



CLOUD NATIVE

THE NEW STACK IN A TORTILLA

slides: <https://berkus.org>

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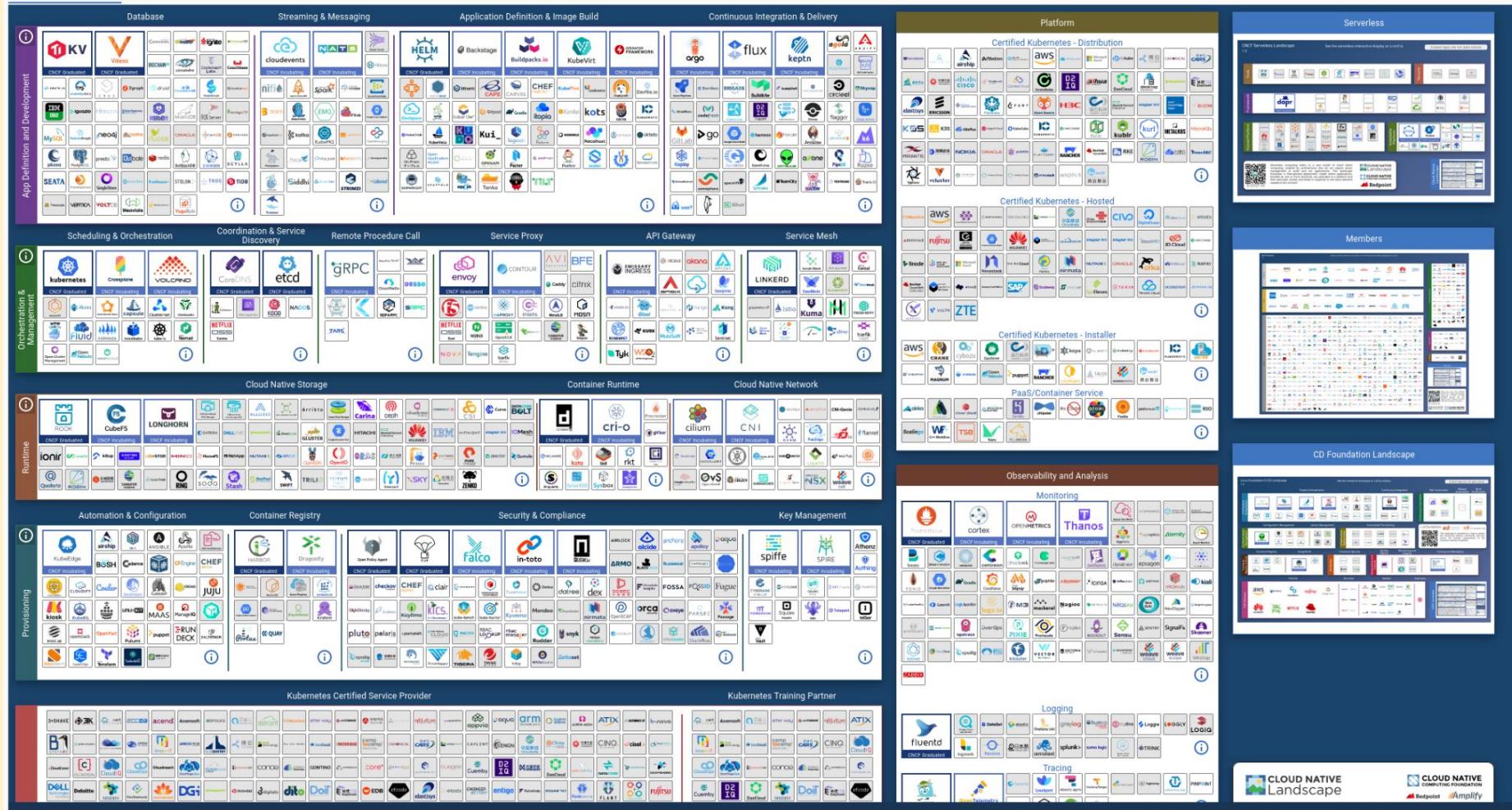
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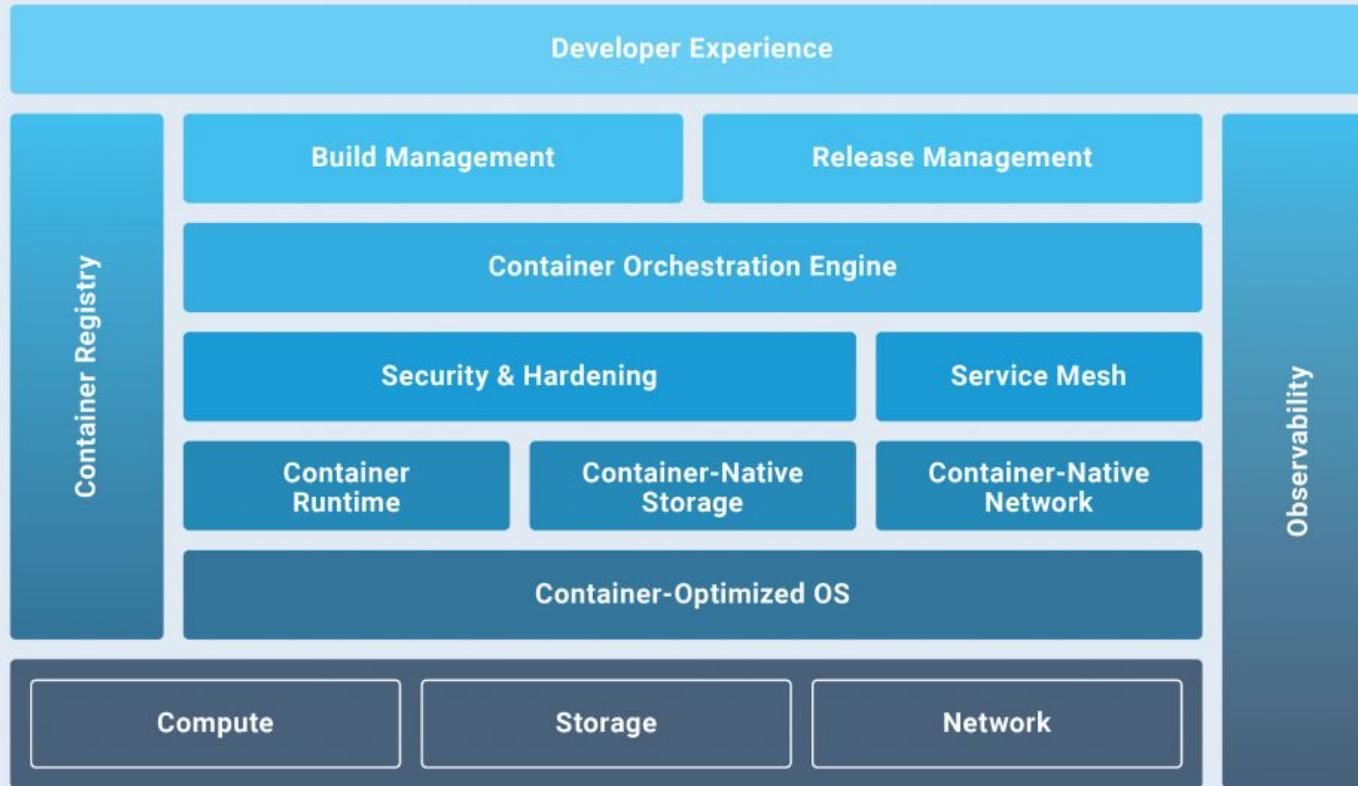
**WHAT'S
CLOUD NATIVE?**

