Taming the Pets

Managing a heterogenous and sovereign multi-cloud container platform

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Boston, 22.05.2023

Swiss Federal Railways

Swiss Federal Railways – Facts & Figures

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- 300’000 tickets sold per day

Swiss Federal Railways – Fun Facts

- Longest Tunnel: 57.1 km (35.5 mi) (Gotthard Base Tunnel) world record
- 8 Hydroelectric power plants

Swiss Federal Railways – Chocolate Quiz

What is the customer punctuality of our trains?
(with less than 3 minutes of delay):

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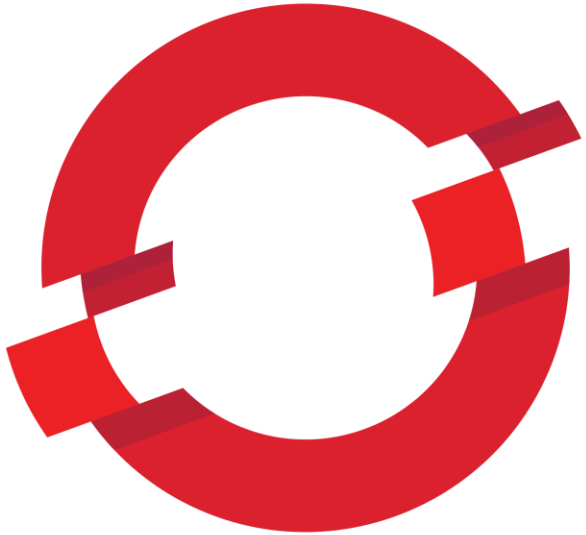


Introducing:
The Swiss Railways Container Platform

Container Platform History

- Started with OpenShift 3.0 in 2015
- One cluster on AWS
- One huge cluster (for that time) on premise
- Operation was not as good as today:
  - Monitoring missed expiration of internal CA
  - Long nights because of Ansible “gather facts...”
  - Different kind of performance issues: SDN, iptables, number of pods on nodes, etc.
- Number of clusters grow, especially with OpenShift 4

Container Platform Today

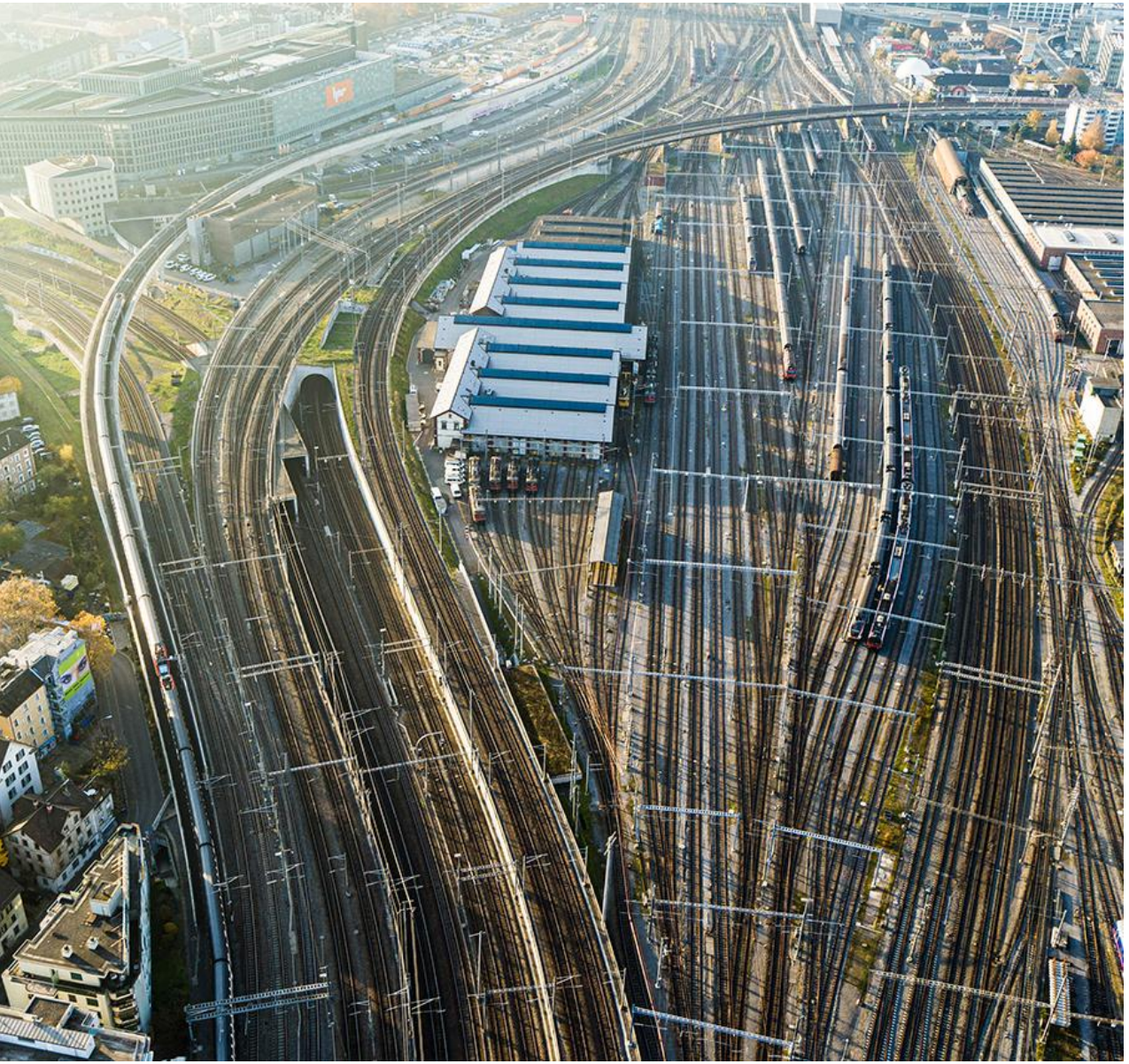
- 42 clusters, 800 nodes, 11’000 vCPUs, tons of memory
- 6 Development clusters
- 19 Test clusters
- 17 Production clusters
- Multi cloud strategy
  - AWS
  - Azure
  - Open Telekom Cloud
- Applications: mostly Java Spring Boot, Kafka, PostgreSQL

SBB CFF FFS

Container Platform Team

Container Platform Team

- 7 Engineers (including product owner) + scrum master
- 24/7 on-call service + engineer on duty
- Having fun at and beside work

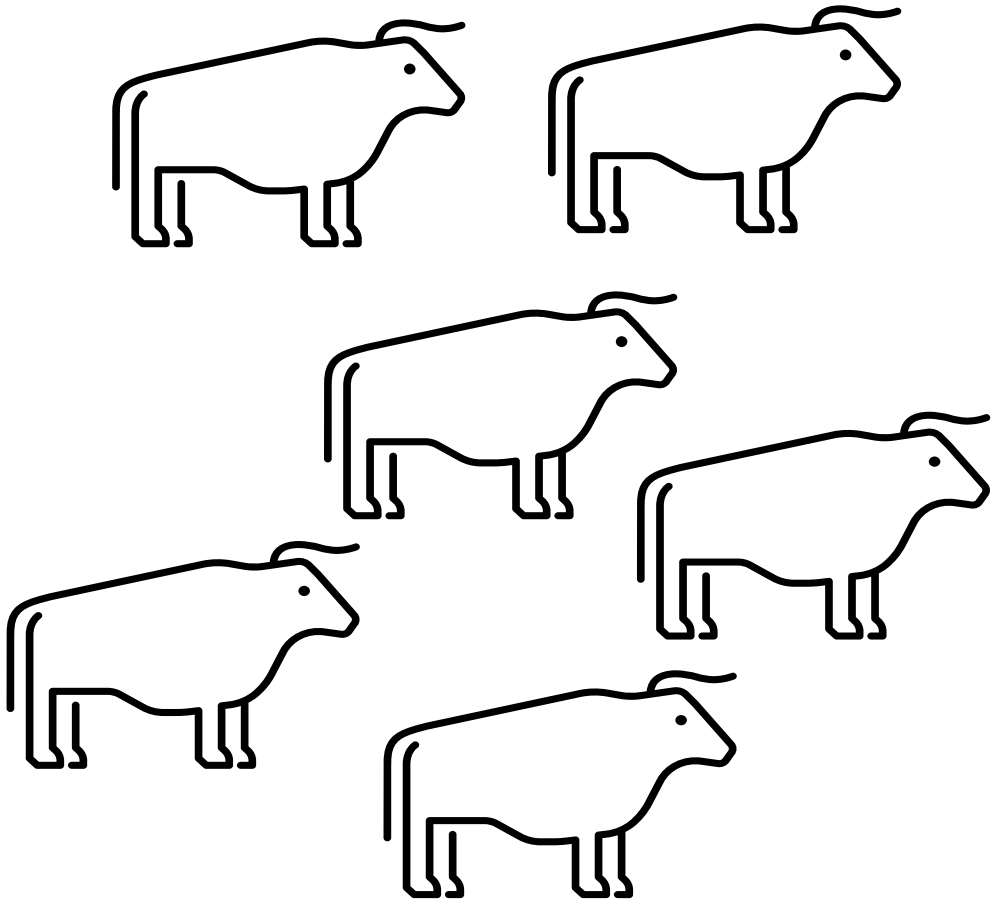


The Challenge

Pet

vs.

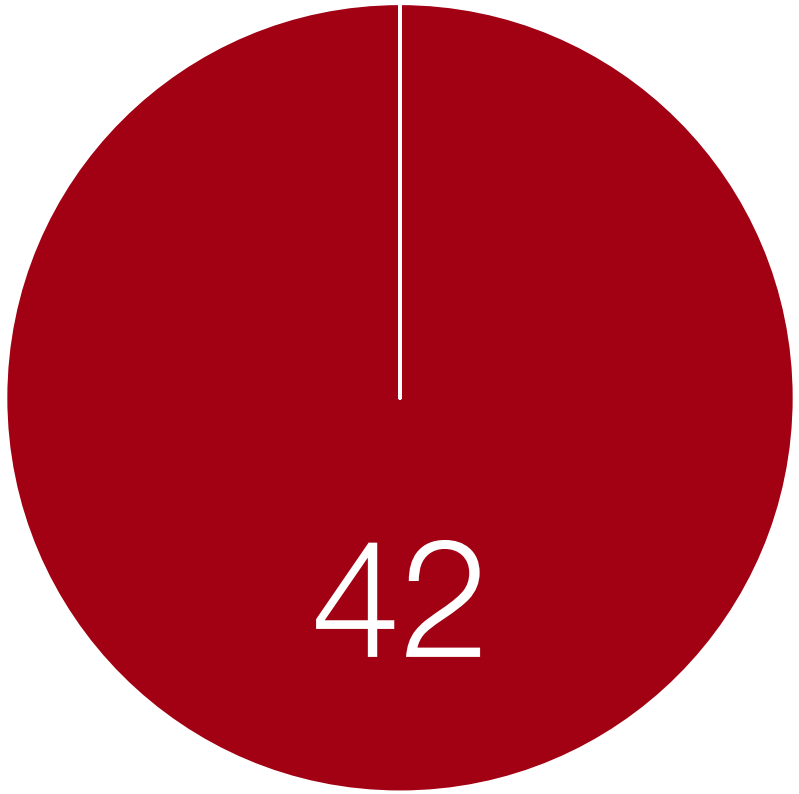
Cattle



Ideal world

All clusters are equal ...

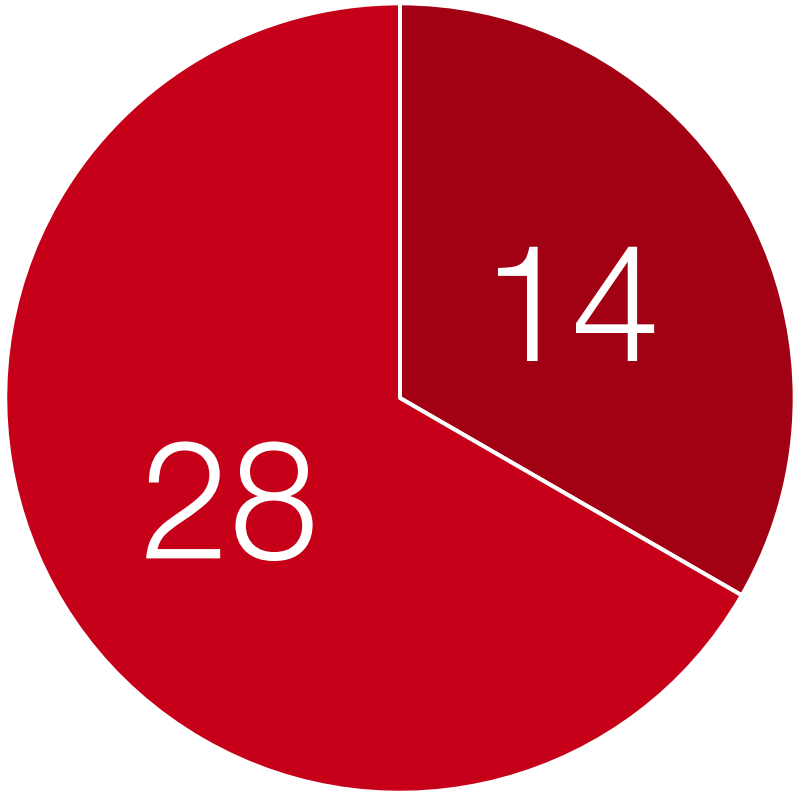
OpenShift
Cluster



Reality

… but some clusters are less equal than others …

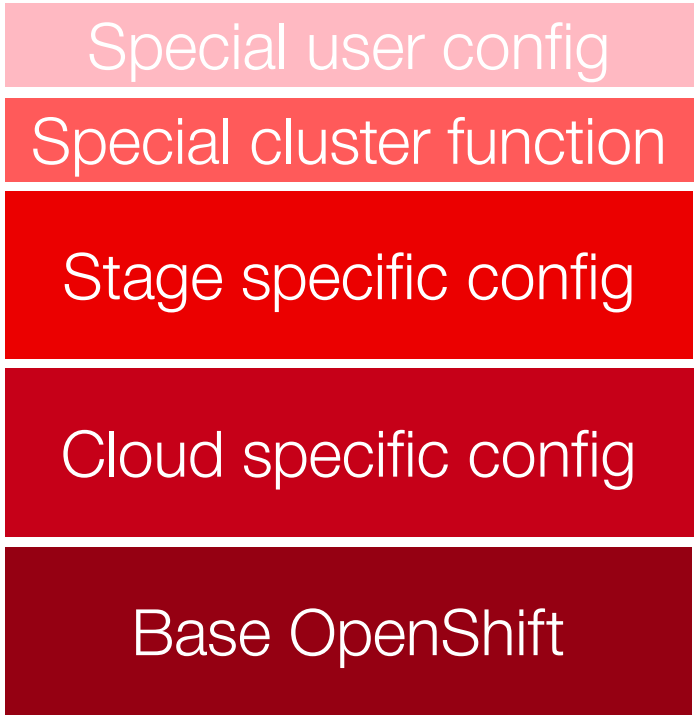
Dedicated clusters



Shared clusters

Harsh Truth

… and probably not even 2 clusters are the same.



