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Running the next generation of cloud-native applications using Open Application Model

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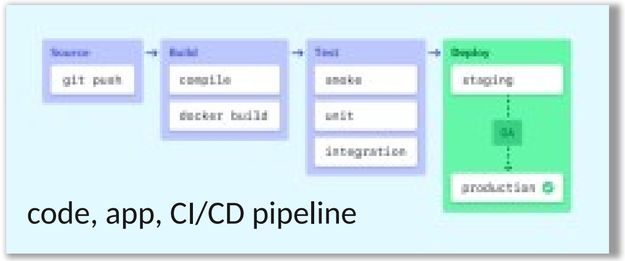
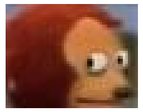
Kubernetes is not built for applications

Dev/ops are used to

API & Primitives

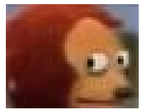




Levels of Abstraction

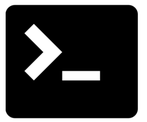
scaling
- auto scale +100 instances when latency > 10%

rollout
- promote the canary instance with step of 10%



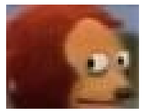
User Interfaces

GUI



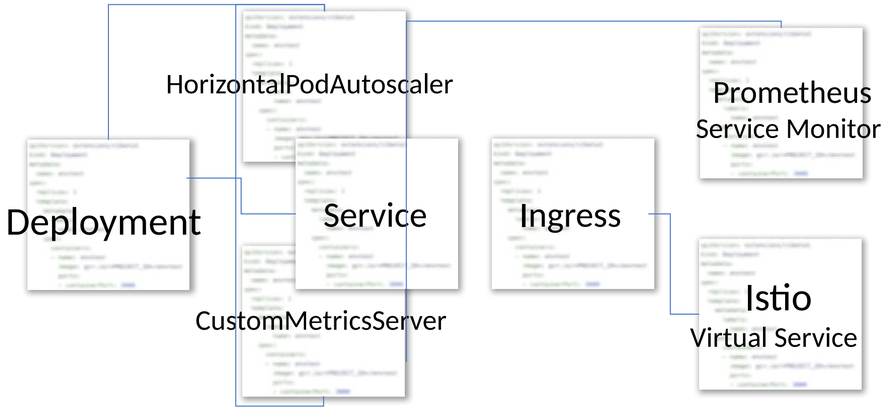
CLI

IaC

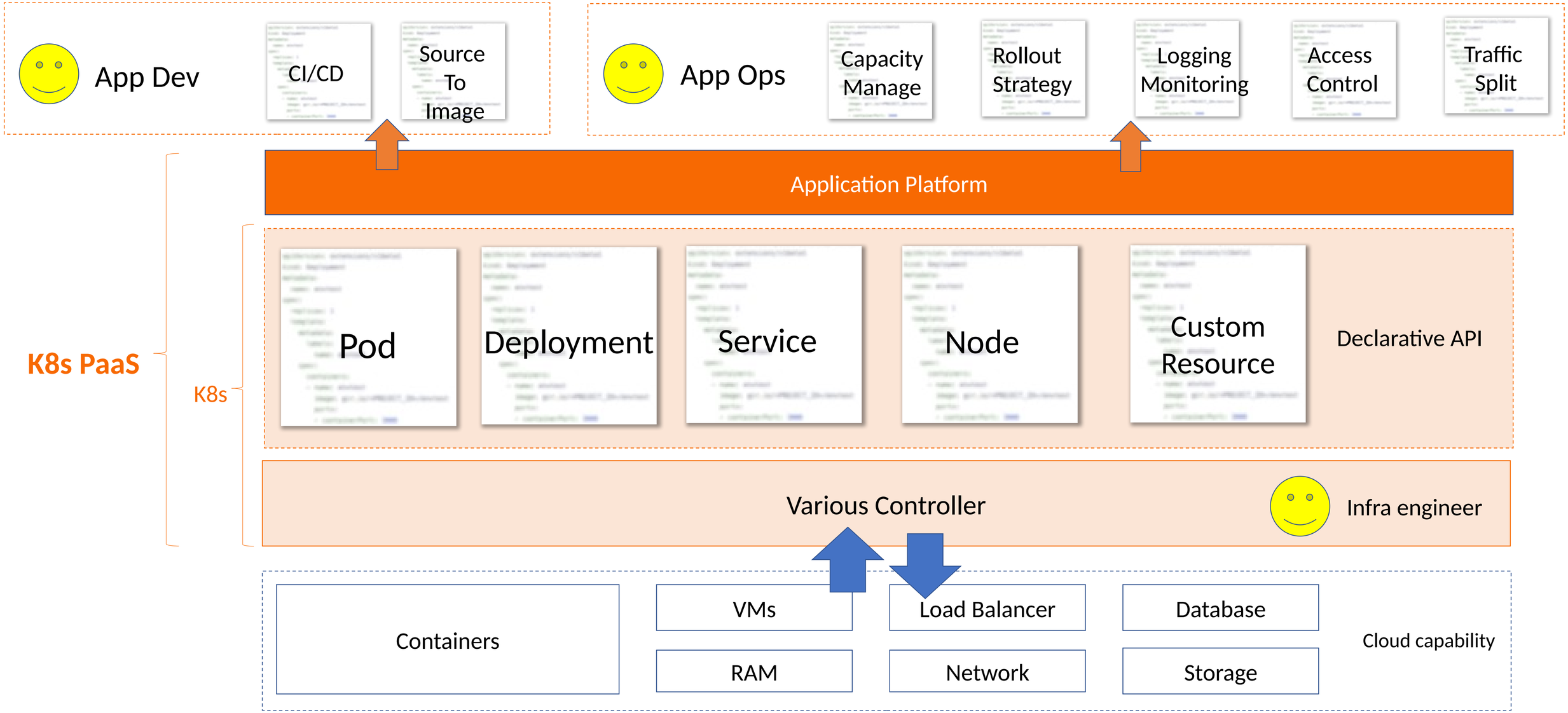


what k8s provides

Deployment	Pod
HPA	Controller
Sidecar	Node
NetworkPolicy	CR/CRD

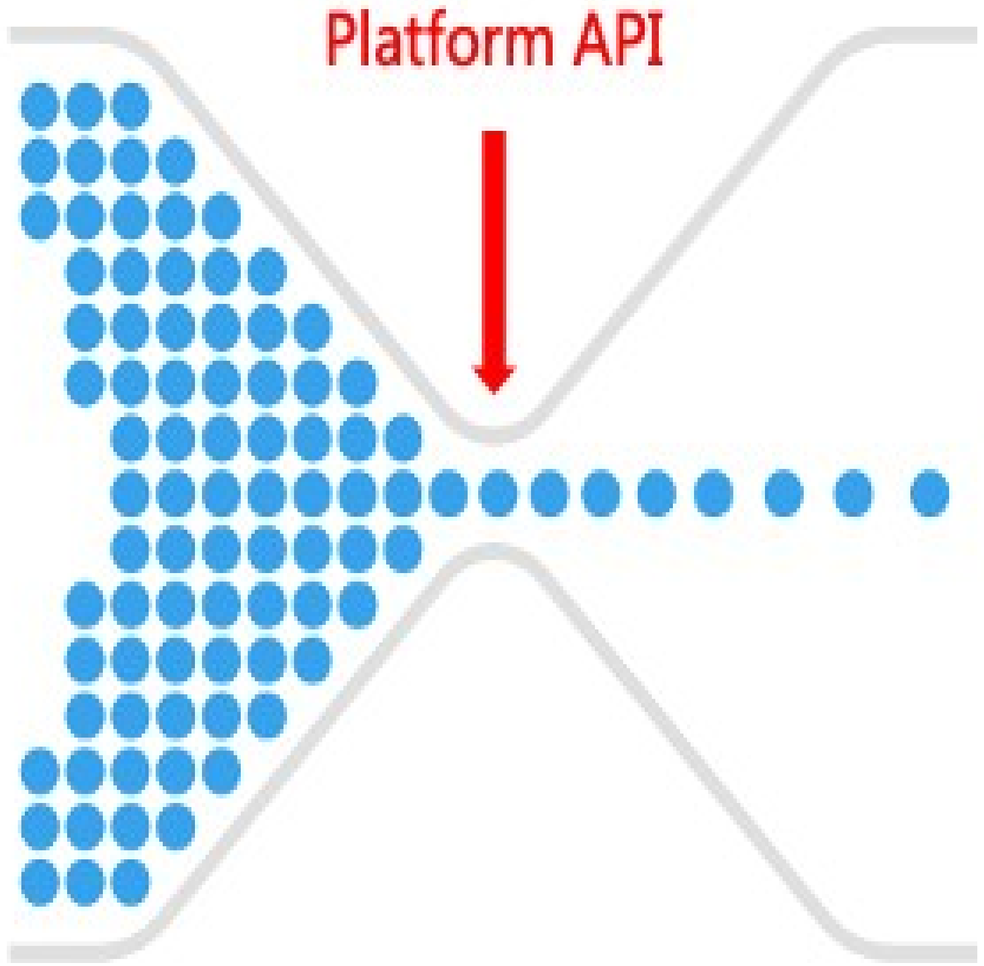


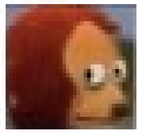
Current Solutions



Did we miss something?

The **unlimited** capabilities in k8s ecosystem





Users ' rapid growing requirements

Open Application Model

OAM is an abstraction standard that allows platform builders to build developer friendly, highly extensible applications platforms

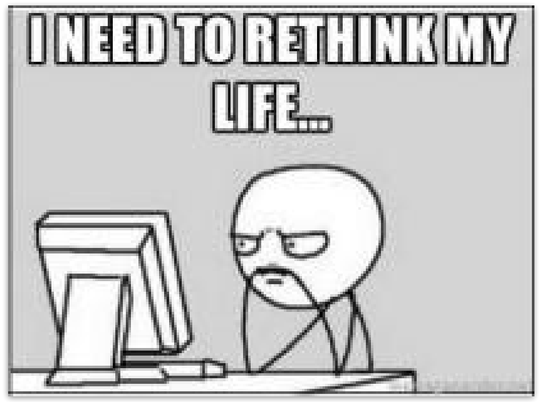
Build abstractions!

Knative, OpenFaaS, or DIY your own abstraction!

Leverage k8s extensibility!

auto scaling, CI service mesh, canary, blue-green, just name it!

How ???



