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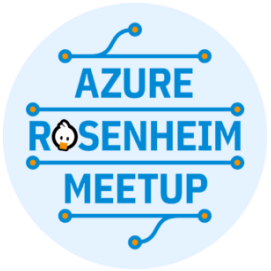
GitOps on Azure

Azure Rosenheim Meetup, 17.03.2022



Microsoft Partner

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Gold Cloud Platform
Gold DevOps
Silver Application Development
Silver Security
Silver Application Integration

GitHub

Who we are?

Martin Brandl (white duck GmbH, Cloud Solution Architect & Azure MVP)
Twitter: @martin_jib
LinkedIn: linkedin.com/in/mbrandl/

Nico Meisenzahl (Senior Cloud & DevOps Consultant & Cloud & Data Management MVP)
Twitter: @nmeisenzahl
LinkedIn: https://www.linkedin.com/in/nicomeisenzahl/

Philip Welz (Senior Kubernetes & DevOps Engineer & GitLab Hero & CKA, CKAD & CKS)
Twitter: @philip_welz
LinkedIn: https://www.linkedin.com/in/philip-welz

twitter.com/whiteduck_gmbh

twitter.com/AzureMeetup

twitter.com/CloudNative_Ro

Housekeeping

- this meetup will be streamed on YouTube!
- want to participate?
  - join our meetup to get access to the Zoom meeting
    - https://www.meetup.com/Azure-Meetup-Rosenheim
  - we do also monitor the comments on YouTube

