HUAWEI

扫码添加小助手，发送“Istio”加群

HUAWEI

CloudNative Lives

istio入门级实训

Istio灰度发布与技术实现

华为云容器团队核心架构师 & CNCF社区主要贡献者倾力打造

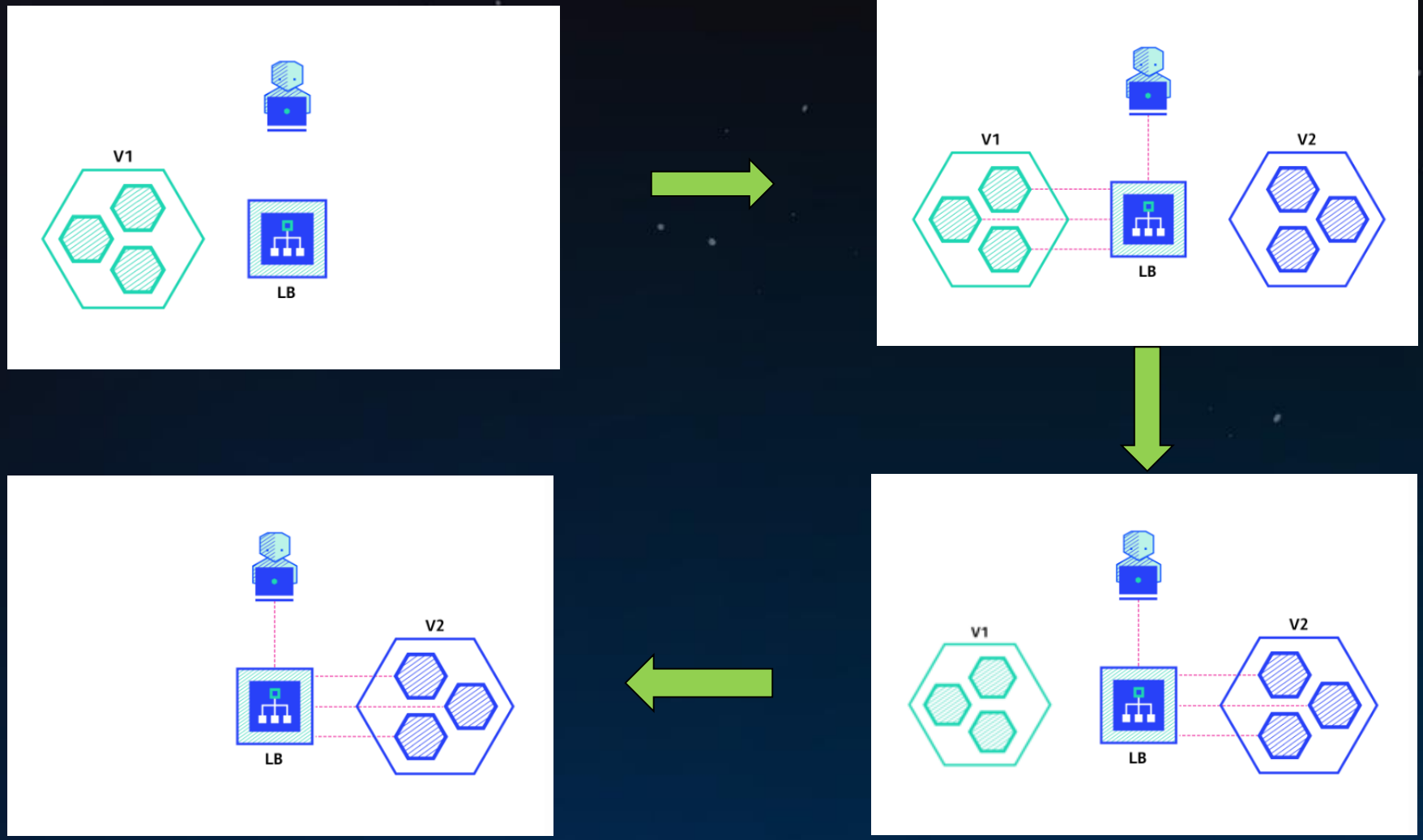
大纲

- 典型发布类型对比
- Istio流量治理技术解析
- 智能灰度发布介绍
- 灰度发布功能展示Demo