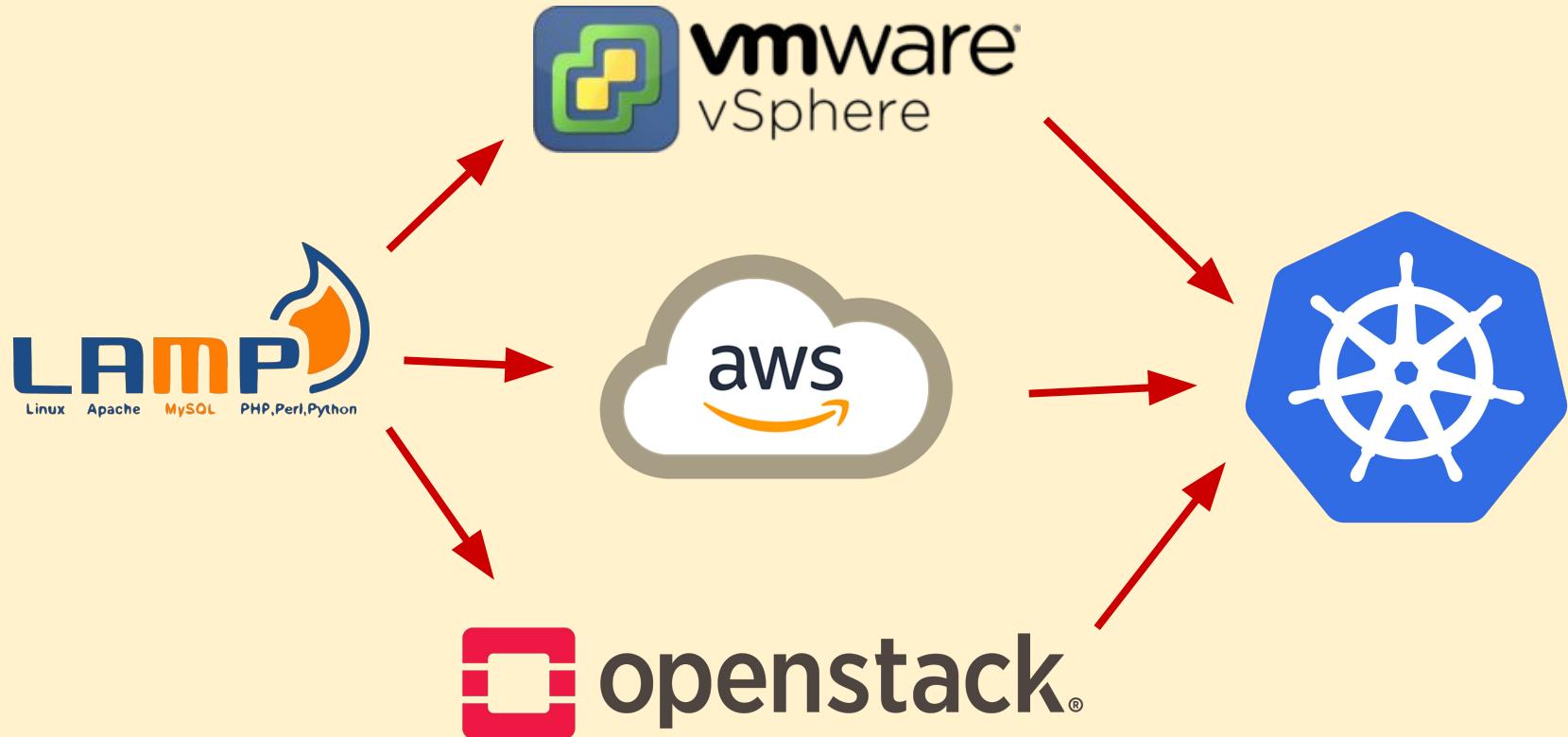
“Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach.

