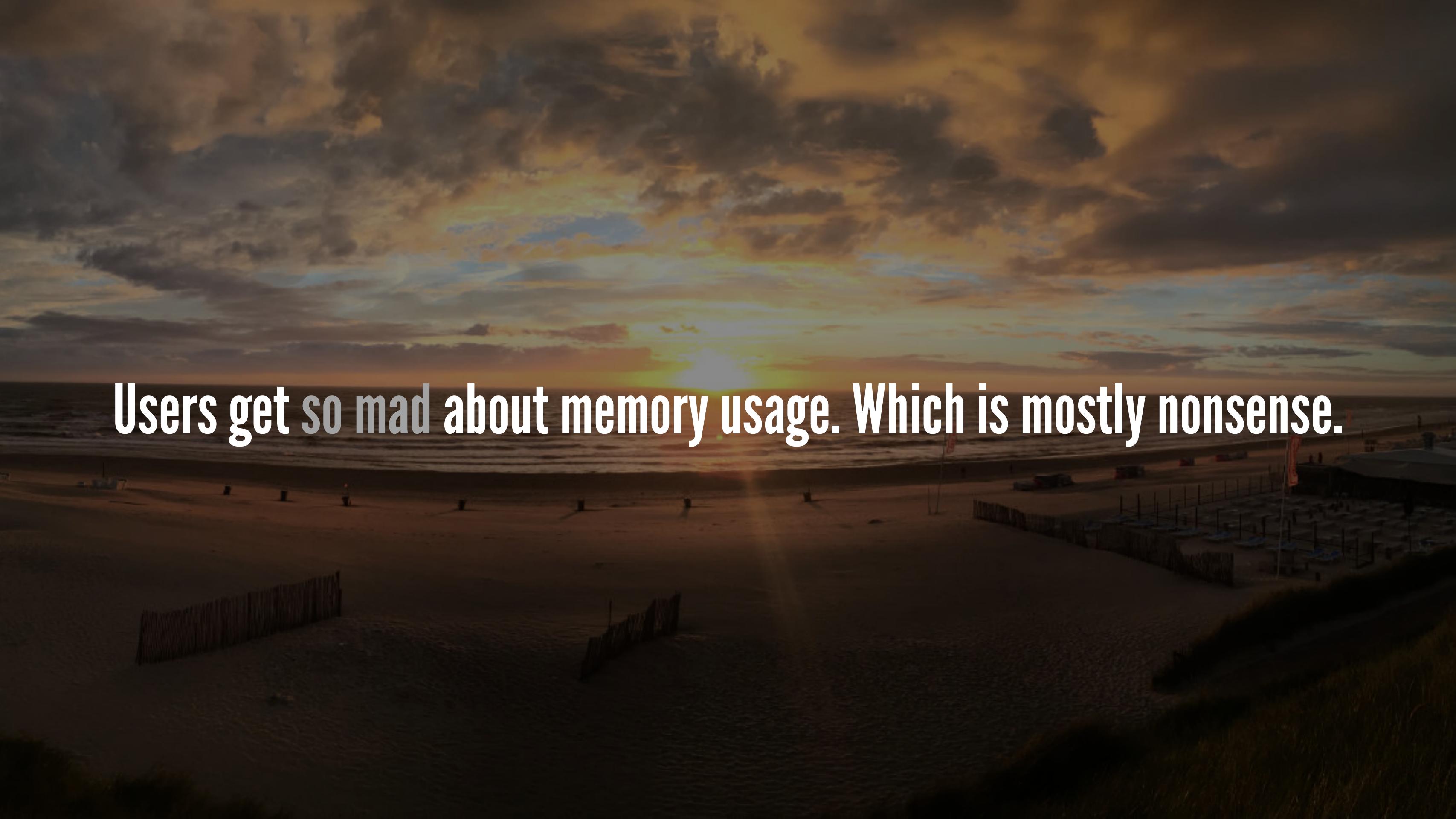
@PAULCBETTS (GITHUB, TWITTER)

Hi.

**HERE'S A FEW THINGS I NOTICE PEOPLE
DOING IN ELECTRON APPS
(THAT MAKE USERS MAD)**

A wide-angle photograph of a beach at sunset. The sky is filled with dark, heavy clouds, with patches of orange and yellow light from the setting sun breaking through. In the foreground, there's a sandy path or boardwalk leading towards the ocean. The ocean itself is visible in the distance, with some small waves. The overall atmosphere is moody and dramatic.

**MEMORY USAGE
MATTERS**

A wide-angle photograph of a beach at sunset. The sky is filled with large, billowing clouds colored in shades of orange, yellow, and blue. In the foreground, there's a dark, sandy area with a wooden fence running across it. Further back, there are several small, white beach houses or umbrellas. The ocean is visible in the distance under the warm glow of the setting sun.

Users get so mad about memory usage. Which is mostly nonsense.

