Alibaba Cloud
Worldwide Cloud Services Partner

基于 Kubernetes 与 OAM 构建统一、标准化的应用管理平台

Lei Zhang, Alibaba Cloud

云原生应用管理交流

Join us for KubeCon + CloudNativeCon EU Virtual

Event dates: August 17-20, 2020

Schedule: Now available!

Cost: $75

Full Event Pass and **Complimentary Pass** are now available! Unsure what pass is the best for you? See the chart!

Register now!

Which pass is the best option *for me?*

	Full Event Pass	Complimentary Pass
All Keynote Sessions	✓	✓
All Breakout Sessions	✓	
All Lightning Talks	✓	
All Tutorials + 101 Track	✓	
Live Q+A with Speakers	✓	
Sponsor Showcase	✓	✓
Sponsor Demo Theater	✓	✓
Engage with Project Maintainers + Leads	✓	✓
Networking including Chat + Job Board	✓	
Experiences including Yoga, Meditation, Games, + Musical Performance	✓	
Ability to Register for Co-Located Events	✓	
50% off Certified Kubernetes Administrator or Application Developer Training + Exam Bundle	✓	

Alibaba Cloud

Speaker Info

Lei Zhang

twitter.com/resouer

阿里云高级技术专家， Kubernetes 项目资深维护者
CNCF 应用交付领域联席主席

为什么我们要构建应用管理平台？

落地云原生过程中的“灵魂拷问”

业务方负责人

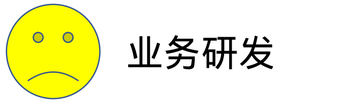
“上 Kubernetes 有什么业务价值？”

业务研发 / 运维

平台工程师

“???”