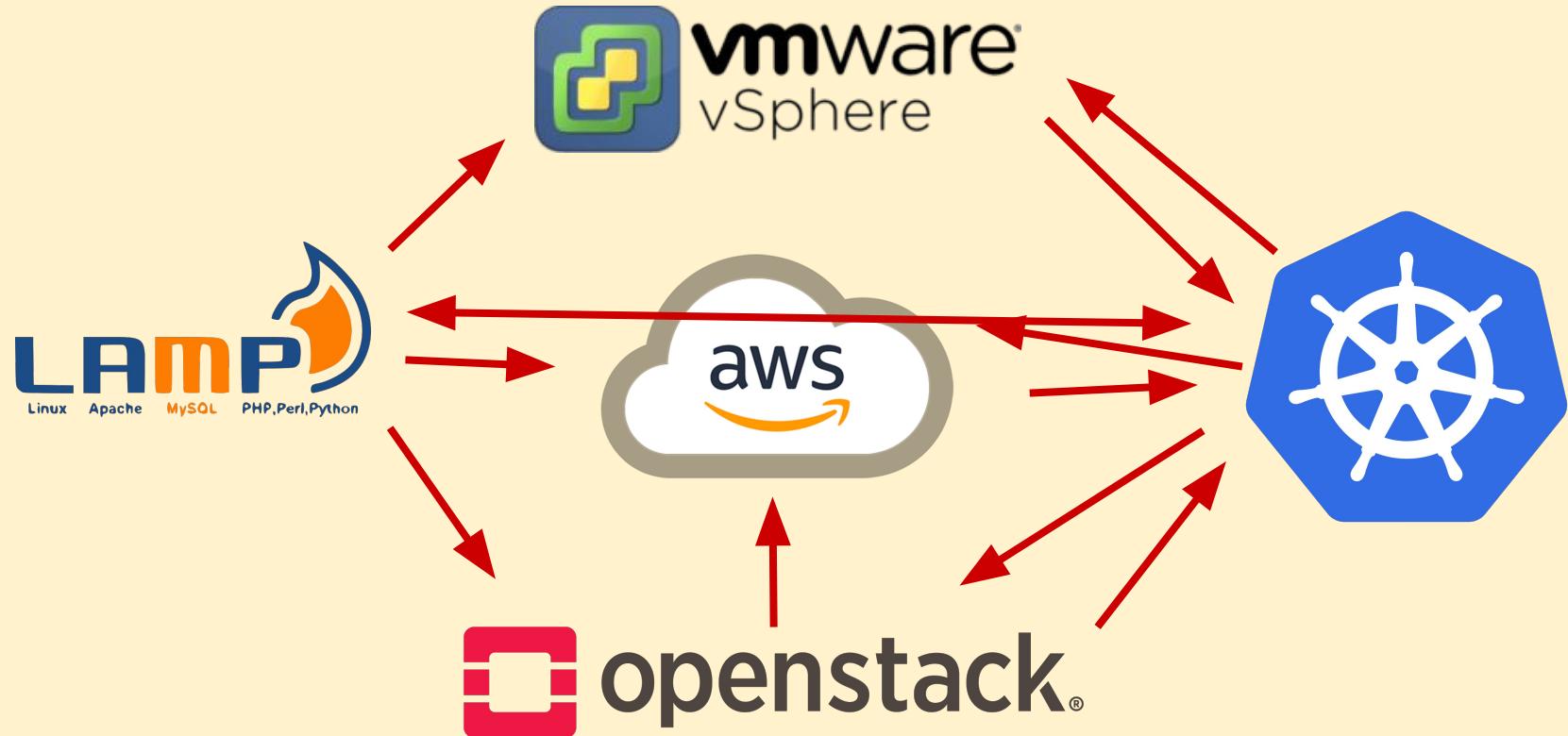
These techniques enable loosely coupled systems that are resilient, manageable, and observable. Combined with robust automation, they allow engineers to make high-impact changes frequently and predictably with minimal toil.”



The Cloud Native Stack









FILLINGS

CHICKEN



CARNITAS



BARBACOA



STEAK



SOFRITAS



VEGGIE



RICE AND BEANS

WHITE RICE



BROWN RICE



BLACK BEANS



PINTO BEANS



FAJITA VEGGIES



TOPPINGS

CHEESE



FRESH TOMATO SALSA



CHILI-CORN SALSA



RED-CHILI SALSA



GREEN-CHILI SALSA



SOUR CREAM



LETUCE



QUESO



GUACAMOLE



SIDES

CHIPS



CHIPS & GUACAMOLE



CHIPS & QUESO



CHIPS & SALSA



build your own burrito

- some things are required
 - even those have options
- many things are optional
- combinations are infinite





320 Calories
9g Fat
50g Carbs
8g Protein



200 Calories
9g Fat
29g Carbs
3g Protein



250 Calories
8g Fat
40g Carbs
7g Protein



210 Calories
4-6g Fat
36-40g Carbs
4g Protein



40 Calories
1g Fat
7g Carbs
3g Protein



320 Calories
9g Fat
50g Carbs
8g Protein



200 Calories
9g Fat
29g Carbs
3g Protein



FLOUR TORTILLA (BURRITO)

TACO SHELLS (3 TACOS)

FLOUR TORTILLAS (3 TACOS)

WHITE/BROWN RICE

CAULIFLOWER RICE

FLOUR TORTILLA (BURRITO)

TACO SHELLS (3 TACOS)

