Cloud Native On The Edge: It Doesn't Have to Be Hard

Brooks Townsend, Cosmonic

Introduction

Brooks Townsend

- Lead Software Engineer at Cosmonic
- wasmCloud maintainer
- Serial open source contributor
- Brewer of Elixir, Wasm enjoyer, Rustacean
- Demo enthusiast

Agenda

- What is a Wasm?
- Where does it fit in?
- Demos… on the edge
- What can I do now?
- How to get involved

Neither Web, nor Assembly

Open W3C Standard

Open and widely supported standard

Safe & Secure

Deny by default secure sandbox, featuring capability driven permissions

Efficient and fast

Small size and near-native execution speed

Polyglot

Choice of deployment language means ability to reuse existing libraries

Portable

WebAssembly runs in all major browsers

Good vs Bad

- General server side computing
  - Microservices
  - Functions
- Constrained devices (“the edge”)
- Plugins
- Runtime optimization
- Libraries
- Browser

- Networking is still difficult
- Things are in the “fast moving” stage
- Slower than native code
- Toolchains aren’t there for some languages
  - No lift and shift with Wasm
- Some domains aren’t really a good fit (yet)
  - Performance tuned applications
  - Nginx, Redis, MySQL, etc.

wasmCloud

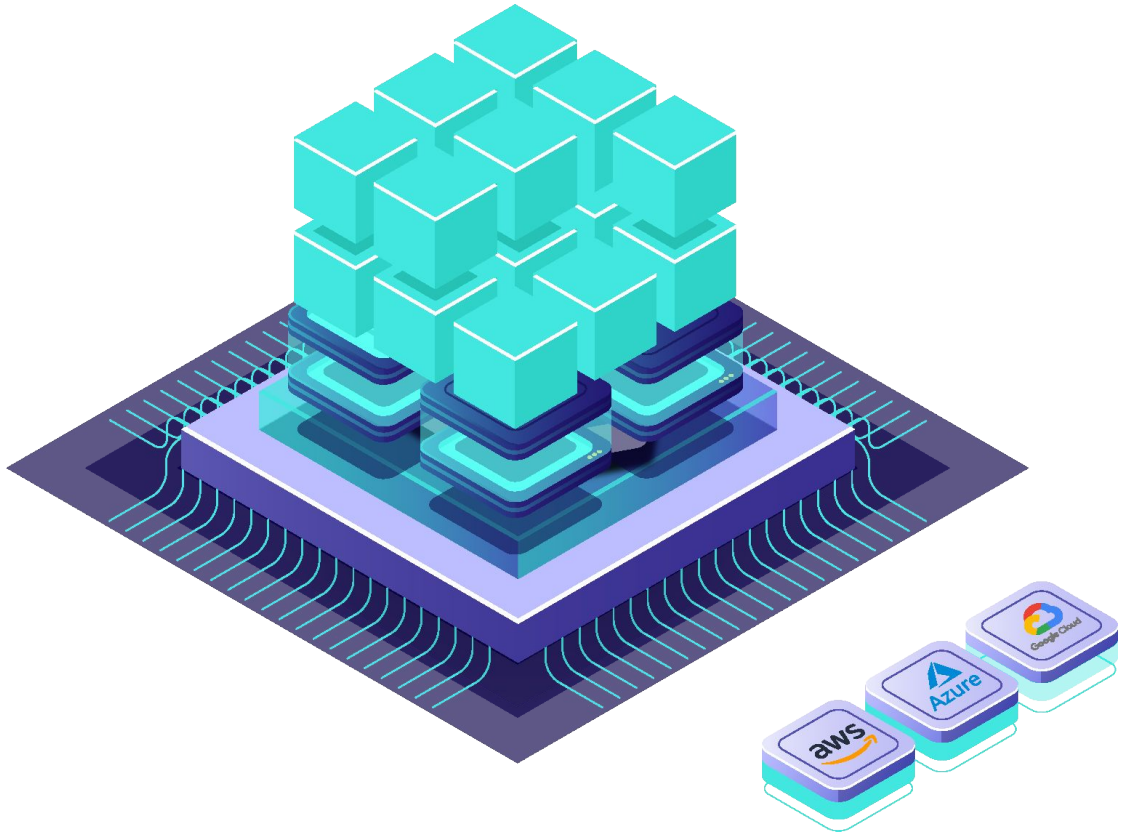
- CNCF Sandbox Application Runtime
- If Wasm is so good, what do we need wasmCloud for?
  - Runtime vs application runtime