应用基础设施与最终用户之间的鸿沟


业务研发


业务运维

视角不同，抽象程度不同，语义不同，使用习惯不同

？？？

标准化的能力接入层


Pod

一组容器


Deployment

一组 Pod 副本


Service

Pod 的访问入口


Node

节点


Custom Resource

自定义对象

声明式 API 对象

各种各样的控制器（ Controller ）


平台工程师

容器

虚拟机

安全服务

负载均衡

网络

数据库

存储

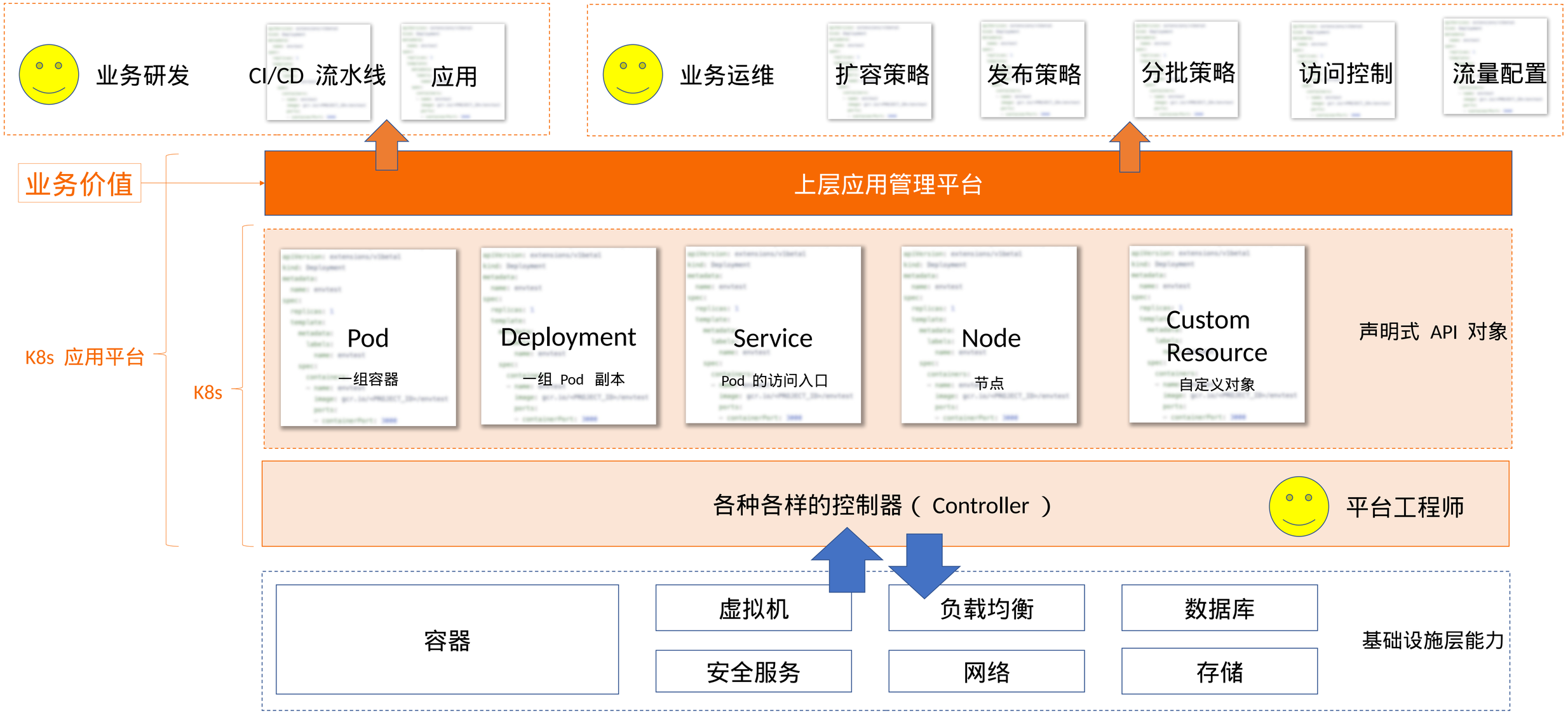
基础设施层能力

怎么破？

方法一：人人都是 Kubernetes 专家

强烈推荐：《 CNCF x Alibaba 云原生技术公开课》

方法二：构建面向最终用户的应用管理平台

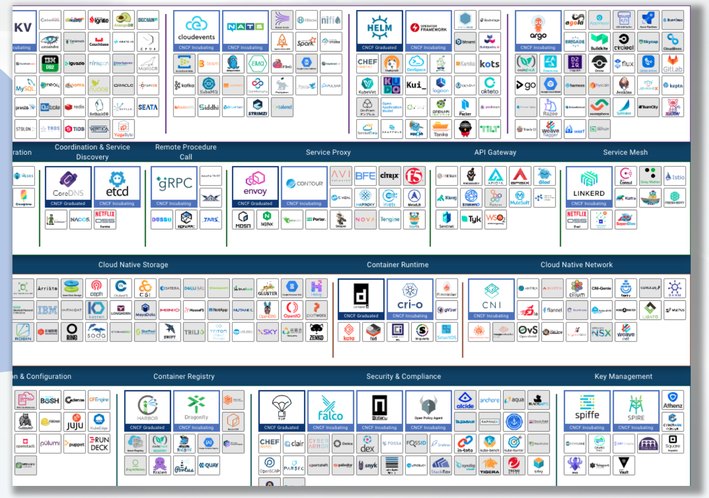


然而 ……

- **有限的、不可扩展的 PaaS 层 API 与能力**

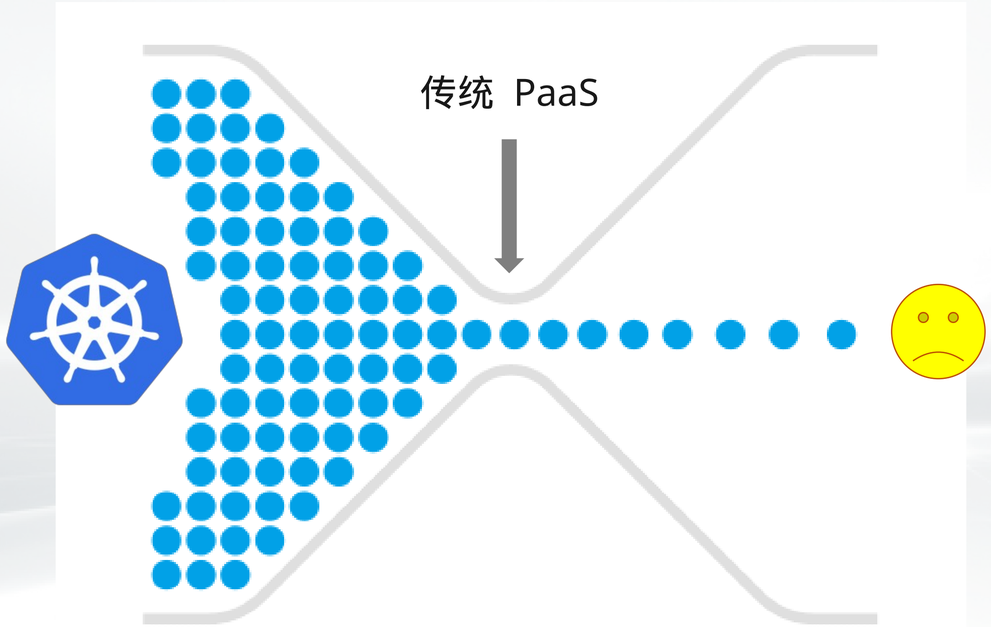
传统应用管理平台（ PaaS)