Every conversation I've ever had about Electron memory usage:

Them: IM SO MAD ABOUT MEMORY USAGE

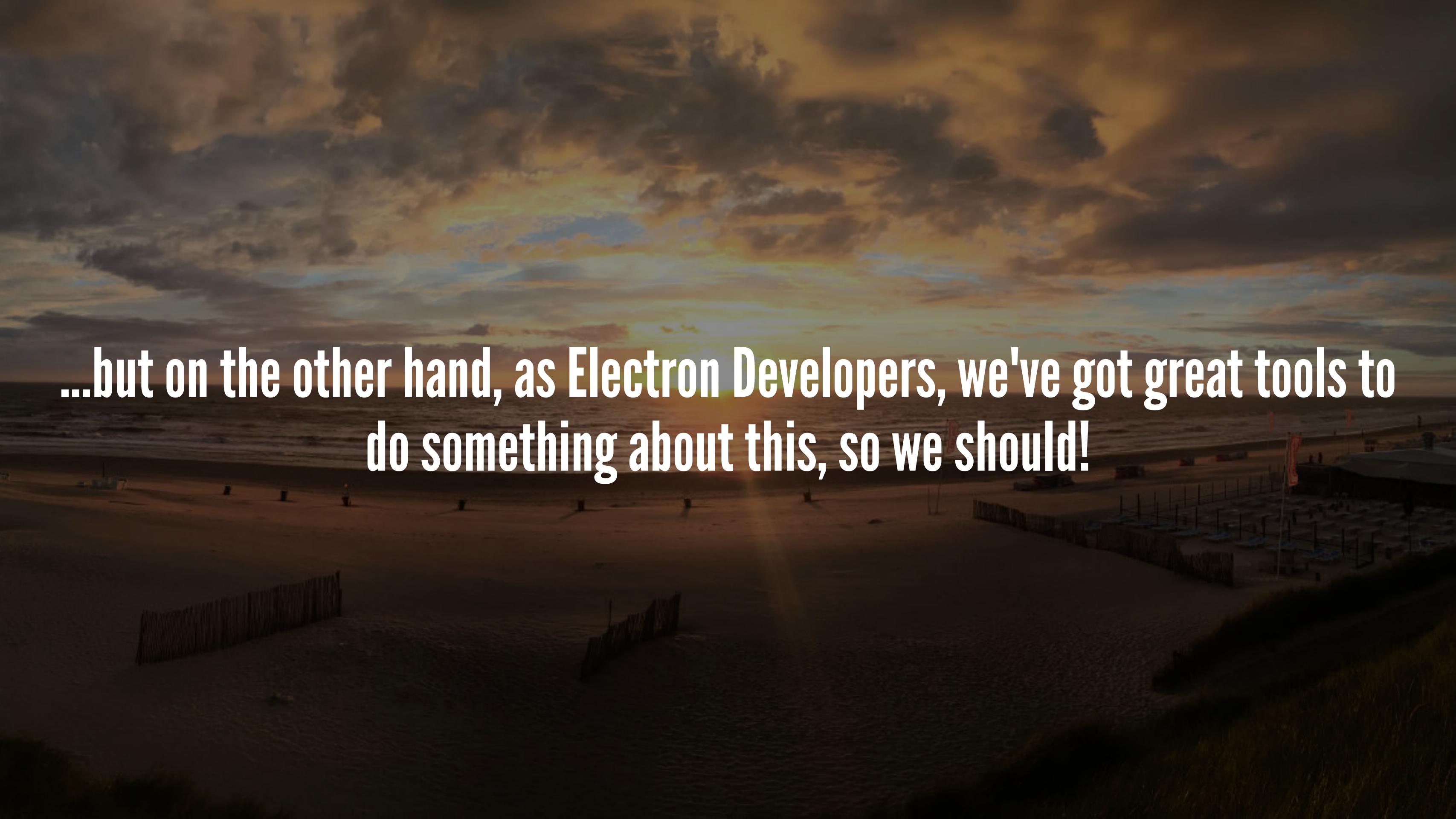
Me: I understand! So, what's the "Commit Charge" say in Task Manager? That's the percentage of RAM that is actually in-use.

Them: Oh, it's 40%.





BUZZ|ooooooooooooOFF

A wide-angle photograph of a beach at sunset. The sky is filled with large, billowing clouds colored in shades of orange, yellow, and blue. In the foreground, there's a sandy beach with several wooden stakes or poles stuck into the sand, likely used for beach erosion control. A wooden fence runs along the left side of the frame. On the right, there's some low-lying beach infrastructure. The overall atmosphere is serene and slightly melancholic.

