



// GITOPS ADVENTURE: REPO STRUCTURES

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Slides



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What is your profession?



Software Engineer / Developer



What is your profession?



Platform Engineer / Ops person

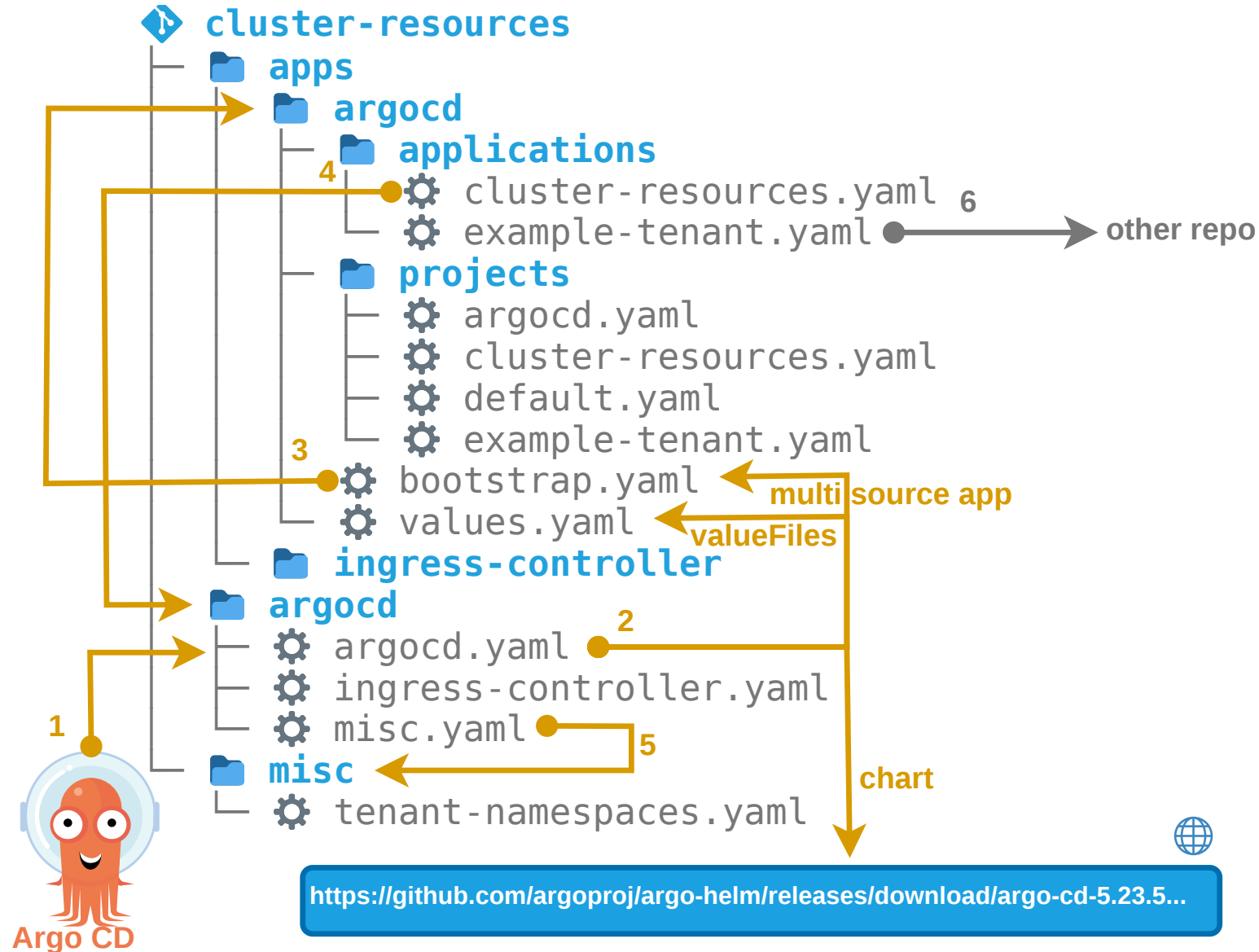


What is your profession?



None of the above

Basic repo structure



Bootstrapping in vanilla cluster

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

```
# The only imperative commands you'll ever need  
helm template ..  
