CLOUD NATIVE + OPEN SOURCE

Virtual Summit China 2020

Kubernetes + OAM 让开发者更简单

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阿里云

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Virtual Summit China 2020

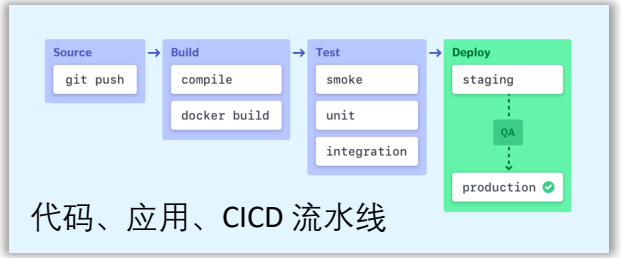
来自应用开发者的“灵魂拷问”

“ Kubernetes 让 Devops 更复杂了！ ”

Kubernetes 对于应用开发复杂在哪里

1. 关注点不同

业务研发



代码、应用、CICD 流水线

容器 | Pod
调度 | Controller
Sidecar | Node
CNI | CSI

2. 语义与抽象程度不同

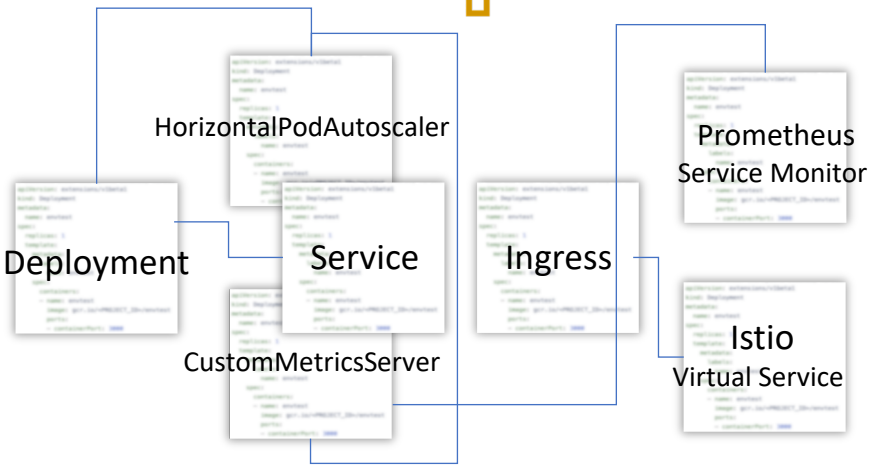
业务运维

扩容策略

- 当 RT 上升 10% 时，自动扩容 100 个实例

发布策略

- 当金丝雀实例通过 99% 的测试时，按每小时切 10% 流量的节奏进行发布



3. 交互与使用习惯不同

业务研发、运维

图形化界面

命令行工具

IaC 配置语言

研发都要做 Kubernetes 专家？

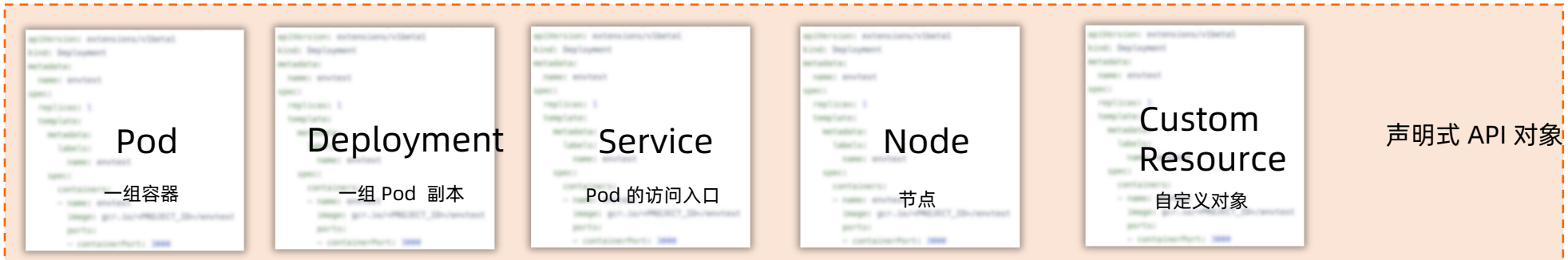
Kubernetes

构建 Platform on Kubernetes

K8s PaaS

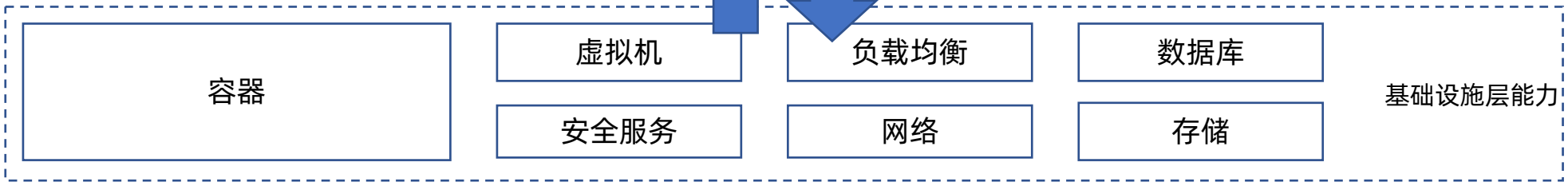
应用管理平台 （Openshift、Cloudfoundry、阿里内部、腾讯内部 ...）