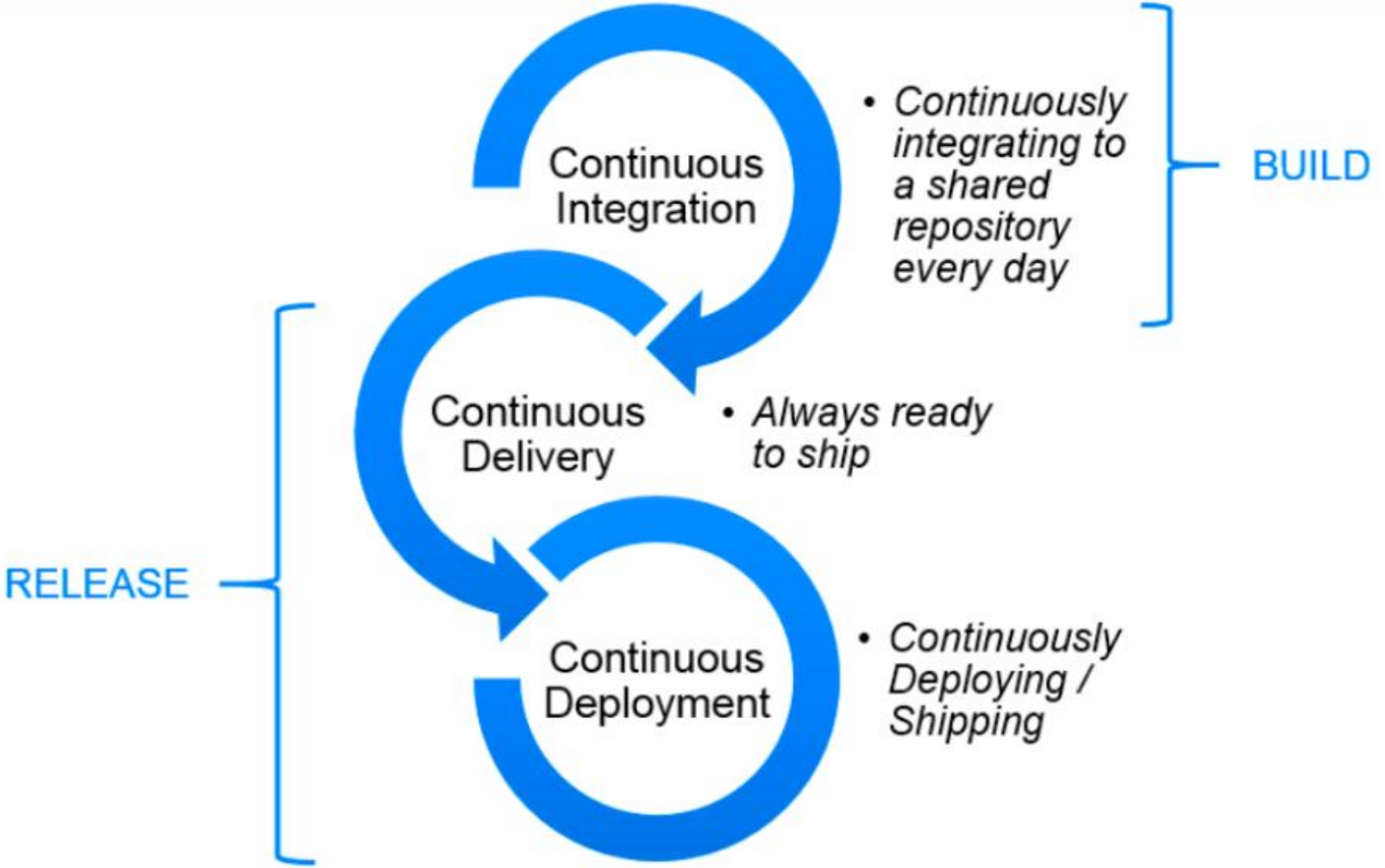
Agenda

- Introduction to GitOps
- Overview of Flux
- Flux on Azure
- Demo
- FAQ / Networking

