Docker + Wasm
empowering microservices

SECOND STATE

WasmEdgeRuntime

Michael Yuan, WasmEdge Maintainer
https://github.com/WasmEdge/WasmEdge

docker
+WASM

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Develop faster. Run anywhere.

The most-loved Tool in Stack Overflow's 2022 Developer Survey.

Download Docker Desktop
 Intel Chip

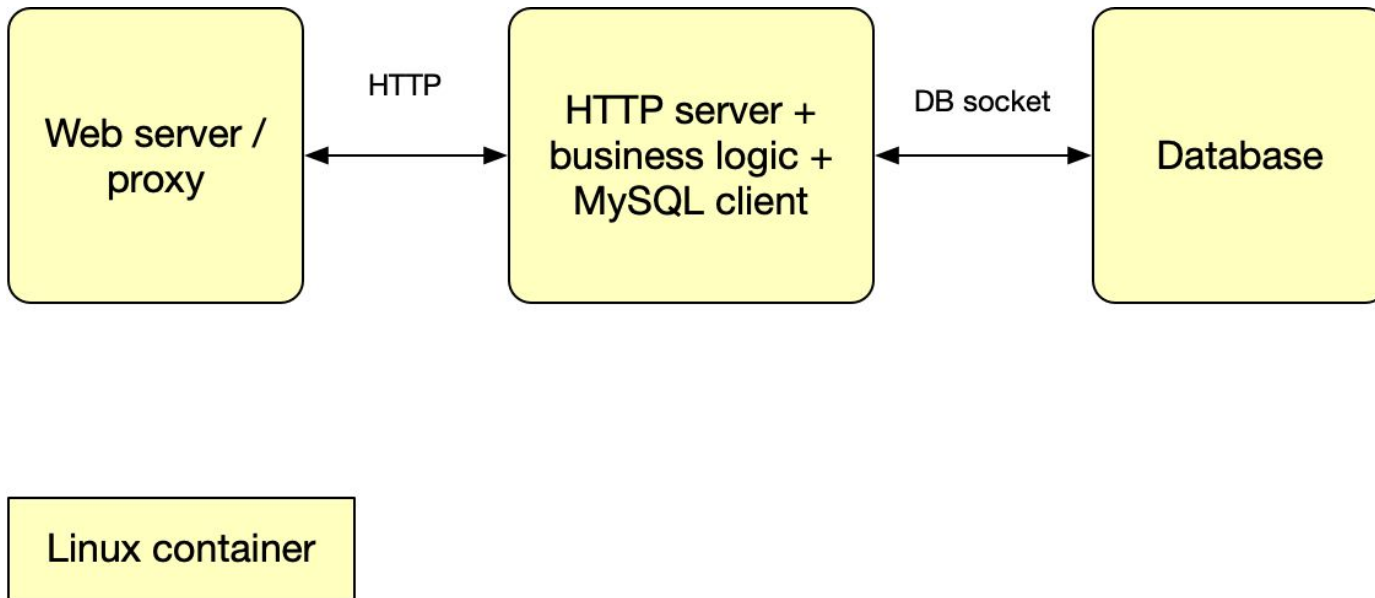 Apple Chip   Windows   Linux

WHAT'S NEW

Docker + Wasm = Awesome!

Wasm is a new, fast, and light alternative to the Linux/Windows containers you're using in Docker today — give it a try with the Docker+Wasm Beta.

→ Try it

How it started

Elon Musk ✔ @elonmusk · Nov 14

Btw, I'd like to apologize for Twitter being super slow in many countries. App is doing >1000 poorly batched RPCs just to render a home timeline!

💬 24.3K   ⟲ 14.7K   ♡ 173.8K   ↥

Elon Musk ✔ @elonmusk · Nov 14
Replying to @sampullara

I was told ~1200 RPCs independently by several engineers at Twitter, which matches # of microservices. The ex-employee is wrong.

Same app in US takes ~2 secs to refresh (too long), but ~20 secs in India, due to bad batching/verbose comms. Actually useful data transferred is low.

💬 604   ⟲ 861   ♡ 8,229   ↥

Elon Musk ✔ @elonmusk · Nov 14
Replying to @elonmusk and @sampullara

Part of today will be turning off the "microservices" bloatware. Less than 20% are actually needed for Twitter to work!

💬 1,694   ⟲ 4,887   ♡ 9,635   ↥

Pain points

1 **Heavyweight (container + Linux OS + frameworks + app)**

2 **Slow, especially at startup time, requiring "warm up"**

3 **A general trade-off between security and overhead**

4 **Not portable – what happens with write-once-run-everywhere?**

Opinionated runtime optimized for microservices

- 1/100 the size of typical LXC images
- 1000x faster startup time
- Near native runtime performance
- Secure by default and very small attack surface
- Completely portable across platforms
- Programming language agnostic
- Plays well with k8s, service mesh, distributed runtimes etc.

Too good to be true? There is no free lunch

- Not a general OS environment
- Must learn new language SDKs to create optimized services
- Common libraries need to be ported

WebAssembly Runtime

WasmEdgeRuntime

A lightweight, secure, high-performance and extensible WebAssembly Runtime

1. Support networking socket and web services
2. Support databases, caches, and DOs
3. Support AI inference in Tensorflow, OpenVino, PyTorch etc.
4. Seamlessly integrates into the existing cloud-native infra
5. Support writing wasm programs using JS

CLOUD NATIVE
COMPUTING FOUNDATION

https://github.com/WasmEdge/WasmEdge

How it's going?

Is WebAssembly ready for prime time?
Can it support common web service patterns?

