



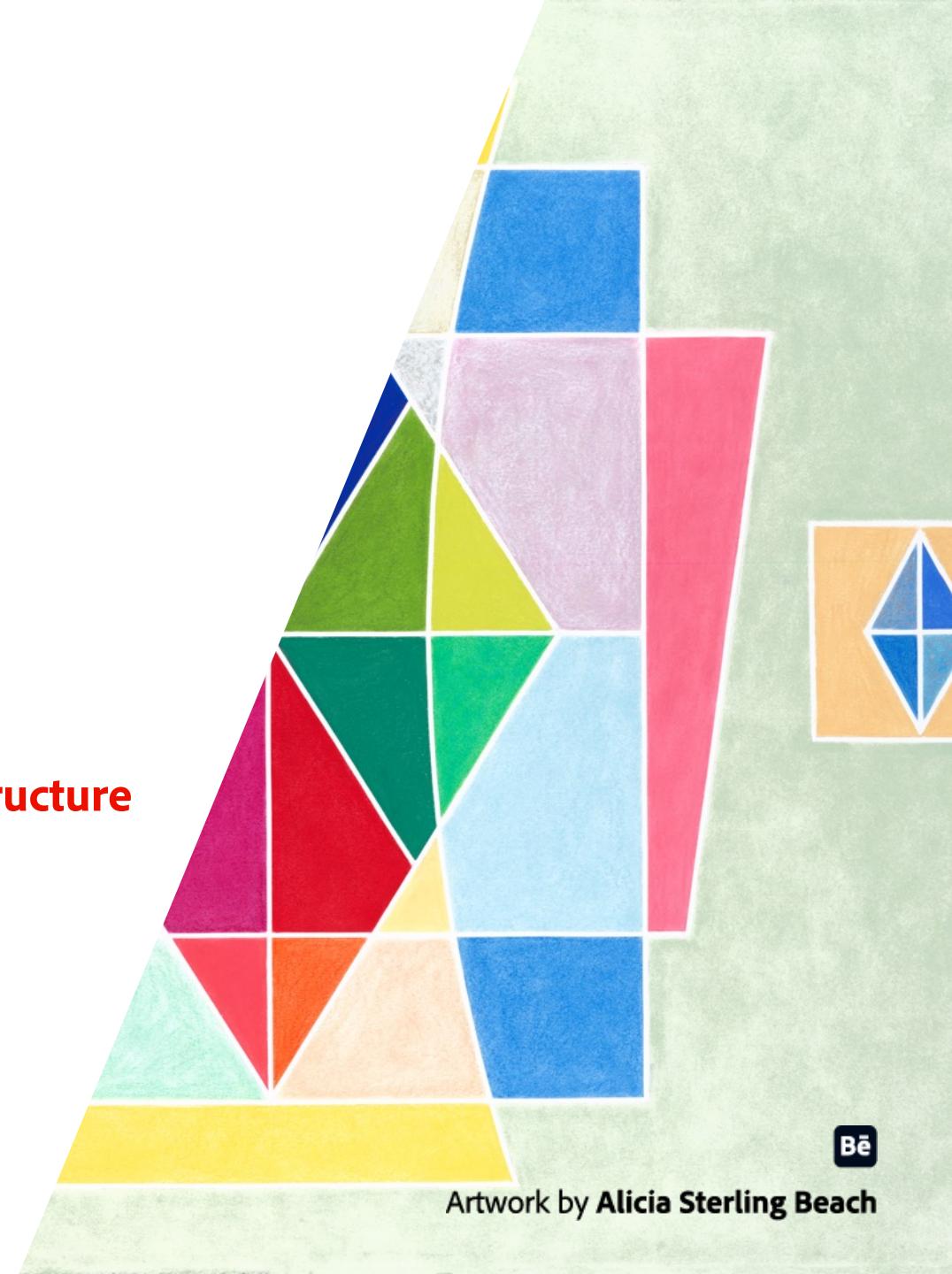
BUILDING FOR THE ROAD AHEAD

# DETROIT 2022



# Multi-Tenancy for Argo Workflows and Argo CD

Srinivas Malladi | Software Engineer - Infrastructure



Artwork by **Alicia Sterling Beach**

# Agenda

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Internal Developer Platform

Terminology

Architecture Overview

Multi-Tenancy

Access

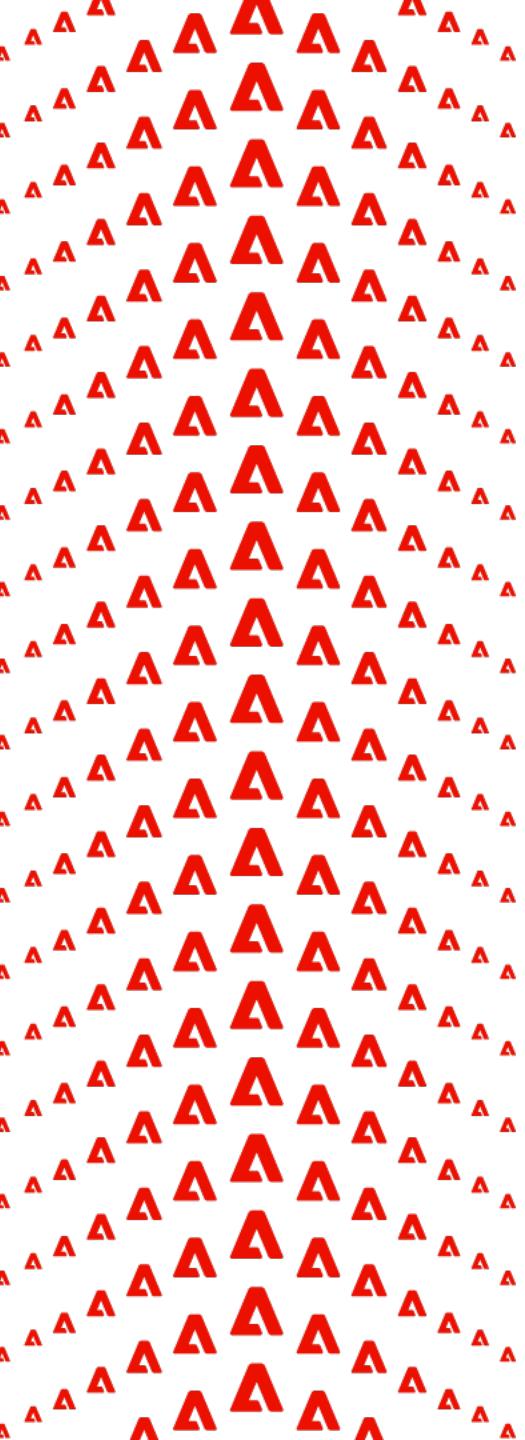
Isolation

Distributed Support

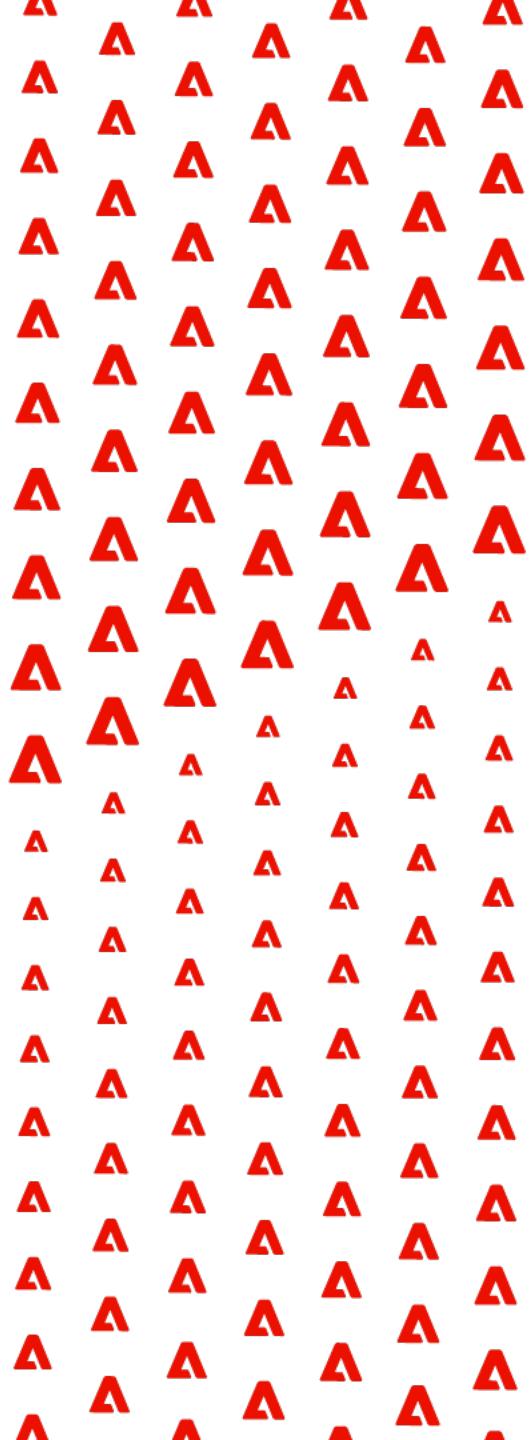
Scaling

Summary

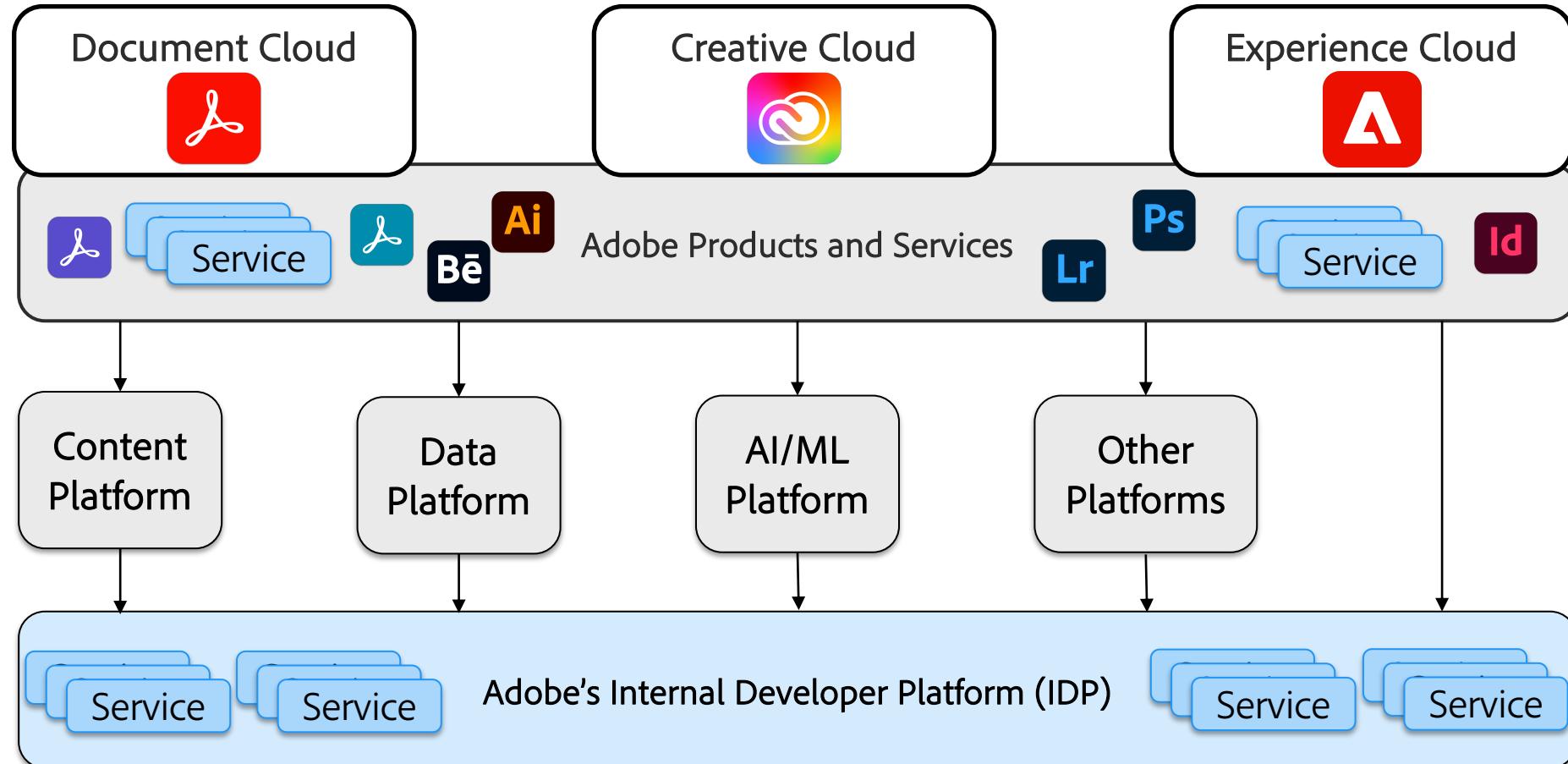
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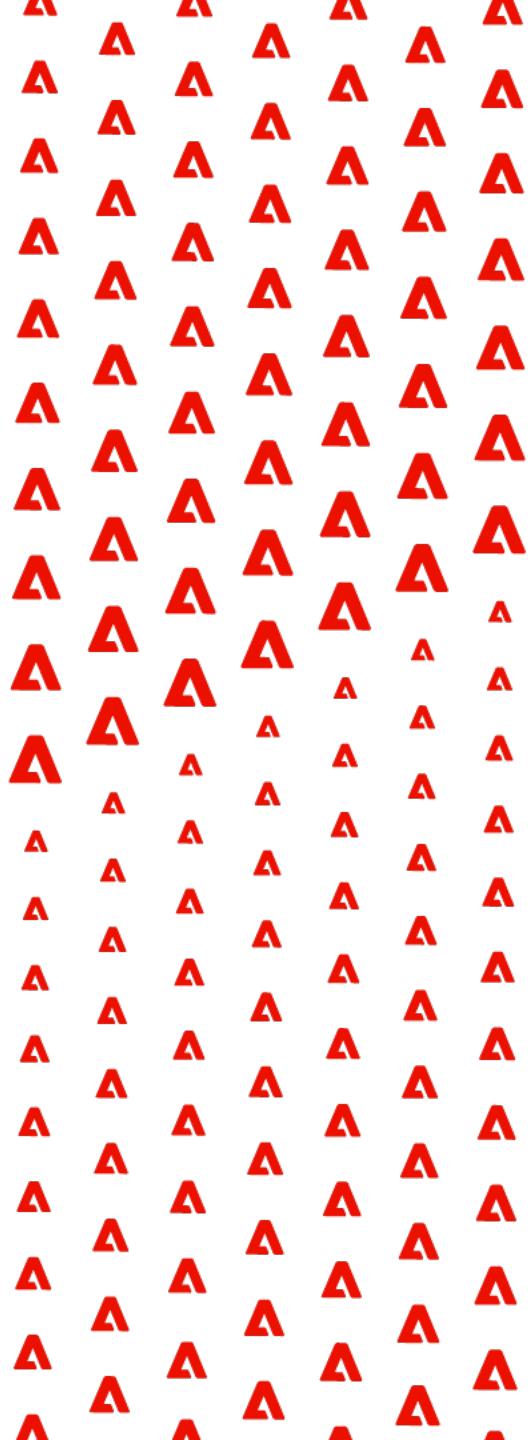
# Internal Developer Platform



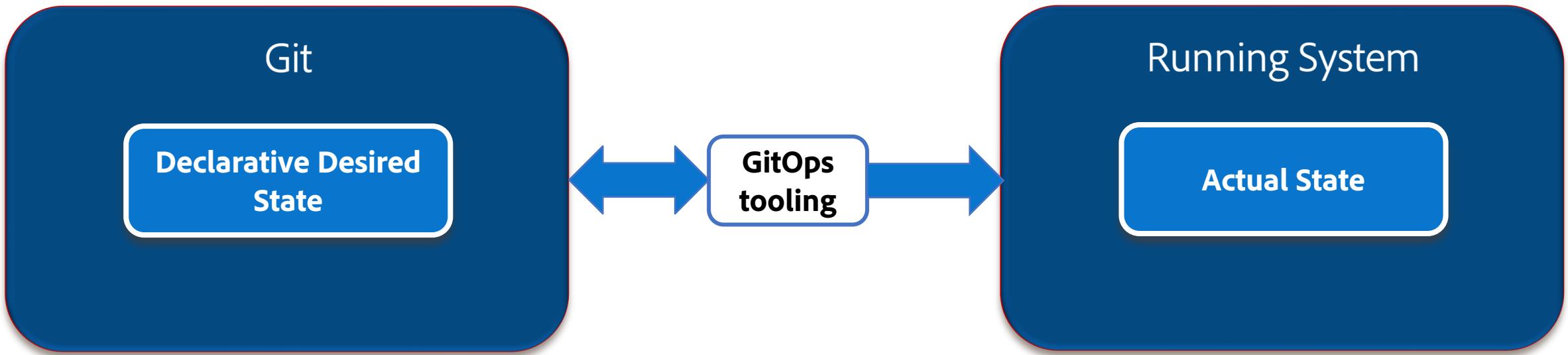
# Internal Developer Platform (IDP) at Adobe



