

打造云原生的 CI/CD 体系

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个人介绍

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- 01 GitOps 介绍
- 02 GitHub Action 介绍和实践
- 03 基于 Argo CD 的实践
- 04 灰度发布



01、GitOps 介绍



传统运维工作

- 上架机器 / 创建主机
- 初始化配置
- 部署软件
- 升级版本
- 故障恢复报警处理
- ...
- 耗费人力
- 重复性工作
- 效率低

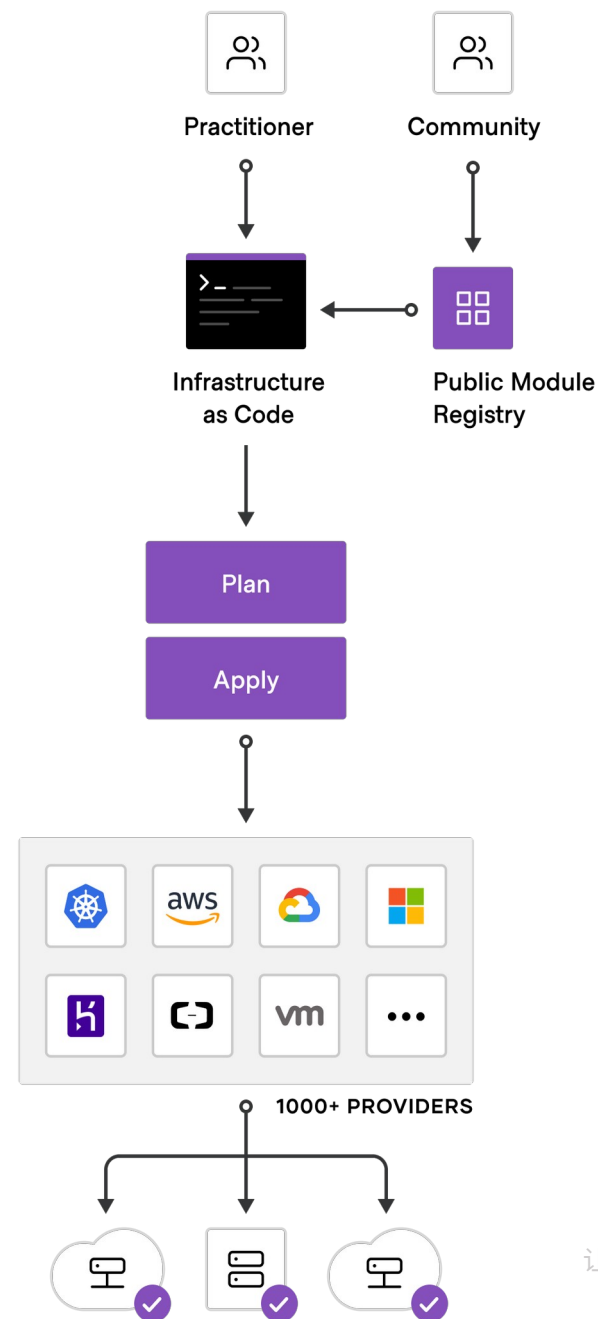


什么是 Infrastructure as code (IaC)

- 基础设施即代码
- 通过代码 / 配置描述行为
- 自动化所有端对端操作
- 通过 IaC 工具完成
- 可重用
- 提升效率
- 节约人力成本
- 自文档

什么是 Infrastructure as code (IaC)