Libraries and frameworks

- Rust
  - Tokio
  - MIO
  - hyper
  - reqwest
  - mysql_async
  - rskafka
  - anna-rs
  - Dapr
- JavaScript
  - Node
  - fetch()
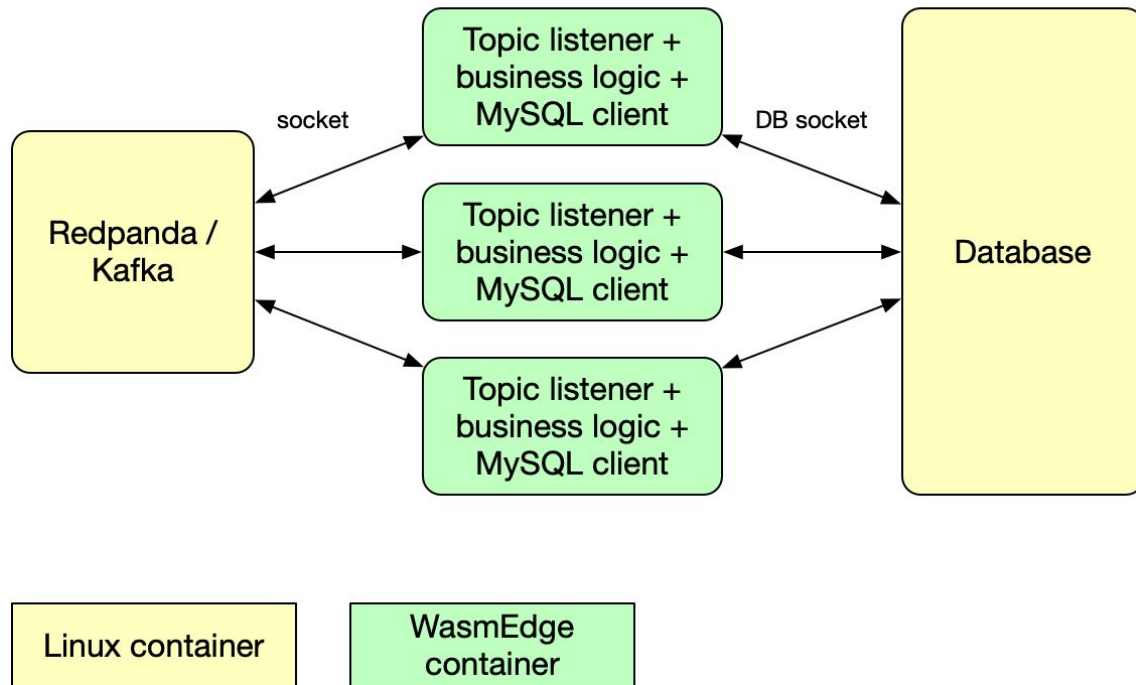 - React SSR

Demo 1: A database backed web service

https://github.com/second-state/microservice-rust-mysql
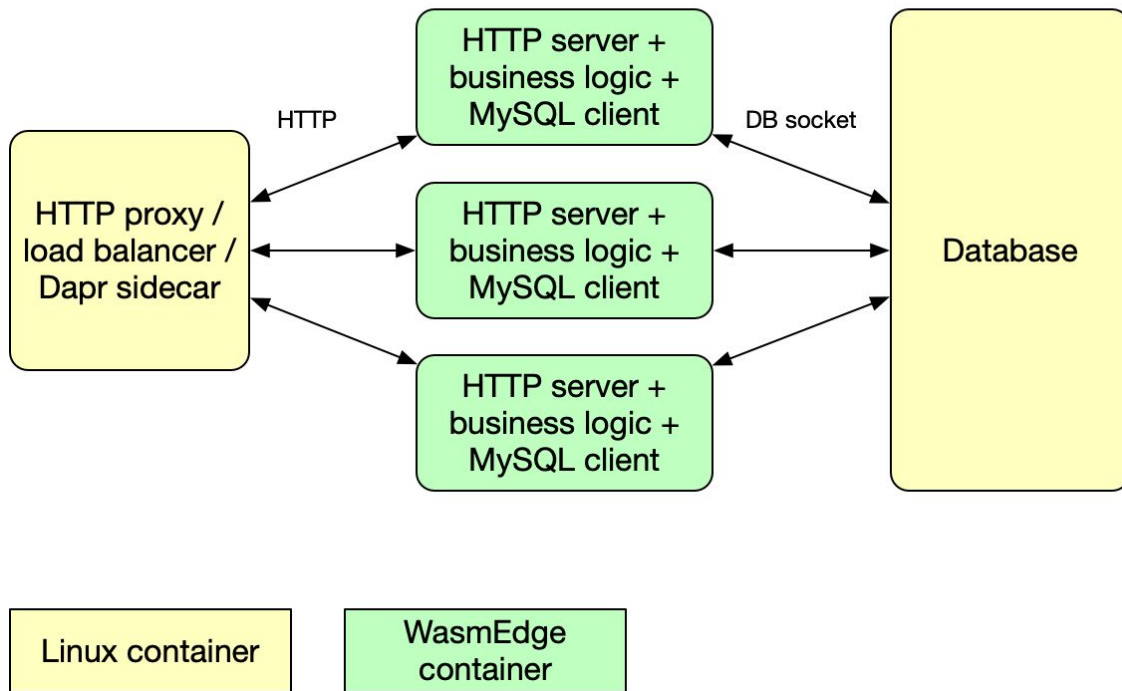
Demo 2: An event driven service

Advanced features?

- AI inference with Tensorflow / Pytorch / openVINO

https://github.com/WasmEdge/wasmedge_hyper_demo/tree/main/server-tflite

- Service integration

https://github.com/second-state/dapr-wasm

Discuss and learn more:

https://github.com/WasmEdge/WasmEdge