GitOps to Azure

INTRODUCTION TO GITOPS

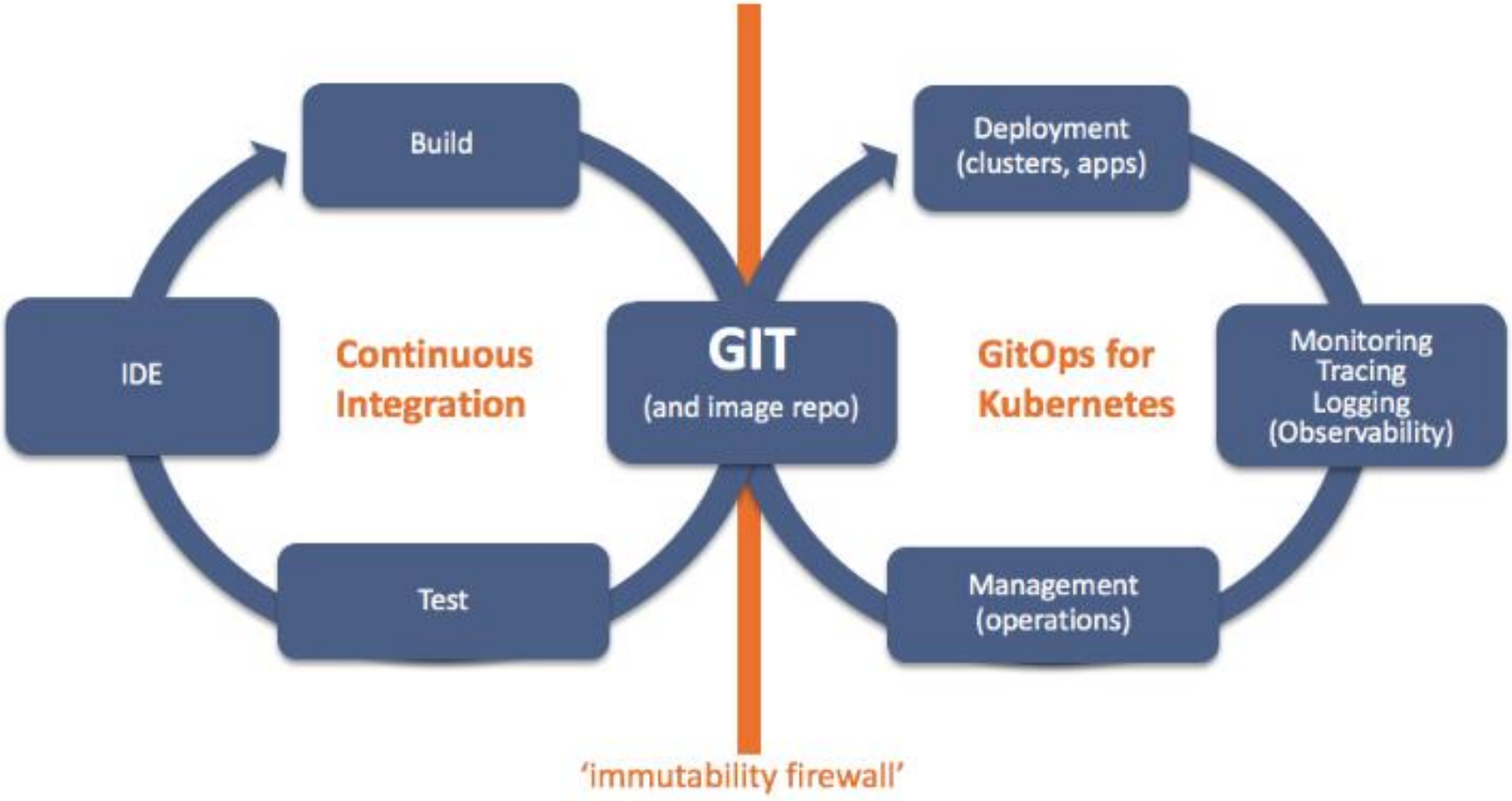
Continuous…



GitOps

Is a way to do Kubernetes cluster management and application delivery. GitOps works by using Git as a single source of truth for declarative infrastructure and applications.

GitOps



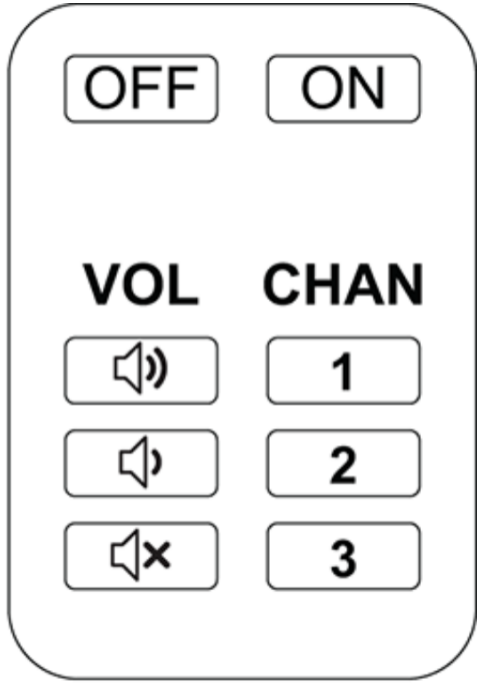
GitOps principles

- a system managed by GitOps must have its desired state expressed declaratively
- desired state is stored in a way that enforces immutability, versioning and retains a complete version history
- software agents automatically pull the desired state declarations from the source
- software agents continuously observe actual system state and attempt to apply the desired state
- OpenGitOps (https://opengitops.dev)

“desired state expressed declaratively”