K8s



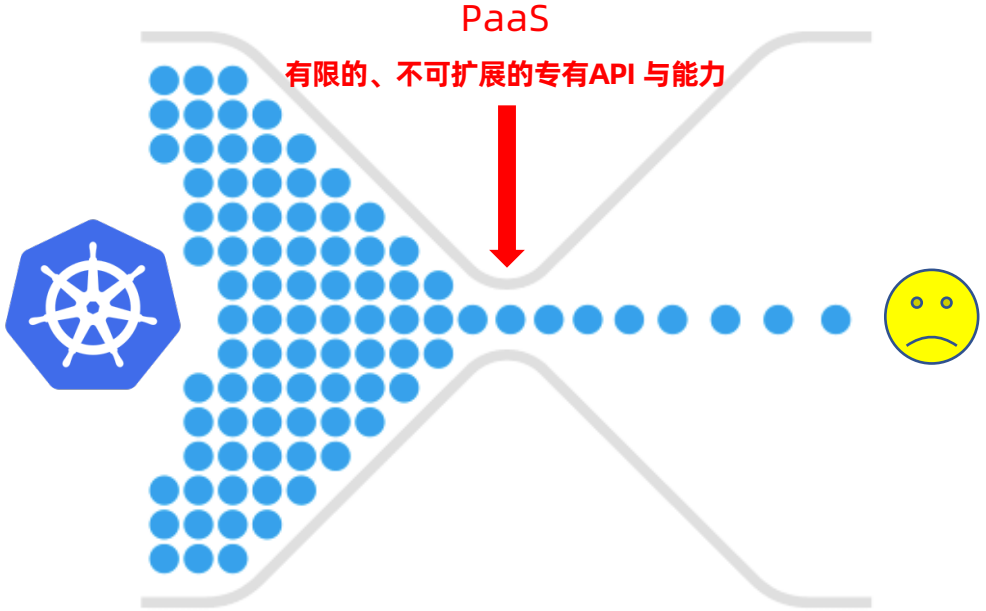
各种各样的控制器（Controller）

平台工程师



但是，K8s PaaS 正面临着 “能力困境”

K8s 生态“无限”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

而且，PaaS 还面临着严重分化

同一个公司内数个 PaaS on Kubernetes


学习成本


研发效率

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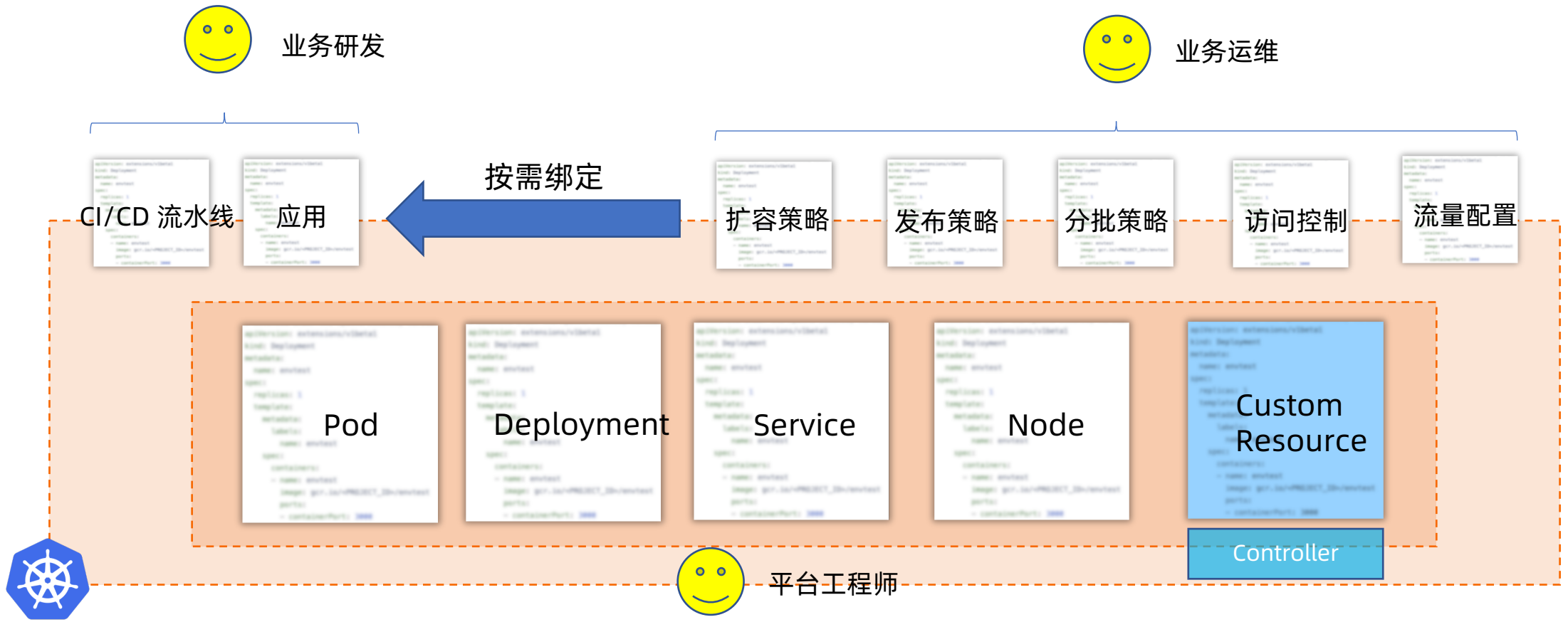
理想中的应用管理平台

