

A 10,000 ft view of the WebAssembly landscape

Hello!

I am Divya Mohan

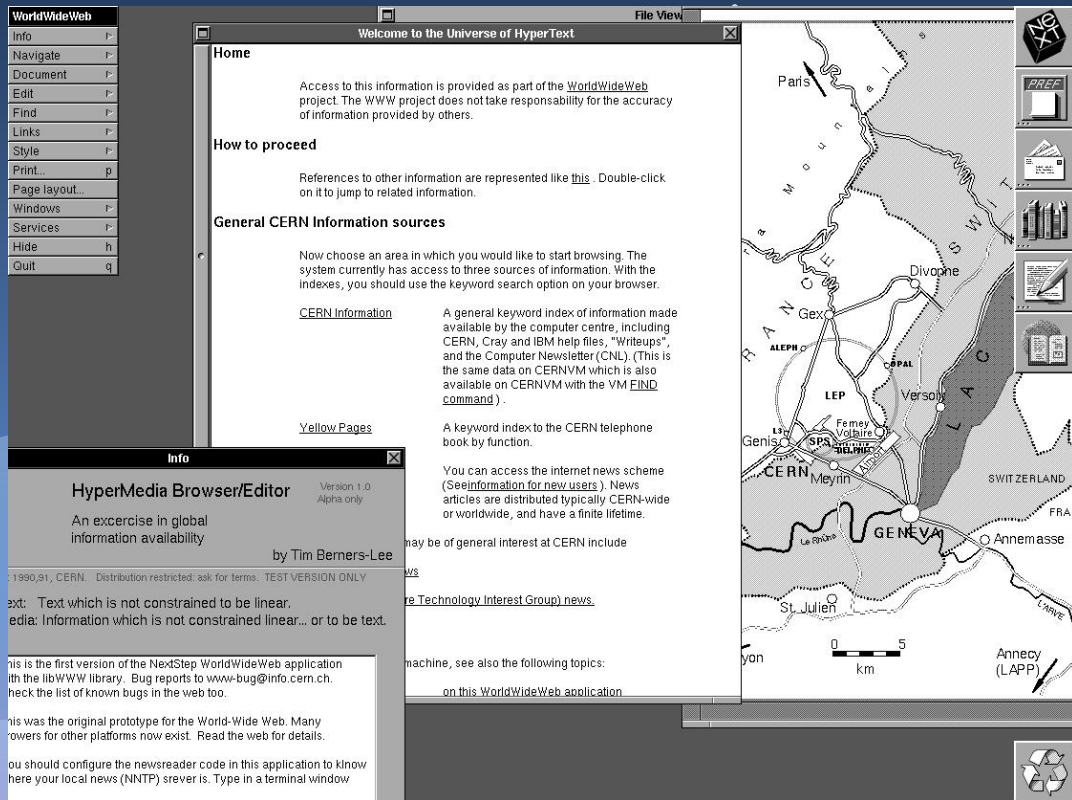
You can find me at

- Twitter: @Divya_Mohan02
- GitHub: @divya-mohan0209



The origin story



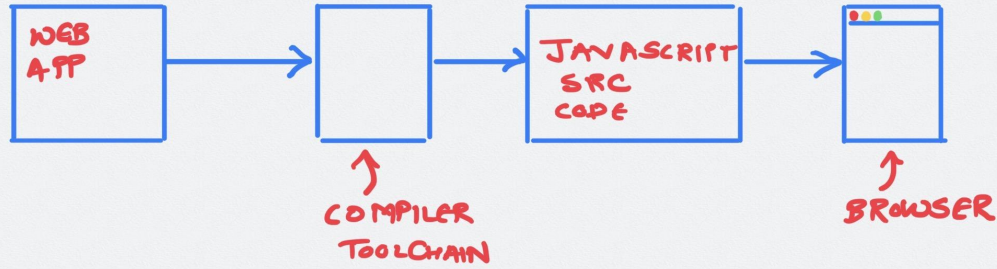


The age of



... And Plugins





What didn't go well?

