Abstracting Platform Complexity Bringing Helm to OAM

Lucas Albuquerque | 16-08-2022

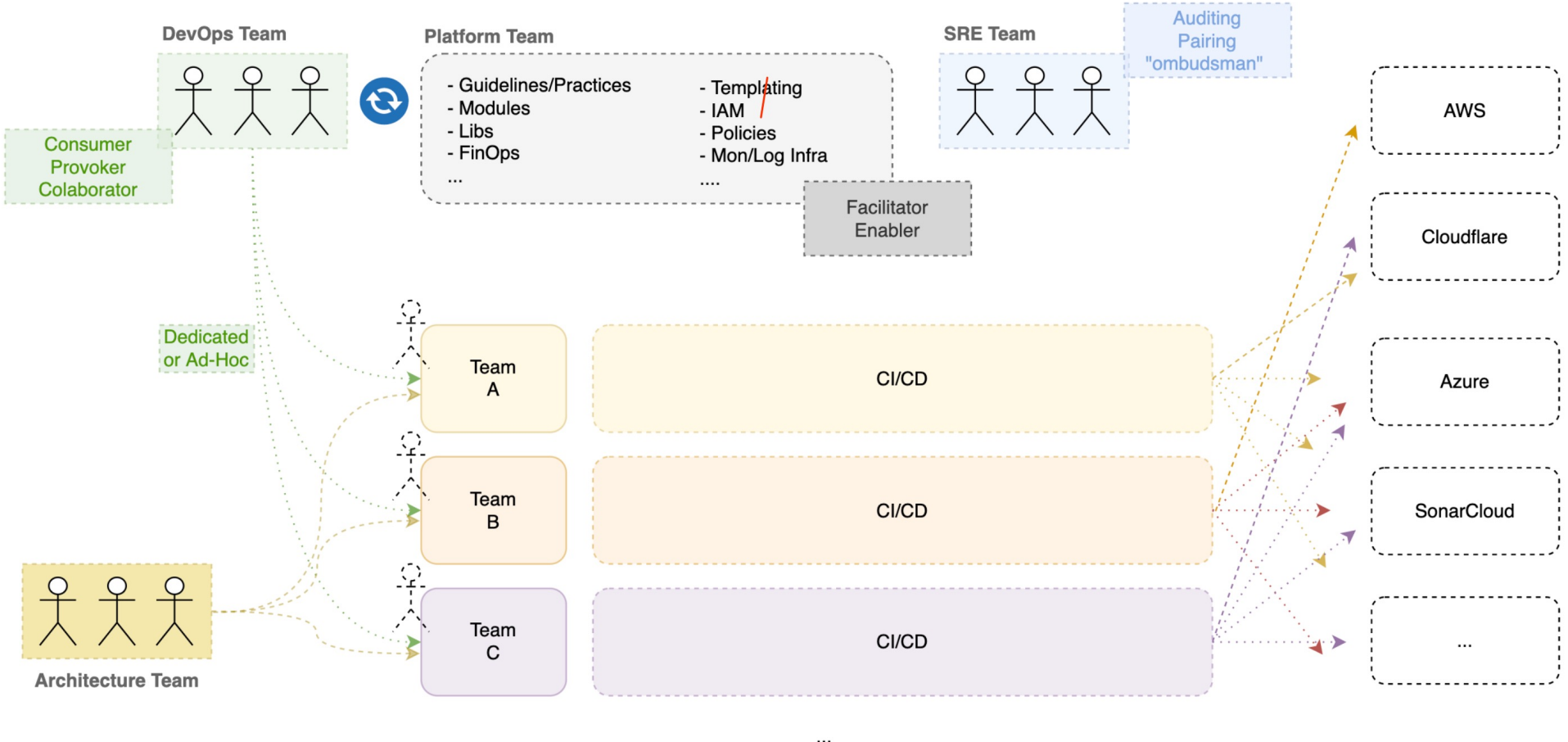
Agenda

- Platform Engineering as a Practice
- APIs and Control-Planes
- The 4C's of Cloud Native
- OAM (Open Application Model)
- Why not Helm instead?
- Customer's Use Case
- Aces Helm OAM
- Coming Next...