FLOUR



180 Calories
7g Fat
0g Carbs
32g Protein



150 Calories
6g Fat
1g Carbs
21g Protein



210 Calories
12g Fat
0g Carbs
23g Protein



170 Calories
7g Fat
2g Carbs
24g Protein



150 Calories
10g Fat
9g Carbs
8g Protein



180 Calories
7g Fat
0g Carbs
32g Protein



150 Calories
6g Fat
1g Carbs
21g Protein



CHICKEN

STEAK



130 Calories
1.5g Fat
22g Carbs
8g Protein



210 Calories
1.5g Fat
0g Carbs
5g Protein



210 Calories
12g Fat
0g Carbs
23g Protein



170 Calories
7g Fat
2g Carbs
24g Protein



150 Calories
10g Fat
9g Carbs
8g Protein



180 Calories
7g Fat
0g Carbs
32g Protein



150 Calories
6g Fat
1g Carbs
21g Protein



PINTO & BLACK BEANS

FAJITA VEGETABLES



80 Calories
1.5g Fat
16g Carbs
3g Protein



18g Carbs
1g Protein



4g Carbs
5g Protein



4g Carbs
0g Protein



3g Carbs
1g Protein



100 Calories
1.5g Fat
16g Carbs
3g Protein



220 Calories
1.5g Fat
18g Carbs
1g Protein



ROASTED CORN SALSA

CHIPOTLE HONEY VINAIGRETTE

QUESO BLANCO

TOMATILLO GREEN SALSA

SUPERGREENS LETTUCE