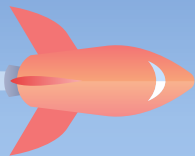
JavaScript

- Not designed to be a compilation target
- Weakly typed
- Eventually faster

Plugins

- Massive security nightmare
- Compatibility issues across devices
- Better ways to enable client-side development





One step closer

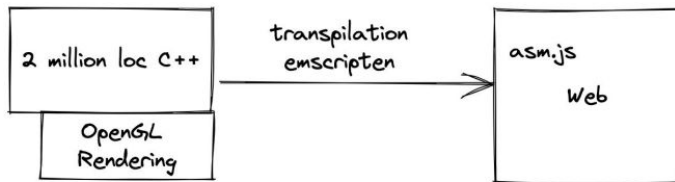
The asm.js specification

The Greatest Hack



CLOUD NATIVE
Wasm DAY

- **The Solution:** transpile to asm.js
- WebGL rendering => eventually changed to Canvas2D



Bailey Hayes



@baihay



@ricochet

asm.js

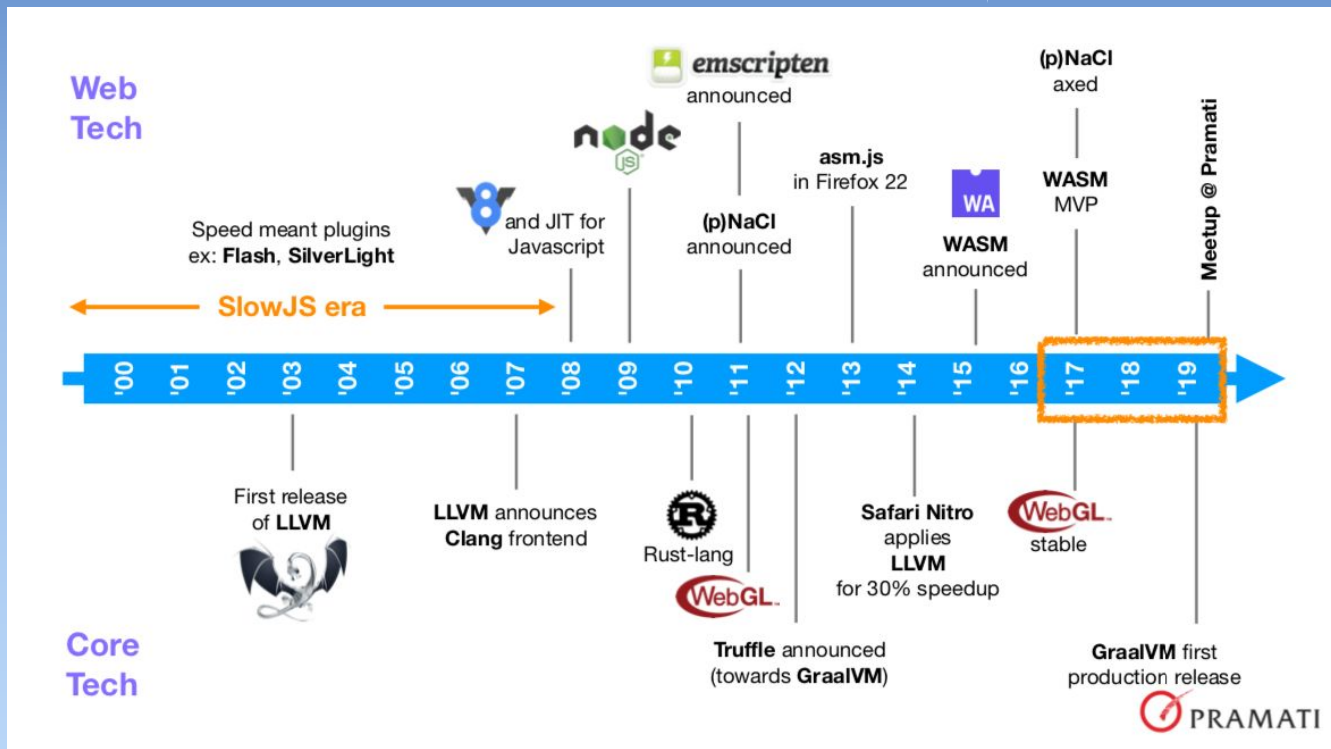
an extraordinarily optimizable, low-level subset of JavaScript