Acceptance

We are not a cattle farm …

Acceptance

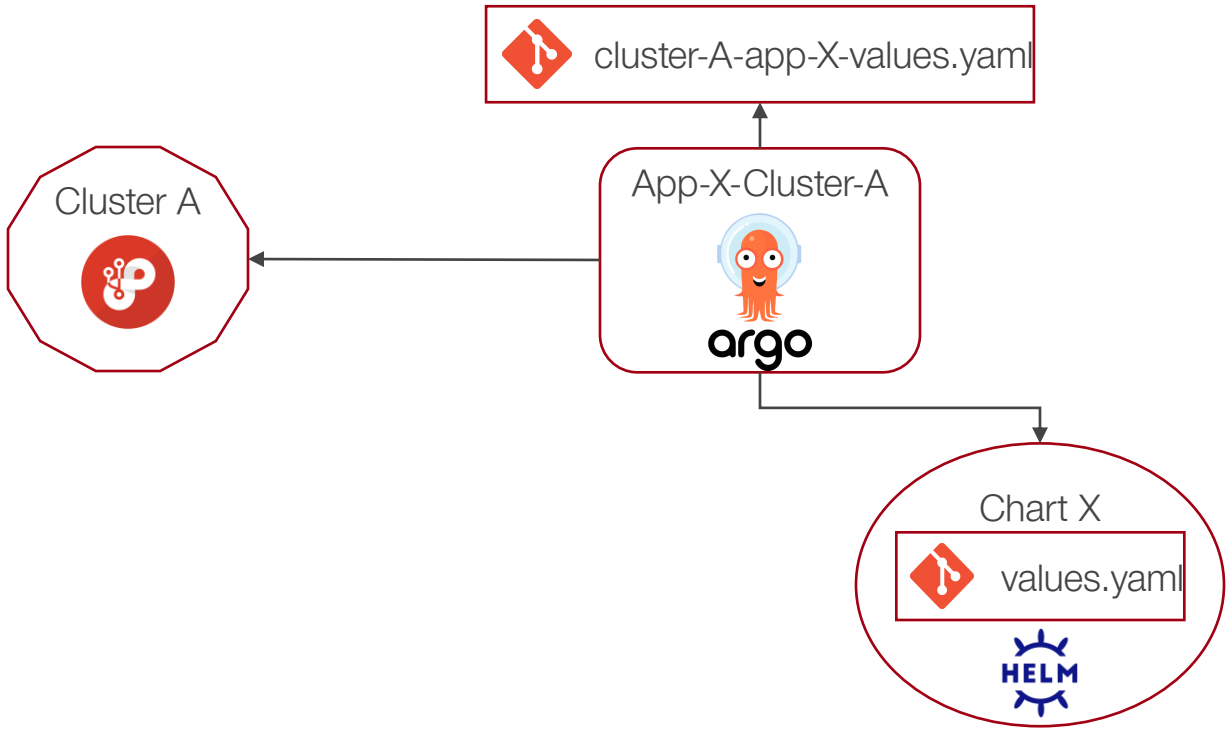
We are not a cattle farm …

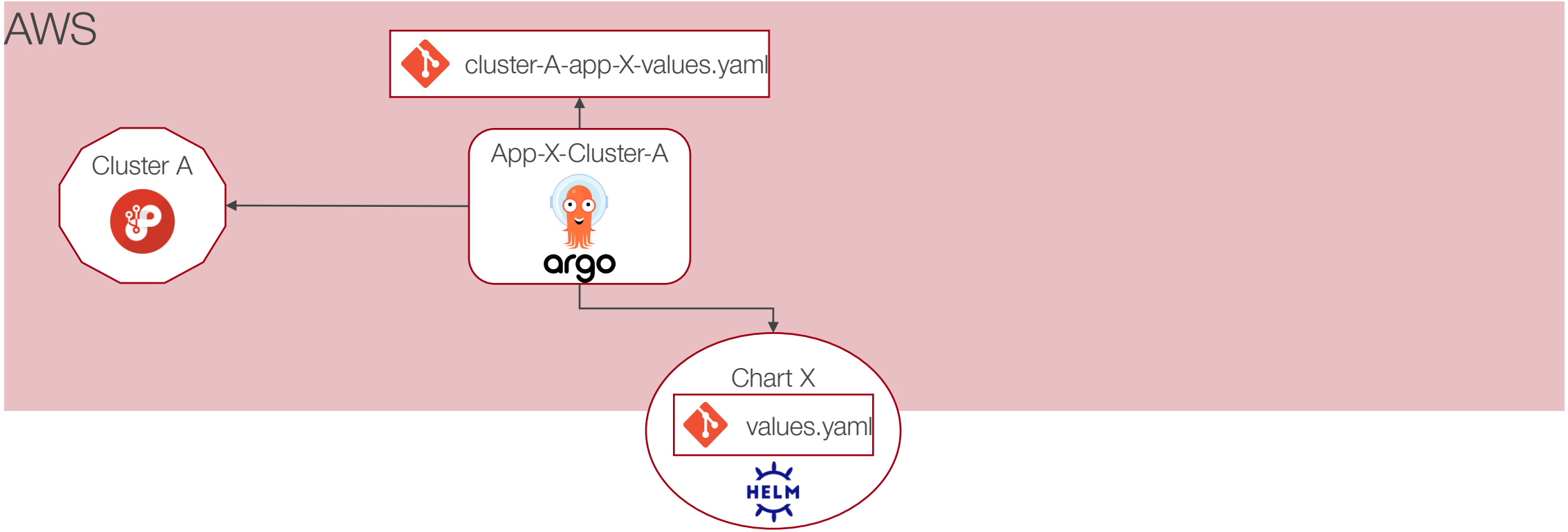
… we are a pet hotel.

The Tools

(and their issues)

