

Connecting a website to native software with Node.JS

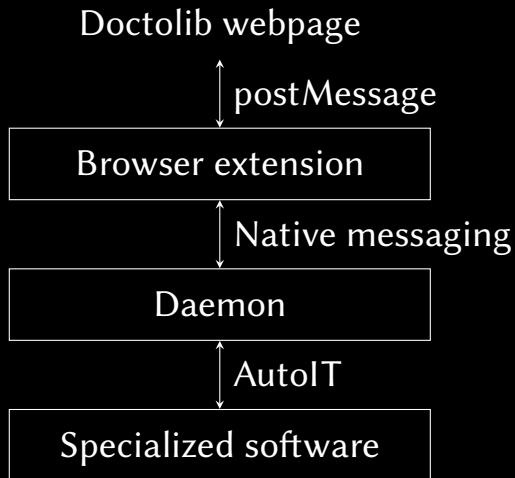
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Our peculiar use case

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Overview



Web extensions, a primer

Web extensions are written in JS and composed of

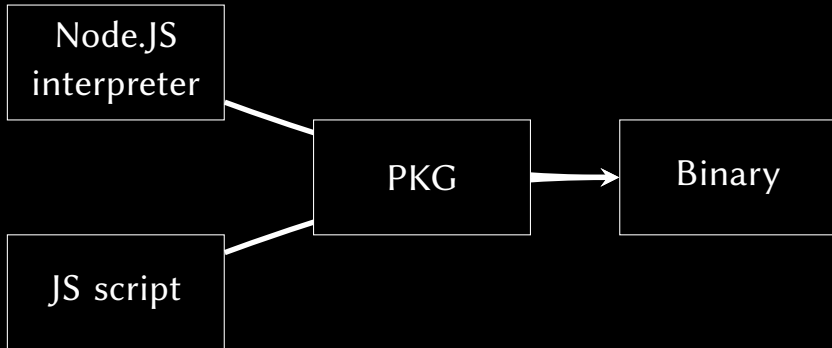
- ▶ Content scripts running in tabs, with access to the DOM.
- ▶ Background scripts running separate from tabs.
- ▶ The manifest file which ties everything together.

Native messaging?



```
npm install chrome-native-messaging
```

So how is it all deployed?



Why use PKG?

- ▶ You don't need to install Node.JS.
- ▶ You get cross-compilation for free.
- ▶ You can sign the binary.

What's AutoIT?

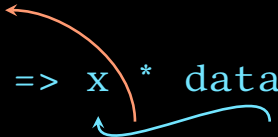
```
WinActivate("Mozilla Firefox") ;  
WinWaitActive("Mozilla Firefox") ;  
Send("{HOME}") ;  
Send("https://example.com") ;  
Send("{ENTER}") ;
```


What's a DLL again?

- ▶ A *Dynamic Link Library*.
- ▶ Contains code and data to be loaded and run by a program at runtime.
- ▶ That's not very different from how CommonJS imports work.

CommonJS modules

```
const data = 42  
const foo = (x) => x * data  
module.exports = { data, foo }
```



Binary code

```
int data = 42;  
  
int foo(int x) {  
    return x * data;  
}
```

Binary code

00	70	6C	65	61	73	65	20	73	Data
08	65	6E	64	20	68	65	6C	70	
10	20	69	E2	80	2A	00	00	00	
18	99	6D	20	74	72	61	70	70	
20	65	64	20	69	6E	20	74	68	
28	65	20	73	6F	66	74	77	61	
30	20	66	61	63	74	6F	72	79	
<hr/>									
38	f	o	o	00	20	00	00	00	Symbol table
40	d	a	t	a	14	00	00	00	

So how do we call that native function?

You can use either ffi or N-API.

ffi...

- ▶ Is a Node.JS module.
- ▶ Requires explicit code to load the library.
- ▶ Requires all types to be rewritten in Javascript.
- ▶ Can call all function synchronously or asynchronously.

N-API...

- ▶ Is an API for building C++ libraries called from JS.
- ▶ Requires you to write bindings in C++.
- ▶ Requires all types to be specified in C++.
- ▶ Requires extra work to offer asynchronous and synchronous variants of functions.

So how do we call that native function with ffi?

Let's build it together!

What when the DLL isn't thread-safe?

That's a topic for an entire talk, or maybe a blog post, such as this one I wrote! <https://bit.do/thread-unsafe-ffi>

Want more?

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