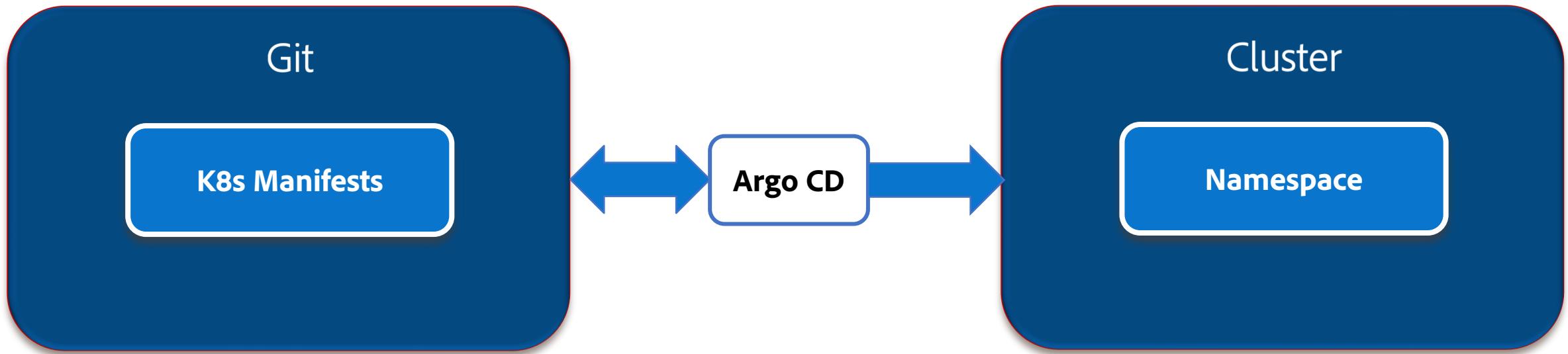
# Terminology



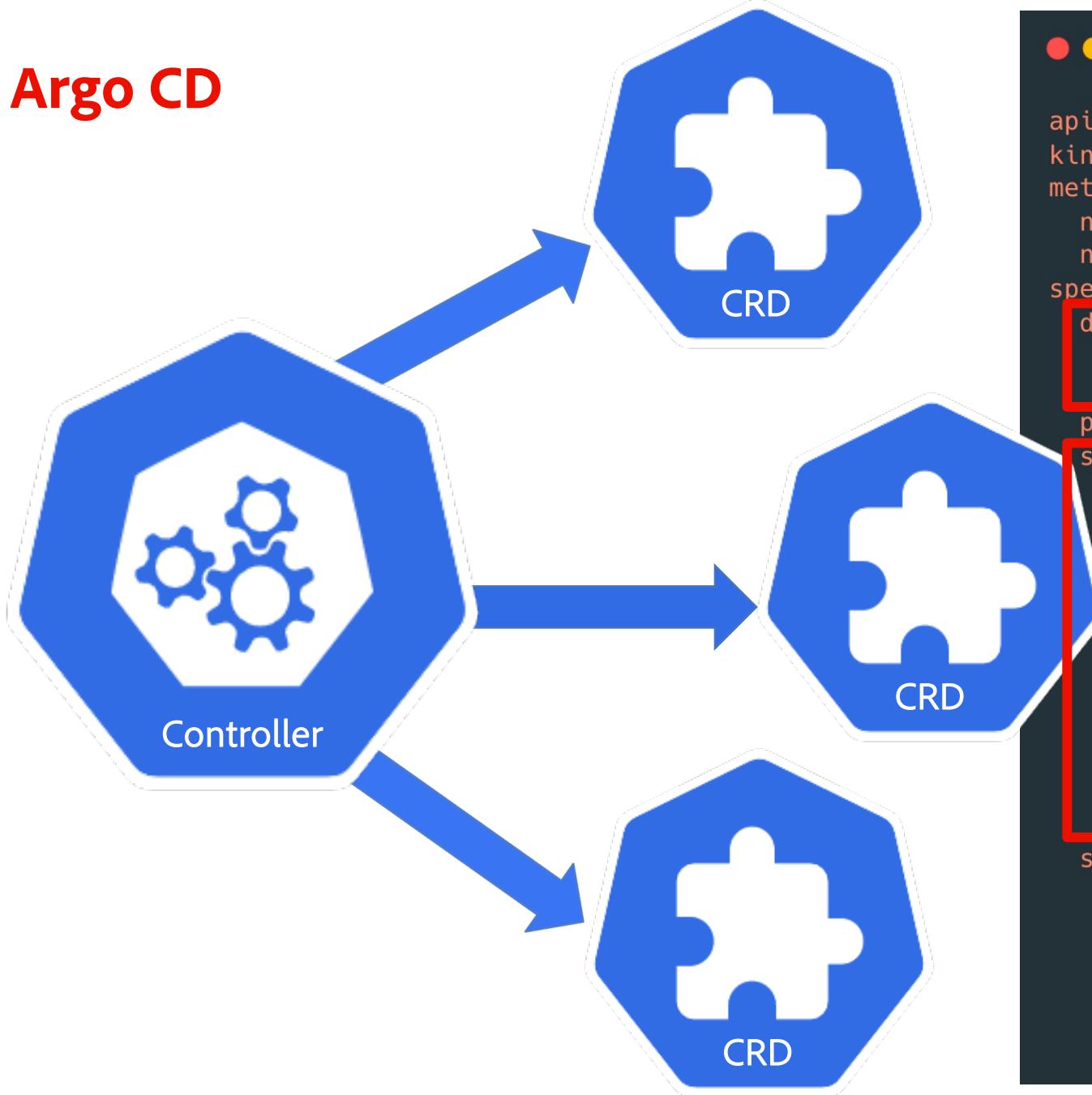
# GitOps



# Argo CD



# Argo CD



```
apiVersion: argoproj.io/v1alpha1
kind: Application
metadata:
  name: my-argocd-application
  namespace: argocd
spec:
  destination:
    namespace: my-remote-namespace
    server: https://<...>.<...>.<...>
  project: my-argocd-project
  source:
    helm:
      ignoreMissingValueFiles: true
      releaseName: app
      skipCrds: true
      valueFiles:
        - ../../values.yaml
        - ./values.yaml
        - values.yaml
      path: k8s/helm/Dev/va6
      repoURL: https://<...>/my-org/my-deploy-repo.git
      targetRevision: main
  syncPolicy:
    automated:
      allowEmpty: true
      prune: true
      selfHeal: true
      retry:
        limit: 5
```

# Argo CD

Applications / Q ethosplayground--malladi-09-19-2022-flex-deploy--ethos-84415385

APPLICATION DETAILS TREE

APP DETAILS

APP DIFF

SYNC

SYNC STATUS

HISTORY AND ROLLBACK

DELETE

REFRESH



Log out

APP HEALTH  
Healthy

CURRENT SYNC STATUS  
Synced

To main (9086d51)

MORE

Author: fetester <fetester@adobe.com> -  
Comment: Updated image tag to 786646b847b2be896b911a270d...

FILTERS

NAME

NAME

KINDS

KINDS

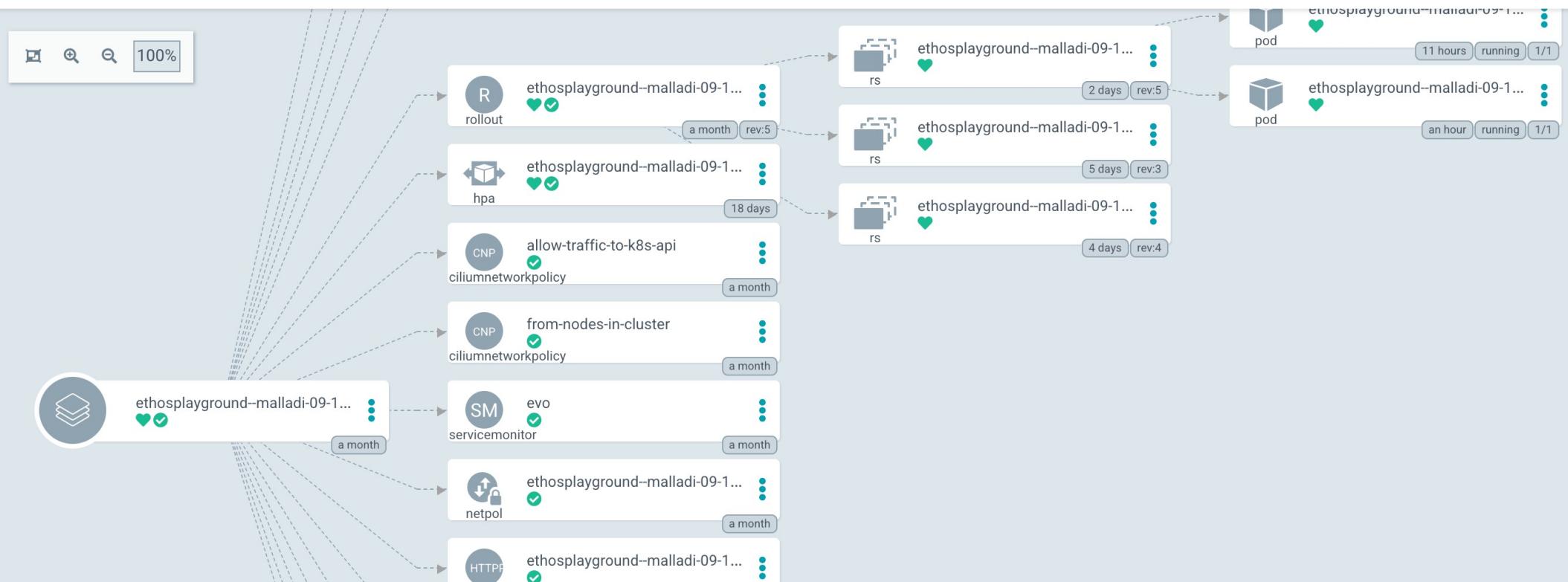
SYNC STATUS

Synced

OutOfSync

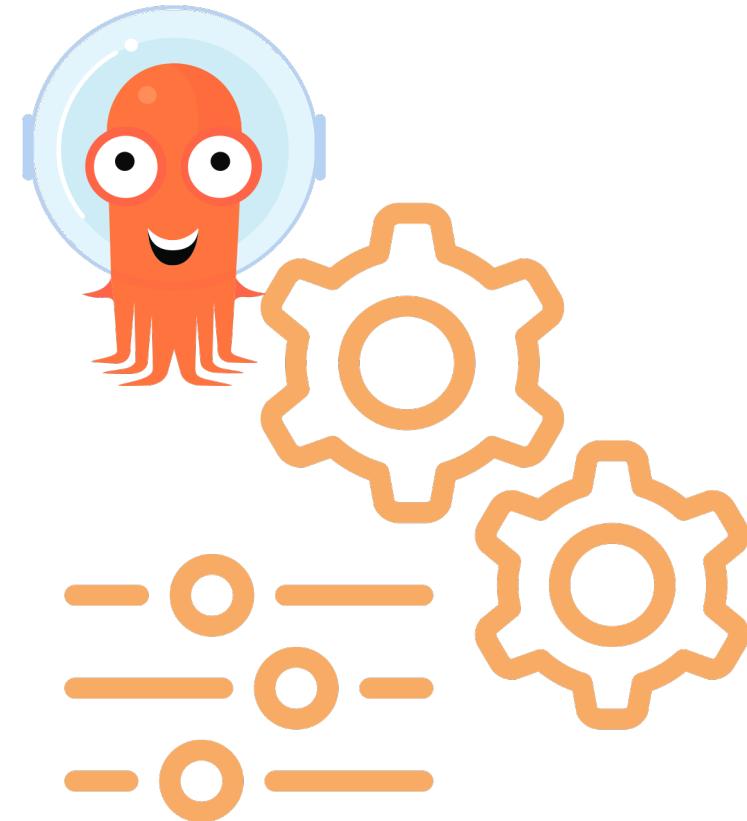
HEALTH STATUS

Healthy

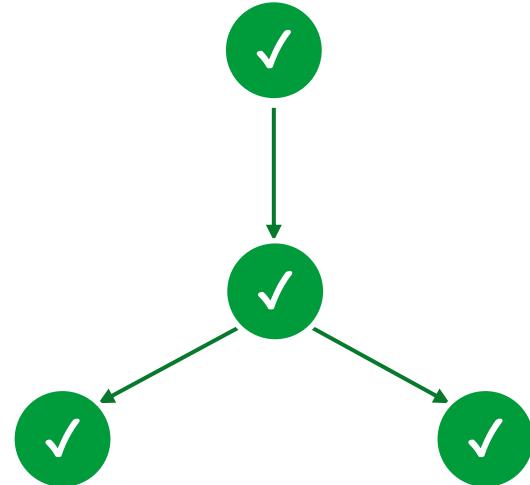


# Argo Workflows

## Workflow Engine

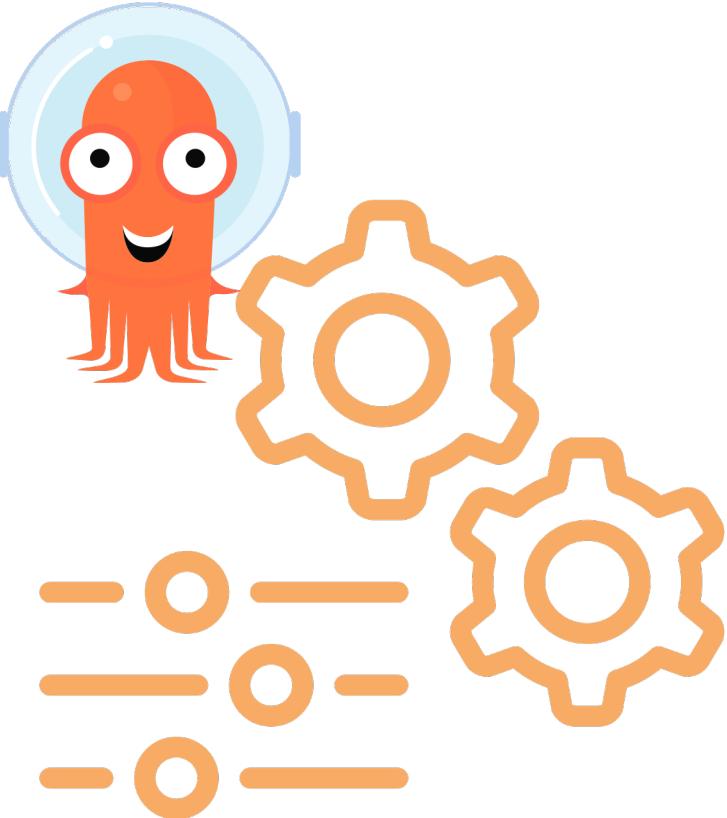


## Workflow Tasks



# Argo Workflows

## Workflow Engine

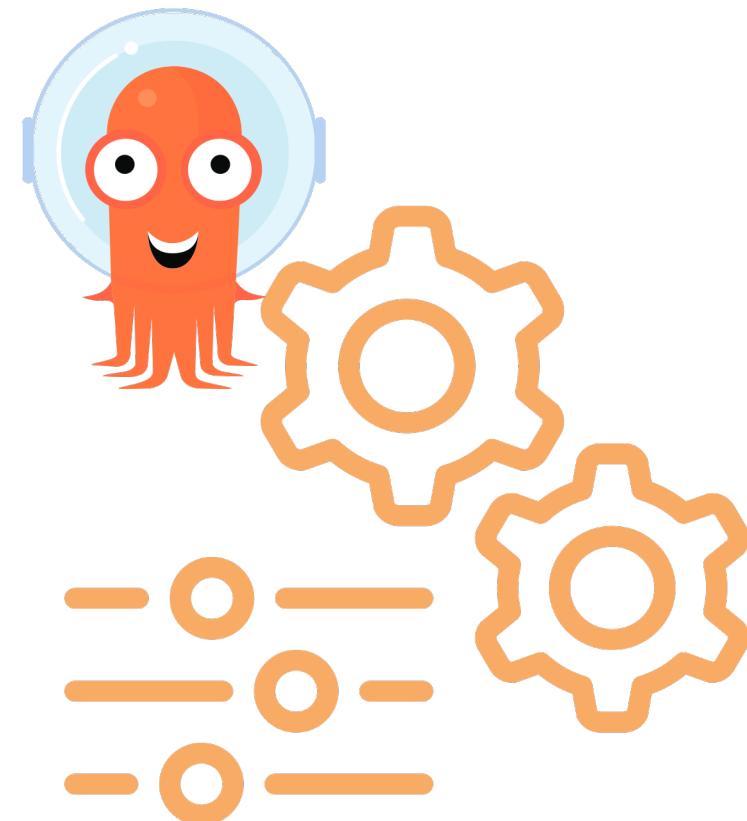


## Workflow

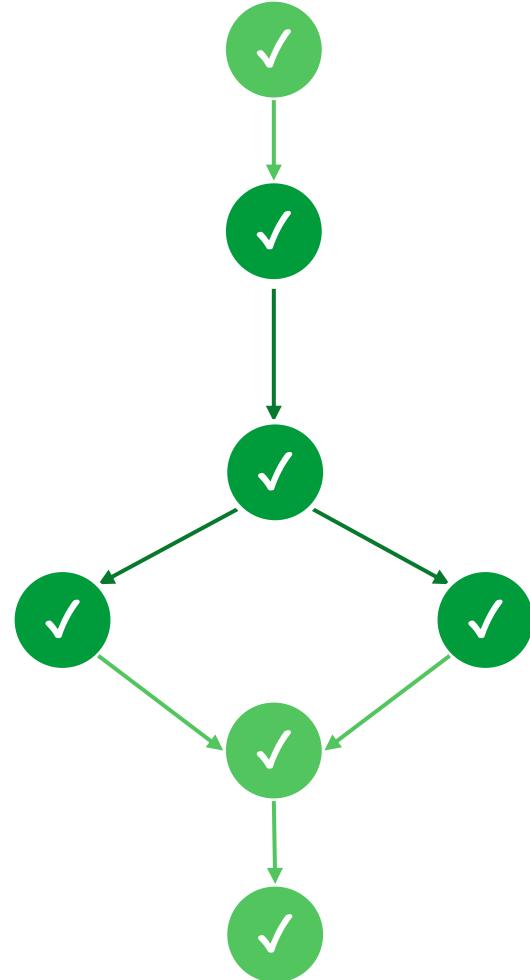
```
# The following workflow executes a diamond workflow
#
#      A
#    / \
#   B   C
#   \ /
#     D
apiVersion: argoproj.io/v1alpha1
kind: Workflow
metadata:
  generateName: dag-diamond-
spec:
  entrypoint: diamond
  templates:
  - name: diamond
    dag:
      tasks:
      - name: A
        template: echo
        arguments:
          parameters: [{name: message, value: A}]
      - name: B
        depends: "A"
        template: echo
        arguments:
          parameters: [{name: message, value: B}]
      - name: C
        depends: "A"
        template: echo
        arguments:
          parameters: [{name: message, value: C}]
      - name: D
        depends: "B && C"
        template: echo
        arguments:
          parameters: [{name: message, value: D}]
    - name: echo
      inputs:
        parameters:
        - name: message
      container:
        image: alpine:3.7
        command: [echo, "{{inputs.parameters.message}}"]
```

