



argo



Open Cluster Management

Multi-Cluster GitOps

ArgoCD & Open Cluster Management(OCM)

Anand Francis J

About Me



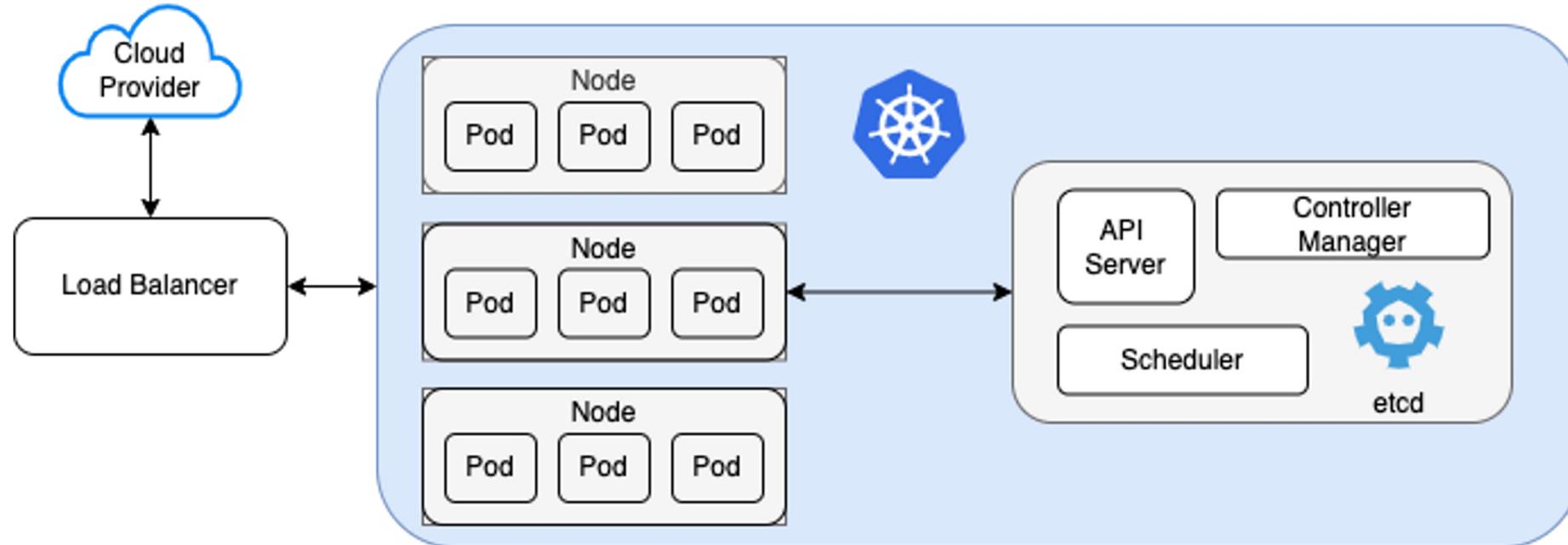
github.com/anandf