ROASTED CORN SALSA

CHIPOTLE HONEY VINAIGRETTE



110 Calories
8g Fat
1g Carbs
6g Protein



540 Calories
25g Fat
73g Carbs
7g Protein



810 Calories
38g Fat
110g Carbs
11g Protein



230 Calories
22g Fat
8g Carbs
2g Protein



460 Calories
44g Fat
16g Carbs
4g Protein



110 Calories
8g Fat
1g Carbs
6g Protein



540 Calories
25g Fat
73g Carbs
7g Protein



MONTERY JACK CHEESE

SIDE OF CHIPS

LARGE CHIPS

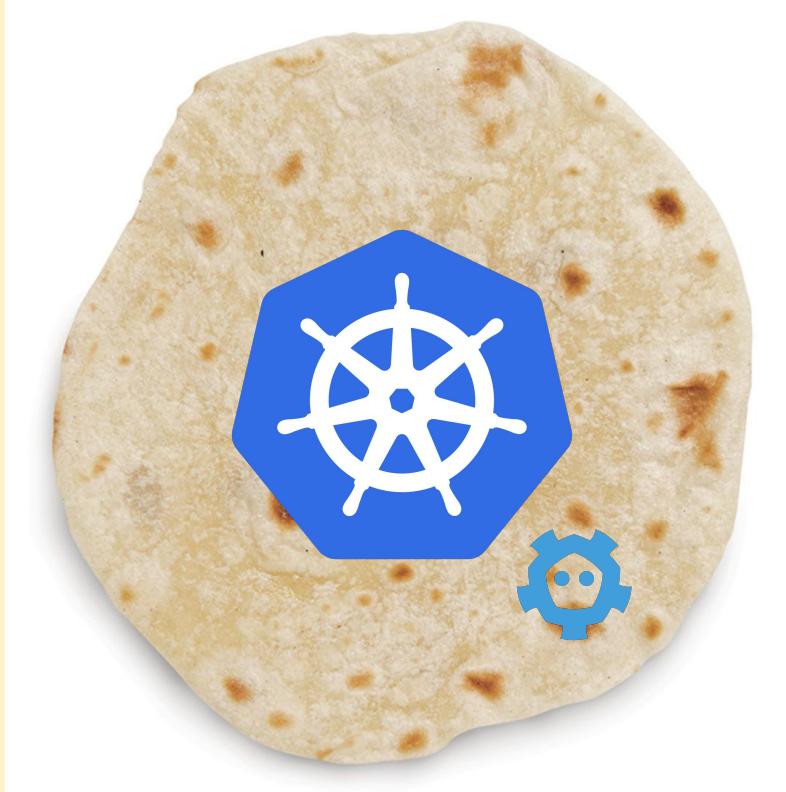
GUACAMOLE

LARGE GUACAMOLE

MONTERY JACK CHEESE

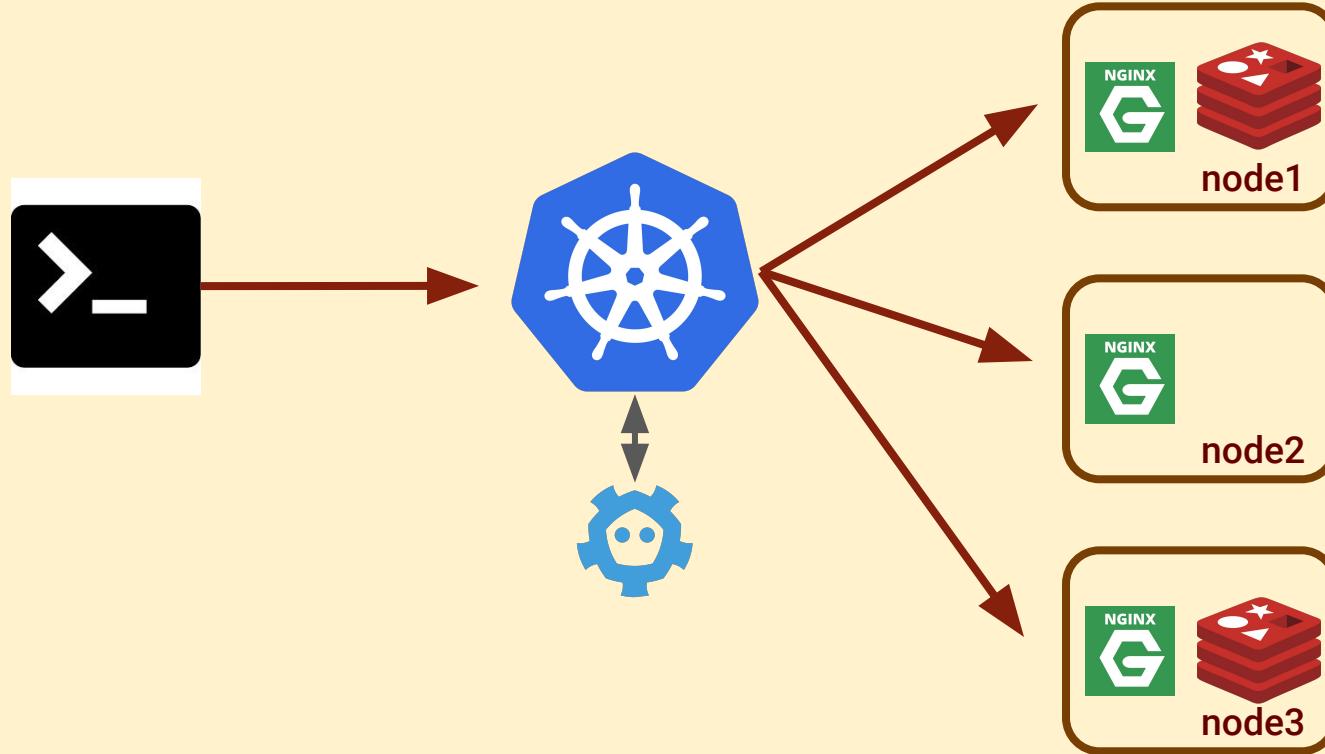
SIDE OF CHIPS

CLOUD NATIVE INGREDIENTS

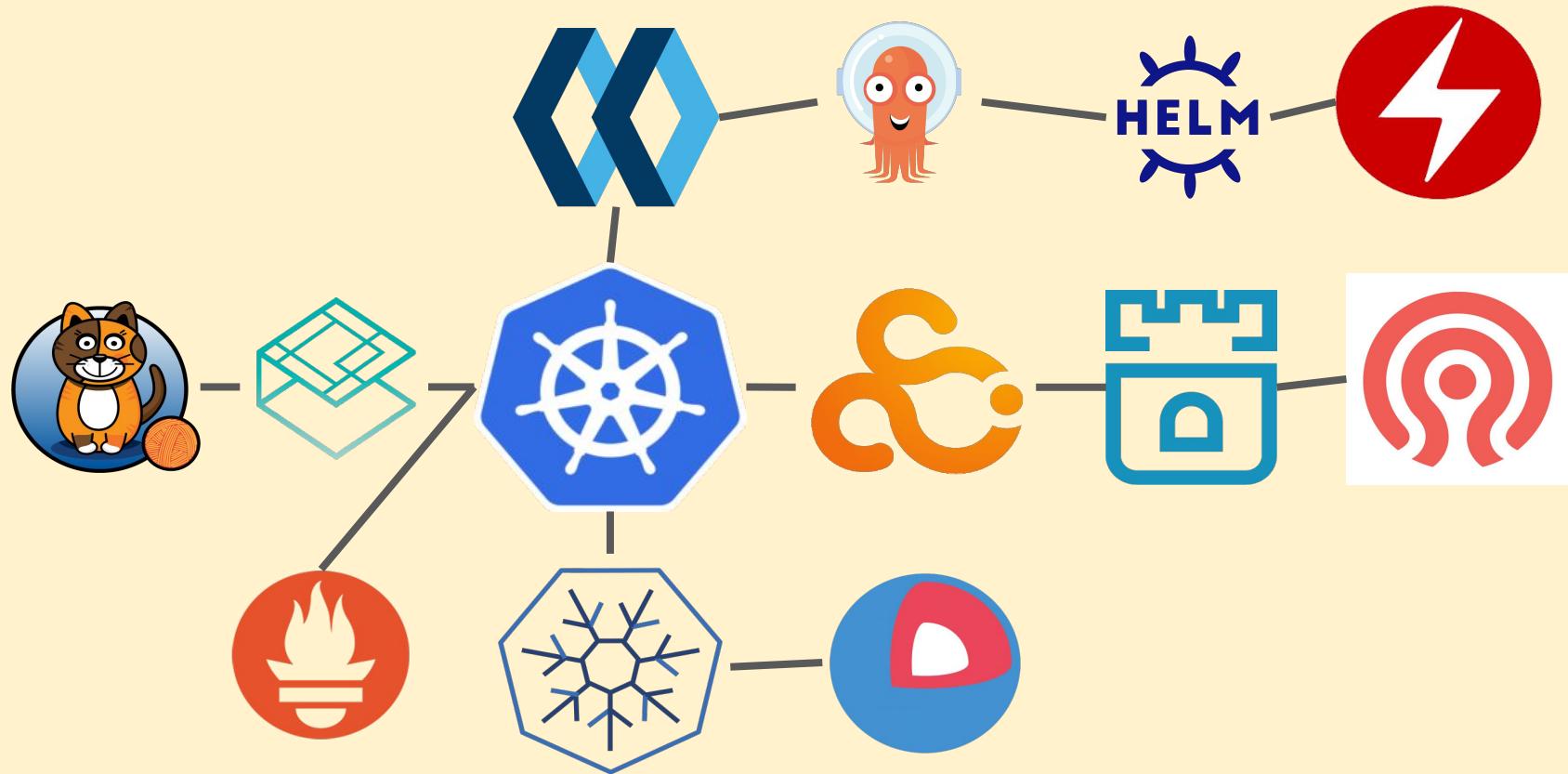


Kubernetes (and etcd)

kubernetes orchestrator



API for Cloud Native



**still
swappable!**



lightweight mini-kubernetes



K3S

μ

rice & beans

staple components

choice of flavors, but required
(most of the time)



rice & beans

- container runtime
- virtual network
- storage
- cloud provider



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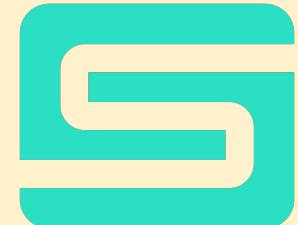
container runtimes