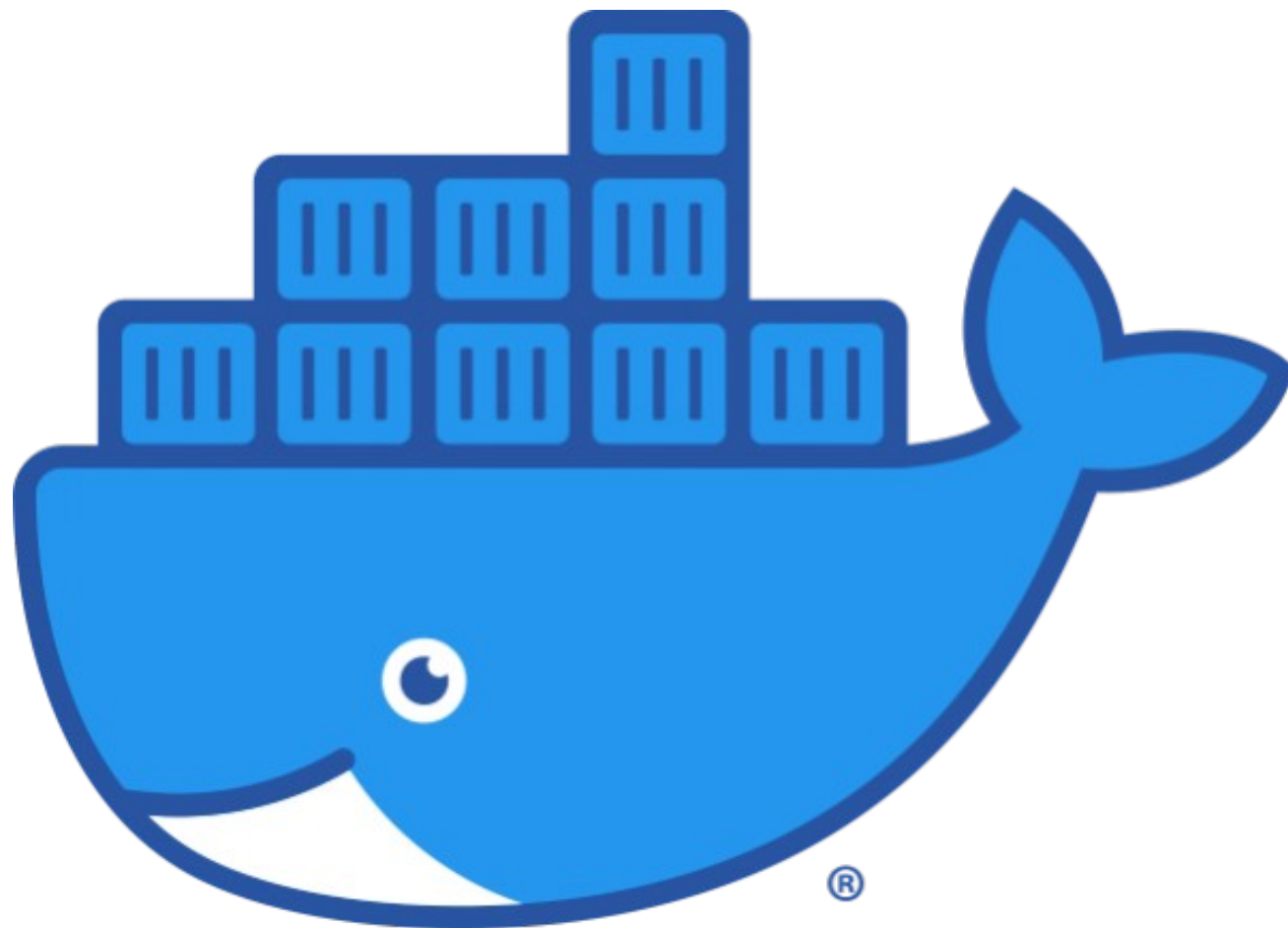
- Terraform
- Ansible
- Chef
- Puppet
- SaltStack
- ...



IaC 任务 / 工具分类



- 基础设施供应
 - 初始化服务器
 - 网络初始化
- 基础配置
 - 应用依赖等
- 应用部署





- 过程式 vs 声明式
- 可变式 vs 不可变式
- Agent (pull) vs Agentless (push)



- 同等对待 IaC 和应用程序代码
- 通过 CI/CD pipeline 进行集成部署等
- $\text{GitOps} == \text{XaC} + \text{PR} + \text{CI/CD}$



02、GitHub Action 介绍和实践

什么是 GitHub Action



事件驱动的自动化 workflows 平台



Automate your workflow from idea to production

GitHub Actions makes it easy to automate all your software workflows, now with world-class CI/CD. Build, test, and deploy your code right from GitHub. Make code reviews, branch management, and issue triaging work the way you want.