- 高可扩展的声明式 API 体系
- 近乎无限”的 Kubernetes 能力池



传统 PaaS 的“能力困境”

K8s 生态繁荣多样的应用基础设施能力



研发与运维人员日益增长的应用管理诉求

如何基于 k8s 打造高可扩展的应用管理平台？

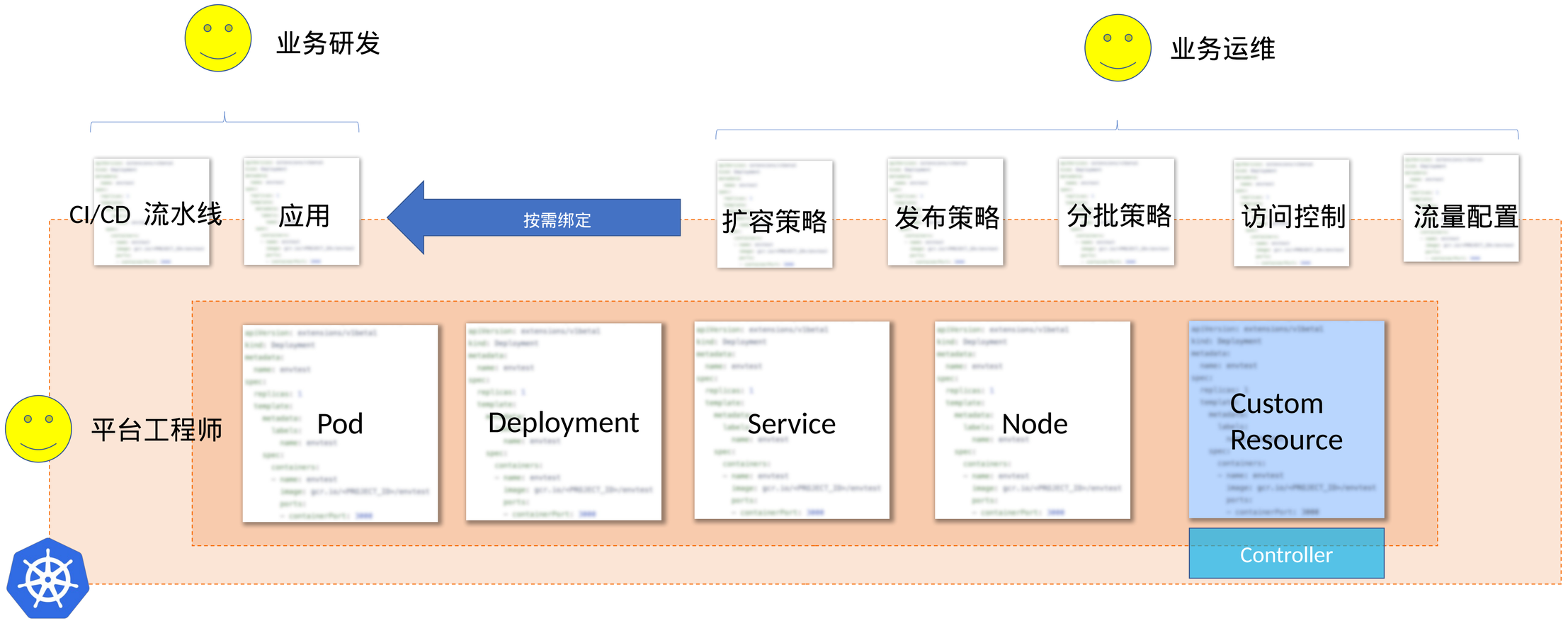
或者说 ……

~~如何基于 k8s 打造高可扩展的应用管理平台？~~

如何打造一个“以应用为中心”的 Kubernetes ？

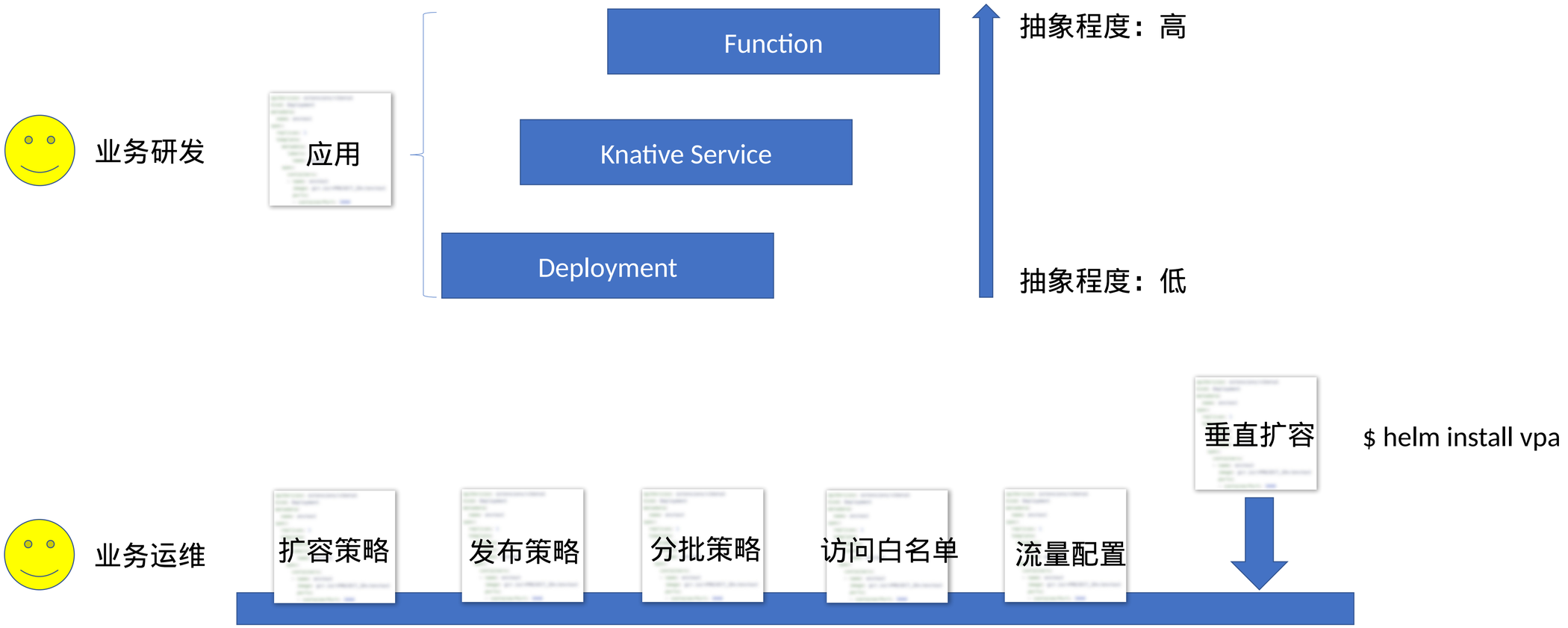
什么是“以应用为中心”的 Kubernetes ？

特征一：通过原生的声明式 API 和插件体系，暴露面向最终用户的上层语义和抽象