- why: something needs to launch the containers on each node
- options: CRI-O, containerd
 - (not Docker)
- alternates: KubeVirt, KataContainers, WASM



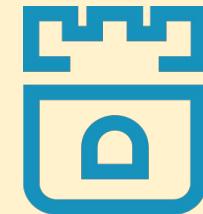
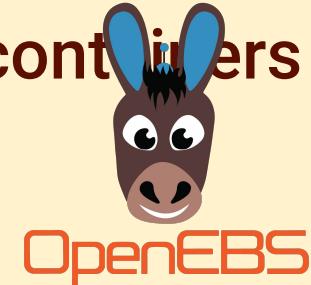
virtual networks

- why: containers need to have network interfaces and route connections
- CNI is the foundation
- networks: Calico, Cillium, OVN
- discovery: CoreDNS, K3GB
- routing: ingress, Contour
- WAN: Submariner, Antrea



storage

- why: need to allocate shared storage to containers
- CSI is the foundation
- built-in: ephemeral volumes
- options: Rook, OpenEBS, Longhorn



cloud provider

- why: every Kubernetes runs somewhere
- public cloud: AWS, Azure, GCE plugin
- private cloud: OpenStack plugin
- bare metal: MetallB, Metal^3



protein

App Deployment

because ... you want to run apps on this, right?



simple apps: Helm

- what: a tool for scripting app deployments on Kubernetes
- who: people who have relatively simple/small clusters
- or: combine with the other app tools



dev infra: CI/CD tools

- why: build a pipeline for the whole company to deploy to Kubernetes
- what: many tools, several of which can be used together
 - ArgoCD
 - Flux
 - JenkinsX
 - Tekton & Shipwright



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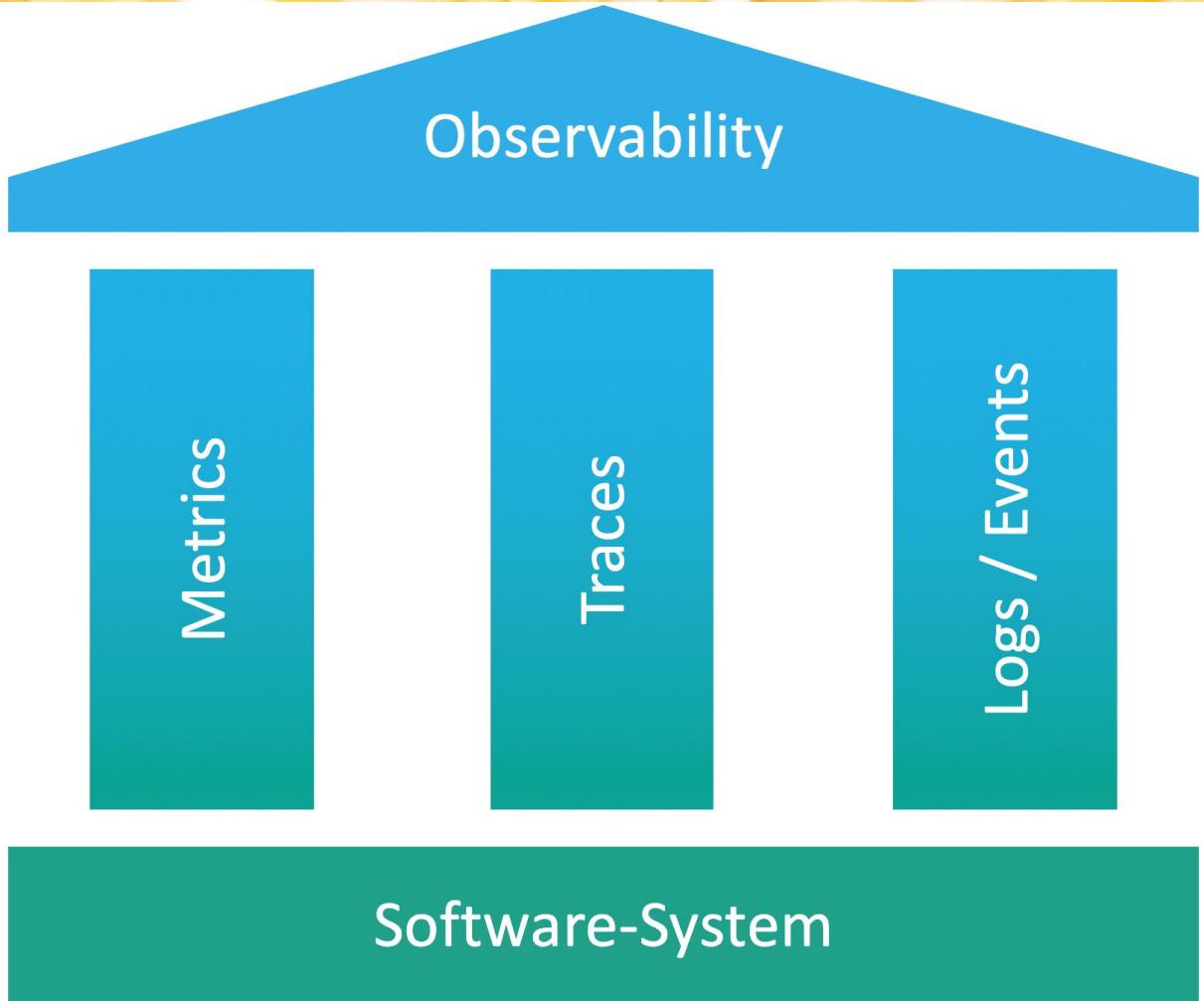
self-driving apps: Operators