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)

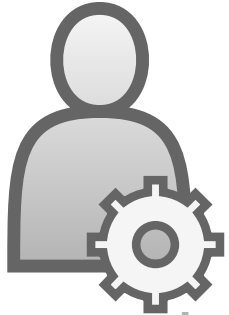
Also runs locally



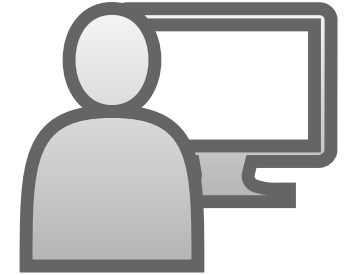
```
VERSION='cec82a7' # Preview for 0.12.0
bash <(curl -s \
  "https://raw.githubusercontent.com/cloudogu/gitops-playground/$VERSION/scripts/init-cluster.sh") \
  && docker run --rm -t -u $(id -u) \
    -v ~/.config/k3d/kubeconfig-gitops-playground.yaml:/home/.kube/config \
    --net=host \
    ghcr.io/cloudogu/gitops-playground:$VERSION --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
```

TODO Try new repo structure

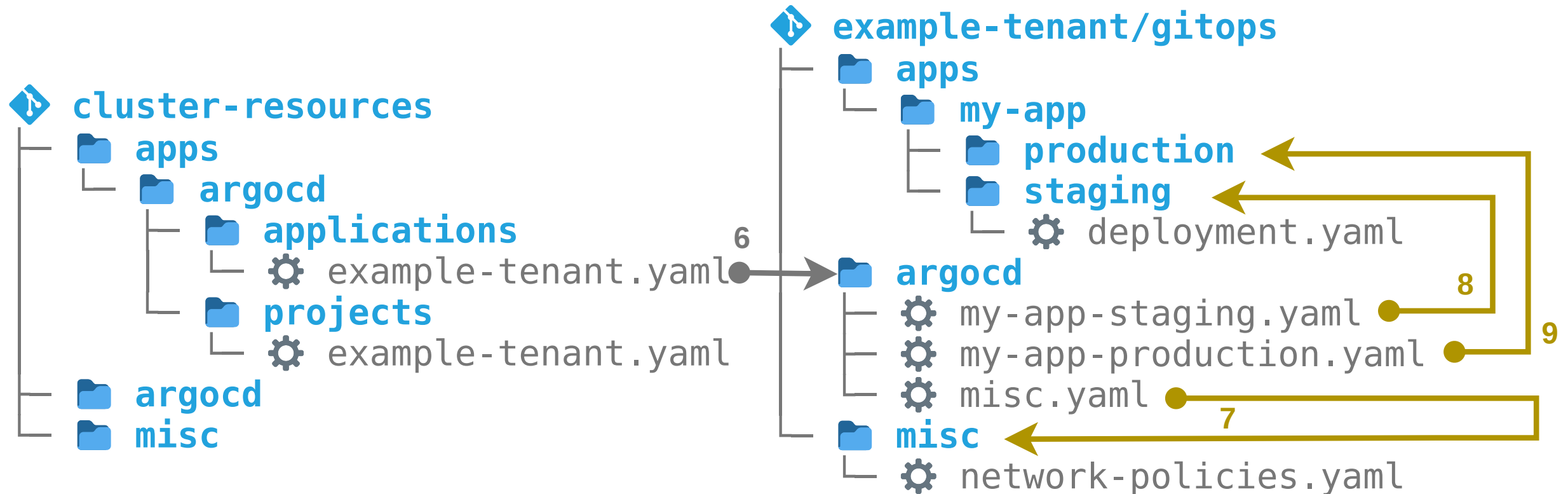
Multi-Tenancy



Platform engineer

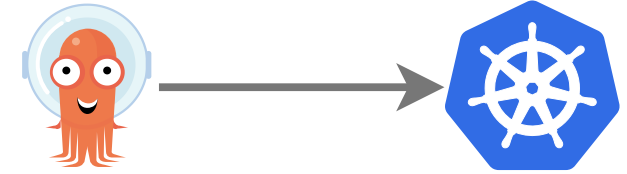


Software engineer

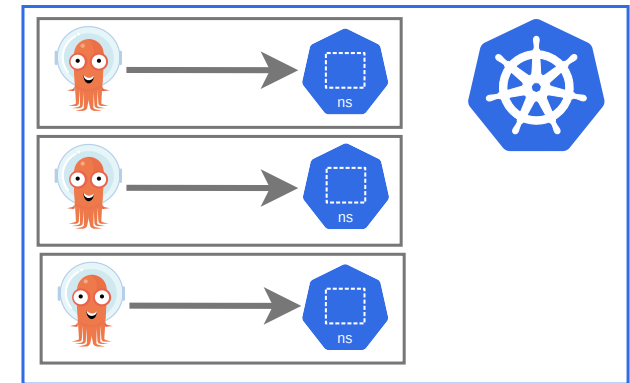


Options for multi-tenancy

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



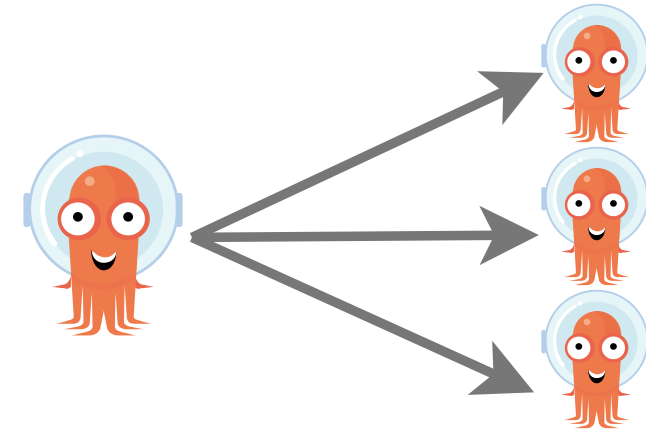
Instance per Cluster



Instance per Namespace

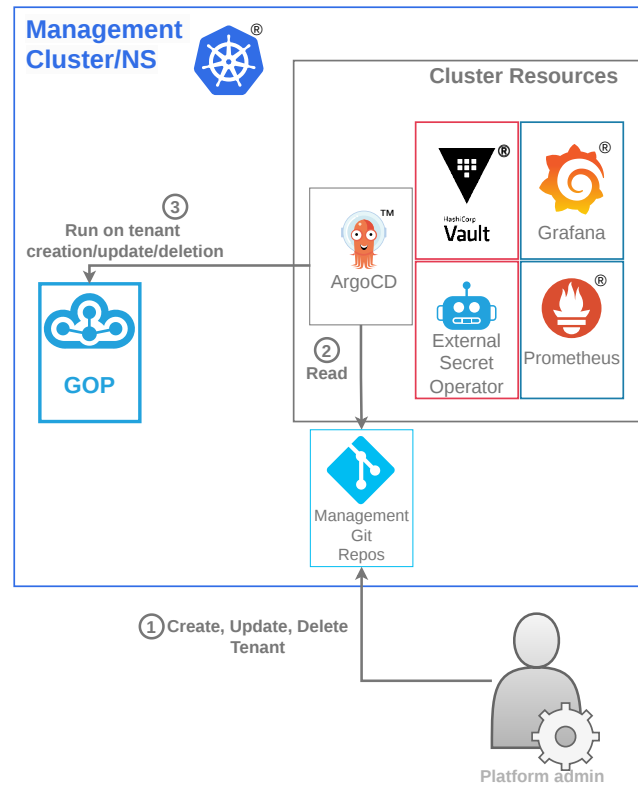
Managing dedicated instances

- Standalone
- Hub and Spoke
 - 💡 Argo CD AppSets

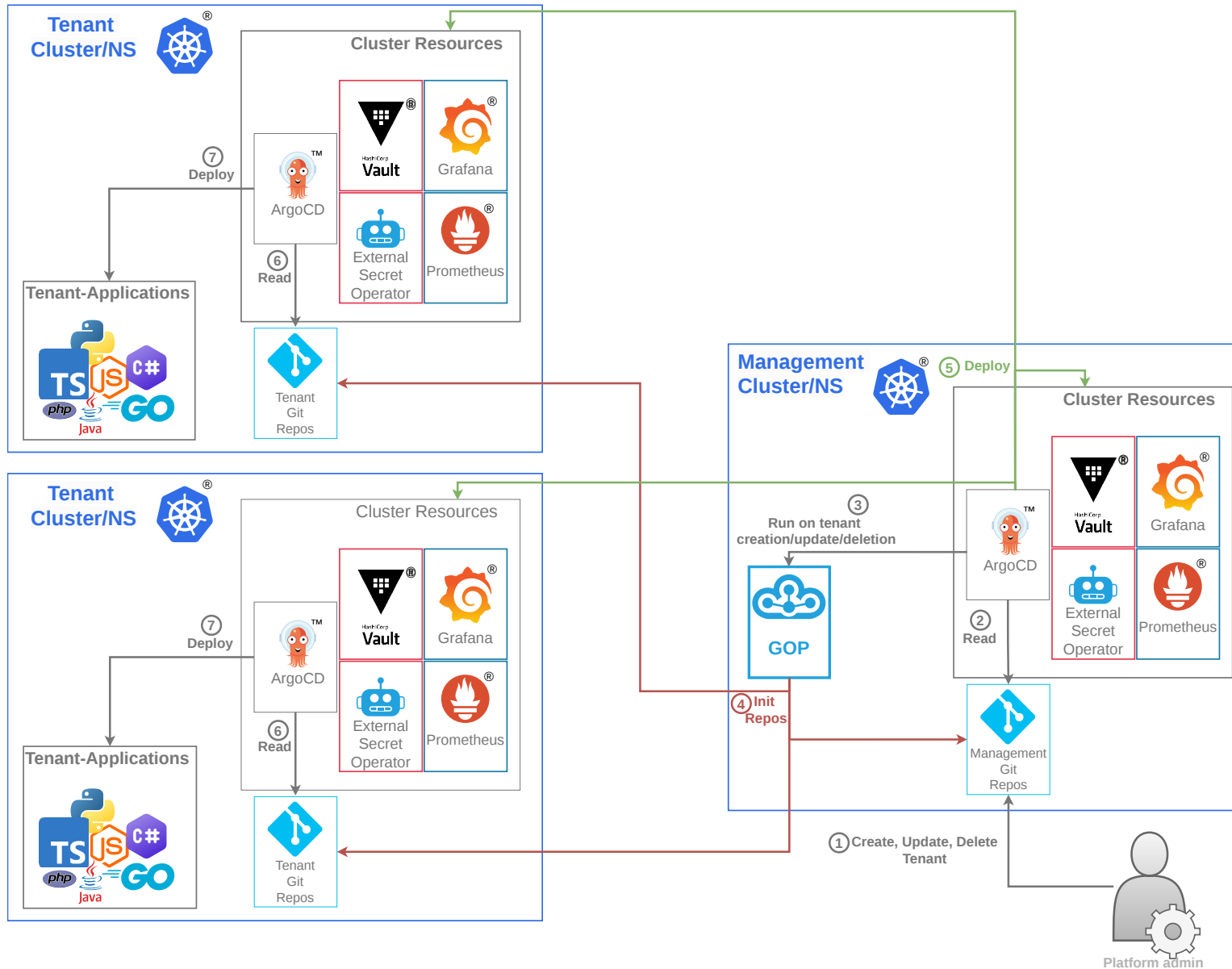


