



// GITOPS ADVENTURE: REPO STRUCTURES

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 in/jschnatterer

Version: 202507040901-d49081a

Agenda

- Basic repo structure
- Bootstrapping
- Multi-Tenancy
- Managing dedicated tenant instances
- Developers
- More examples





What is your profession?



What is your profession?



Software Engineer / Developer



What is your profession?



Platform Engineer / Ops person

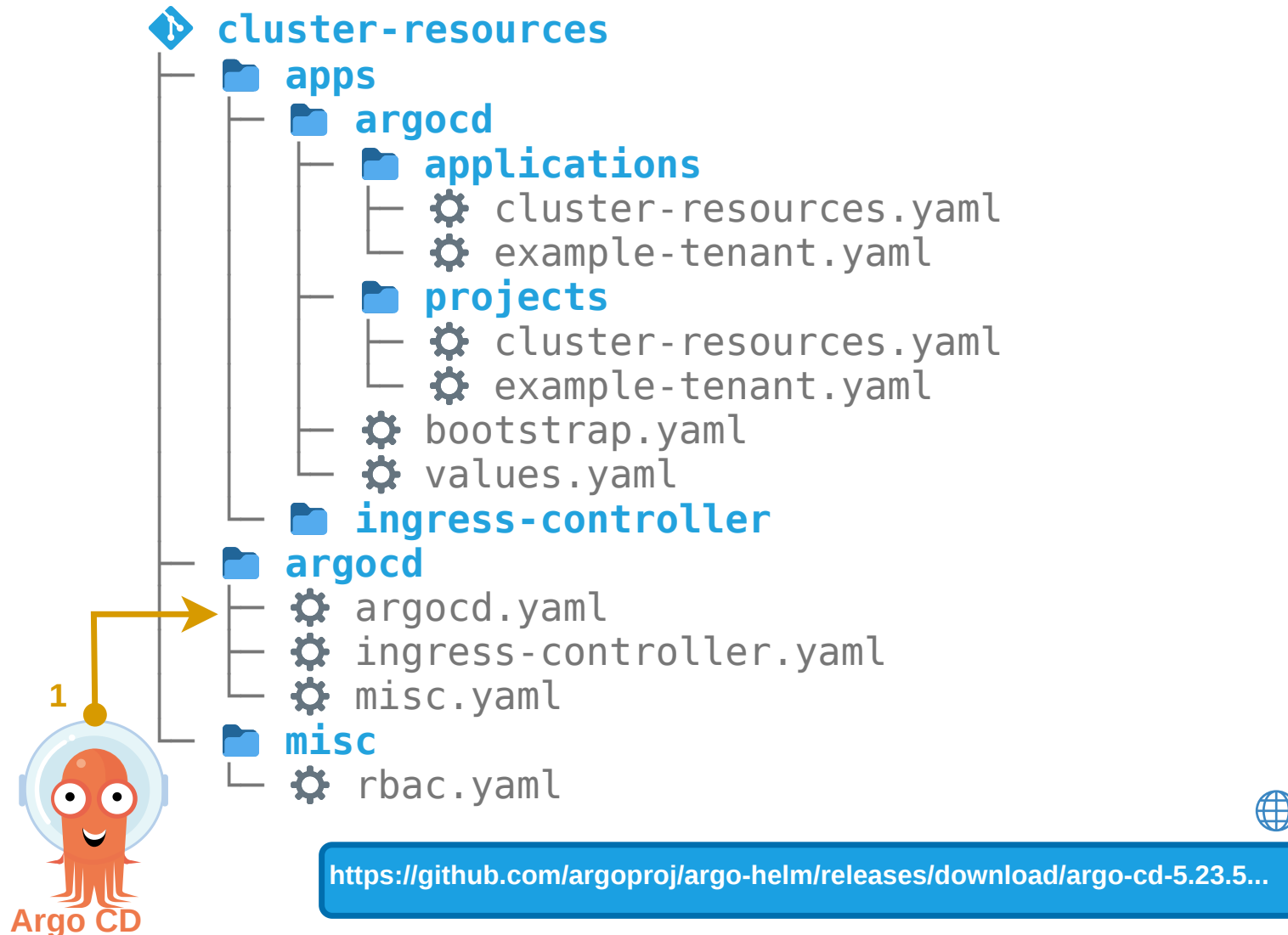


What is your profession?