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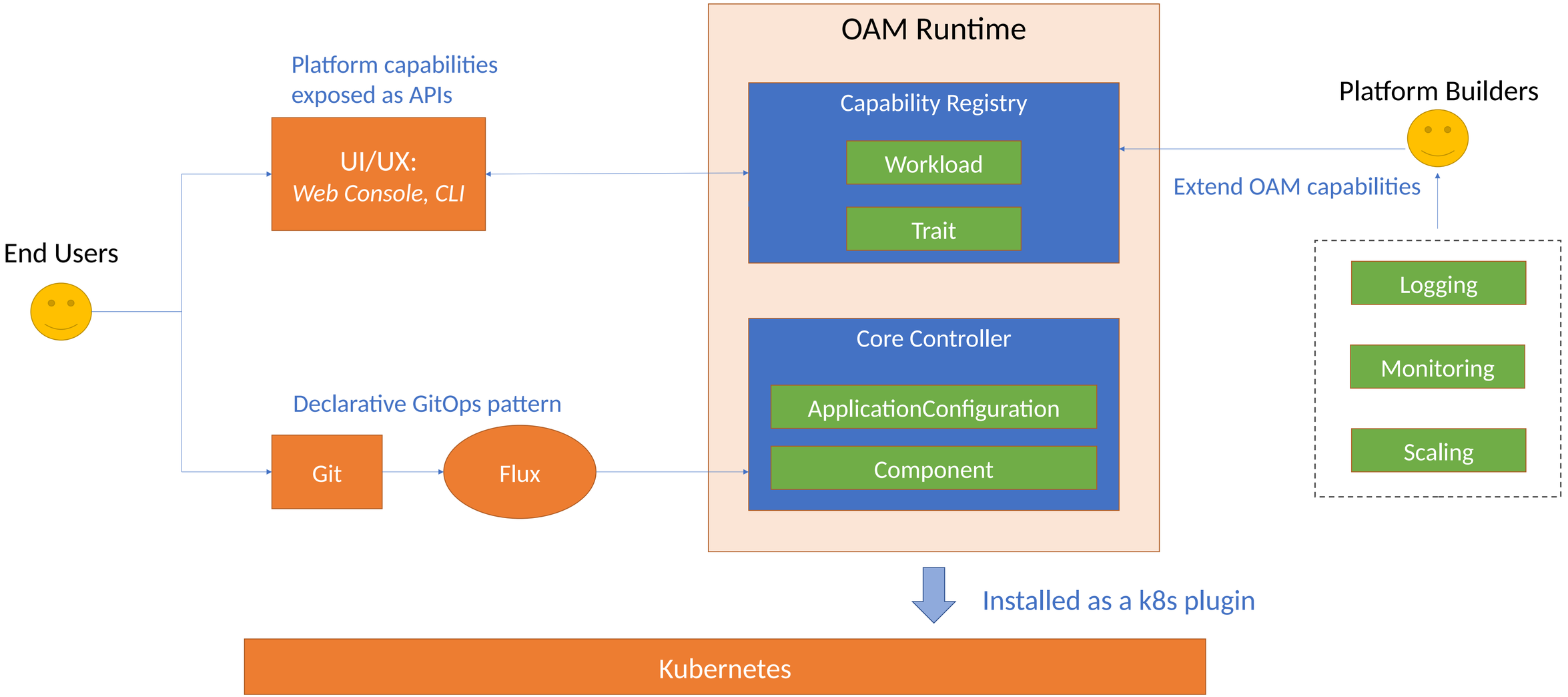
Designed for **Platform Builders**

- The building block and framework for creating *application centric platforms*
  - Bring your own workloads
  - Traits System
    - manageable and discoverable capability system
    - leveraging existing cloud native ecosystem
  - Balance between extensibility and abstraction

- PaaS/Serverless Platform
  - Team-centric (separation of concerns) workflow which endorses LightOps/NoOps
  - Serverless by nature
    - 100% developer level abstraction for workloads and operational capabilities