The Tools


cluster-A-app-X-values.yaml
Cluster A
App-X-Cluster-A
argo
Chart X
values.yaml
HELM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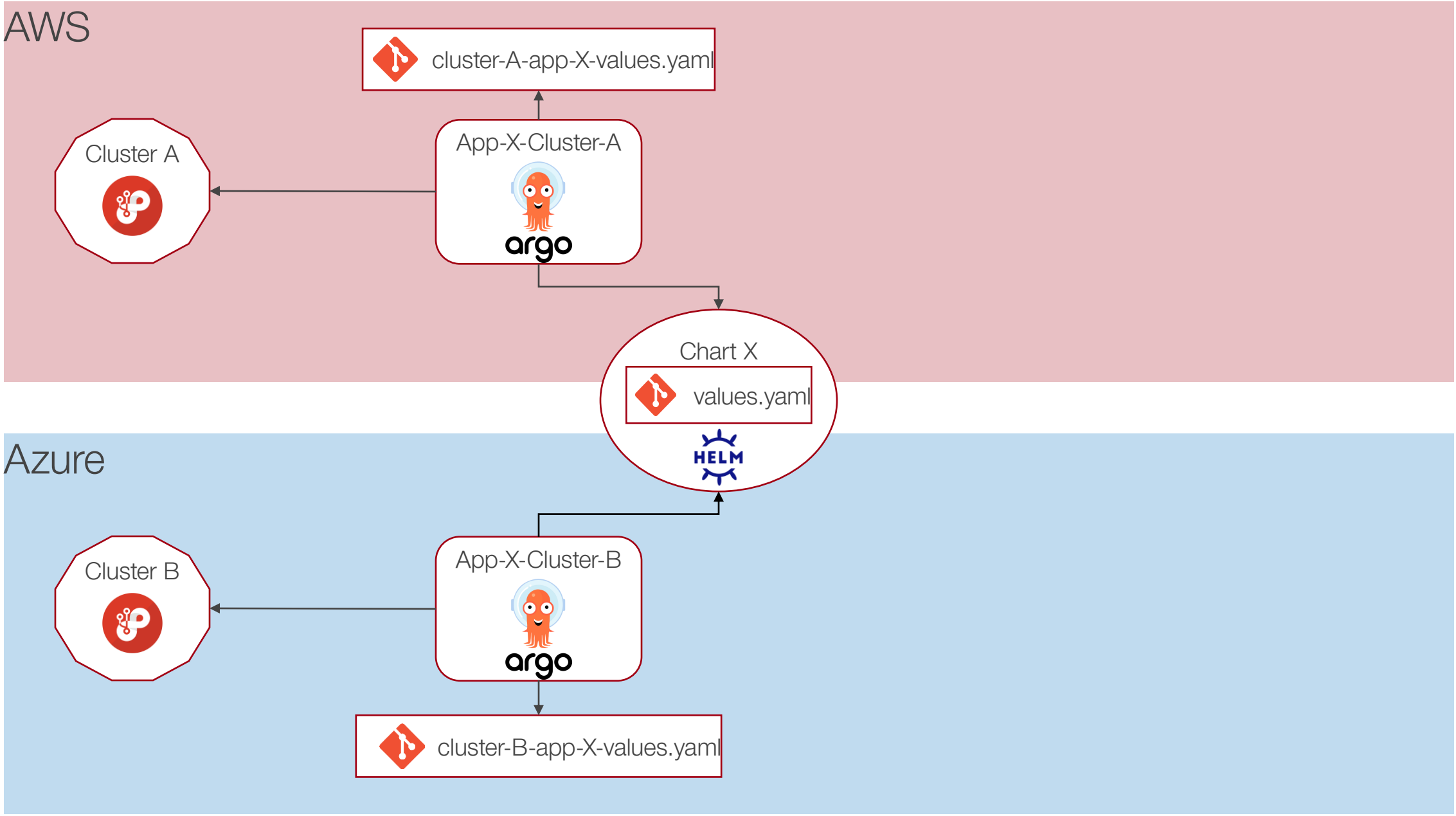
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Cluster B
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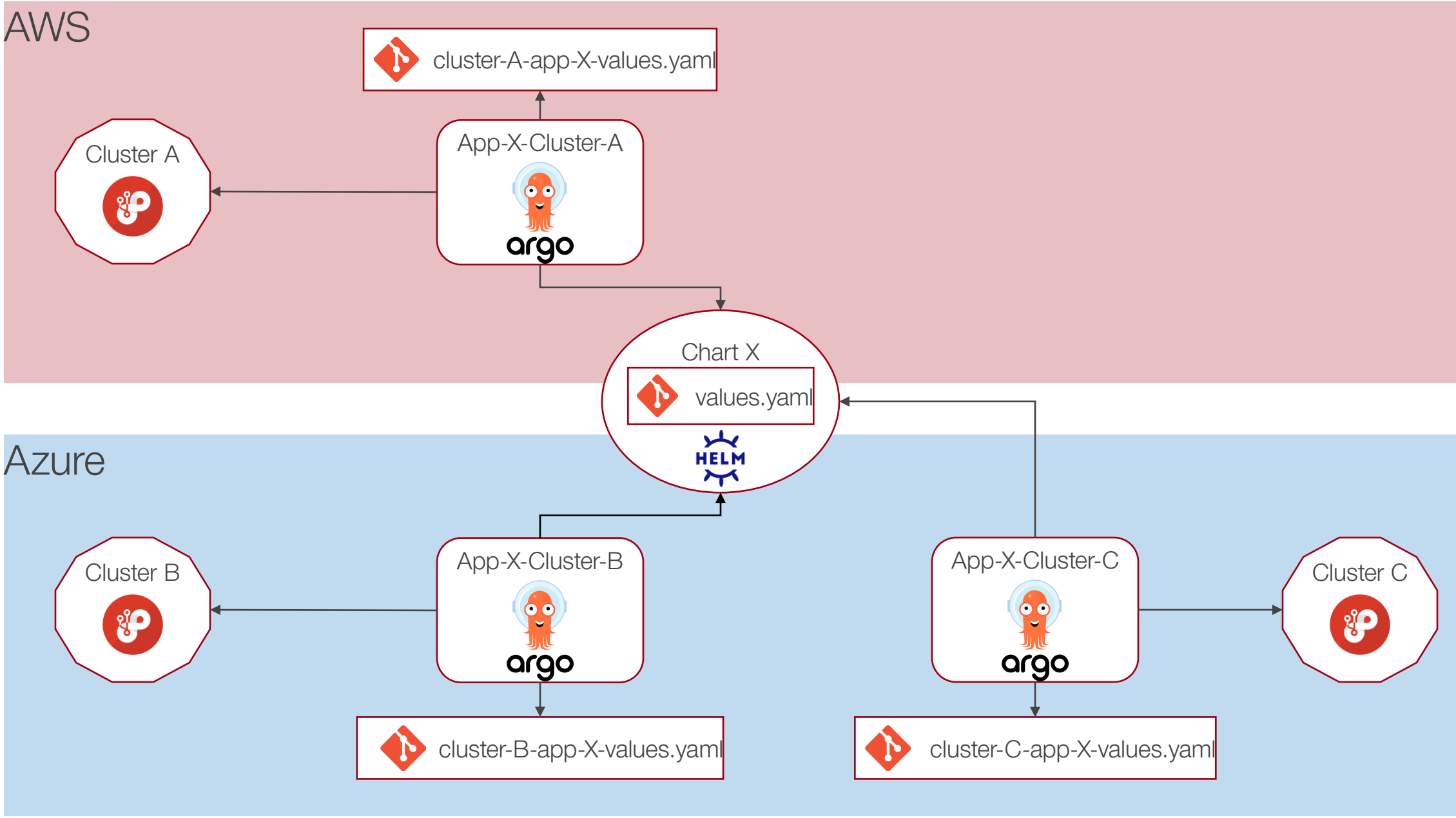
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App-X-Cluster-C
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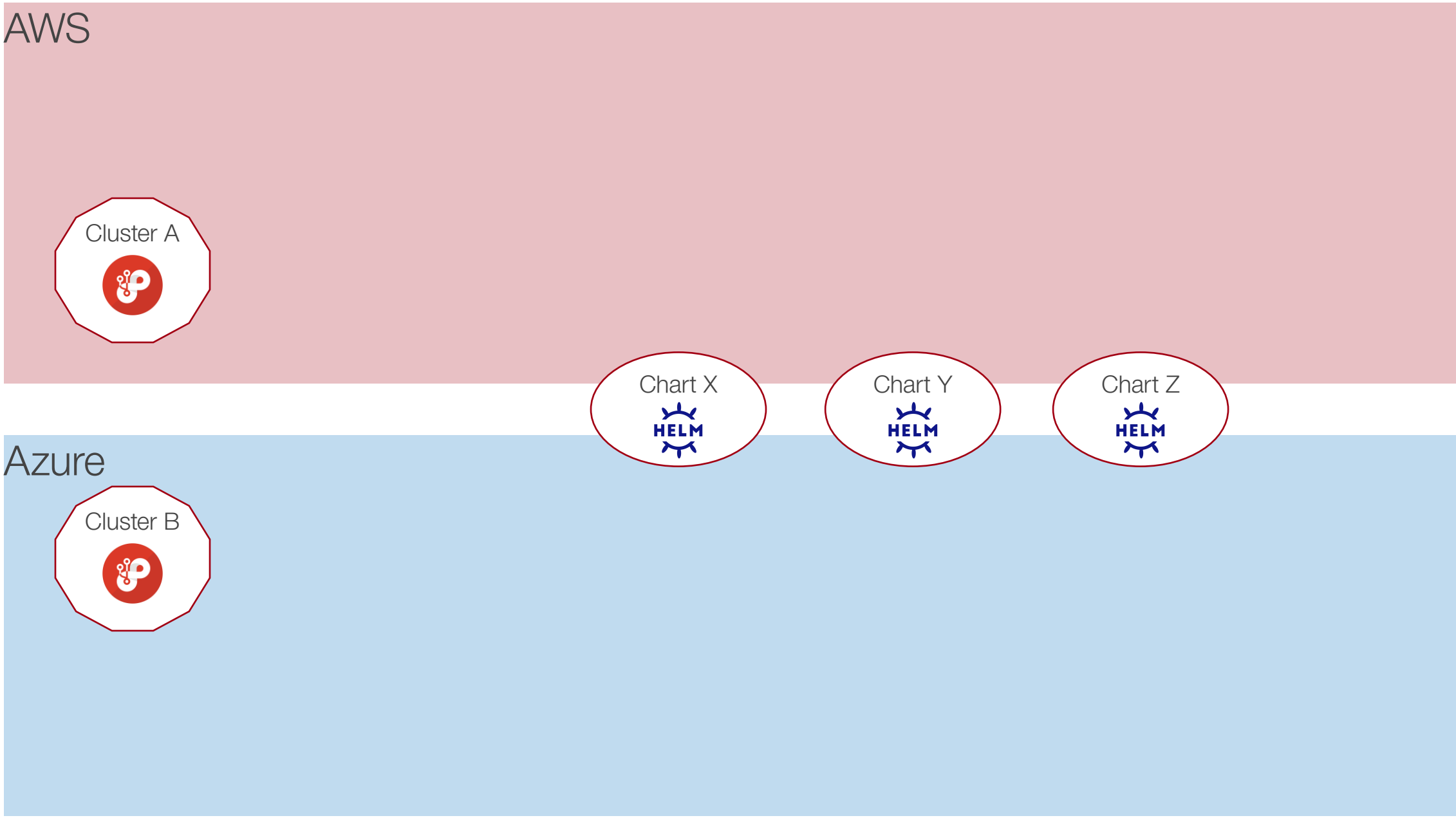
Cluster C
cluster-B-app-X-values.yaml
cluster-C-app-X-values.yaml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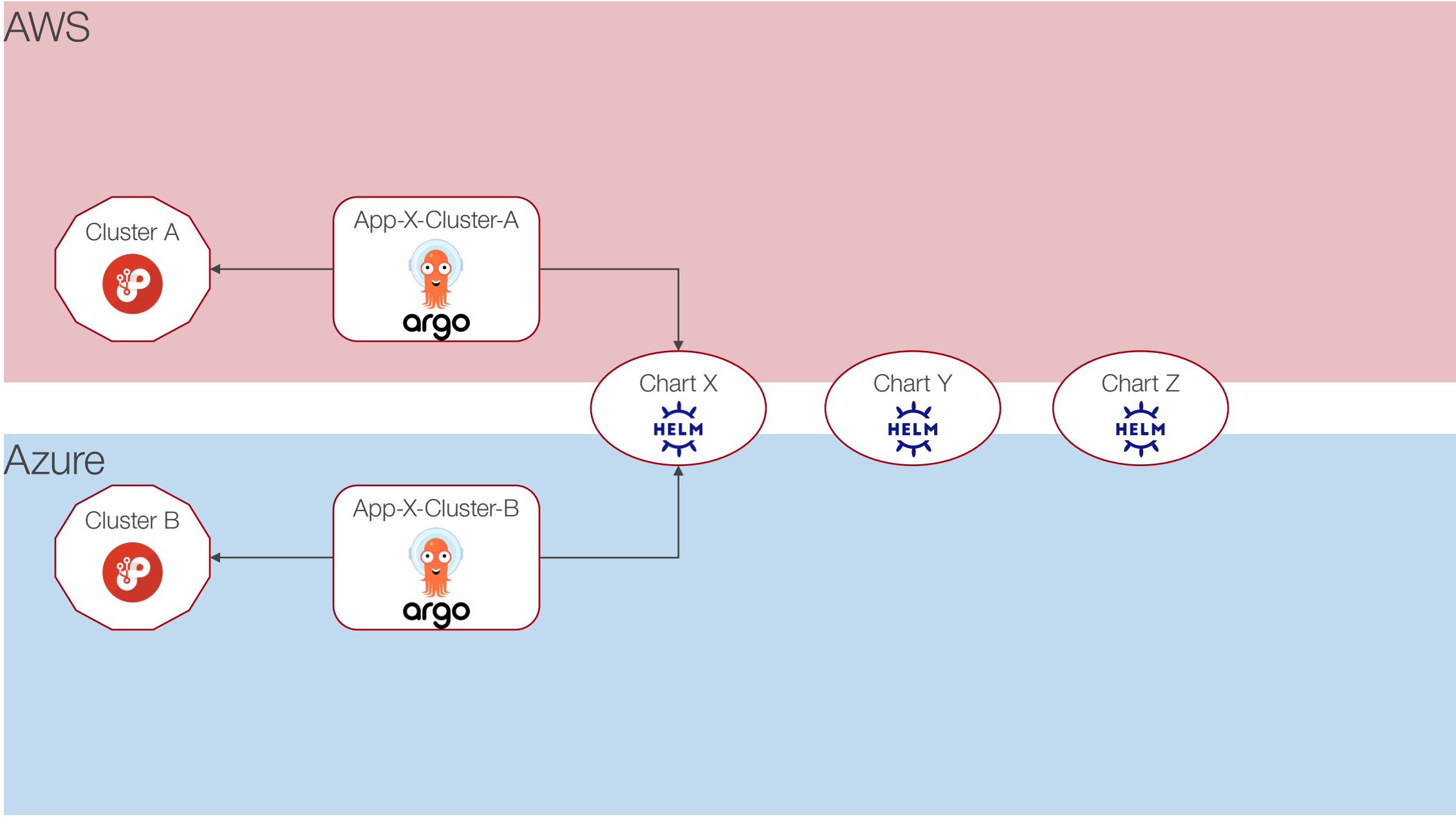
Azure
Cluster B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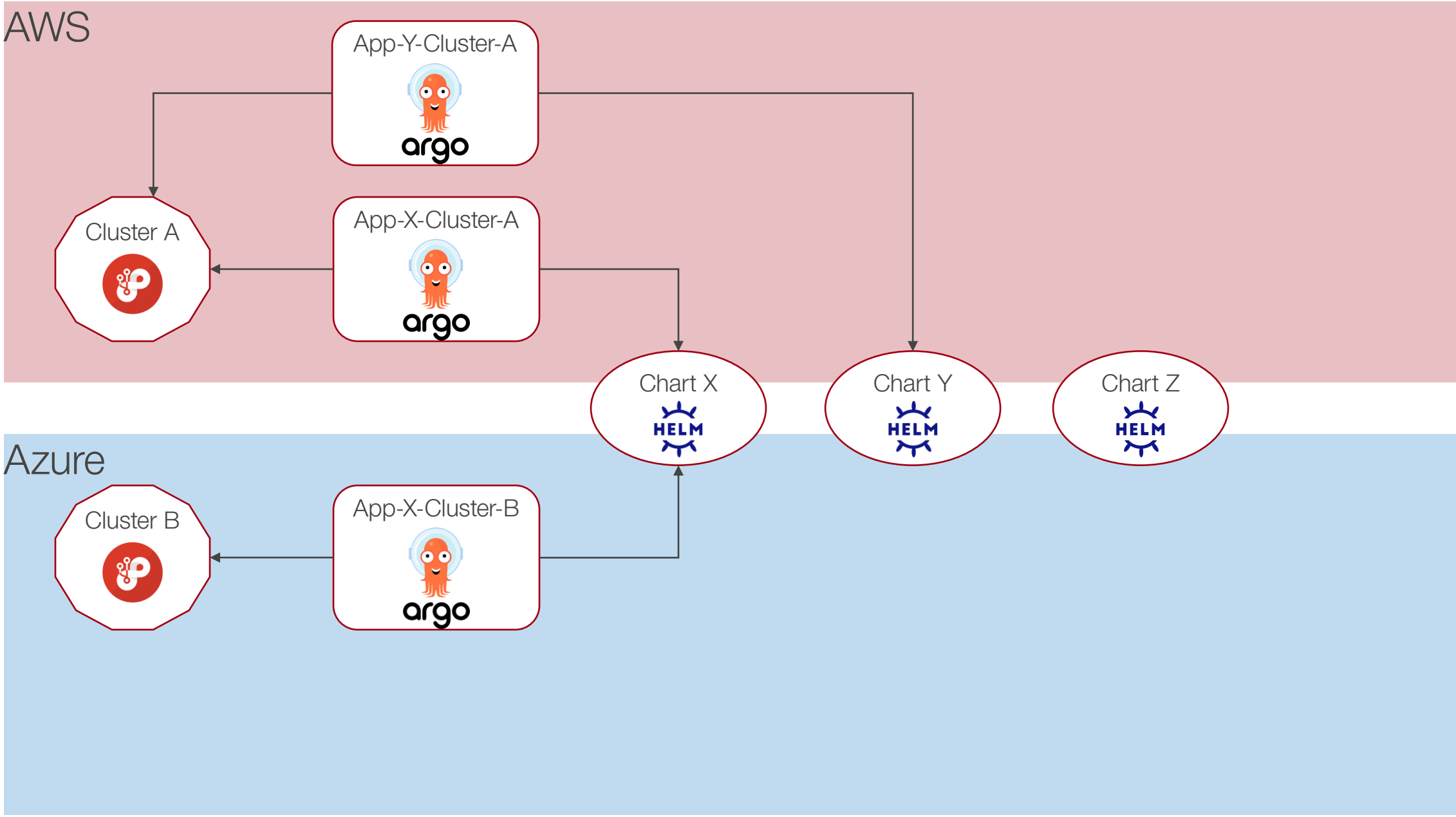
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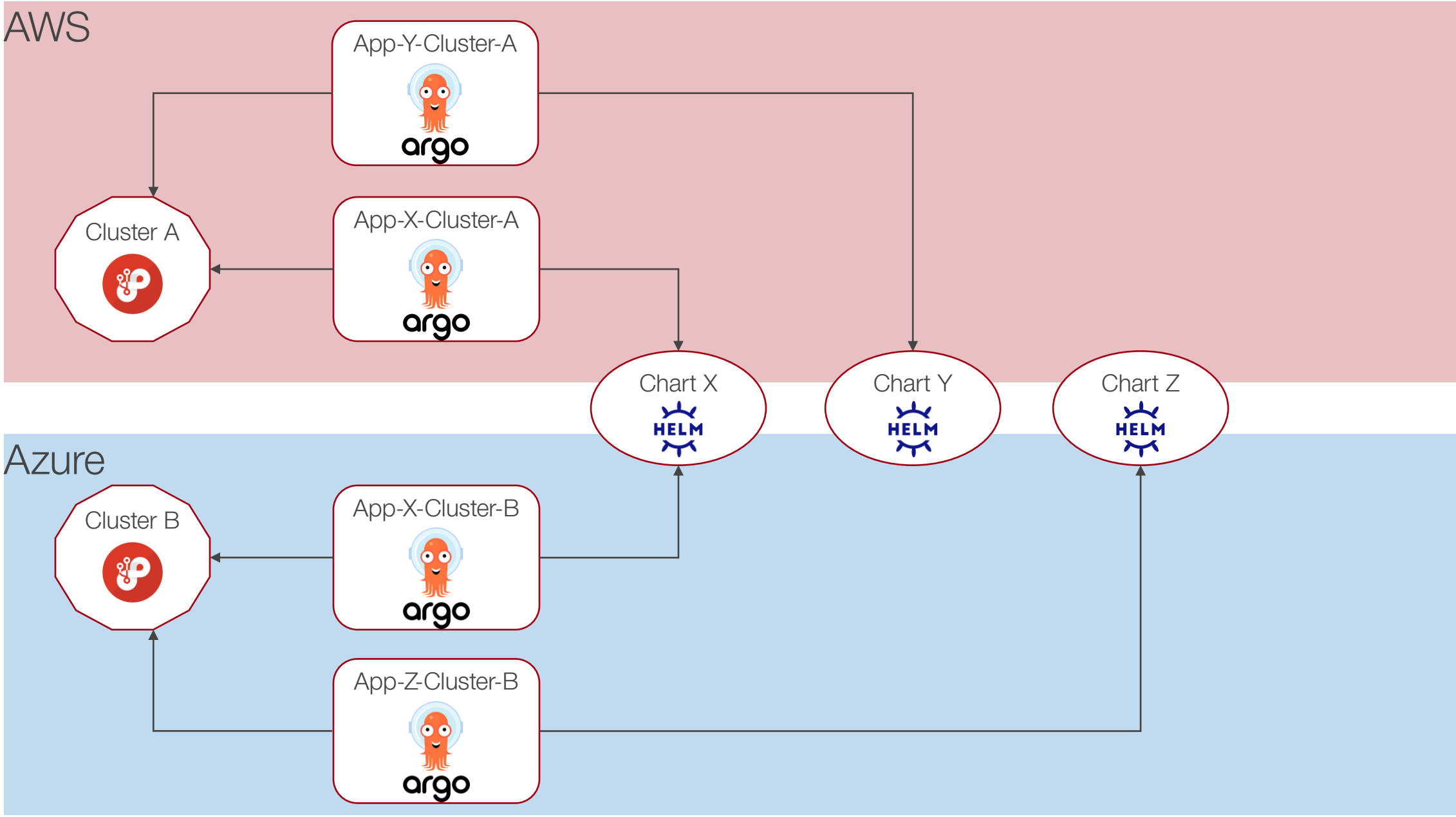
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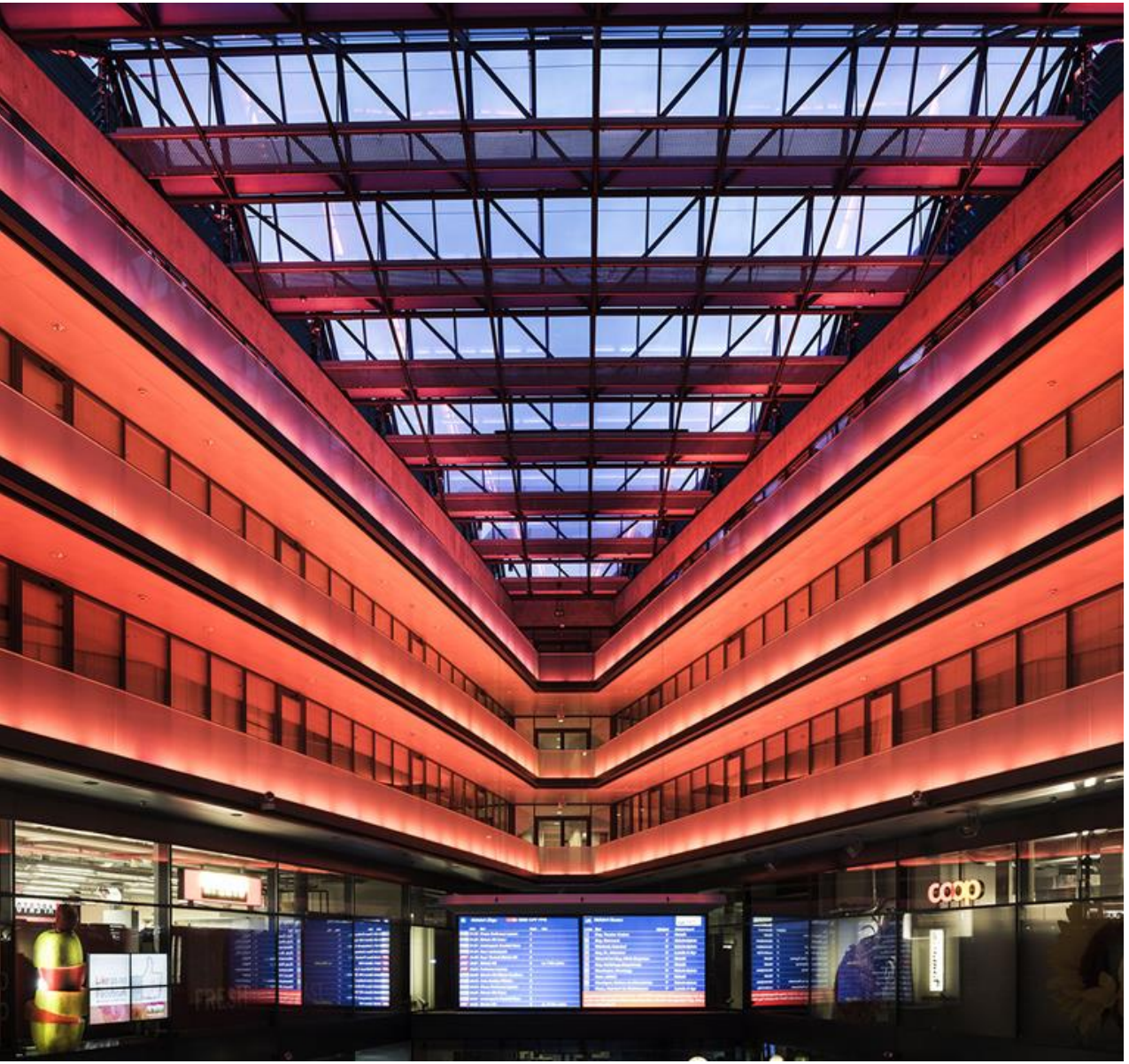
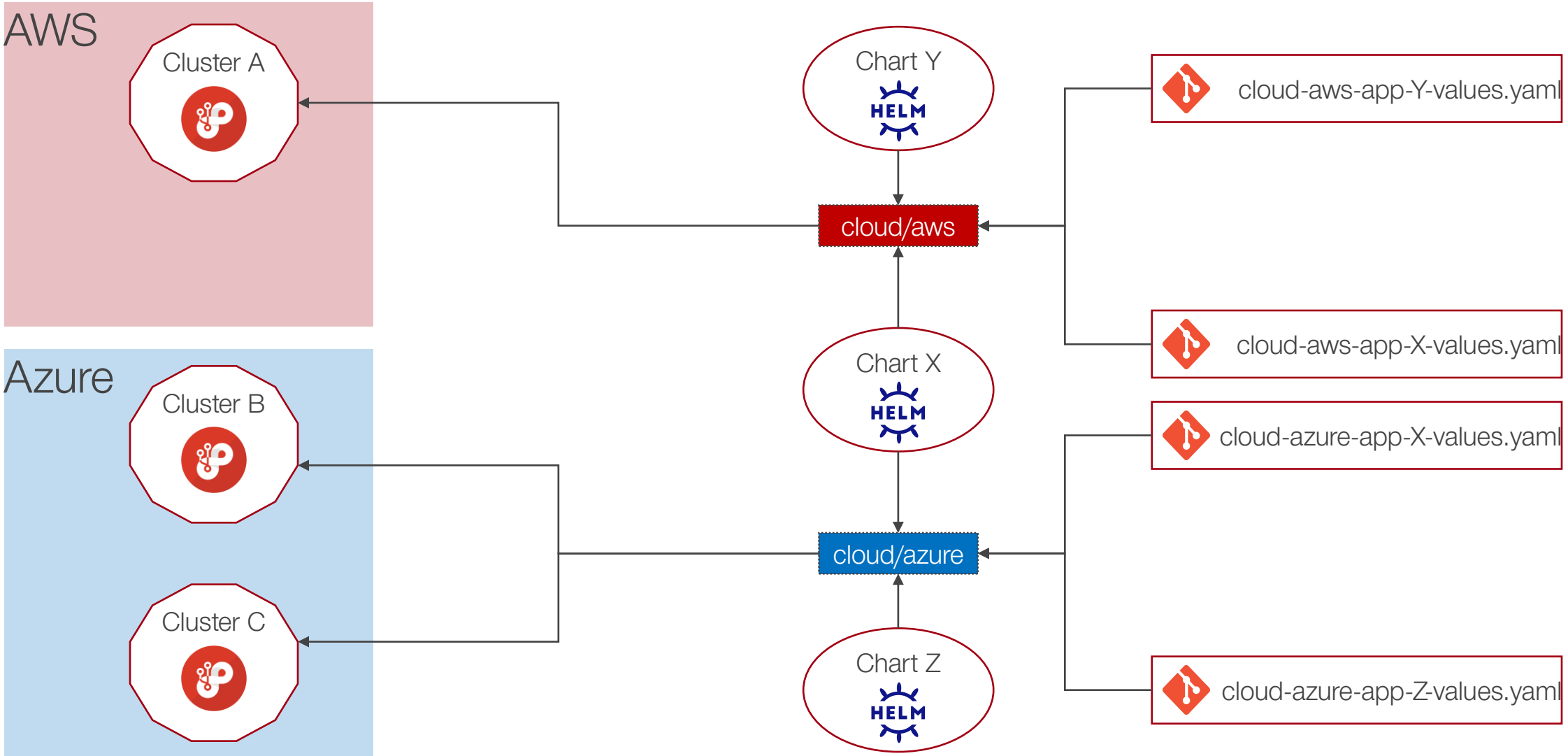