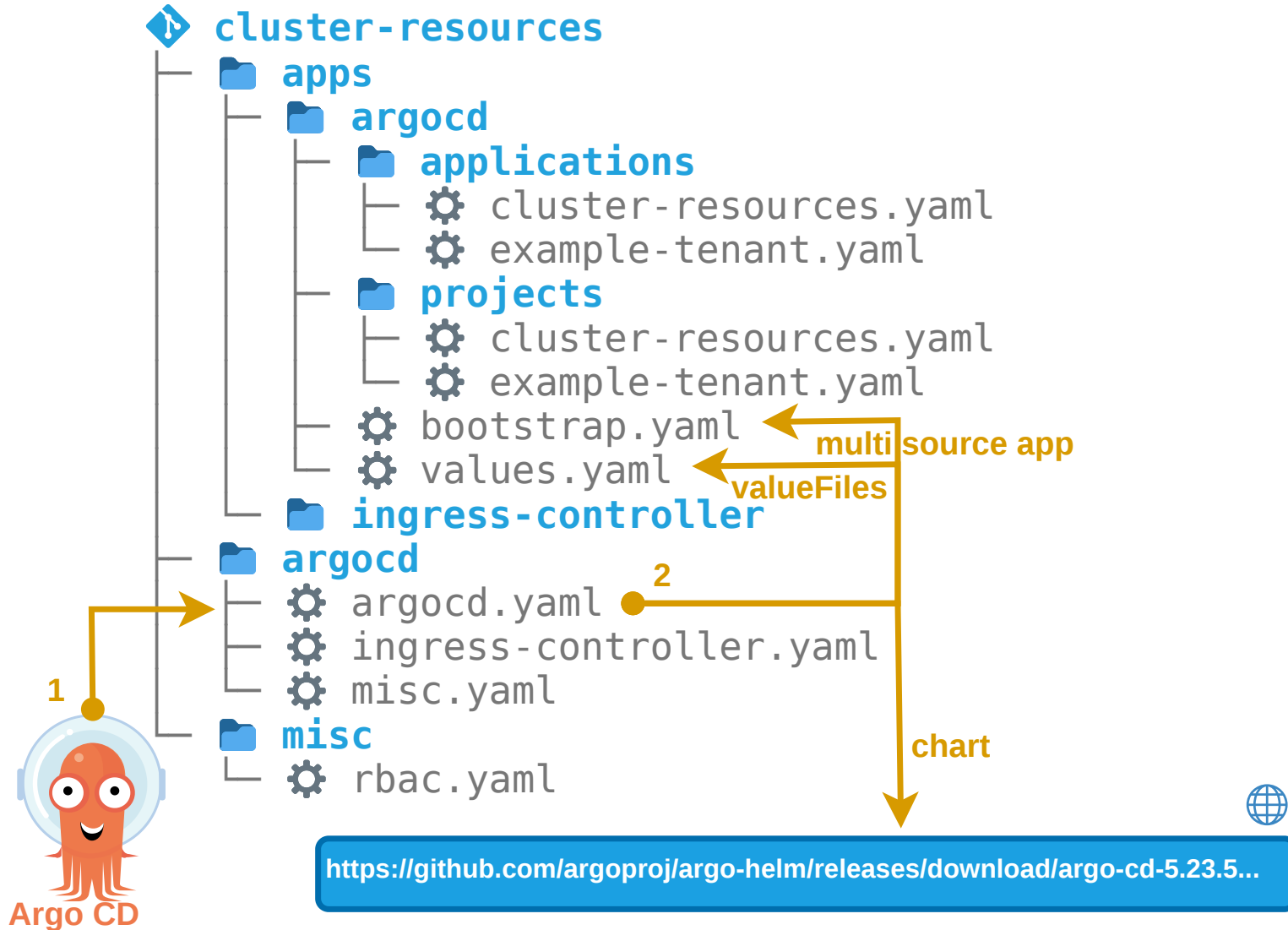


None of the above

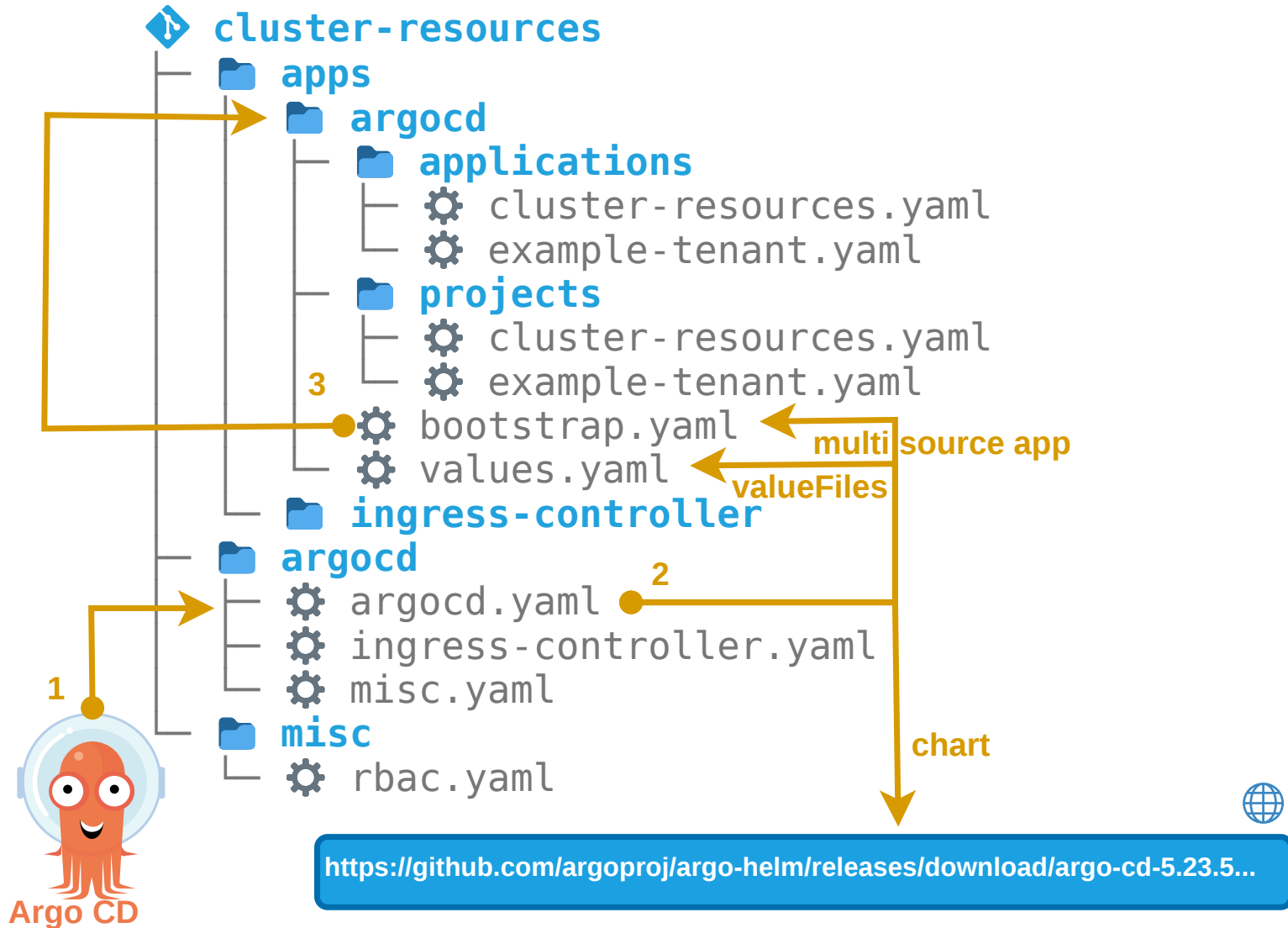
Basic repo structure



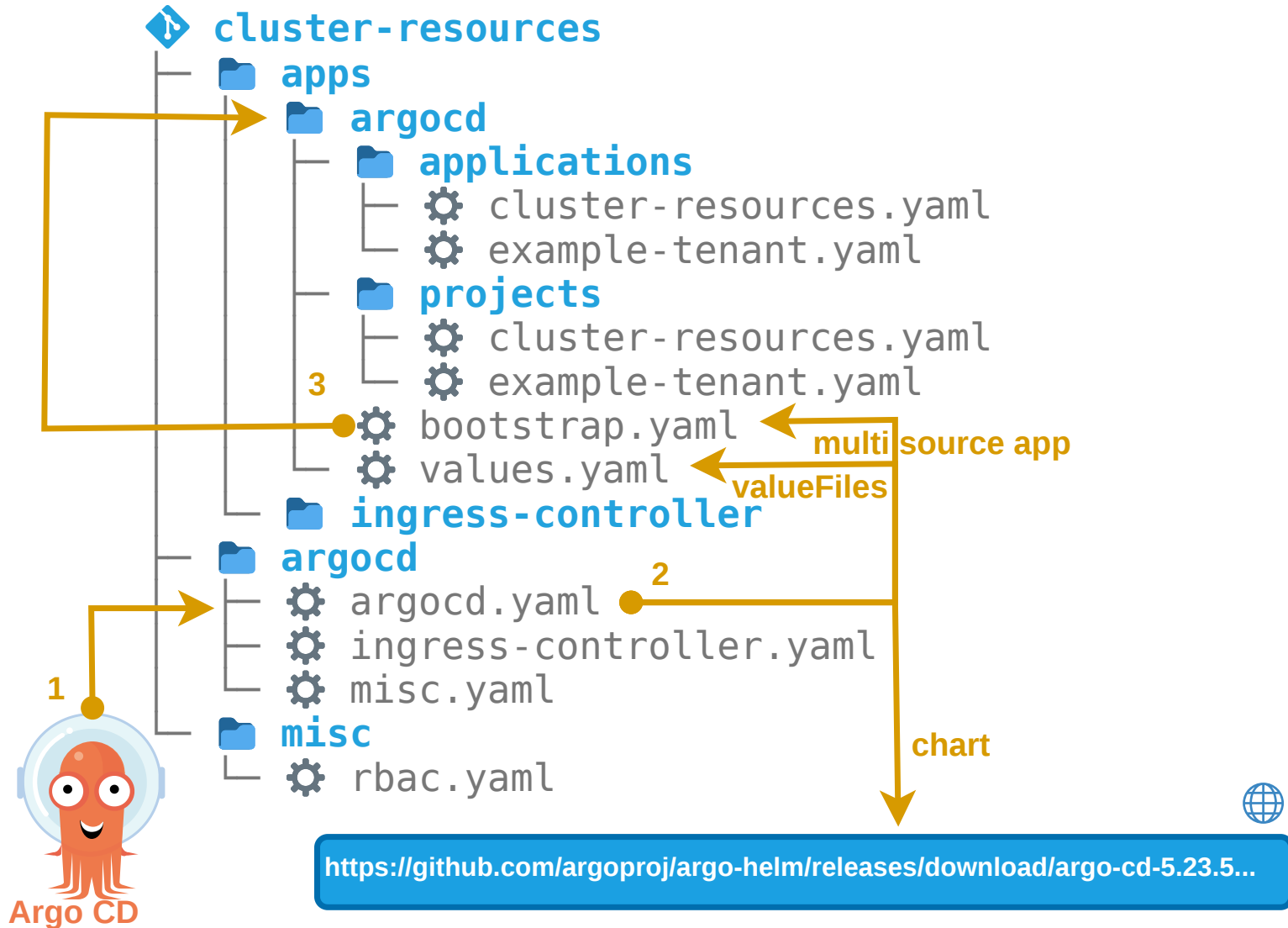
Basic repo structure



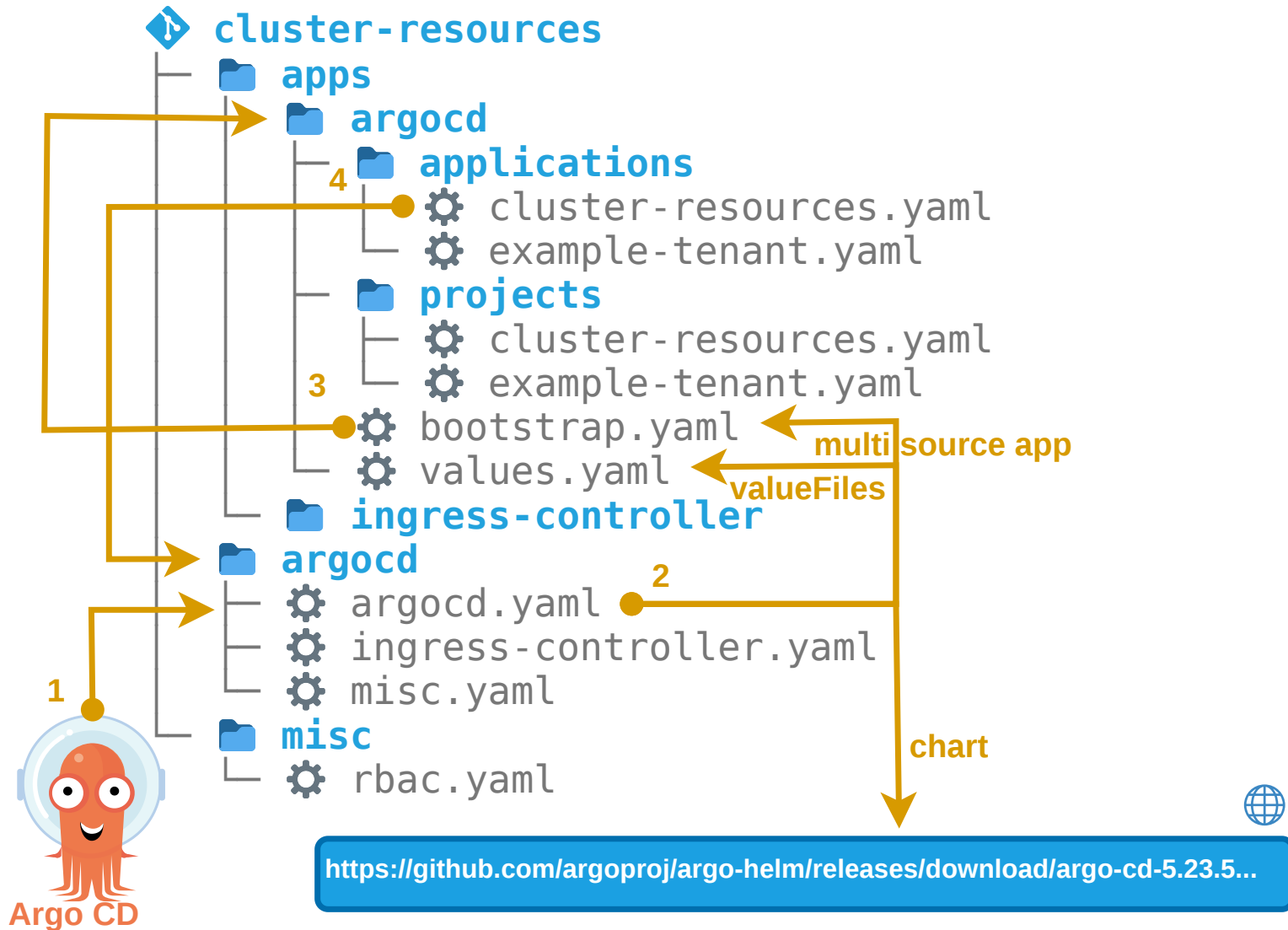
Basic repo structure



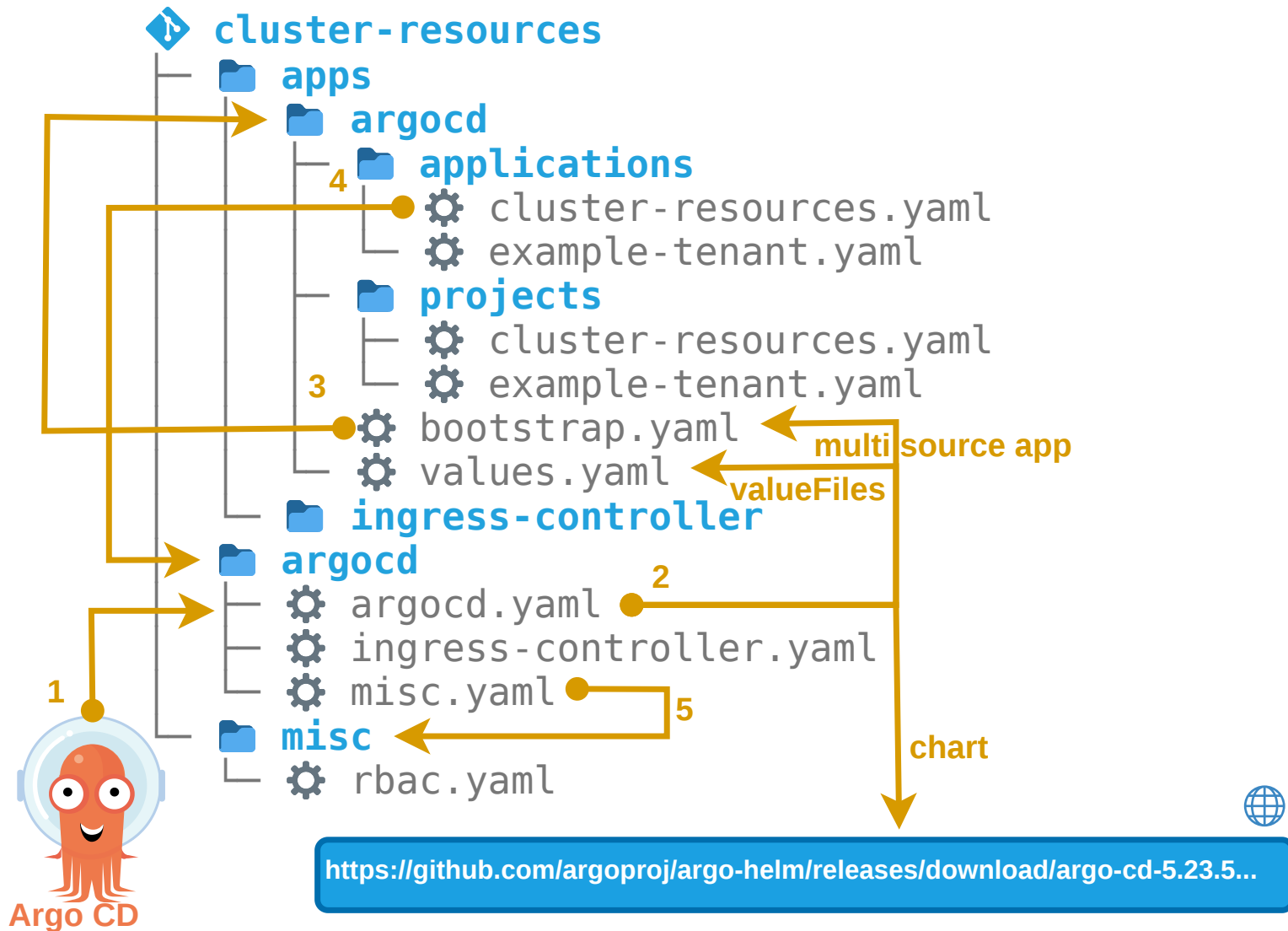
Basic repo structure



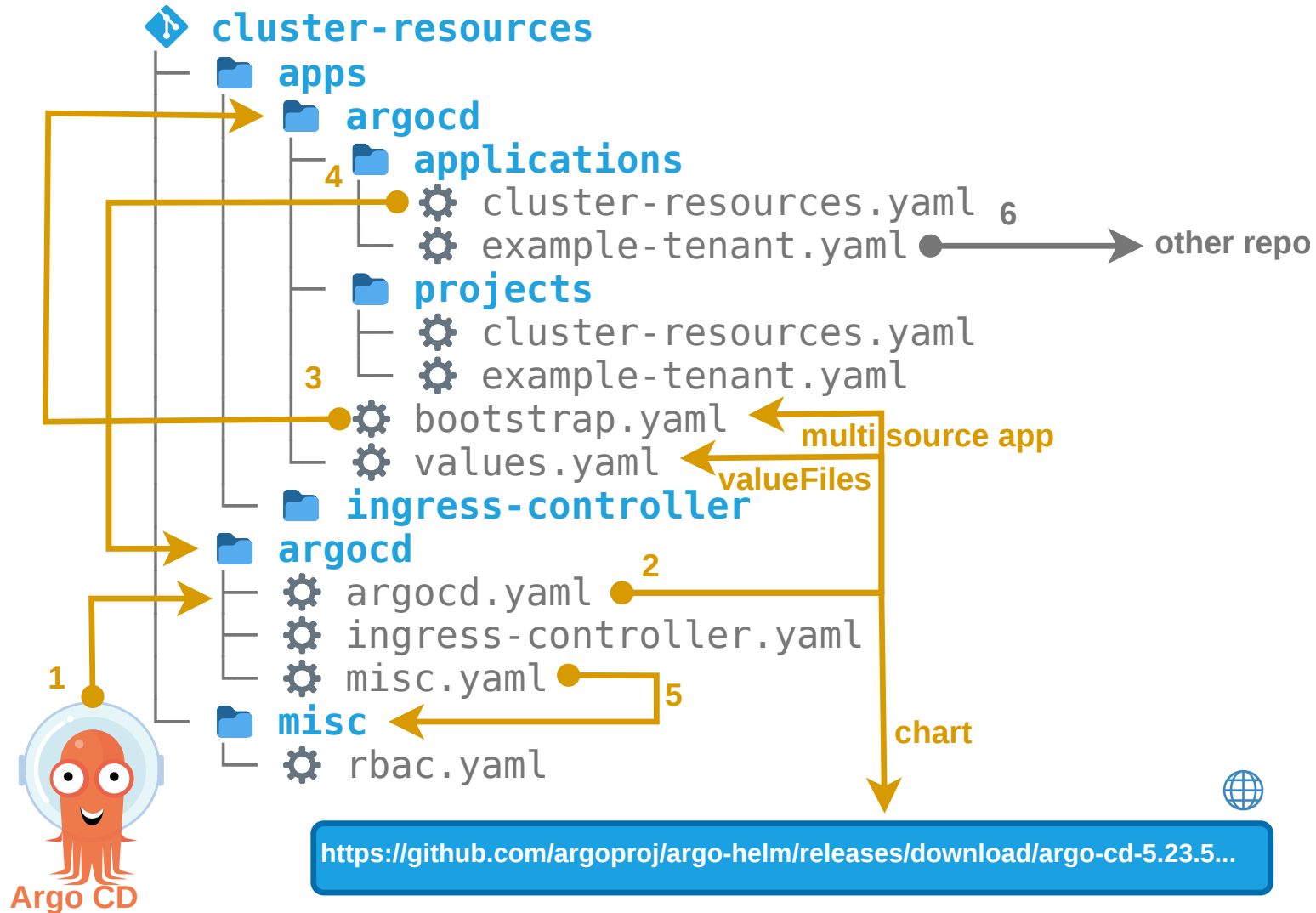
Basic repo structure



Basic repo structure



Basic repo structure



Bootstrapping in vanilla cluster

- Deploy Argo CD + repo secret
- Apply `projects` + app `argocd`

```
# The only imperative commands you'll ever need
helm template argocd argo/argo-cd --version .. --namespace argocd --values .. \
  | kubectl apply -f-

kubectl apply ..
```

 GitOps

IDP Bootstrapping made simple: GOP

Creates a complete GitOps-based operational stack / IDP on your Kubernetes clusters

