WebAssembly WA

With .NET🔥Blazor🔥

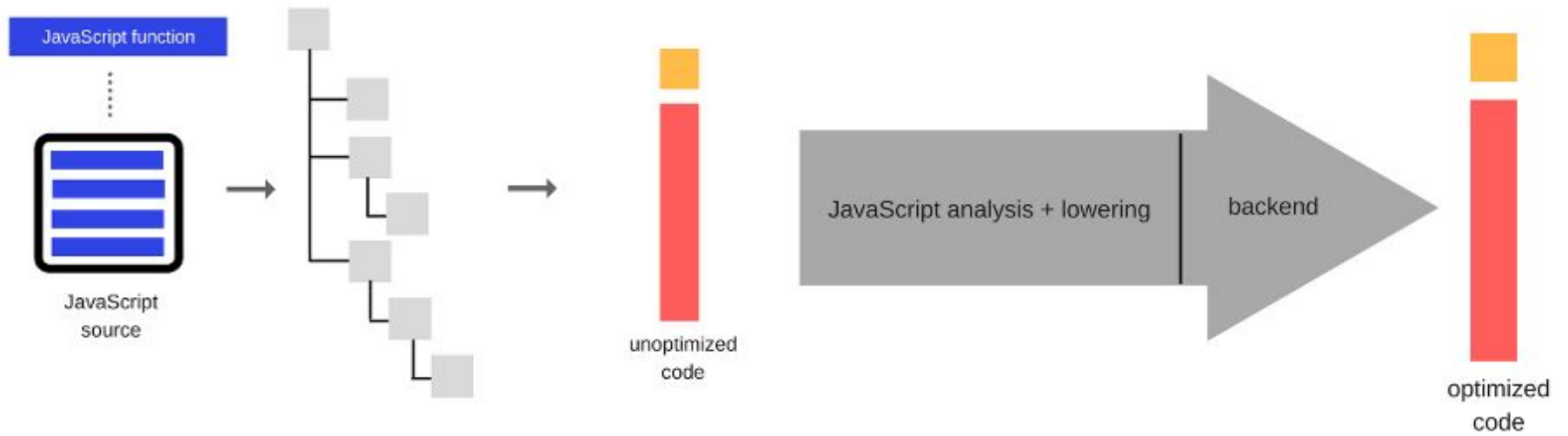# Vorapat Nicklamai (Guide)

Software Engineer
At Jetabroad

Contents
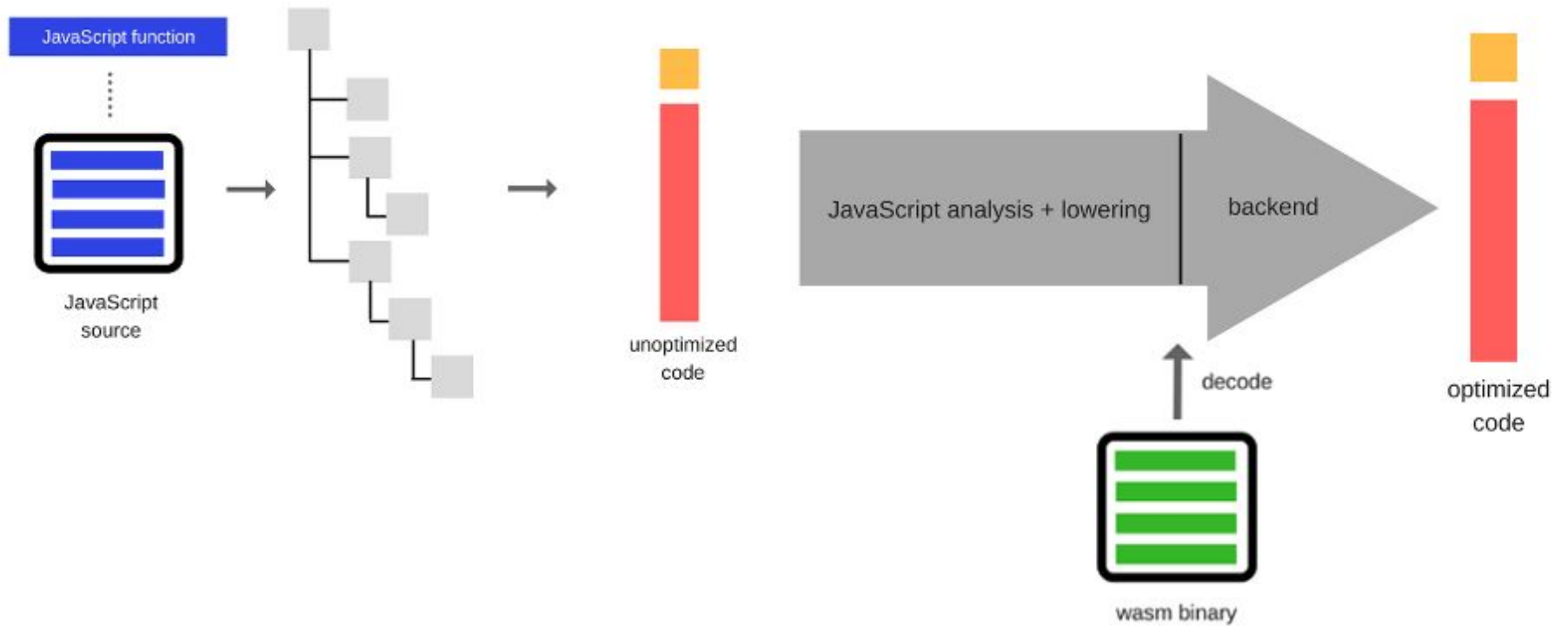
- Problem
- What is WASM?
- What is Blazor?
- Blazor Demo(s)

