



# WebAssembly

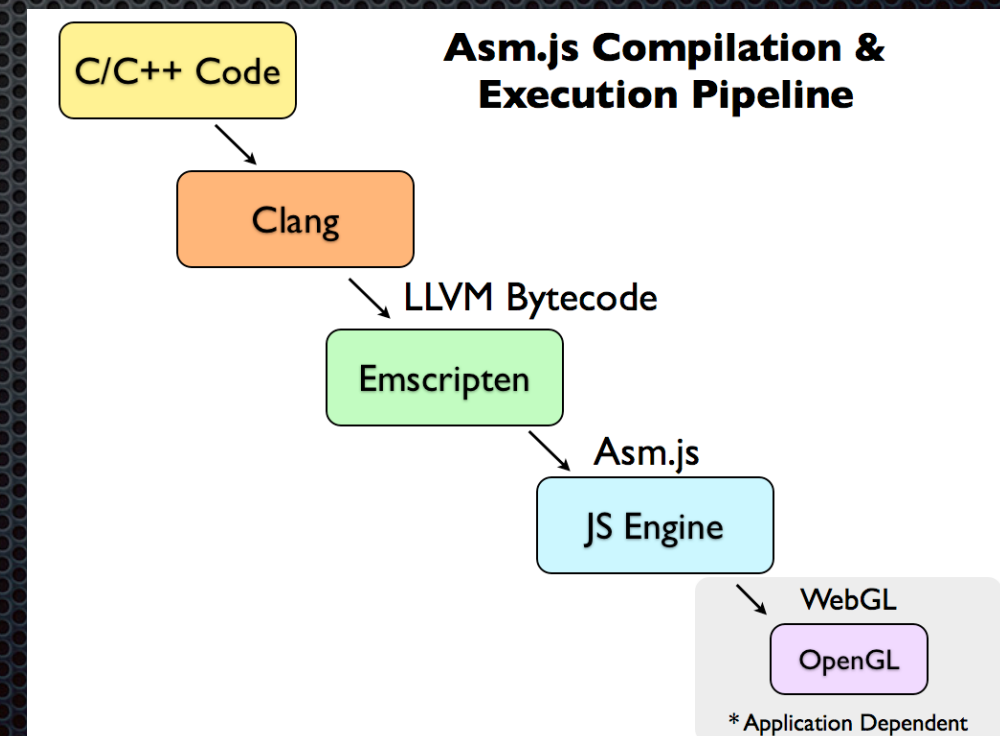
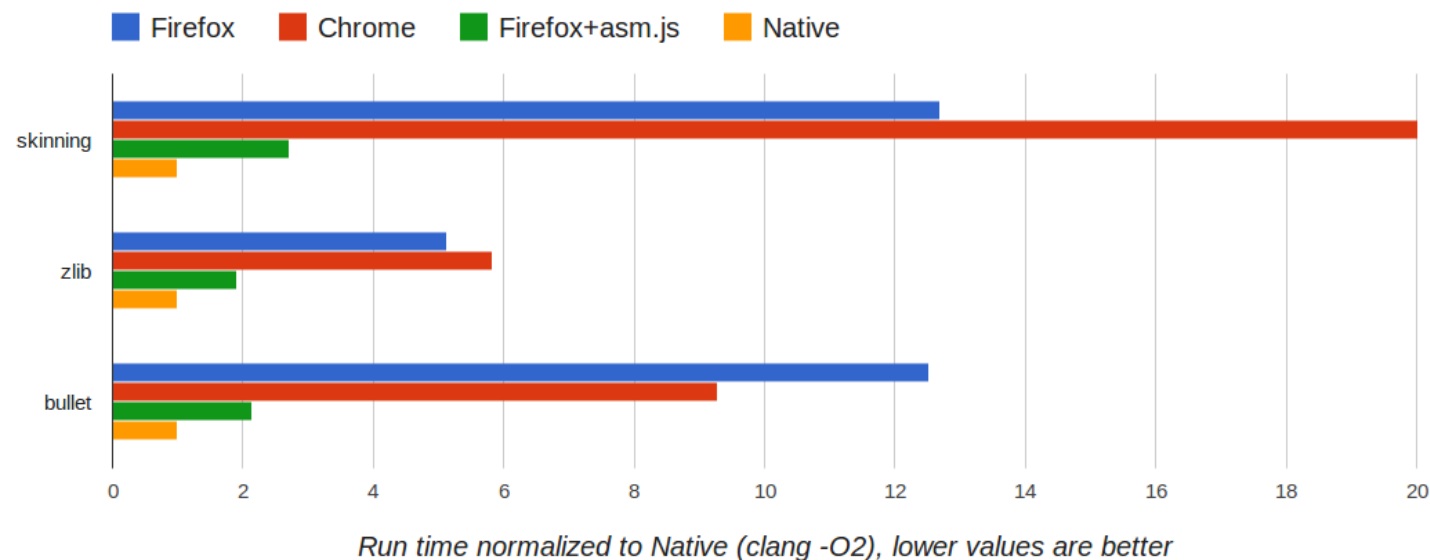
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# asm.js