OAM Platform Architecture



Application Workflow

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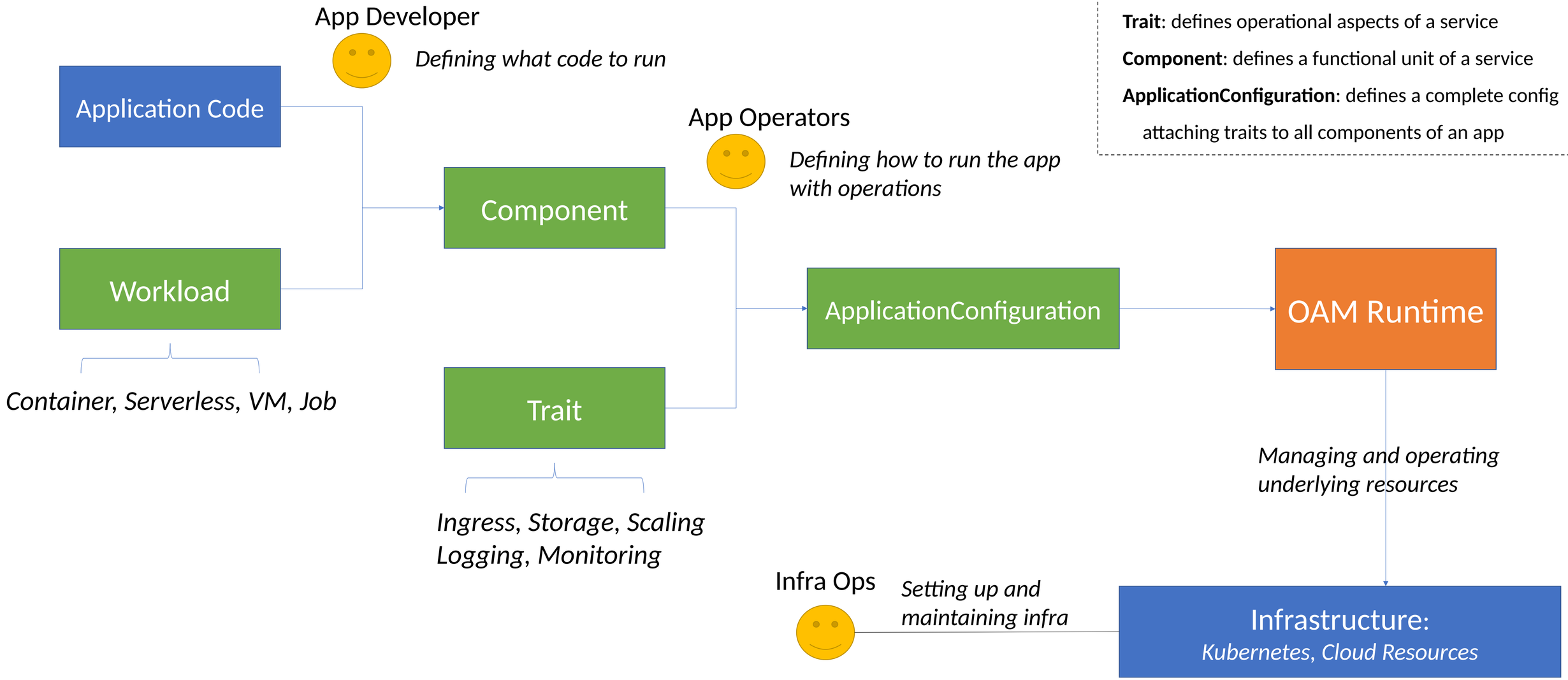
Workload: defines how services run

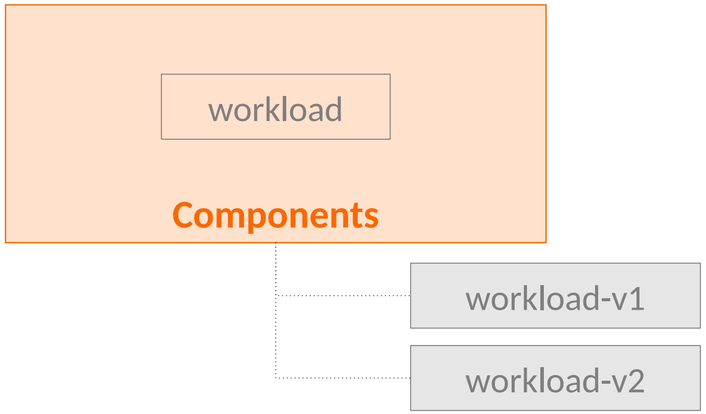
Trait: defines operational aspects of a service

Component: defines a functional unit of a service

ApplicationConfiguration: defines a complete config attaching traits to all components of an app