[specification](#) (work in progress)

[frequently asked questions](#)

[big web app? compile it!](#) – slide deck by [@kripken](#)

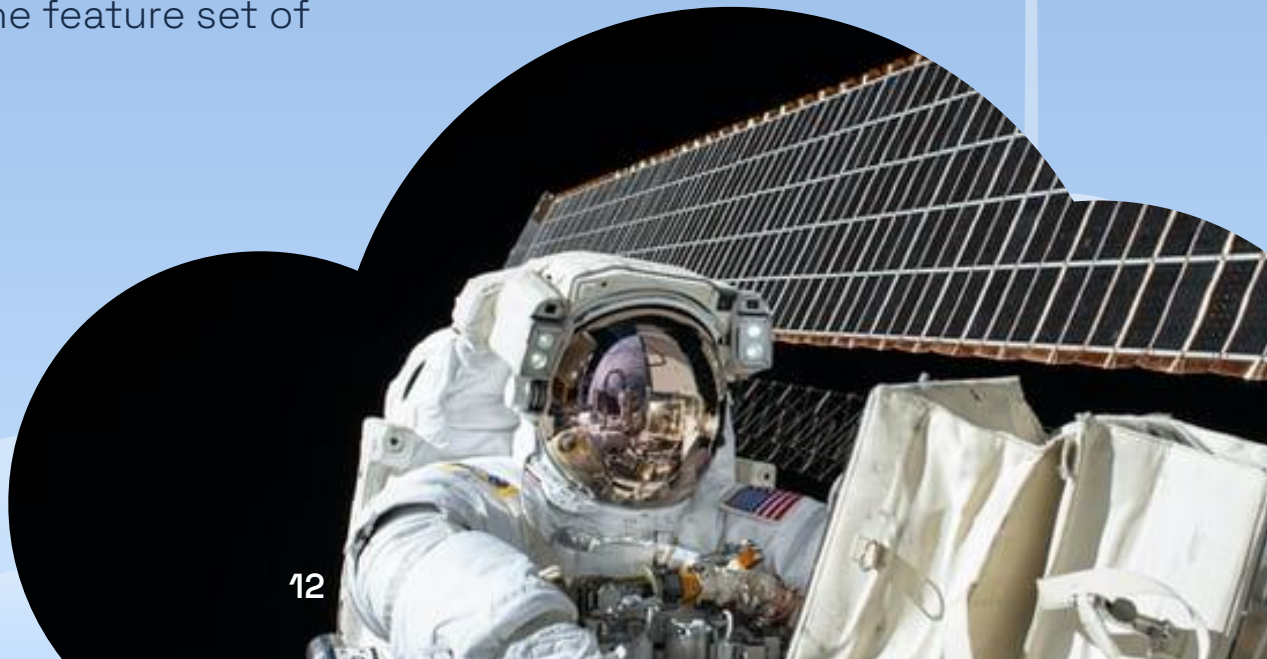
Image credits: Bailey Hayes, Second State



Source: <http://sriku.org/blog/2019/08/24/talk-the-nuts-and-bolts-of-webassembly/>

Circa 2015

WebAssembly was announced with an initial implementation based on the feature set of `asm.js`



A photograph of a Space Shuttle Columbia launching from the Kennedy Space Center. The shuttle is ascending vertically, leaving a massive, bright white and orange plume of smoke and fire. The sky is a deep blue with scattered white stars. In the foreground, there are large, stylized, semi-transparent clouds in shades of blue and white. The text "2017: WebAssembly MVP announced" is overlaid in white, sans-serif font at the bottom center.