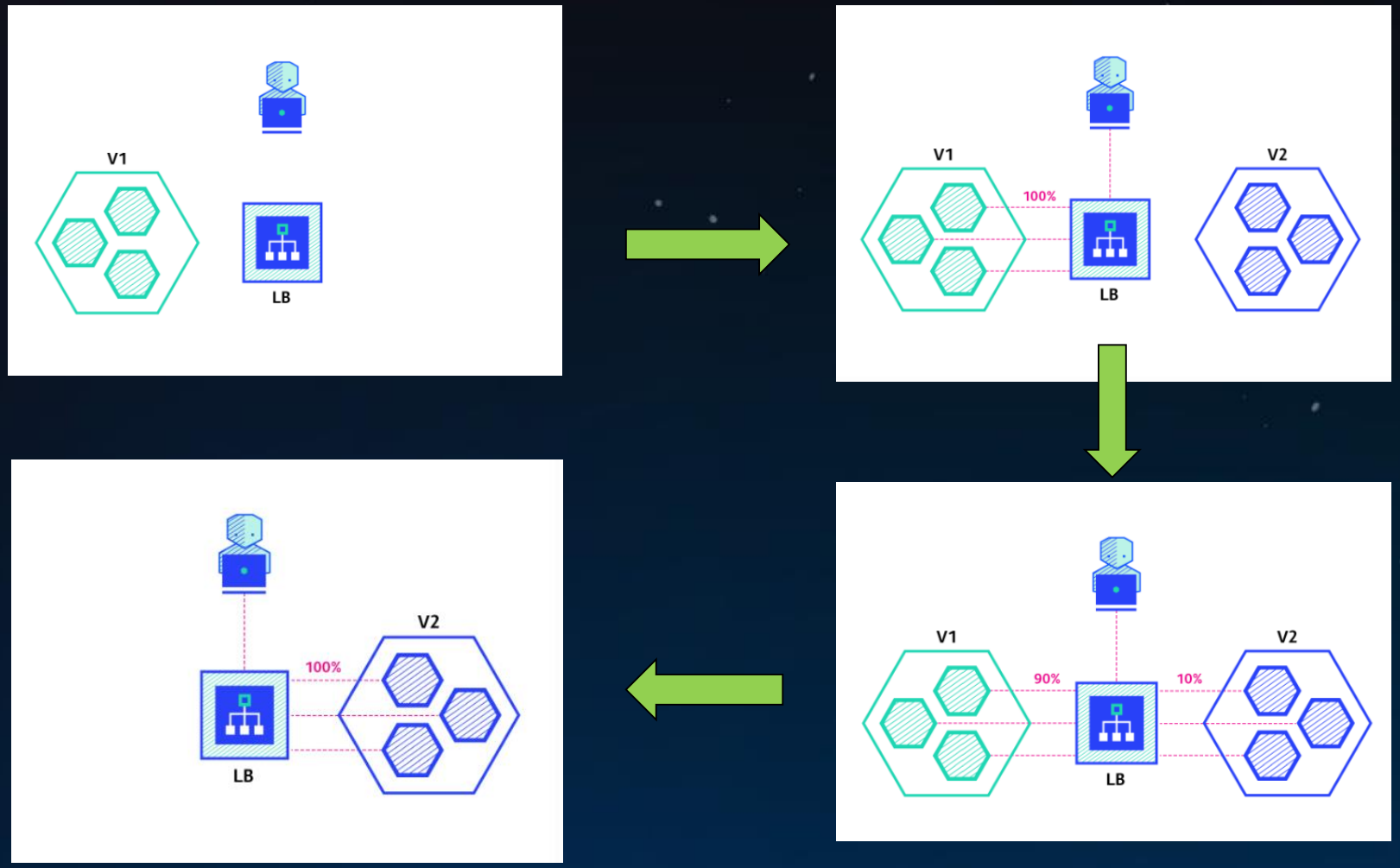
发布类型

- 蓝绿发布
- 灰度发布（金丝雀发布）
- A/B Test

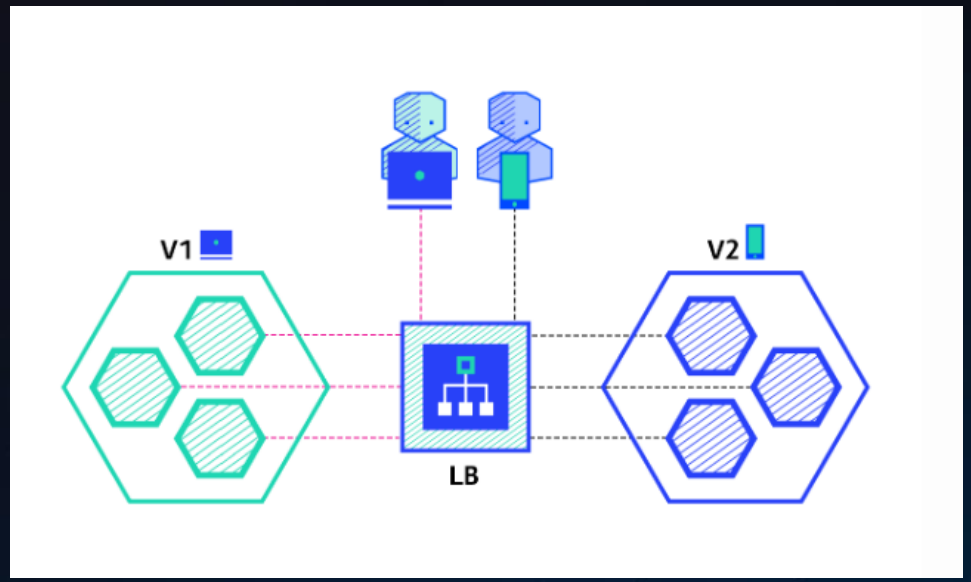
蓝绿发布



金丝雀发布

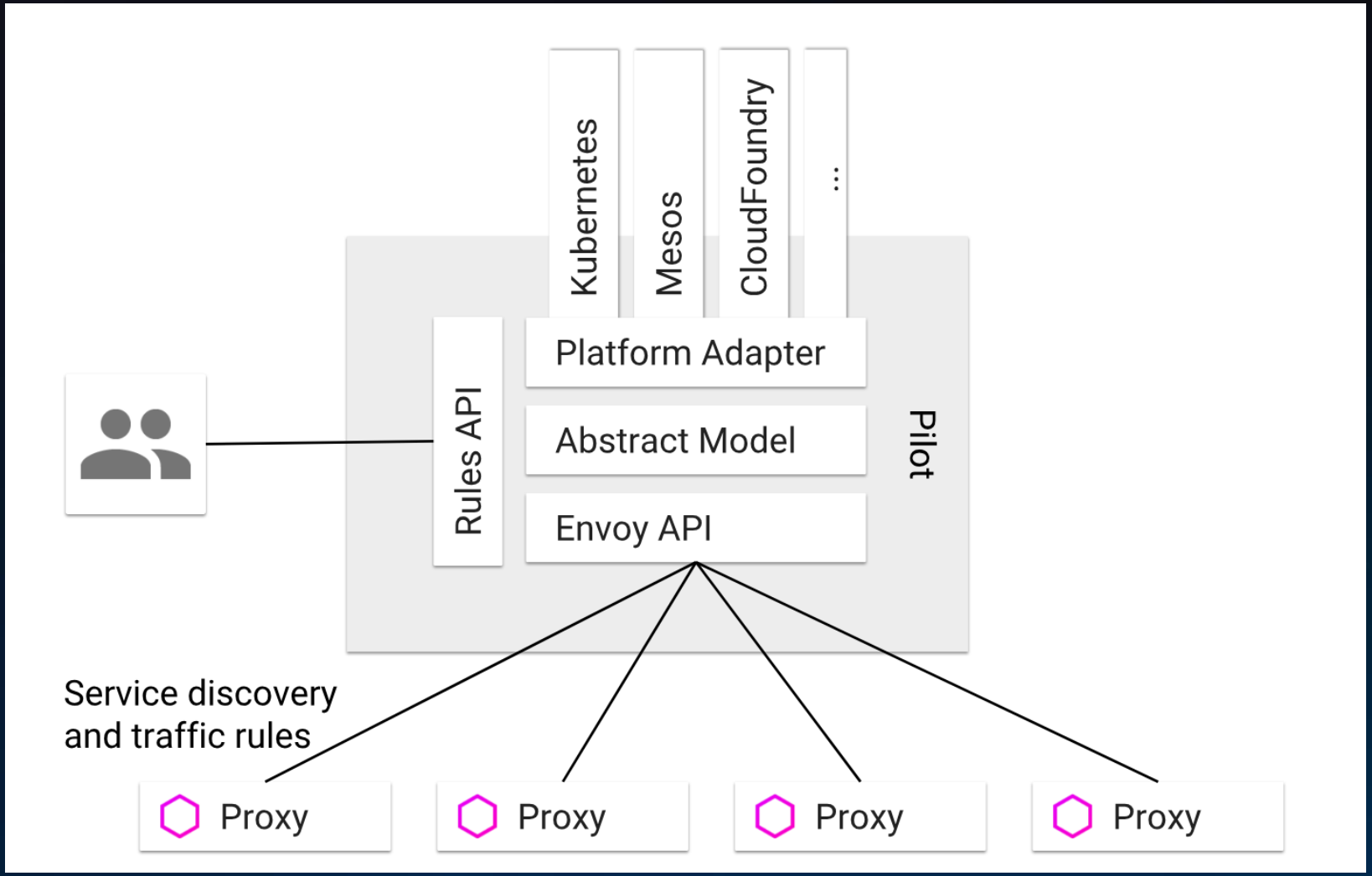


A/B Test



A/B Test主要对特定用户采样后，对收集到的反馈数据做相关对比，然后根据比对结果作出决策。
用来测试应用功能表现的方法，侧重应用的**可用性，受欢迎程度**等。

Istio 流量管理


Kubernetes
Mesos
CloudFoundry
...
Platform Adapter
Rules API
Abstract Model
Envoy API
Pilot
Service discovery
and traffic rules
Proxy
Proxy
Proxy
Proxy