- declarative!
  - you describe what you want to be achieved
- easy to validate

Imperative remote control



Declarative remote control

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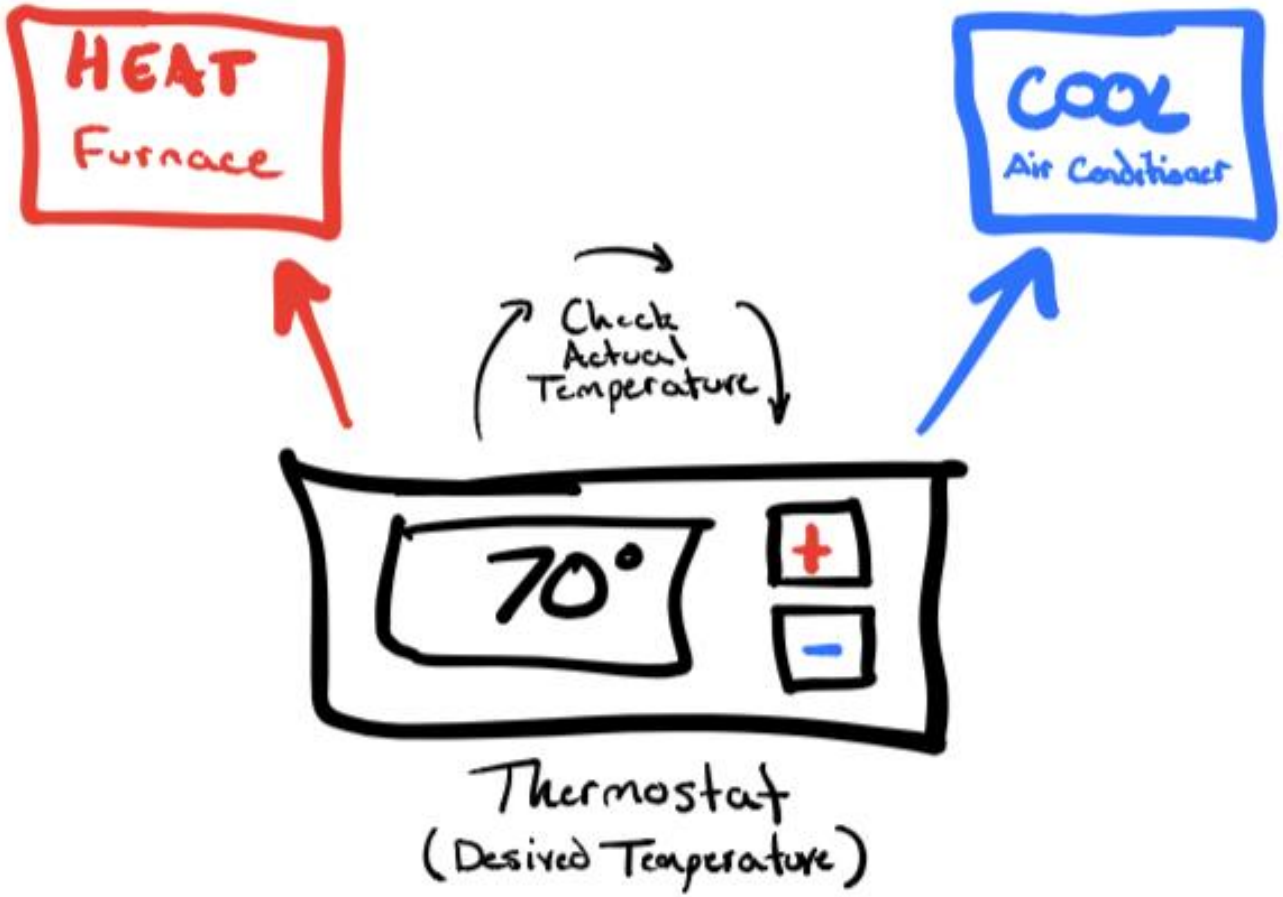
“desired state is stored immutable & versioned”

- Git is the single source of truth
- Git is immutable
- Git is versioned
- Git history allows easy rollbacks

“agents automatically pull the desired state”

- pull instead of push
- changes are automatically applied
- Operator pattern
- privileged operators don’t cross security boundaries
- separates the what and the how

Desired state



“agents continuously observe actual state”

- continuously checking that desired state is met
  - no configuration drift!
- recovers from errors without intervention
- control loop for your operations

GitOps workflow (a sample)

Development

- Developer writes and tests code & merges code changes
- Pipeline builds the image and updates the deployment manifest (via PR)

