WebAssembly + OpenfaaS The Universal Runtime for Serverless Functions

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Hey everyone!

- Co-founder of Okteto.
- Former architect @ Atlassian, Software Engineer @ Azure.
- @rberrelleza in most places.

Hey everyone!

- What is WebAssembly?
- WebAssembly in a Serverless World
- Demo
- Where do we start?


WA

WebAssembly is a low-level assembly-like language with a compact binary format that runs with near-native performance and provides languages with a compilation target so that they can run on the web.

WebAssembly is fast

WebAssembly is portable

WebAssembly is secure


WA

WebAssembly is fast

WebAssembly is portable

WebAssembly is secure

WebAssembly on Cloudflare Workers

October 1, 2018 8:00 AM

Kenton Varda

How Fastly and the developer community are investing in the WebAssembly ecosystem

Published May 29, 2020 EDGE

Pat Hickey
Principal Software Engineer

We built Compute@Edge, our new serverless compute environment now in beta, to give developers more power, scalability, and speed at the edge. And we decided to build Compute@Edge on WebAssembly. We chose WebAssembly because it's an emerging

ABOUT THE AUTHOR

Robert is the author of the book "Level Up With WebAssembly" and is a Bioinformatics Software Engineer at Invitae, where he develops web applications for the … More about Robert Aboukhalilich …

AUGUST 28, 2019 • 4 comments

Beyond The Browser: Getting Started With Serverless WebAssembly

QUICK SUMMARY ↬ *You've probably heard of WebAssembly and why it's a powerful tool in the browser. In this article, we explore why serverless WebAssembly might be equally powerful outside the browser, and how to get started using it.*

7 min read

Browsers, JavaScript, Apps

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Saved for offline reading

NOW THAT WEBASSEMBLY IS SUPPORTED BY ALL MAJOR BROWSERS AND more than 85% of users worldwide, JavaScript is no longer the only browser language in town. If you haven't heard, WebAssembly is a new low-level language that runs in the browser. It's also a compilation target, which means you can compile existing programs written in languages such as C, C++, and Rust into WebAssembly, and run those programs in the browser. So far, WebAssembly has been used to port all sorts of applications to the web, including desktop applications, command-line tools, games and data science tools.

Smashing

Let's build it on top of what we already have!

README.md

Krustlet: Kubernetes Kubelet in Rust for running WASM

🚧🚧🚧**This project is highly experimental.** 🚧🚧🚧It should not be used in production workloads.

Krustlet acts as a Kubelet by listening on the event stream for new pods that the scheduler assigns to it based on specific Kubernetes tolerations.

The default implementation of Krustlet listens for the architecture `wasm32-wasi` and schedules those workloads to run in a `wasmtime`-based runtime instead of a container runtime.

Documentation

If you're new to the project, get started with the introduction. For more in-depth information about Krustlet, plunge right into the topic guides.