The Concept

Introducing: Groups



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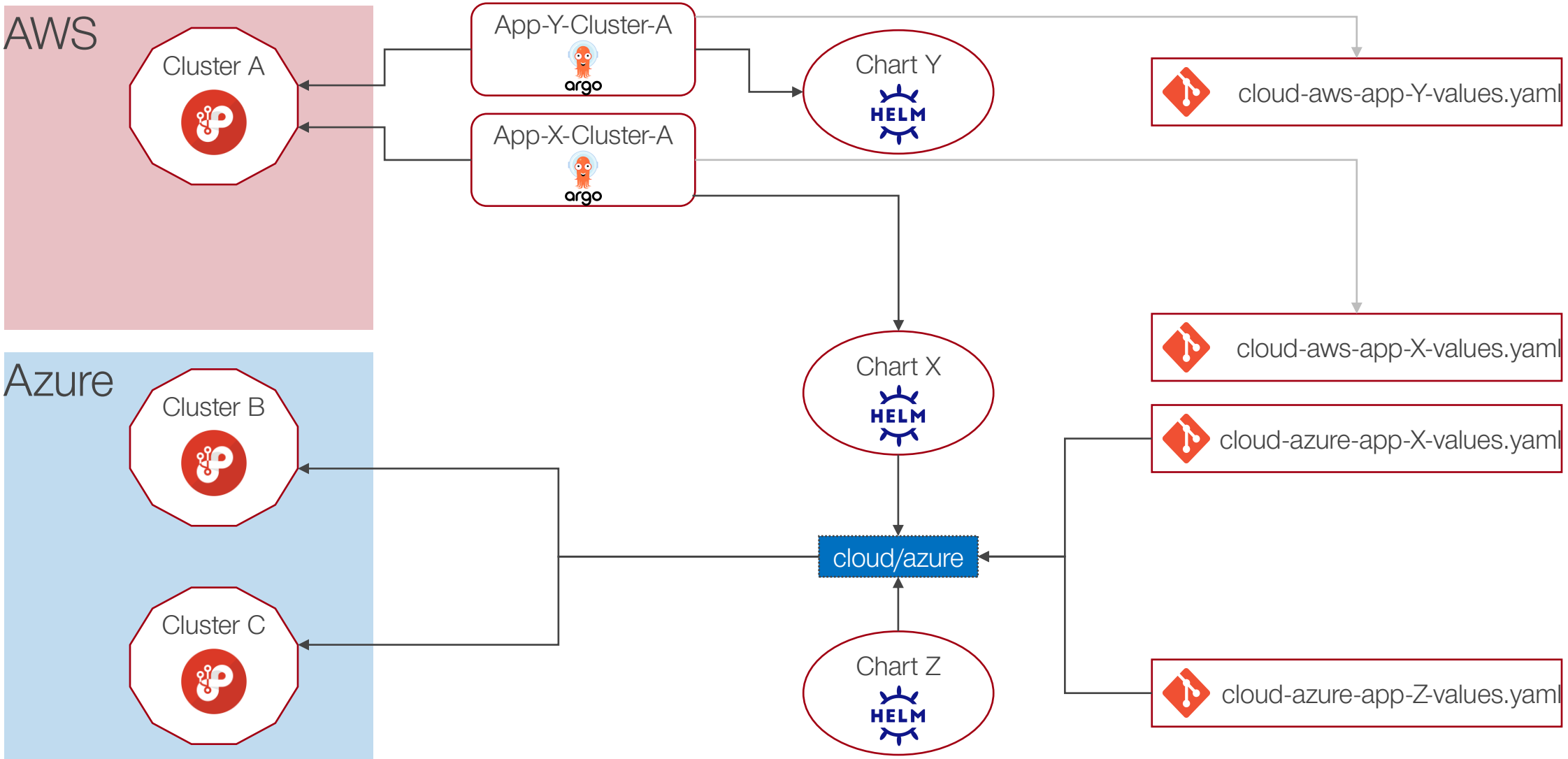

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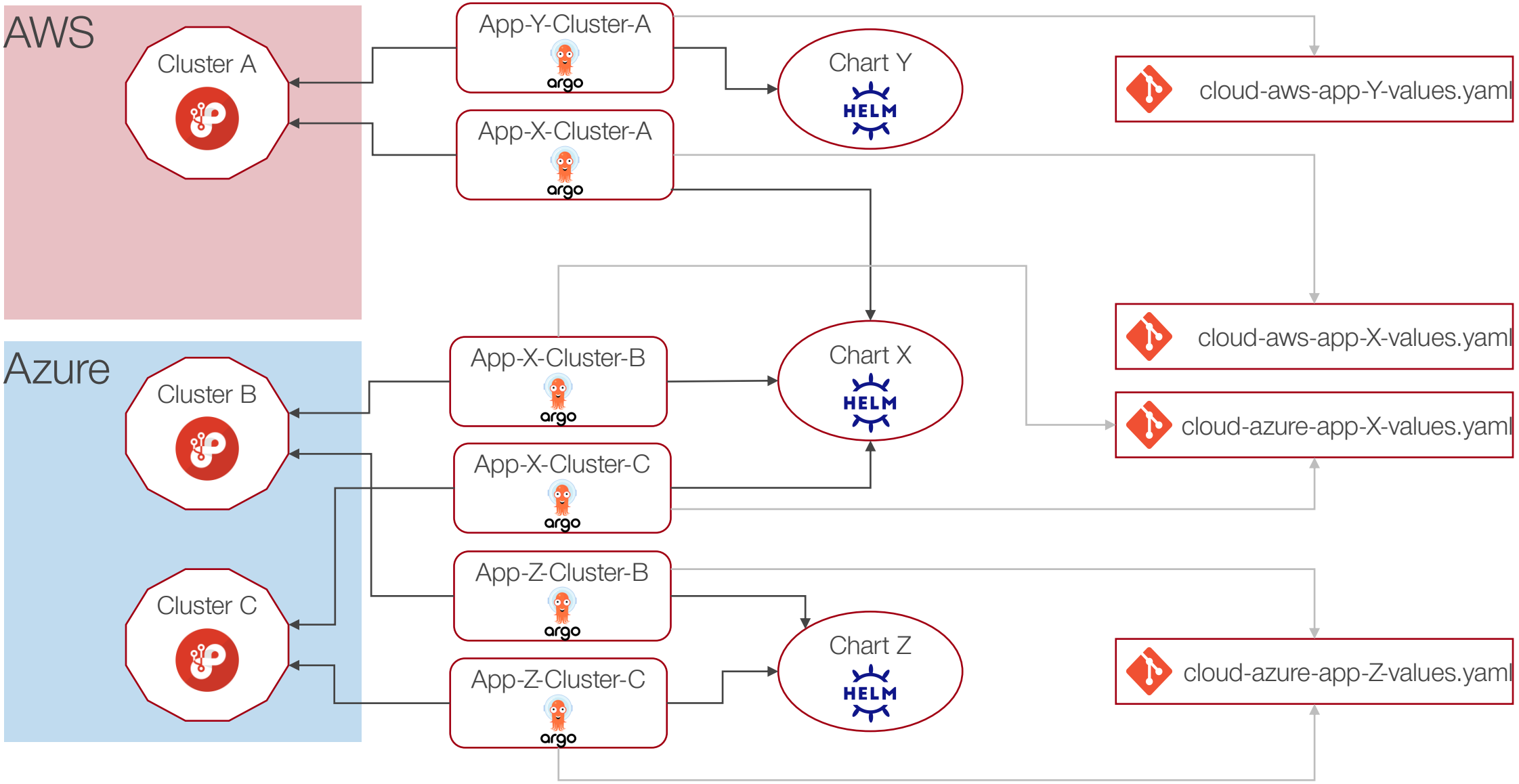

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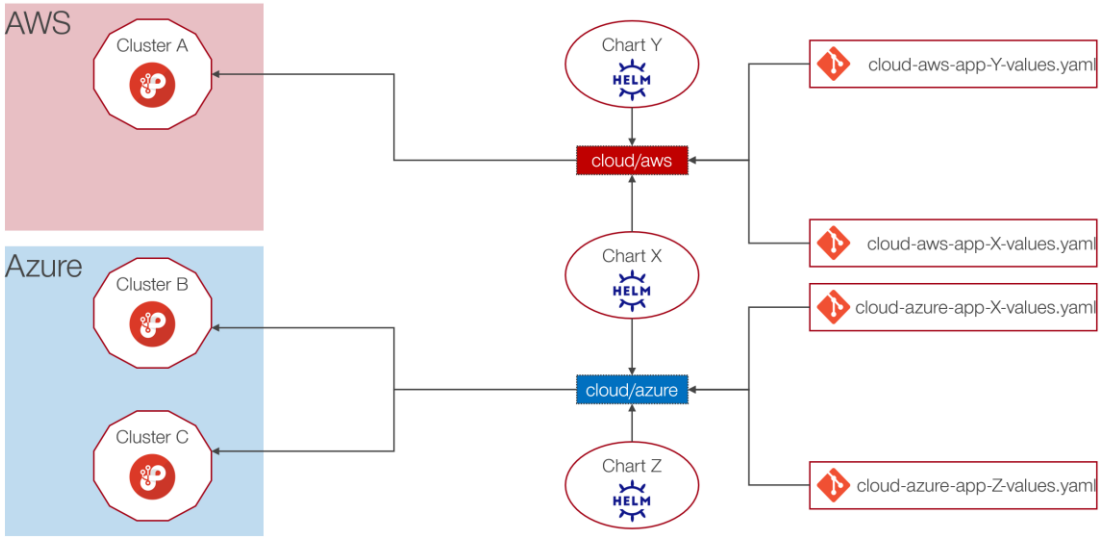

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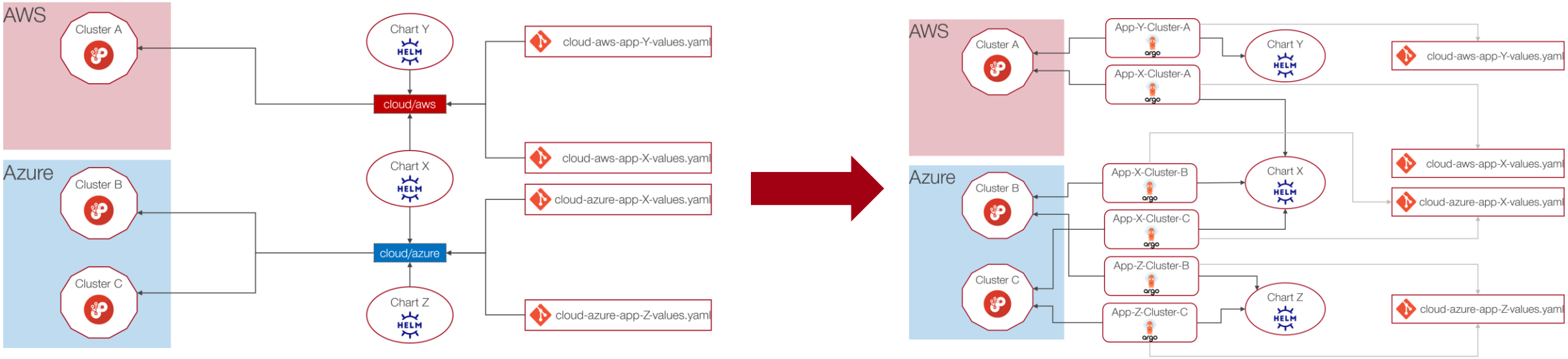
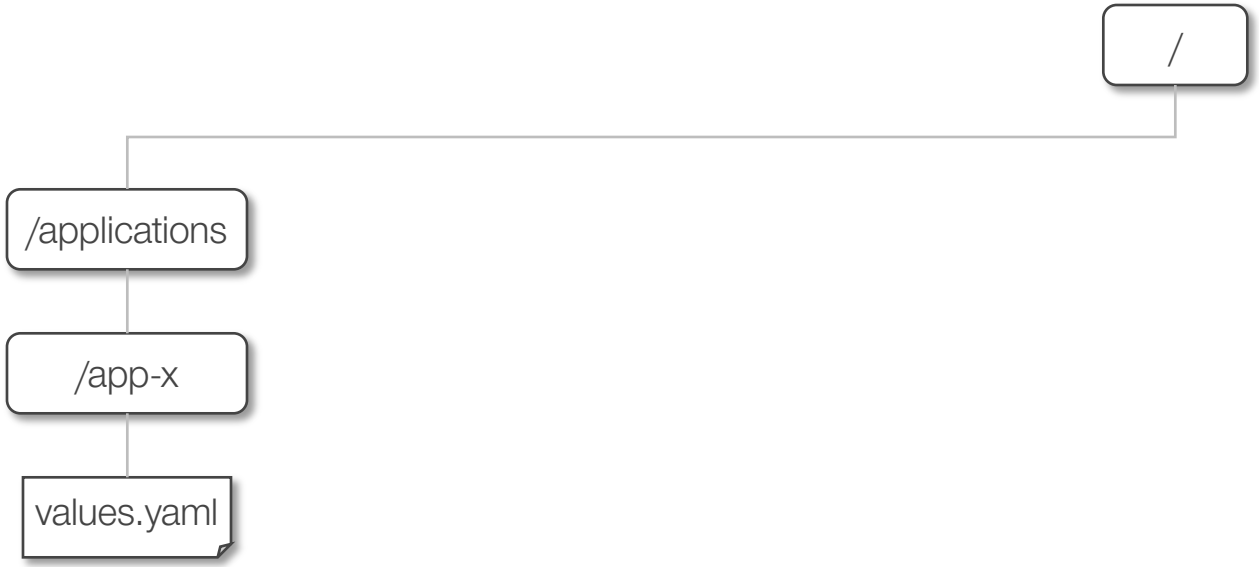