wasmcloud

wasmCloud Application Runtime

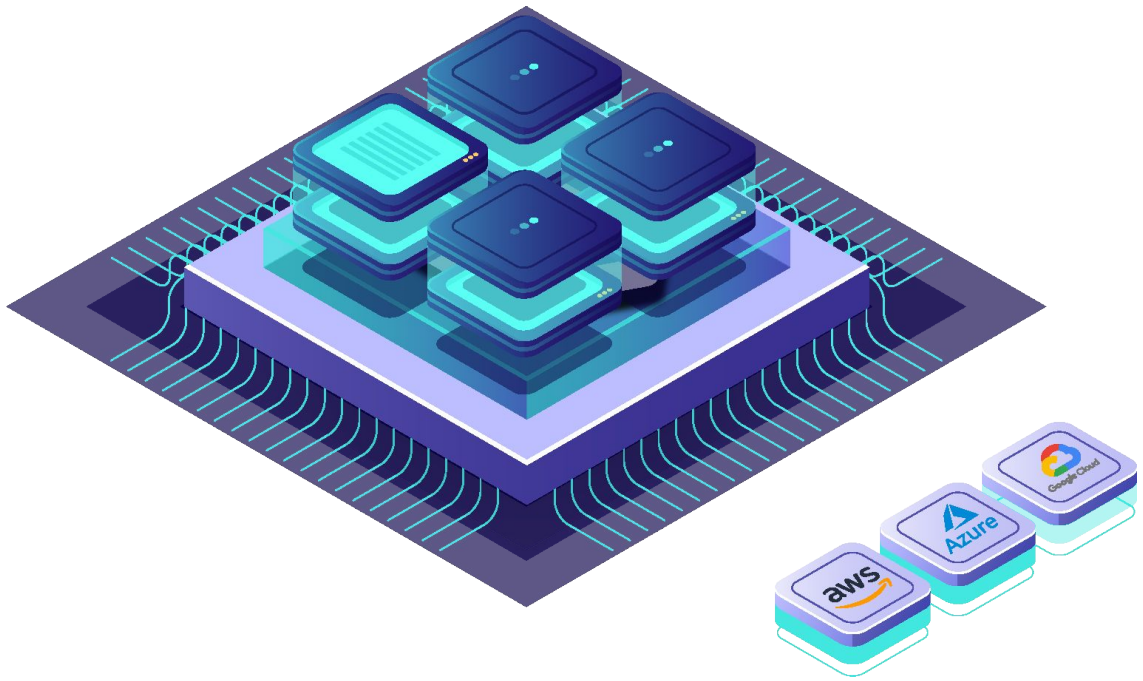
- Run and orchestrate Wasm
- Secure access to capabilities
- Horizontally and vertically scalable, stateless actors
- Manage networking, failover, request routing