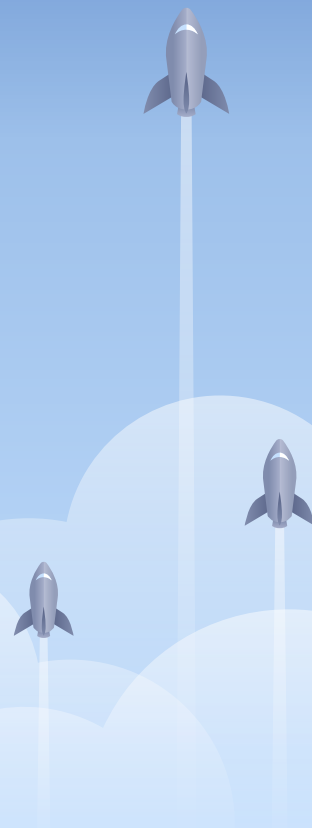
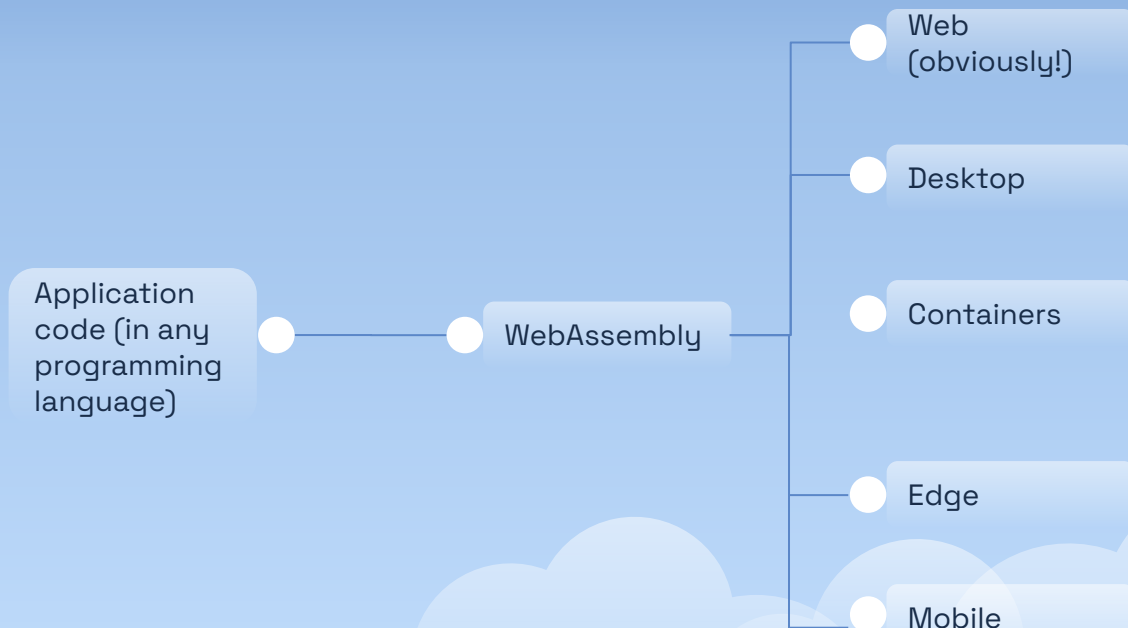
2017: WebAssembly MVP
announced

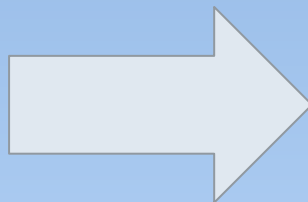
What is WebAssembly?

- Portable, language-agnostic compilation target
 - Binary code format + textual format
- Designed for the web, initially
 - But can extend to server-side & other environments



Where can WebAssembly be used?





ruffle

Powering flash emulation for



WASI, the component model, & the wider Wasm ecosystem





Solomon Hykes

@solomonstre




If WASM+WASI existed in 2008, we wouldn't have needed to create Docker. That's how important it is. Webassembly on the server is the future of computing. A standardized system interface was the missing link. Let's hope WASI is up to the task!