Get started with Actions

Questions? [Contact Sales](#) →



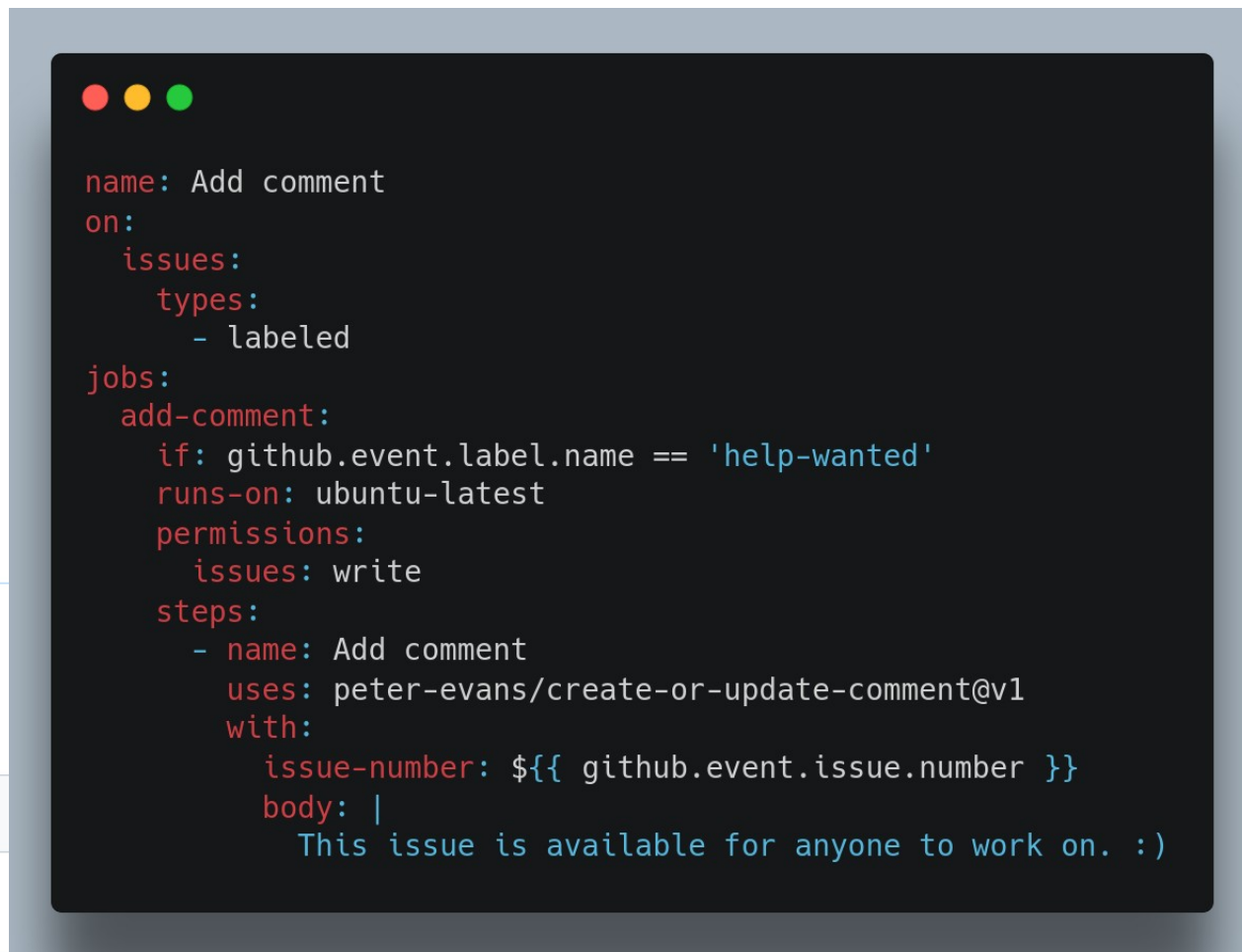
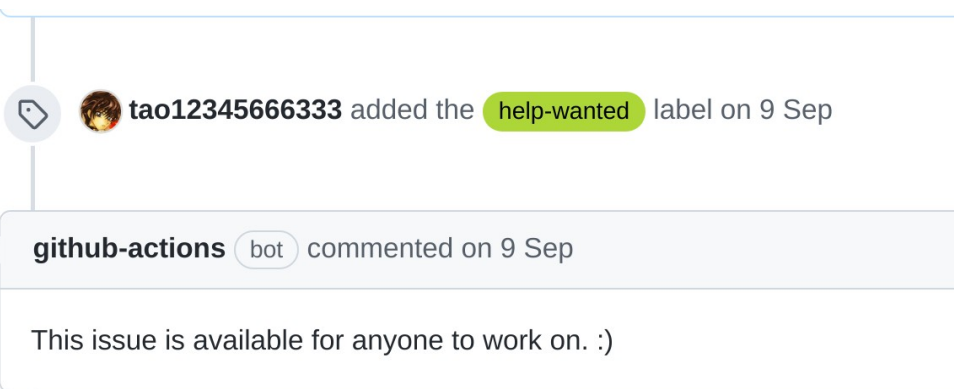
GitHub Action 支持的事件

on: check_run	on: deployment
on: check_suite	on: deployment_status
on: create	on: discussion
on: delete	on: discussion_comment
on: pull_request	on: fork
on: pull_request_review	on: gollum
on: pull_request_review_comment	on: issue_comment
on: pull_request_target	on: issues
on: push	on: label
on: registry_package	on: milestone
on: release	on: page_build
on: status	on: project
on: watch	on: project_card
on: workflow_run	on: project_column
	on: public



GitHub Action 的优势

- 配置简单
- 原生集成
- 生态丰富



<https://github.com/tao12345666333/issue-label-action>

GitHub Actions 生态



Marketplace / Search results

Types

Apps

Actions

Categories

API management

Chat

Code quality

Code review

Continuous integration

Dependency management

Deployment

IDEs

Learning

Localization

Mobile

Search for apps and actions

Sort: Best Match

Actions

An entirely new way to automate your development workflow.

10192 results filtered by Actions

Actions



Setup Go environment

By actions

Setup a Go environment and add it to the PATH

519 stars



Upload a Build Artifact

By actions

Upload a build artifact that can be used by subsequent workflow steps

1.1k stars



Download a Build Artifact

By actions

Download a build artifact that was previously uploaded in the workflow by the upload-artifact action

406 stars



First interaction

By actions

Greet new contributors when they create their first issue or open their first pull request

140 stars



Close Stale Issues

By actions

Close issues and pull requests with no recent activity

464 stars



Cache

By actions

Cache artifacts like dependencies and build outputs to improve workflow execution time