 [cloudogu/gitops-playground](https://github.com/cloudogu/gitops-playground)

Also runs locally

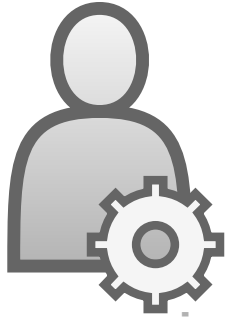


```
VERSION='cec82a7' # Preview for 0.12.0
bash <(curl -s \
  "https://raw.githubusercontent.com/cloudogu/gitops-playground/$VERSION/scripts/init-cluster.sh") \
  && docker run --rm -t -u $(id -u) \
  -v ~/.config/k3d/kubeconfig-gitops-playground.yaml:/home/.kube/config \
  --net=host \
  ghcr.io/cloudogu/gitops-playground:$VERSION --yes --argocd --ingress-nginx --base-url=http://localhost
# More IDP-features: --monitoring --vault=dev --cert-manager --mailhog
# More features for developers: --jenkins --registry --content-examples
```

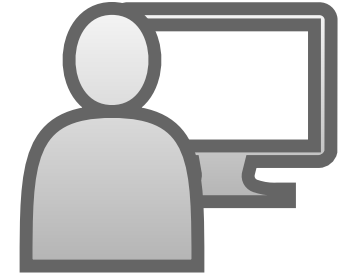
Try new repo structure with GOP:

 github.com/cloudogu/gitops-talks/tree/772d0c79/src/repo-examples/basic-repo-structure