Lin Clark  @linclark

WebAssembly running outside the web has a huge future. And that future gets one giant leap closer today with...

 Announcing WASI: A system interface for running WebAssembly outside the web (and inside it too)

[hacks.mozilla.org/2019/03/standa...](https://hacks.mozilla.org/2019/03/standards-for-webassembly/)

2:09 AM · Mar 28, 2019



[Read the full conversation on Twitter](#)



2.1K



Reply



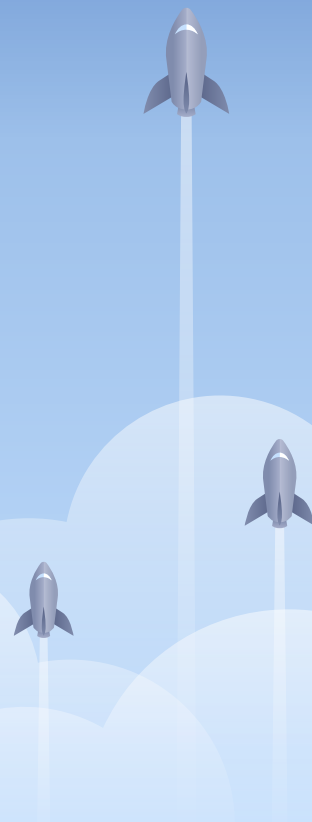
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WASI

- System interface
- Proposals currently available
 - I/O
 - Filesystem
 - Clocks
 - Random
 - Handle Index
 - Limited networking capabilities (see [WAGI](#))

-



The component model for Wasm

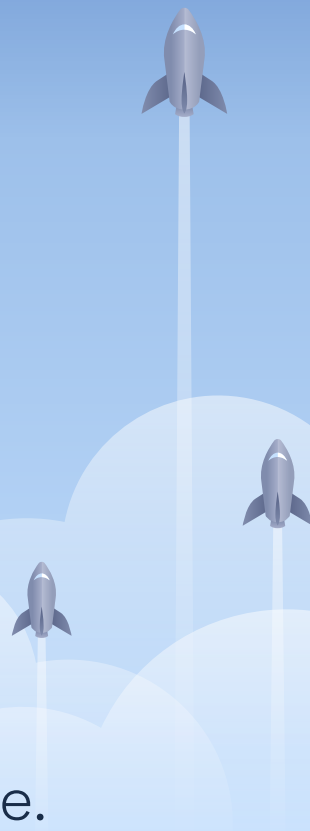
- Language-agnostic approach for s/w development
- Layering of Wasm modules
- Nothing is shared!



Runtimes

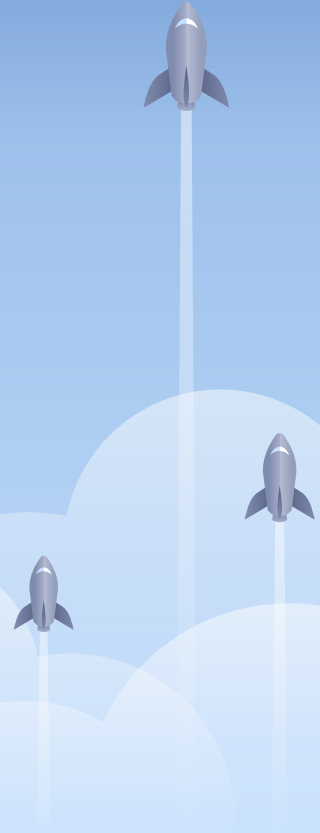
- Wasmtime
- Wasmer
- Wasm3
- WAMR
- WasmEdge
- Lunatic

And many many more. Refer [this listing](#) for more.