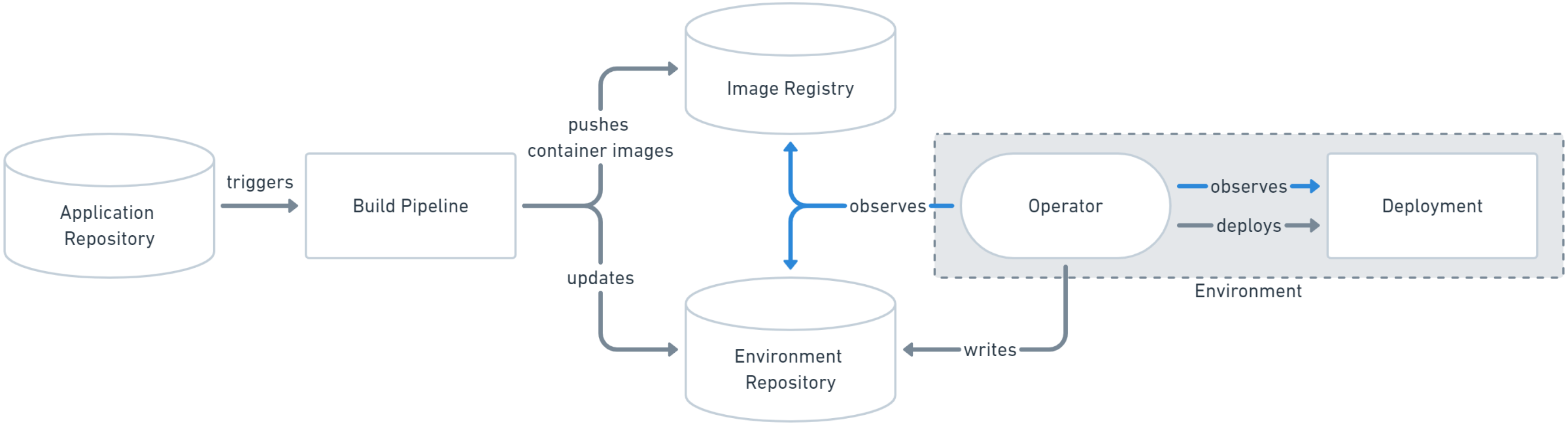
Staging

- After testing the developer merges the deployment manifest PR into the staging branch
- The GitOps agent reconciles the state in the staging cluster

Production

- After validation the developer merges the changes (via PR) into the production branch
- The GitOps agent reconciles the state in the production cluster

Big picture



GitOps benefits

- increased productivity
- enhanced developer experience
- improved stability
- higher reliability
- consistency and standardization
- stronger security guarantees

GitOps: the bad and the ugly

- can be only used with Kubernetes (for now)
- prevent concurrent push on the same repository to not cause conflicts
- git management can become overwhelming
- doesn’t solve centralized secret management
- validation pipelines are a must

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GitOps on Azure

FLUX

Flux

- “is a collection of tools for keeping Kubernetes clusters in sync with sources of configuration”
- contains of
  - Operators keeping Kubernetes clusters in sync
  - CRDs to store configuration
  - CLI
- focuses on the basics
- easy to deploy
- There is Flux v1 and v2!

Flux in detail

- supports multiple sources like Git and Helm Repositories and S3 Buckets
- allows to patch resources with Kustomize
- supports Helm Releases
- can do health assessment
- understands dependency mapping
- can automatically act on new container images
- allows feedback loops (notifications, integrations)