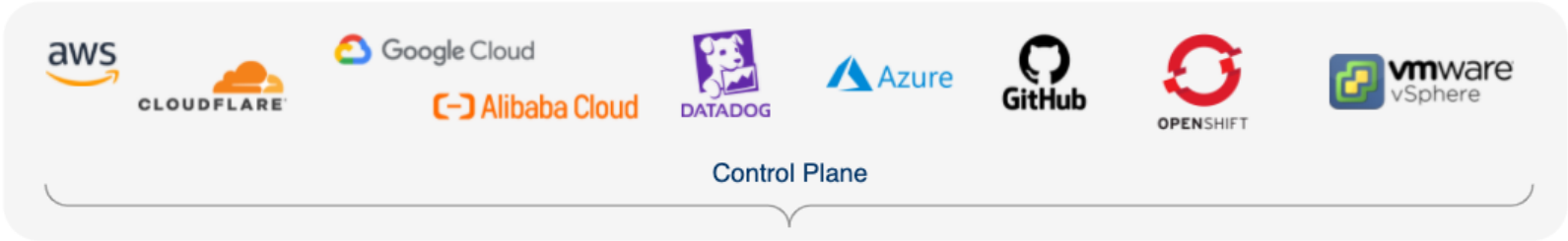
50 min

Platform Engineering as a Practice

- Improve Product Teams' productivity
- Streamline DevOps processes
- Autonomy within Boundaries
- Policy Enforcement and Compliance Checks
- Oversee standards

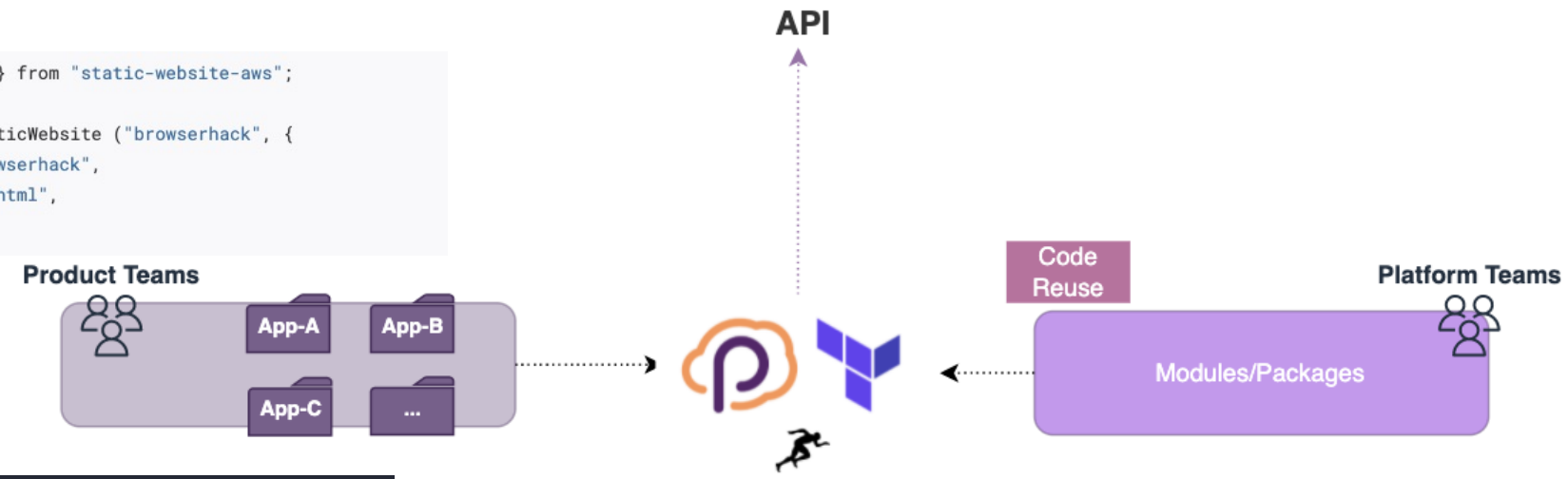


APIs and Control-Planes




```
import  { StaticWebsite } from "static-website-aws";

const website  = new StaticWebsite ("browserhack", {
    pathToContent:"./browserhack",
    custom404Path:"/404.html",
});
```




```
module "consul" {
  source  = "hashicorp/consul/aws"
  version = "0.0.5"

  servers = 3
}
```