Hub and Spoke

IDP as a Service using Argo CD AppSets



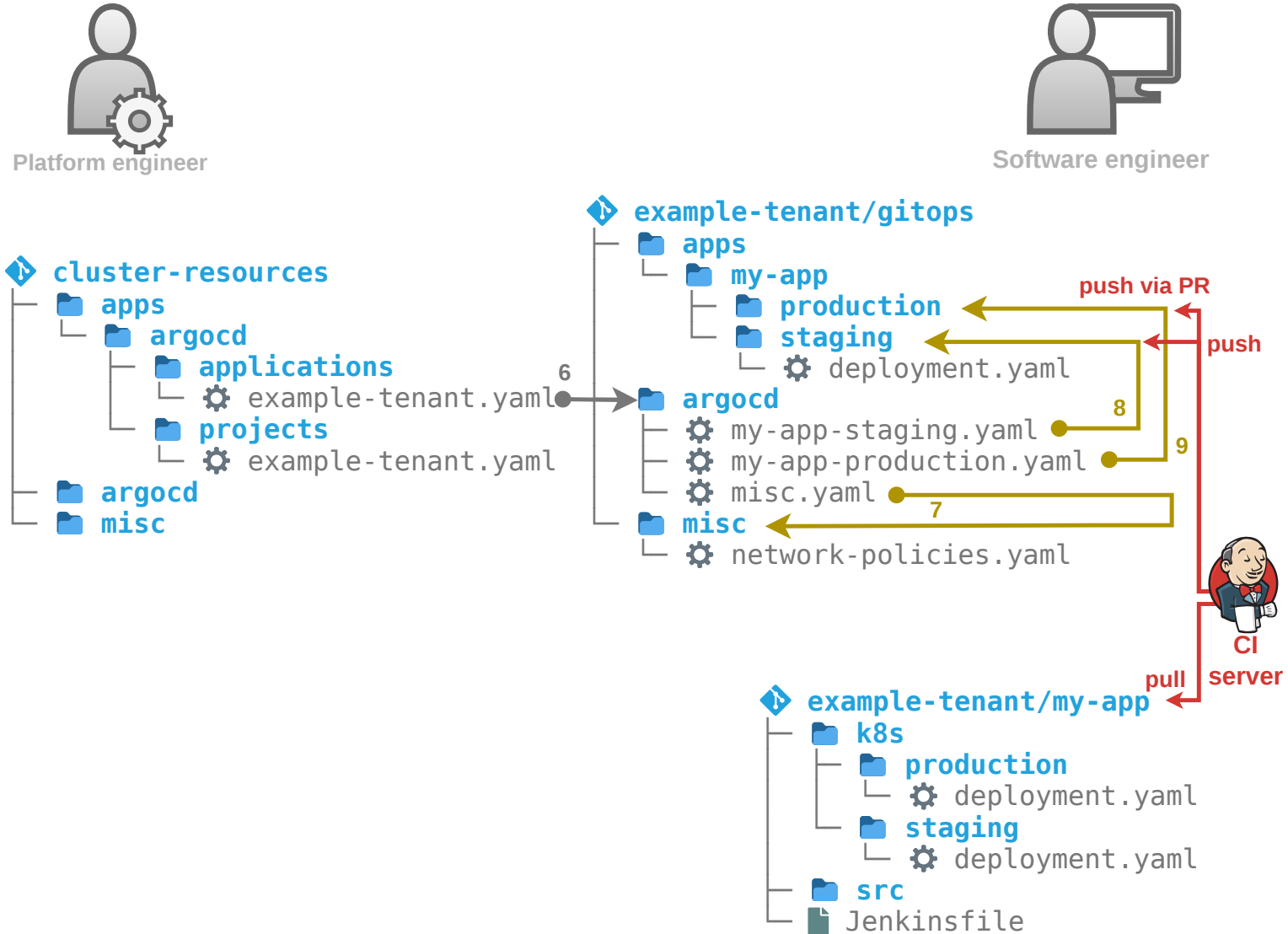
IDP as a Service using Argo CD AppSets








TODO

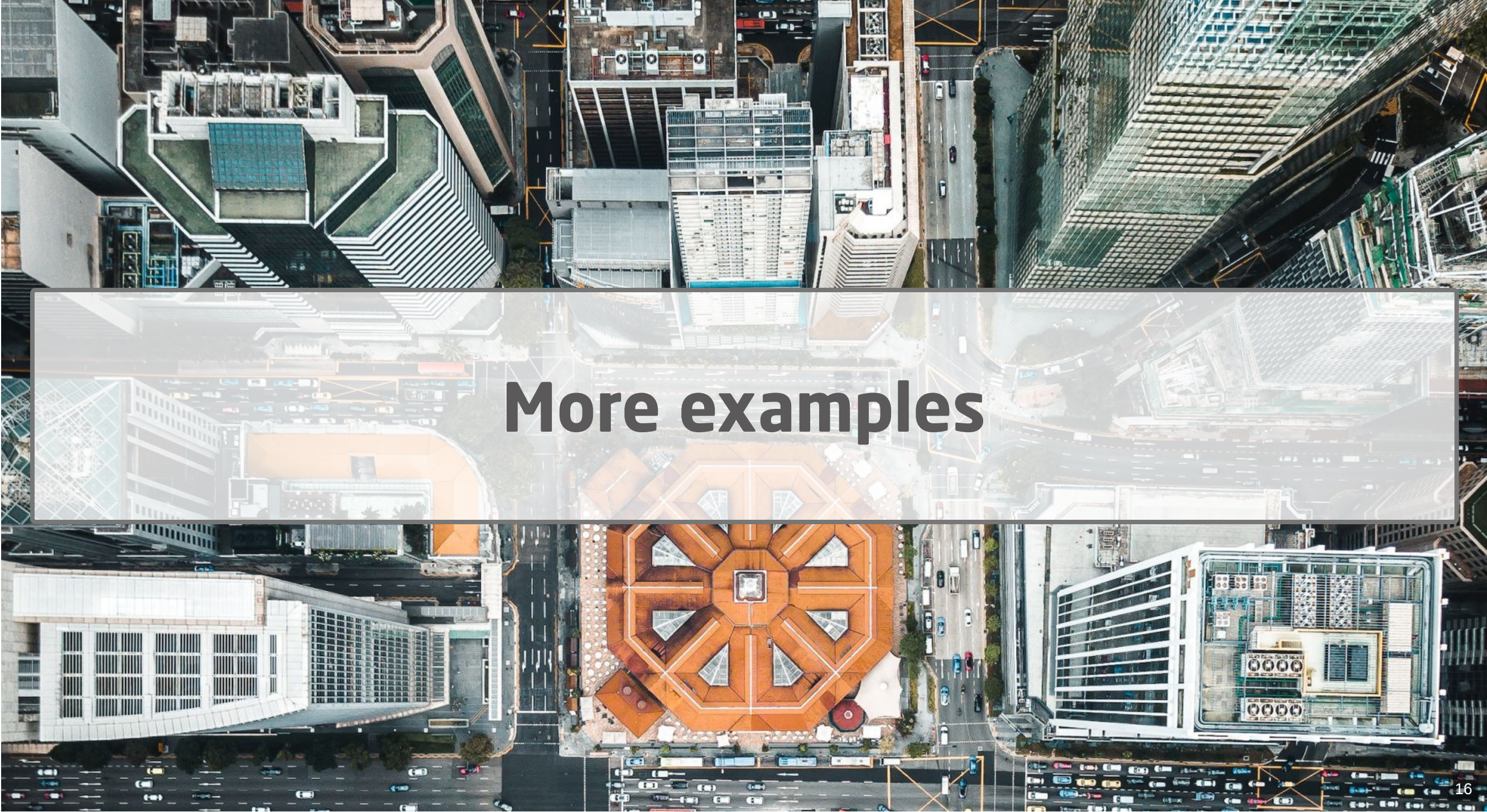
- Repo Structure
- Try it with GOP

Developers



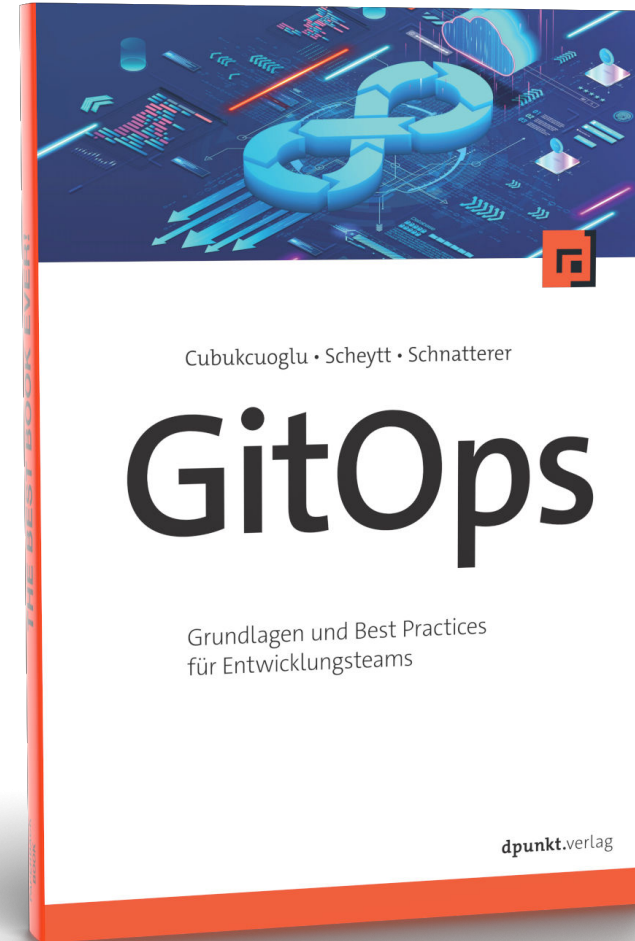
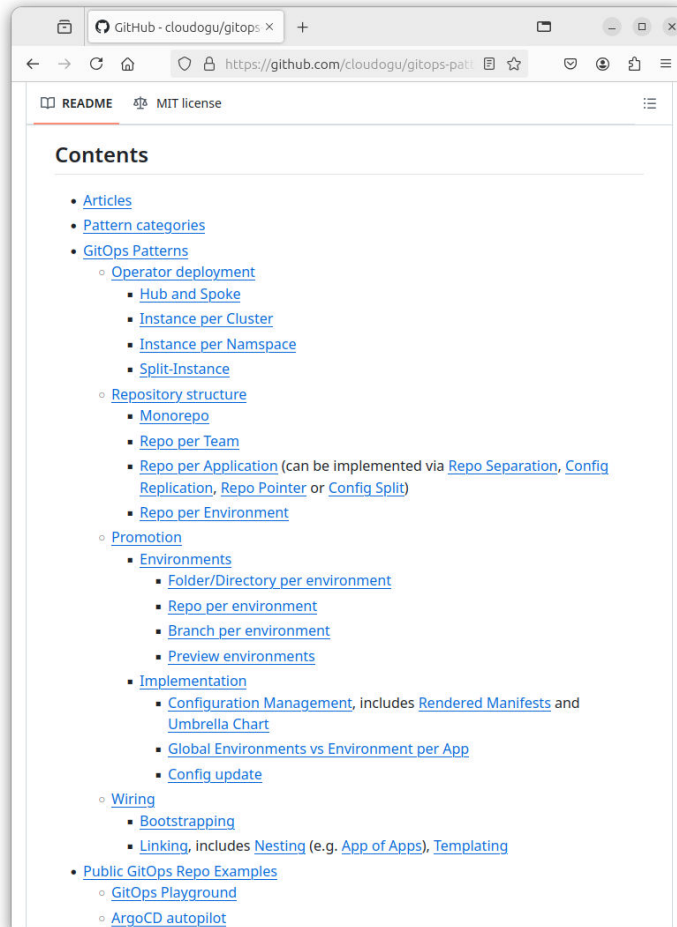
Alternatives for promotion

- **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 Stage promotions, provides UI
 - Yet another tool



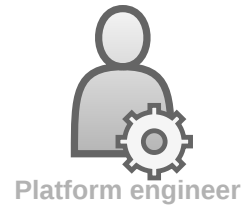
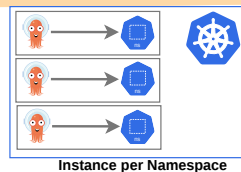