The Implementation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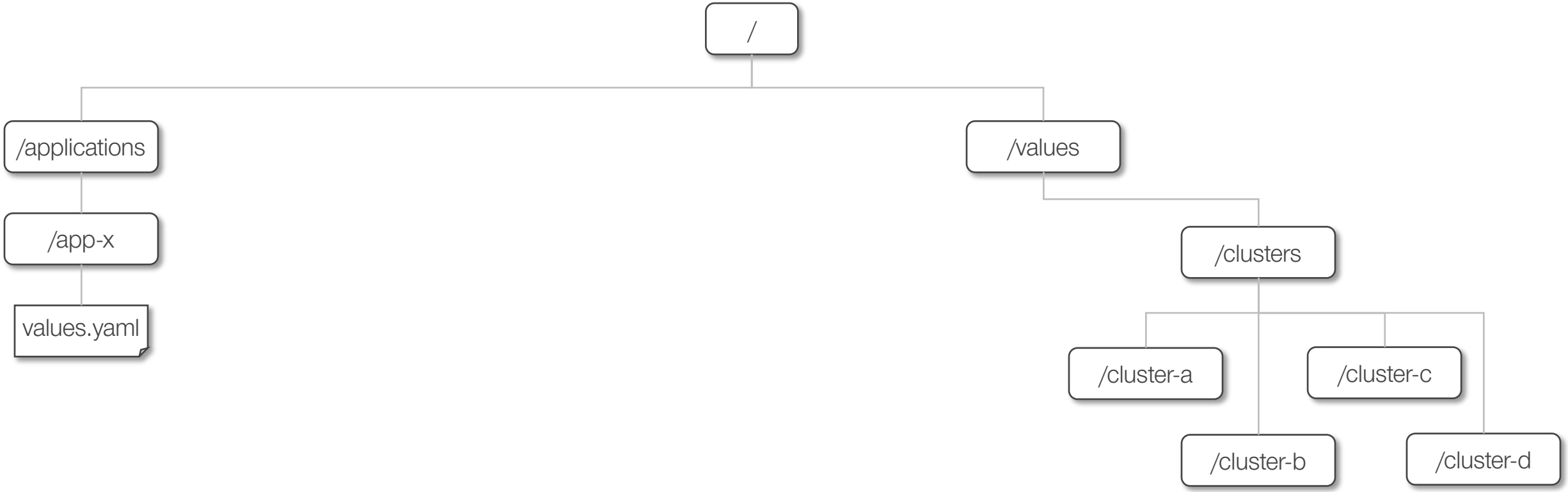
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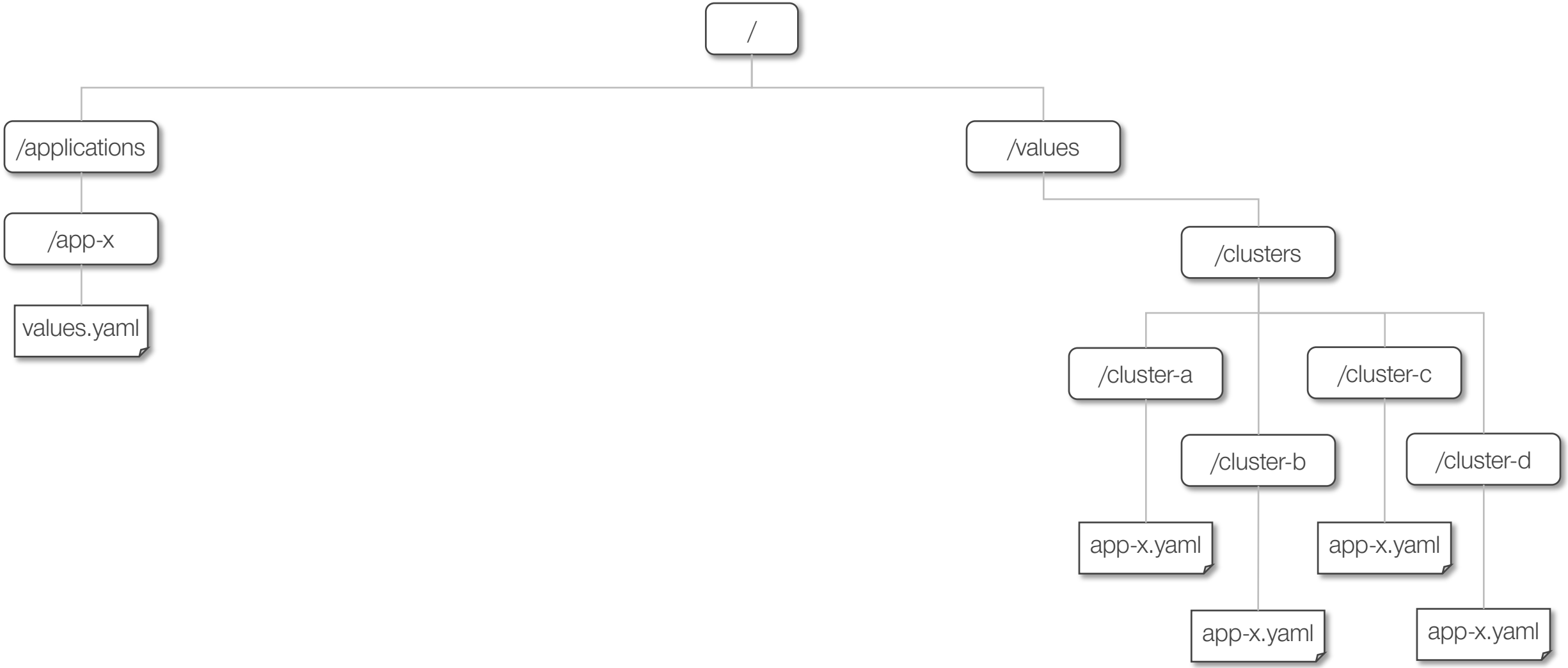
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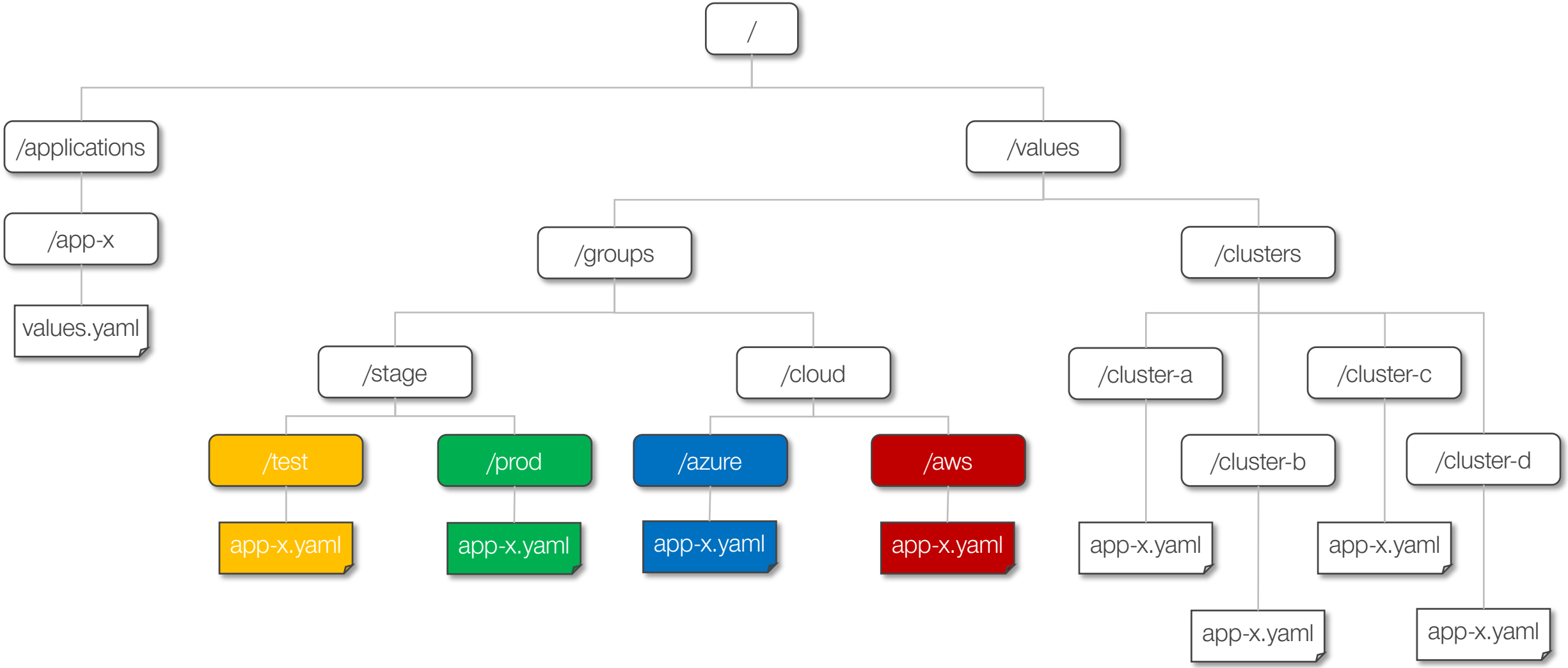
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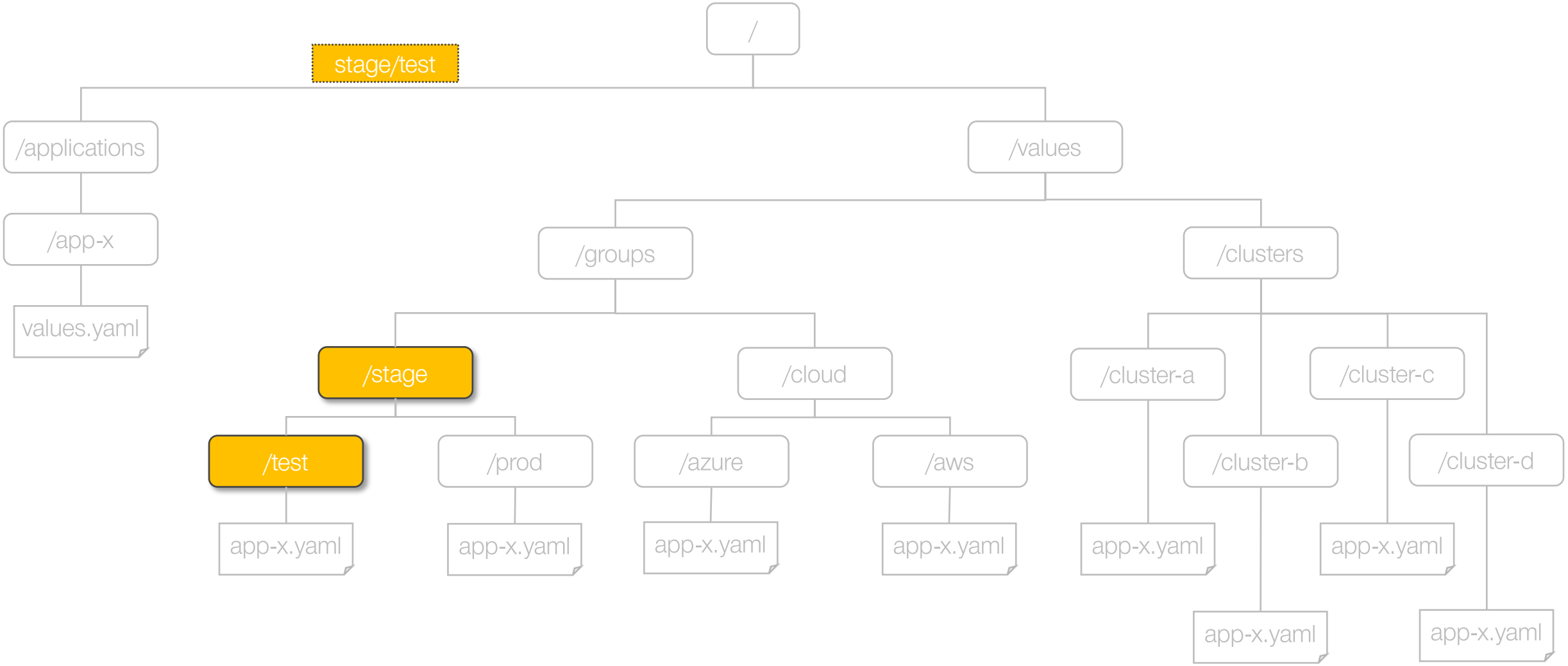
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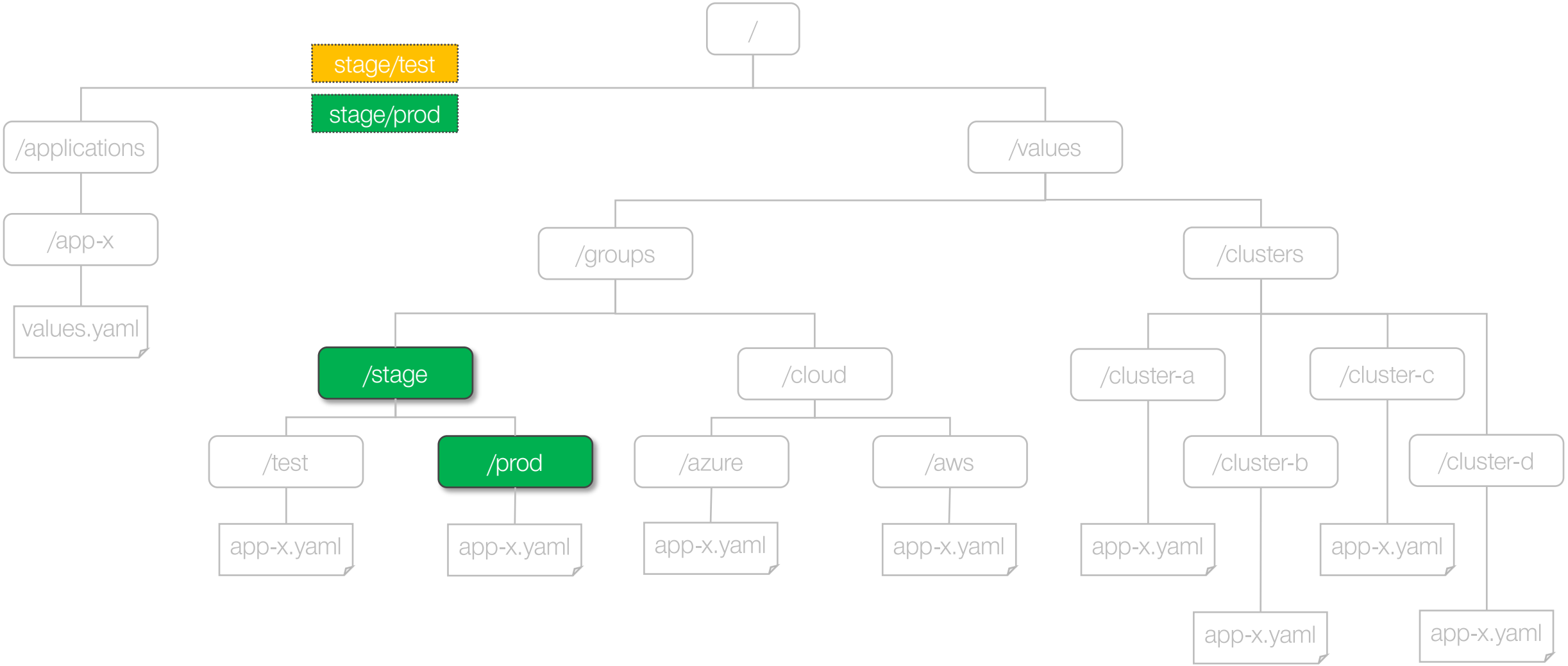
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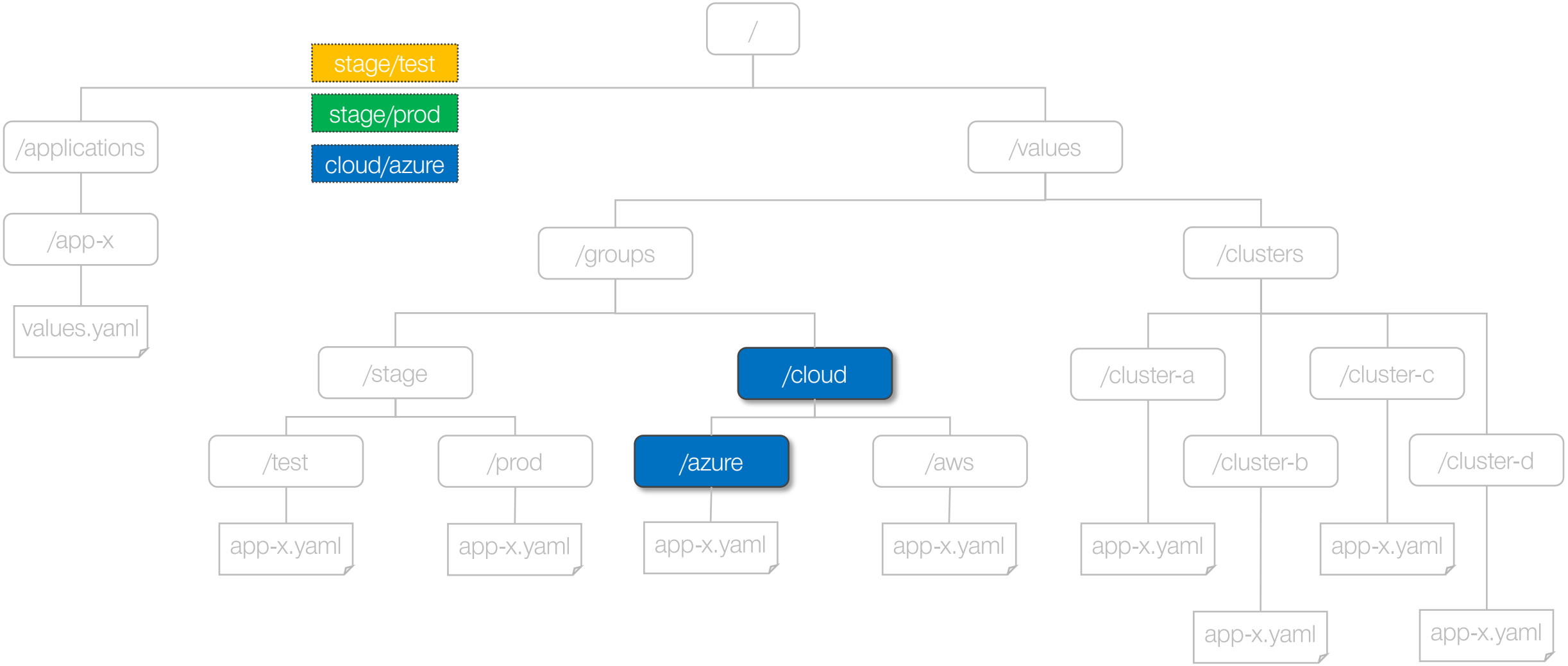
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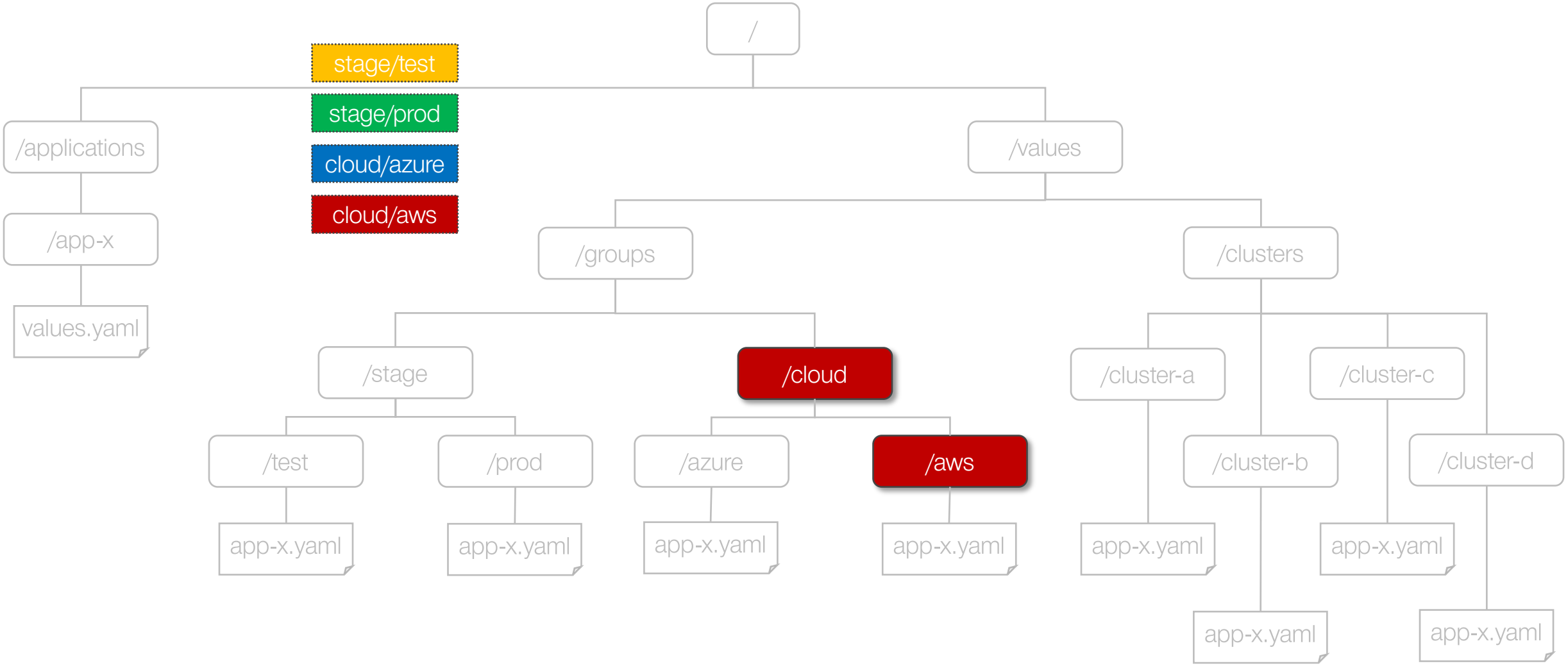
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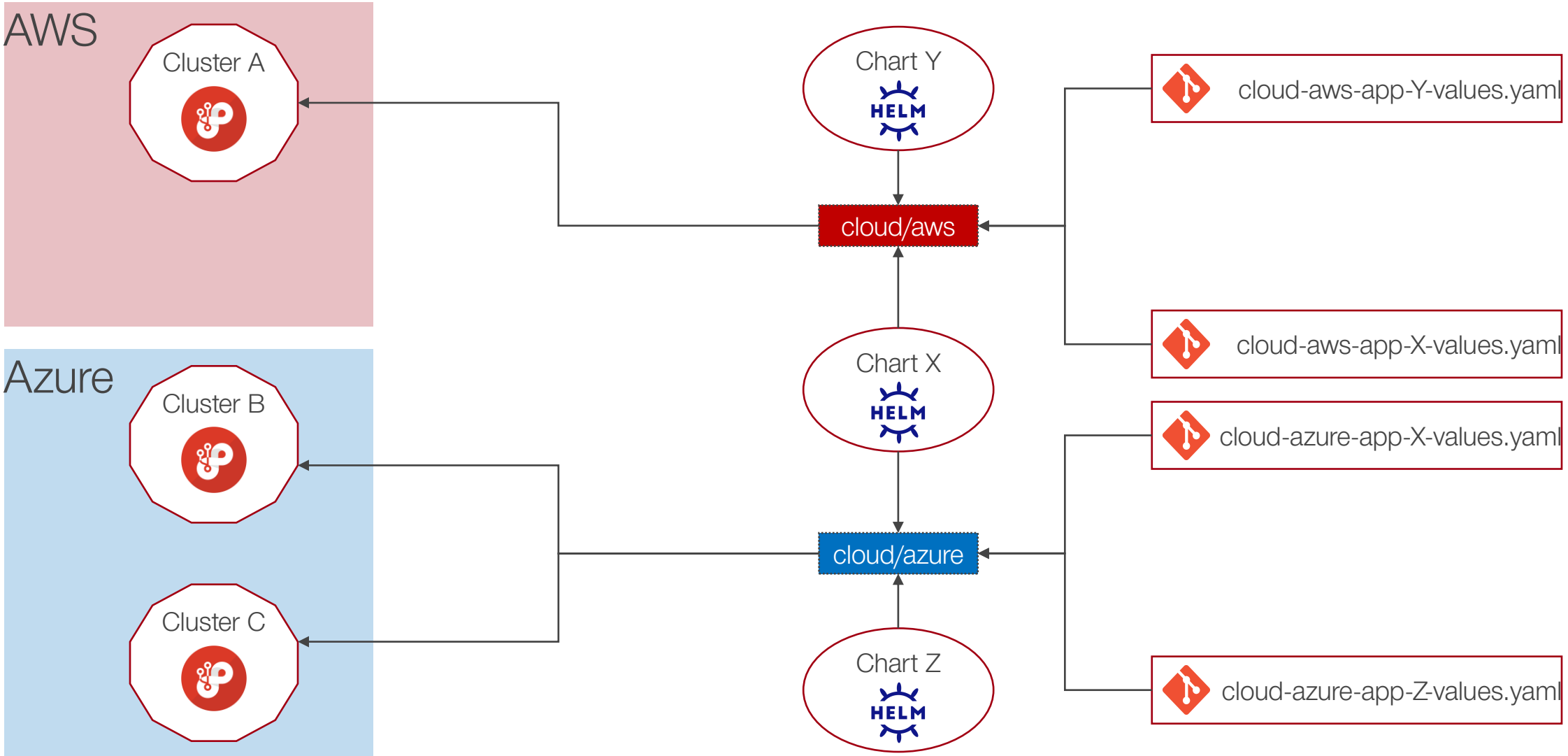
Introducing: Groups