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JavaScript function

JavaScript
source

unoptimized
code

JavaScript analysis + lowering | backend

optimized
code

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WebAssembly (**wasm**) is an efficient, low-level bytecode for the web.

JavaScript function

JavaScript
source

unoptimized
code

JavaScript analysis + lowering

backend

decode

wasm binary

optimized
code

JS loads .js files

Wasm loads compiled binary format files

C input source	Linear assembly bytecode (intermediate representation)	Wasm binary encoding (hexadecimal bytes)
```int factorial(int n) { if (n == 0) return 1; else return n * factorial(n-1); } ```	```get_local 0 i64.eqz if (result i64) i64.const 1 else get_local 0 get_local 0 i64.const 1 i64.sub call 0 i64.mul end ```	```20 00 50 04 7E 42 01 05 20 00 20 00 42 01 7D 10 00 7E 0B ```

S-expression

```
(func (param i32) (param f32) (local f64)
  get_local 0
  get_local 1
  get_local 2)
```

- Wasm was originally designed for low-level use cases (like OpenGL)

- Wasm currently favors non-gc(garbage collector) languages because wasm hasn't implement gc, yet.

- Debugging is not yet available (like Source maps)

- Network advantage. No more .js files load.

- Mobile battery life is improved.

- Writing native code instead of JS.