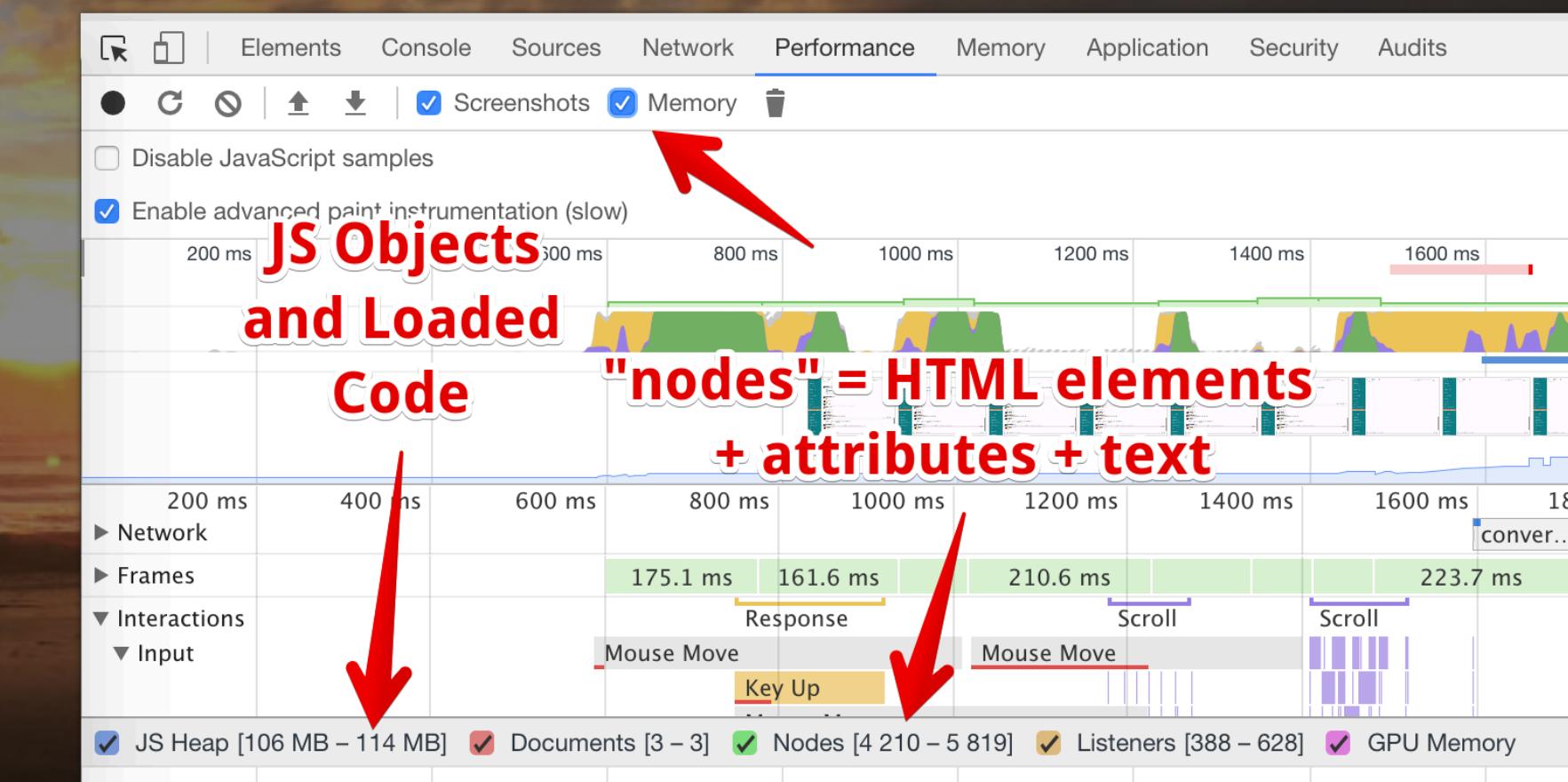
...but on the other hand, as Electron Developers, we've got great tools to
do something about this, so we should!

A wide-angle photograph of a beach at sunset. The sky is filled with large, dark, billowing clouds illuminated from behind by a bright orange and yellow sun. In the foreground, a dark wooden fence runs across the frame. Beyond the fence, the ocean is visible with gentle waves. The overall atmosphere is moody and dramatic.

LOAD LESS STUFF

LOAD LESS STUFF

- ▶ Lots and Lots of DOM Elements
- ▶ Especially Images
- ▶ JS Heap



USER REACTOR

VUE

(AND VIRTUALIZING LISTS)

LOAD LESS STUFF

- ▶ Libraries that you load in your app never get unloaded
- ▶ Bad for startup performance and for memory usage!

**require
takes time!**

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require	require	require	require

A photograph of a beach at sunset or sunrise. The sky is filled with dark, heavy clouds, with some lighter areas where the sun is visible, casting a warm glow. The ocean waves are visible in the background. In the foreground, there's a dark, textured surface, possibly sand or a paved area. Overlaid on this image is a large, bold, white sans-serif font that reads "USE THE HEAP PROFILER".

USE THE HEAP
PROFILER

The screenshot shows the Chrome DevTools interface with the 'Memory' tab selected. In the top navigation bar, 'Elements', 'Console', 'Sources', 'Network', 'Performance', 'Memory', 'Application', 'Security', and 'Audits' are listed, with 'Memory' underlined. To the right are icons for 'File' (document), 'Edit' (pencil), 'Elements' (eye), 'Console' (terminal), and 'Sources' (code). A warning icon with '1' and three vertical dots are also present.

The main area displays a table of memory usage data. The columns are: 'Profiles' (rowspan=2), 'Constructor' (rowspan=2), 'Distance' (rowspan=2), 'Objects Count' (rowspan=2), 'Shallow Size' (rowspan=2), and 'Retained Size' (rowspan=2).

Profiles	Constructor	Distance	Objects Count	Shallow Size	Retained Size
HEAP SNAPSHOT	► global / file://	1	1 0 %	56 0 %	12 887 019 80
	► (compiled code)	3	10 321 9 %	2 040 872 13 %	10 506 120 65
Snapshot 1 15.4 MB	► Object	2	1 376 1 %	81 352 1 %	7 247 528 45
	► (string)	2	13 094 11 %	6 911 432 43 %	6 911 432 43
	► (system)	-	61 251 52 %	2 675 056 17 %	3 961 104 25

A scenic landscape featuring a vast mountain range in the background under a sky transitioning from deep blue to warm orange and yellow hues near the horizon. In the foreground, there are large, light-colored rock formations and some green shrubs and trees. A wooden fence post is visible on the right side.

**DON'T RUN STUFF
IN THE MAIN
PROCESS**

A wide-angle photograph of a mountainous landscape at sunset. In the foreground, large, light-colored boulders are scattered across the ground. To the right, a tall, dark evergreen tree stands prominently. The middle ground shows a range of mountains with their peaks partially obscured by the setting sun, which casts a warm orange glow across the sky. The background is a vast, hazy expanse of hills under a clear, blue-grey sky.

but what about...?

A landscape photograph of a mountainous region at sunset. In the foreground, there are large, light-colored boulders and rocks. To the right, a tall tree trunk is visible. The background features a range of mountains under a sky transitioning from blue to orange and yellow. A large, bold, white text "NO" is overlaid on the center-left portion of the image.