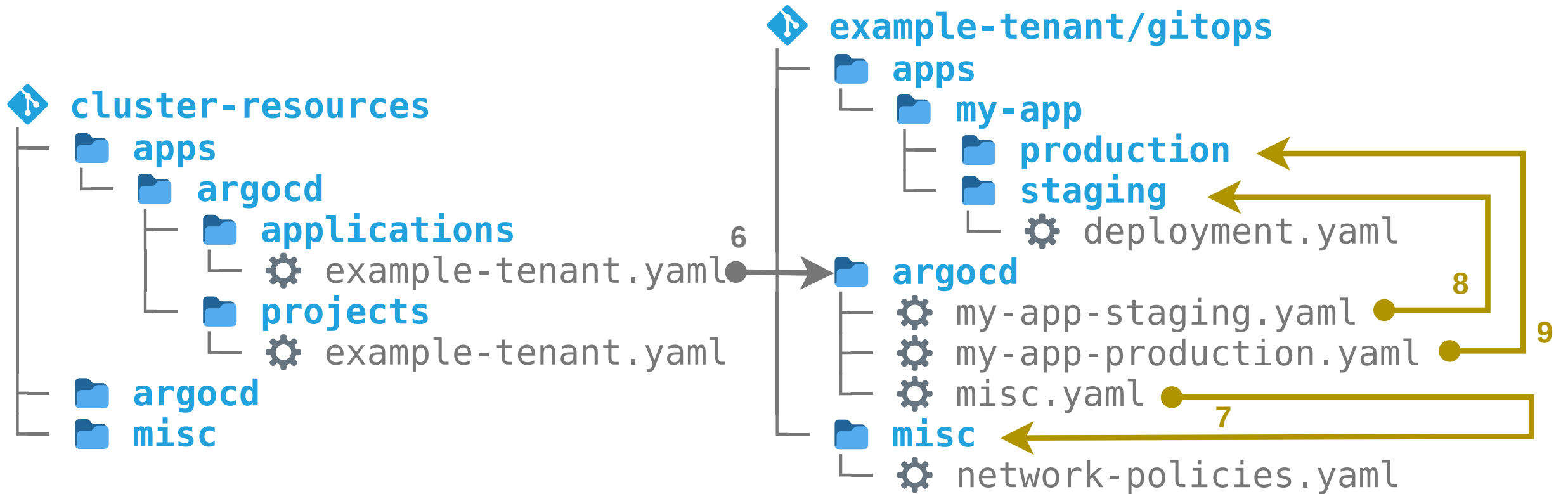
Multi-Tenancy



Platform engineer

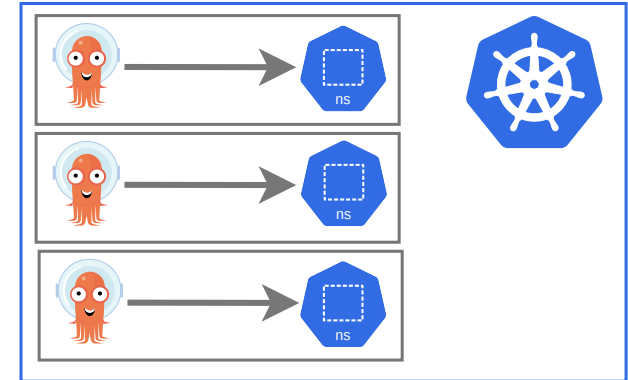


Software engineer

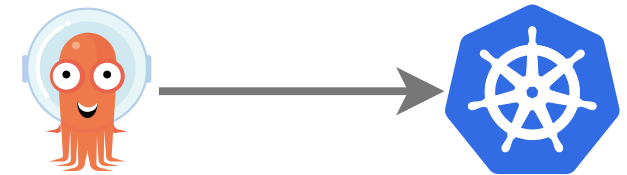


Options for multi-tenancy

- Shared
- Dedicated
 - Instance per Namespace
 - Instance per Cluster



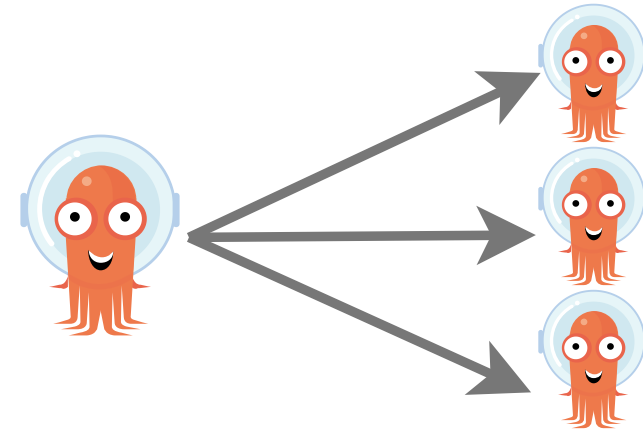
Instance per Namespace



Instance per Cluster

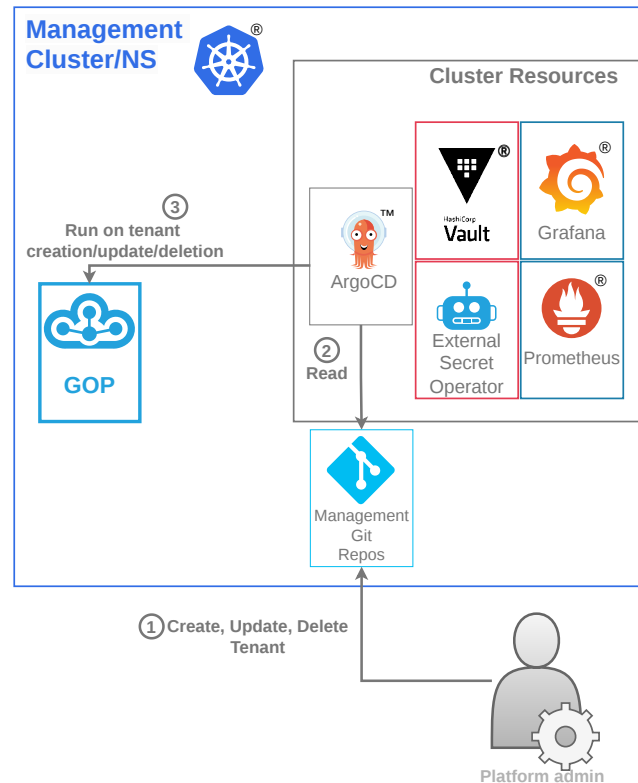
Managing dedicated tenant instances

- Standalone
- Hub and Spoke
 - 💡 Argo CD AppSets

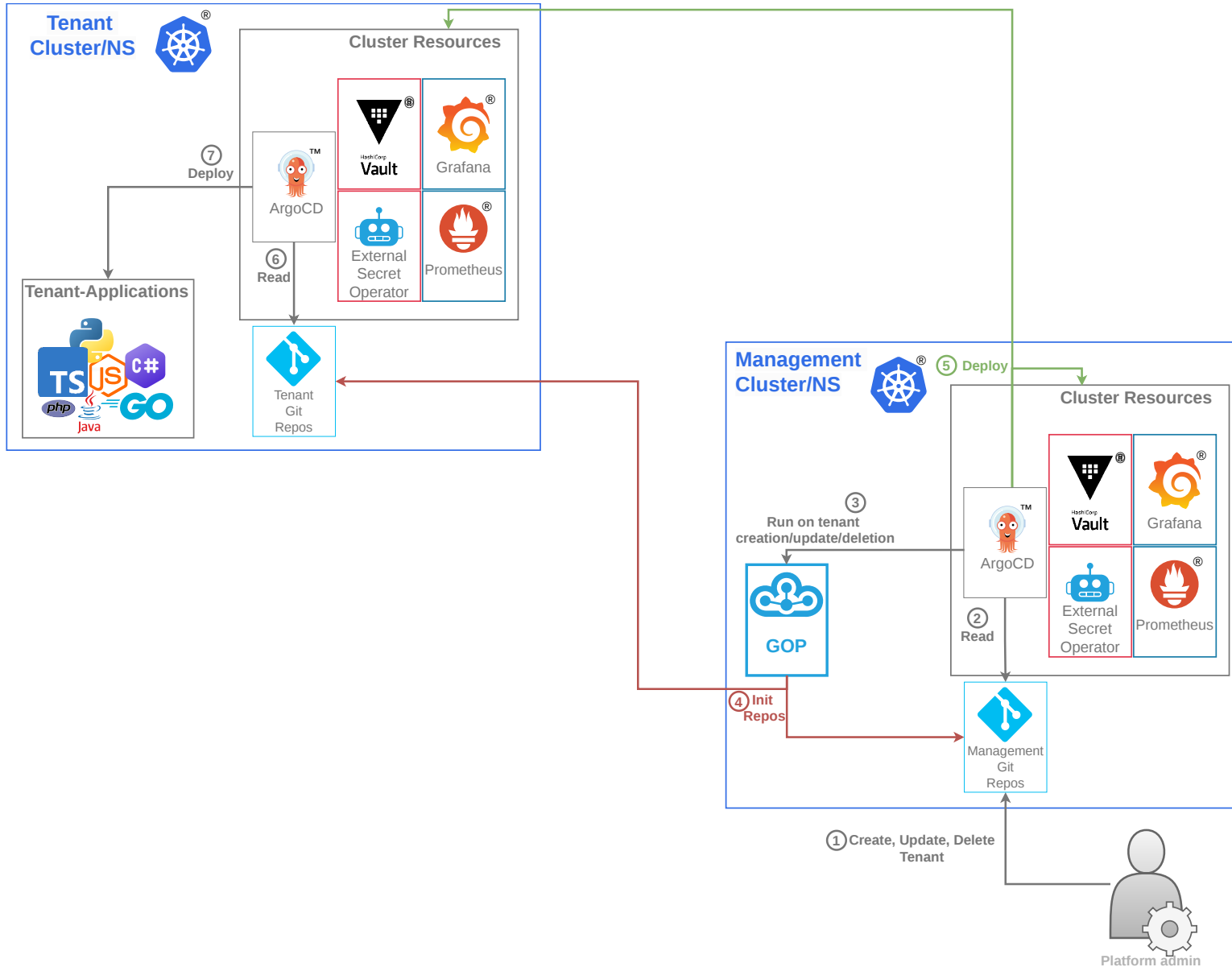


Hub and Spoke

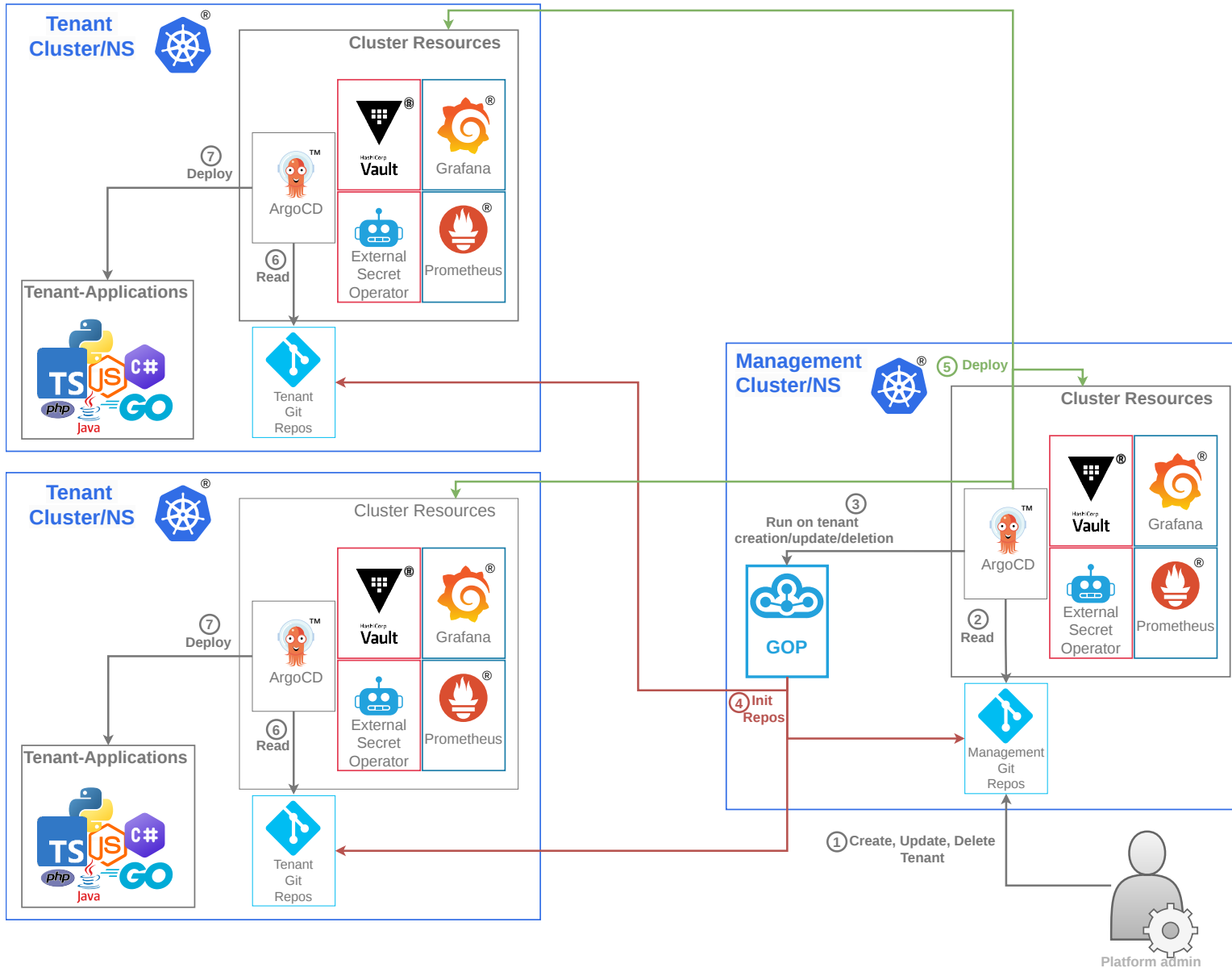
IDP as a Service using Argo CD AppSets



IDP as a Service using Argo CD AppSets

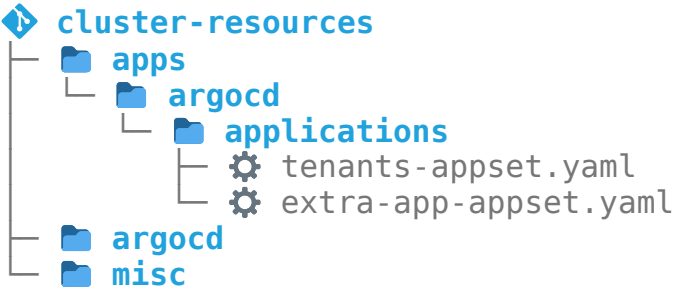


IDP as a Service using Argo CD AppSets

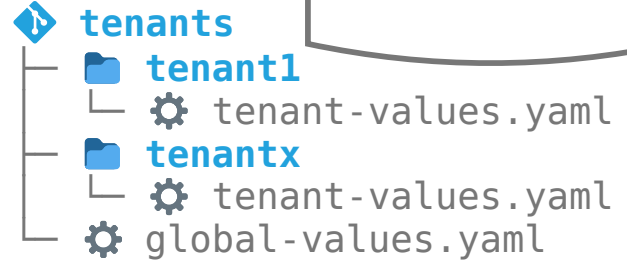




1



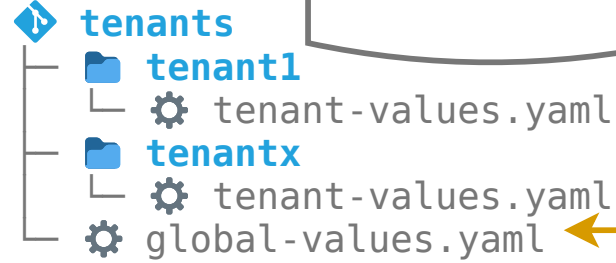
2
Generate one app per file:
"/tenant-values.yaml"