The Cloud-Native 4C's

Application Definition & Image Build

CNCF Graduated: HELM

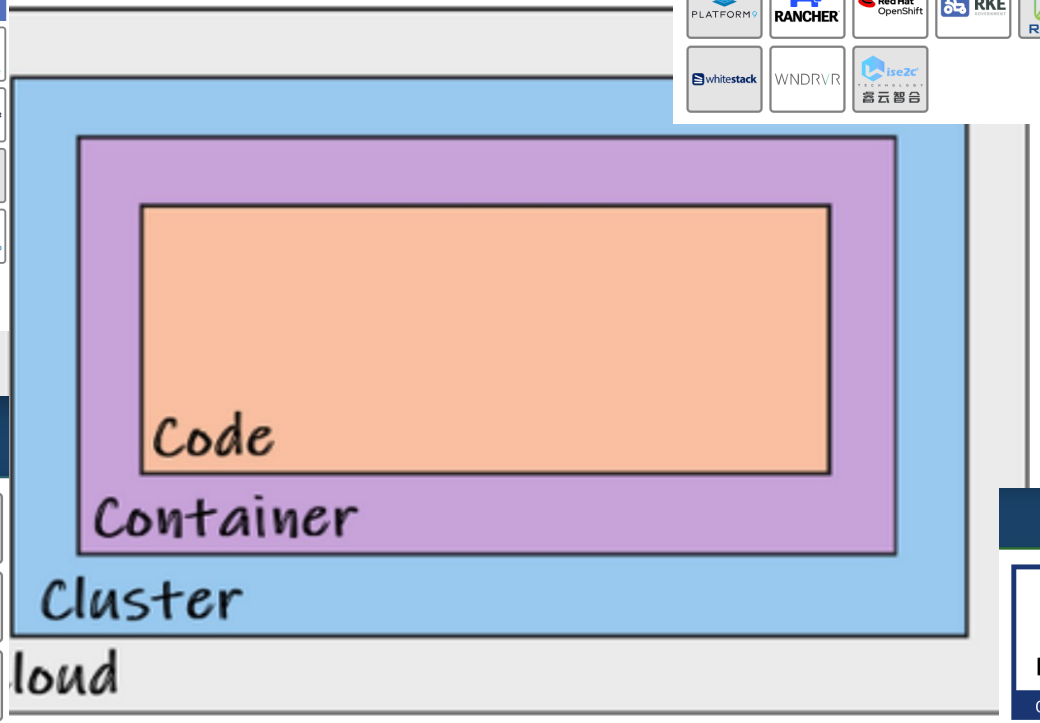
CNCF Incubating: Backstage, Buildpacks.io, KubeVirt, OPERATOR FRAMEWORK

bitnami, CARVEL, CHEF HABITAT, KubePlus, codezero, DeployHub, Devfile.io, DevSpace, Gitpod, Gradle, itopia, Kaniko, kots, KRATOR, KUBERMATIC, KubeOrbit, KubeVela, KUDO, Kui_, lagoon, Platform, MONOKLE, Nocalhost, OCTANT, okteto, On-Prem オンプレム, Open Application Model, OPENAPI INITIATIVE, Packer, podman, Porter, rafftt, sealer, ServiceComb, SHIPWRIGHT, SKAFFOLD, squash, Tanka, TILT

Automation & Configuration

CNCF Incubating: KubeEdge

airship, Akri, ANSIBLE, Apollo, AWS CloudFormation, BOSH, Cadence, CFEngine, CHEF INFRA, Cloud Custodian, CLOUDIFY, Couler, DevStream, FOREMAN, juju, kiosk, KubeDL, kubefirst, LINUX KIT, MAAS, ManageIQ, mist.io, openstack, OpenYurt, Pulumi, puppet, RUN DECK, SALTSTACK, StackStorm, SuperEdge, Terraform, tinkerbell, vmware vSphere