# Argo Workflows

## Workflow Engine



## Workflow Tasks

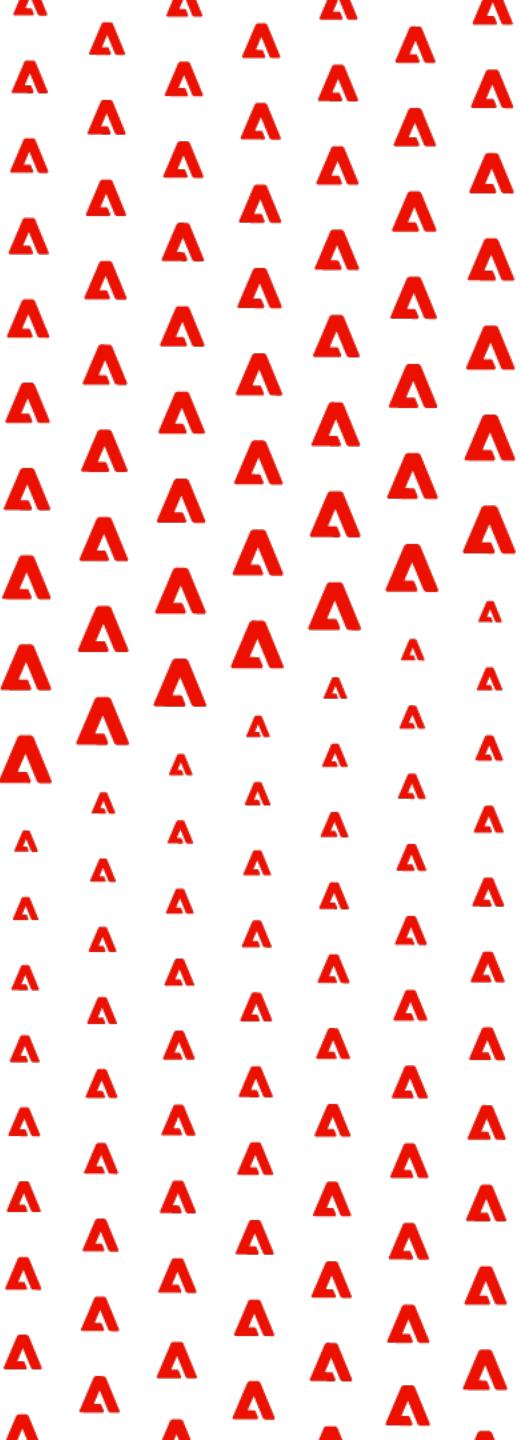


## K8s Native

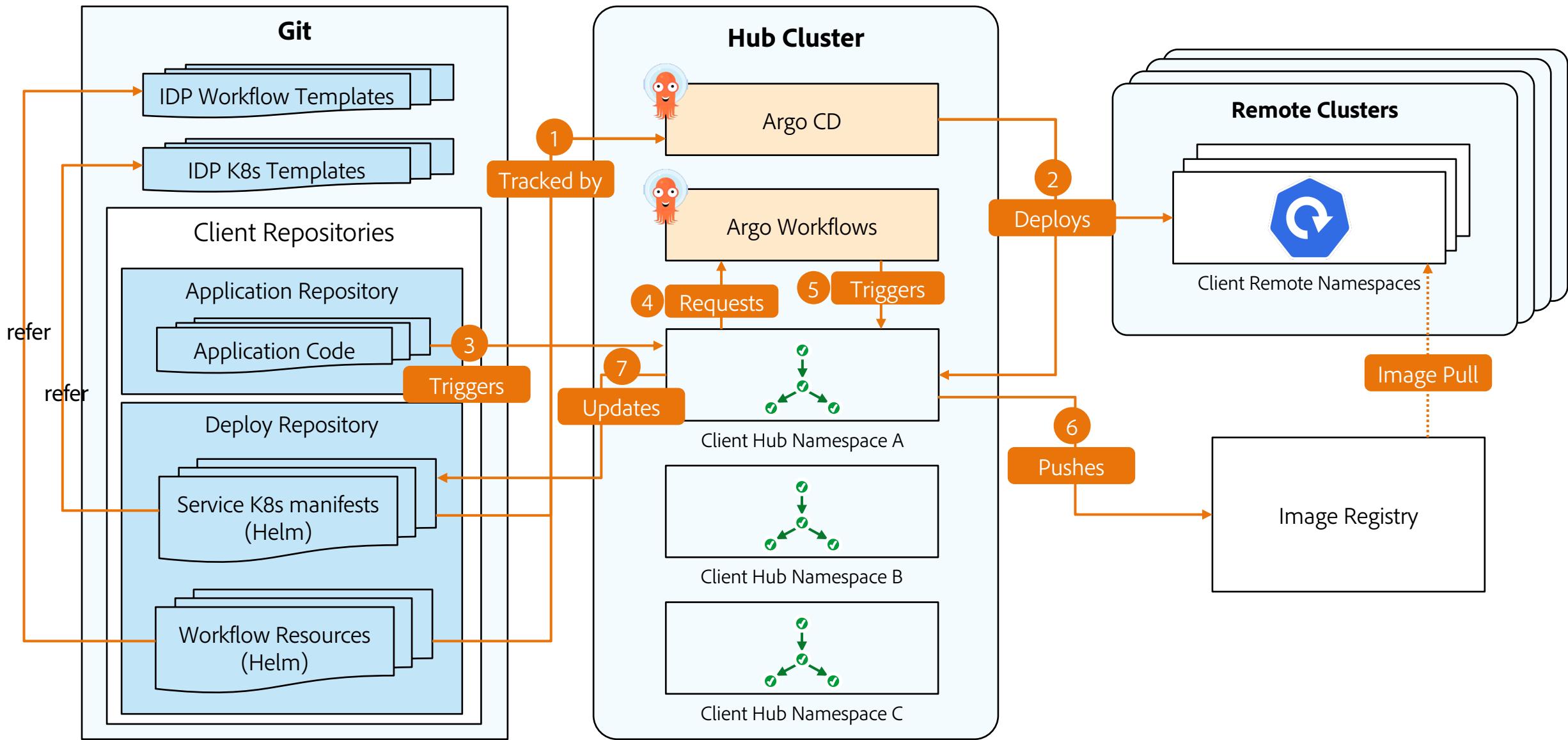


**kubernetes**

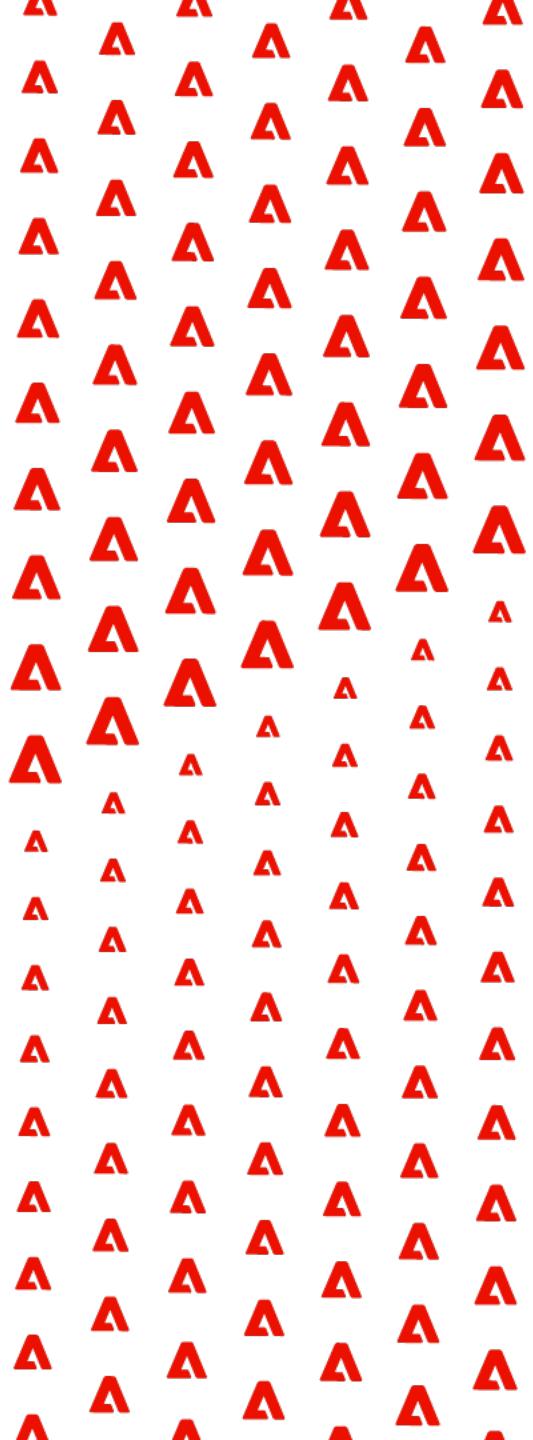
# Architecture Overview



# Walkthrough

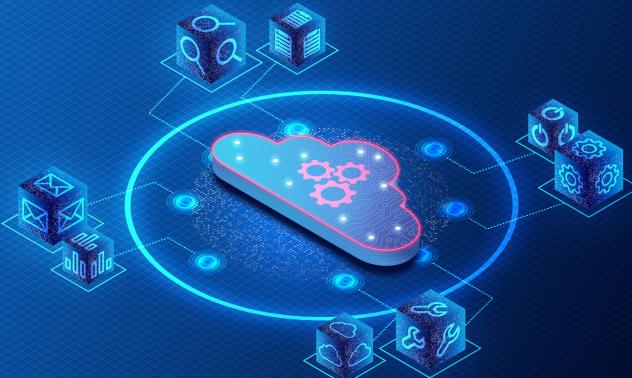


# Multi-Tenancy



# Multi-Tenancy

Many clients, one resource



Saves cloud resources



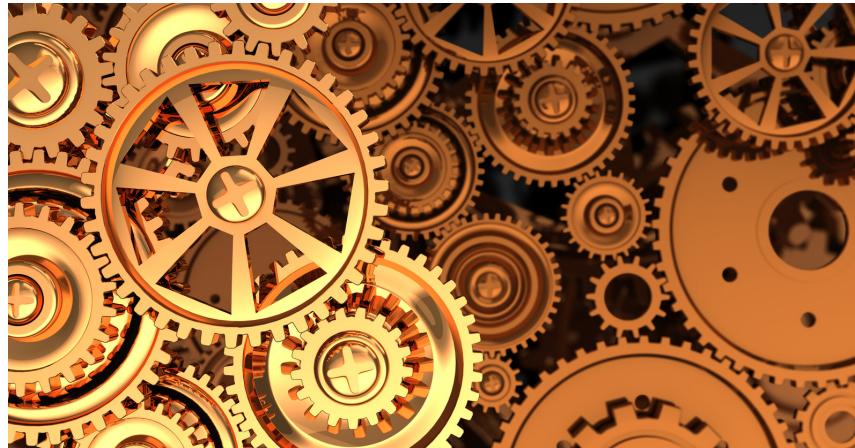
Saves time



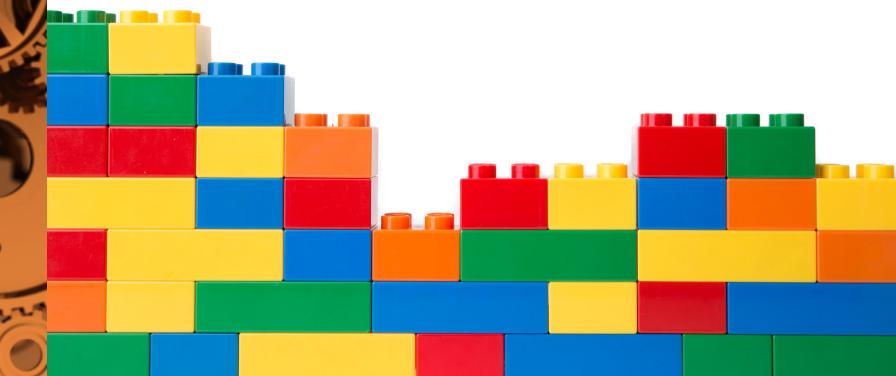
Consolidates best practices



Promotes efficiency



Scales well



# Multi-Tenancy in Argo Workflows and Argo CD

Access



Isolation



Distributed Support



Scaling



Role-Based Access Control  
(RBAC) for Argo Workflows  
and Argo CD

Isolating client *workflows*  
and client *deployments*

Distributing best practices,  
security fixes, upgrades

Preparing for heavy load

# Access – Argo Workflows UI

Workflows / ns-team-ethosplayground--malladi-09-19-2022-flex-depl-469390aa WORKFLOWS

+ SUBMIT NEW WORKFLOW

SEARCH

<input type="checkbox"/>	NAME	NAMESPACE	STARTED	FINISHED	DURATION	PROGRESS	MESSAGE	DETAILS
<input type="checkbox"/>	ethosplayground--malladi-09-19-2022-flex-cl...	ns-team-...	56s ago	-	56s	0/1	-	SHOW ▾
<input type="checkbox"/>	ethosplayground--malladi-09-19-2022-flex-cl...	ns-team-...	1d ago	1d ago	6m	9/9	-	SHOW ▾

NAMESPACE  
ns-team-ethosplaygroup 

LABELS

WORKFLOW TEMPLATE

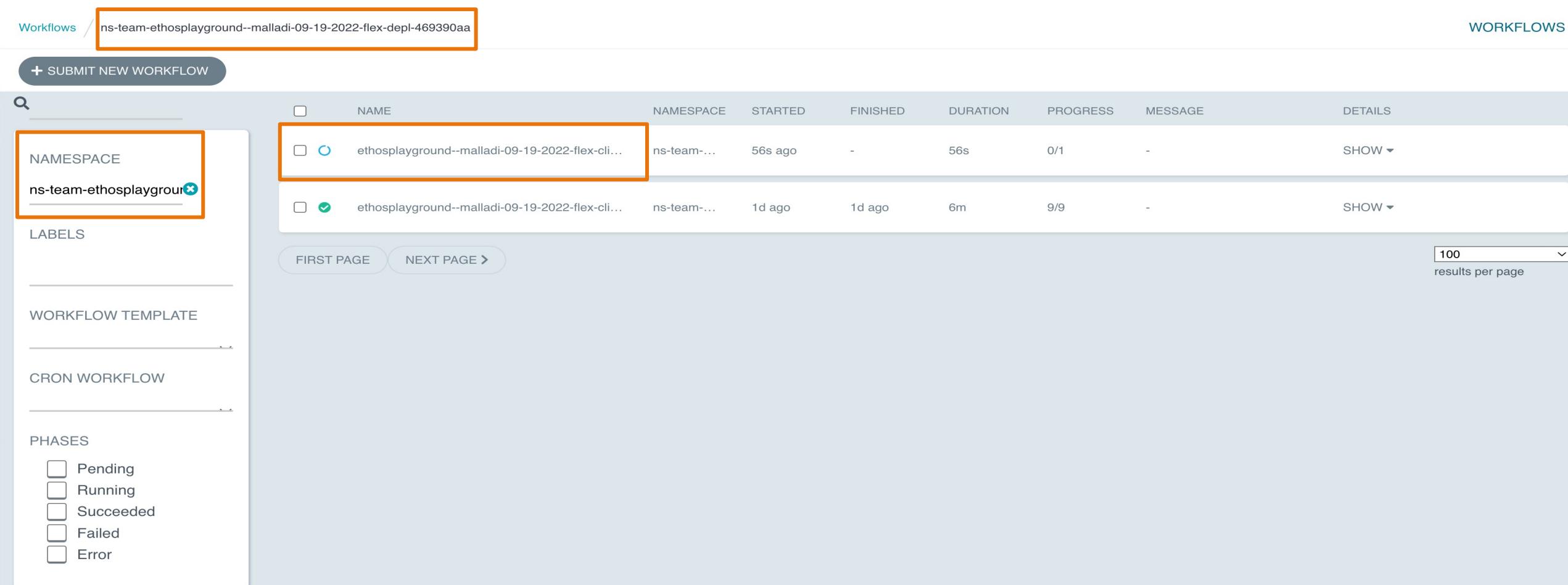
CRON WORKFLOW

PHASES

- Pending
- Running
- Succeeded
- Failed
- Error

FIRST PAGE  NEXT PAGE 

100 results per page



# Access – Argo Workflows UI

Workflows / ns-team-ethosplayground--malladi-09-19-2022-flex-depl-469390aa / ethosplayground--malladi-09-19-2022-flex-client-dockerapp-8zb5v WORKFLOW DETAILS