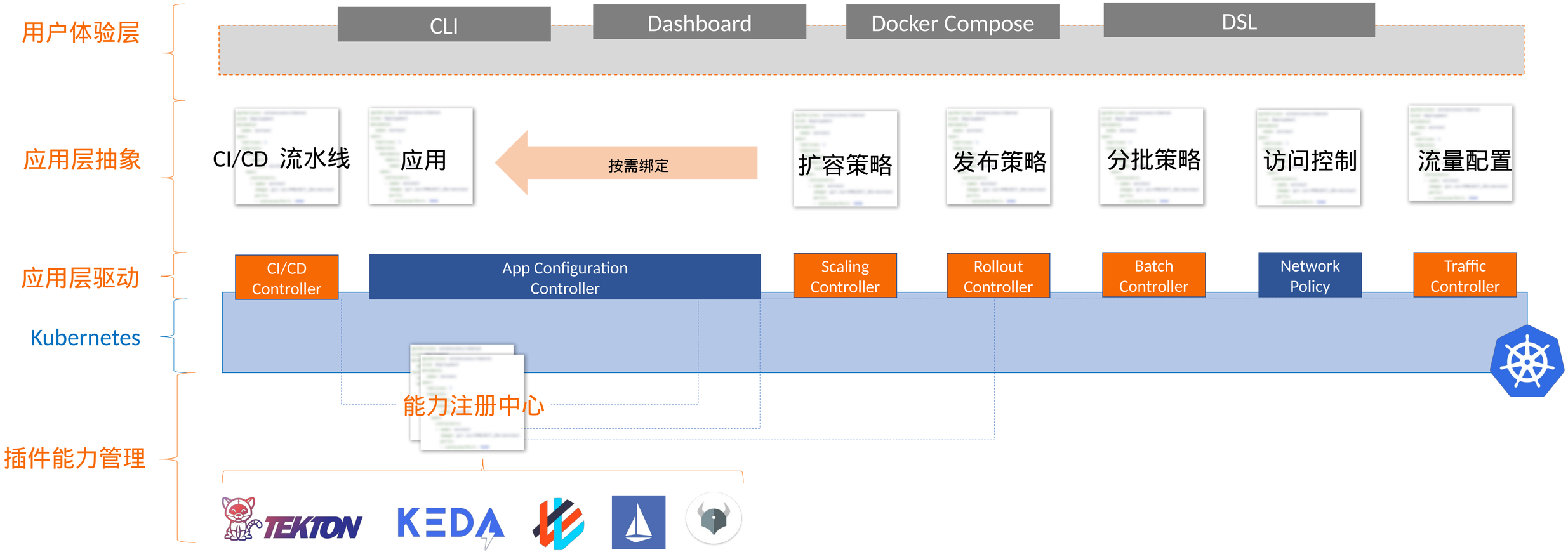


什么是“以应用为中心”的 Kubernetes ？

特征二：上层语义和抽象可插拔、可扩展，没有抽象程度锁定和任何能力限制



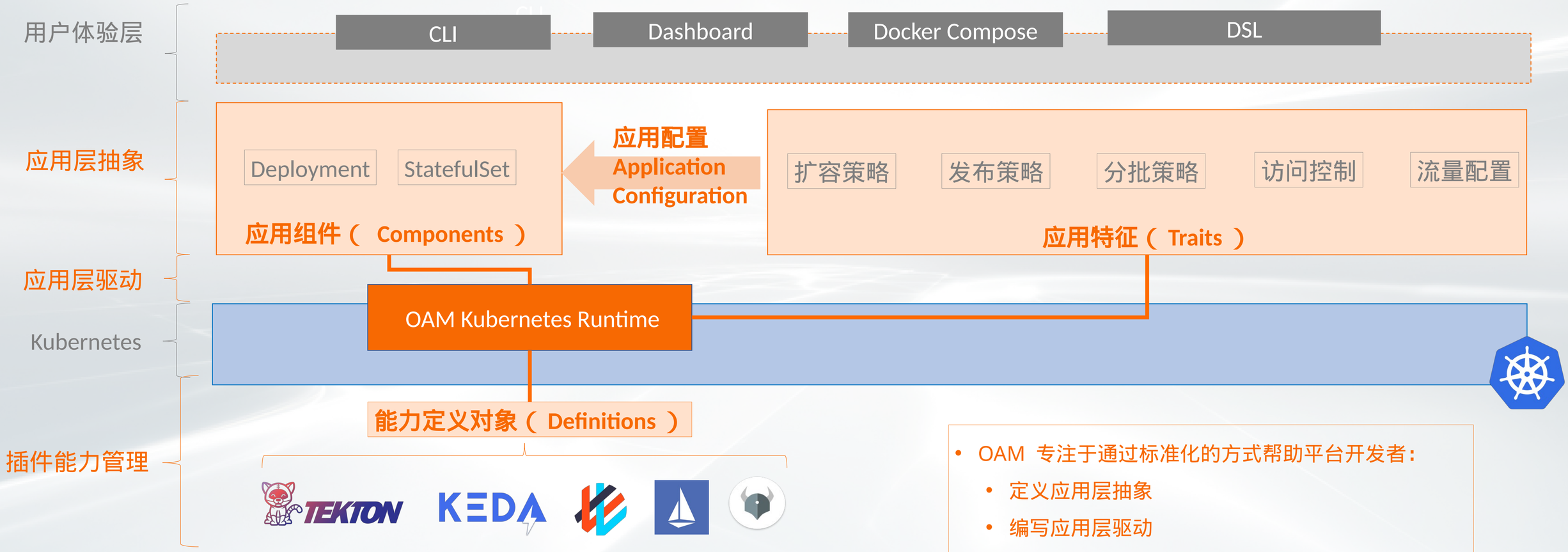
如何构建“以应用为中心”的 Kubernetes ？



Open Application Model (OAM)

Alibaba Cloud

一个构建“以应用为中心”的 Kubernetes 的标准规范与框架



- OAM 专注于通过标准化的方式帮助平台开发者：
  - 定义应用层抽象
  - 编写应用层驱动