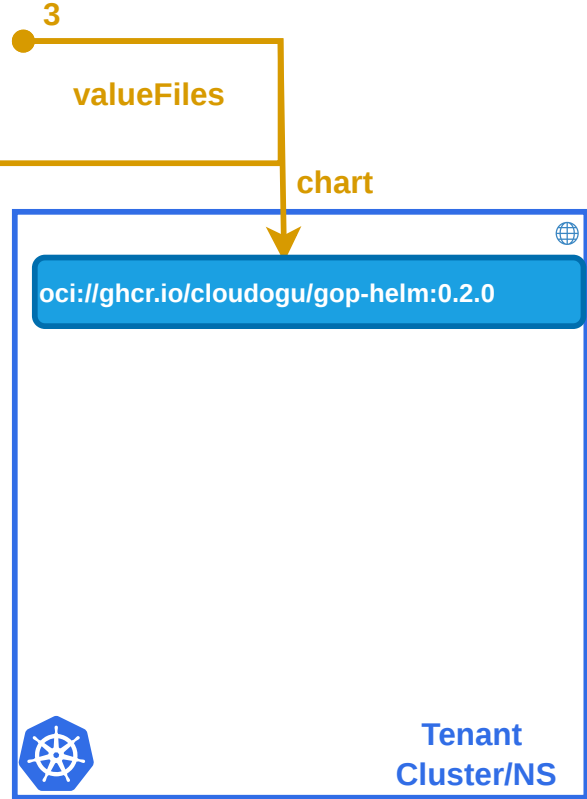
apiServerUrl: https://x.x.x.x:6443

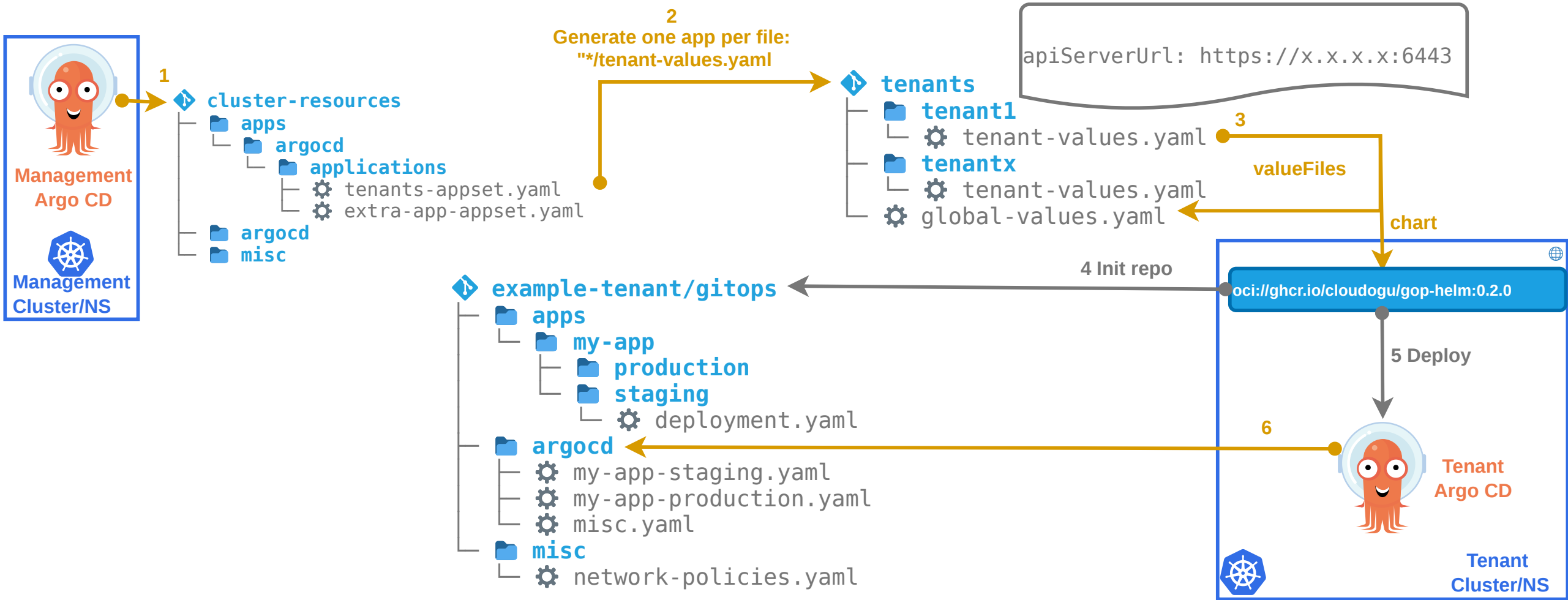


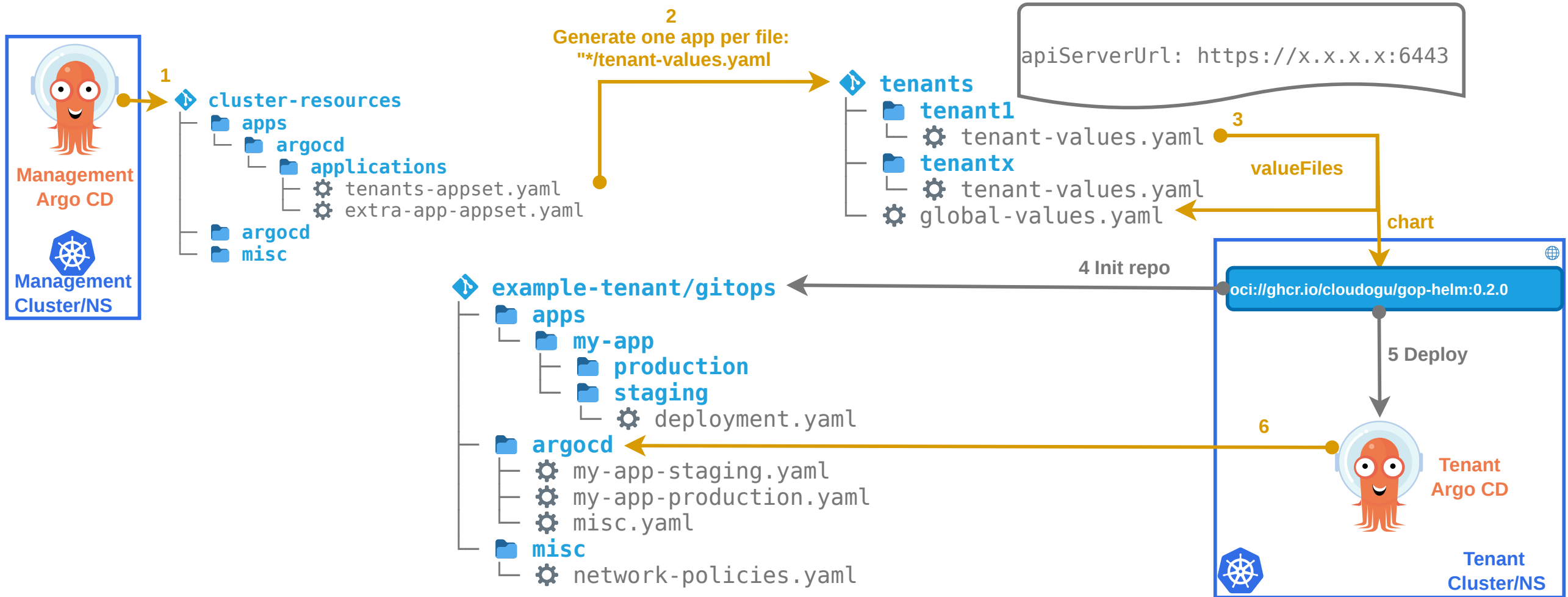
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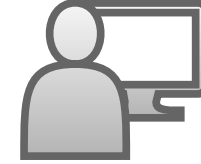
Try with GOP:

 [cloudogu/gop-multi-tenant-multi-cluster-example](https://github.com/cloudogu/gop-multi-tenant-multi-cluster-example)

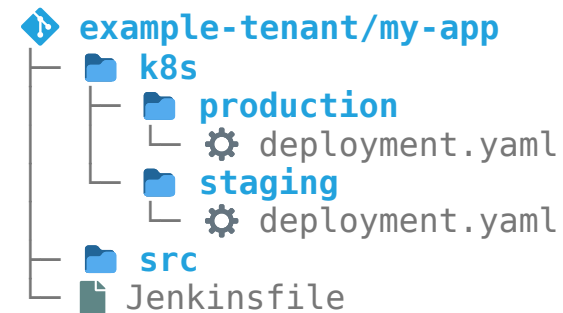
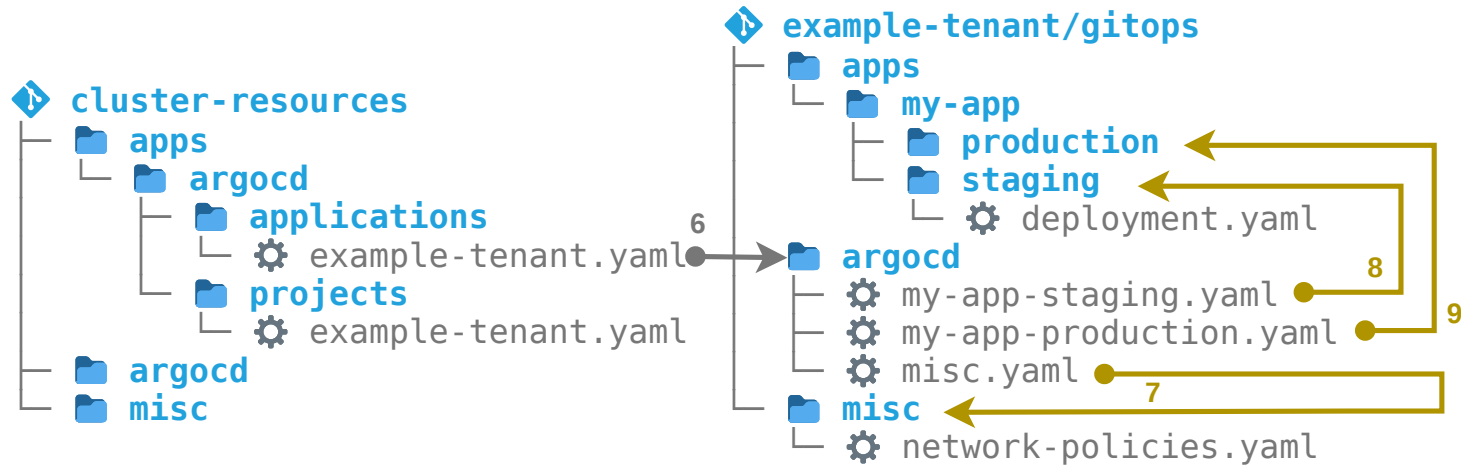
Developers