Platform

Certified Kubernetes - Distribution

ACCORDION, A SORA KUBE, AiStation, alauda Container Platform, ALVISTACK, aws, ASUS Cloud Infra, Microsoft Azure, bizkube, 博云 BoCloud, CANONICAL, CARS, 碧基平台, 中国东信 China-ASEAN Information Harbor, CISCO, Cloudboostr, Cocktail Cloud, Constellation, D2 IQ, DaoCloud, desktop Kubernetes, DIAMANTI, 易捷行云 EasyStack, elastisys, ERICSSON, Flexkube, FURY, Giant Swarm, H3C, 谐云科技 HARMONY CLOUD, inspur 浪潮, Intel Smart Edge Open, JD.COM, K3S, K8sPlus, KubeCube, KUBERMATIC, KUBESPHERE, Kubic, kublr, kurl, METALK8S, MicroK8s, 网易数帆, ORACLE, palette, PLATFORM9, RANCHER, Red Hat OpenShift, RKE, ROBIN, 时速云, TmaxA&C, Typhoon, vcluster, VMware Tanzu, whitestack, WNDRVR, 壹云智合

Scheduling & Orchestration

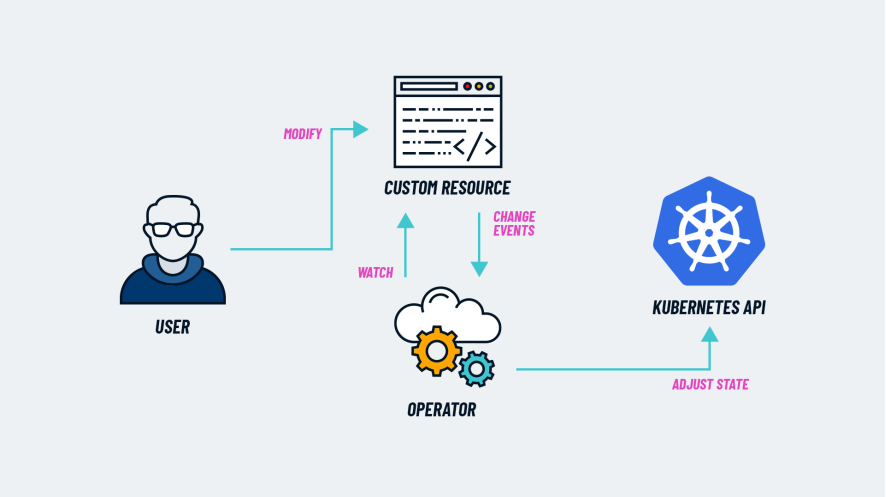
CNCF Graduated: kubernetes

CNCF Incubating: Crossplane, VOLCANO

Amazon ECS, MESOS, Azure Service Fabric, capsule, Clusternet, Clusterpedia, Docker SWARM, fluid, iSSCloud, KARMADA, koordinator, kube-rs, Nomad, Open Cluster Management, Open Nebula, wasmcloud

Operators as a Cloud Native Trend

- **Cloud-Native** Vendors offering **K8S operators** (CRs)
- K8S Operator **is an abstraction** for deploying **non-trivial applications** on top of Kubernetes , **behind K8S APIs**



- Operators are like "**Modules**" and can be shared: https://operatorhub.io/
- Using Operators, we can **manage anything** (incl. non-k8s resources) via **K8S API**
- We can easily build our K8S operators using an **Operator Framework** https://operatorframework.io/