配置规则

HUAWEI

- **VirtualService 在 Istio 服务网格中定义路由规则，控制路由如何路由到服务上。**
- **DestinationRule 是 VirtualService 路由生效后，配置应用与请求的策略集。**
- ServiceEntry 是通常用于在 Istio 服务网格之外启用对服务的请求。
- Gateway 为 HTTP/TCP 流量配置负载均衡器，最常见的是在网格的边缘的操作，以启用应用程序的入口流量。

DestinationRule

```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: bookinfo-ratings
spec:
  host: ratings.prod.svc.cluster.local
  trafficPolicy:
    loadBalancer:
      simple: RANDOM
  subsets:
  - name: v3
    labels:
      version: v3
    trafficPolicy:
      loadBalancer:
        simple: ROUND_ROBIN
```

DestinationRule 所定义的策略，决定了经过路由处理之后的流量的访问策略。

- host —— 目标服务的名称
- trafficPolicy —— 流量策略（负载均衡配置、连接池配置和熔断配置）。
- subsets —— 一个或多个服务版本

Virtualservice

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: myapp-route
spec:
  gateways:
  - mesh
  hosts:
  - myapp
  http:
  - match:
    - port: 3711
    route:
    - destination:
        host: myapp
        port:
          number: 8080
        subset: v1
  tcp:
  - match:
    - port: 3721
    route:
    - destination:
        host: myapp
        port:
          number: 8009
```

VirtualService 定义了一系列针对指定服务的流量路由规则。

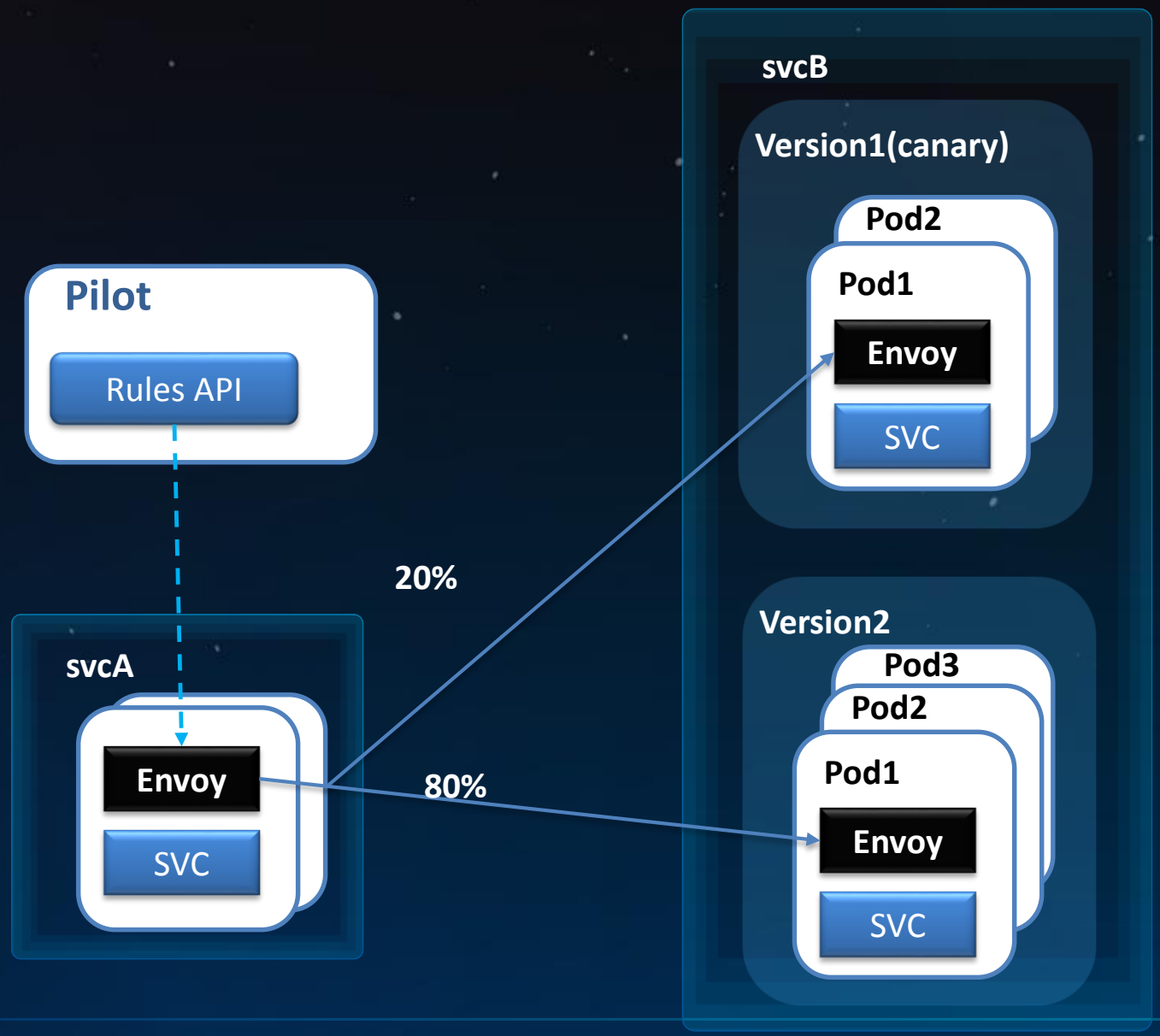
- hosts —— 流量的目标主机
- gateways —— Gateway名称列表
- http —— HTTP 流量规则（HTTPRoute）的列表
- tcp —— tcp流量规则（TCPRoute）的列表
- tls —— tls和https（TLSRoute）流量规则的列表

HTTPRoute
HttpMatchRequest（uri,headers,port,method……）
DestinationWeight（destination， weight）
Redirect
Rewrite
Timeout
Retries
……

TCPRoute
L4MatchAttributes（destinationSubnets,port……）
DestinationWeight（destination， weight）

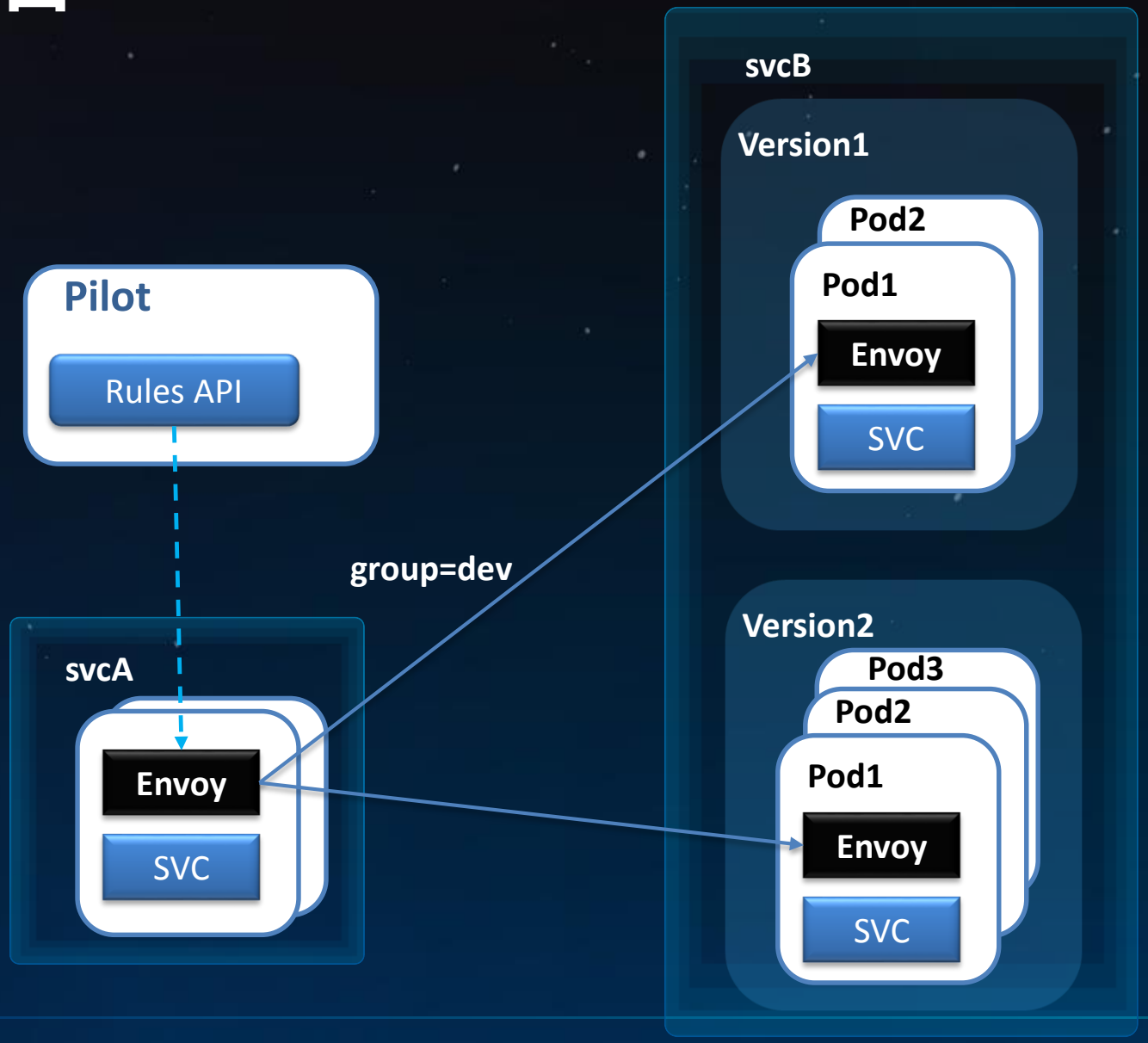
基于权重的路由