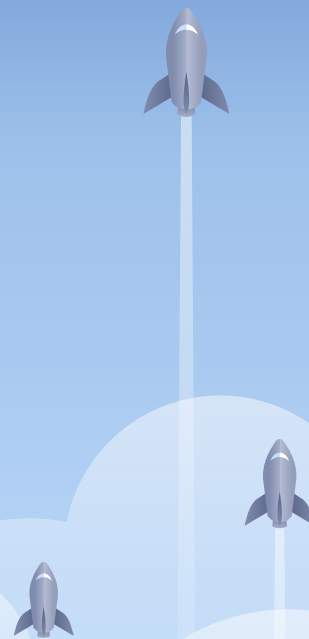
Platform

- Fermyon
- Suborbital
- Wasmcloud
- Faasm
- Mycelial
- Fluence



Compilers

- LLVM
- Cranelift
- aWasm in SLEdge
- Lucet
- wasmi

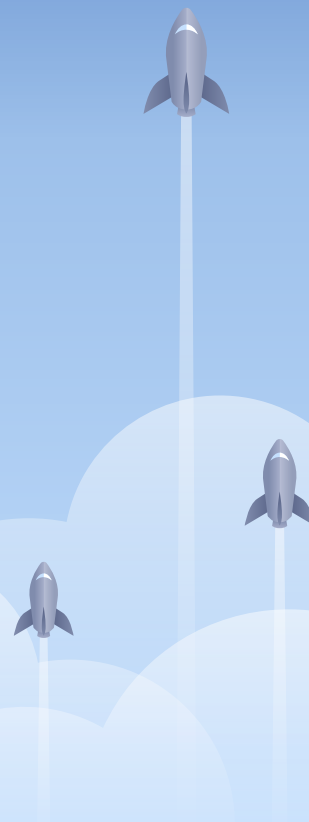


Languages

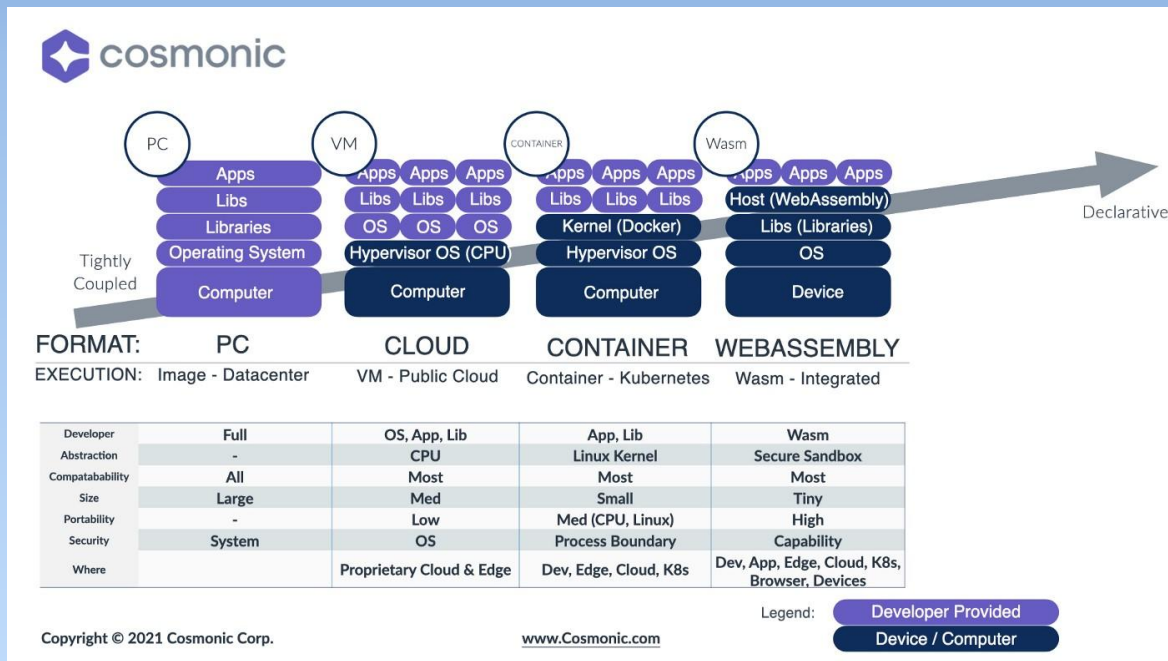
Wasm-specific
languages

Scripting
Languages

Compiled
Languages



Cloud Native & Wasm

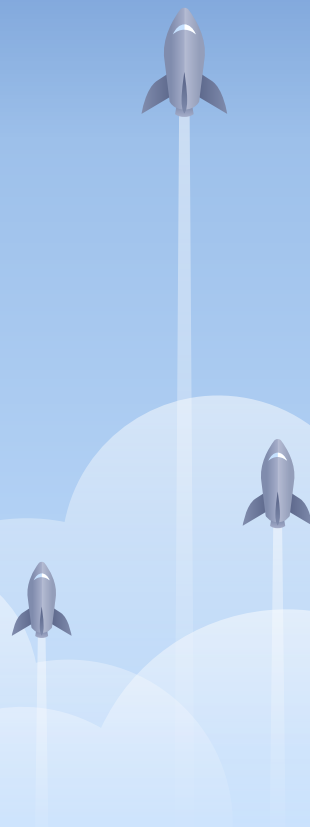


Source: <https://cosmonic.com/blog/kubecon-eu-2021-webassembly-keynote-cloud-native-and-wasm-better-together/>

Cloud Native projects

- Krustlet
- Kubewarden
- OPA
- Envoy

And many more.



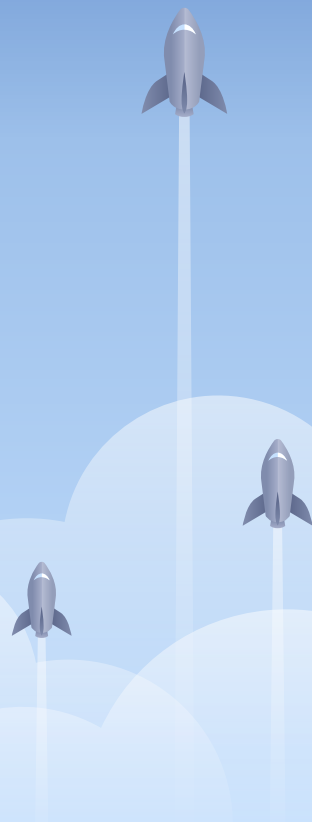


The Future of Wasm