NO

WHAT THE MAIN PROCESS IS NOT

- ▶ "The Backend"
- ▶ "A Background Thread"
- ▶ "The Server"

THE MAIN
PROCESS IS FOR
ORCHESTRATION

THE MAIN PROCESS IS FOR ORCHESTRATION

Running code in the main process slows everything else down

Chromium uses IPC internally to do things, such as signaling window size changes

So when the main thread is busy, your app glitches!

THE MAIN PROCESS IS FOR ORCHESTRATION

ipc.send is asynchronous which is Better, but not enough!

The main process can still do a lot of work as a result of ipc.send, and
block stuff

THE MAIN PROCESS IS FOR ORCHESTRATION

The main process should really only be used to tell other processes what to do

- ▶ Sending information between windows
- ▶ Signalling menu items and dock events
- ▶ Crash reporting and other APIs that only work in the main process

A scenic landscape featuring a vast valley with rolling hills and mountains in the background. In the foreground, there are large, light-colored rock formations with distinct horizontal layers. A dense forest of green pine trees is visible on the right side. The sky is filled with warm, golden hues of sunset or sunrise, casting a glow over the entire scene.

**SO HOW CAN I DO
STUFF THEN??**

A scenic landscape at sunset or sunrise. In the foreground, there are large, light-colored, layered rocks. In the middle ground, a valley opens up with more mountains in the distance. The sky is a gradient from dark blue at the top to a warm orange and yellow near the horizon. A few evergreen trees are visible on the right side.

**WHAT IF WE CREATE A BROWSERWINDOW
BUT DIDN'T SHOW IT?**



Search or jump to...



Pull requests Issues Marketplace Explore



electron-userland / electron-remote

Unwatch ▾

12

Star

366

Fork

30

Code

Issues 15

Pull requests 4

Projects 0

Wiki

Insights

Settings

Execute JavaScript in remote electron processes with remote

Edit

Manage topics

135 commits

ELECTRON-REMOTE

2 branches

2 releases

5 contributors

MIT

Branch: master ▾

New pull request

Create new file

Upload files

Find file

Clone or download ▾



paulcbetts Merge pull request #41 from electron-userland/security-upgrades



Latest commit b314f9c on Jun 12



src

Add configurable timeouts to several things

5 months ago



test

Update the tests a bit

5 months ago

ELECTRON-REMOTE, DOING WORK FROM THE MAIN PROCESS

```
import { createProxyForRemote } from 'electron-remote';

// myWindowJs is now a proxy object
// for myWindow's `window` global object
const myWindowJs = createProxyForRemote(myWindow);

// Functions suffixed with _get
// will read a value
userAgent = await myWindowJs.navigator.userAgent_get()
```

window.requestIdleCallback()

Languages

Jump to: [Syntax](#) [Example](#) [Specifications](#) [Browser compatibility](#) [See also](#)

Web technology for developers >

Web APIs

window.requestIdleCallback()

Related Topics

Window

Properties

applicationCache

caches

closed

console

controllers

crypto

customElements

REQUESTIDLECALLBACK IS SUPERCOOL

You can call `requestIdleCallback()` within an idle callback function to schedule another callback to take place no sooner than the next pass through the event loop.

A `timeout` option is strongly recommended for required work, as otherwise it's possible multiple seconds will elapse before the callback is fired.

REQUESTIDLECALLBACK IS SUPER COOL

Like setTimeout but only runs once the UI is no longer busy

The callback allows you to repeatedly schedule requestIdleCallback to do work in a loop

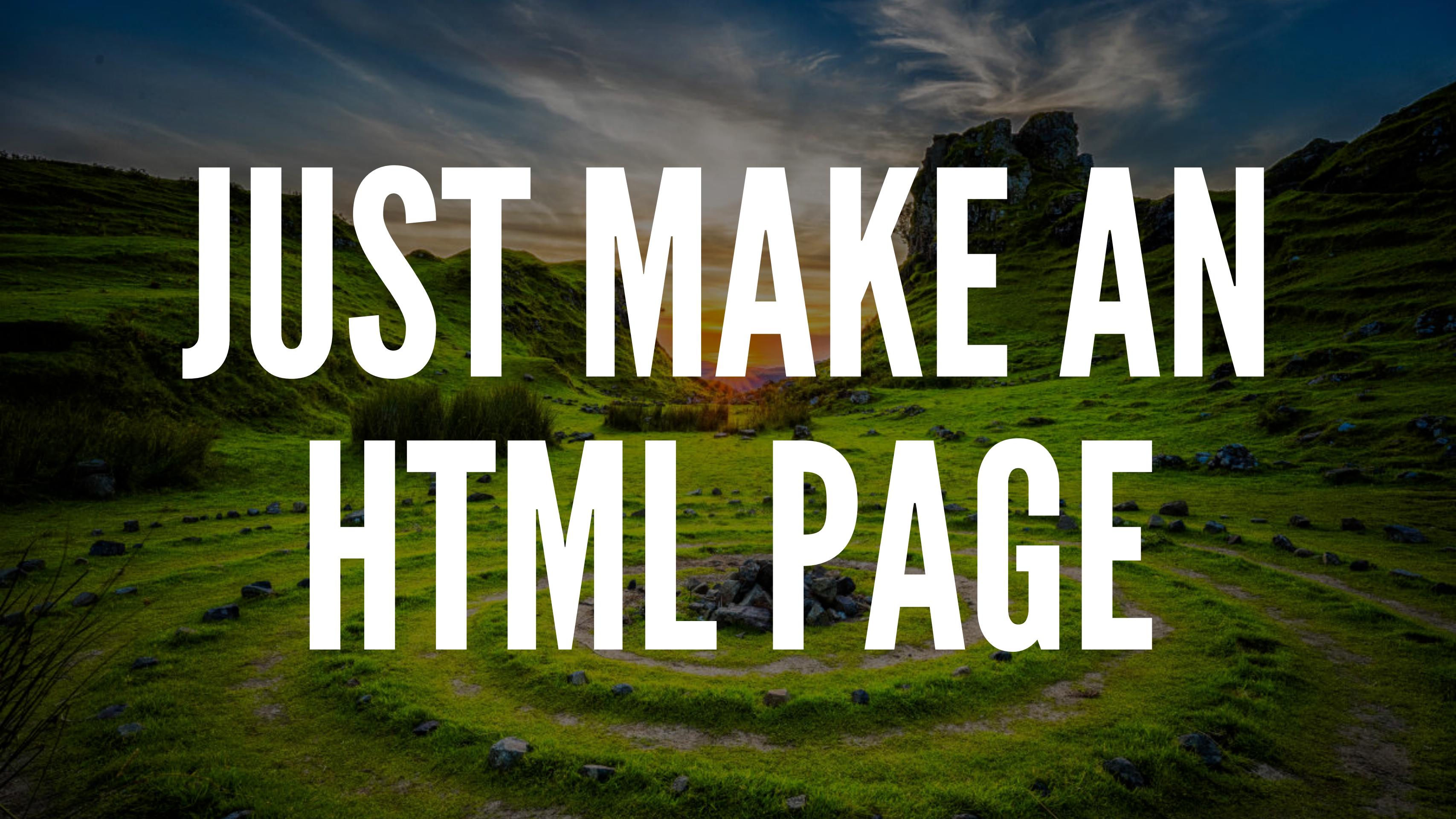
Writing App Data in the background is a great place to use requestIdleCallback

