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Virtual Summit China 2020

Five Biggest Challenges In App Delivery and How We Solve Them

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Work Plan (due: Jul 26th 2020)

In this session, we will deep dive five biggest issues in the app delivery space:

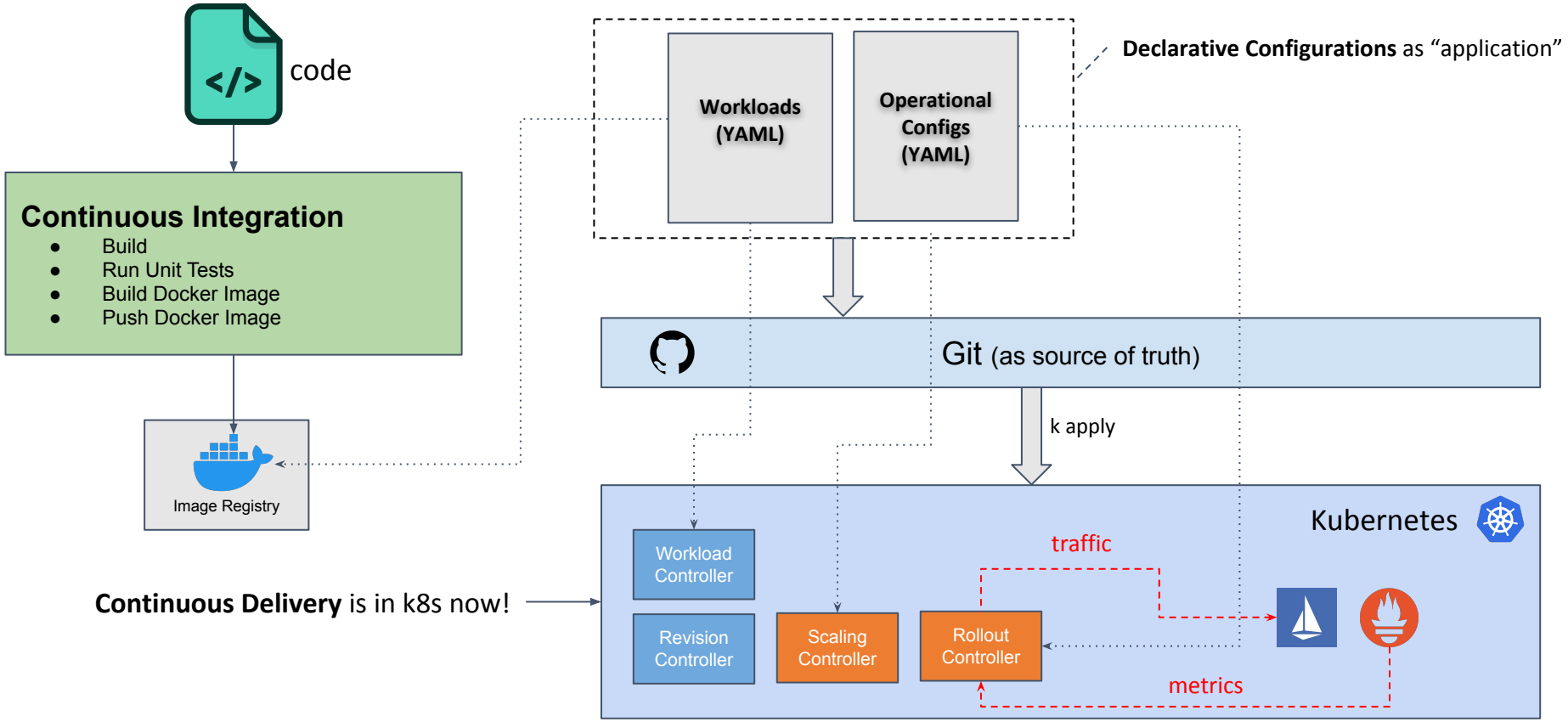
- - Application definition and packaging
  - - no unified/simple way to this, dependency management
- - Installing new apps into multiple clusters, SMI etc. are a good starting point but there are many corner cases
- - Packaging for COTS usage: If you want to simple ship a COTS “run on Kubernetes” app it is hard
- - Chain of custody for delivery. Hard to understand what gets installed based on Operators etc.
- - Ability for operations automation at an application level in a reusable form

Plus, we will explore the community within scope of sig-app-delivery and share the existing efforts and trends in the community.