The screenshot shows the Argo Workflows UI interface. On the left, a workflow graph is displayed with various tasks: pre-deploy-validation, build-scan-push, git-clone-build, image-scan-trivy, image-push, deploy-all, deploy-env-Dev, deploy-wait-Dev-va6, promote-to-env-Dev-va6, and argocd-sync-and-wait-Dev-va6. The 'git-clone-build' task is highlighted with an orange box and an orange arrow points from it to the 'MAIN LOGS' tab on the right. The top navigation bar includes buttons for RESUBMIT, DELETE, LOGS, and SHARE, which are also highlighted with an orange box. The right side of the screen shows the 'WORKFLOW DETAILS' panel with fields for NAME, TYPE, POD NAME, HOST NODE NAME, PHASE, START TIME, END TIME, DURATION, PROGRESS, MEMOIZATION, RESOURCES, and DURATION. The 'MAIN LOGS' tab is also highlighted with an orange box.

ethosplayground--malladi-09-19-2022-flex-client-dockerapp-8zb5v

RESUBMIT DELETE LOGS SHARE

Search

ethosplaygro...ckerapp-8zb5v

pre-deploy-validation

build-scan-push

git-clone-build

image-scan-trivy

image-push

deploy-all

deploy-env-Dev

deploy-wait-Dev-va6

promote-to-env-Dev-va6

argocd-sync-and-wait-Dev-va6

ethosplayground--malladi-09-19-2022-flex-client-dockerapp-8zb5v.build-scan-push.git-clone-build

Pod

ethosplayground--malladi-09-19-2022-flex-client-dockerapp-8zb5v-33634645

Succeeded

3d ago

3d ago

1m

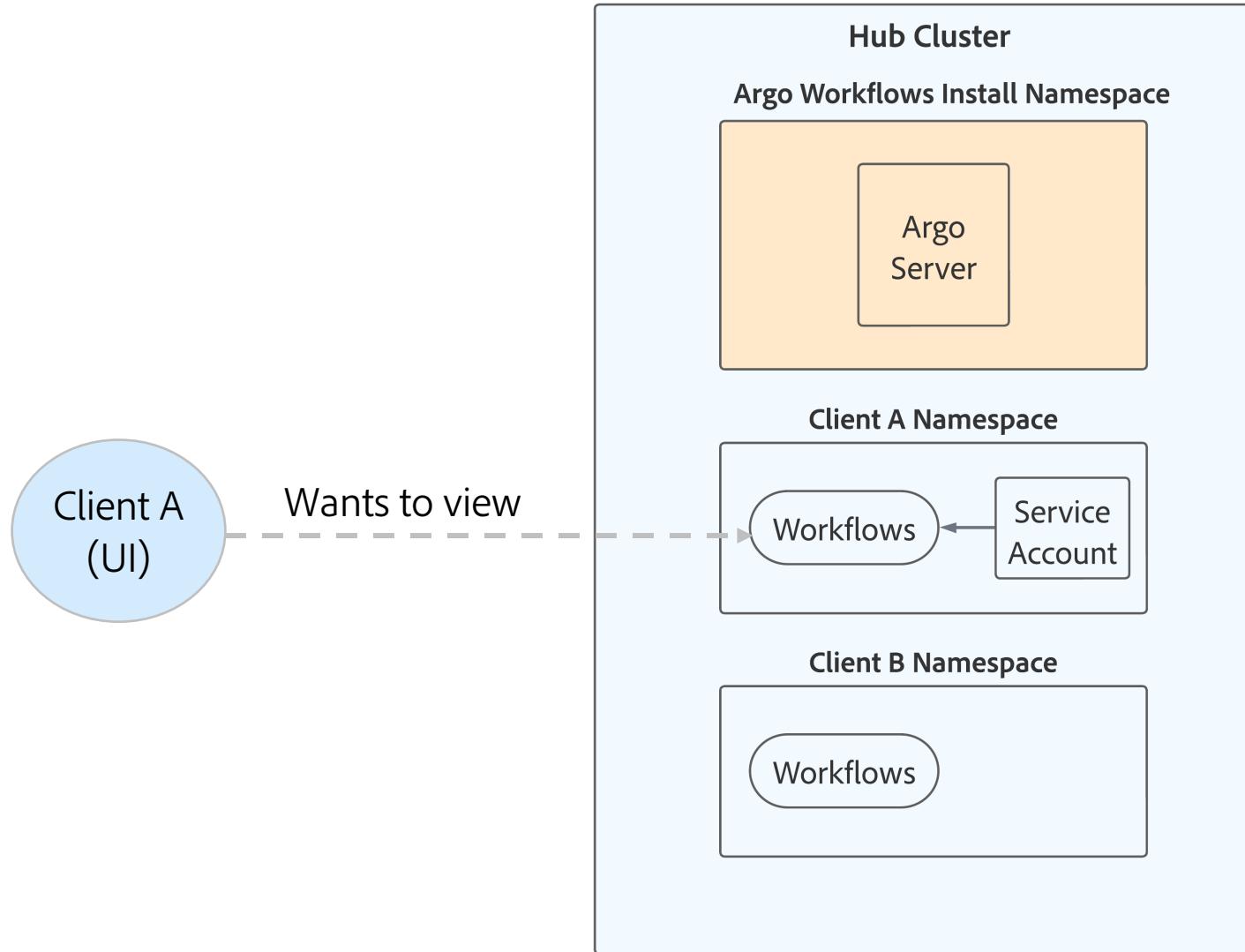
1/1

N/A

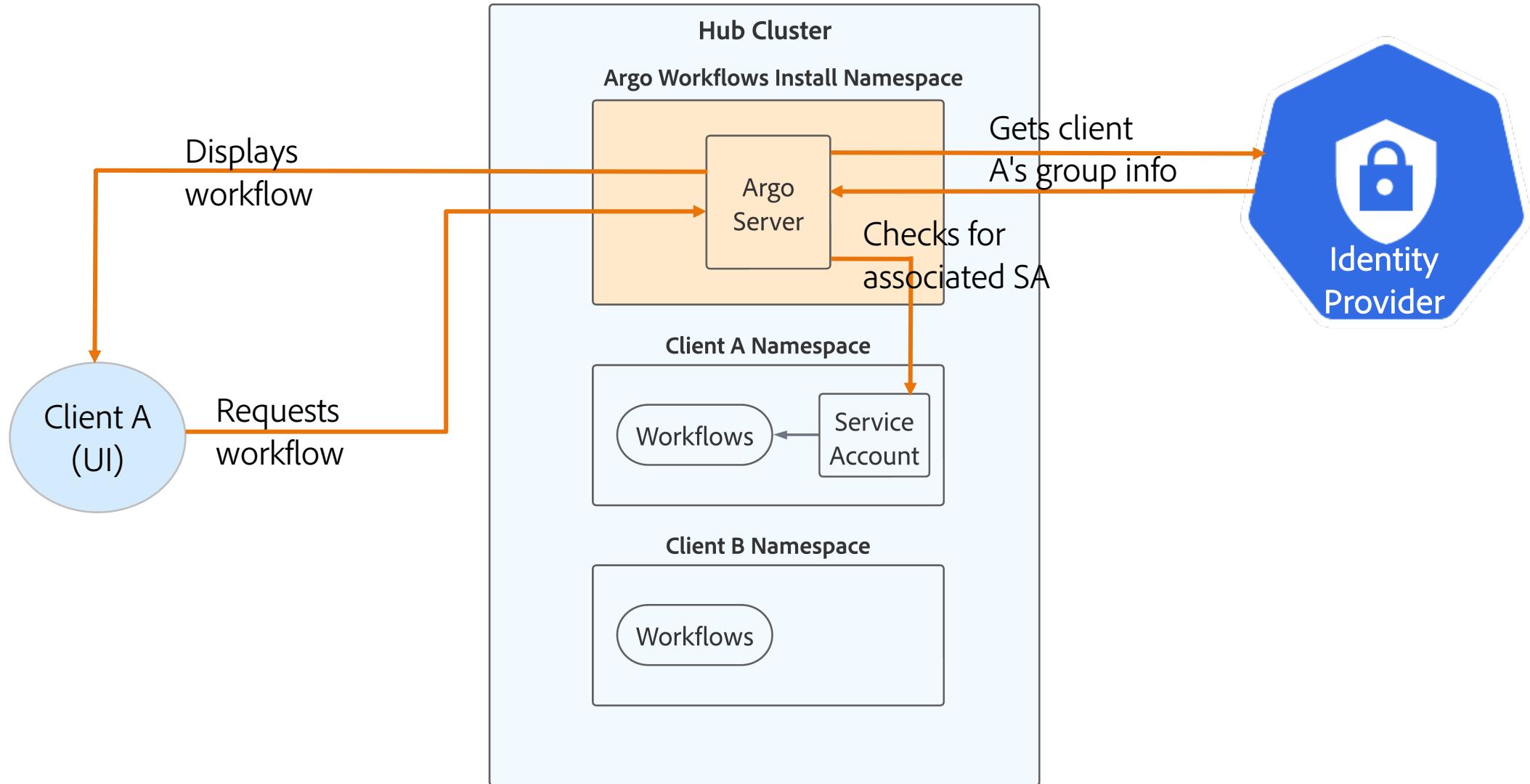
5m\*(1 cpu),1h\*(100Mi memory)

MANIFEST MAIN LOGS EVENTS

# Access - Argo Workflows UI



# Access - Argo Workflows UI

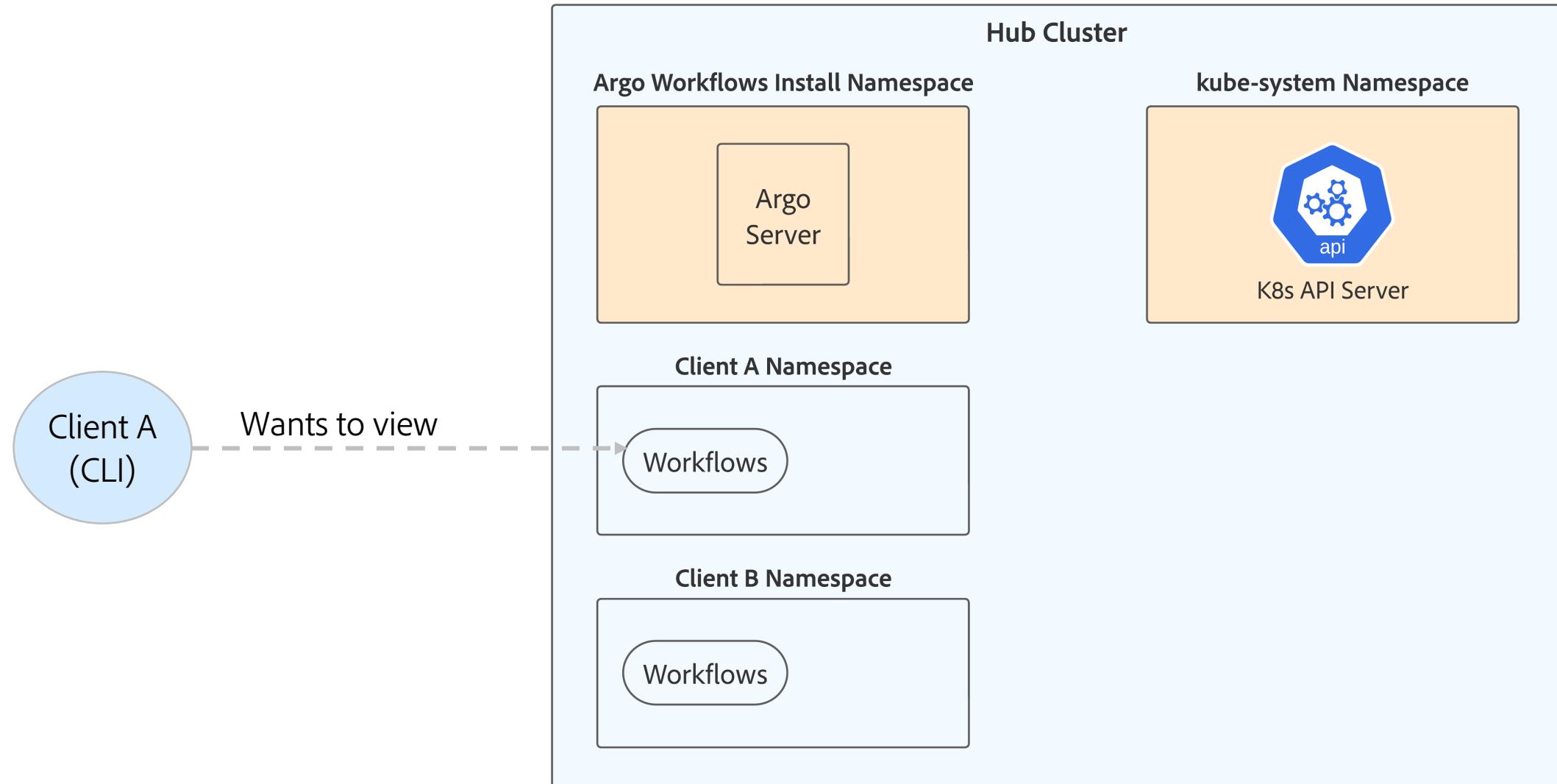


# Access - Argo Workflows UI

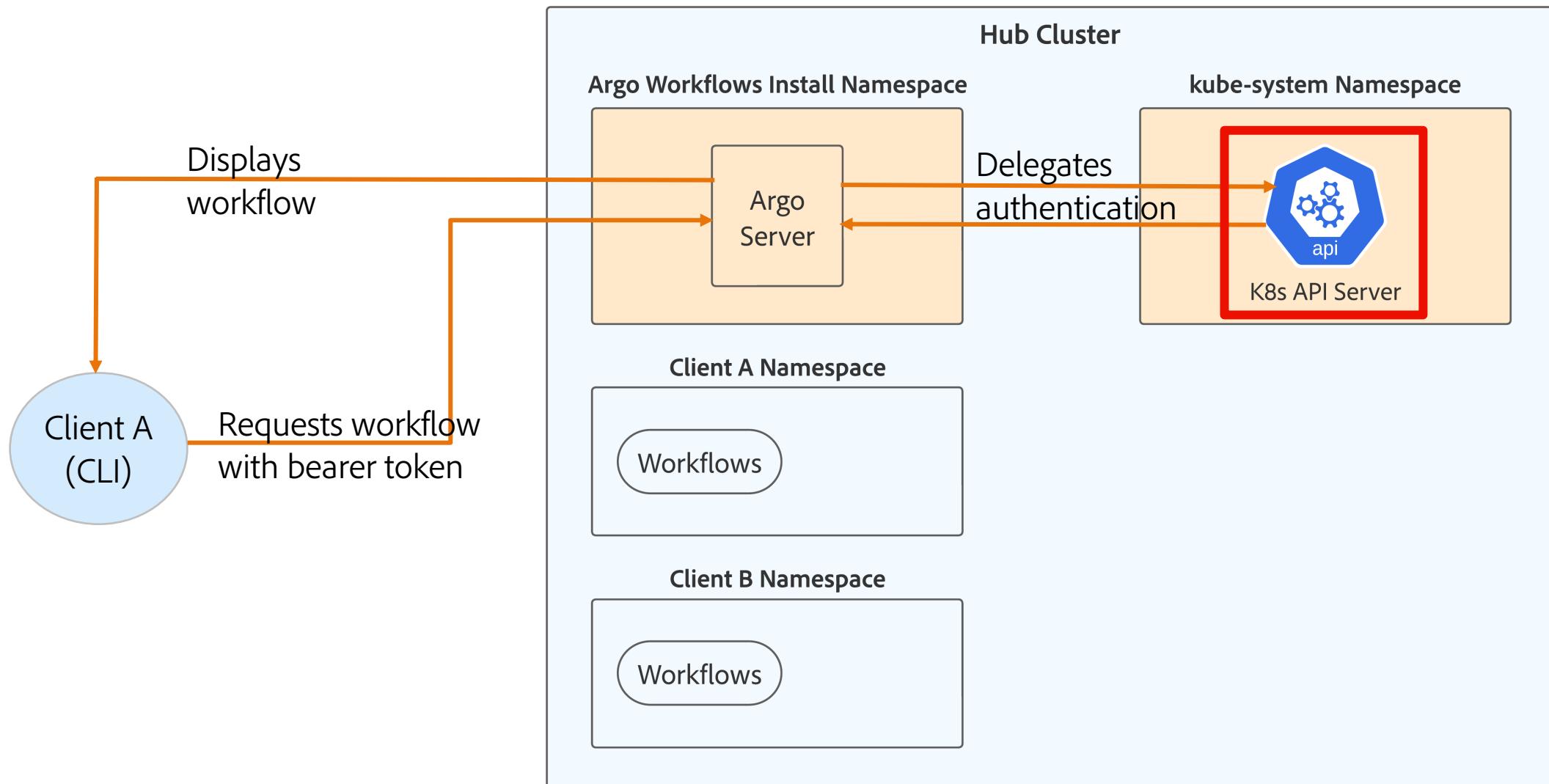
The screenshot shows a ServiceAccount configuration in a dark-themed interface. At the top, there's a header with three colored dots (red, yellow, green) and a title "Hub Cluster" above "Argo Workflows Install Namespace". Below the configuration, there's a large red rectangular box highlighting specific annotations in the code.

```
apiVersion: v1
kind: ServiceAccount
metadata:
  annotations:
    workflows.argoproj.io/rbac-rule: 'any( ["GROUP_A"], {# in groups})'
    workflows.argoproj.io/rbac-rule-precedence: '2'
  name: client-a-namespace-access-sa
  namespace: client-a-namespace
```