思考：

1. 基于 Kubernetes
2. 用户友好、高可扩展
3. 统一、标准化

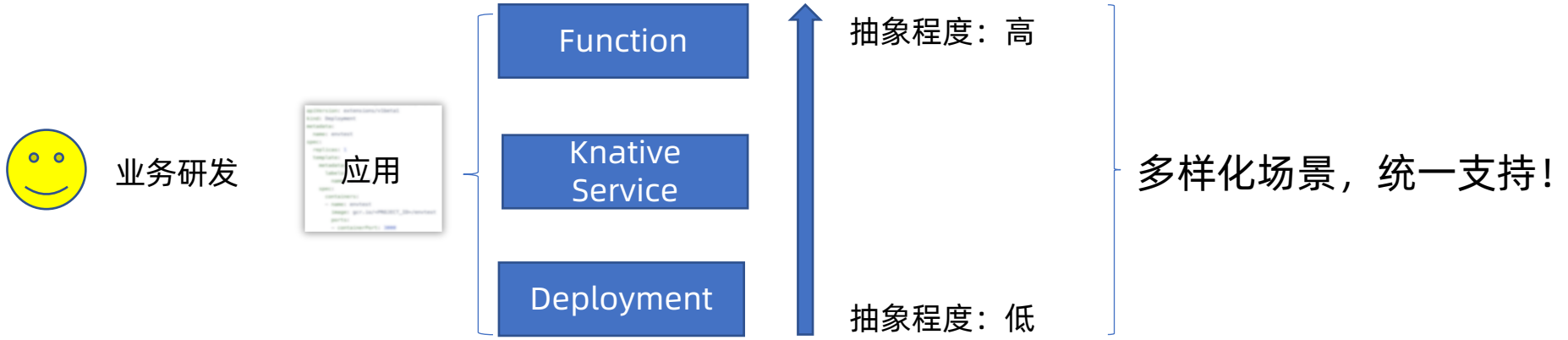
目标一：一个面向用户，应用为中心

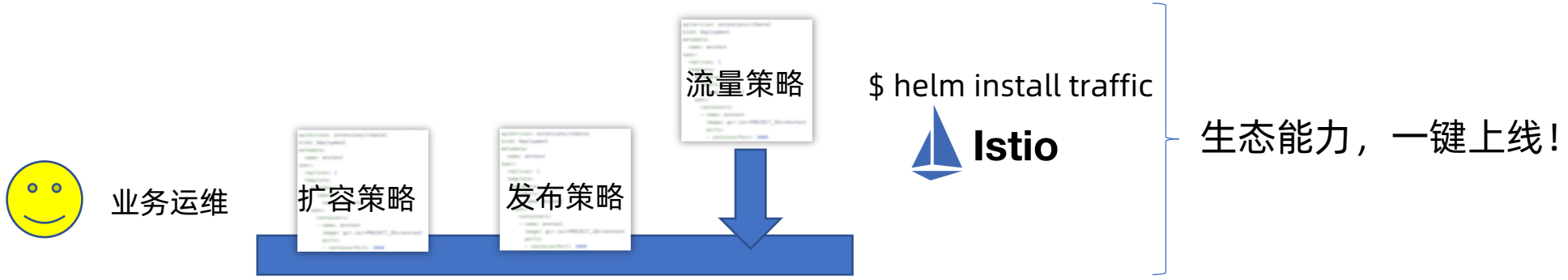
关键词：用户友好，应用层语义和抽象



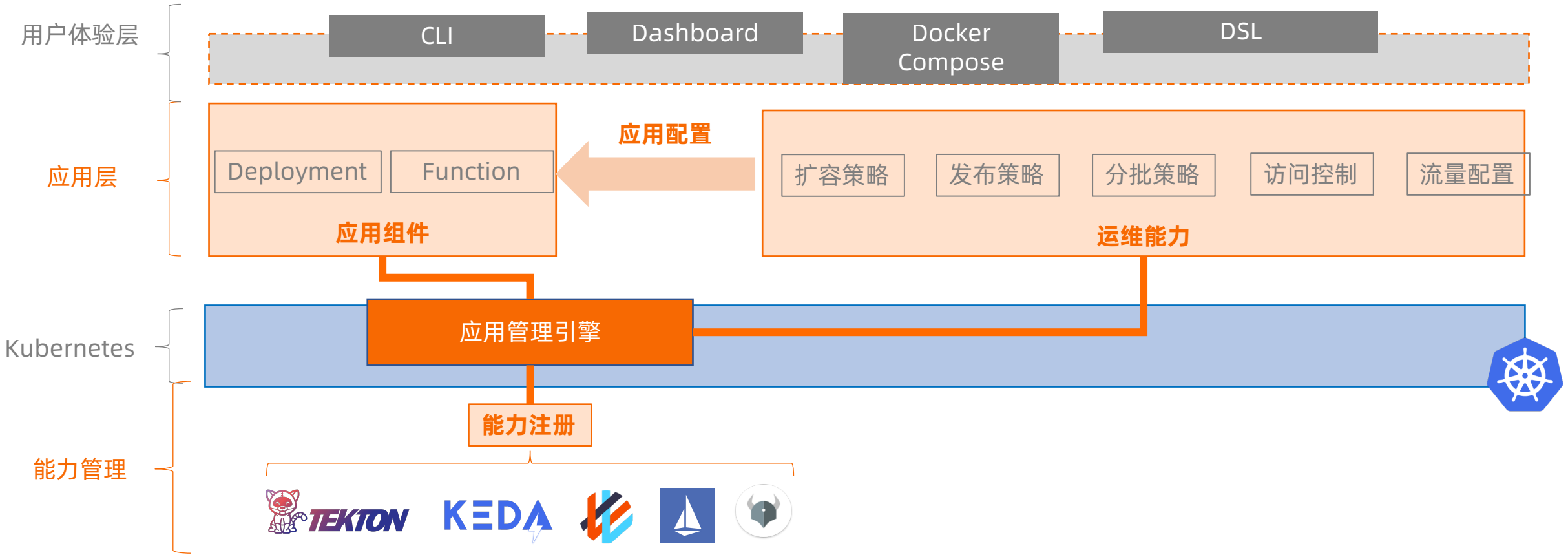
目标二：一个高可扩展的应用管理平台