Components



Component is versionized instance of a workload

```
$ kubectl get components
NAME          WORKLOAD TYPE
frontend      deployment.apps.k8s.io

$ kubectl get deployment
NAME                      REVISION    AGE
frontend-c8bb659c5        1           2d15h
frontend-a8eb65xfe        2           10m
```

```yaml
apiVersion: core.oam.dev/v1alpha2
kind: Component
metadata:
  name: frontend
  annotations:
    description: Container workload
spec:
  workload:
    apiVersion: apps/v1
    kind: Deployment
    spec:
      template:
        spec:
          containers:
            - name: web
              image: 'php:latest'
              env:
                - name: OAM_TEXTURE
                  value: texture.jpg
              ports:
                - containerPort: 8001
                  name: http
                  protocol: TCP
```

Persona: App Developer

Workloads

A workloadDefinition is a way for an infrastructure operator or platform builder to define what components are available to application developers on a given platform.

Platform builders are free to define **workloads at any abstraction level**, including cloud resources.

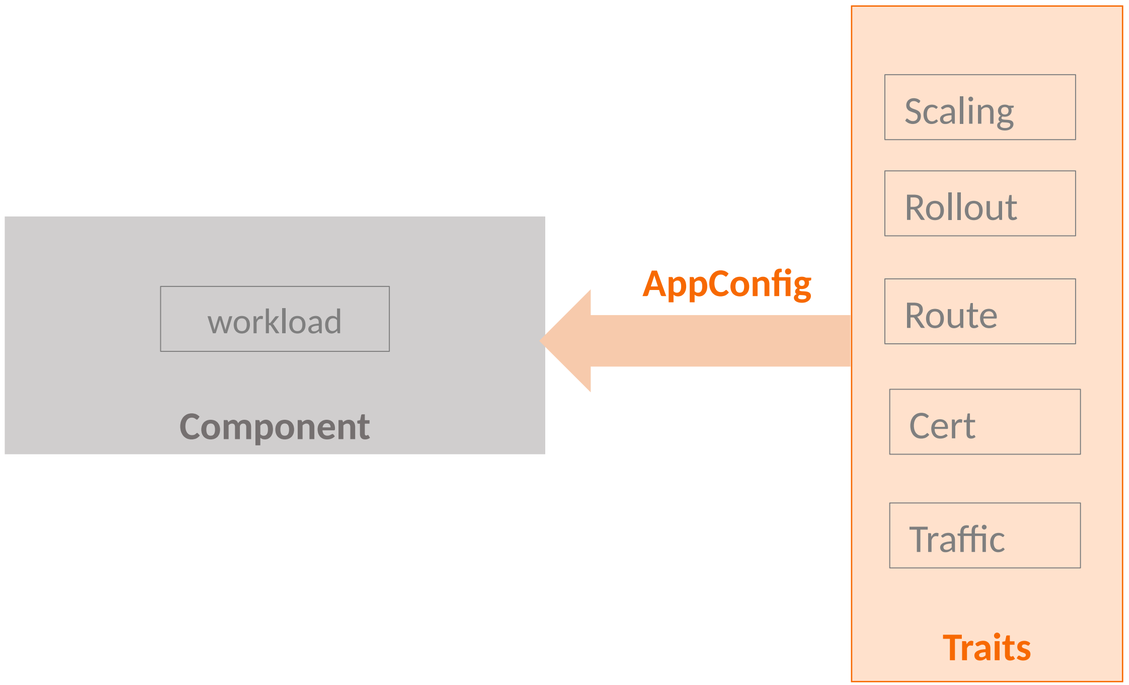
```
apiVersion: core.oam.dev/v1alpha2
kind: Component
metadata:
  name: frontend
  annotations:
    description: Container
workload
spec:
  workload:
    apiVersion: apps/v1
    kind: Deployment
    spec:
      replicas: 3
      selector:
        matchLabels: app: nginx
      template:
        metadata:
          labels:
            app: nginx
        spec:
          containers:
          - name: nginx
            image: nginx:1.14.2
            ports:
            - containerPort: 80
```