```
apiVersion: …
kind: VirtualService
metadata:
  name: vs-svcb
spec:
  hosts:
  - svcb
  http:
    route:
    - destination:
        name: v1
      weight: 20
    - destination:
        name: v2
      weight: 80
```



基于请求内容的路由

```
apiVersion: …
kind: VirtualService
metadata:
  name: ratings-route
spec:
  hosts:
  - svcb
  http:
  - match:
    - headers:
        cookie:
          exact: “group=dev”
    route:
    - destination:
        name: v1
  - route:
    - destination:
        name: v2
```



复杂灰度场景下的VirtualService

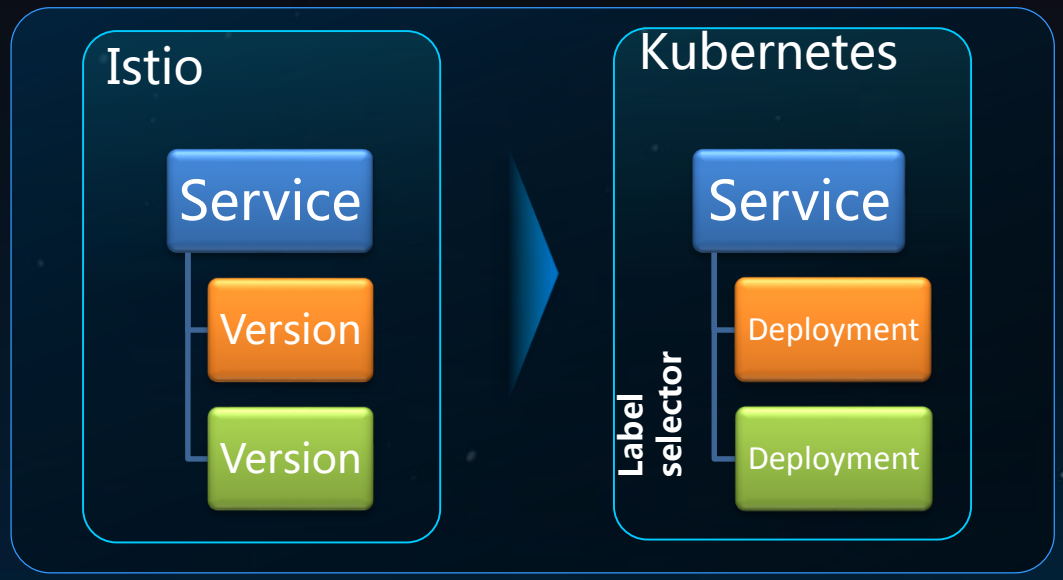
HUAWEI

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: helloworld
spec:
  hosts:
    - helloworld
  http:
  - match:
    - headers:
        cookie:
          regex: "^(.*?;)?(email=[^;]*@some-company-name.com)(;.*)?$"
  route:
    - destination:
        host: helloworld
        subset: v1
      weight: 50
    - destination:
        host: helloworld
        subset: v2
      weight: 50
  - route:
    - destination:
        host: helloworld
        subset: v1
```