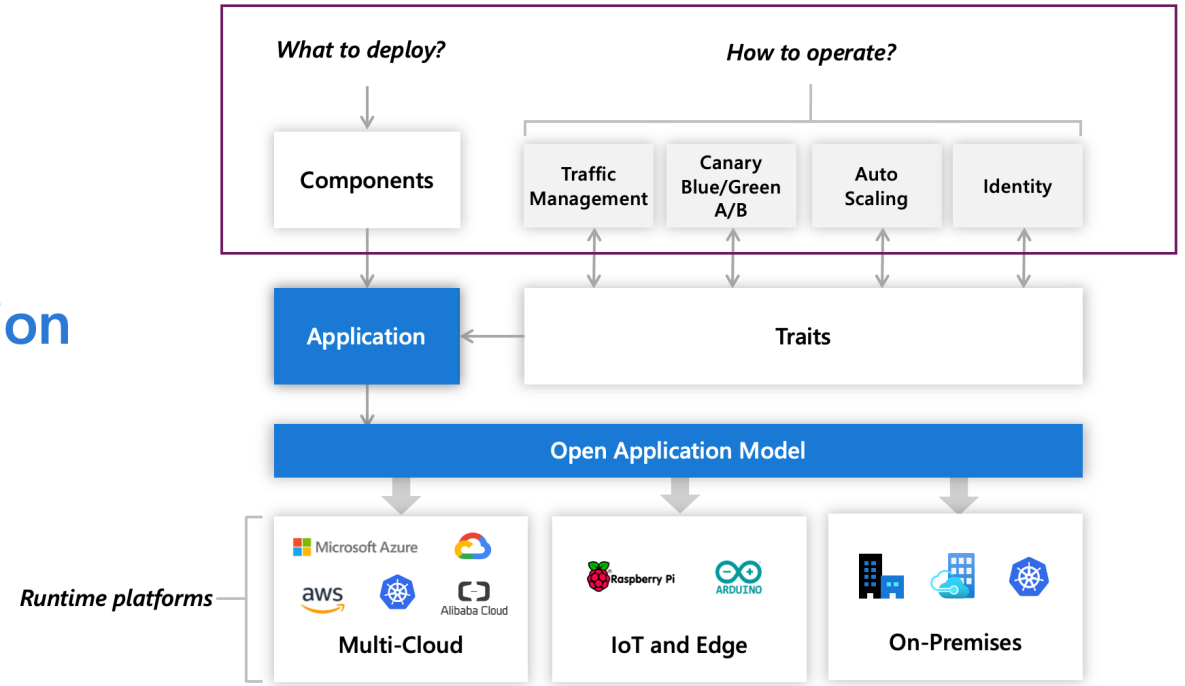
Operators are Amazing but…

- There's **no common practice** for declaring resources
- Consumers need to **get familiar** with each -- too much for most Devs
- OAM (Open Application Model) was proposed to address that (https://oam.dev/)