Abstraction level: **low**

```
apiVersion: core.oam.dev/v1alpha2
kind: Component
metadata:
  name: frontend
  annotations:
    description: Container workload
spec:
  workload:
    apiVersion: apps.alibaba-inc/v1
    kind: Containerized
    spec:
      image: nginx:1.14.2
      deploy:
        replicas: 3
```

Abstraction level: **high**

Traits and AppConfig



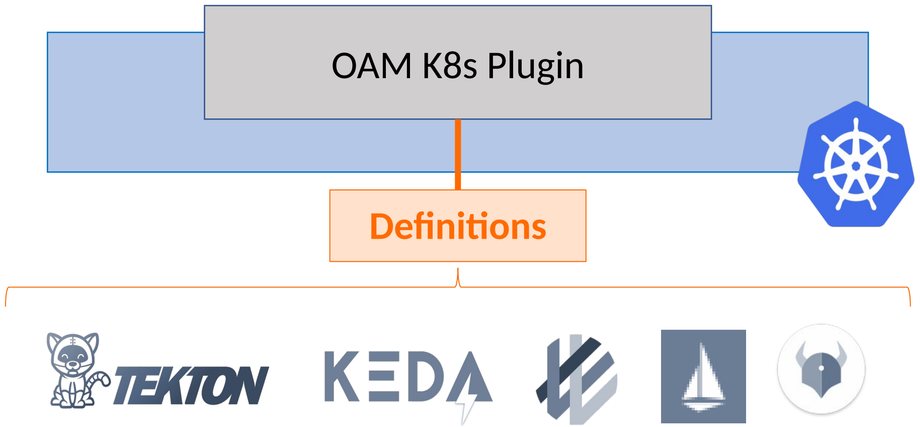
- Traits
  - Declarative abstractions for operational capabilities
- AppConfig（ Application Configuration ）
  - Bind given trait to component

```
apiVersion: core.oam.dev/v1alpha2
kind: ApplicationConfiguration
metadata:
  name: helloworld
spec:
  components:
    # 1st component
    - componentName: frontend
      traits:
        - trait:
            apiVersion: autoscaling/v2beta2
            kind: HorizontalPodAutoscaler
            spec:
              minReplicas: 1
              maxReplicas: 10
        - trait:
            apiVersion: networking.alibaba-
inc.com/v1
            kind: APIGateway
            spec:
              hostname: app.alibaba.com
              path: /
              service_port: 8001
    # 2nd component
    - componentName: redis
```

Persona: App Operator

Platform add-ons

Register and discover k8s capabilities (API resources) as workloads or traits




```yaml
apiVersion: core.oam.dev/v1alpha2
kind: TraitDefinition
metadata:
  name: virtualservices.networking.istio.io
  annotations:
    alias: traffic
spec:
  appliesTo:
    - *.apps.k8s.io
  conflictsWith:
    - traffic-split.alimesh.io
  definition: virtualservices.networking.istio.io
```

Persona: Platform Builder/Infra Operator

e.g. : Register Istio VirtualService as Traffic trait

```
$ kubectl get traits
NAME    DEFINITION                              APPLIES TO      CONFLICTS WITH
traffic virtualservices.networking.istio.io     *.apps.k8s.io   traffic-split.alimesh.io
route   route.core.oam.dev                      *.apps.k8s.io
cert    cert.core.oam.dev                       *.apps.k8s.io
```