- what: Kubernetes programming for apps
- who: folks who need maximum repeatable automation
- how: write your own Kubernetes “object” (CRD) or get one from the Operator Hub





The Cheese: Observability



Observability

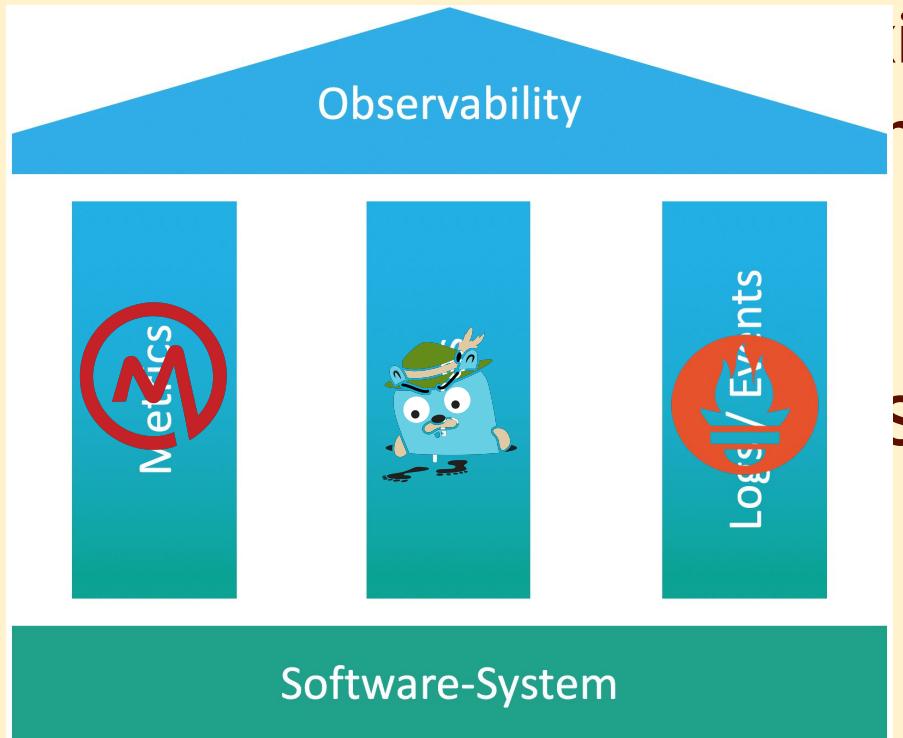
Metrics

Traces

Logs / Events

Software-System

3 pillars in Cloud Native



ie
metry
Sysdig)

Toppings Time

many “optional” components

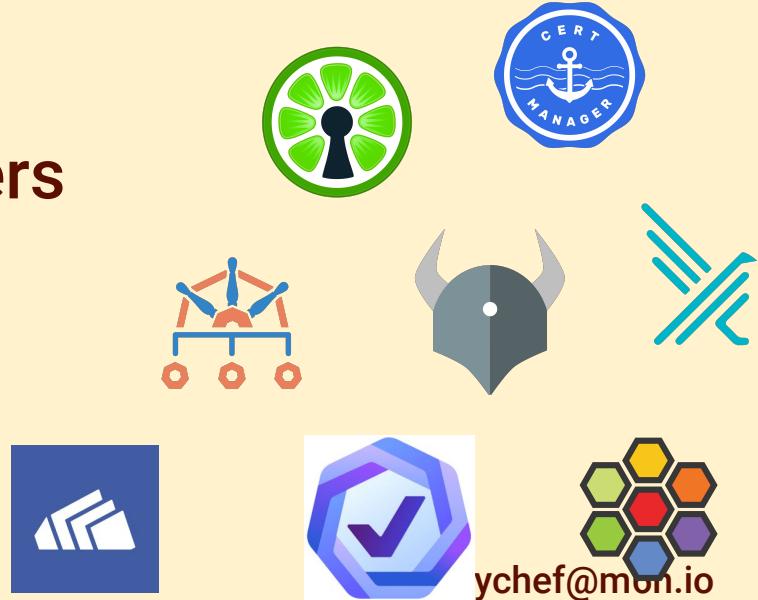
- security tools
- service mesh
- serverless
- container registry
- image building
- management
- alternate runtimes