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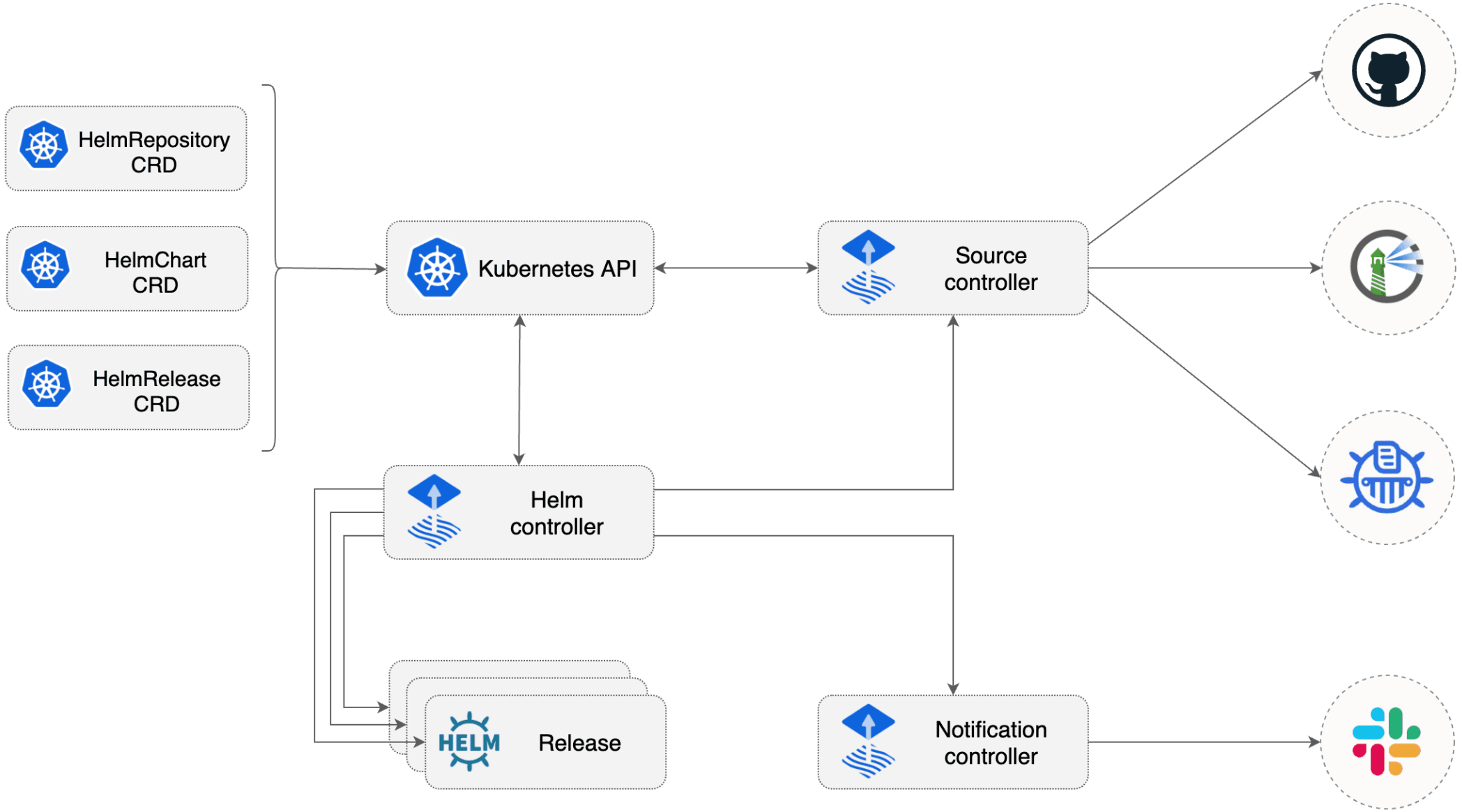
Flux lifecycle (with Helm and Notification)