Actors



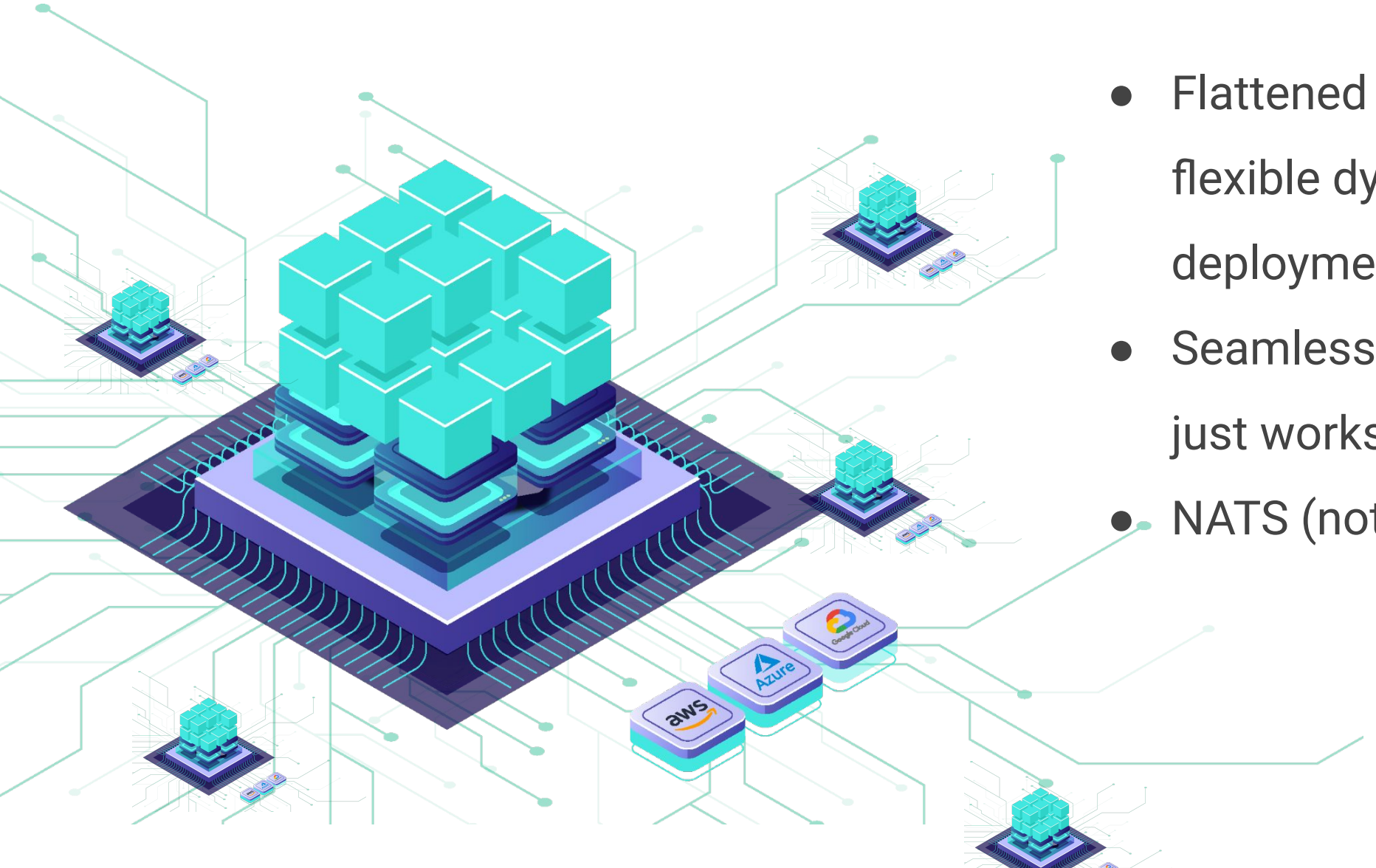
- Implement only your business logic
- Stateless and reactive
- Tiny footprint, portable & scalable
- Easy to develop & low boilerplate

Capabilities



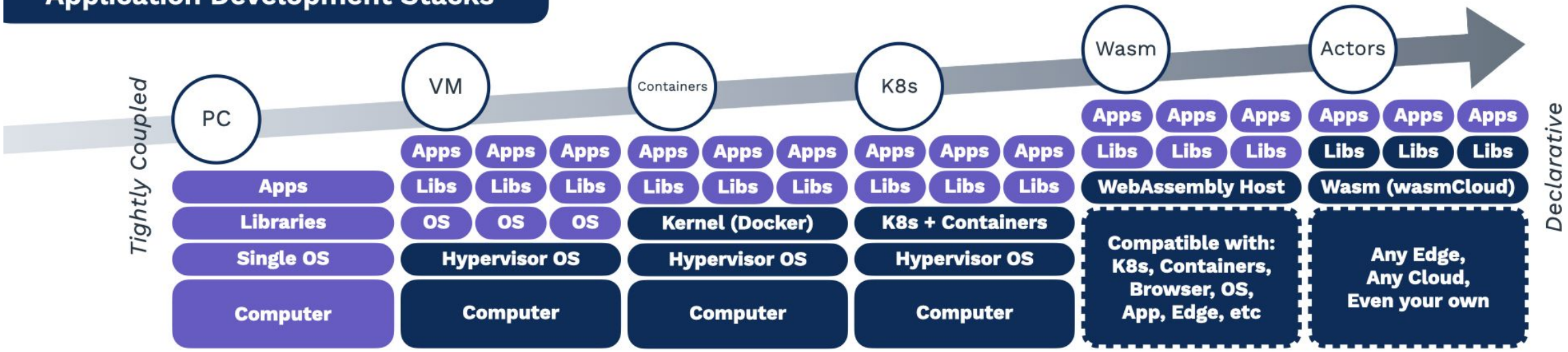
- Contract driven design
- Choose implementation at runtime, hot swap
- Decoupled libraries from business logic

Lattice Network



- Flattened topology, enables flexible dynamic deployments
- Seamlessly connected, “it just works”
- NATS (not NATs)