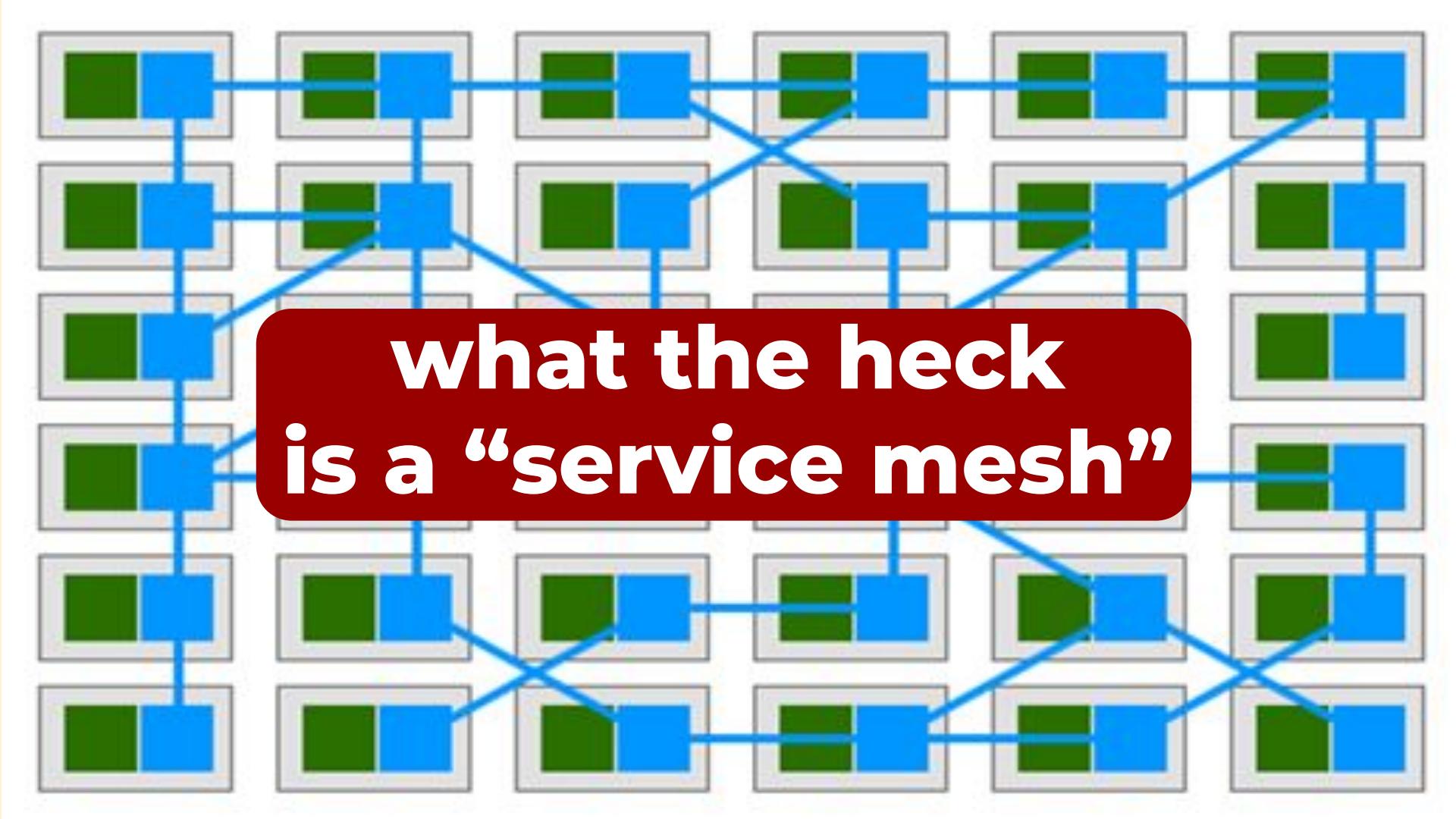


security

security: many + interrelated

- policy: Open Policy Agent, OCM-Policy, Kyverno
- identity/secrets: Keylime, Keycloak, Vault, Cert-Manager, SPIFFE
- network: Calico, Cilium
- runtime: confidential containers
- devops: kubelinter
- threats: Falco
- framework: Stackrox





**what the heck
is a “service mesh”**

service mesh

Collapse multiple network layers (4-7) into a single tool in order to centrally control and monitor network traffic on a granular level.

Discovery, routing, sessions, and identity are controlled through configurable proxies.

Why? A/B testing, traffic status, bridging, live migration, security.

many meshes

- Istio + Envoy
- Contour + Envoy
- OSM + Envoy
- Kuma + Envoy
- Linkerd



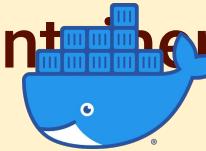
serverless tools

- knative: events & functions
- cloud events: event spec
- OpenFaaS: functions
- Dapr: events
- Strimzi: streaming support



image building

- why: you need better ways to create containers from code than BASH
- what: tools that integrate into CI/CD
- tools: Docker, BuildPacks, S2I, Backstage, Devfile, Porter



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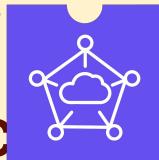
image registry

- why: you need a private/secure place to host your own images (instead of docker/google/GH)
- what: server applications that store & distribute
- tools: Harbor, Quay, Dragonfly



alternate runtimes

- why: you need to run nonstandard containers or you need Kubernetes to run somewhere specific
- alternate containers: KubeVirt, KataContainers, WASMEdgeRuntime
- alternate kubelets: krustlet, Virtual Kubelet, KubeEdge



managing it all

- why: you need a console/API that lets you manage everything (inc. multiple clusters)
- tools: Open Cluster Management, CrossPlane, Keptn, Kogito



combos & specials

**Cloud Native
distributions &
platforms**

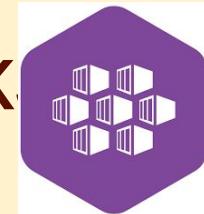
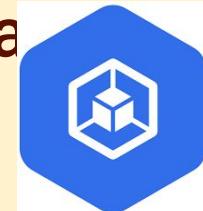


most people pick a distro

- why: too many options & tools, easier to pick an opinionated stack
 - also, integration is hard
- options: public cloud, on-prem or “hybrid”

public cloud distros

- why: you don't want to think about installing and maintaining a cluster, and you're OK with being on one cloud
- what: fully hosted Kubernetes + CN, you just get a kubectl interface
- tools: Google GKE, Azure AKS, Amazon EKS
 - plus most other cloud hosts



hybrid cloud distros

- why: you want to run your distro on-prem, across multiple clouds, or both
- what's it: Kubernetes stack install including lots of options
- tools: Red Hat OpenShift, VMware Tanzu, SuSE





wrapping it up

burrito conclusions

- Cloud Native is an entire application runtime stack
- Like burritos, there are many alternate ingredients offering millions of possible combinations
 - a few are essential, but most are optional
 - you can start simple and build up
 - or use someone else's recipe

¿preguntas?

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