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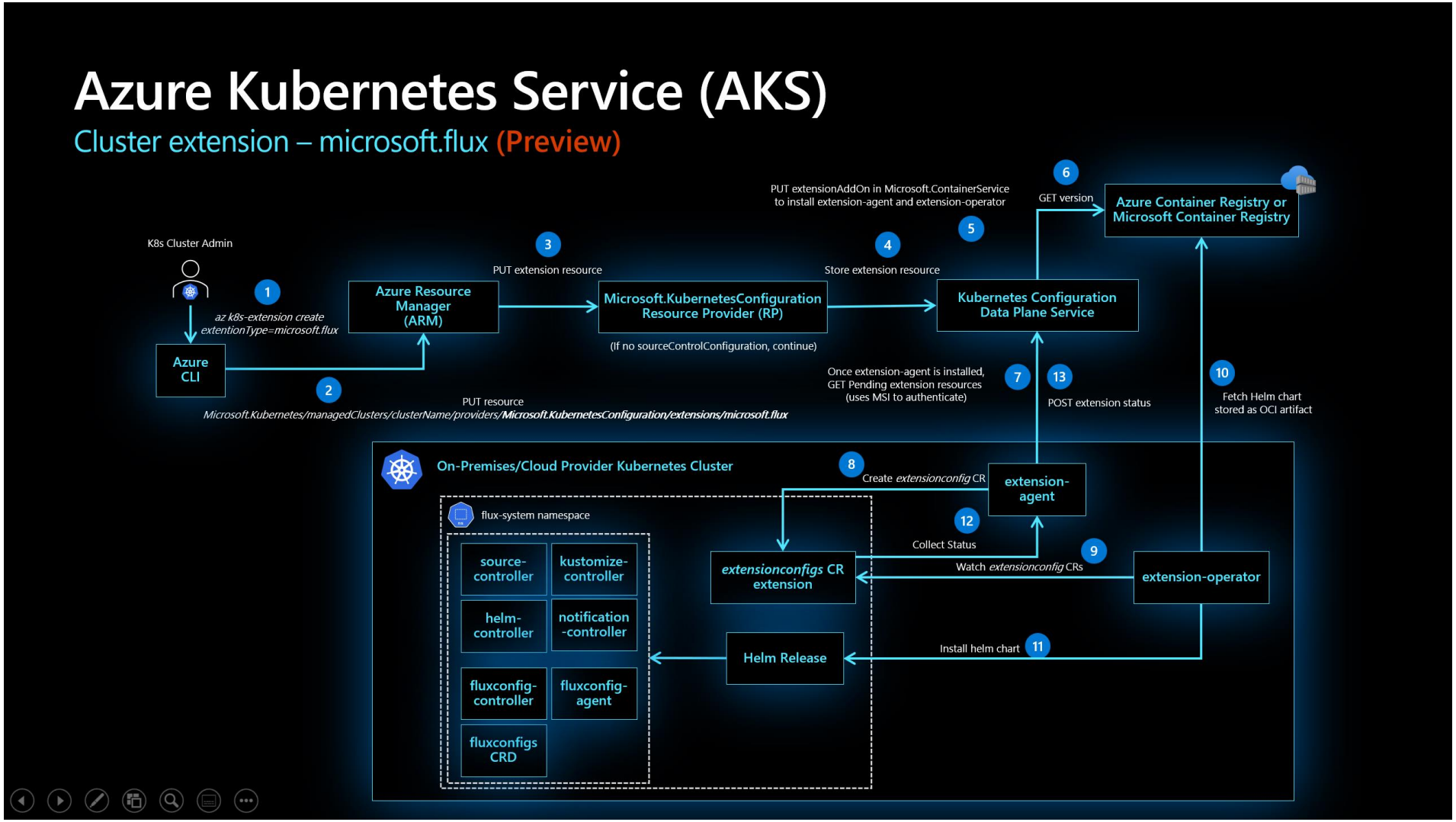
GitOps on Azure

FLUX ON AZURE

Flux on Azure

- Flux v1 is available as AKS addon
- Flux v2 was introduced in Azure Arc-enabled Kubernetes
- since Decembre 2021 public preview in AKS
- enabled as a cluster extension
- cluster extension vs. addon
- can be only used with the Azure Resource Manager
  - Terraform does not support cluster extensions as of now

Flux on Azure



GitOps on Azure

DEMO

Demo

- install & configure Flux extension on an existing AKS cluster
- App deployment with GitOps pattern

FAQ / NETWORKING

Questions?

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twitter.com/whiteduck_gmbh

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