Plan:

- Harry will do the blue ones (6 mins), Alois will do the red ones (9 mins)

Background: App Delivery In Cloud Native Era



Yet New Challenges Are There ...

1. Unified application definition/model
2. App delivery into multiple clusters
3. Packaging and shipping a COTS app is still hard
4. Chain of custody for app delivery
5. Ability for operations automation at app level, in a reusable form

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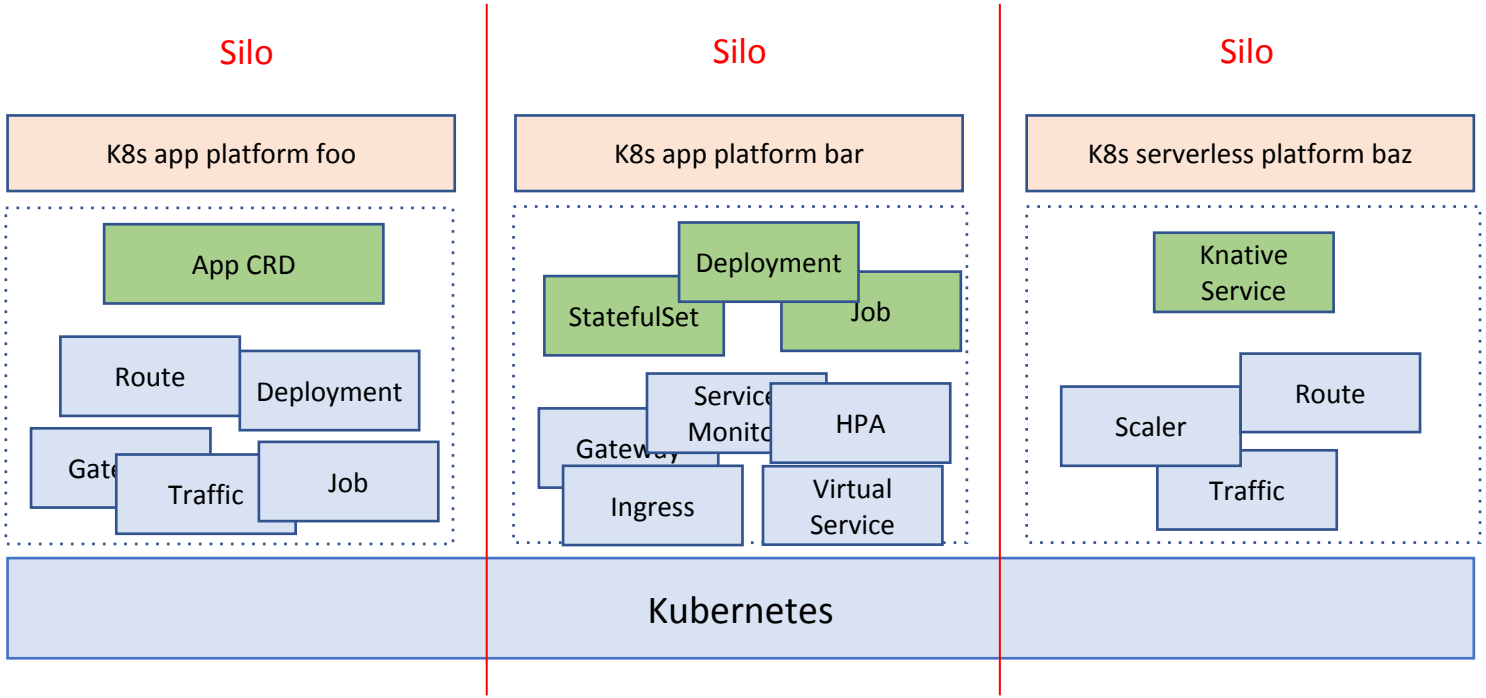
Challenge 1:
Unified Application Definition/Model

We created silos ...