# Access - Argo Workflows CLI



# Access - Argo Workflows CLI



# Access - Argo Workflows CLI



```
~ $argo list -n ns-team-ethosplayground--malladi-09-19-2022-flex-depl-469390aa
```

NAME	STATUS	AGE	DURATION
PRIORITY			
ethosplayground--malladi-09-19-2022-flex-client-dockerapp-8zb5v	Succeeded	2d	6m
intentional-fail-vbm7n	Failed	2d	10s
ethosplayground--malladi-09-19-2022-flex-client-dockerapp-c9lzs	Succeeded	4d	5m
ethosplayground--malladi-09-19-2022-flex-client-dockerapp-smhwt	Failed	4d	3m

(CLI)

with bearer token

( Workflows )



```
~ $argo list -n default
```

```
FATA[2022-10-17T04:19:29.534Z] rpc error: code = PermissionDenied desc = workflows.argoproj.io
is forbidden: User <...> cannot list resource "workflows" in API group "argoproj.io" in the
namespace "default"
```

# Access - Argo CD

## Applications

APPLICATIONS

+ NEW APP   SYNC APPS   REFRESH APPS   Search applications...   /  

FILTERS

FAVORITES ONLY

SYNC STATUS

Category	Count
Unknown	0
Synced	2
OutOfSync	0

HEALTH STATUS

Category	Count
Unknown	0
Progressing	0
Suspended	0

**ethosplayground--malladi-09-19-2022-flex-deploy** ★

Project: ethosplayground--malladi-09-19-2022-flex-deploy...

Labels: chart-path=argo, cluster=ethos999-prod-or2, io....

Status: Healthy Synced

Repository: <https://git.corp.adobe.com/EthosPlayGround/m...>

Target Revi... main

Path: argo

Destination: in-cluster

Namespace: ns-team-ethosplayground--malladi-09-19-2022-fl...

SYNC REFRESH DELETE

**ethosplayground--malladi-09-19-2022-flex-deploy** ★

Project: ethosplayground--malladi-09-19-2022-flex-deploy...

Labels: chart-path=k8s\_helm\_Dev\_va6, cluster=ethos11...

Status: Healthy Synced

Repository: <https://git.corp.adobe.com/EthosPlayGround/m...>

Target Revi... main

Path: k8s/helm/Dev/va6

Destination: ethos11-stage-va6

Namespace: ns-team-ethosplayground--malladi-09-19-2022-fl...

SYNC REFRESH DELETE

# Access - Argo CD

Applications / Q ethosplayground--malladi-09-19-2022-flex-deploy--ethos-84415385 APPLICATION DETAILS TREE

**APP DETAILS** **APP DIFF** **SYNC** **SYNC STATUS** **HISTORY AND ROLLBACK** **X DELETE** **REFRESH** Log out

**APP HEALTH** **?** **Healthy** **CURRENT SYNC STATUS** **?** **Synced** **MORE** **To main (9086d51)**

Author: ftester <ftester@adobe.com> - Comment: Updated image tag to 786646b847b2be896b911a270d...

**FILTERS**

**NAME**

**KINDS**

**SYNC STATUS**

Synced

OutOfSync

**HEALTH STATUS**

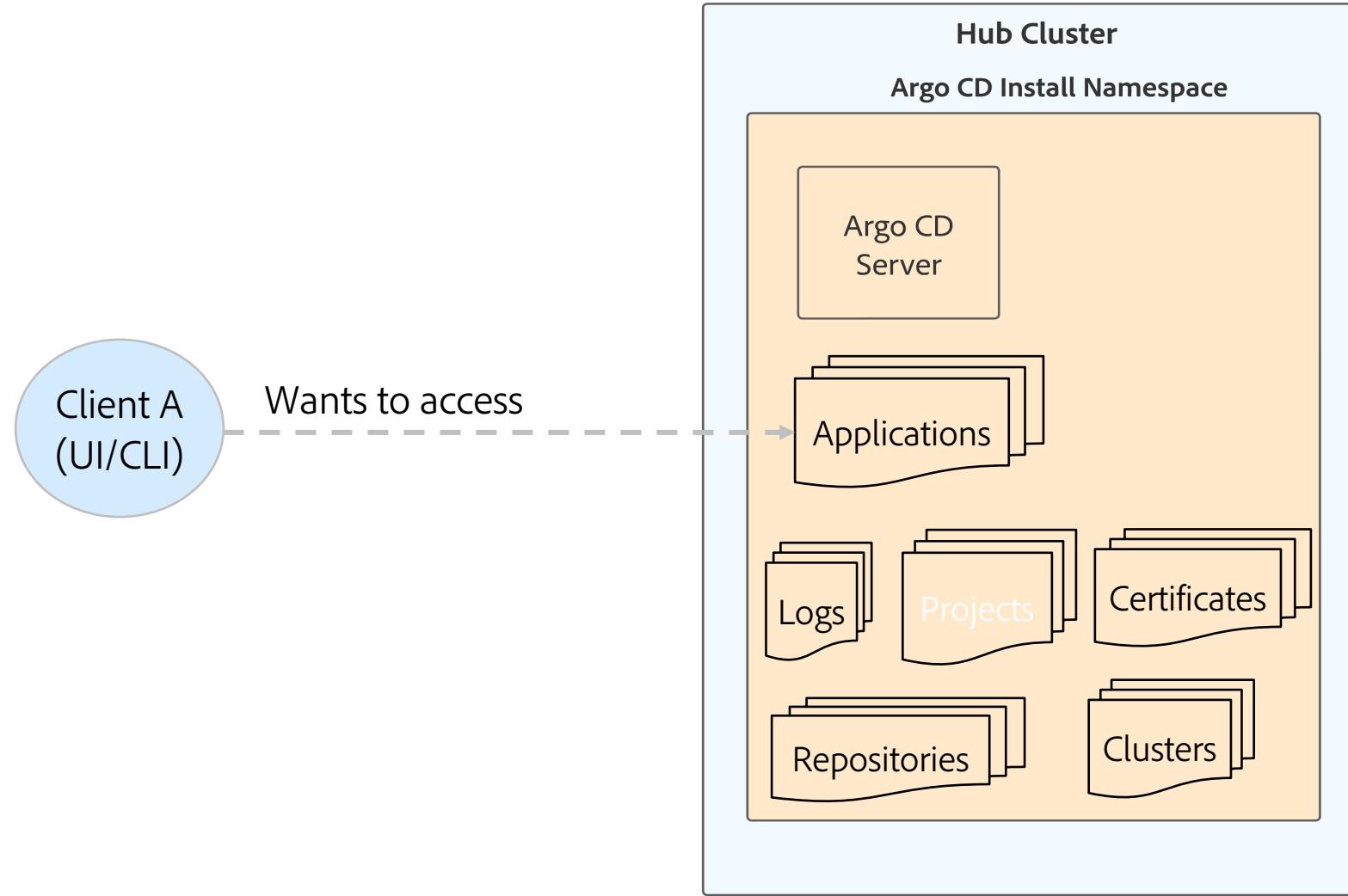
Healthy

The diagram illustrates the sync status of various Kubernetes resources under the application 'ethosplayground--malladi-09-19-2022-flex-deploy--ethos-84415385'. The resources are categorized by their kind:

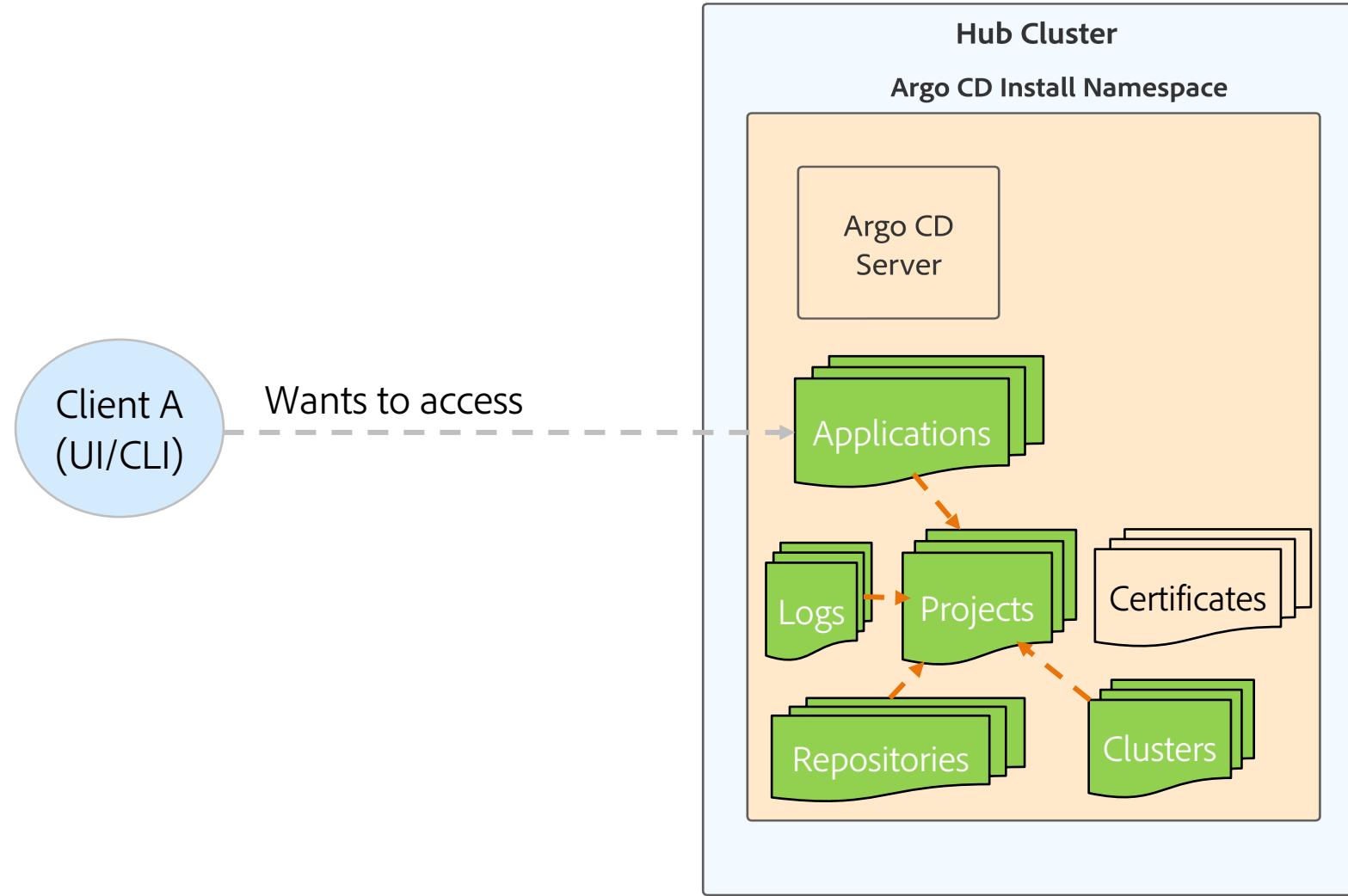
- rollout**: ethosplayground-malladi-09-1... (Synced, a month ago, rev:5)
- hpa**: ethosplayground-malladi-09-1... (Synced, 18 days ago)
- CNP**: allow-traffic-to-k8s-api (Synced, a month ago), ciliumnetworkpolicy (Synced, a month ago)
- CNP**: from-nodes-in-cluster (Synced, a month ago), ciliumnetworkpolicy (Synced, a month ago)
- evo**: evo (Synced, a month ago), servicemonitor (Synced, a month ago)
- netpol**: ethosplayground-malladi-09-1... (Synced, a month ago)
- HTTP**: ethosplayground-malladi-09-1... (Synced, a month ago)

Each resource is shown with its current sync status (Synced) and the last sync time. The diagram also shows the relationship between the main application and its components.