  - 提供插件化**能力注册与管理**机制
  - 构建**高度可扩展**的用户体验层

Component

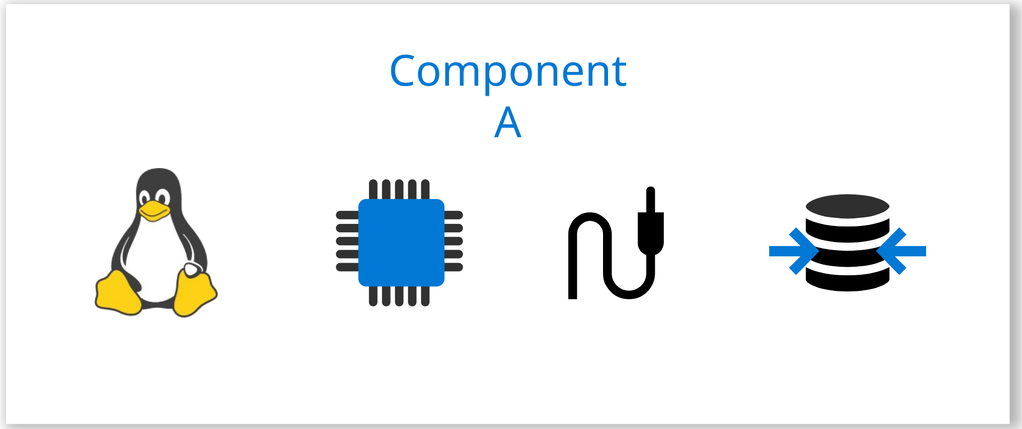
Component 是工作负载的版本化定义

$ kubectl get components

NAME	WORKLOAD
frontend	deployment.apps.k8s.io

$ kubectl get deployment

NAME	REVISION	AGE
frontend-c8bb659c5	1	2d15h




```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
```