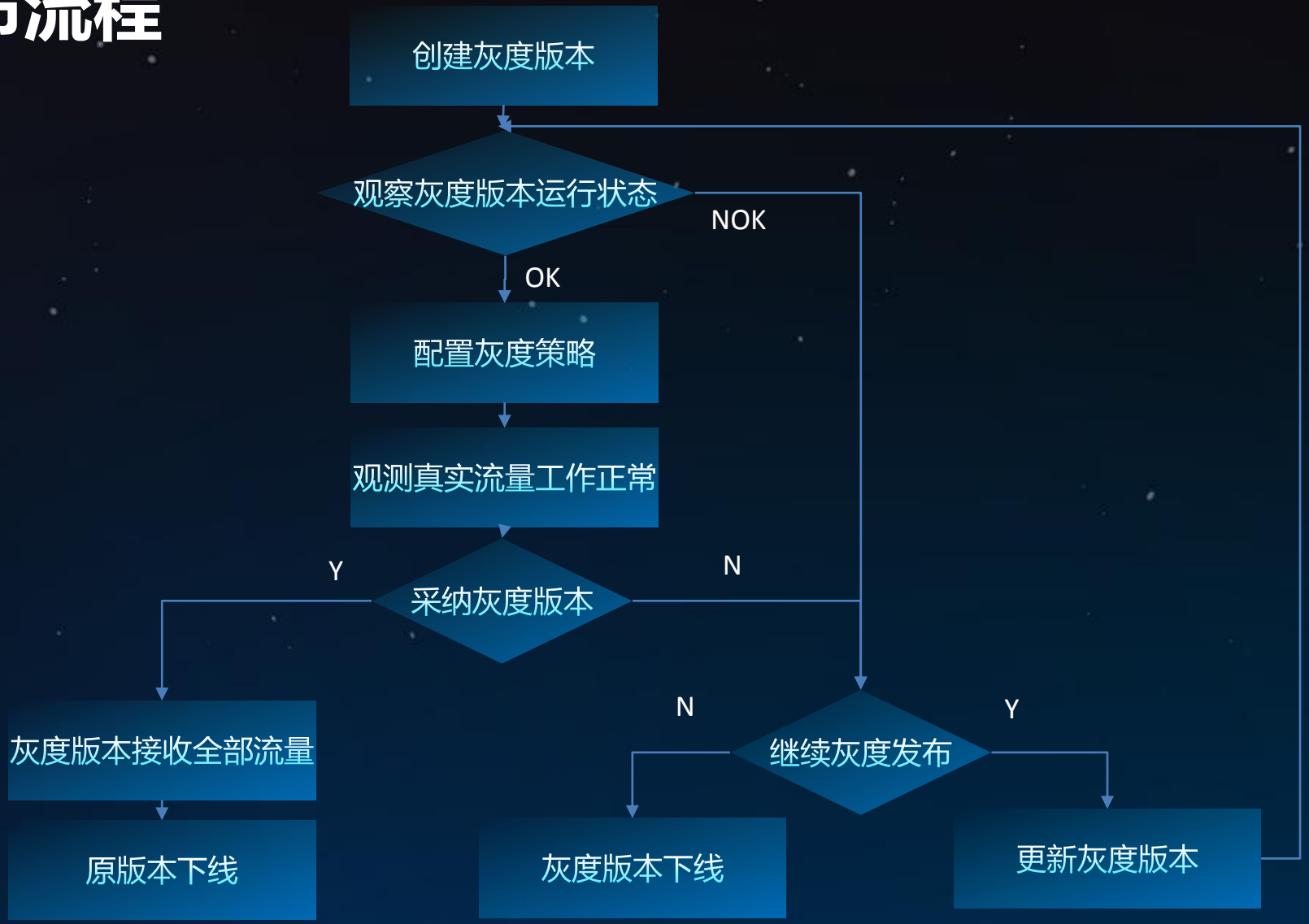
灰度版本存在形式

```
kind: Deployment
metadata:
  name: rating-v1
spec:
  replicas: 2
  template:
    metadata:
      labels:
        app: rating
        version: v1
    spec:
      containers:
      - image: rating-v1
        ...
---
```

```
kind: Deployment
metadata:
  name: rating-v2
spec:
  replicas: 3
  template:
    metadata:
      labels:
        app: rating
        version: v2
    spec:
      containers:
      - image: rating-v2
        ...
```



灰度发布流程


创建灰度版本
观察灰度版本运行状态
NOK
OK
配置灰度策略
观测真实流量工作正常
Y
采纳灰度版本
N
灰度版本接收全部流量
N
继续灰度发布
Y
原版本下线
灰度版本下线
更新灰度版本

智能灰度发布

目标：细粒度控制的自动化的持续交付

特点：

- 用户细分
- 流量管理
- 关键指标可观测
- 发布流程自动化

智能灰度发布


自动化发布
配置
路由配置
分配流量
服务
调整步长
健康检查
下线版本
上报数据
日志系统
发布日志
控制器
监控数据
适配器
上报警告
显示数据
告警系统
监控系统

自适应灰度发布参数

- 负载健康状态
- 请求成功率
- 平均请求时延
- 流量权重步长
- 回滚门限值

监控指标

RED

- (Request) **R**ate - the number of requests, per second, your services are serving.
- (Request) **E**rrors - the number of failed requests per second.
- (Request) **D**uration - The amount of time each request takes expressed as a time interval