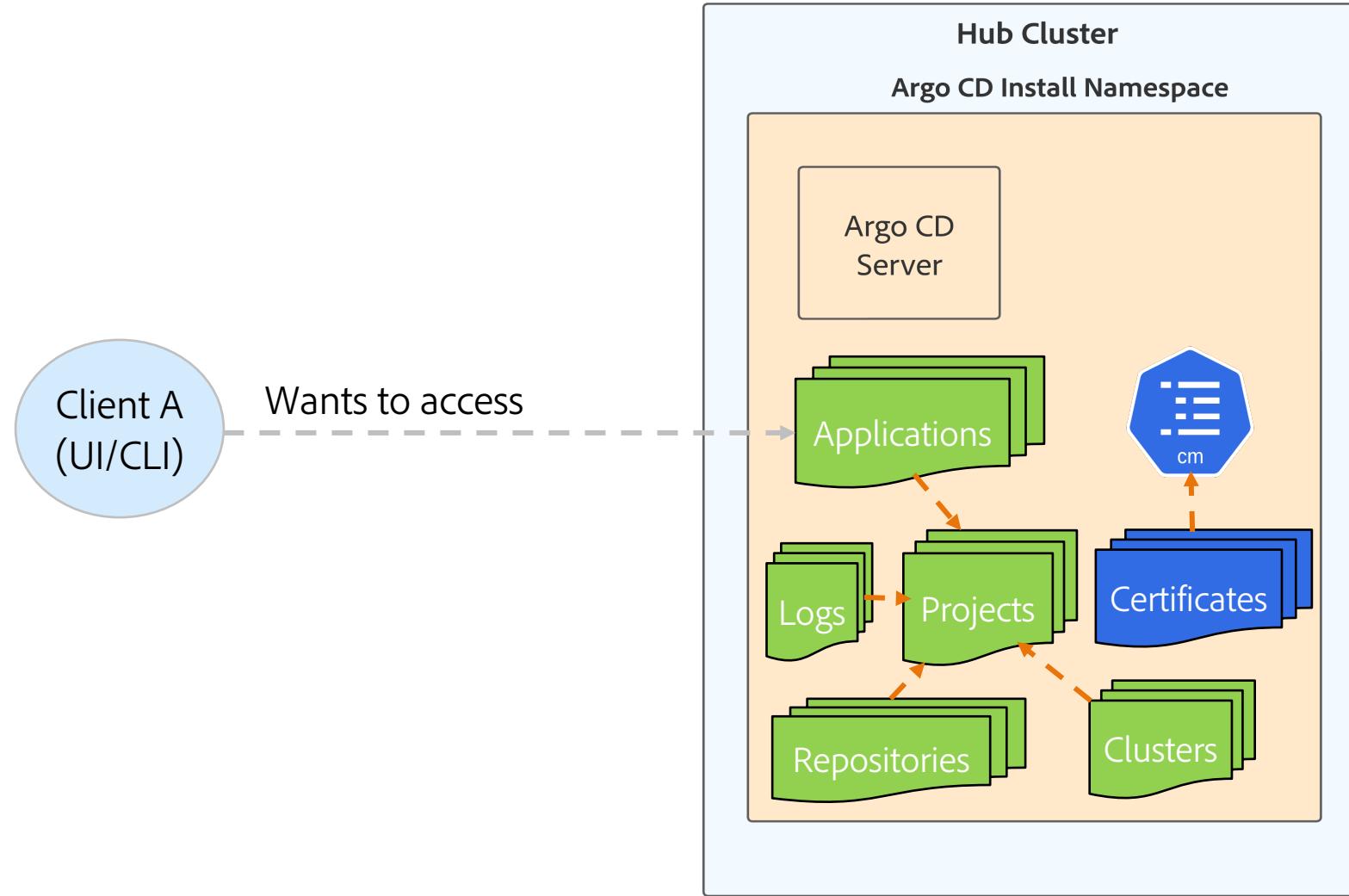
# Access - Argo CD



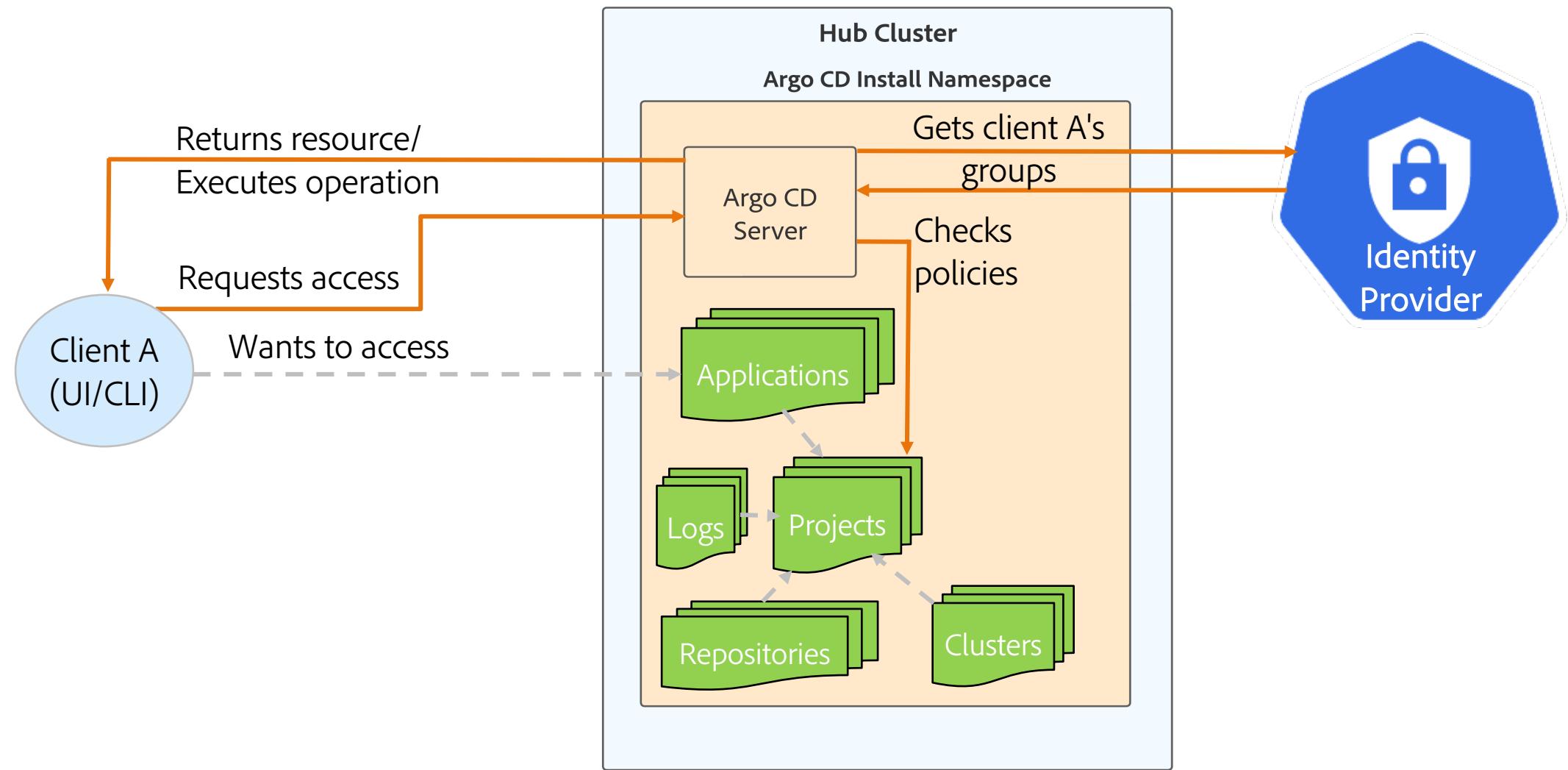
# Access - Argo CD



# Access - Argo CD



# Access - Argo CD



# Access - Argo CD

```
● ● ●  
  
apiVersion: argoproj.io/v1alpha1  
kind: AppProject  
metadata:  
  name: my-project  
  namespace: argocd  
spec:  
  description: My App Project  
  roles:  
    - description: Read and sync privileges over this project's apps  
      groups:  
        - GRP-FE-TEST  
      name: project-deployer-role  
  policies:  
    - p, proj:my-project:project-deployer-role, applications, get, my-project/*, allow  
    - p, proj:my-project:project-deployer-role, applications, sync, my-project/*, allow
```

# Access - Argo CD

-09-19-2022-flex-deploy--appro-42fb227e

**DELETE**

SUMMARY	ROLES	WINDOWS
NAME	DESCRIPTION	
project-automation-role	Sync/read privileges over this project's apps in ArgoCD	
project-admin-role	Admin privileges over this project's apps for ArgoCD UI SSO client access	
project-deployer-role	Read and sync privileges over this project's apps for ArgoCD UI SSO client access	

CANCEL UPDATE DELETE X

Role Name  
project-deployer-role

Role Description  
Read and sync privileges over this project's apps for ArgoCD UI SSO client access

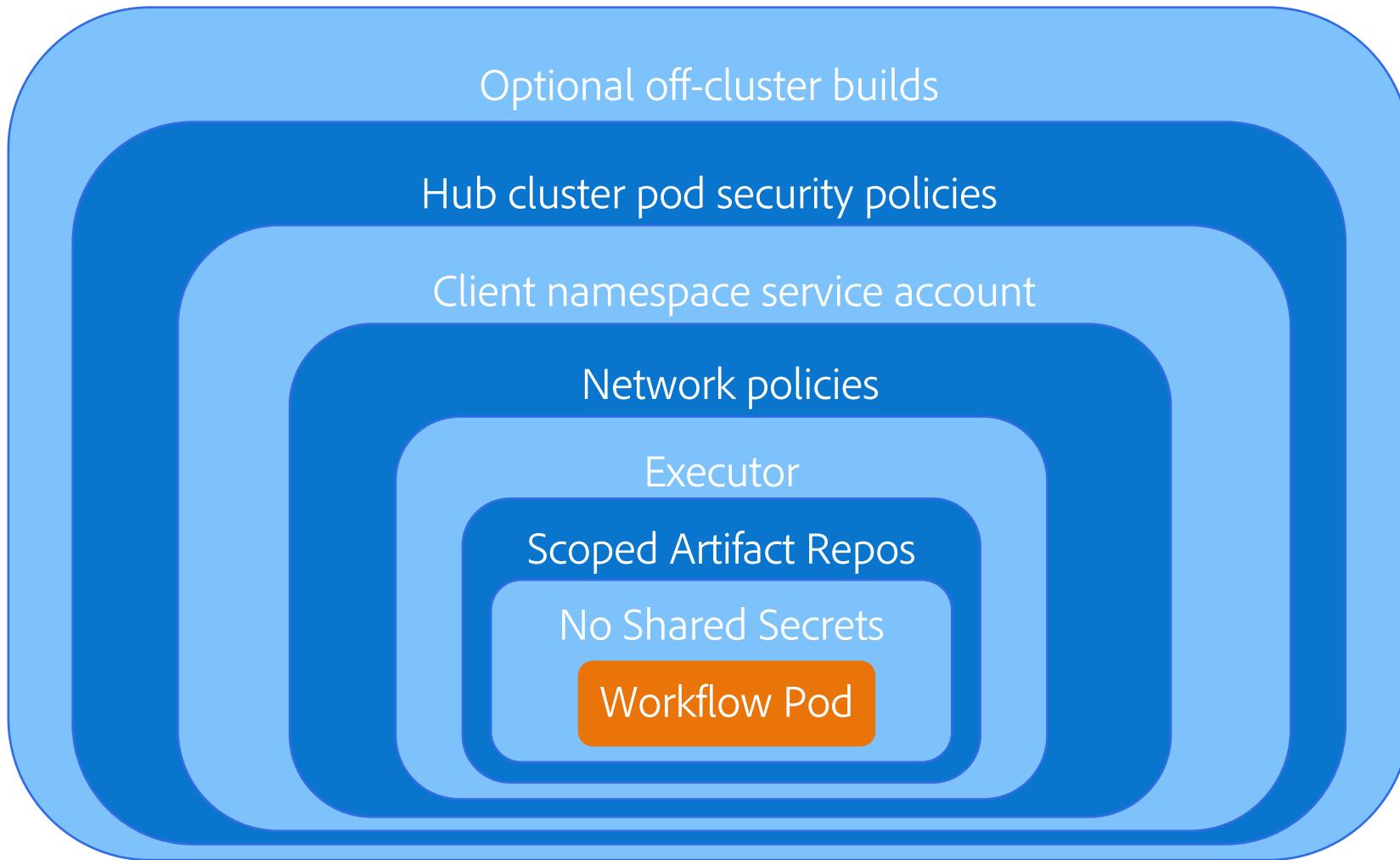
## Policy Rules

Manage this role's permissions to applications

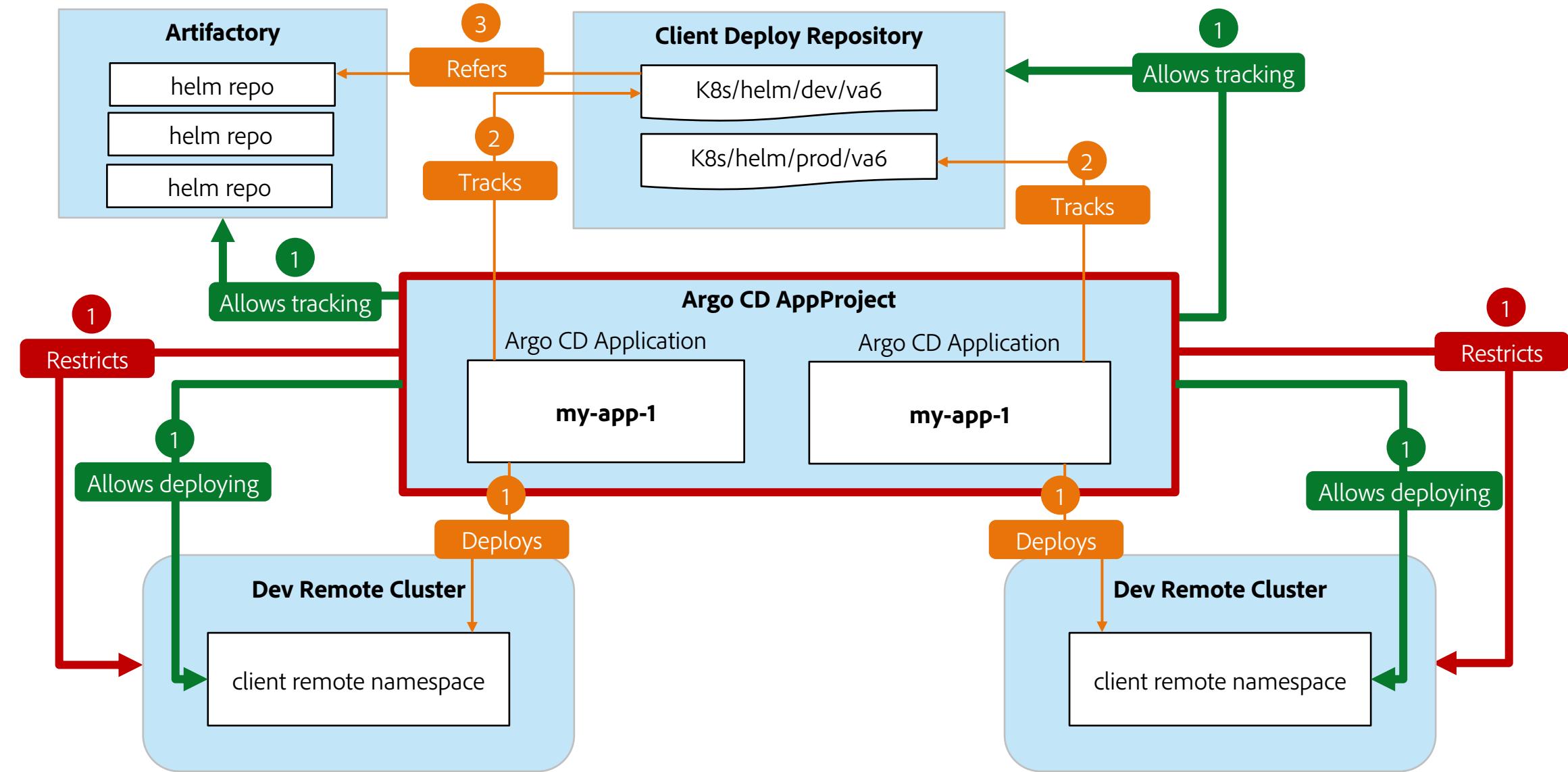
ACTION	APPLICATION	PERMISSION	X
get	ethosplayground-mr	allow	X
sync	ethosplayground-mr	allow	X