KubeVela

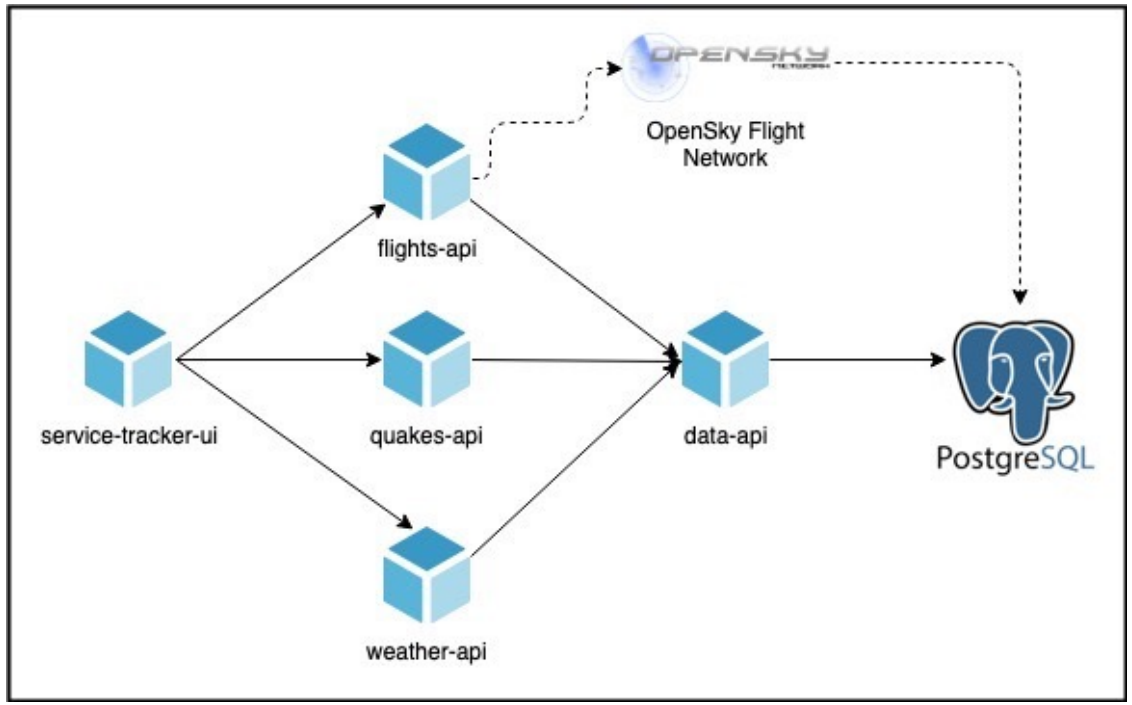
Crossplane

Open Application Model



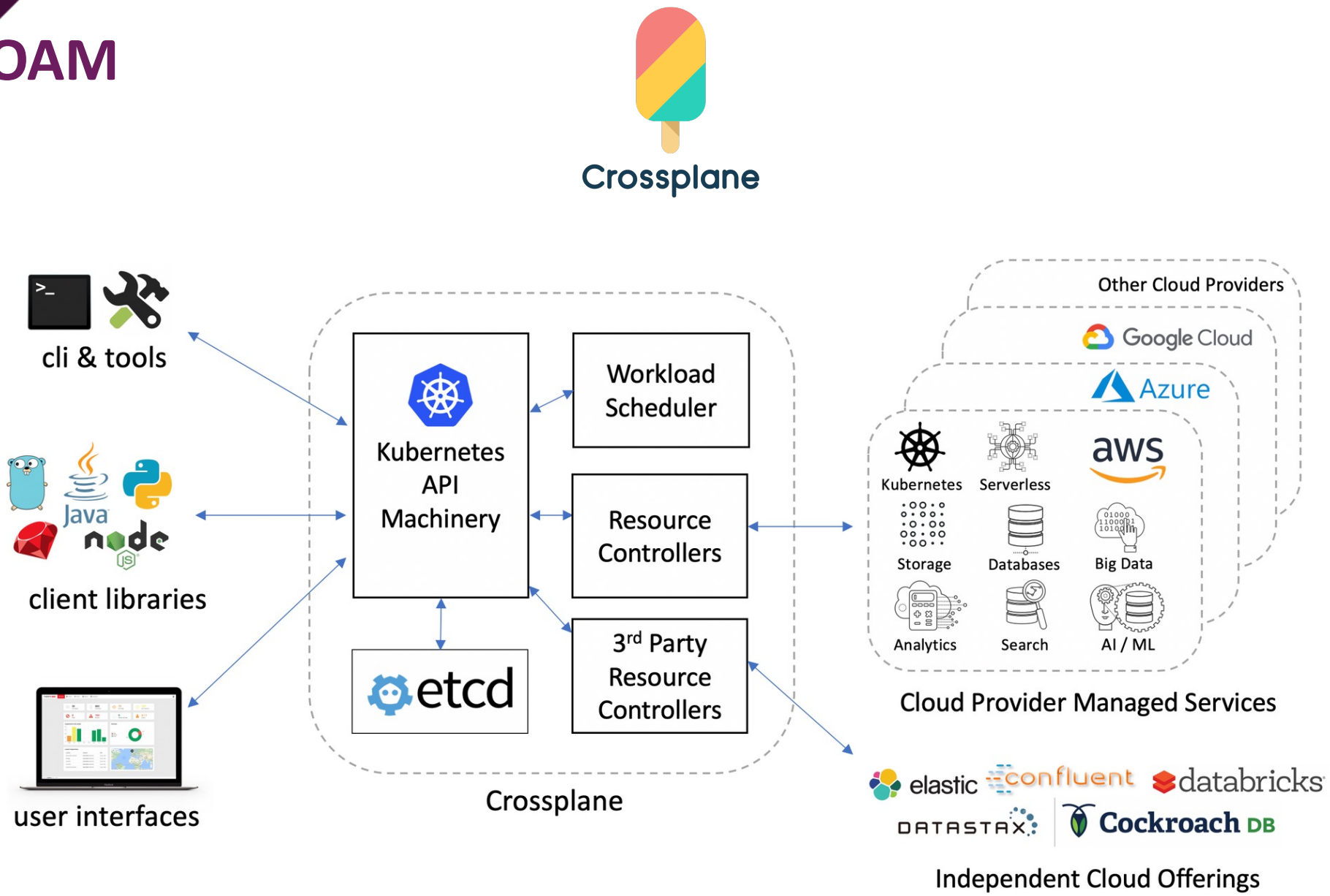
OAM

KubeVela



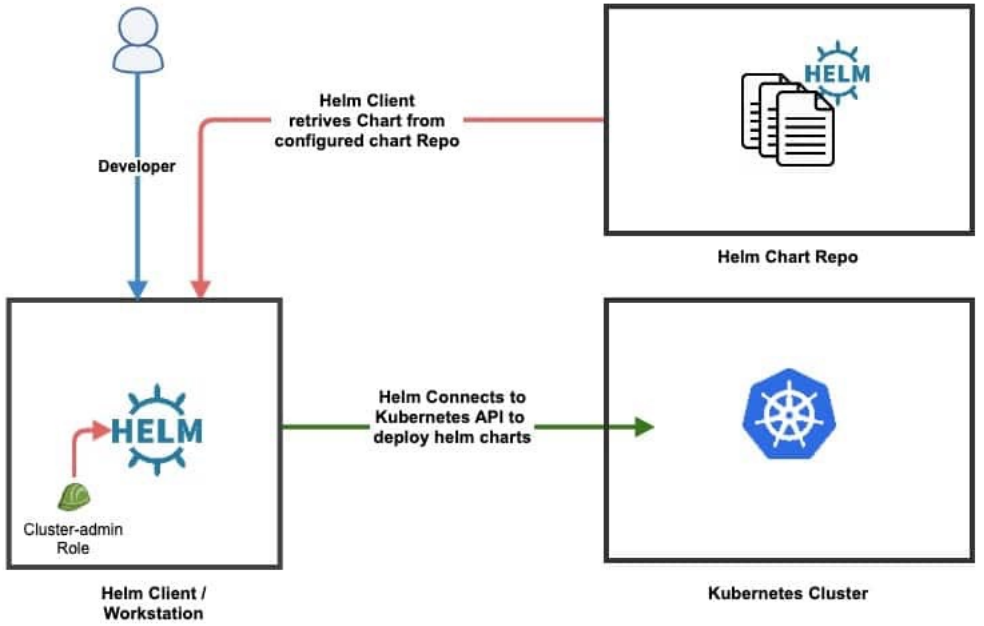
Link to the Code

OAM


Crossplane
cli & tools
client libraries
user interfaces
Kubernetes API Machinery
Workload Scheduler
Resource Controllers
3rd Party Resource Controllers
etcd
Crossplane
Other Cloud Providers
Google Cloud
Azure
aws
Kubernetes
Serverless
Storage
Databases
Big Data
Analytics
Search
AI / ML
Cloud Provider Managed Services
elastic
confluent
databricks
DATASTAX
Cockroach DB
Independent Cloud Offerings

Why not Helm instead?

- Helm is a K8S native package manager
- Definitions declared using **YAML**, backend powered by **GoTpl** and packaged as **Charts**
- Vast integration ecosystem: *artifacthub.io, ArgoCD, Flux, Kustomize*, ...