Users/Customers

K8s is “platform for platforms”, so we are all building **app level platforms** with k8s! But ...



Breaking Down the Silos!

Users/Customers

App platform foo

Application Model

operational caps

workloads

App platform bar

Application Model

operational caps

workloads

Serverless platform baz

Application Model

operational caps

workloads

Model Layer

Operational Capabilities

Traffic

Gateway

Monitor

Service Binding

Ingress

Route

Alert

Rollout

interpretability

Workload Types

Deployment

K8s Operator

Function

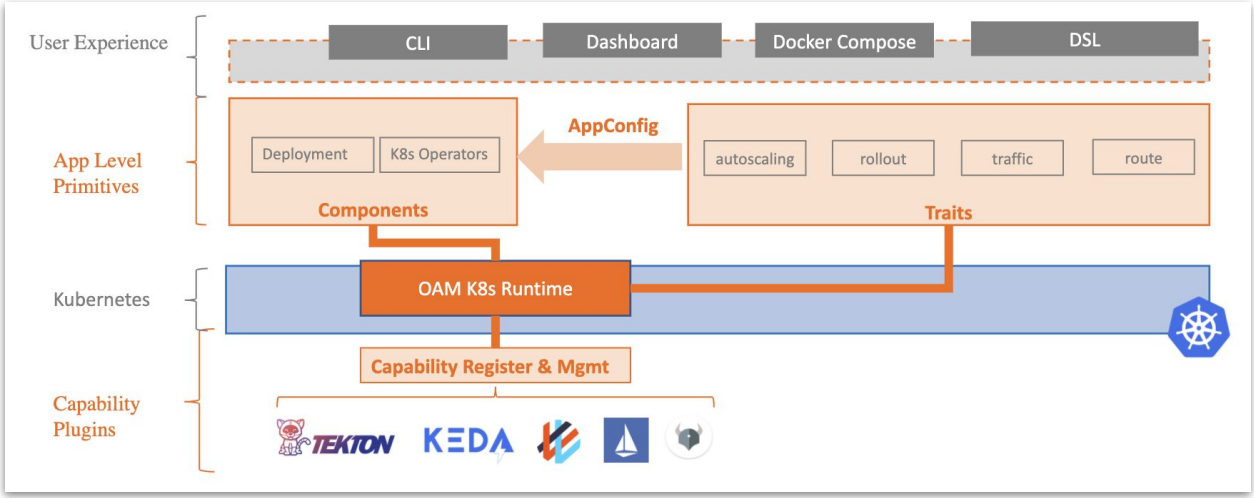
Virtual Machine

Capability Layer

Kubernetes

Community Efforts

- Open Application Model (OAM)
  - Design: modeling microservice by 3 app level primitives:
    - **Components** - what workload to run?
      - e.g. deployment, statefulset, operator etc
    - **Traits** - how to operate
      - e.g. rollout strategy, traffic policy etc
    - **AppConfig** - configure traits to components



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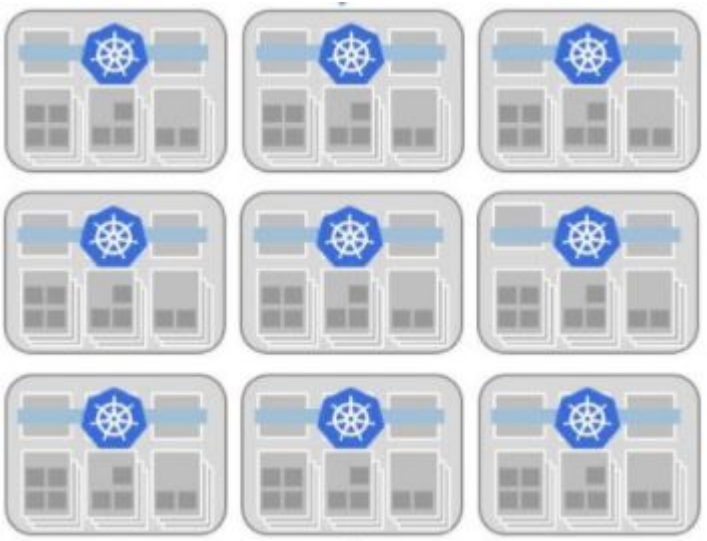
Challenge 2:
App Delivery Into Multiple Clusters

