Flux Descriptors - DevOps Guide

What is Flux?

Flux is a GitOps tool for Kubernetes. It keeps your Kubernetes clusters in sync with configuration stored in Git (or OCI registries). Any change made in Git automatically gets applied to the cluster. Flux has modular controllers like Source Controller, Kustomize Controller, Helm Controller, and Notification Controller.

What are Flux Descriptors?

Flux descriptors are YAML custom resources (CRDs) that define how Flux behaves. They tell Flux where to fetch the desired state, how to apply it, and how to keep syncing.

Types of Flux Descriptors

1. Source Descriptors: GitRepository, HelmRepository, Bucket, OCIRepository 2. Kustomize Descriptors: Kustomization 3. Helm Descriptors: HelmRelease, HelmChart 4. Notification Descriptors: Alert, Receiver, Provider

Workflow of Descriptors

1. Source descriptor fetches config 2. Kustomization/HelmRelease applies config 3. Notification descriptor reports results 4. Flux keeps everything in sync

Why Are They Important in DevOps?

• Make Flux fully declarative • Replace manual kubectl apply • Provide auditability via Git history • Enable extensibility and automation

What You Need to Contribute

1. YAML skills 2. Kubernetes basics 3. GitOps workflow 4. Flux CLI usage 5. Debugging skills 6. Best practices: infra repo, overlays, secure secrets, interval tuning

Flux Descriptors Cheat Sheet

GitRepository

```
apiVersion: source.toolkit.fluxcd.io/v1
kind: GitRepository
metadata:
  name: my-app-config
  namespace: flux-system
spec:
  interval: 1m
  url: https://github.com/org/my-app-config
  ref:
    branch: main
```

Kustomization

```yaml
apiVersion: kustomize.toolkit.fluxcd.io/v1
kind: Kustomization
metadata:
  name: my-app
  namespace: flux-system
spec:
  interval: 5m
  path: "./overlays/prod"
  prune: true
  sourceRef:
    kind: GitRepository
    name: my-app-config
```

HelmRelease

```yaml
apiVersion: helm.toolkit.fluxcd.io/v2beta1
kind: HelmRelease
metadata:
  name: my-app
  namespace: flux-system
spec:
  interval: 5m
  chart:
    spec:
      chart: my-app-chart
      version: "1.2.3"
      sourceRef:
        kind: HelmRepository
        name: my-helm-repo
  values:
    replicaCount: 3
```

Notification (Alert)

```yaml
apiVersion: notification.toolkit.fluxcd.io/v1
kind: Alert
metadata:
  name: slack-alert
  namespace: flux-system
spec:
  providerRef:
    name: slack-bot
  eventSeverity: info
  eventSources:
    - kind: Kustomization
      name: my-app
```