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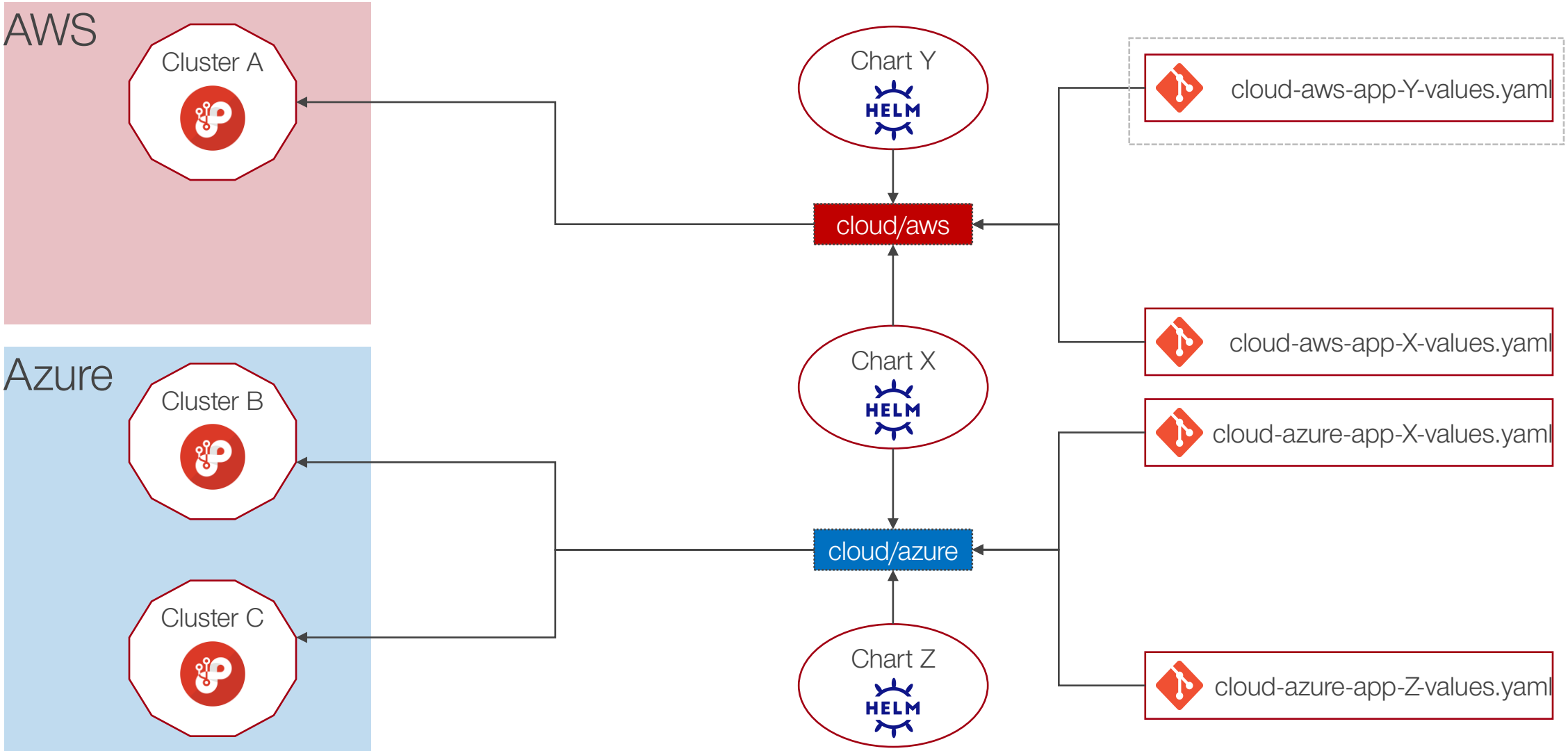
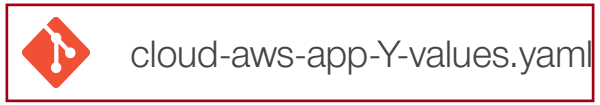
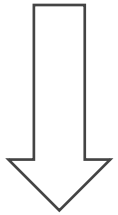



cloud-aws-app-Y-values.yaml



cloud/aws

values/groups/**cloud/aws**/app-y.yaml

FANCY!