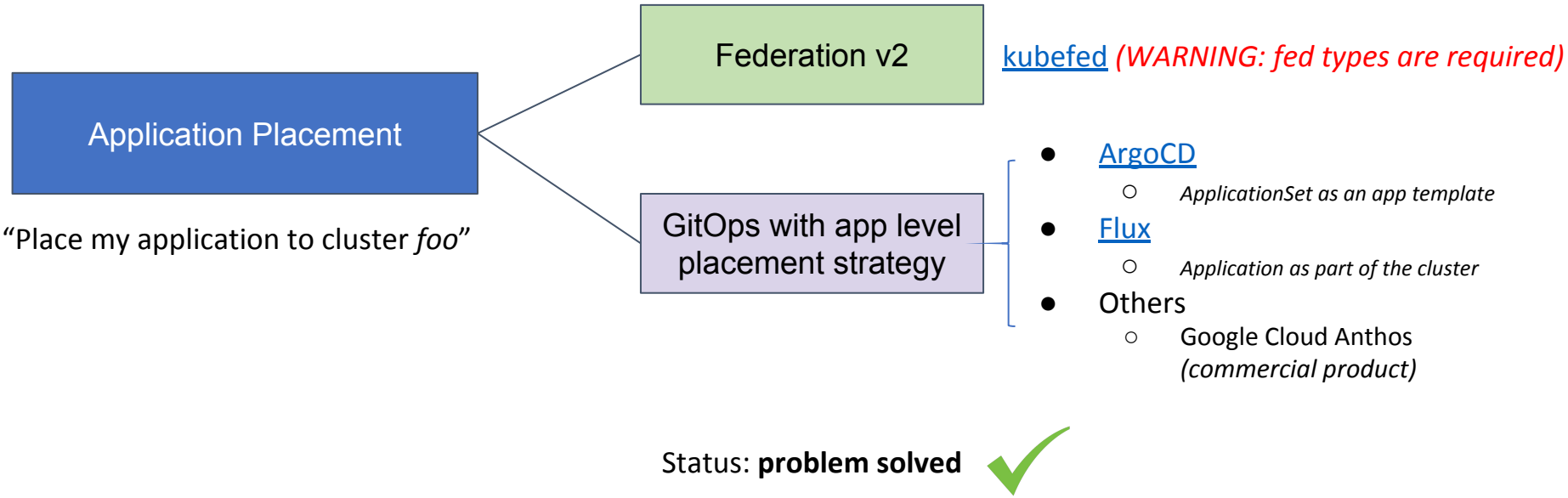
Why Multi Cluster Kubernetes?

- Better Isolation
- Improved Availability
- Better capacity planning for bursting
- Location affinity
- Avoid vendor lock