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🔥Blazor🔥

(Browser + Razor)

Blazor is a single-page web app framework built on .NET that runs in the browser with WebAssembly.

Comparable to these guys

Brief History

— — —

Mar 2013 - asm.js and Emscripten LLVM (Mozilla)

Feb 2017 - WASM design completed (W3C, browsers)

Jun 2017 - Blazor (on DNA) introduction as personal project

Aug 2017 - Mono announces WASM support

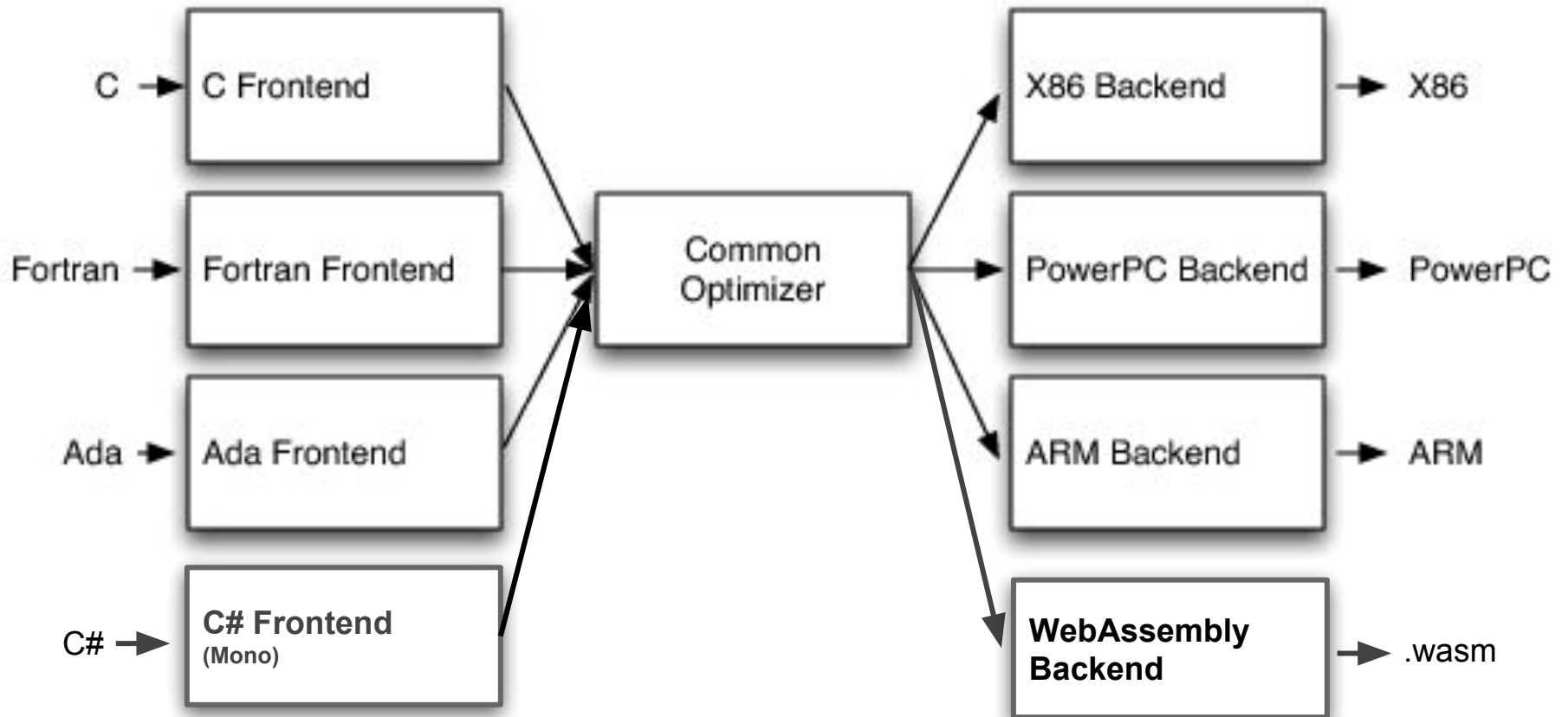Sep 2017 - WASM supported in all major browsers

Nov 2017 - Blazor migrates to Mono

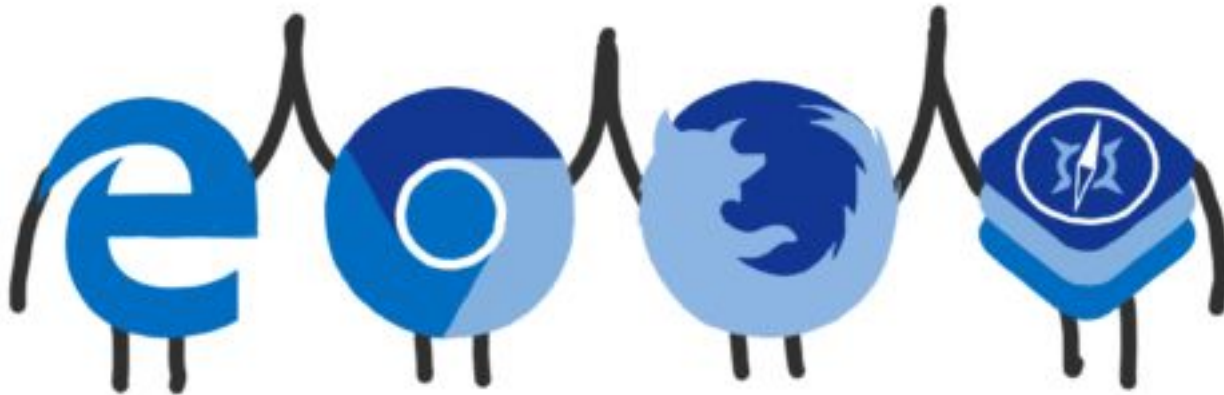Feb 2018 - Blazor joins ASP.NET foundation as experiment

Mar 2018 - First public preview of Blazor

LLVM - Low Level Virtual Machine (like JVM, CLR!)

– – – –

C → C Frontend

Fortran → Fortran Frontend

Ada → Ada Frontend

C# → **C# Frontend** **(Mono)**

Common Optimizer

X86 Backend → X86

PowerPC Backend → PowerPC

ARM Backend → ARM

WebAssembly Backend → .wasm

wasm is compatible with all major browsers

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Q&A

Credits
https://blog.sessionstack.com/how-javascript-works-a-comparison-with-webassembly-why-in-certain-cases-its-better-to-use-it-d80945172d79

https://blazor.net/

https://github.com/aspnet/samples/tree/master/samples/aspnetcore/blazor/FlightFinder