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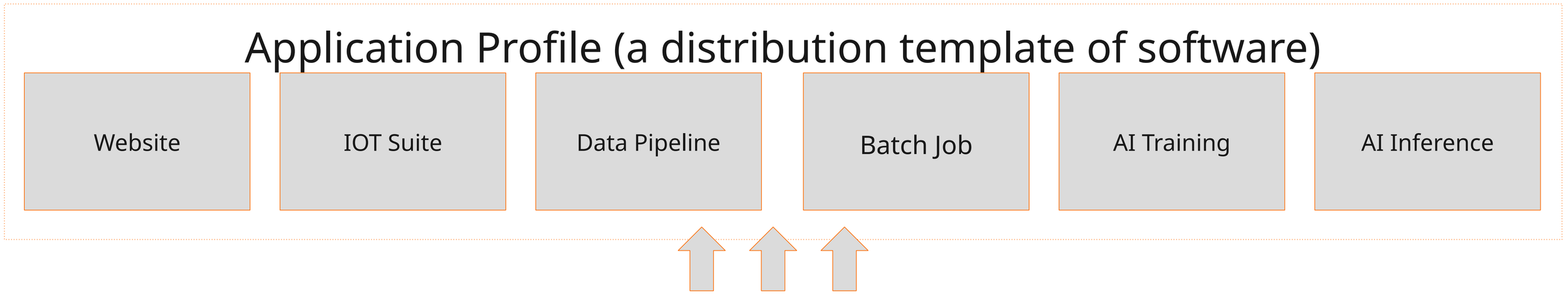
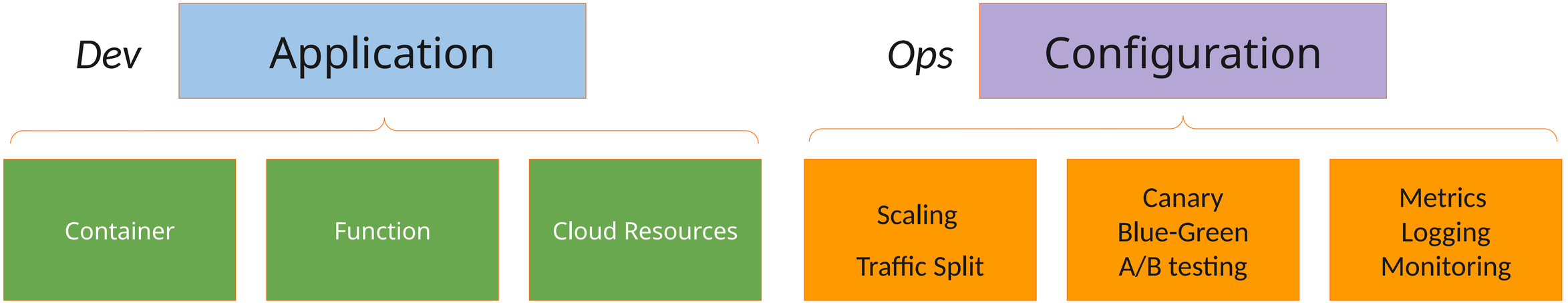
Demo time

OAM Platform Architecture



Combination of ***components*** and ***traits/scopes*** based on scenarios, categorized by ***Application*** and ***Configuration***



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The community

OAM Adopters and End Users

- 20+ companies using OAM platforms
- 3 vendors to support OAM on cloud service
- 1,000+ OAM applications deployed in Alibaba

Adopted OAM to Unify 10+ Application Platforms and Empower Cloud Business.

Adopted OAM to Standardize Application Management across Multi-Clouds.

Announced OAM in Its build conferences

Using OAM Platform to Deploy and Manage Large services

Using OAM Platform to Deploy and Manage Machine Learning Applications.

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Questions?

- Join the community meeting: meeting time in https://oam.dev/
- OAM Specification: https://github.com/oam-dev/spec
- OAM Runtime Repo: https://github.com/crossplane/oam-kubernetes-runtime
- OAM Slack Channel: https://slack.crossplane.io/channel/oam
- Twitter: https://twitter.com/oam_dev

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Thank you