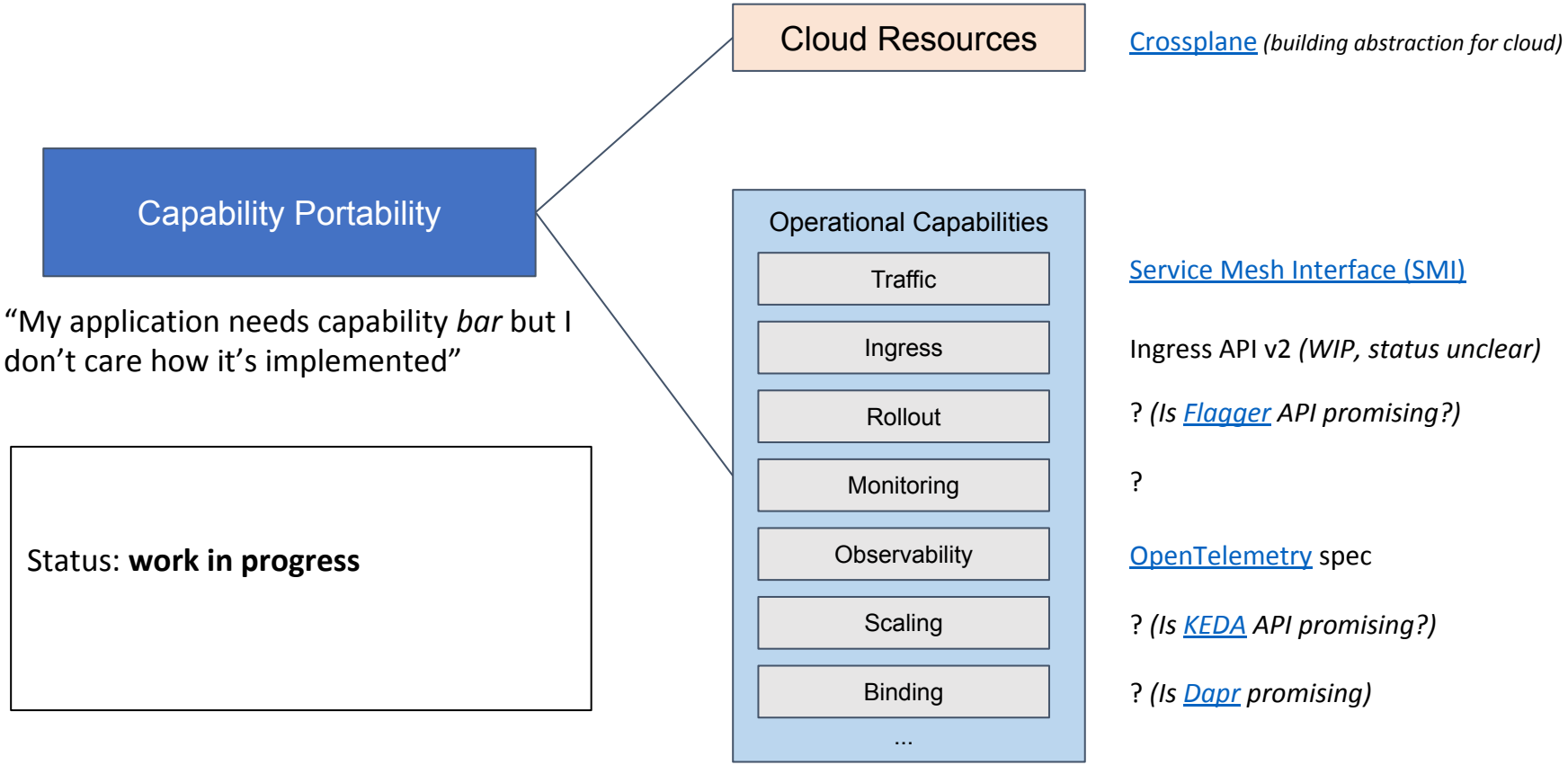


pic source: Gartner blog

Multi Cluster App Delivery: Where Are We?



Multi Cluster App Delivery: Where Are We?



"My application needs capability *bar* but I don't care how it's implemented"

Status: **work in progress**

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Challenge 3:
Packaging and Shipping COTS App is Still Hard

COTS Application Delivery

COTS means Commercial off-the-shelf applications

=> i.e. stuff you simply install and simply use

Like Multi-Cluster delivery to an extreme

We need a basic “contract” about what ot expect from an environment

Currently these are “only” platform primitives

A standardized self-contained packaging format would help

Packaging - Available Solutions

Helm Charts

- Enable packaging up applications to run on Kubernetes
- Not all components are part of Helm charts
- Dependency on Helm