关键词：可插拔，可扩展，模块化，没有抽象程度锁定



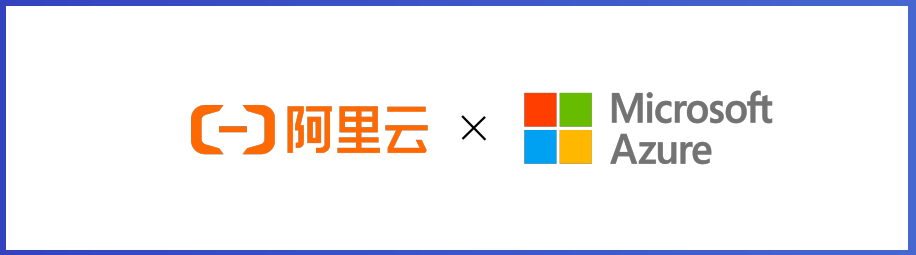


目标三：一个统一、标准化的应用管理引擎



Open Application Model（OAM）

一个用来构建云原生应用管理平台的**标准规范与核心框架**



OAM + OAM Platform

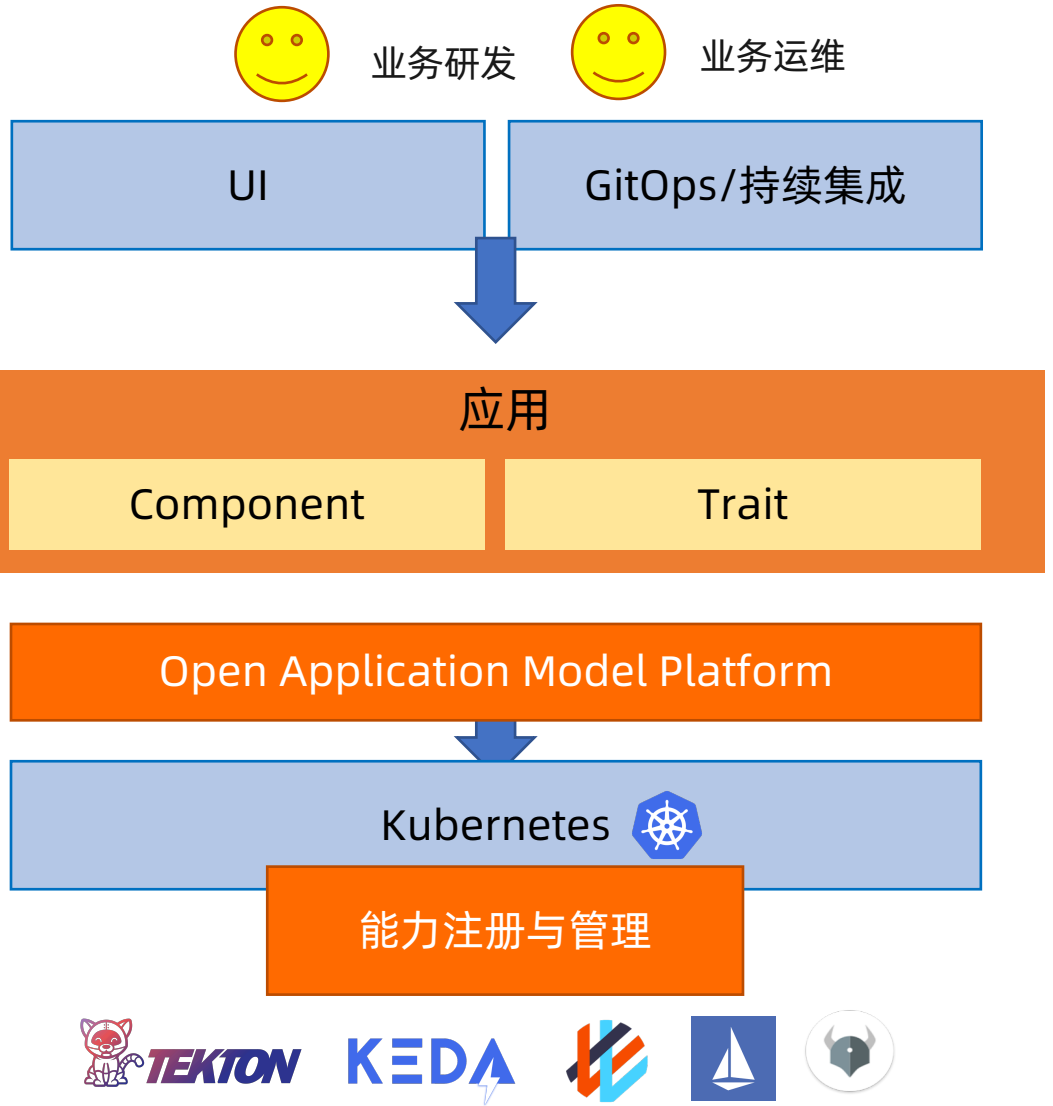
统一、标准、高可扩展的云原生应用管理平台