cloud/aws

values/groups/**cloud/aws**/app-y.yaml

App-Of-Apps Pattern

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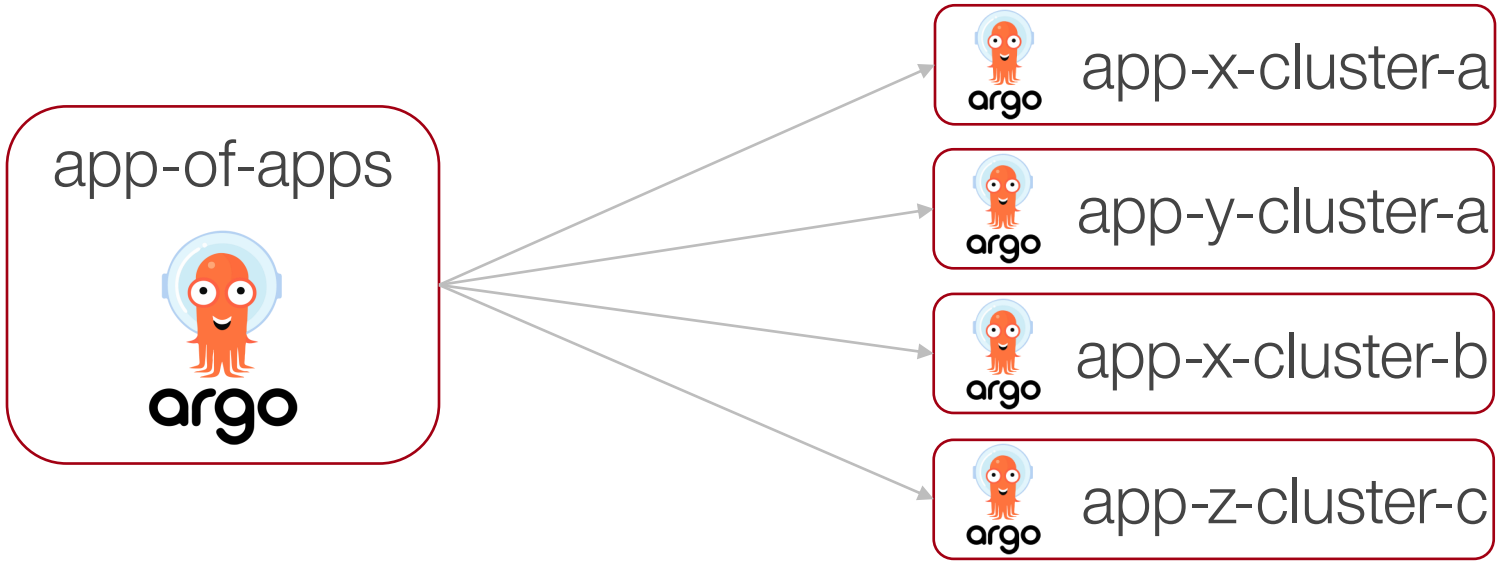

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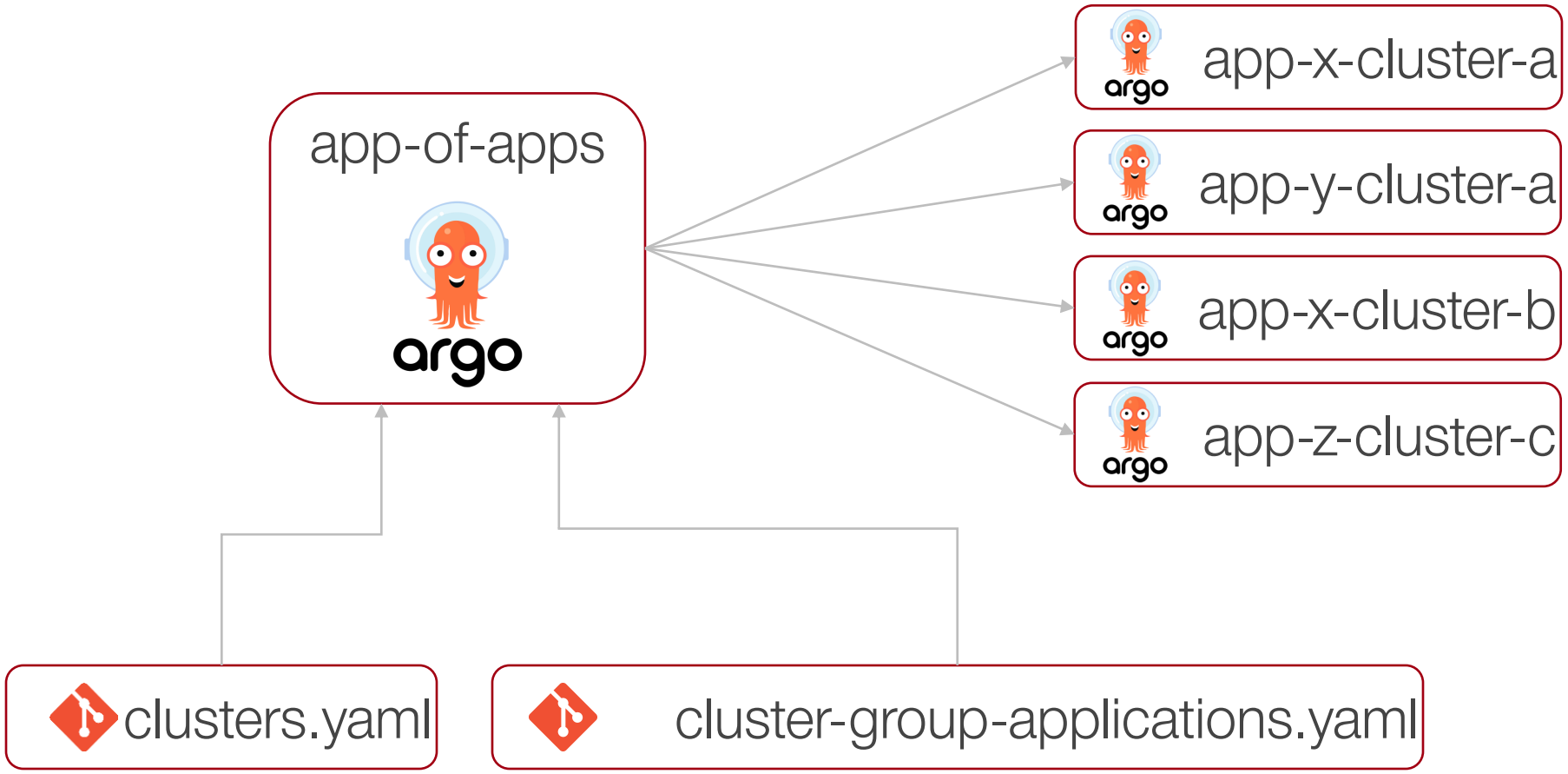

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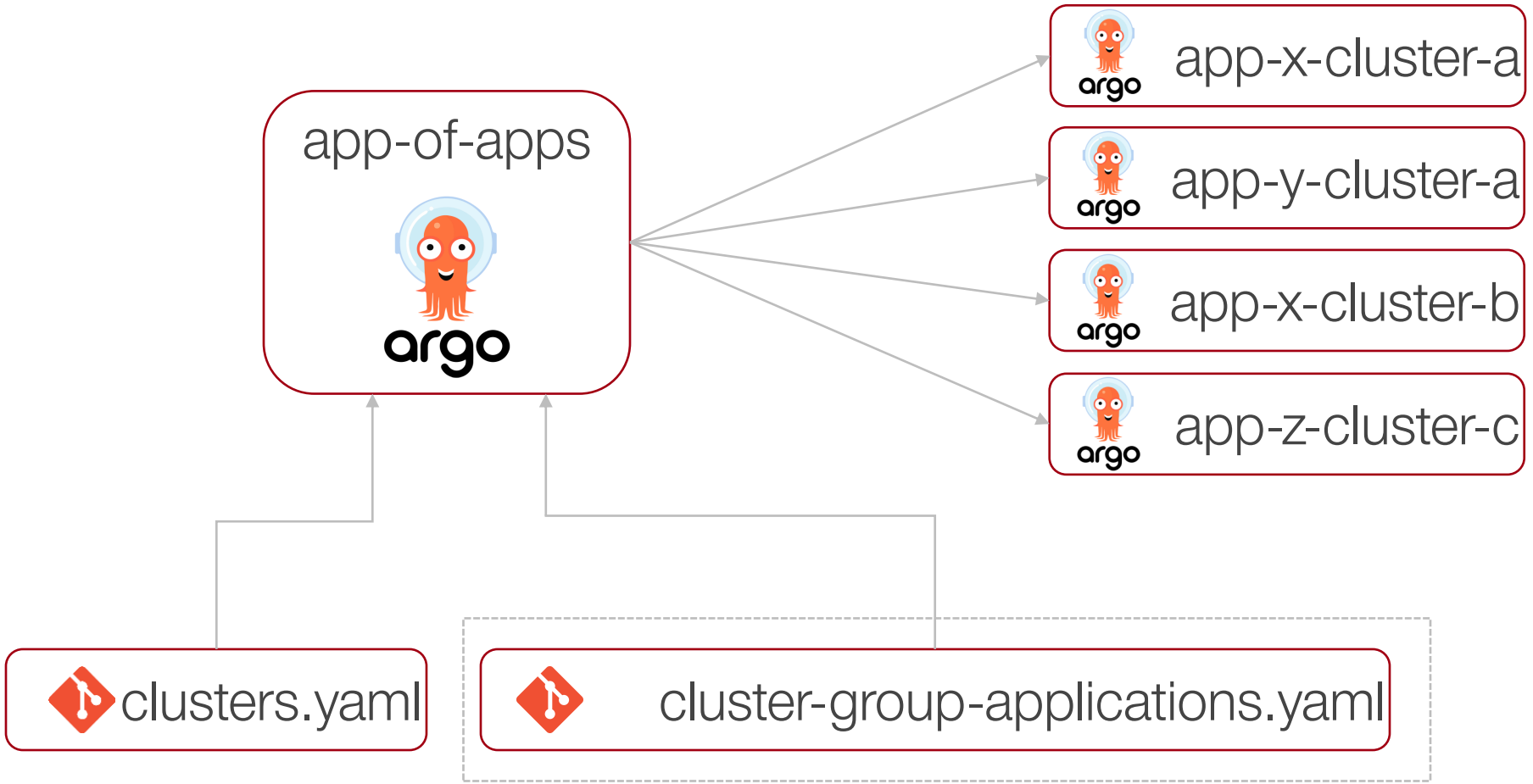

cluster-group-applications.yaml

```yaml
cloud/azure:
  applications:
    - name: "app-u"
      namespace: "app-u"
    - name: "app-v"
      namespace: "app-v"
  excludes: []
```

cloud/azure

cluster-group-applications.yaml

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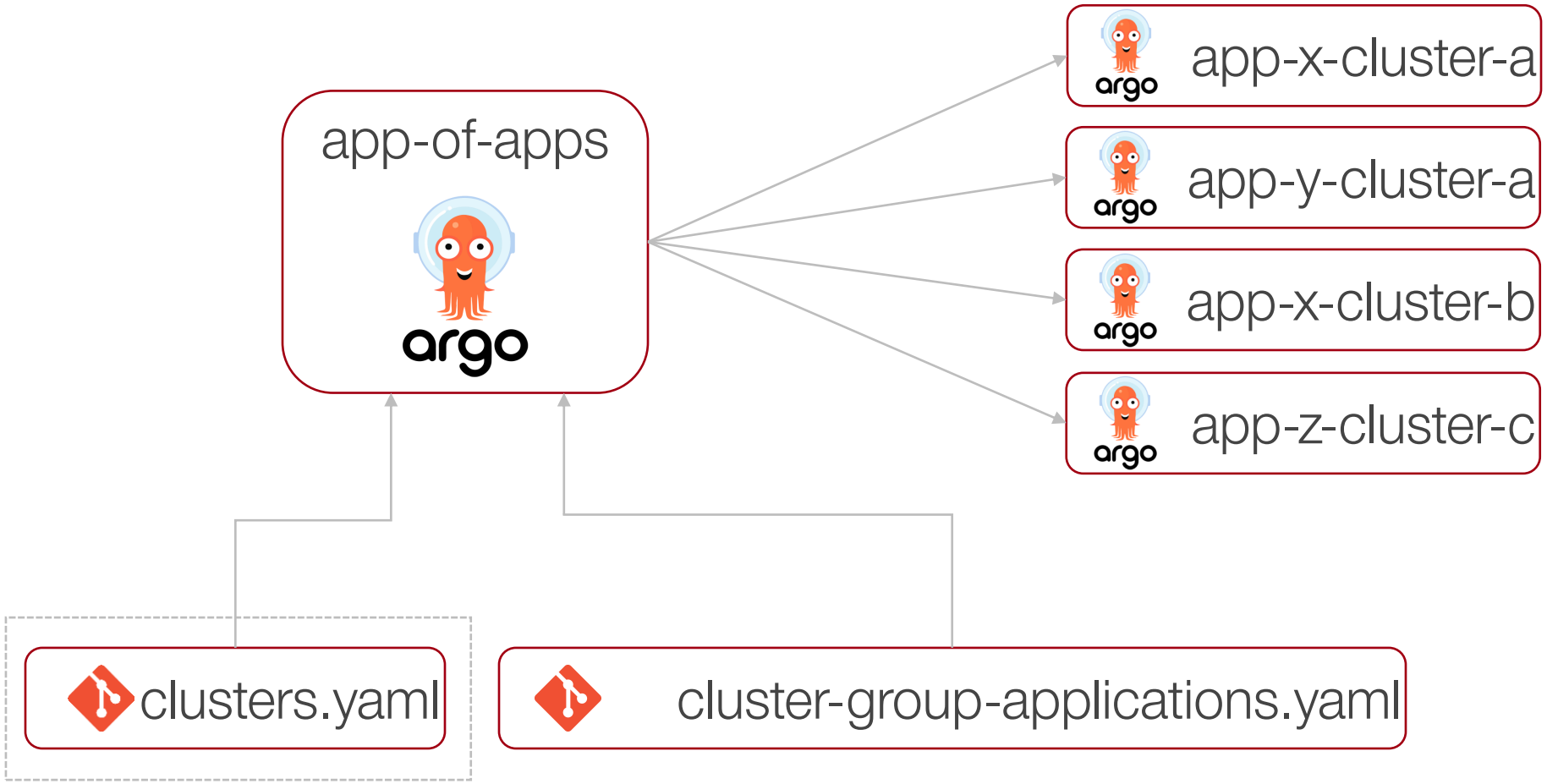
cloud/azure