Application Development Stacks



FORMAT	PC	CLOUD	CONTAINER	K8S	WASM	WASMCLOUD
EXECUTION	***Image (Datacenter)***	***VM (Public Cloud)***	***Container (Docker)***	***Containers (K8s / Cloud)***	***WASM (Everywhere)***	***Distributed WASM (Everywhere)***
Dev Responsibility	Full	OS, App, Lib	App, Lib	App, Lib	Wasm	Business Logic
Abstraction	-	CPU	Linux Kernel	K8s	Secure Sandbox	Sandbox + Capabilities
Compatibility	All	Most	Most	Most	Most	Most
Size	Large	Med	Small	Small	Tiny	Minuscule
Portability	-	Low	Med (CPU, Linux)	Med (CPU, Linux)	High	Highest
Security	System	OS	Process Boundary	Process Boundary	Capability	Actor
Location	On Prem & Co-location	Proprietary Cloud & Edge	Dev, Edge, Cloud, K8s	Dev, Edge, Cloud, K8s	Dev, App, Edge, Cloud, K8s, Browser, Devices	Dev, App, Edge, Cloud, K8s, Browser, Devices

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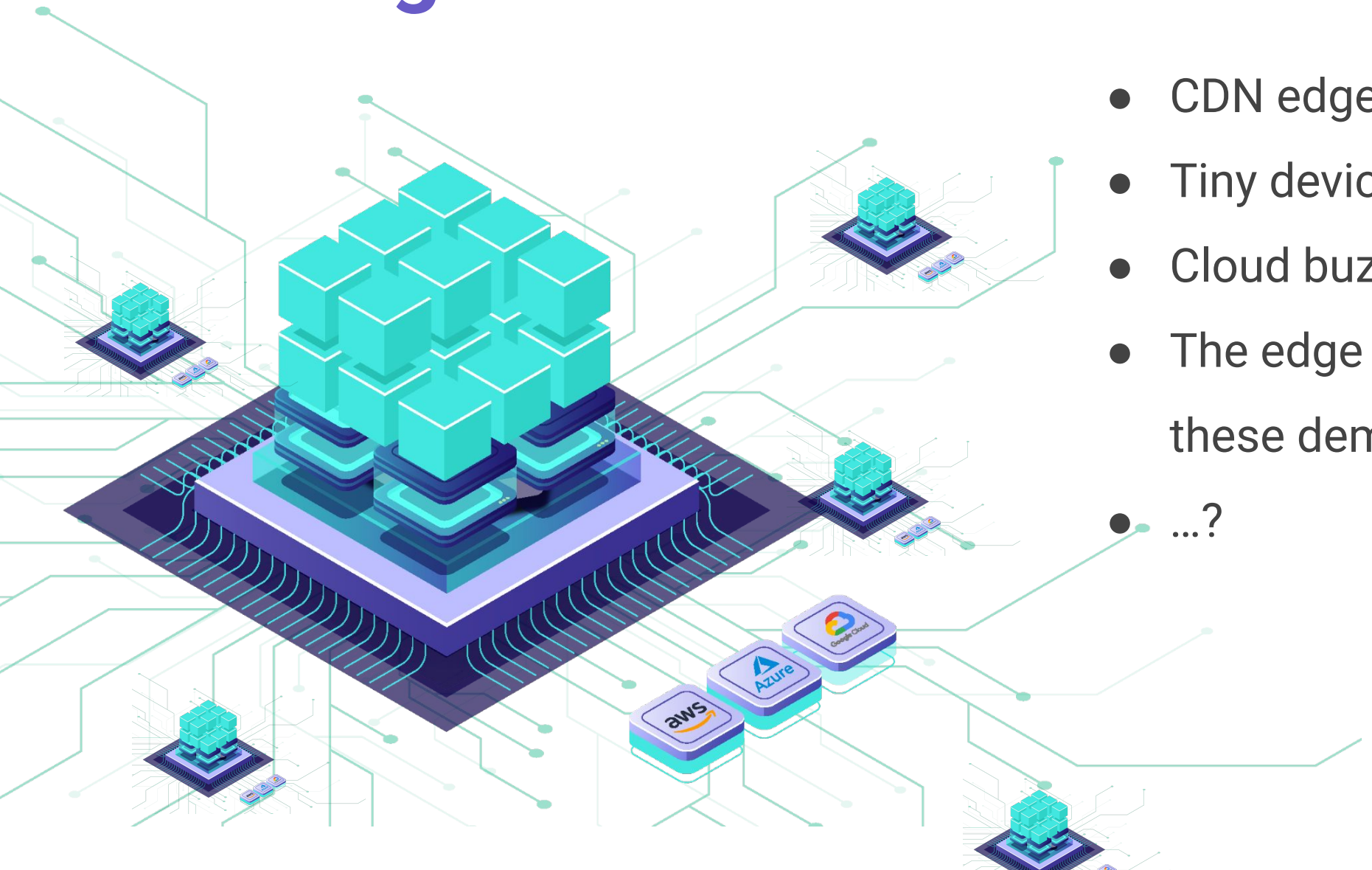
Legend: **Developer Provided** **Service Provided** **Flexible**