2.2k stars



03、基于 Argo CD 的实践

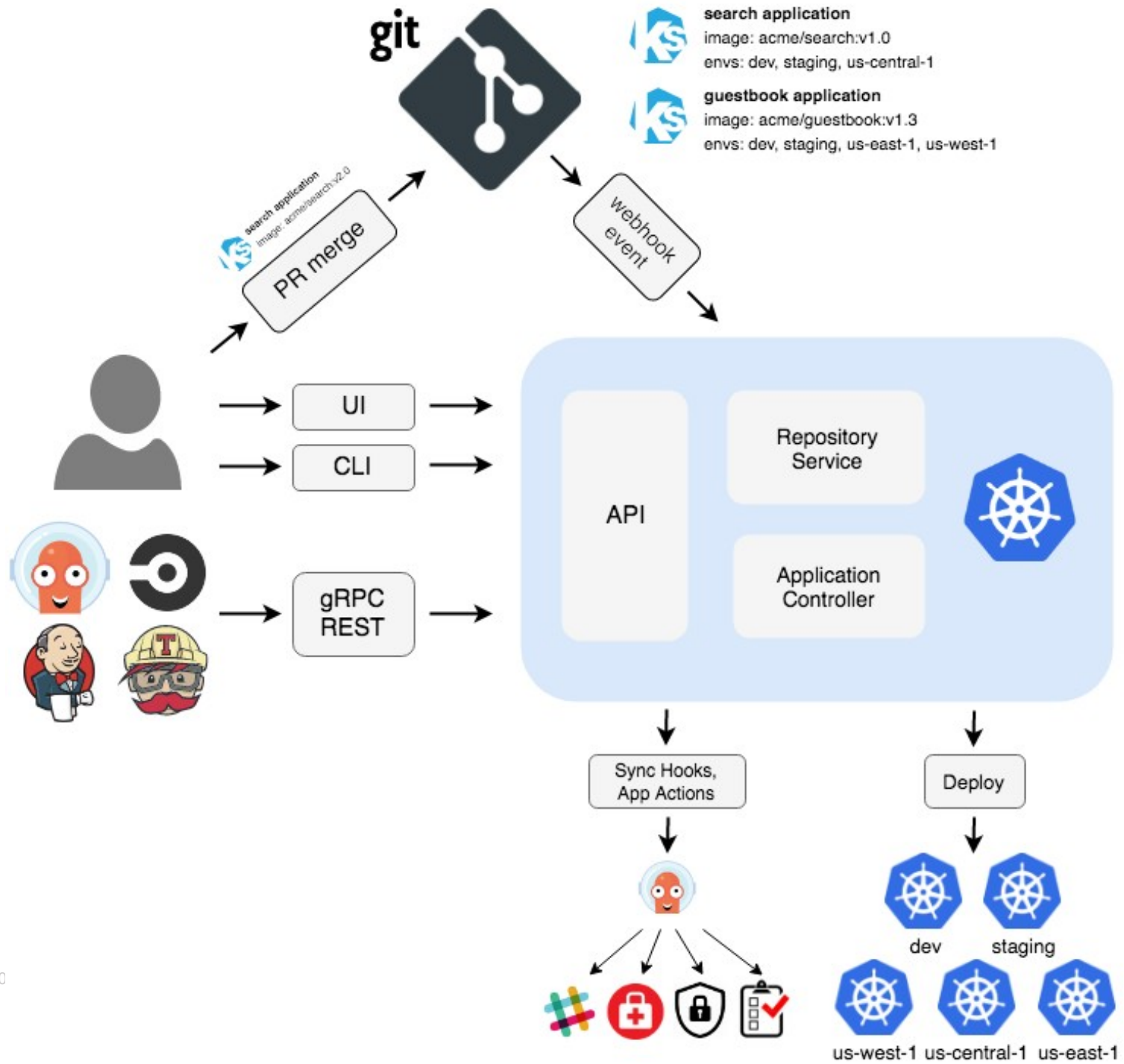
Argo CD 是什么



- Kubernetes 中的持续部署工具
- 基于 GitOps 理念
- 声明式配置
- 企业级功能（SSO，RBAC，audit 等）

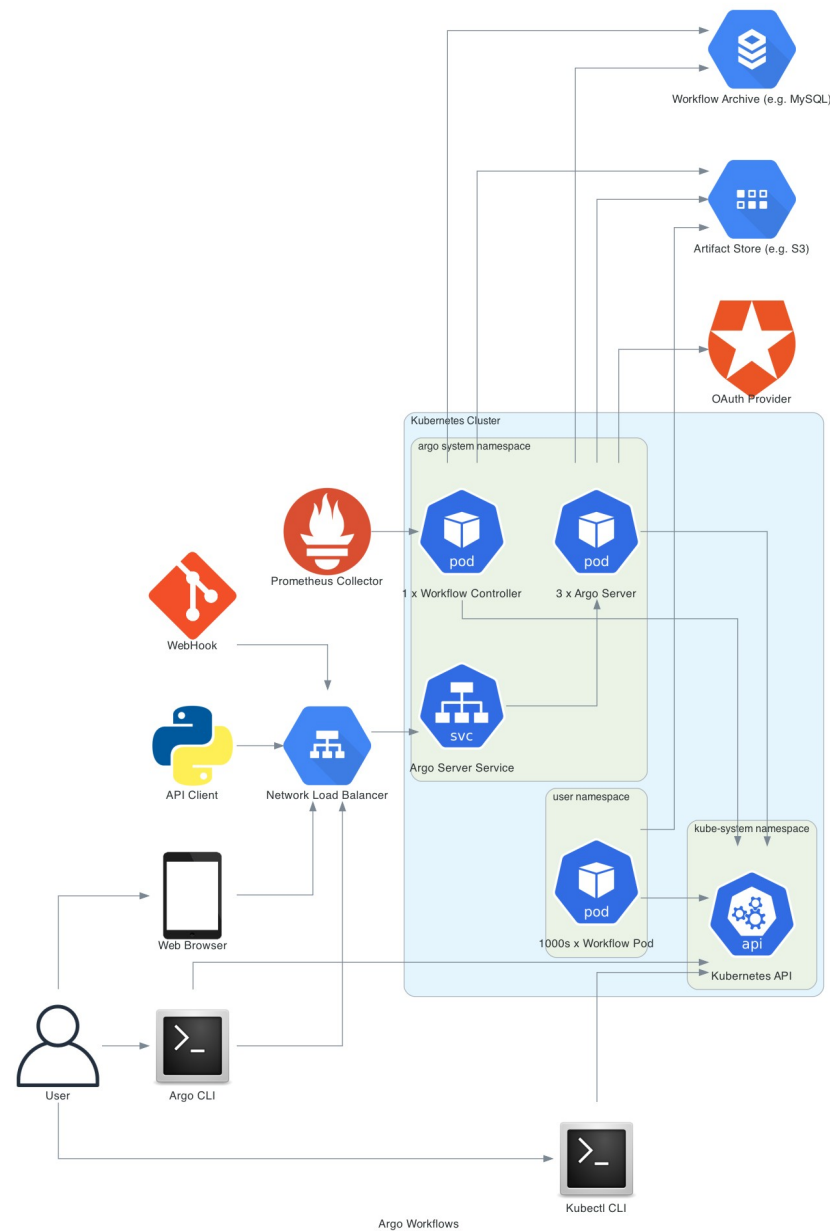


Argo CD 架构

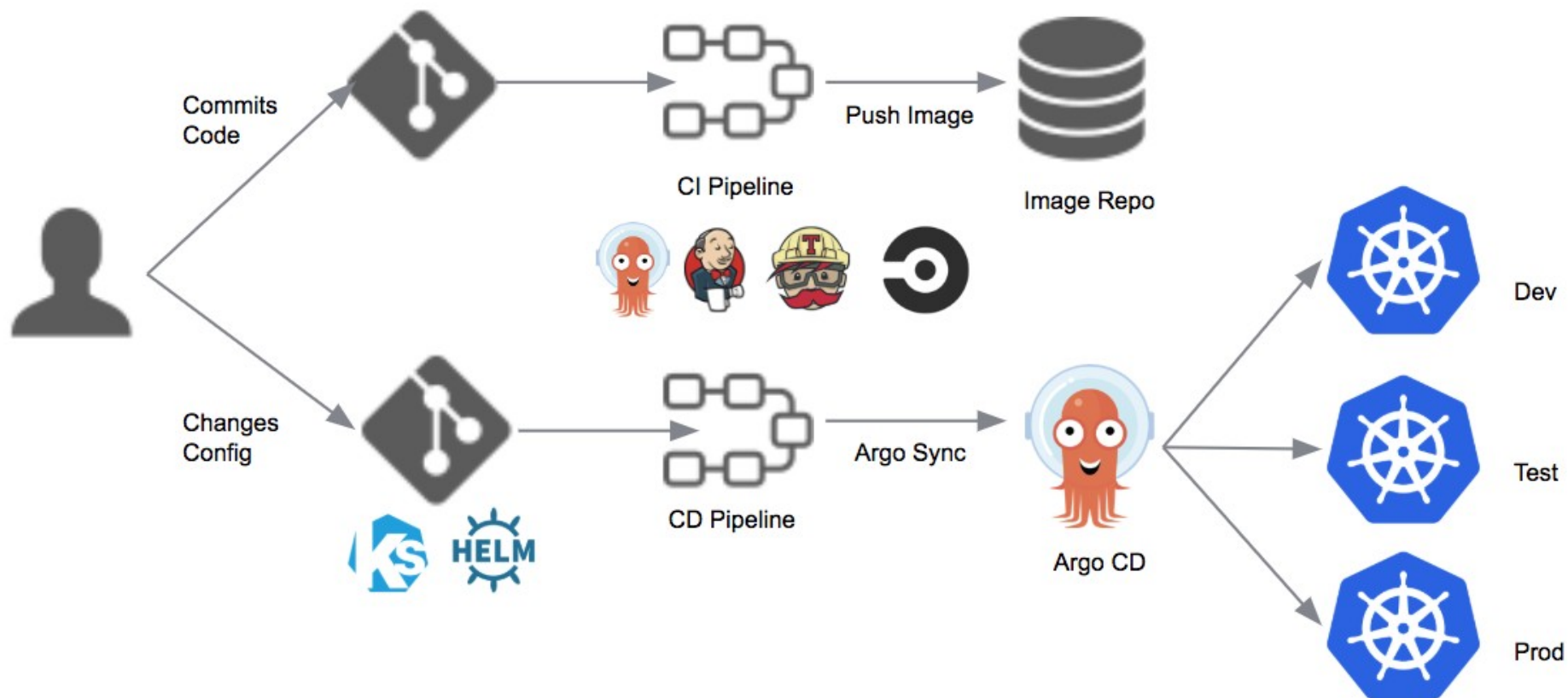


Argo Workflow

- 自定义 workflow
- 可通过 CLI 或者 CR 控制
- 多处 hook



Argo CD 工作流程





Kustomize 是什么

- 可用于自定义 Kubernetes 资源文件的 CLI 工具
- 自 Kubectl v1.14 起，kustomize build 已集成

Kustomize Base



base: kustomization + resources

kustomization.yaml

```
commonLabels:
  app: myWord
resources:
- deployment.yaml
- service.yaml
configMapGenerator:
- name: wordpress-map
  files:
  - env.startup.txt
```

deployment.yaml

```
apiVersion: v1
kind: Deployment
metadata:
  name: wordpress
  labels:
    app: wordpress
spec:
  replicas: 1
  selector:
    matchLabels:
      app: wordpress
  template: ...
```

service.yaml

```
apiVersion: v1
kind: Service
metadata:
  name: wordpress
spec:
  ports:
    - port: 389
  selector:
    app: wordpress
```

Kustomize Overlay



overlay: **kustomization** + **patches** + more resources
(referencing a base)

kustomization.yaml

```
namePrefix: prod-
commonLabels:
  variant: prod
commonAnnotations:
  note: Hello, I am production!