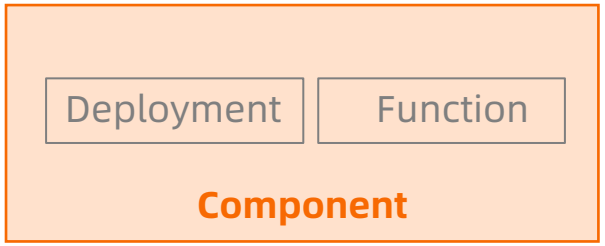
标准化定义应用组件

标准化配置应用运维能力

标准化管理 k8s 能力插件

平台工程师



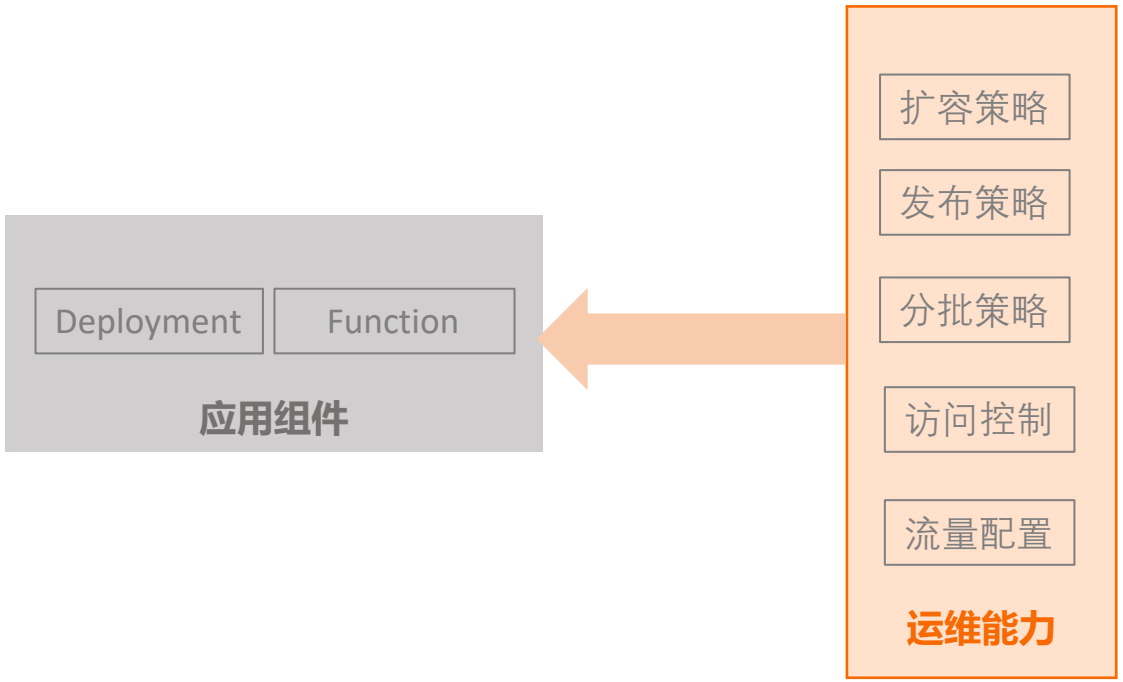


Component：应用中的一个组成部分，例如容器、Function或者云服务等

```
$ 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
```