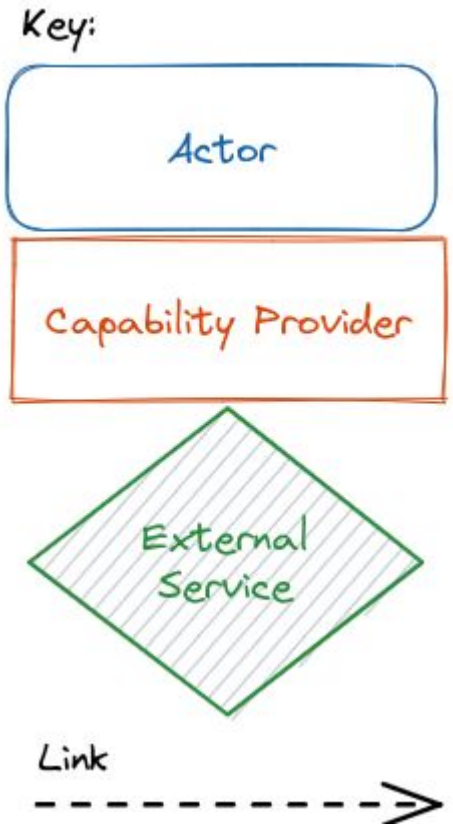
“The Edge”

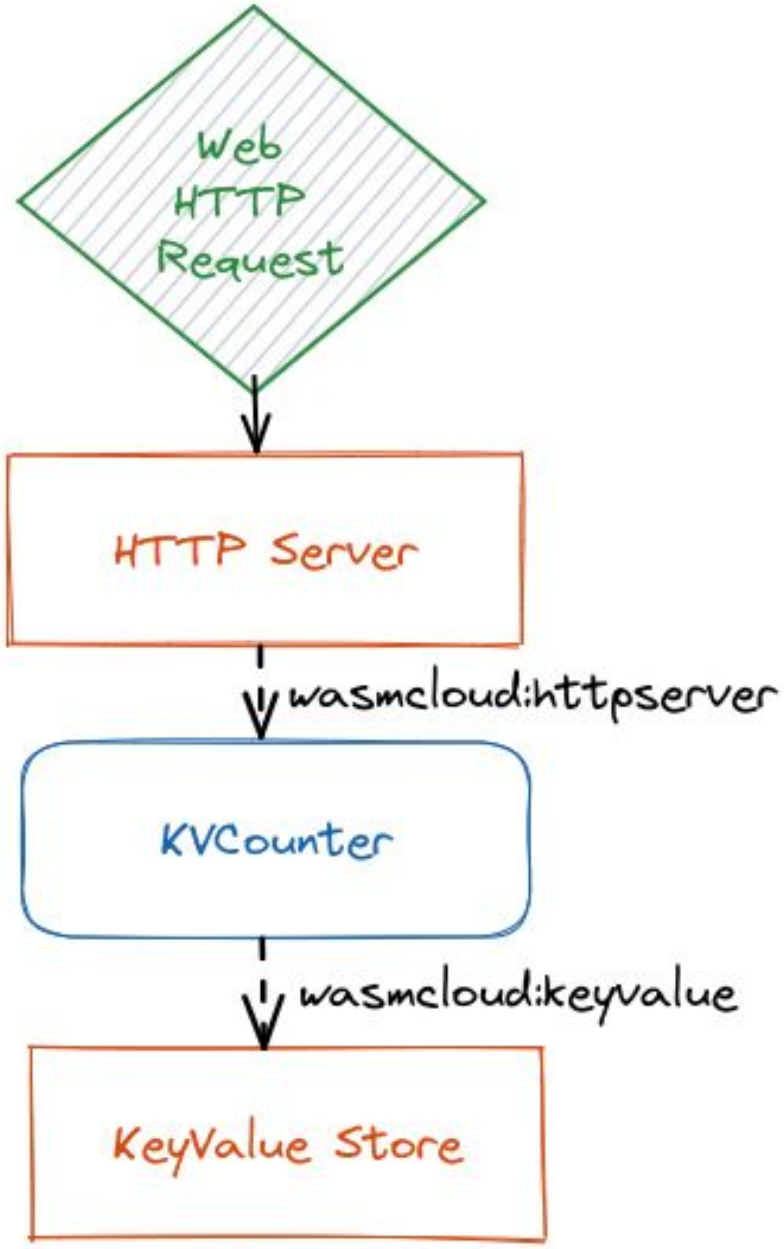


- CDN edge
- Tiny devices edge
- Cloud buzzword edge
- The edge of your seat for these demos
- …?