bases:
- ../../base
patches:
- replica_count.yaml
- cpu_count.yaml
```

replica_count.yaml

```
apiVersion: v1
kind: Deployment
metadata:
  name: wordpress
spec:
  replicas: 80
```

cpu_count.yaml


```
apiVersion: v1
kind: Deployment
metadata:
  name: wordpress
spec:
  template:
    spec:
      containers:
      - name: my-container
        resources:
          limits:
            cpu: 7000m
```





<https://github.com/tao12345666333/argo-cd-demo>


添加项目





v2.1.2+7









Applications


+ NEW APP

SYNC APPS


Search applications... /

FILTERS


SYNC STATUS

☐  Unknown

0


☐  Synced

0


☐  OutOfSync

1


HEALTH STATUS

☐  Unknown


0

☐  Progressing

0

☐  Suspended

0

☐  Healthy

0

☐  Degraded

0

☐  Missing

1

 **argo-cd-demo**

Project: default

Labels:

Status:  Missing  OutOfSync

Repository: https://github.com/tao12345666333/argo-cd...

Target Rev... kustomize

Path: ./kustomization

Destination: in-cluster


Namespa... kustomize

SYNC


REFRESH


DELETE







v2.1.2+7












Applications

+ NEW APP

 SYNC APPS


 Search applications...

/

 FILTERS


SYNC STATUS

☐

 Unknown


0

☐

 Synced

1


☐

 OutOfSync

0


HEALTH STATUS

☐

 Unknown


0

☐