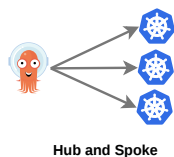
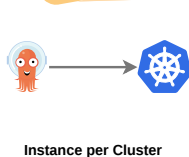
More examples

Further reading



Example 1: GOP

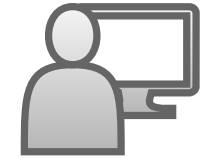
- **Repo pattern:** Per team 🗂️ per app
- **Operator pattern:** Instance per Cluster (Hub and Spoke, Instance per Namespace)
- **Operator:** 🐙
- **Bootstrapping:** GOP (Helm, kubectl)
- **Linking:** 🐙 Application
- **Features:**
 - Operate ArgoCD with GitOps
 - Solution for cluster resources
 - Env per 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)



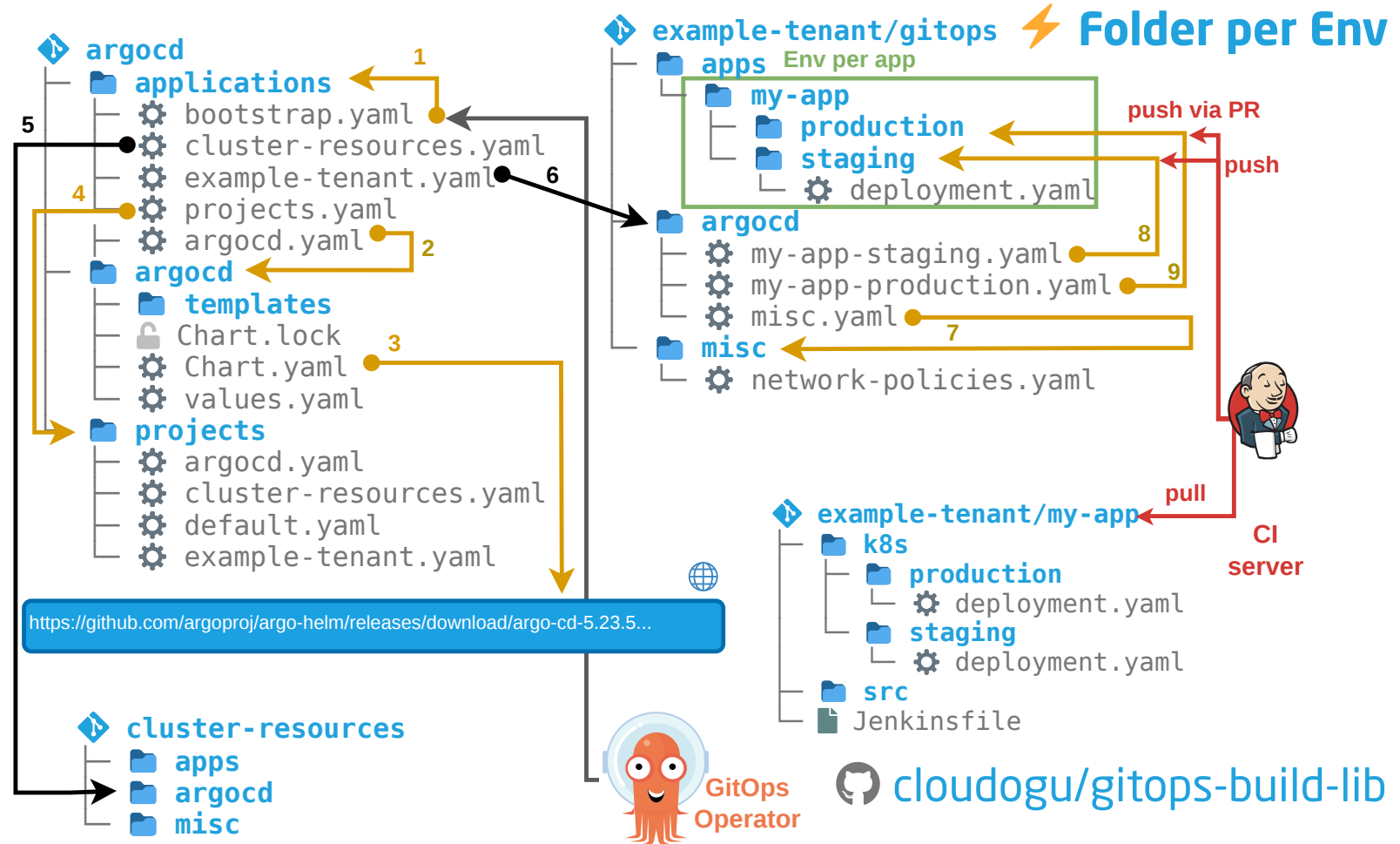