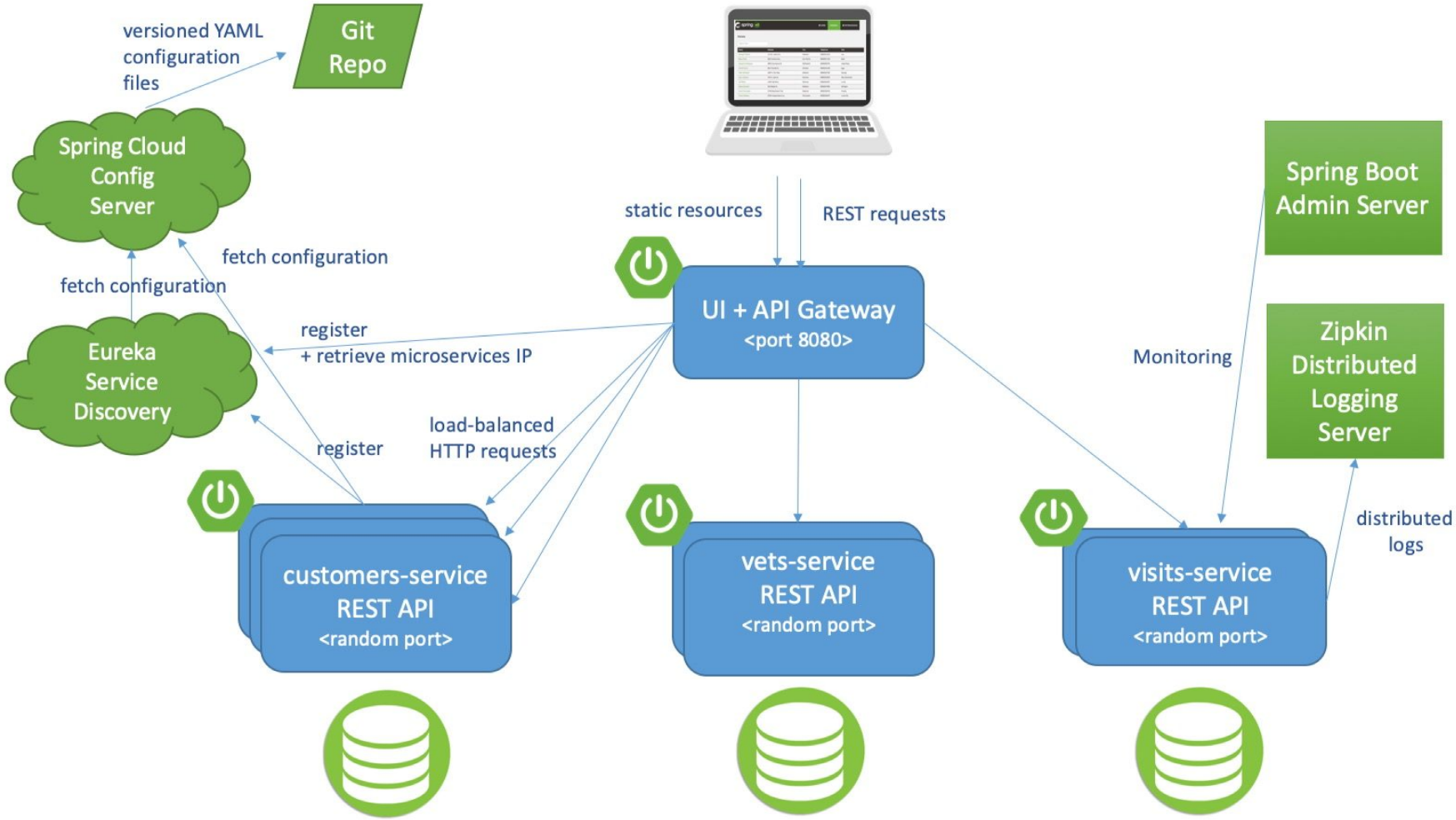
DEMO TIME

KVCounter

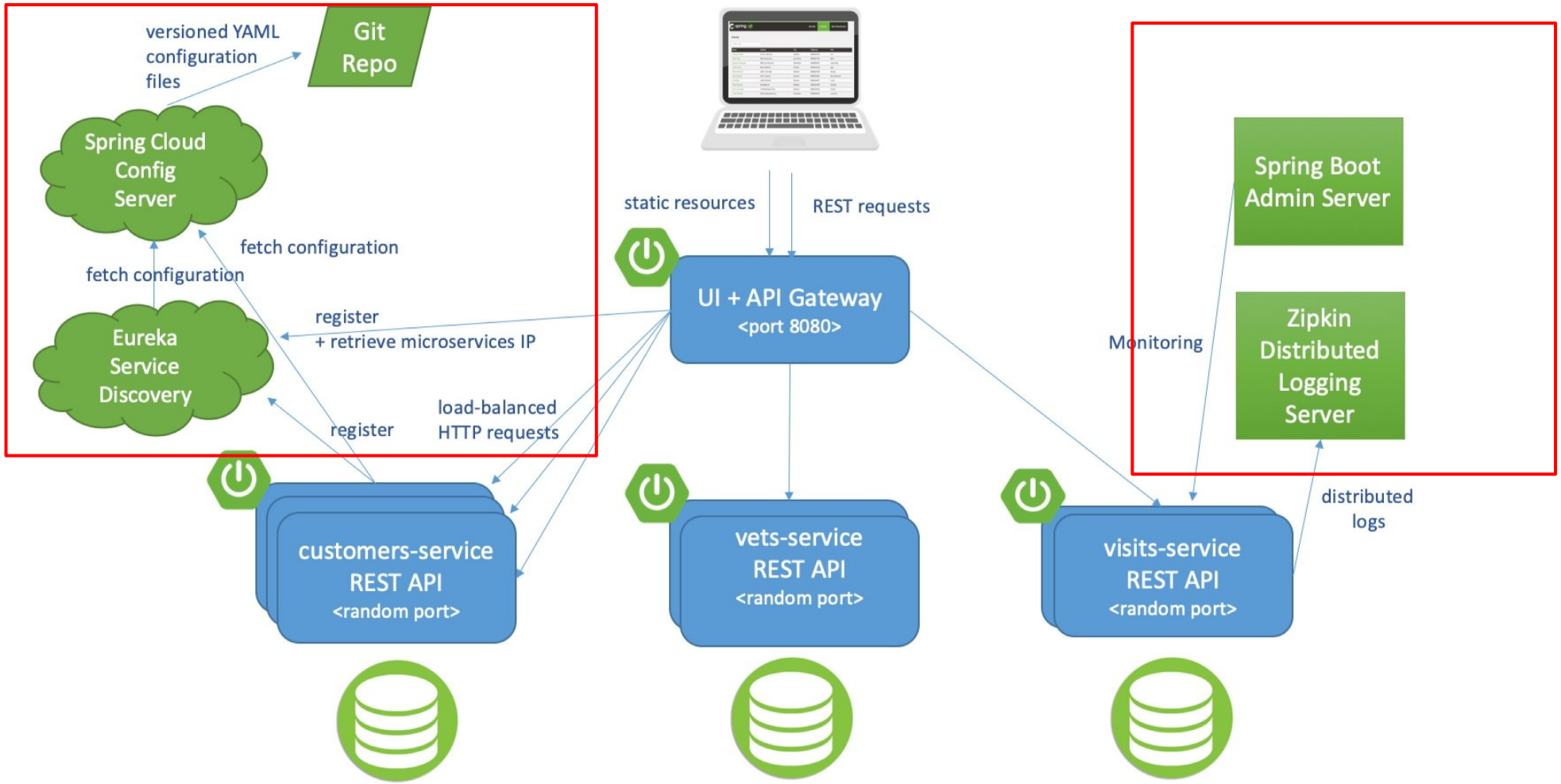

Key:
Actor
Capability Provider
External Service
Link


Web HTTP Request
HTTP Server
wasmcloud:httpserver
KVCounter
wasmcloud:keyvalue
KeyValue Store