App-Of-Apps Pattern



clusters.yaml

```yaml
name: cluster-c
api: ...
groups:
  - stage/prod
  - cloud/azure
applications:
  - name: app-x
    namespace: app-x
  - name: app-y
    namespace: app-y
excludeApplications: []
```

stage/prod

cloud/azure

clusters.yaml

```yaml
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api: ...
groups:
  - stage/prod
  - cloud/azure
applications:
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  - name: app-y
    namespace: app-y
excludeApplications: []
```

stage/prod

cloud/azure

clusters.yaml

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```

stage/prod

cloud/azure

clusters.yaml

```yaml
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api: ...
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  - stage/prod
  - cloud/azure
applications:
  - name: app-x
    namespace: app-x
  - name: app-y
    namespace: app-y
excludeApplications: []
```

stage/prod

cloud/azure

clusters.yaml

```yaml
name: cluster-c
api: ...
groups:
  - stage/prod
  - cloud/azure
applications:
  - name: app-x
    namespace: app-x
  - name: app-y
    namespace: app-y
excludeApplications: []
```

stage/prod

cloud/azure

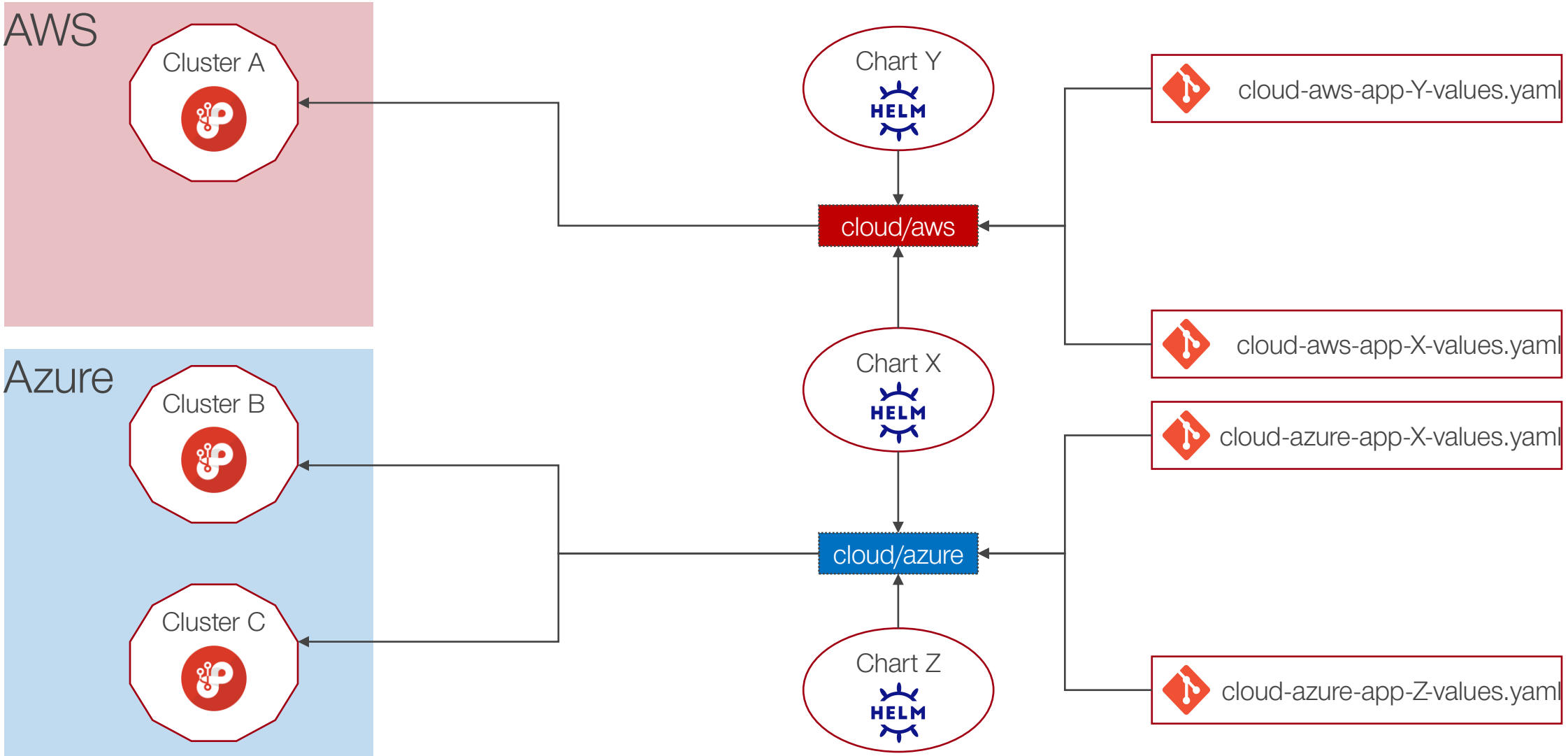
clusters.yaml

```yaml
name: cluster-c
api: ...
groups:
  - stage/prod
  - stage/prod/update-group-b
  - cloud/azure
  - cloud/aws/ocp-prod-account
  - platform/ocp4
  - cluster/shared
  - cluster/batch-nodes
  - cluster/network-ingress-azure
  - applications/argo-workflows
  - applications/instana
  - applications/3scale
  - applications/kafka-operator
applications:
  - name: app-x
    namespace: app-x
  - name: app-y
    namespace: app-y
excludeApplications:
  - someapp
```

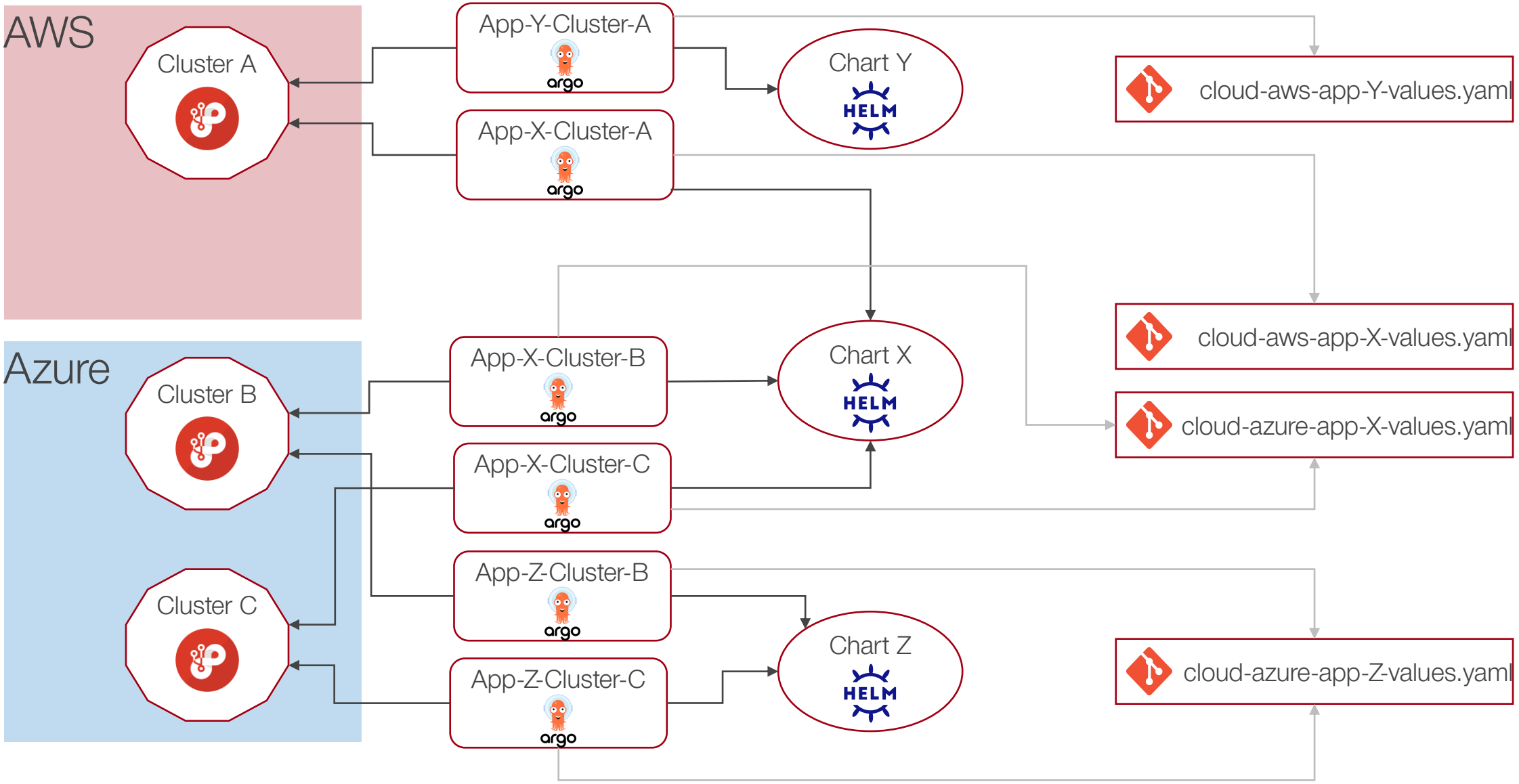
stage/prod

cloud/azure

Groups


AWS
Cluster A
Azure
Cluster B
Cluster C
Chart Y
HELM
Chart X
HELM
Chart Z
HELM
cloud/aws
cloud/azure
cloud-aws-app-Y-values.yaml
cloud-aws-app-X-values.yaml
cloud-azure-app-X-values.yaml
cloud-azure-app-Z-values.yaml

Introducing: Groups



There is more …

- Cluster Admin delegation with ArgoCD Projects
- Common values
- Secrets-handling with mozilla/sops
- “Shared” app charts
- Cluster inventory
- ArgoCD application labels

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- Cluster Ad
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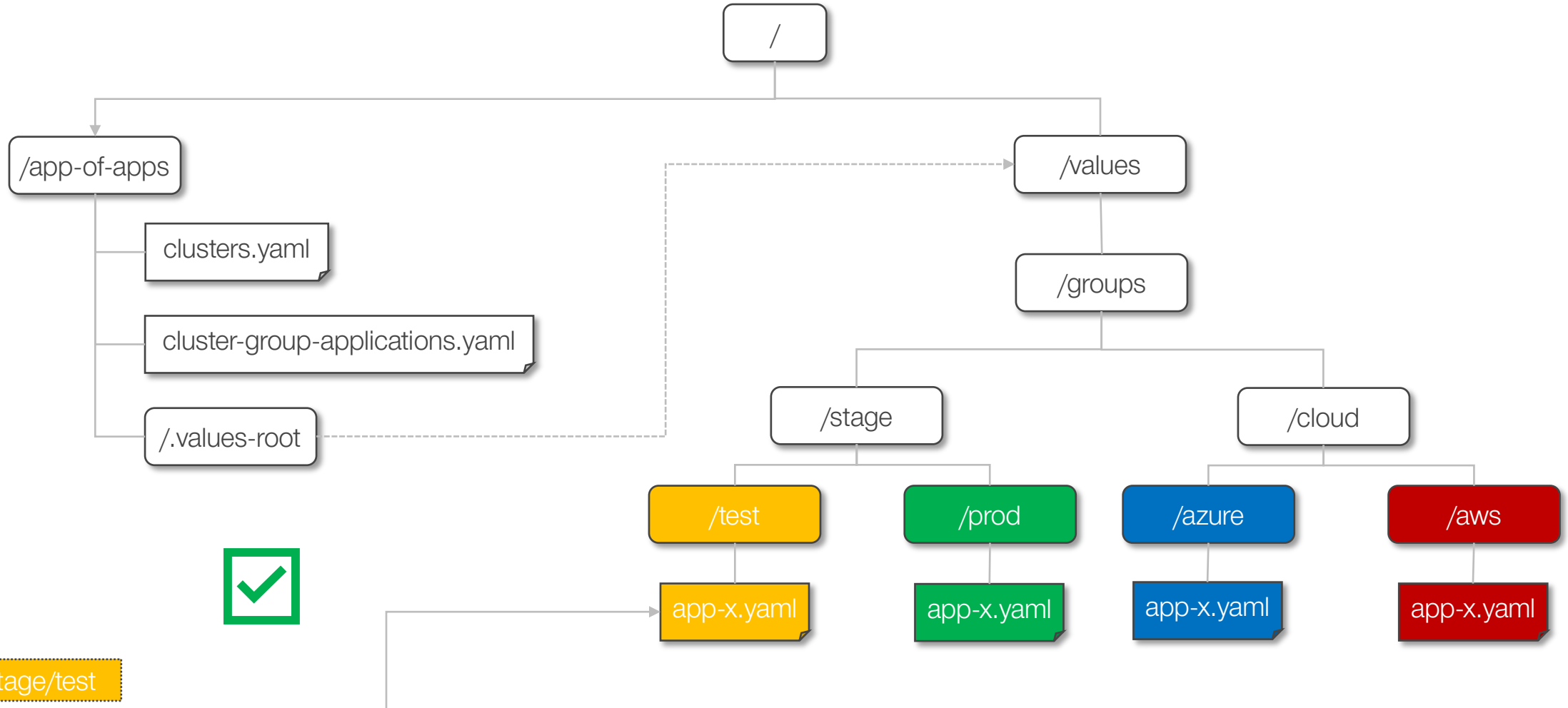
- h
- Shared”
- Cluster inv
- ArgoCD a

GitHub

https://github.com/SchweizerischeBundesbahnen/container-platform-base

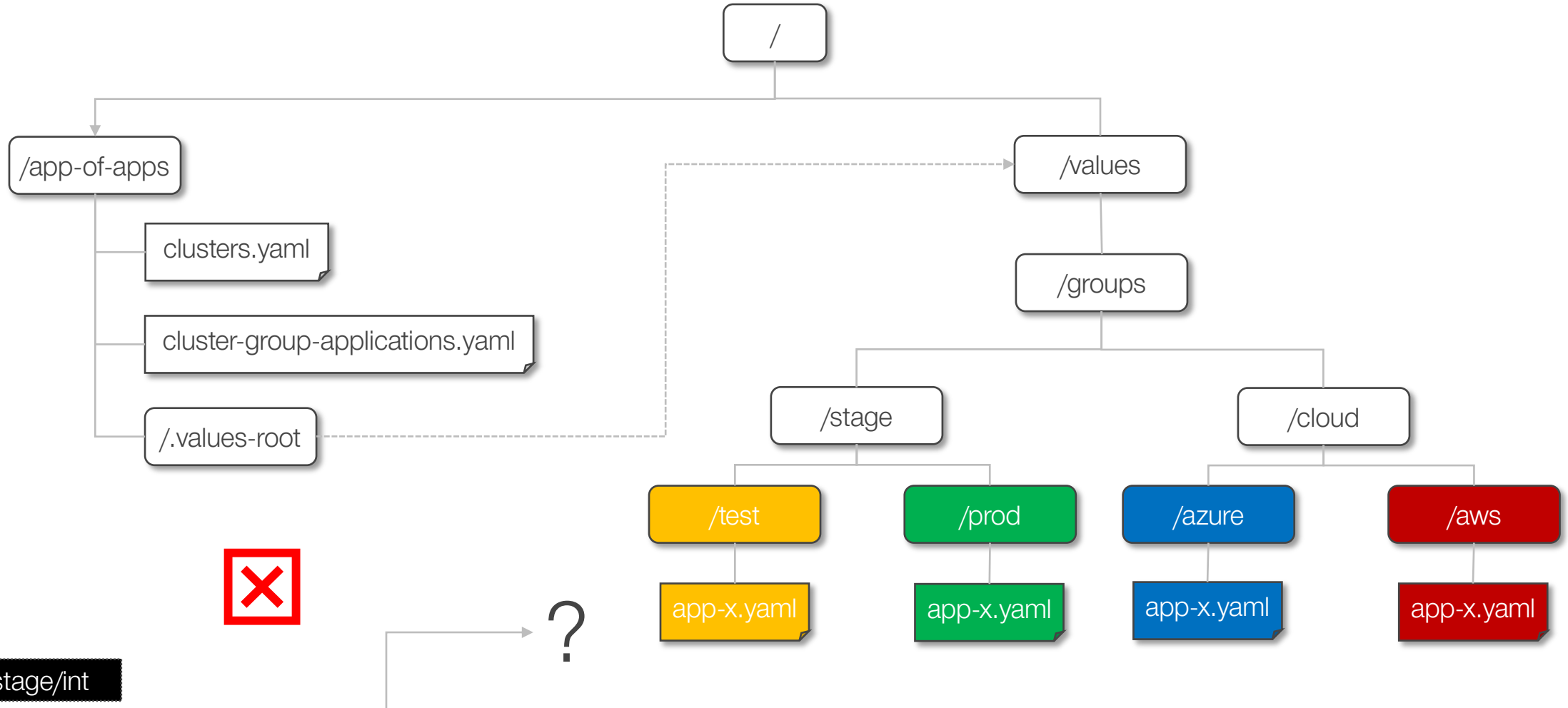

SBB CFF FFS
Thanks,
danke,
merci
& grazie.

Automatic values yaml detection




```
.Files.Get ".values-root/groups/stage/test/app-x.yaml"
```

Automatic values yaml detection




```
.Files.Get ".values-root/groups/stage/int/app-x.yaml"
```

Automatic values yaml detection