Platform engineer

App of Apps






Umbrella Chart

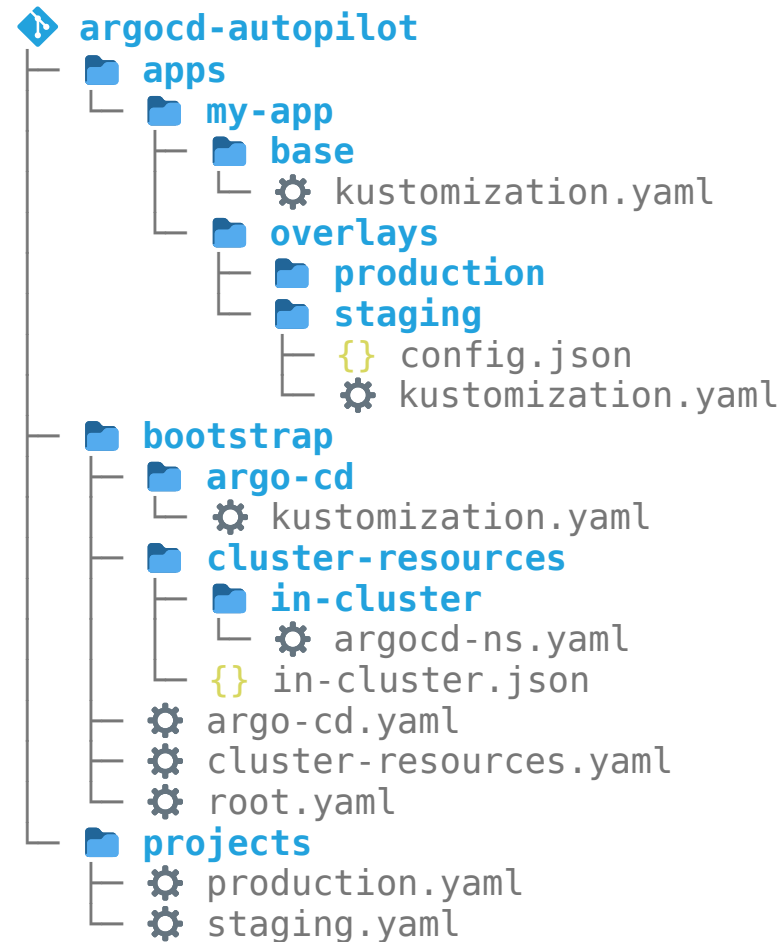


Software engineer



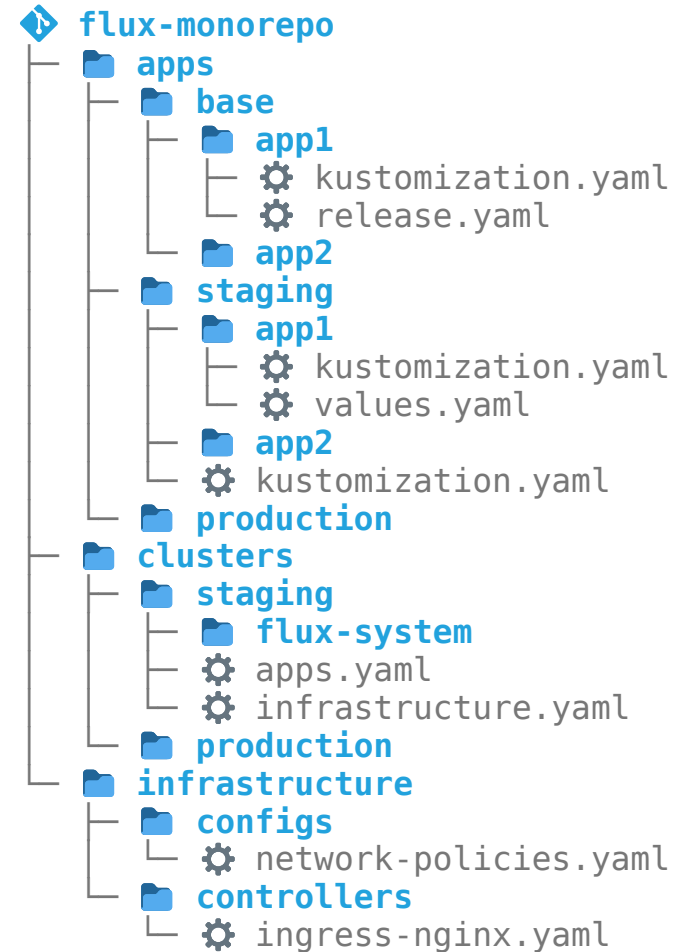
Example 2: ArgoCD autopilot

- **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](#)
 -  [gitops-book/argocd-autopilot-example](#)









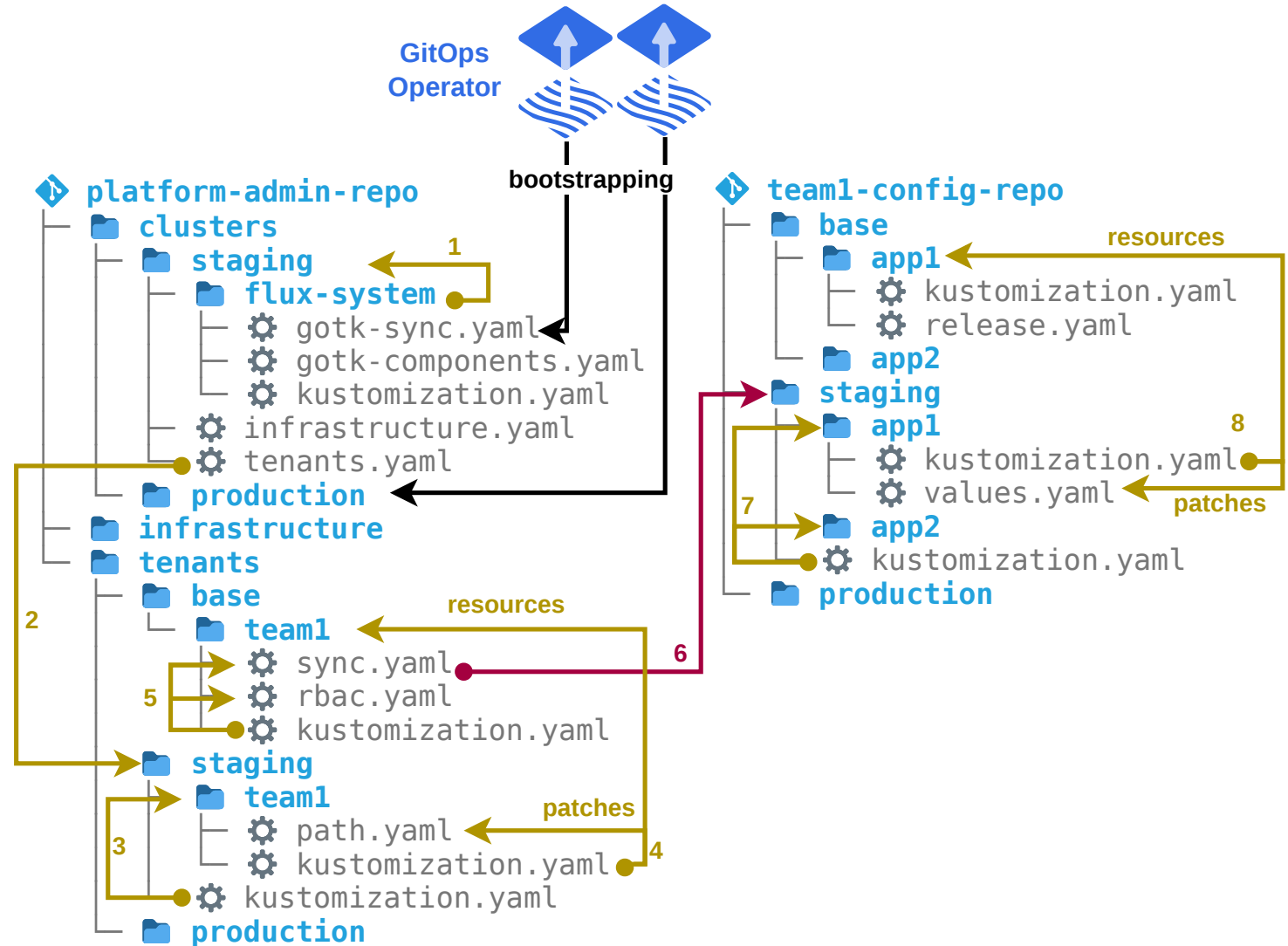
Example 3: Flux Monorepo

- **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](#)



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](#)
 -  [fluxcd.io/flux/guides/repository-structure](#)