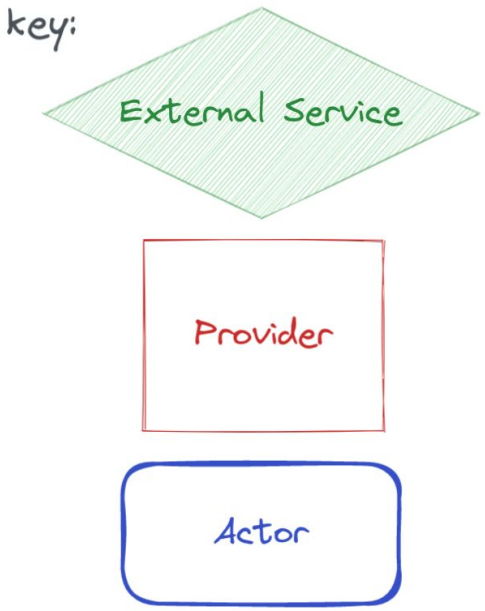
Spring Boot Pet Clinic

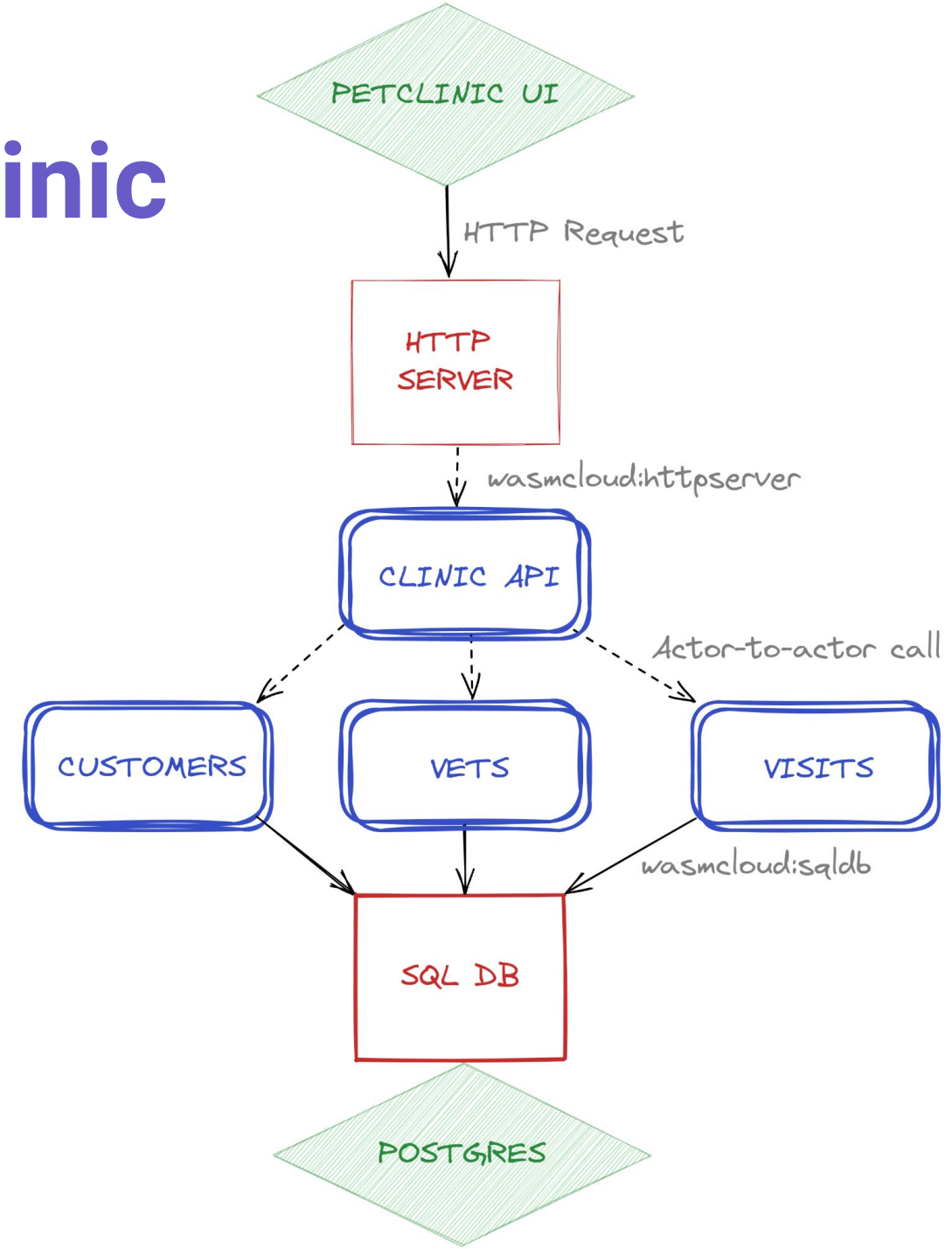


Spring Boot Pet Clinic



wasmCloud Pet Clinic





What could you do now?

1. Basic data/image/etc. processing
2. One small part of a service
    - Runs smaller and cheaper
3. A full stateful application
    - Use the various providers to connect to the data sources you need

Join our community Slack and check out our GitHub!

https://slack.wasmcloud.com

https://github.com/wasmCloud/wasmCloud

❓ Questions ❓