Platform engineer



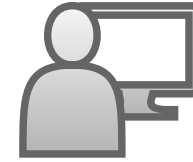
Software engineer



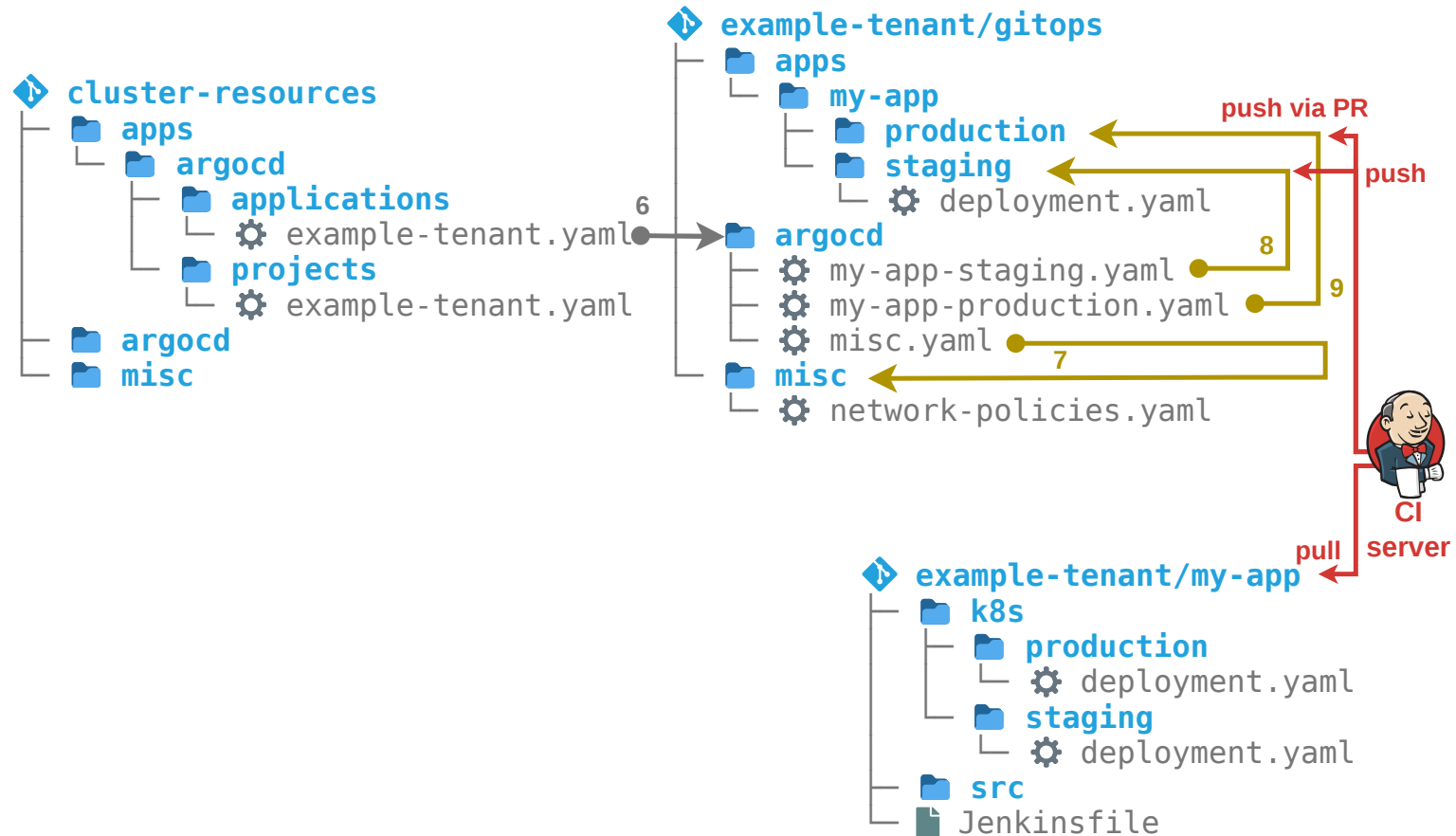
Developers



Platform engineer



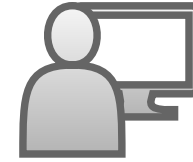
Software engineer



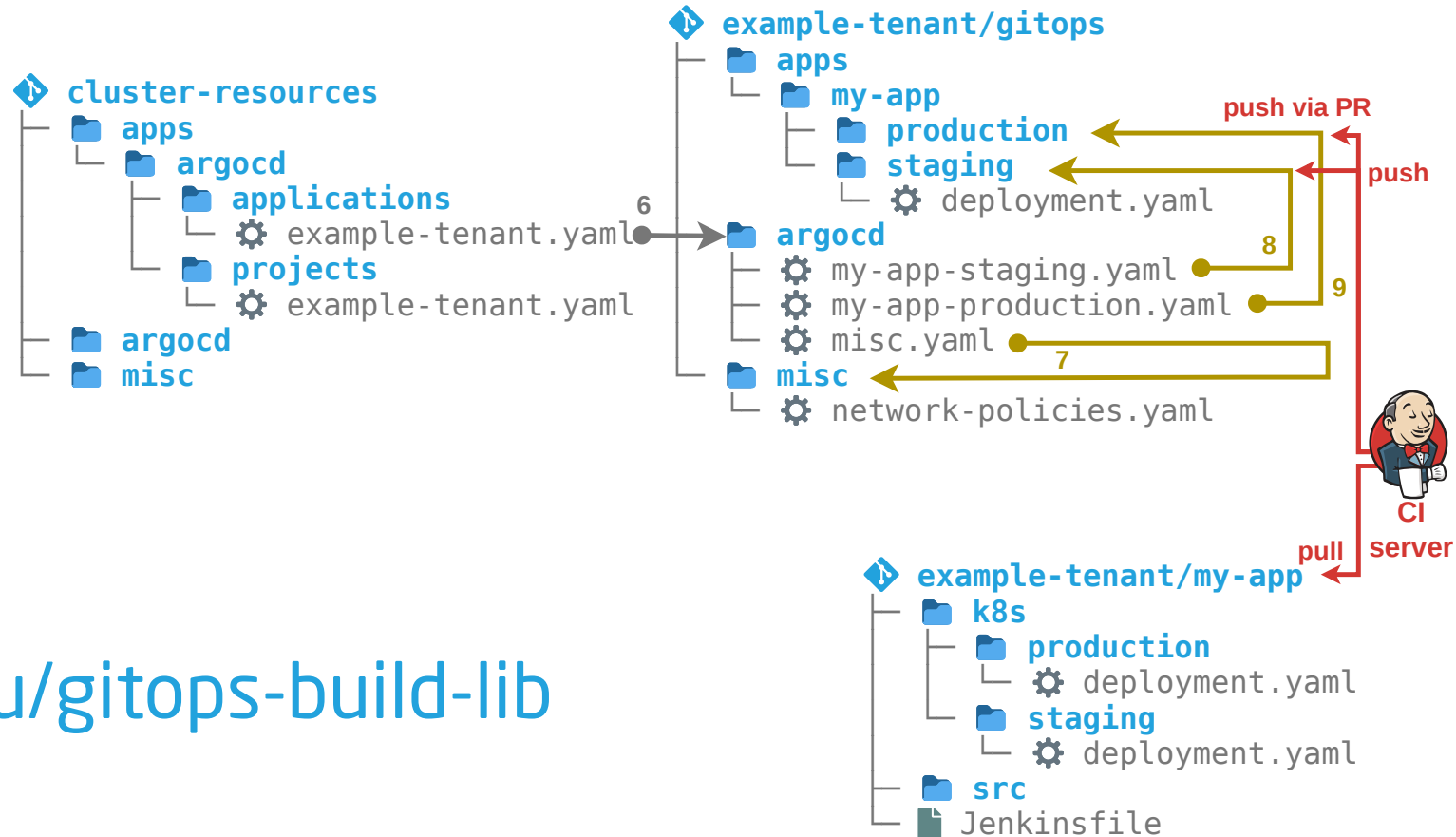
Developers



Platform engineer








Software engineer



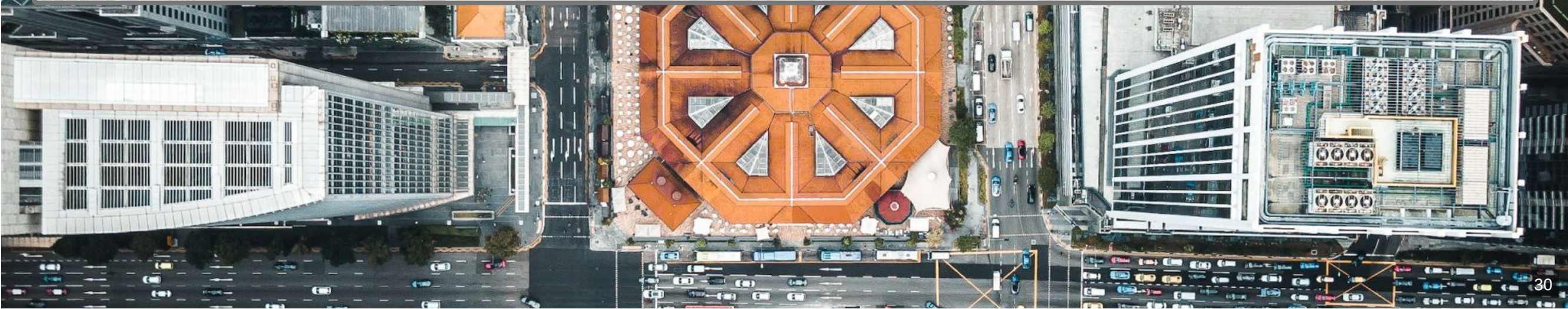
 [cloudogu/gitops-build-lib](https://github.com/cloudogu/gitops-build-lib)

Alternatives for promotion

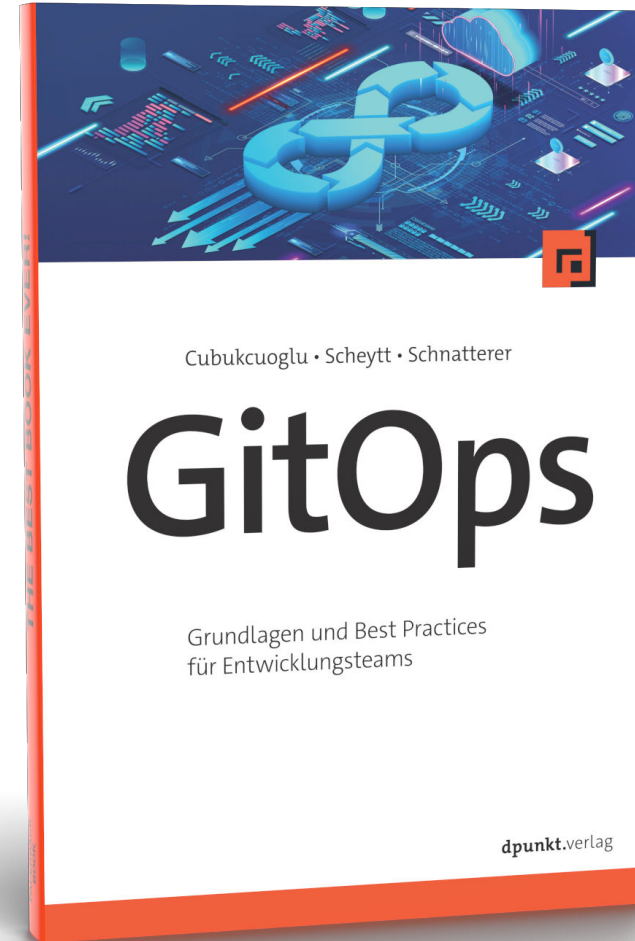
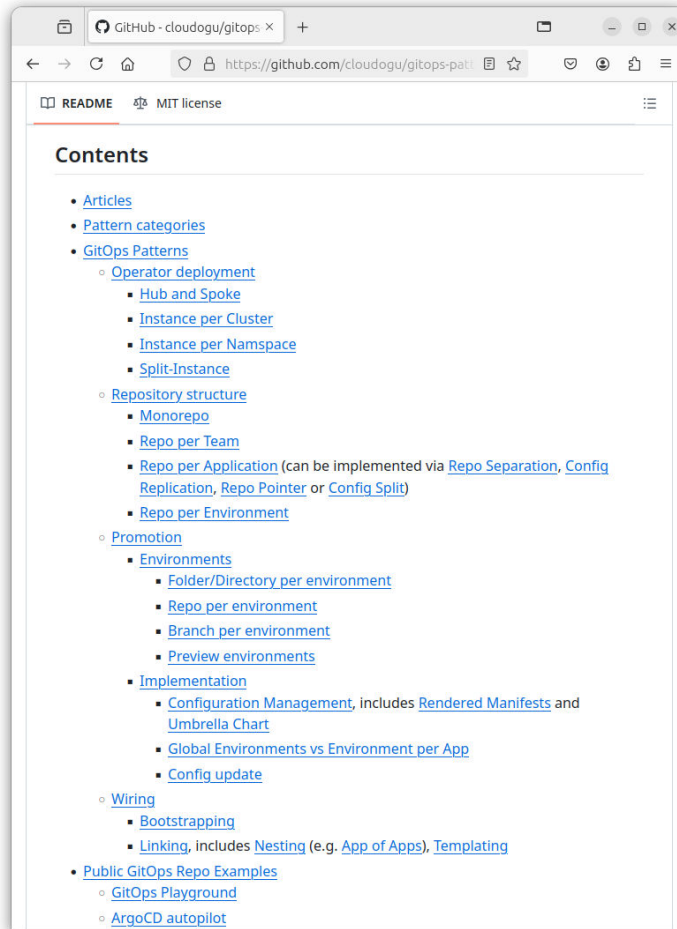
- **CI** 
 - + Can provide lots of features (PRs, hydration, validation, etc.)
 - Depends on CI and SCM
- **Renovate** 
 - + Generic solution
 - Less specific K8s or GitOps-related options
- **Image Updaters** 
 - + Good integration to GitOps operator
 - No PRs (so far)
- **[argoproj-labs/gitops-promoter](#)** 
 - + First Party Argo CD solution (also does hydration)
 - Not stable, not for flux
- **[akuity/kargo](#)** 
 - + Declarative promotions, UI
 - Yet another tool, not for flux



More examples

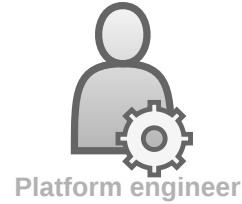
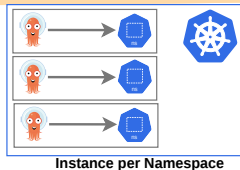
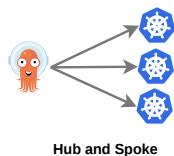
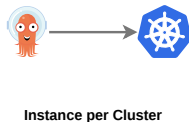