ELECTRON-REMOTE, TASKPOOL

```
import { requireTaskPool } from 'electron-remote';

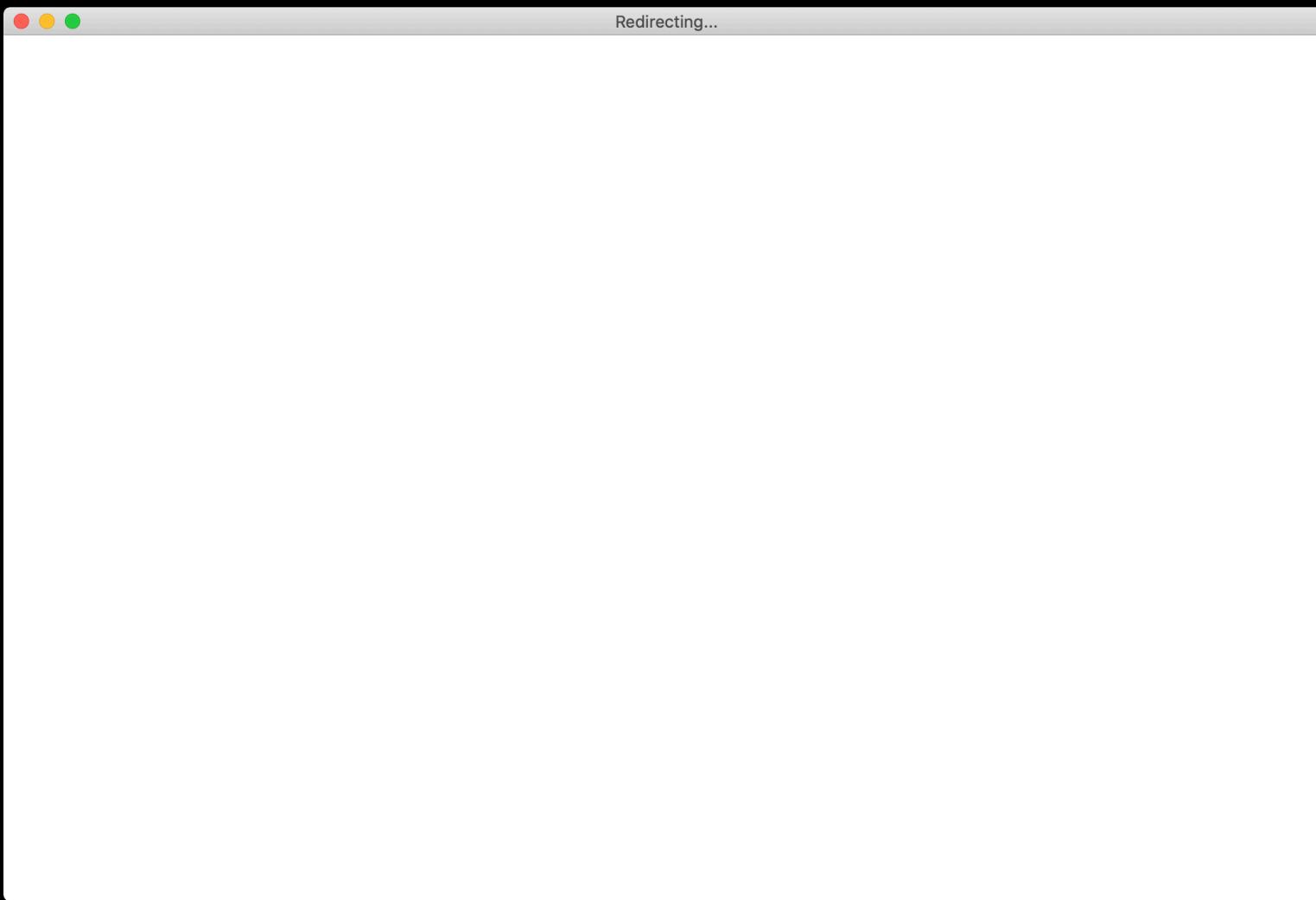
const myCoolModule = requireTaskPool(
  require.resolve('./my-cool-module'));

// This method will run synchronously,
// but in a background BrowserWindow process
// so that your app will not block
let result = await myCoolModule.calculateDigitsOfPi(100000);
```