定义上层抽象

在 Workload 部分，可以自由的定义您自己的上层抽象

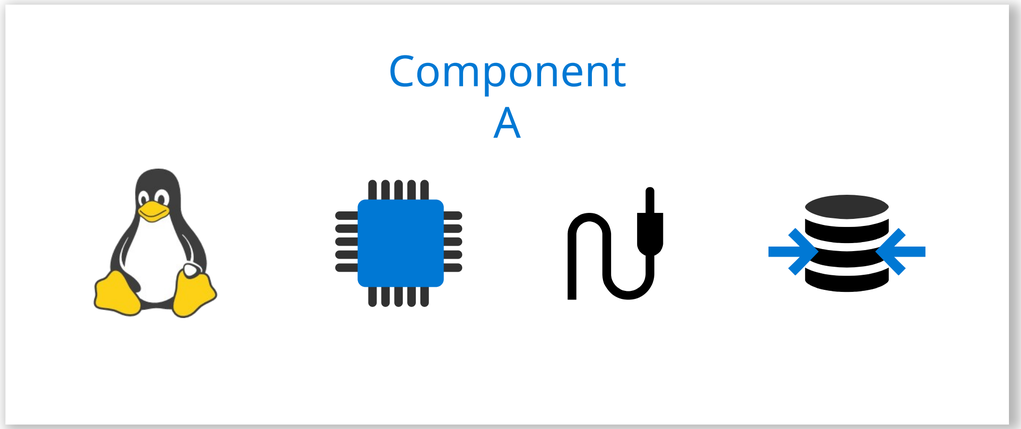
```yaml
apiVersion: core.oam.dev/v1alpha2
kind: Component
metadata:
  name: frontend
  annotations:
    description: Container workload
spec:
  workload:
    apiVersion: apps/v1
    kind: Deployment
    spec:
      replicas: 3
      selector:
        matchLabels: app: nginx
      template:
        metadata: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

```yaml
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
```

Component

“云服务”也是一种工作负载

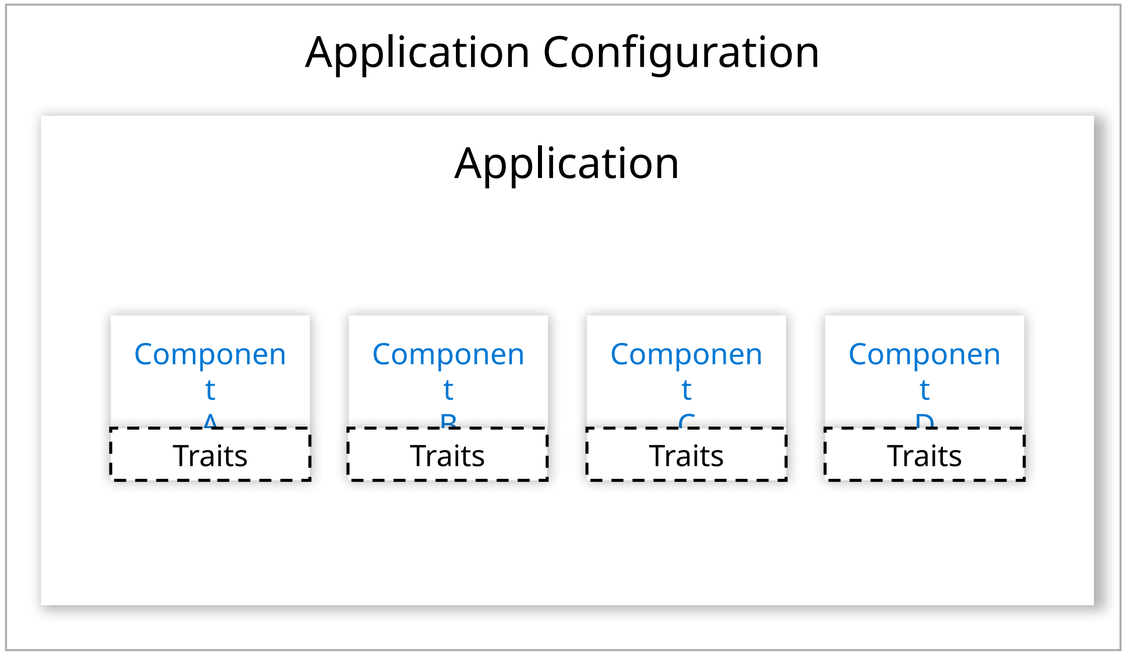
```
$ kubectl get components
NAME        WORKLOAD
frontend    deployment.apps.k8s.io
redis       kv.aliyun.com
```




```yaml
apiVersion: core.oam.dev/v1alpha2
kind: Component
metadata:
  name: redis
  annotations
    description: Azure RedisCache Instance
spec:
  workload:
    # a redis instance provided by cloud
    apiVersion: kv.aliyun.com /v1alpha1
    kind: RedisCache
    spec:
      location: hz
      properties:
        sku:
          name: Basic
          family: C
          capacity: 1
        enableNonSslPort: true
```

Trait 和 Application Configuration

- *Trait* - 声明式的运维能力的描述
- *Application Configuration* - 将 Traits 绑定给 Component