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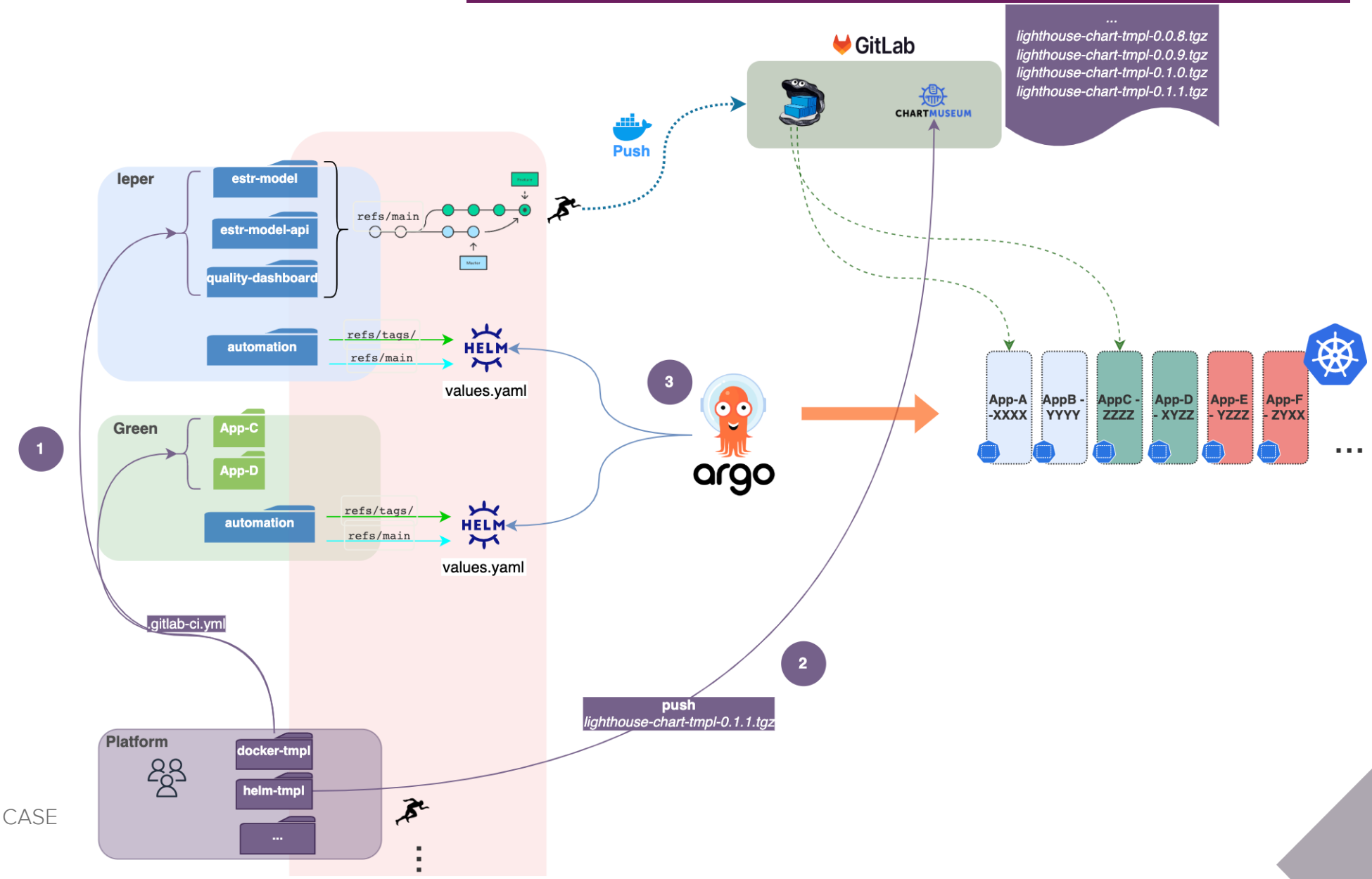
AN USE CASE ... to illustrate the idea

An IFF Use Case

But where OAM-concept comes into the game?



An IFF Use Case

But How Can We Bring Helm to OAM-Model?

... Let's check the code.

Benefits of This Approach

- A **single file** for declaring resources (*values.yaml*)
- **Unified** syntax and documentation
- **Abstract** different operators **complexity** under an single interface;
- Platform “Team” in charge of **evolving the Charts** (adding new features)
- Product Teams can **pick the charts and versions** that works best for them
- Platform resources declared/managed by Product Teams (**Autonomy**)

Coming Next…

- **Evolving the Charts** (NetPol, InitContainers, OPA, Reloader, Vault, …)
- Consolidate a **Platform-as-Product vision**: evolvement and lifecycle managed using consolidated methodologies (Scrum, Kanban, etc), Product Owner, …
- **Standardizing practices** by providing an Internal Developer Platform (IDP) for Devs
- **Improve documentation** evolving workflow
- Facilitate new products **on-boarding** (e.g. Backstage)
- Many more.

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Thanks for Joining
Questions?

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