Add policy

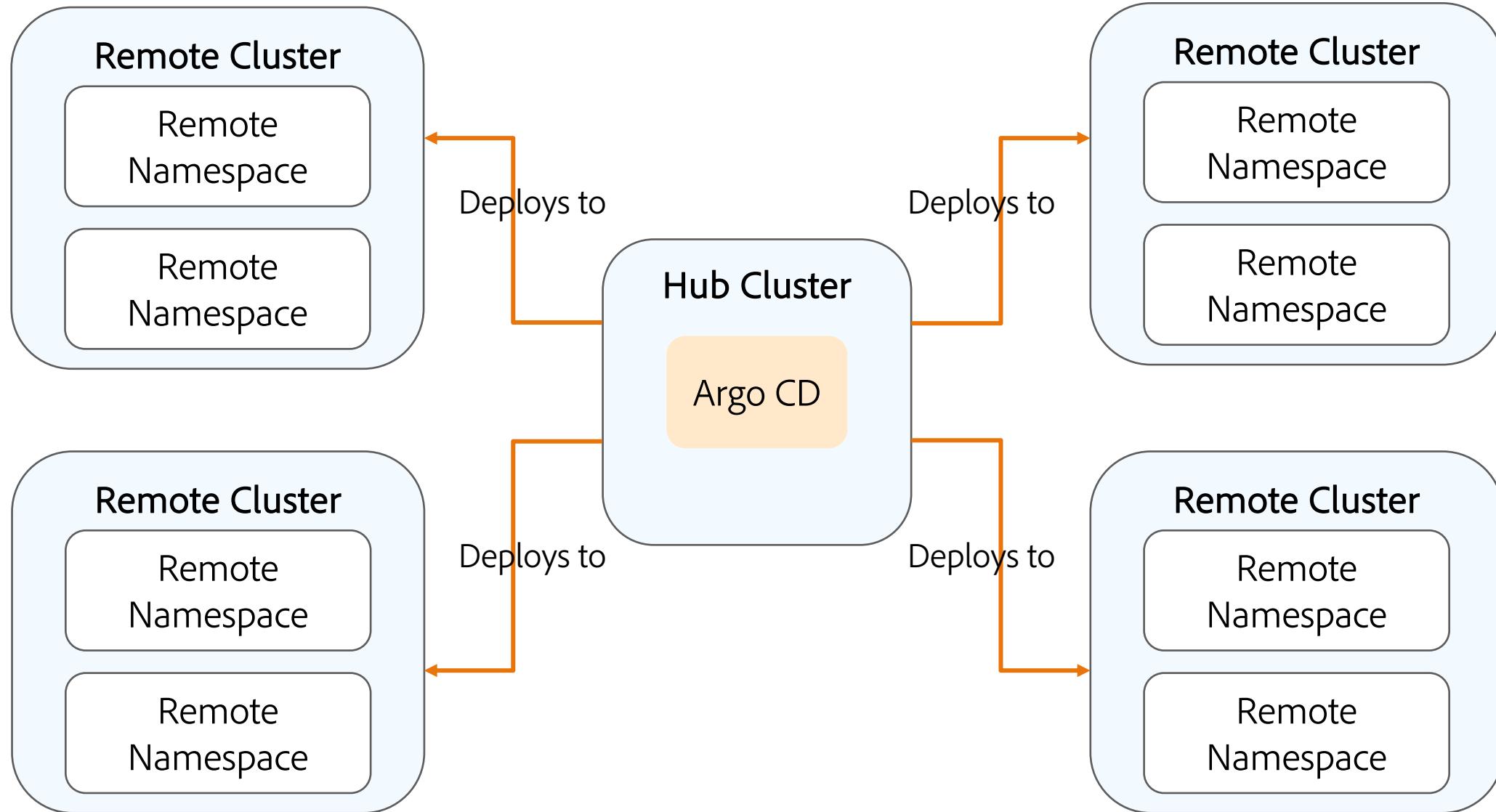
# Isolation - Argo Workflows



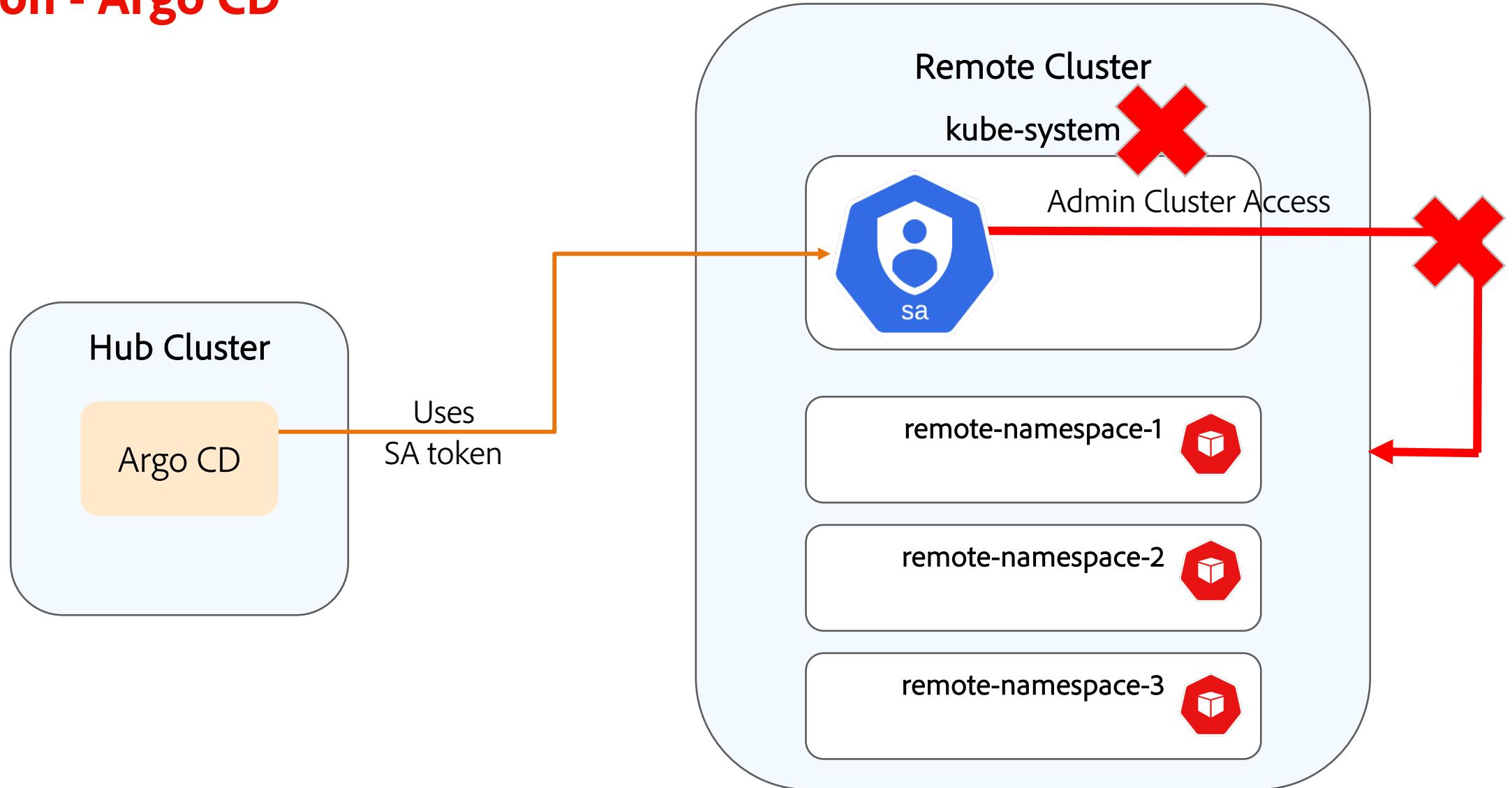
# Isolation - Argo CD



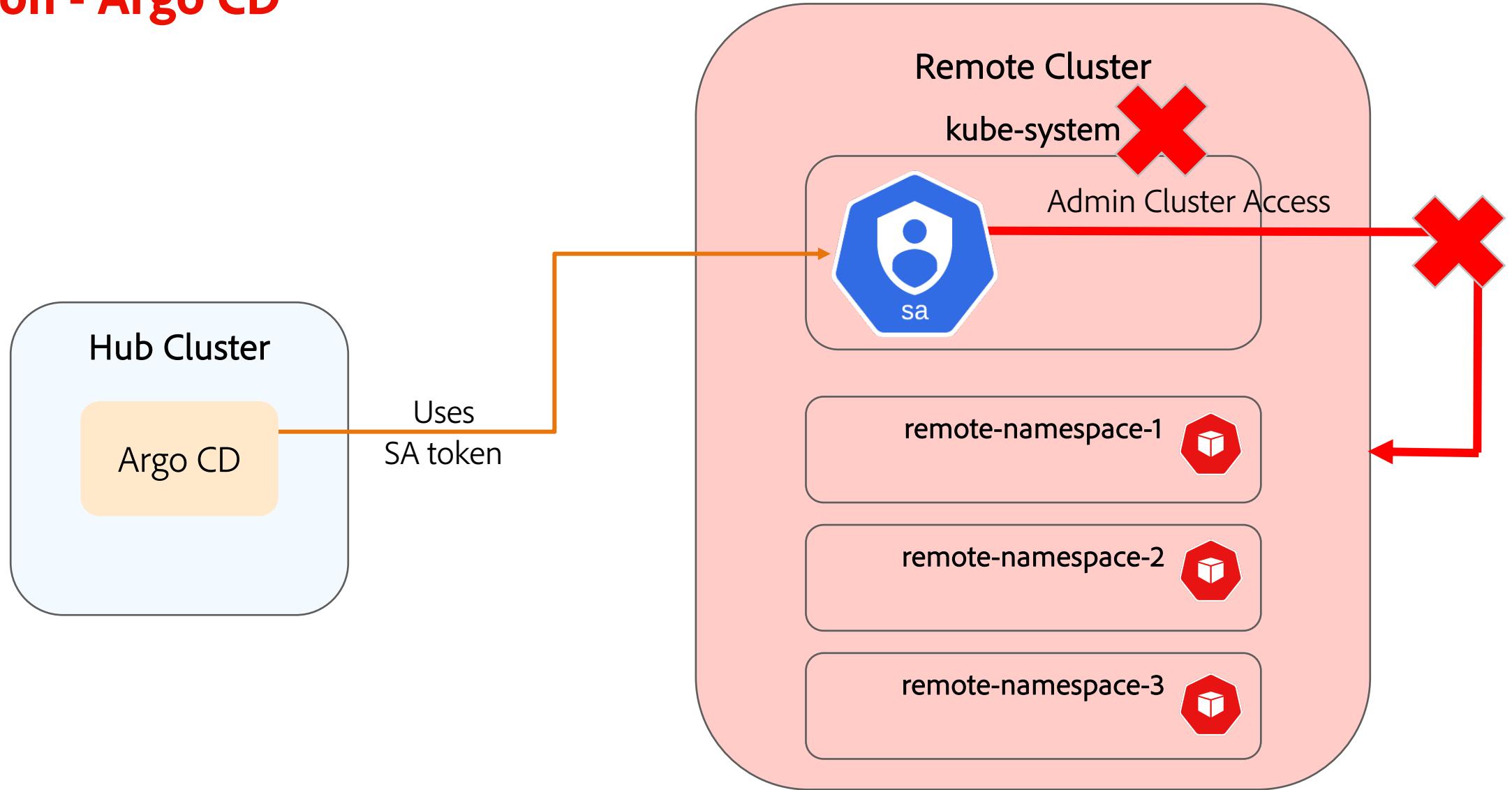
# Isolation - Argo CD



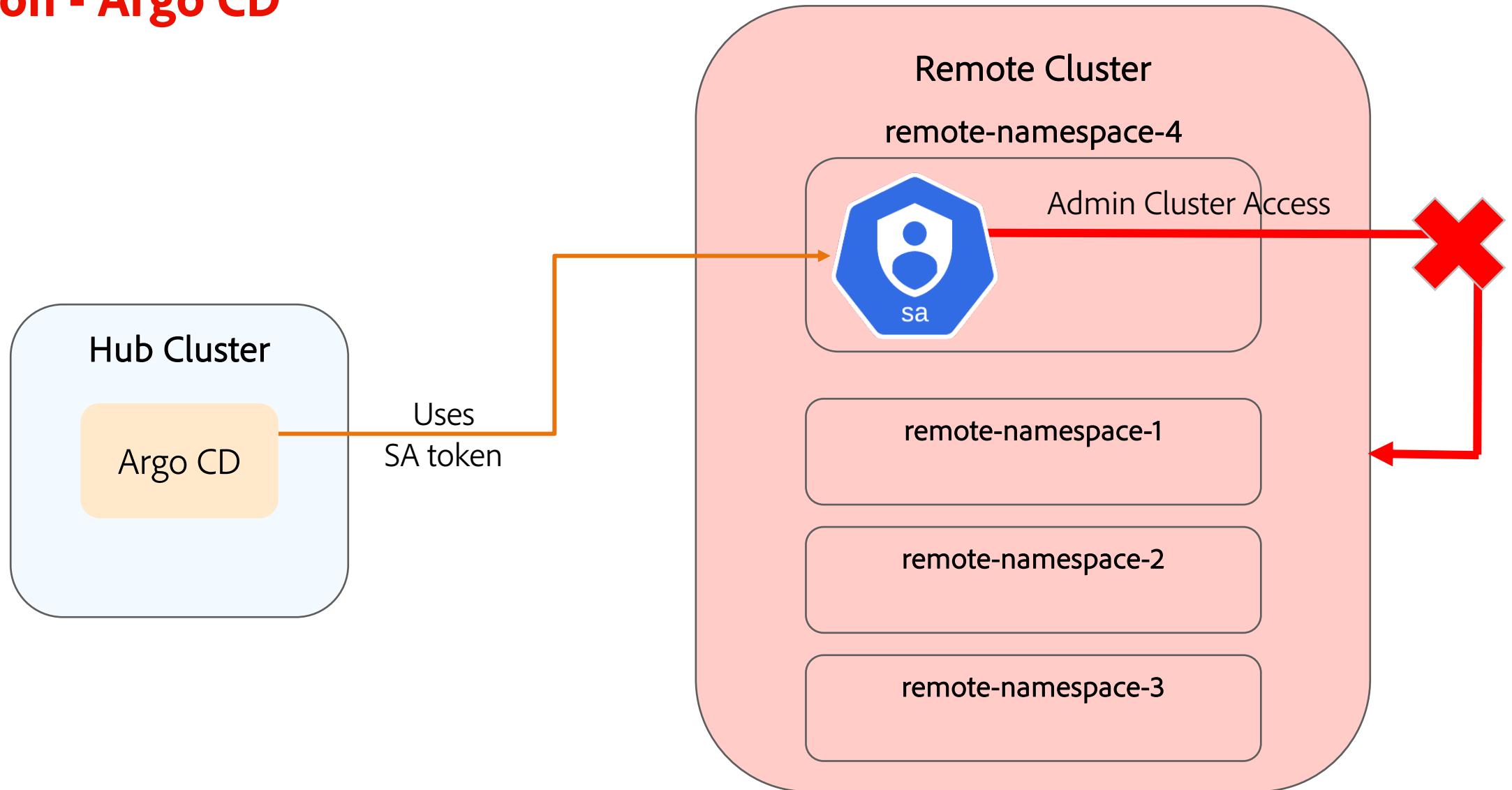
# Isolation - Argo CD



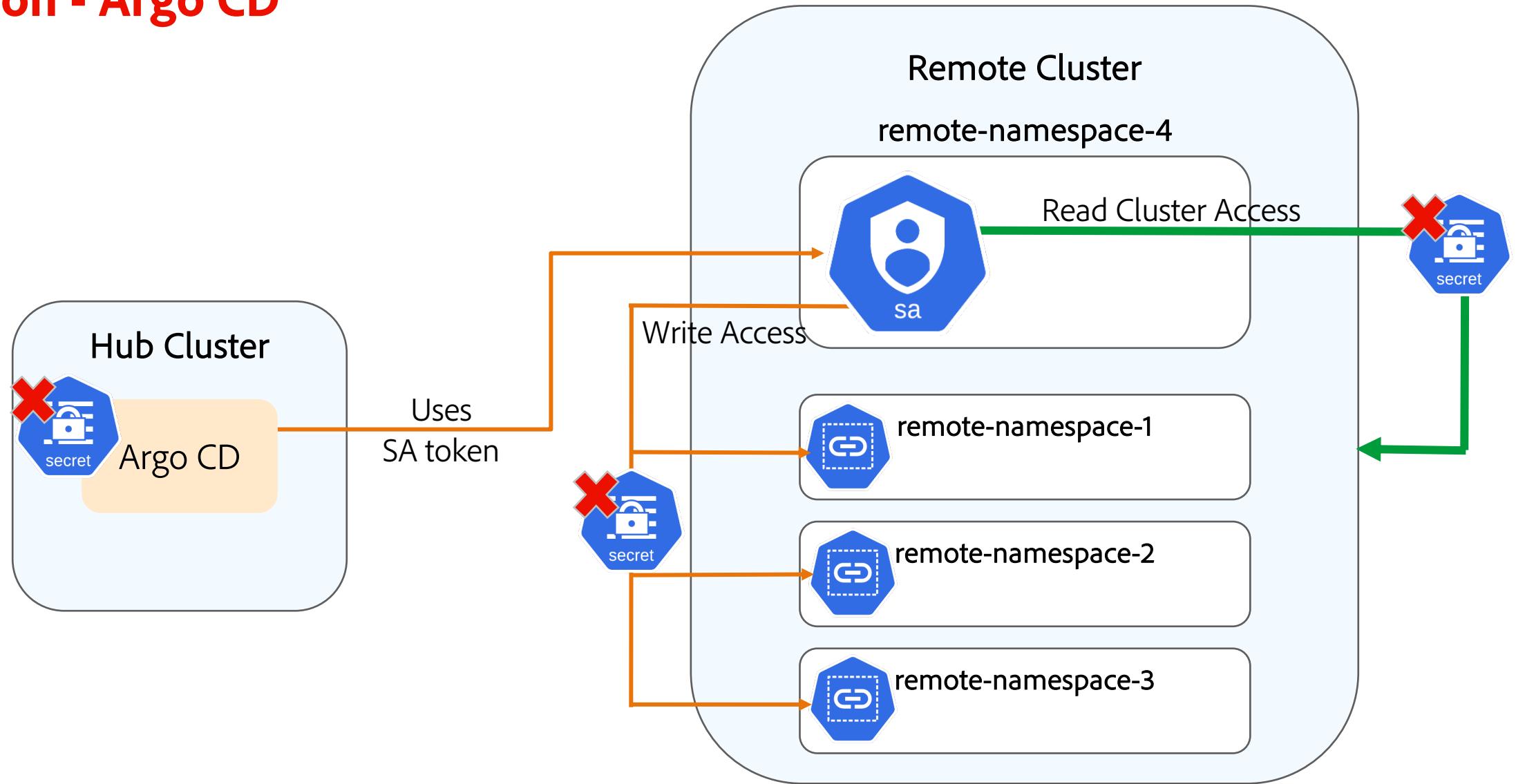
# Isolation - Argo CD



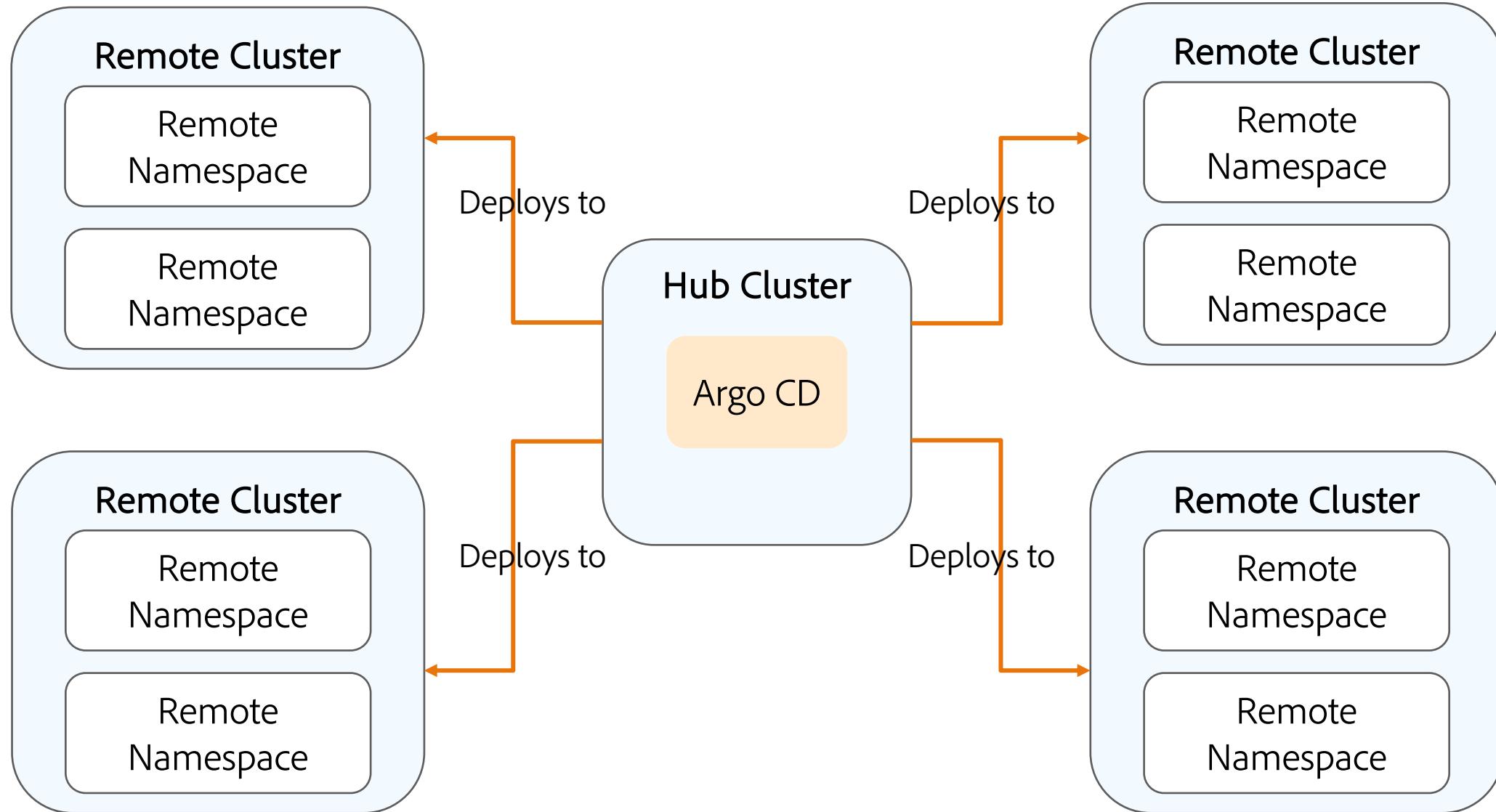
# Isolation - Argo CD



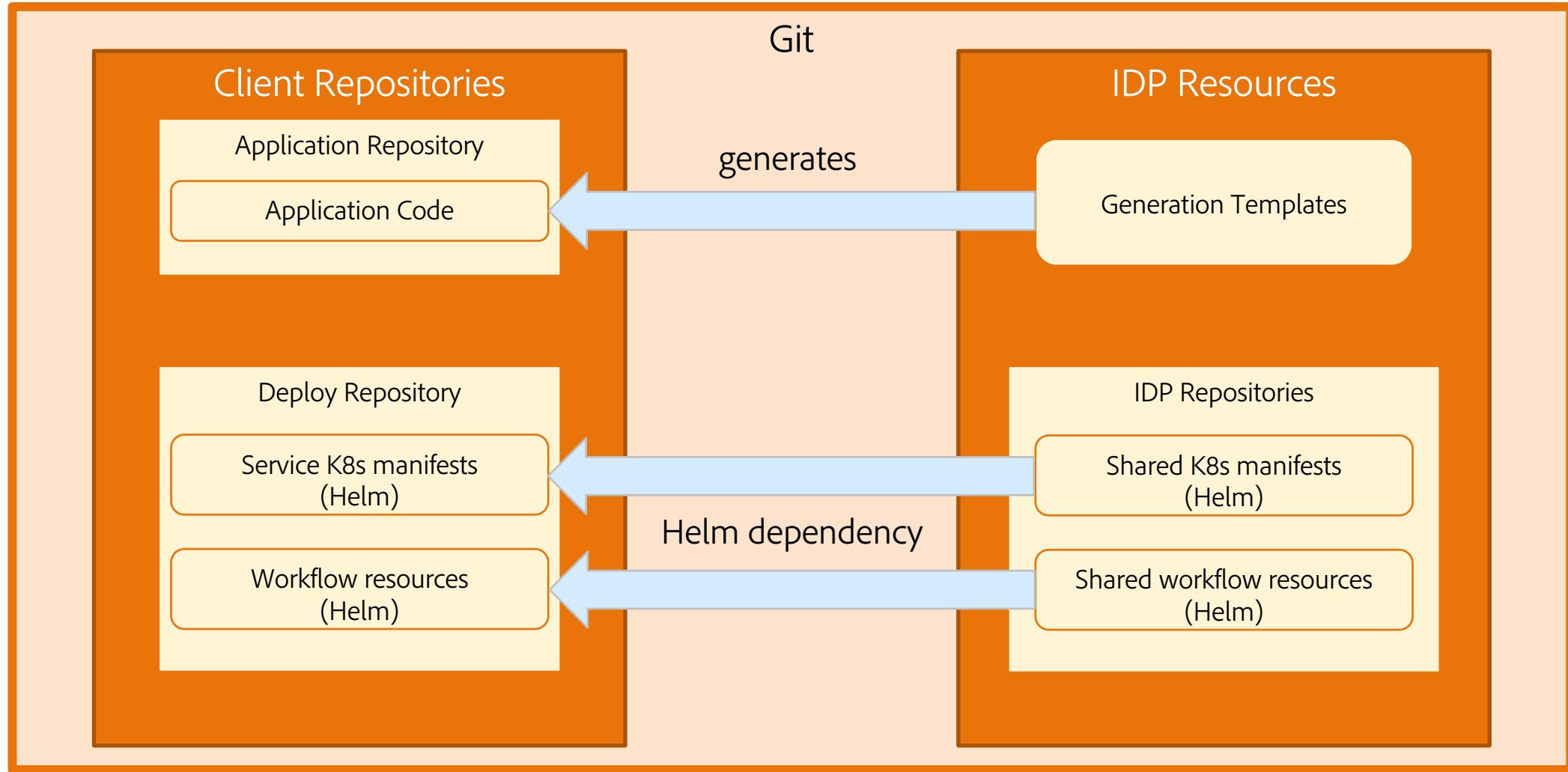
# Isolation - Argo CD



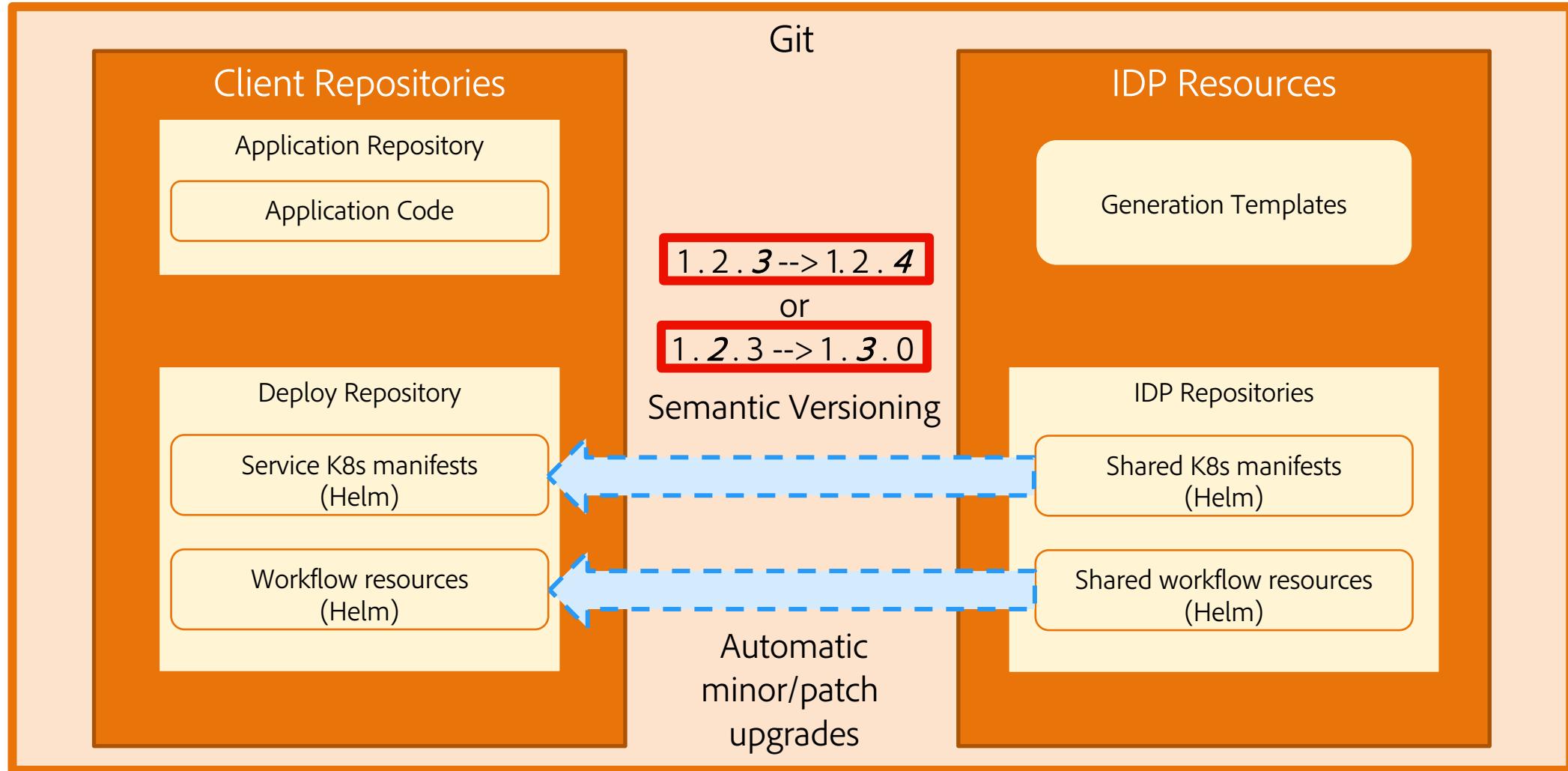
# Isolation - Argo CD



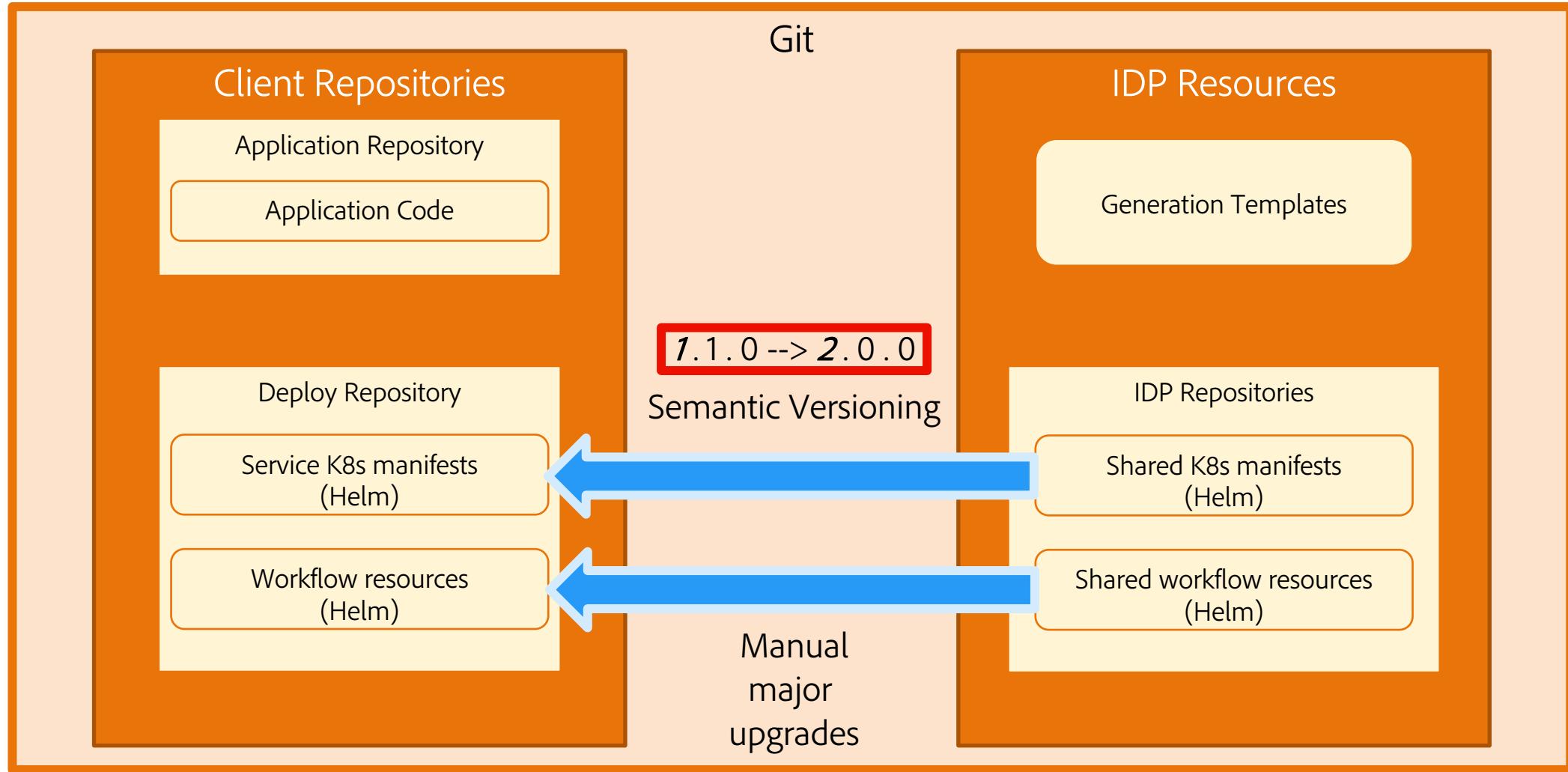
# Distributed Support



# Distributed Support



# Distributed Support



# Distributed Support

Git



```
apiVersion: v2

description: A Helm chart for workflow and deployment resources

name: ethos-argo-client-templates

version: "0.0.1"

dependencies:
  - name: ethos-workflowtemplates
    version: "^1.0.0"
    repository: https://artifactory-uw2.adobeitc.com/artifactory/helm-ethos-workflowtemplates-release

  - name: ethos-argo-workflows-resources
    version: "^2.0.0"