Further reading



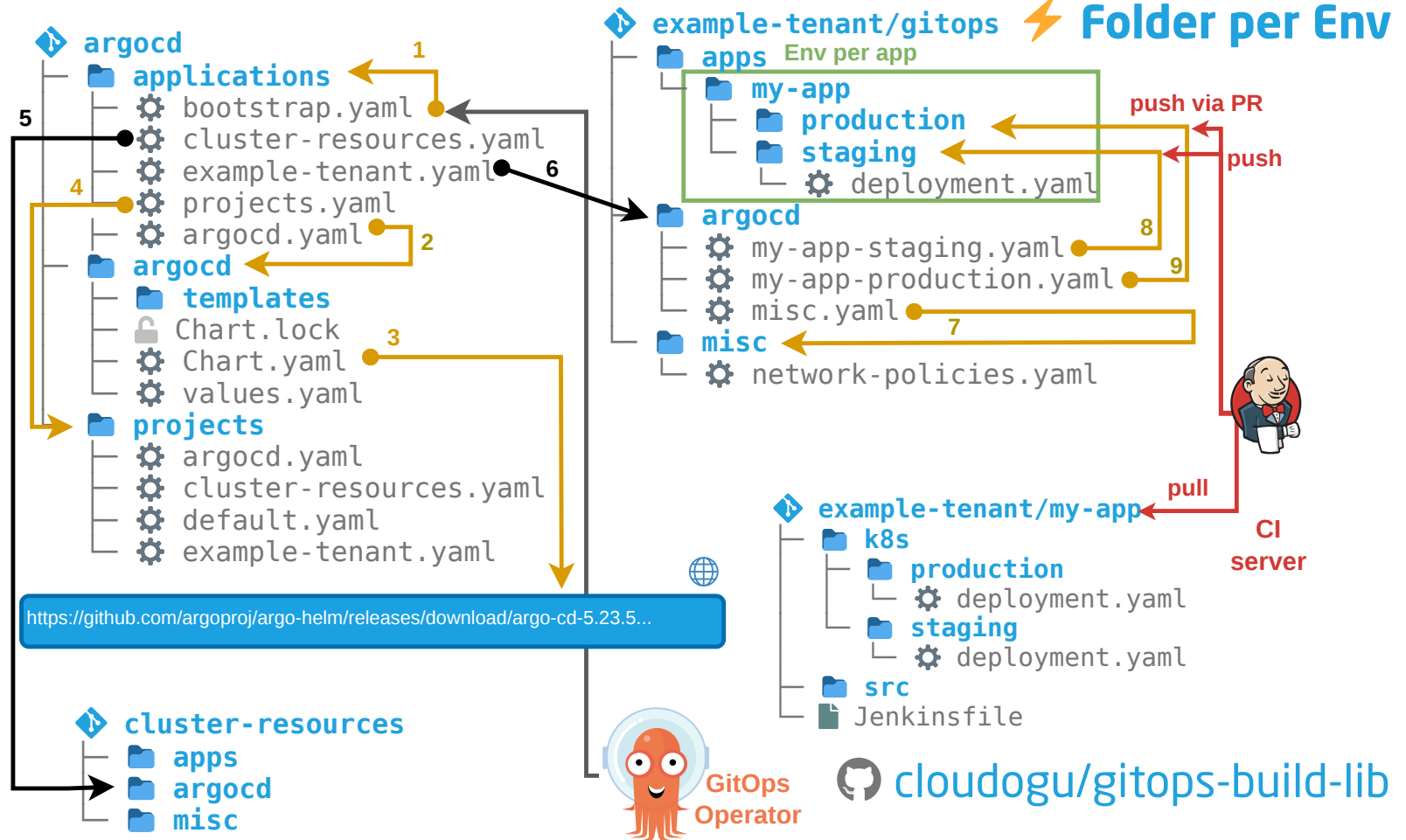
Example 1: GOP (old repo structure)

- **Repo pattern:** Per team 🧑 per app
- **Operator pattern:** Instance per Cluster (Hub and Spoke, Instance per Namespace)
- **Operator:** 🐙
- **Bootstrapping:** GOP (Helm, kubectl)
- **Linking:** 🐙 Application
- **Features:**
 - Operate ArgoCD with GitOps
 - Solution for cluster resources
 - Env per app
 - CI: Config update + replication, rendered Manifest 🚢
 - Multi-tenancy: N tenants on 1 cluster (namespace envs)
- **Source:** 🐙 [cloudogu/gitops-playground](https://github.com/cloudogu/gitops-playground)








App of Apps

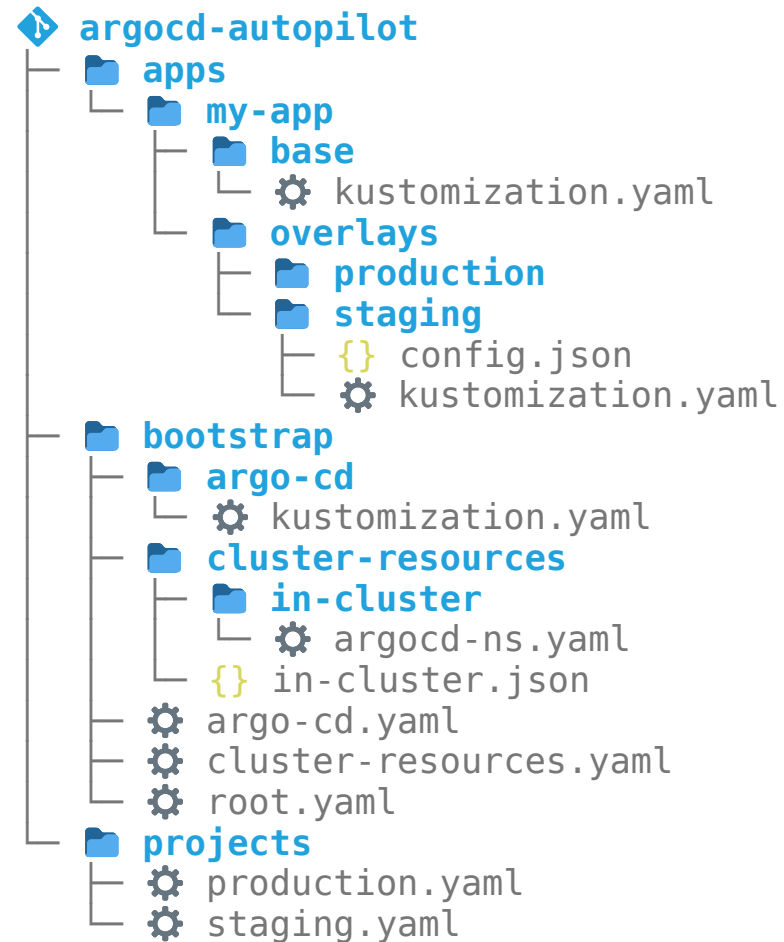
Umbrella Chart



[cloudogu/gitops-build-lib](https://github.com/cloudogu/gitops-build-lib)

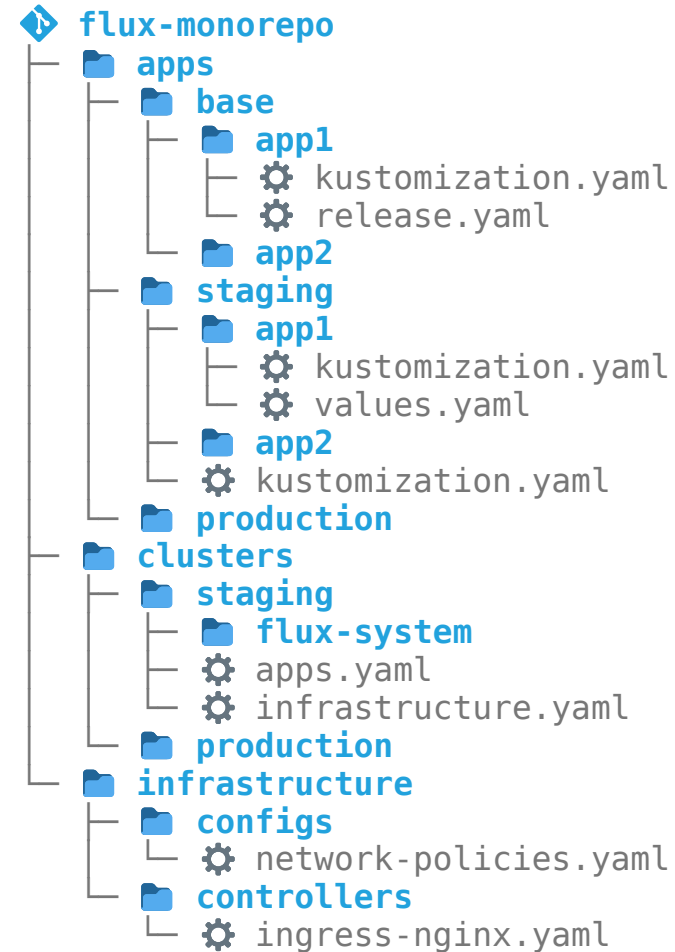
Example 2: ArgoCD autopilot

- **Repo pattern:** [Monorepo](#)
- **Operator pattern:**
Instance per Cluster / Hub and Spoke
- **Operator:** 
- **Bootstrapping:** `argocd-autopilot`
- **Linking:**  `Application`,
`ApplicationSet`, 
- **Features:**
 - Operate ArgoCD with GitOps
 - Solution for cluster resources
 - Env per app Pattern
 - Create structure and YAML via CLI
- **Source:**
 -  [argoproj-labs/argocd-autopilot](https://github.com/argoproj-labs/argocd-autopilot)
 -  [gitops-book/argocd-autopilot-example](#)









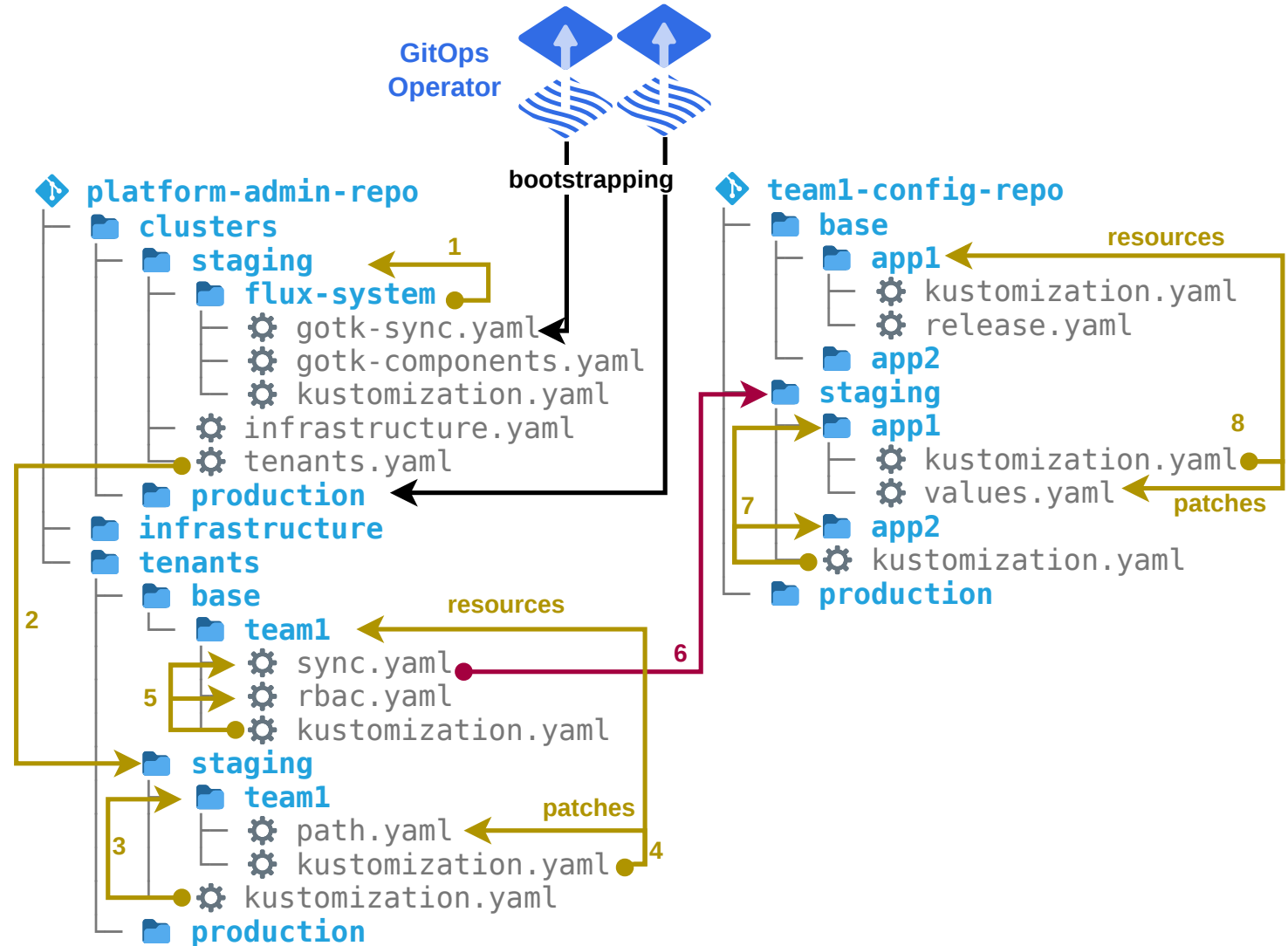
Example 3: Flux Monorepo

- **Repo pattern:** Monorepo
- **Operator pattern:** Instance per Cluster
- **Operator:** 
- **Bootstrapping:** flux
- **Linking:**  Kustomization, 
- **Features:**
 - Operate Flux with GitOps
 - Solution for cluster resources
- **Source:**
 -  [fluxcd/flux2-kustomize-helm-example#16](https://github.com/fluxcd/flux2-kustomize-helm-example#16)
 -  fluxcd.io/flux/guides/repository-structure
 -  [gitops-book/flux2-kustomize-helm-example](https://gitops-book.com/flux2-kustomize-helm-example)