 Progressing

0

☐



 Suspended

0

 **argo-cd-demo**

Project: default

Labels:

Status:  Healthy  Synced


Repository: https://github.com/tao12345666333/argo-cd...


Target Rev... kustomize


Path: ./kustomization

Destination: in-cluster

Namespa... kustomize

 SYNC

 REFRESH

 DELETE

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同步



v2.1.2+

Applications / argo-cd-demo

APPLICATION DETAILS

APP DETAILS

APP DIFF

SYNC

SYNC STATUS

HISTORY AND ROLLBACK

DELETE

REFRESH

APP HEALTH Healthy

CURRENT SYNC STATUS Synced

To [kustomize \(e8a2d77\)](#)

Author: github-actions <41898282+github-actions[bot]@users...>
Comment: Commit from GitHub Actions (Deployment CI)

LAST SYNC RESULT Sync OK

To [e8a2d77](#)

Succeeded a few seconds ago (Thu Sep 16 2021 18:35:35 GMT+0800)
Author: github-actions <41898282+github-actions[bot]@users...>
Comment: Commit from GitHub Actions (Deployment CI)

FILTERS

KINDS

KINDS

SYNC STATUS

☐ Synced

☐ OutOfSync

HEALTH STATUS

☐ Healthy

argo-cd-demo

4 minutes

argo-cd-demo

a few seconds

argo-cd-demo

a few seconds

argo-cd-demo

a few seconds

argo-cd-demo-x6dnc

a few seconds

argo-cd-demo-7c6f4575cb

a few seconds

argo-cd-demo-7c6f4575cb-8nc...