The Future of Wasm

- Default compilation target?
- Plug and play application development?
- Evolution of the component model
 - Language-neutral Wasm application development
 - Standardizing software development

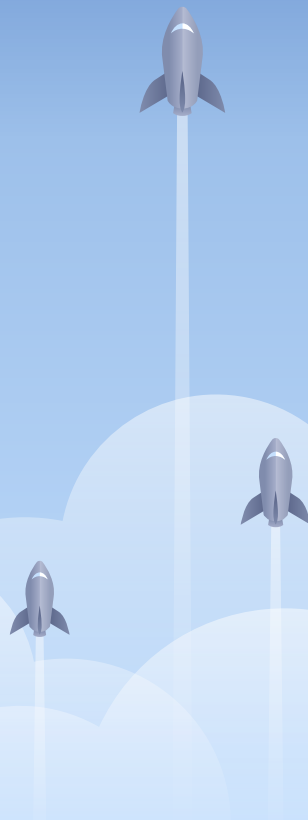


Community & Learning Resources



Community & Learning Resources

- Wasm.builders
- Bytecode Alliance
- W3C Community Group
- Cloud Native Computing Foundation
- Confidential Computing Consortium



Community & Learning Resources

- [WebAssembly weekly newsletter](#)
- [Lin Clark's blog](#)
- [Radu Matei's blog](#)
- [The WebAssembly specification](#)
- [Mozilla Developer docs](#)





Thank you!