A wide-angle photograph of a natural landscape. In the foreground, there's a grassy field with scattered dark rocks. A dirt path or track cuts through the grass. In the middle ground, there are more green hills and a prominent, rugged, light-colored rock formation or cliff face. The sky is filled with dramatic, layered clouds, ranging from dark grey to bright white, suggesting either sunrise or sunset. The overall scene is peaceful and scenic.

**JUST MAKE AN
HTML PAGE.**

THIS EXPERIENCE IS A DRAG.



JUST MAKE AN HTML PAGE

Putting a website into an Electron frame is easy, but not great for Users

Offline Mode is way easier

Your app will start Really Fast

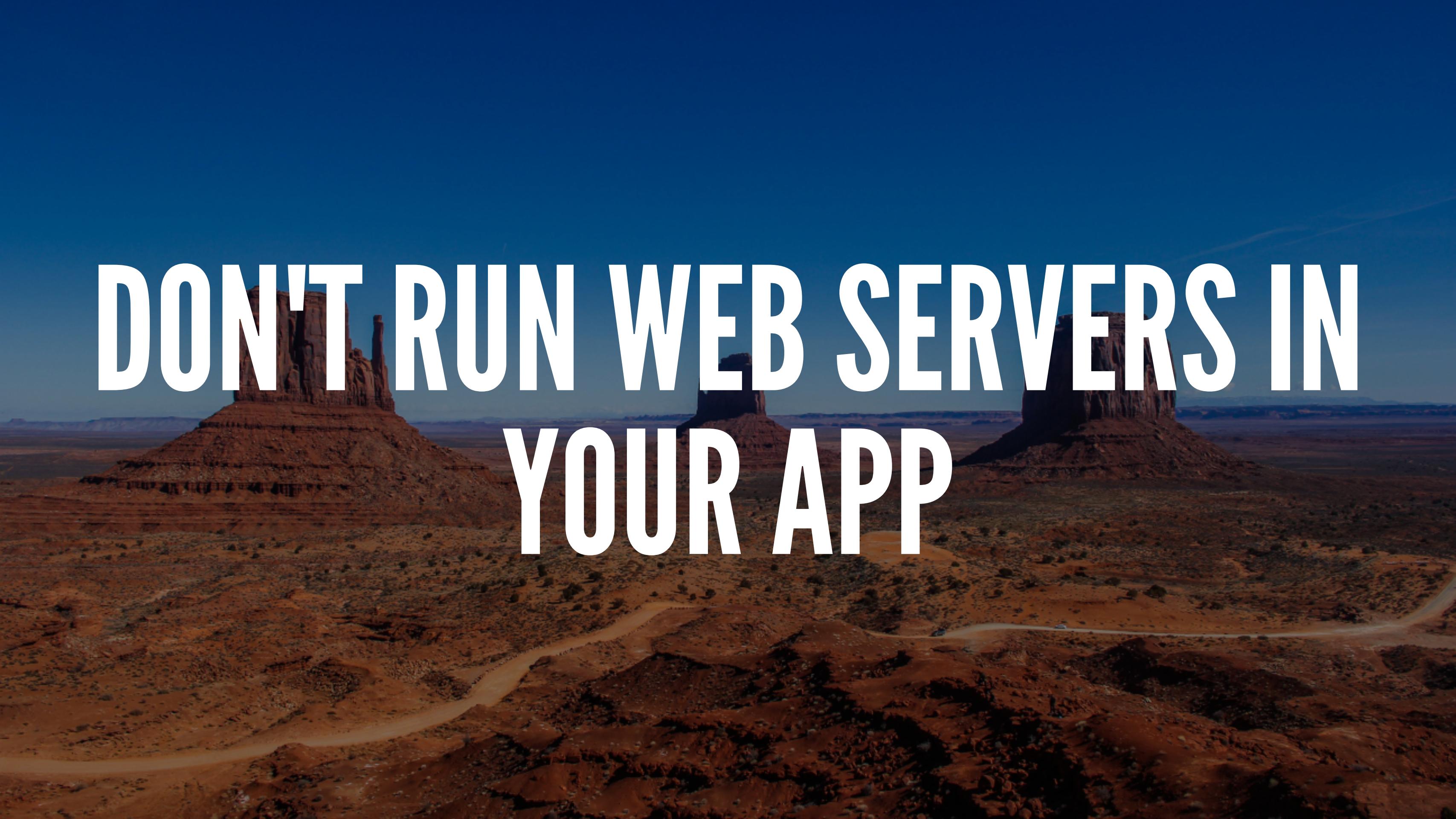
Starting with a Desktop Mindset will make your app feel like an app

HTML PAGES ARE MORE SECURE

Designing a hybrid app is Very Security Sensitive, so that you don't accidentally give Desktop Powers™ to remote content

When all of the code for your app is local, you remove this possibility altogether

XSS is still extremely important to watch out for!

A scenic view of Monument Valley, featuring several large, reddish-brown sandstone mesas rising from a dry, arid landscape. A dirt road winds its way through the valley floor between the mesas. The sky is clear and blue.

**DON'T RUN WEB SERVERS IN
YOUR APP**

DON'T RUN WEB SERVERS IN YOUR APP

...cause like, what if more than one user uses your app?