a few seconds

running

1/1

argo-cd-demo-7c6f4575cb-hjg27

a few seconds

running

1/1

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配置



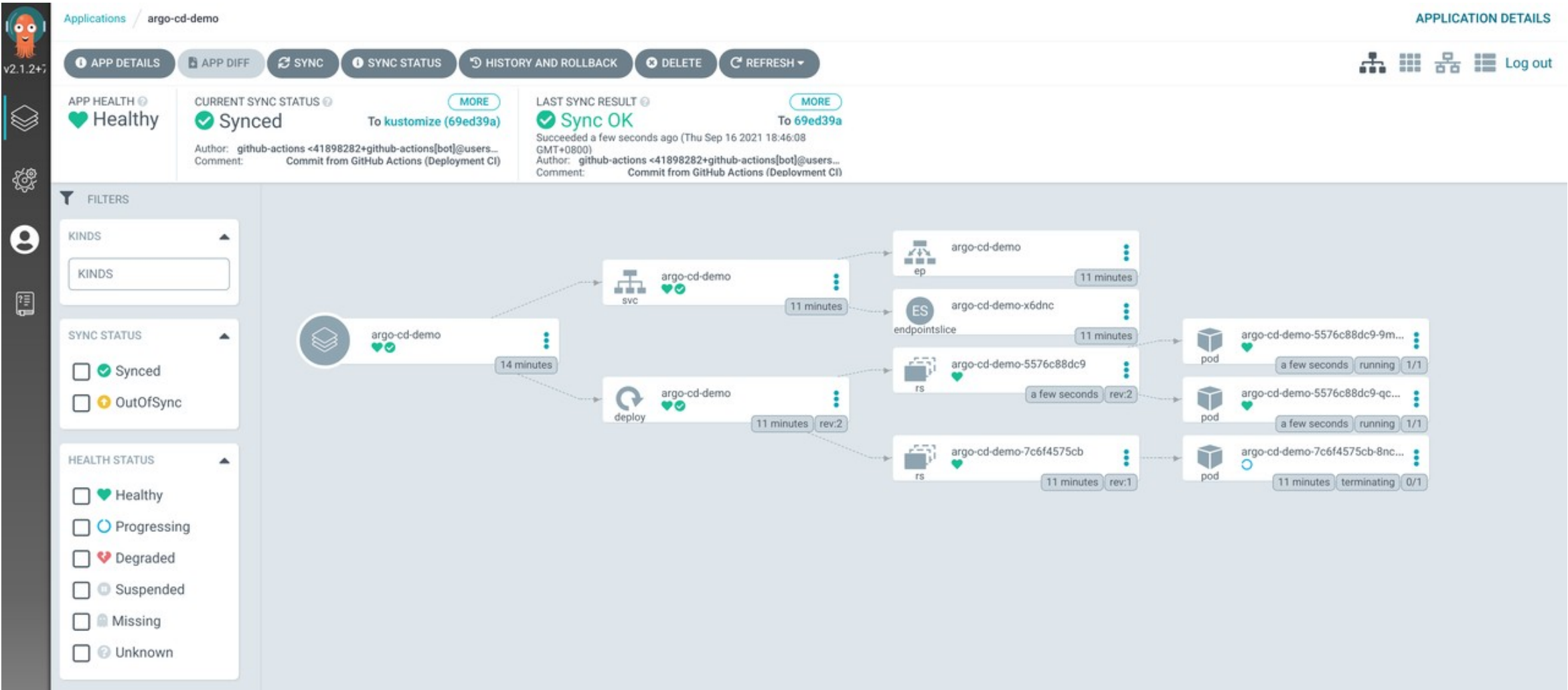
```
deploy:
  name: Deploy
  runs-on: ubuntu-latest
  continue-on-error: true
  needs: build

steps:
  - name: Check out code
    uses: actions/checkout@v2

  - name: Setup Kustomize
    uses: imranismail/setup-kustomize@v1
    with:
      kustomize-version: "4.3.0"

  - name: Update Kubernetes resources
    env:
      DOCKER_USERNAME: ${ secrets.DOCKER_USERNAME }
    run: |-
      cd manifests
      kustomize edit set image ghcr.io/${ github.repository }/argo-cd-demo:${ github.sha }
      cat kustomization.yaml
      kustomize build ./ > ../kustomization/manifests.yaml
      cat ../kustomization/manifests.yaml
  - uses: EndBug/add-and-commit@v7
    with:
      default_author: github_actions
      branch: kustomize
```