```yaml
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
```

Definition Object

系统管理员用来注册和发现插件化能力的 API 对象

 # 示例：将 Knative Service 定义为平台支持的一种工作负载

```
$ kubectl get workloads
NAME            DEFINITION
deployment      apps.k8s.io
ksvc            service.serving.knative.dev
```

```yaml
apiVersion: core.oam.dev/v1alpha2
kind: WorkloadDefinition
metadata:
  name: service.serving.knative.dev
  annotations:
    alias: ksvc
spec:
  definitionRef:
    name: service.serving.knative.dev
```

其他功能

- 声明式数据传递
  - 例如： 声明系统需要自动将 MySQL 组件的链接信息注入到 PHP 组件的环境变量中
- 声明式依赖管理
  - 例如：声明 PHP 组件需要等待 MySQL 组件启动后再启动
    - 根据 *.status* 字段决策，而非简单依赖于容器的运行状态

总结

统一、标准、高可扩展的应用管理平台

标准化定义应用层抽象

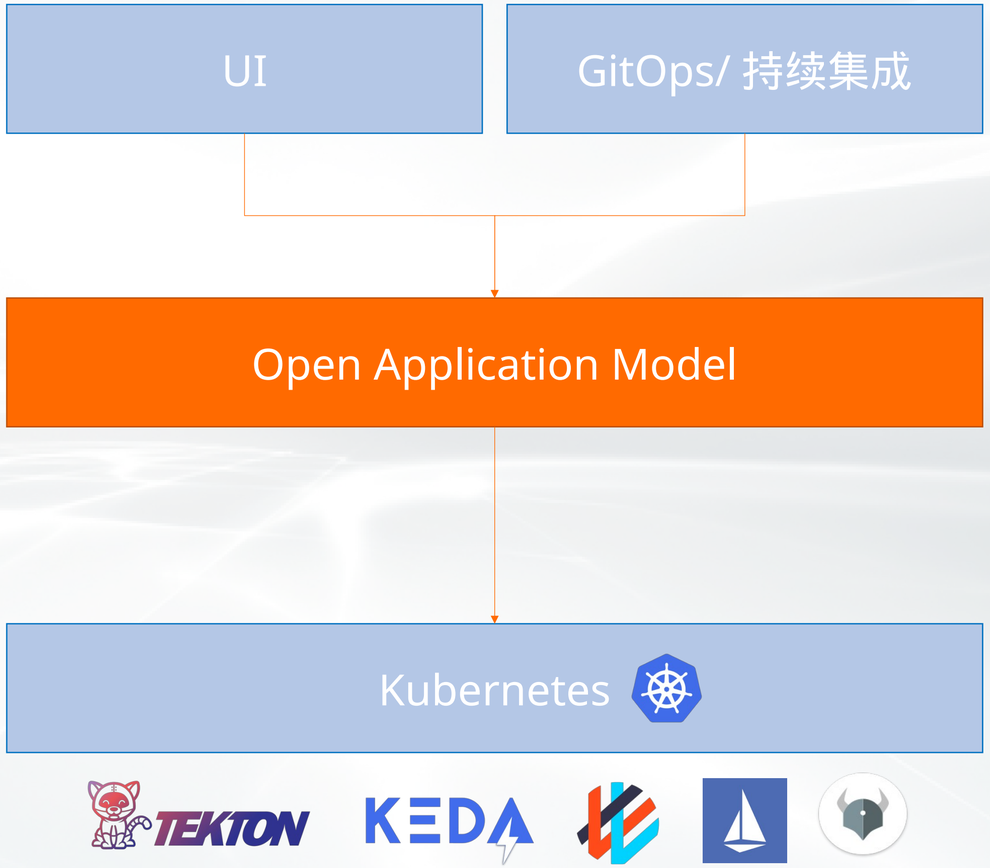
标准化编写应用层驱动

标准化管理 k8s 插件能力

平台工程师

业务研发

业务运维



OAM 社区欢迎大家！❤️

- The OAM spec:
  - https://github.com/oam-dev/spec#community
- The OAM plugin for k8s:
  - https://github.com/crossplane/oam-kubernetes-runtime
    - *A join effort with Crossplane*

云原生应用管理交流

Open Application Model

https://oam.dev

Alibaba Cloud | Worldwide Cloud Services Partner

Thanks!