- ✧ compiled C/C++ in JS
- ✧ low-level JS subset with high efficiency

```
1 function Vb(d) {  
2     d = d | 0;  
3     var e = 0, f = 0, h = 0, j = 0, k = 0, l = 0, m = 0, n = 0,  
4         o = 0, p = 0, q = 0, r = 0, s = 0;  
5     e = i;  
6     i = i + 12 | 0;  
7     f = e | 0;  
8     h = d + 12 | 0;  
9     j = c[h >> 2] | 0;  
10    if ((j | 0) > 0) {  
11        c[h >> 2] = 0;  
12        k = 0  
13    } else {  
14        k = j  
15    }  
16    j = d + 24 | 0;  
17    if ((c[j >> 2] | 0) > 0) {  
18        c[j >> 2] = 0
```





# Initial WebAssembly

- ✦ asm.js in binary format
- ✦ But...
  - ✦ 20 times faster parsing JS
  - ✦ evolved simpler (without AOT constraints)

C++	Binary	Text
	20 00	get_local 0
	42 00	i64.const 0
	51	i64.eq
	04 7e	if i64
	42 01	i64.const 1
	05	else
	20 00	get_local 0
	20 00	get_local 0
	42 01	i64.const 1
	7d	i64.sub
	10 00	call 0
	7e	i64.mul
	0b	end
int factorial(int n) { if (n == 0) return 1; else return n * fac(n-1); }		