· 运维特征（Trait）

· 声明式的运维能力的描述

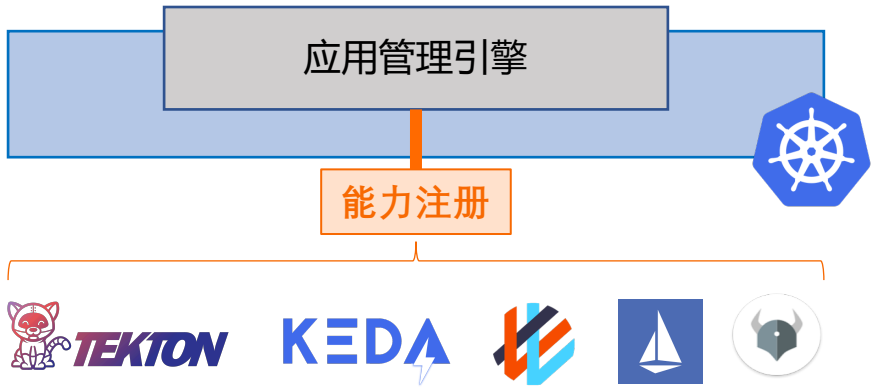
```
- componentName: frontend
      traits:
        - trait:
            apiVersion: autoscaling/v2beta2
            kind: HorizontalPodAutoscaler
            spec:
              minReplicas: 1
              maxReplicas: 10
        - trait:
            apiVersion: networking.alibaba-
inc.com/v1
            kind: APIGateway
            spec:
              hostname: app.alibaba.com
              path: /
              service_port: 8001
```

应用配置 （Application Configuration）

面向应用维度配置运维能力与组件


```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
```

Workload 与 Trait 注册与发现机制




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

示例：将 Istio VirtualService 注册为平台的流量管理能力

$ kubectl get traits

NAME	DEFINITION	APPLIES TO	CONFLICTS WITH
traffic	virtualservices.networking.istio.io	apps.k8s.io	services.k8s.io
route	route.core.oam.dev	apps.k8s.io	
tls	tls.core.oam.dev	apps.k8s.io	

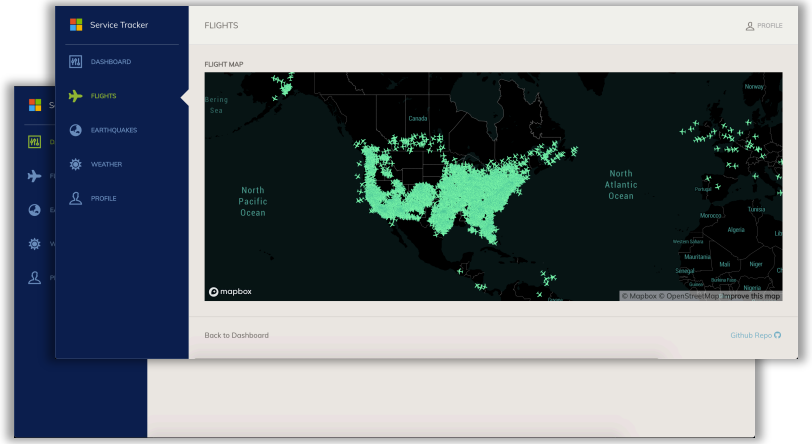
示例：使用 OAM 模型管理应用

```yaml
apiVersion: core.oam.dev/v1alpha2
kind: Component
metadata:
  name: flights-api
spec:
  workload:
    apiVersion: core.oam.dev/v1alpha2
    kind: ContainerizedWorkload
    metadata:
      name: flights-api
    spec:
      osType: linux
      arch: amd64
      containers:
        - name: flights-api
          image: sonofjorel/rudr-flights-api:0.49
          env:
            - name: DATA_SERVICE_URI
              value: "foo"
          ports:
            - name: http
              containerPort: 3003
              protocol: TCP
```

示例：容器化工作负载

```yaml
apiVersion: core.oam.dev/v1alpha2
kind: ApplicationConfiguration
metadata:
  name: service-tracker
spec:
  components:
    - componentName: tracker-postgres-db
    - componentName: data-api
    - componentName: flights-api
      traits:
        - trait:
            apiVersion: core.oam.dev/v1alpha2
            kind: ManualScalerTrait
            metadata:
              name: flights-api
            spec:
              replicaCount: 2
    - componentName: quakes-api
      traits:
        - trait:
            apiVersion: core.oam.dev/v1alpha2
            kind: ManualScalerTrait
            metadata:
              name: quakes-api
            spec:
              replicaCount: 2
    - componentName: weather-api
      traits:
        - trait:
            apiVersion: core.oam.dev/v1alpha2
            kind: ManualScalerTrait
            metadata:
              name: weather-api
            spec:
              replicaCount: 2
    - componentName: service-tracker-ui
```