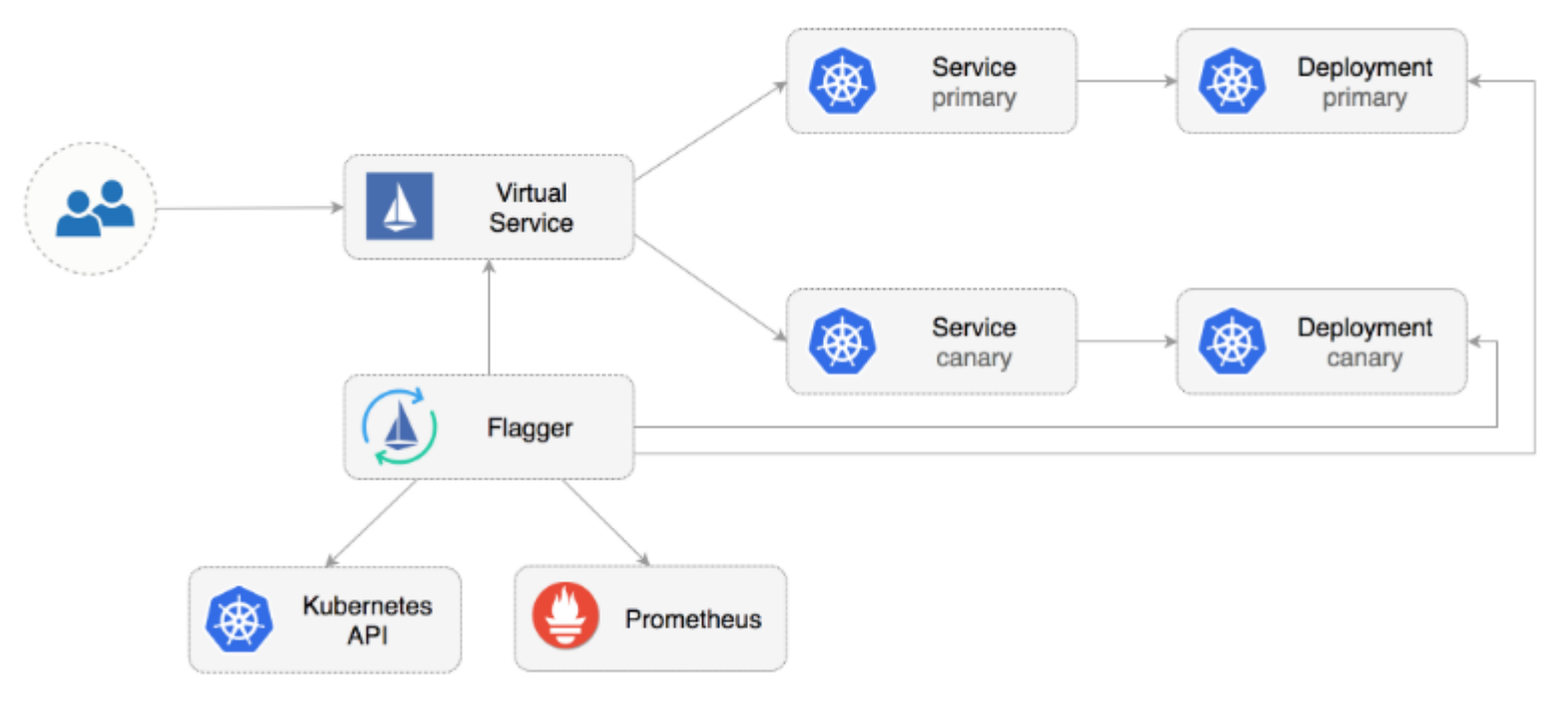
USE（utilization，saturation，errors）

- CPUs: sockets, cores, hardware threads (virtual CPUs)
- Memory: capacity
- Network interfaces
- Storage devices: I/O, capacity
- Controllers: storage, network cards
- Interconnects: CPUs, memory, I/O

flagger

HUAWEI

Flagger is a Kubernetes operator that automates the promotion of canary deployments using Istio routing for traffic shifting and Prometheus metrics for canary analysis.



flagger

HUAWEI

```
kubectl -n test describe canary/podinfo

Status:
  Canary Revision:  19871136
  Failed Checks:    0
  State:            finished
Events:
  Type     Reason  Age   From     Message
  ----     ------  ----  ----     -------
  Normal   Synced  3m    flagger  New revision detected podinfo.test
  Normal   Synced  3m    flagger  Scaling up podinfo.test
  Warning  Synced  3m    flagger  Waiting for podinfo.test rollout to finish: 0 of 1 updated replicas are available
  Normal   Synced  3m    flagger  Advance podinfo.test canary weight 5
  Normal   Synced  3m    flagger  Advance podinfo.test canary weight 10
  Normal   Synced  3m    flagger  Advance podinfo.test canary weight 15
  Normal   Synced  2m    flagger  Advance podinfo.test canary weight 20
  Normal   Synced  2m    flagger  Advance podinfo.test canary weight 25
  Normal   Synced  1m    flagger  Advance podinfo.test canary weight 30
  Normal   Synced  1m    flagger  Advance podinfo.test canary weight 35
  Normal   Synced  55s   flagger  Advance podinfo.test canary weight 40
  Normal   Synced  45s   flagger  Advance podinfo.test canary weight 45
  Normal   Synced  35s   flagger  Advance podinfo.test canary weight 50
  Normal   Synced  25s   flagger  Copying podinfo.test template spec to podinfo-primary.test
  Warning  Synced  15s   flagger  Waiting for podinfo-primary.test rollout to finish: 1 of 2 updated replicas are available
  Normal   Synced  5s    flagger  Promotion completed! Scaling down podinfo.test
```

相关链接

- https://support.huaweicloud.com/usermanual-cce/cce_01_0050.html
- https://bbs.huaweicloud.com/videos/e4927c347e4a41da82feb9c8c0bf6b30
- https://github.com/stefanprodan/flagger
- https://github.com/magneticio/vamp2setup/blob/master/BASIC_TUTORIAL.md
- https://github.com/intuit/wasabi

HUAWEI

HUAWEI

Thank You

直播 每周四 晚20:00

CloudNativeLives

Kubernetes Docker Istio