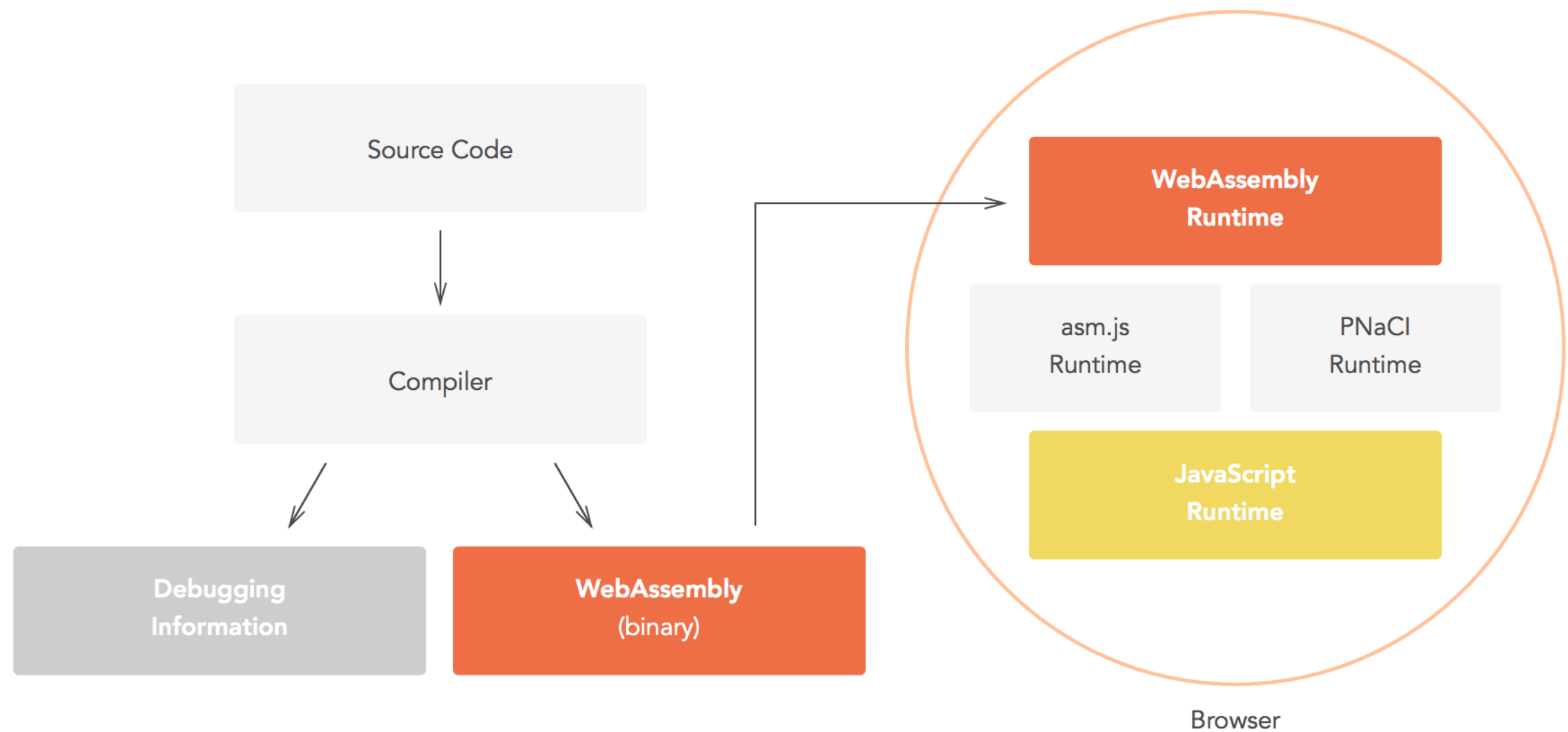


# Wasm as Future Web Platform

- ✦ Define an Abstract Syntax Tree (AST) stored in binary format. Close to native speed.
- ✦ Add threads, zero cost exceptions, and SIMD.
- ✦ Bring language diversity to the web platform.
- ✦ Integrate with existing platforms / support non-browser embeddings