示例：手动扩容策略



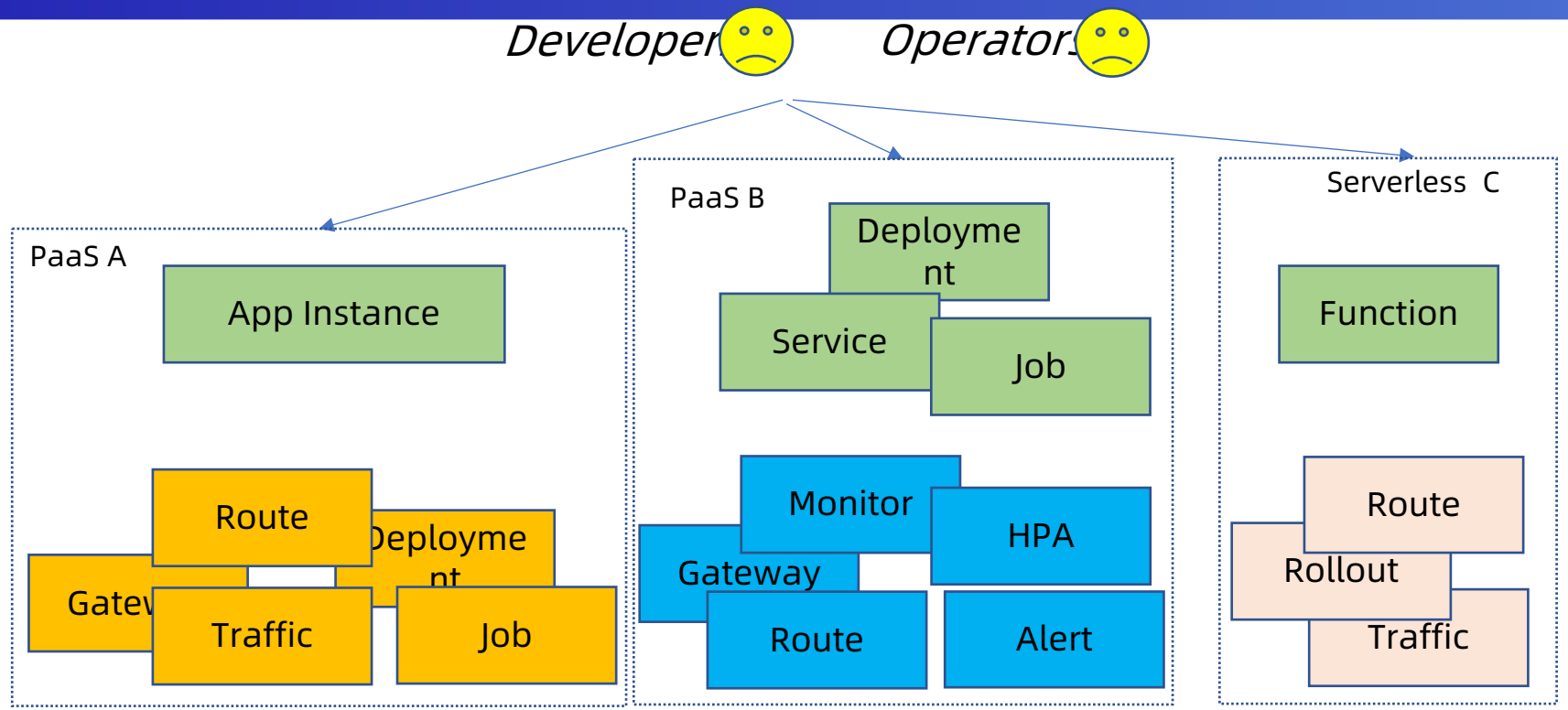
查看完整演示

1. 创建应用组件

2. 绑定运维特征

3. 应用部署成功

案例：过去的阿里巴巴应用管理平台

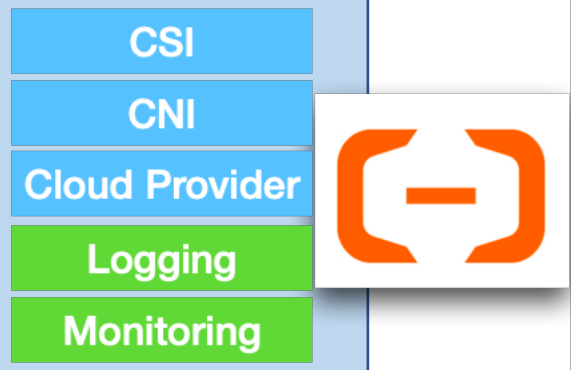


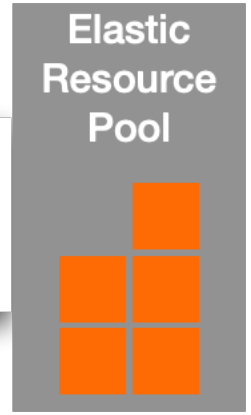
- **碎片化：** 大约 11 个内部 PaaS/Serverless
- **烟囱化：** 互相之间完全独立，没有可互操作性
- **用户不友好：** 大量基础设施层语义泄露
- **封闭：** 不能利用 K8s 生态能力