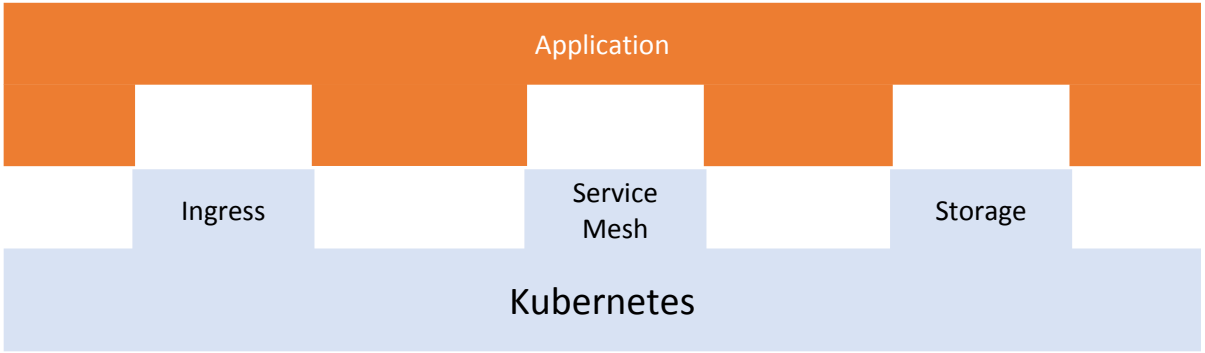
Operators

- Encapsulate a lot of installation logic (and more)
- Images are still not part of package
- Does not solve registry dependency either

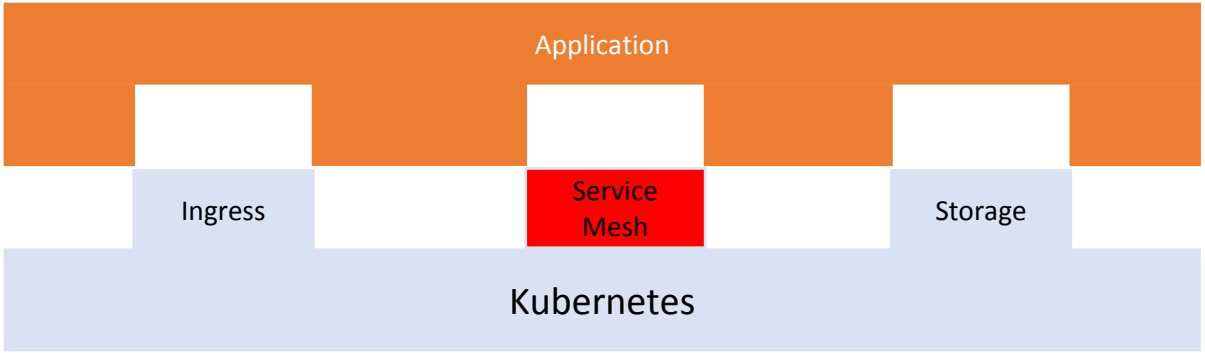
CNAB - Cloud-Native application bundles

- Allows packaging including signing etc.
- Thick bundles come with images included
- Still requires tooling on the cluster-side