# Wasm as Future Web Platform





# Use Cases

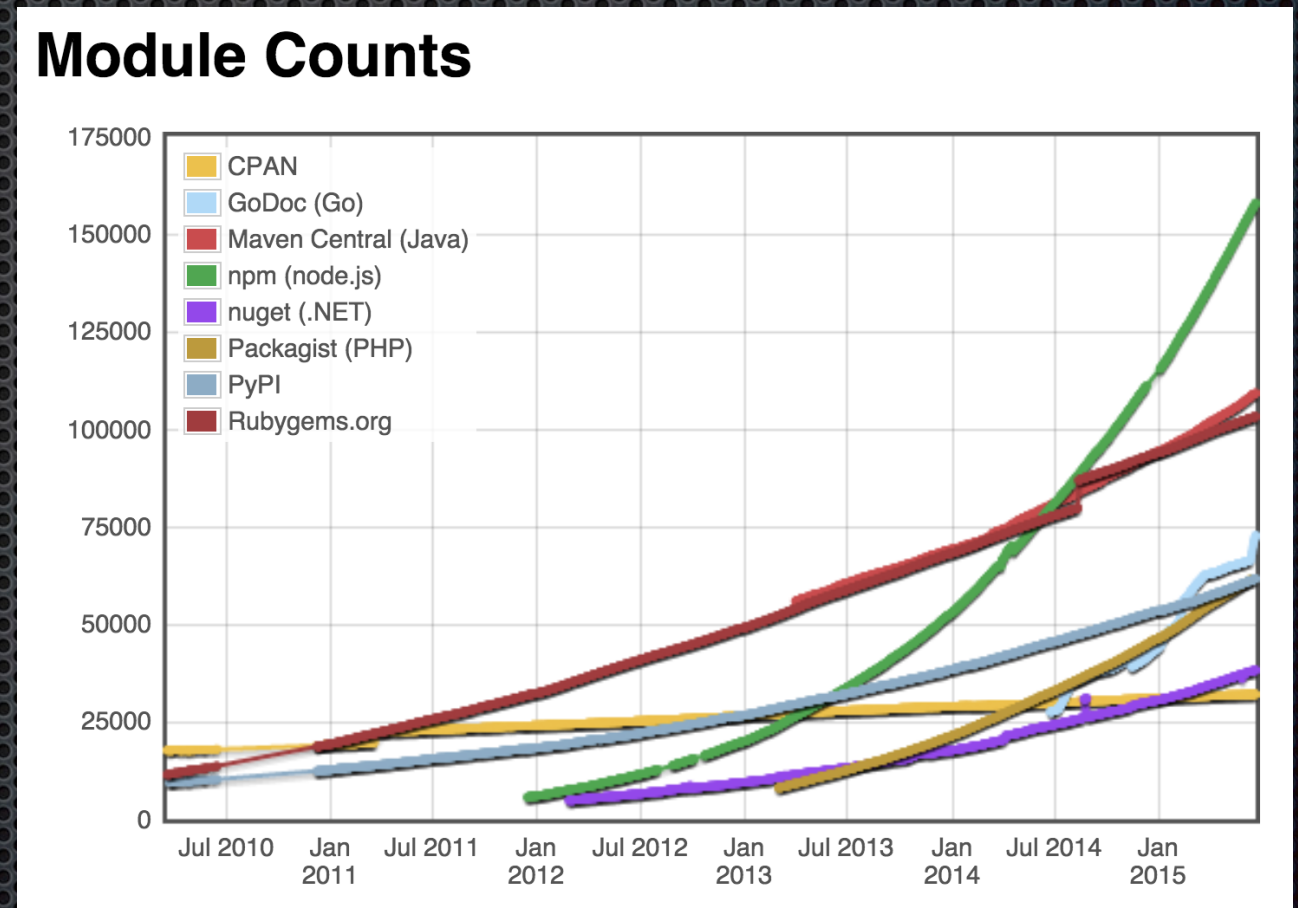
- Better execution for languages and toolkits that are currently cross-compiled to the Web (C/C++, GWT,...)
- Image / video editing / Games
- P2P Apps / VR / AR
- Platform simulation / Developer tools
- Server-side application
- Hybrid native apps on mobile devices





# Replace Javascript?

- ✦ Again, wasm is a platform
- ✦ Javascript is competitive
- ✦ Integrate well with the existing Web platform (Javascript APIs, Modules)
- ✦ But in long term?





# Summary

- WebAssembly is a continued evolution of ASM.js
- WebAssembly is promising as a low-level web platform
- WebAssembly will not replace Javascript in the near future



# Reference

- ✦ <https://github.com/WebAssembly/design>
- ✦ <http://ejohn.org/blog/asmjs-javascript-compile-target/>
- ✦ <https://medium.com/javascript-scene/why-we-need-webassembly-an-interview-with-brendan-eich-7fb2a60b0723#.w9vydyns8>
- ✦ <https://auth0.com/blog/7-things-you-should-know-about-web-assembly/>