Scale:
- **10,000** nodes/cluster
- **100,000** apps/cluster
- **1,000,000** containers/cluster

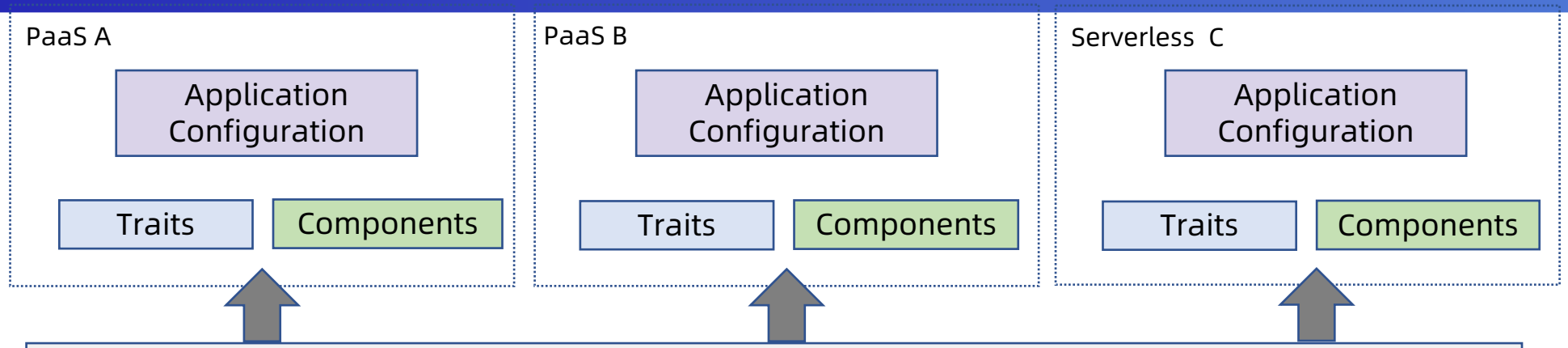
Velocity:
- **100,000** deploys/day
- **500~1000** replicas/app

Infra Ops



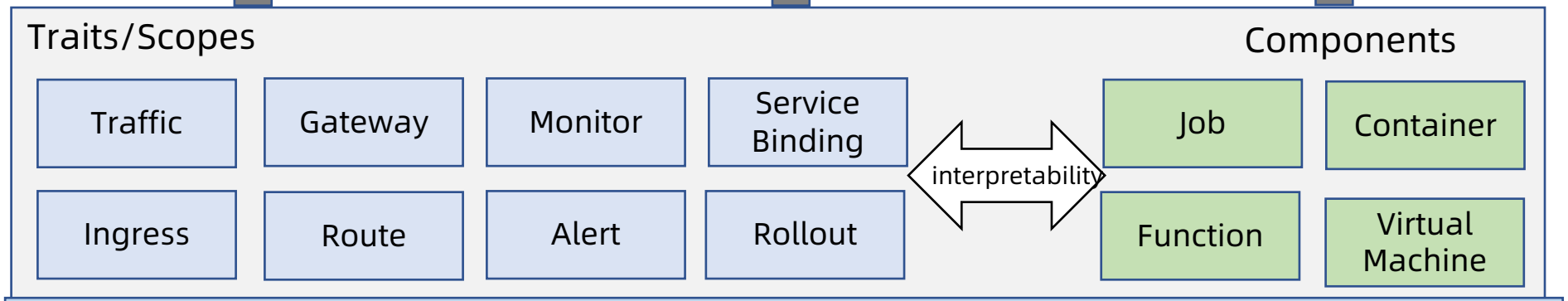


案例：今天的阿里巴巴应用管理



Developer

Operator

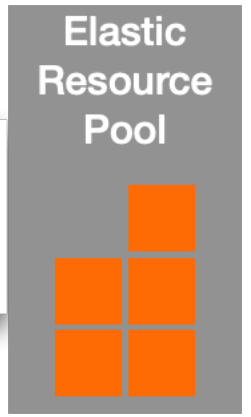


- **统一、标准**
- **用户友好**
- **高可扩展**
- **全局拉通共建**

Scale:
- **10,000** nodes/cluster
- **100,000** apps/cluster
- **1,000,000** containers/cluster

Applications:
- **100,000** deploys/day
- **500~1000** replicas/app

Infra Ops



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OAM 社区欢迎大家！

- **The OAM spec:**
  - https://github.com/oam-dev/spec#community
- **OAM Kubernetes 官方插件（CNCF Sandbox 项目）：**
  - https://github.com/crossplane/oam-kubernetes-runtime
    - *A join effort with Crossplane*
- **OAM Kubernetes 云原生应用基础平台 - 9 月即将开源**
  - **早期项目成员与合作伙伴招募中！**

云原生应用管理交流千人钉钉群

We Are Hiring!
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