    repository: https://artifactory-uw2.adobeitc.com/artifactory/helm-ethos-argo-workflows-resources-release
```

# Scaling – Argo Workflows

## High Availability



## Rate limiting



## Resource consumption



## Metrics



- <https://argoproj.github.io/argo-workflows/high-availability/>

- Mirror common images

- Increase executor memory
- Default container limits
- Namespace quotas

- Controller and custom metrics

# Scaling – Argo CD

## High Availability



## Rate limiting



## Resource consumption



## Metrics



- [https://argo-cd.readthedocs.io/en/stable/operator-manual/high\\_availability/](https://argo-cd.readthedocs.io/en/stable/operator-manual/high_availability/)

- GitHub App for repo registration

- Limiting repo-server memory usage
- Sharding Argo CD

- Controller and server metrics

# Scaling - Metrics

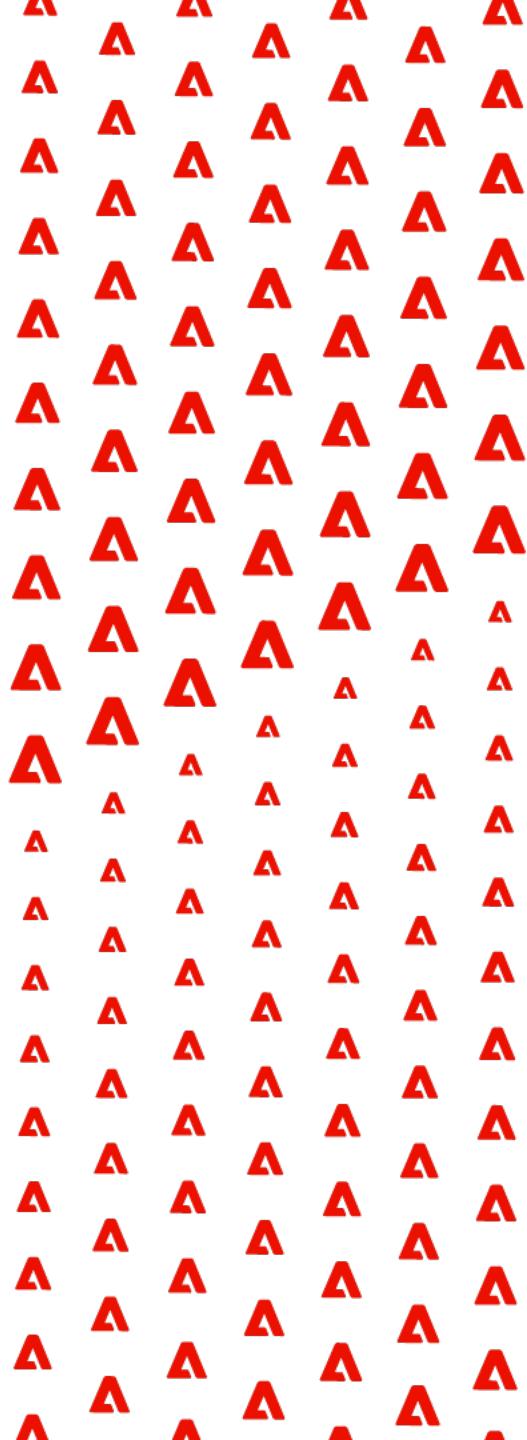
## Argo Workflows



## Argo CD



# Summary



Thank you!

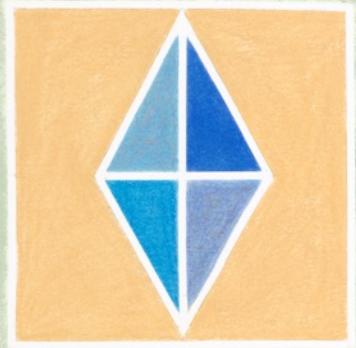


BUILDING FOR THE ROAD AHEAD

**DETROIT 2022**



Please scan the QR Code above to  
leave feedback on this session



Bē

Artwork by **Alicia Sterling Beach**