Platform Capability Requirements

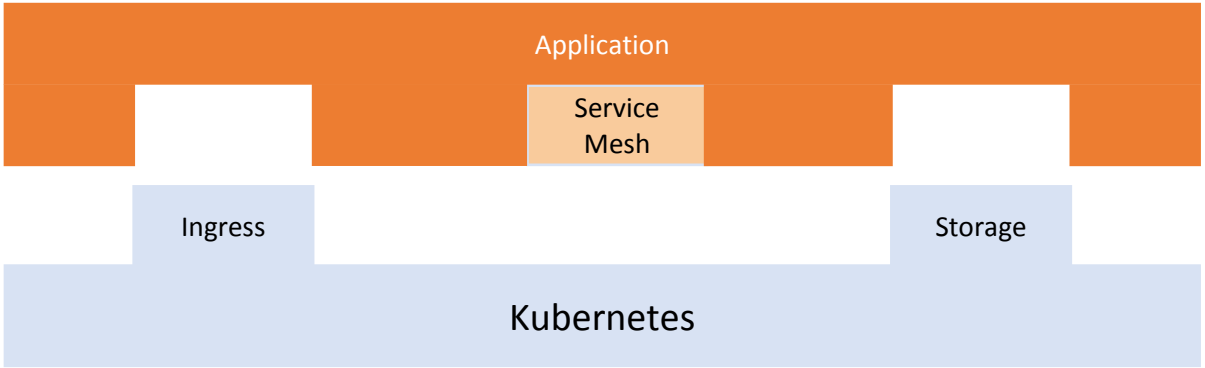


Platform assumptions met

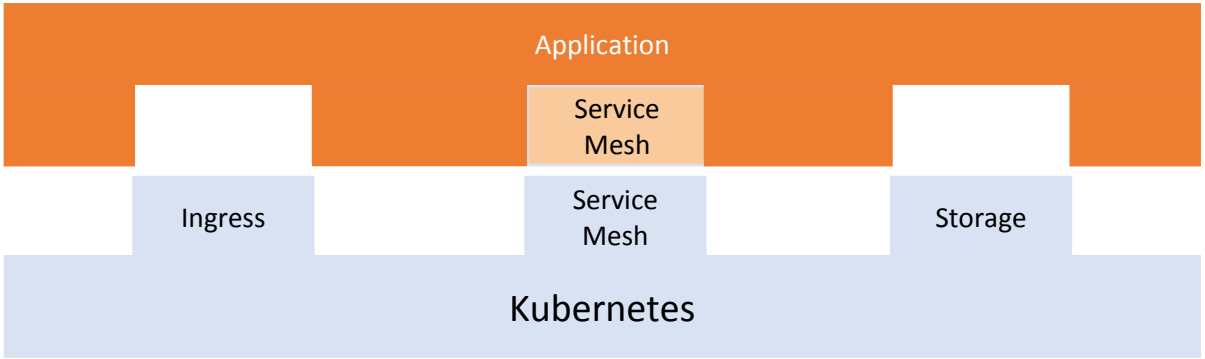


Application will not run

Platform Capability Requirements



Application ships platform components



Problems with components available multiple times

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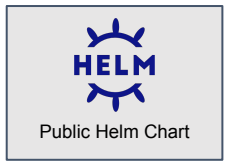
Challenge 4:
Chain of Custody for App Delivery

Who has done it before?

kubectl apply -f someFileonTheInternet.yaml



Untrusted zone

Your Registry

Your Artefact store

Your Cluster

Trusted Zone

Chain of Custody Concerns

Establish trust and ensure authenticity of artefacts

- Are you really getting what you think

Get them into your “safe zone”

- Exporting and re-importing images into your registries and adjusting manifests is not very convenient

More convenience - like operators - hides more of the internals

- Harder to know what an operator is doing

Some potential solutions

DCT (Docker Content Trust) is only a partial solution

Ensure that only trusted images get used

Helm Provenance and Integrity

Ensure you use Helm charts you trust

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Challenge 5:
Ability for Operations Automation at App Level, in a Reusable Form

Standardized Application Operations

Kubernetes handles “generic” application operations

- Restart, scaling, health monitoring etc.

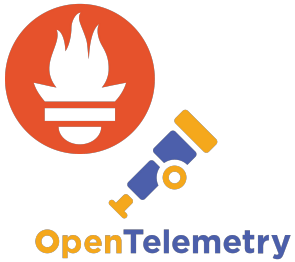
Applications are not managed by health endpoints alone

- How to you handle SLOs/SLIs based operations

Domain-specific operations requires custom logic

- e.g. If loads gets too high switch to static content delivery

Standardized Application Operations



Exposing metrics is easy

- Prometheus and OpenTelemetry make this easy

Kubernetes operators for automated operations

- Encapsulate operations logic
- How to work with SLIs/SLOs?
- How to consume metrics/alerts?

Keptn allows SLO and alert based automation

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Want to join the conversation?

SIG App Delivery is working on several of these challenges, so join us!

Dedicated working groups on

- Operator Working Group
- Air-Gapped Environments Working Group

Have best practices to share? Get on one of the next meetings!

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