 -  [gitops-book/flux2-multi-tenancy](#)

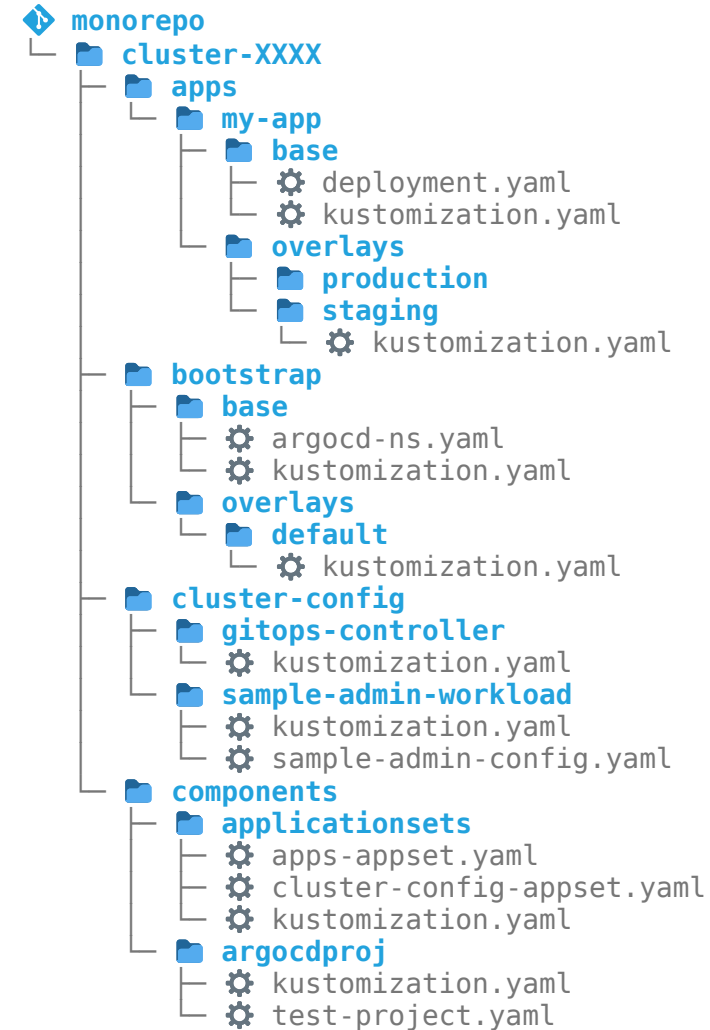


Example 4b: Flux D1 Reference Architecture



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

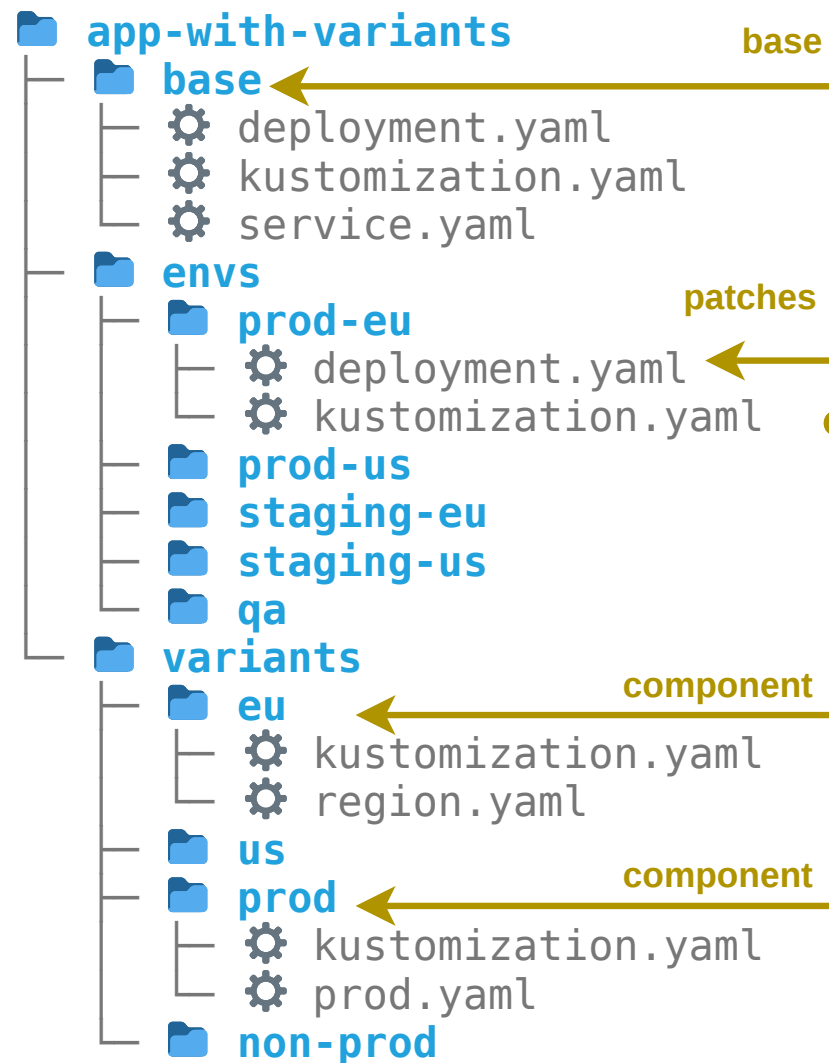
Example 5: ArgoCD and Flux alternative

- **Repo pattern:** Monorepo
- **Operator pattern:** Instance per Cluster
- **Operator:** 🧑‍🔧 ⬆️
- **Bootstrapping:** kubectl
- **Linking:** 🧑‍🔧 Application, ApplicationSet / ⬆️ Kustomization, 📁
- **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

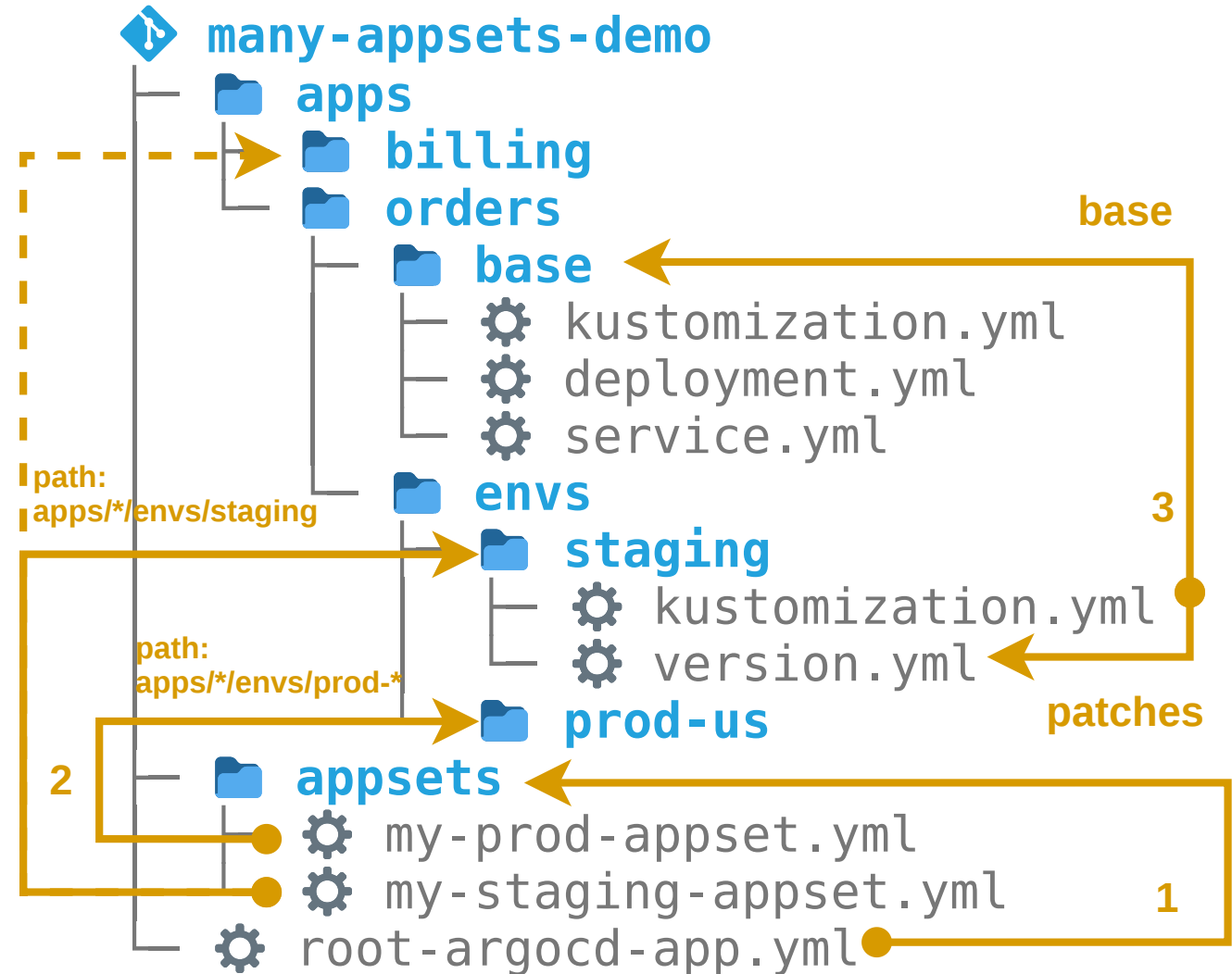
- **Operator:** 🐙 (🔗)
- **Linking:** 
- **Features:**
 - Env variants for a single app
 - Promotion "via `cp`"
 - Env per app Pattern
- **Source:**
 [kostis-codefresh/gitops-environment-promotion](https://github.com/kostis-codefresh/gitops-environment-promotion)






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: Repos, operators, clusters, namespaces
- ➔ Use examples as inspiration to solving your use case

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Slides



 clouddogu/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