Your web service now a great way to move data between different users

If you run as Admin, it's now a great way to local EoP

...or if you're really unlucky, have arbitrary websites run Desktop code

Electron Forge

The command line interface for ambitious Electron applications



Ready for a closer look? Dive into the [CLI documentation](#)

Opinionated Electron development

Modern language compilation, one-step builds for all platforms,
and sane templates for your favorite frameworks.

USE ELECTRON-FORGE

electron-forge handles all of the things you might want to use Express or Webpack for, like Hot Module Reload

It handles Babel/TypeScript/LESS/Sass via hooking Electron and compiling on-the-fly during development

electron-forge does all of the packaging and compilation work too

A wide-angle photograph of the Monument Valley desert landscape. In the foreground, a dirt road winds through the reddish-brown sandstone buttes. The middle ground shows more of the valley floor with sparse vegetation. In the background, the iconic buttes of Monument Valley rise against a clear blue sky. A faint contrail from an airplane is visible in the upper right corner.

BUT I LIKE WEBPACK!

BUT I LIKE WEBPACK!

Trying to interact with Electron itself gets Weird because now there are two separate module systems

Native node modules are a pain with Webpack, both at runtime and on the build side

Packaging becomes way more complex



PERFORMANCE,
BLAH.



SECURITY, BORINGCo



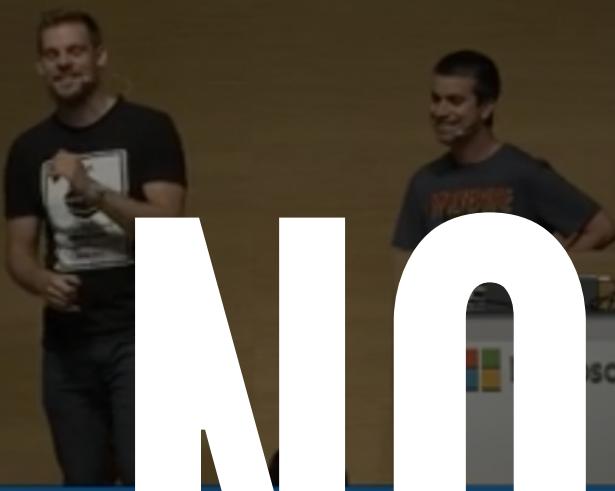
A night photograph of a busy street in Tokyo, Japan, with neon signs and people walking. The scene is filled with bright lights from various storefronts and billboards, creating a vibrant urban atmosphere. In the foreground, a crosswalk is visible with white markings. The background shows a dense concentration of buildings and commercial activity.

MEMORY, UCHI

NODEFRITSCHOOL



T6976



Node.js
Features from Node.js and Electron
Igor Baiborodov
Senior Software Engineer

Node.js
Windows
from Node.js and Electron
Felix Ritterberg
Senior Desktop Engineer @ Slack

#MSBuild



A night photograph of a busy street in Tokyo, Japan, with neon signs and people walking.

**CALL WIN10 APIs FROM
ELECTRON SUPER EASILY**

SOME COMPELLING EXAMPLES:

- Windows.Devices.Display
- Windows.Devices.Geolocation
- Windows.Media.Capture
- Windows.Media.OCR
- Windows.System.Power



A night photograph of a busy street in Tokyo, Japan, likely Shinjuku or Shibuya. The scene is filled with bright neon signs in Japanese characters (kanji and hiragana) advertising various businesses like "ラムしゃぶ" (ramen), "カラオケ" (karaoke), and "BAR 油そば". People are walking along the sidewalks, and the street is wet, reflecting the city lights.

WHAT ABOUT MACOS?



(ツ)/

There's no easy way to call macOS APIs from Electron, you have to write
a Native Node Module.

You can do very simple things with node-ffi, but more complicated
things will lead to Segfault City

A night photograph of a busy street in Tokyo, Japan, likely Shinjuku or similar. The scene is filled with bright neon signs in Japanese and English for various businesses like "カラオケ BIG ECHO" and "ラムしゃぶ 金の目 渋谷店". People are walking along the sidewalks, and the street is wet, reflecting the lights.

HOW CAN I FIGURE OUT WHAT I CAN DO?

Recent

Installed

Visual C#

Get Started

Windows Universal

Windows Desktop

.NET Core

.NET Standard

Test

Visual Basic

Visual C++

JavaScript

Other Project Types

Dependency Validation

Online

Sort by: Default



Search (Ctrl+E)



Blank App (Universal Windows)

Visual C#



Class Library (Universal Windows)

Visual C#



Windows Runtime Component (Universal Windows)

Visual C#



Optional Code Package (Universal Windows)

Visual C#



Unit Test App (Universal Windows)

Visual C#



Coded UI Test Project (Universal Windows)

Visual C#

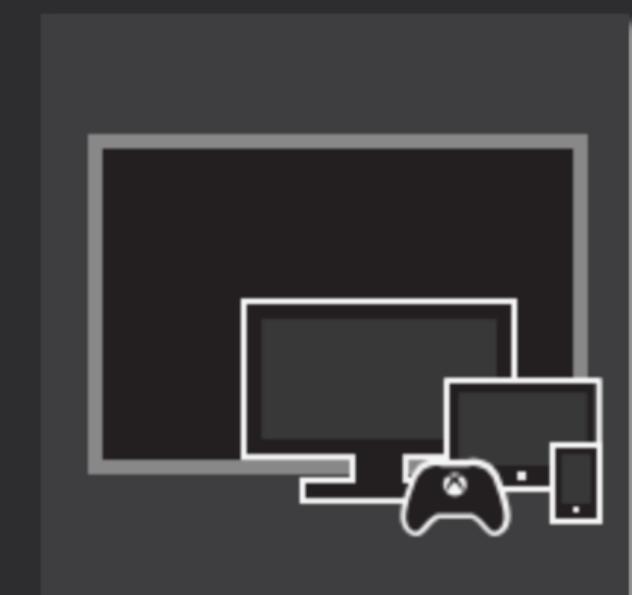


Windows Application Packaging Project

Visual C#

Type: Visual C#

A project for a single-page Universal Windows Platform (UWP) app that has no predefined controls or layout.