Example 4: Flux repo per team

- **Repo pattern:** Repo per team
- **Operator pattern:** Instance per Cluster
- **Operator:** 
- **Bootstrapping:** flux
- **Linking:**  Kustomization, 
- **Features:**
 - Operate Flux with GitOps
 - Solution for cluster resources
 - Multi-tenancy: N tenants on 1 cluster per env (cluster envs)
- **Source:**
 -  [fluxcd/flux2-multi-tenancy](https://github.com/fluxcd/flux2-multi-tenancy)
 -  fluxcd.io/flux/guides/repository-structure
 -  [gitops-book/flux2-multi-tenancy](https://gitops-book.com/flux2-multi-tenancy)

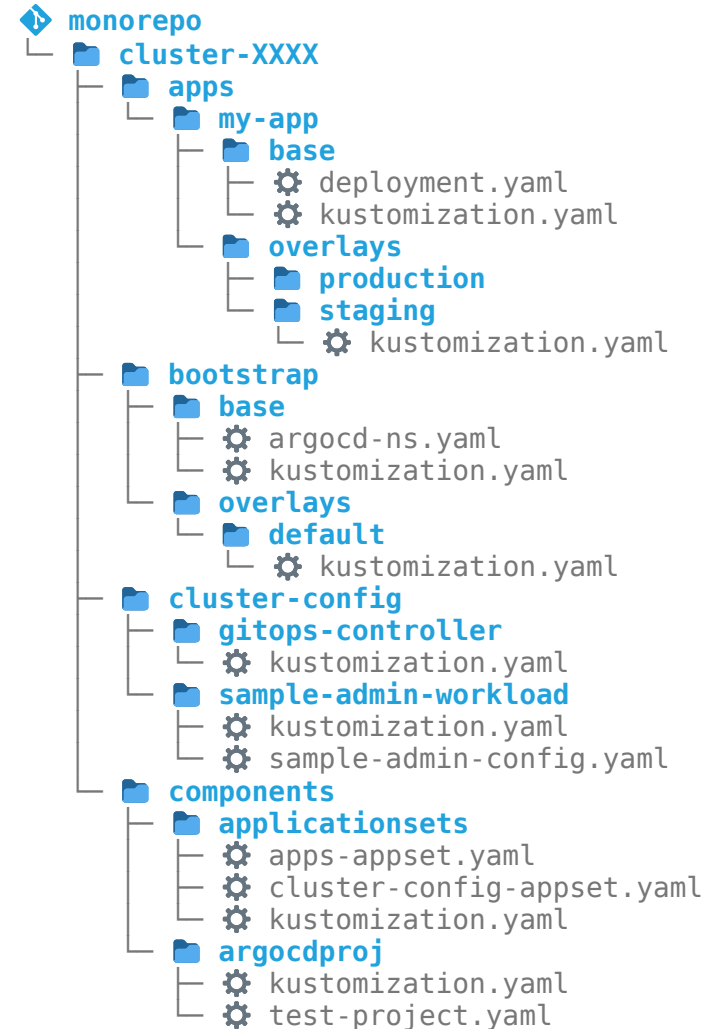


Example 4b: Flux D1 Reference Architecture

 [controlplaneio-fluxcd/d1-infra](https://github.com/controlplaneio-fluxcd/d1-infra)

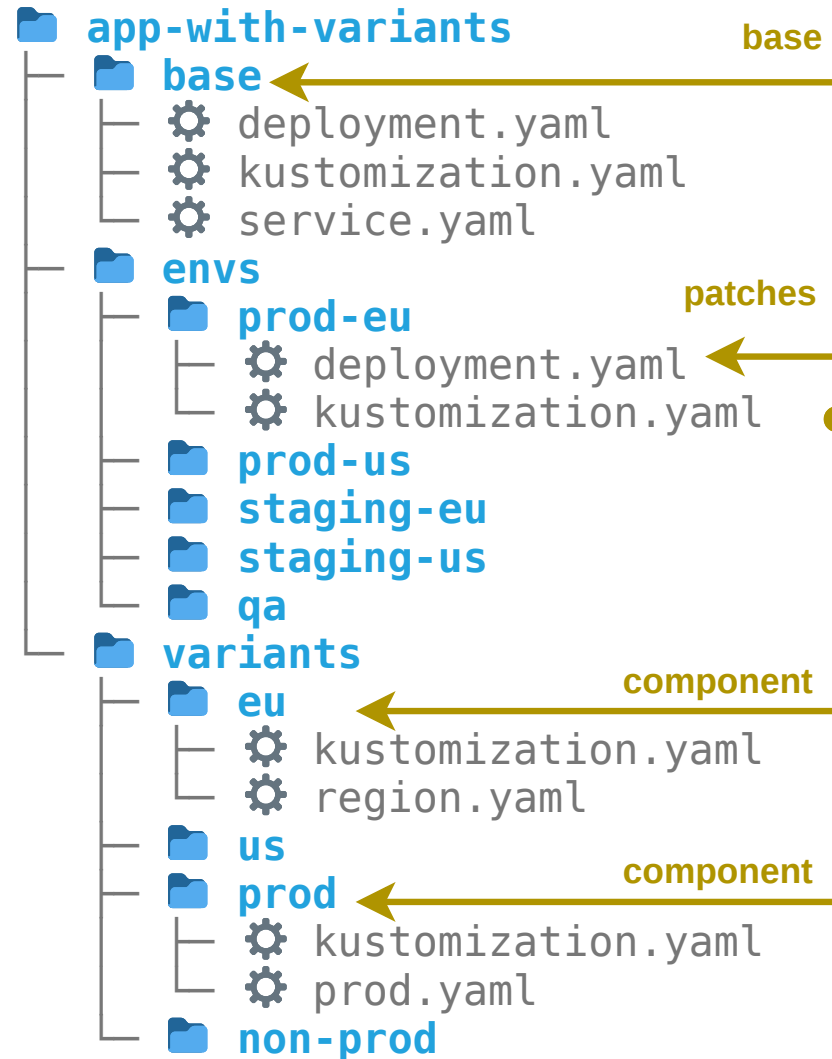
Example 5: ArgoCD and Flux alternative

- **Repo pattern:** Monorepo
- **Operator pattern:** Instance per Cluster
- **Operator:** 🧑‍🔧 ⚙️
- **Bootstrapping:** kubectl
- **Linking:** 🧑‍🔧 Application, ApplicationSet / ⚙️ Kustomization, 📁 K
- **Features:**
 - Solution for cluster resources
 - ArgoCD **and** Flux examples
- **Source:**
 - 🔄 [christianh814/example-kubernetes-go-repo](https://github.com/christianh814/example-kubernetes-go-repo)
 - 📖 C. Hernandez - The Path to GitOps






Example 6: Env variations single app

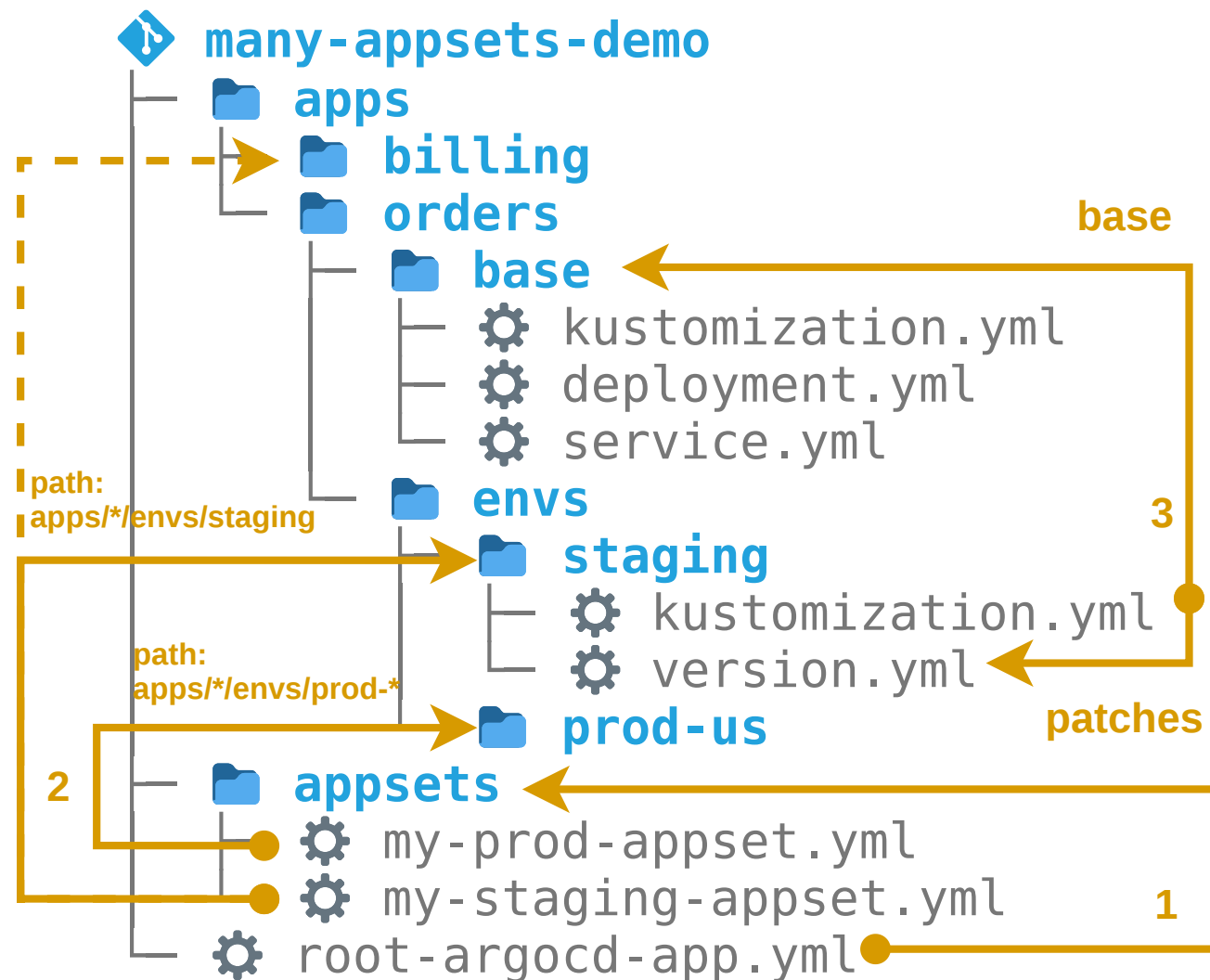
- **Operator:** 🐙 (🔗)
- **Linking:** 📄 K
- **Features:**
 - Env variants for a single app
 - Promotion "via cp"
 - Env per app Pattern
- **Source:**
 - 🔗 [kostis-codefresh/gitops-environment-promotion](https://github.com/kostis-codefresh/gitops-environment-promotion)






Example 7: Env variations multiple apps

- **Operator:** 
- **Linking:**  ,  ApplicationSet, (Application)
- **Features:**
 - Env variants for multiple apps with few appSets
 - Promotion "via cp"
 - Env per app Pattern
- **Source:**

 [kostis-codefresh/many-appsets-demo](https://github.com/kostis-codefresh/many-appsets-demo)



Key Takeaways

- Bootstrapping: The only imperative step before GitOps
 - Linking: 
 -  `Kustomization`
 -  `Application`, `ApplicationSet`
 - Multi-Tenancy:
 - Shared: Less effort but weaker isolation
 - Dedicated: Keep calm and build your own IDPaaS using AppSets 😊
- ➔ Use examples as inspiration to solving your use case

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Slides



☒ Let's meet



 cloudogu/gitops-playground

Image sources

- Live Example:
<https://unsplash.com/photos/assorted-color-hot-air-balloons-during-daytime-DuBNA1QMpPA>
- More examples:
<https://unsplash.com/photos/XZc4f2XZc84>
- coloured-parchment-paper background by brgfx on Freepik:
https://www.freepik.com/free-vector/coloured-parchment-paper-designs_1078492.htm