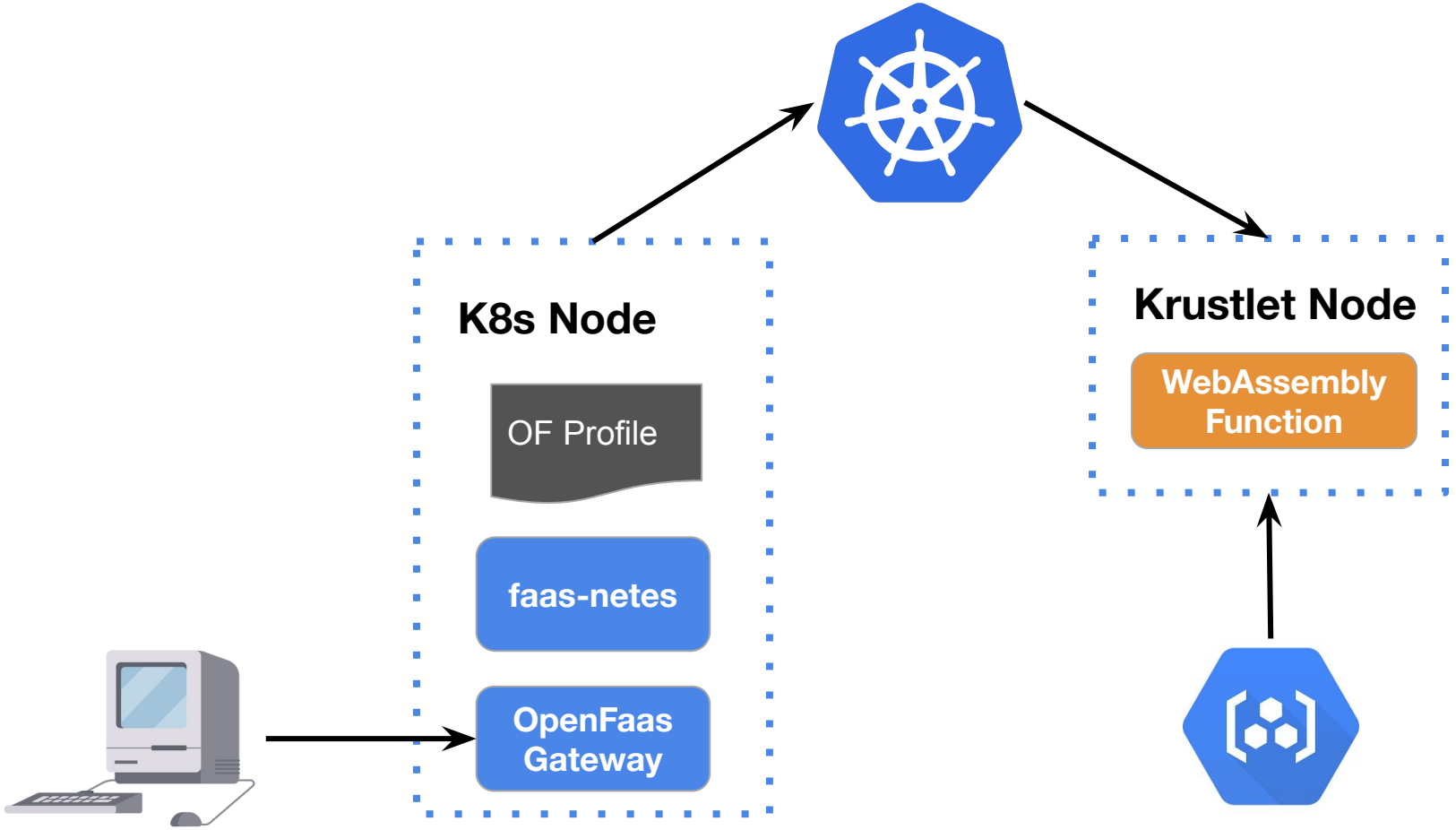
Looking for the developer guide? Start here.

Community, discussion, contribution, and support

OPENFAAS

Demo time!

How does it work?


K8s Node
OF Profile
faas-netes
OpenFaas Gateway
Krustlet Node
WebAssembly Function

Conclusions

WebAssembly + Serverless
is in its infancy

WebAssembly is an ideal container for functions

Kubernetes is everywhere

Krustlet lets us run WebAssembly workloads on any Kubernetes cluster

OCI registries lets us distribute WebAssembly containers

OpenFaaS lets us build, publish, deploy and scale up/down our WebAssembly functions

WebAssembly + OpenFaaS can be the Universal Runtime for Serverless Functions

Challenges / ToDos

- Krustlet's networking capabilities are WIP
- Dockerhub doesn't support pushing non-containers
- WasCC capabilities and port assignment are not so easy
- Need more demos, docs and tutorials!

Links!

- https://webassembly.org
- https://github.com/openfaas/faas
- https://github.com/rberrelleza/openfaas-plus-webassembly
- https://twitter.com/rberrelleza

Prior Art

- https://www.smashingmagazine.com/2019/08/beyond-browser-serverless-webassembly
- https://cloudblogs.microsoft.com/opensource/2020/04/07/announcing-krustlet-kubernetes-rust-kubelet-webassembly-wasm
- https://blog.cloudflare.com/webassembly-on-cloudflare-workers
- https://www.fastly.com/blog/how-fastly-and-developer-community-invest-in-webassembly-ecosystem

Thank you!

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