Not finding what you are looking for?

[Open Visual Studio Installer](#)

Name: App1

Location: C:\Users\me\source\repos

Browse...

Solution: Create new solution

Solution name: App1

 Create directory for solution Create new Git repository

OK

Cancel

Windows Media Capture

Reference Manager - App2

Assemblies

Projects

Shared Projects

Universal Windows

- Core
- Extensions
- Recent

Browse

Filtered to: SDKs applicable to App2

	Name	Version
	Microsoft General MIDI DLS for Universal Windo...	10.0.171...
	Microsoft Universal CRT Debug Runtime	10.0.171...
	Microsoft Universal CRT Debug Runtime	10.0.102...
	Microsoft Visual C++ 2013 Runtime Package for...	14.0
	Microsoft Visual Studio Test Core	15.5
	Microsoft Visual Studio Test Core	15.0
	MSTest for Managed Projects	15.5
	MSTest for Managed Projects	15.0
	Visual C++ 2012 UWP Desktop Runtime for nativ...	14.0
	Visual C++ 2013 UWP Desktop Runtime for nativ...	14.0
	Visual C++ 2015 Runtime for Universal Windows...	14.0
	Visual C++ 2015 UWP Desktop Runtime for nativ...	14.0
<input checked="" type="checkbox"/>	Windows Desktop Extensions for the UWP	10.0.171...
	Windows IoT Extensions for the UWP	10.0.171...
	Windows Mobile Extensions for the UWP	10.0.171...
	Windows Team Extensions for the UWP	10.0.171...

Search (Ctrl+E)

?

X

Browse... OK Cancel

Connected Services

Properties

References

- Analyzers
- Microsoft.NETCore.UniversalWindowsPlatform
- Universal Windows
- Assets
- App.xaml
- App2_TemporaryKey.pfx
- MainPage.xaml
- MainPage.xaml.cs
- Package.appxmanifest



File Edit View Project Build Debug Team Tools

	Solution Explorer	
	Team Explorer	Ctrl+\ Ctrl+M
	Server Explorer	
	Bookmark Window	Ctrl+K, Ctrl+W
	Call Hierarchy	
	Class View	Ctrl+Shift+C
	Code Definition Window	Ctrl+\ D
	Object Browser	
	Error List	Ctrl+\ E
	Output	
	Task List	Ctrl+\ T

- ↳ **Windows**
 - ↳ **Windows.AI.MachineLearning.Preview.MachineLearn**
 - ↳ **Windows.ApplicationModel.Calls.CallsVoipContract**
 - ↳ **Windows.ApplicationModel.SocialInfo.SocialInfoCo**
 - ↳ **Windows.ApplicationModel.StartupTaskContract**
 - ↳ **Windows.Devices.Custom.CustomDeviceContract**
 - ↳ **Windows.Devices.DevicesLowLevelContract**
 - ↳ **Windows.Devices.Printers.PrintersContract**
 - ↳ **Windows.Devices.SmartCards.SmartCardBackground**
 - ↳ **Windows.Devices.SmartCards.SmartCardEmulatorC**
 - ↳ **Windows.Foundation.FoundationContract**
 - ◀ **Windows.Foundation.UniversalApiContract**
 - ▷ {} **Windows.ApplicationModel**
 - ▷ {} **Windows.ApplicationModel.Activation**
 - ▷ {} **Windows.ApplicationModel.AppExtensions**
 - ▷ {} **Windows.ApplicationModel.Appointments**
 - ▷ {} **Windows.ApplicationModel.Appointments.Appo**
 - ▷ {} **Windows.ApplicationModel.Appointments.Data**
 - ▷ {} **Windows.ApplicationModel.AppService**
 - ▷ {} **Windows.ApplicationModel.Background**
 - ▷ {} **Windows.ApplicationModel.Calls**
 - ▷ {} **Windows.ApplicationModel.Chat**
 - ▷ {} **Windows.ApplicationModel.Contacts**
 - ▷ {} **Windows.ApplicationModel.Contacts.DataProvid**
 - ▷ {} **Windows.ApplicationModel.Contacts.Provider**
 - ▷ {} **Windows.ApplicationModel.Core**
 - ▷ {} **Windows.ApplicationModel.DataTransfer**
 - ▷ {} **Windows.ApplicationModel.DataTransfer.DragD**
 - ▷ {} **Windows.ApplicationModel.DataTransfer.DragD**
 - ▷ {} **Windows.ApplicationModel.DataTransfer.ShareT**

Assembly **Windows.Foundation.UniversalApiContract**
C:\Program Files (x86)\Windows Kits\10\Windows.Foundation.UniversalApiContract.dll

THANKS!

@PAULCBETTS (GITHUB, TWITTER)

ELECTRON PRO TIPS

Red Threads:

- ▶ Performance And Memory Usage Matters
- ▶ Users Care about Memory Usage, so you should too - you have great tools to debug it!
- ▶ Just Load Less Stuff - module load time is super easy to debug in Perf tools