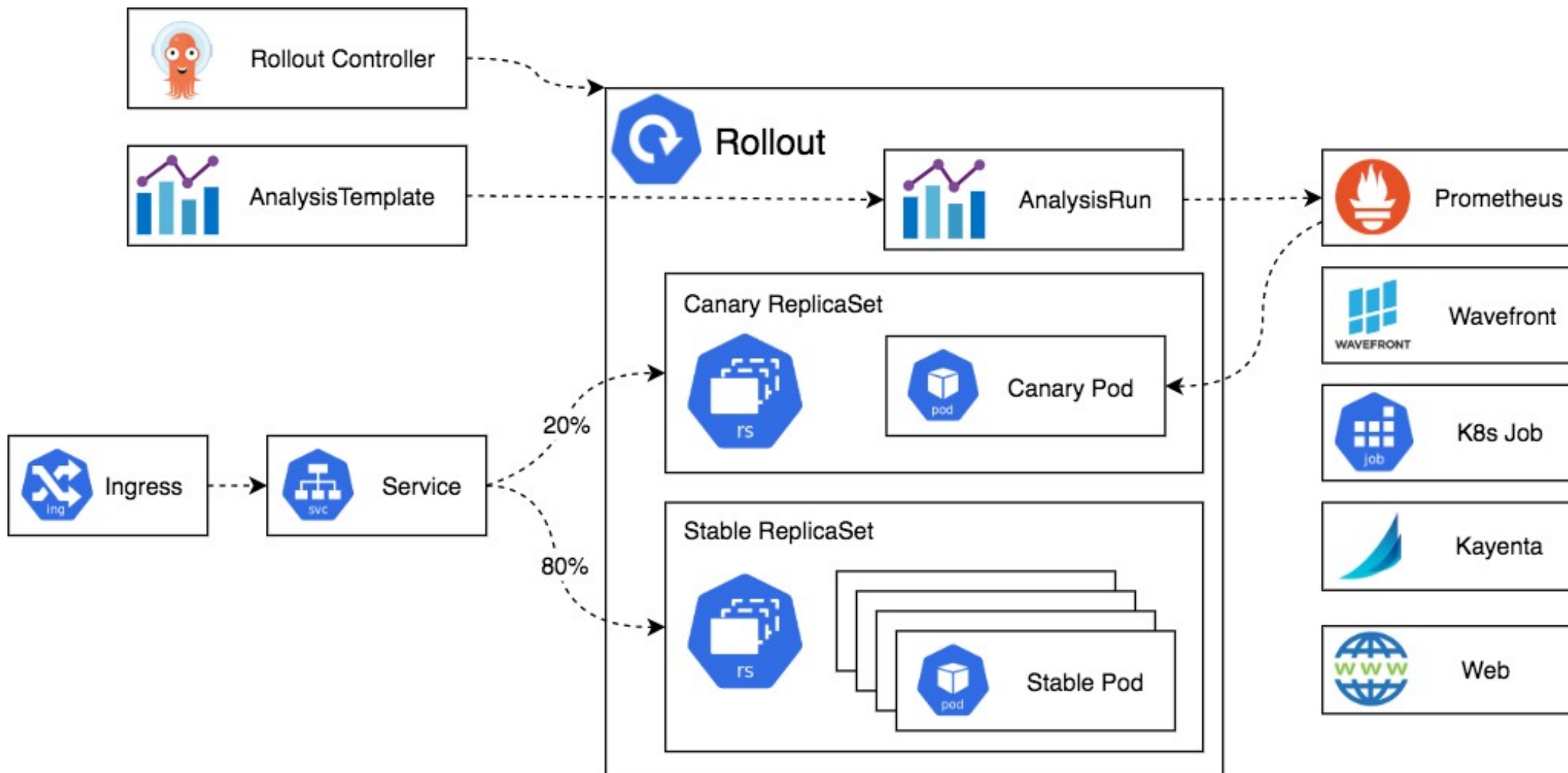
发布完成





04、灰度发布

Argo Rollouts



灰度配置



```
apiVersion: argoproj.io/v1alpha1
kind: Rollout
metadata:
  name: example-rollout
spec:
  replicas: 10
  selector:
    matchLabels:
      app: nginx
  template:
    metadata:
      labels:
        app: nginx
    spec:
      containers:
        - name: nginx
          image: nginx:1.15.4
          ports:
            - containerPort: 80
  minReadySeconds: 30
  revisionHistoryLimit: 3
  strategy:
    canary: #Indicates that the rollout should use the Canary strategy
    maxSurge: "25%"
    maxUnavailable: 0
    steps:
      - setWeight: 10
      - pause:
          duration: 1h # 1 hour
      - setWeight: 20
      - pause: {} # pause indefinitely
```


灰度配置



```
Name:          rollouts-demo
Namespace:      default
Status:        II Paused
Strategy:      Canary
  Step:        1/8
  SetWeight:   20
  ActualWeight: 20
Images:        argoproj/rollouts-demo:blue (stable)
               argoproj/rollouts-demo:yellow (canary)
Replicas:
  Desired:     5
  Current:     5
  Updated:     1
  Ready:       5
  Available:   5
```

NAME	KIND	STATUS	AGE	INFO
rollouts-demo	Rollout	II Paused	10m	
└─# revision:2				
└─rollouts-demo-789746c88d	ReplicaSet	✓ Healthy	40s	canary
└─rollouts-demo-789746c88d-qkxrh	Pod	✓ Running	40s	ready:1/1
└─# revision:1				
└─rollouts-demo-7bf84f9696	ReplicaSet	✓ Healthy	10m	stable
└─rollouts-demo-7bf84f9696-8m8fk	Pod	✓ Running	10m	ready:1/1
└─rollouts-demo-7bf84f9696-lmbtk	Pod	✓ Running	10m	ready:1/1
└─rollouts-demo-7bf84f9696-msbtk	Pod	✓ Running	10m	ready:1/1
└─rollouts-demo-7bf84f9696-qllf5	Pod	✓ Running	10m	ready:1/1

Argo Rollouts vs Argo CD



- 可配合使用
- 非强制依赖
- Argo CD 可识别 Argo Rollouts 的配置

总结



- GitOps
- GitHub Actions
- Argo CD
- Kustomize
- Argo Rollouts

示例项目： <https://github.com/tao12345666333/argo-cd-demo>



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Thanks