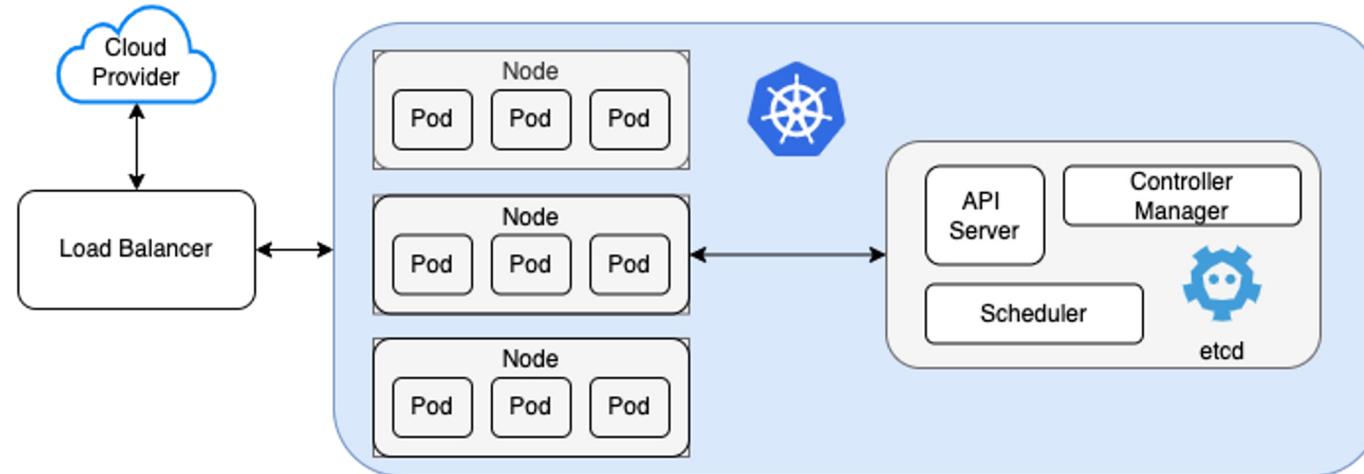
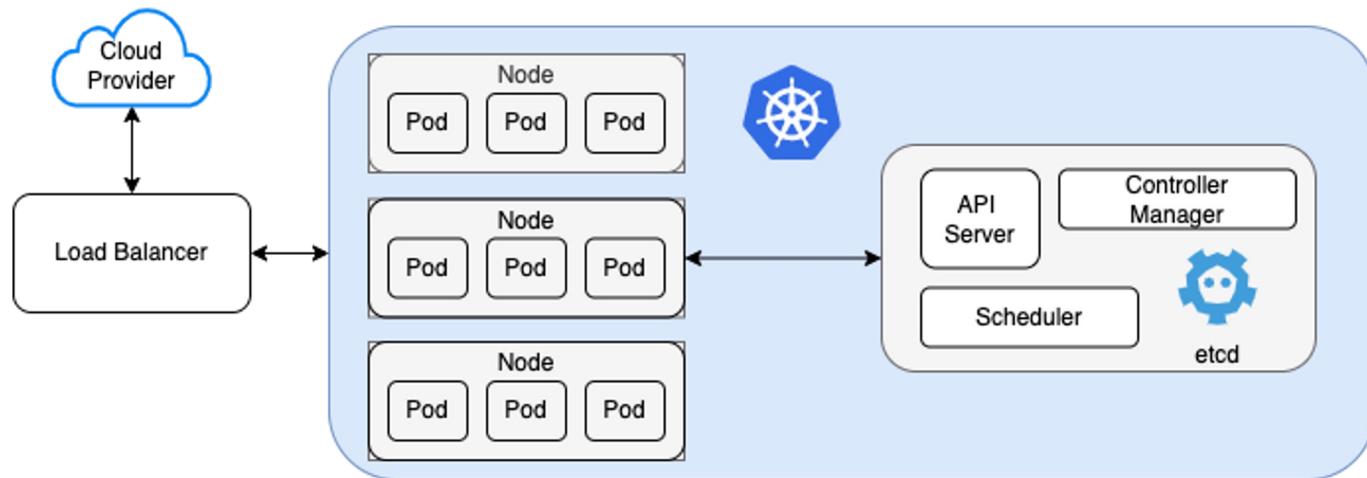
Anand Francis Joseph

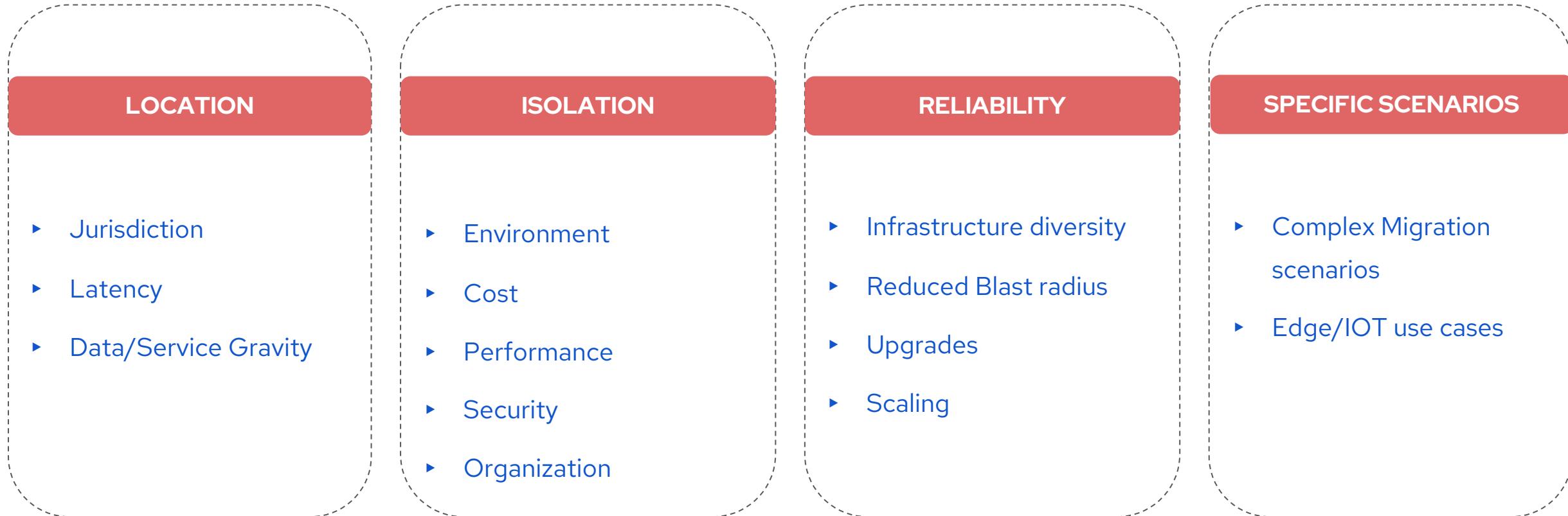
Principal Software Engineer at Red Hat working on ArgoCD and GitOps Service.

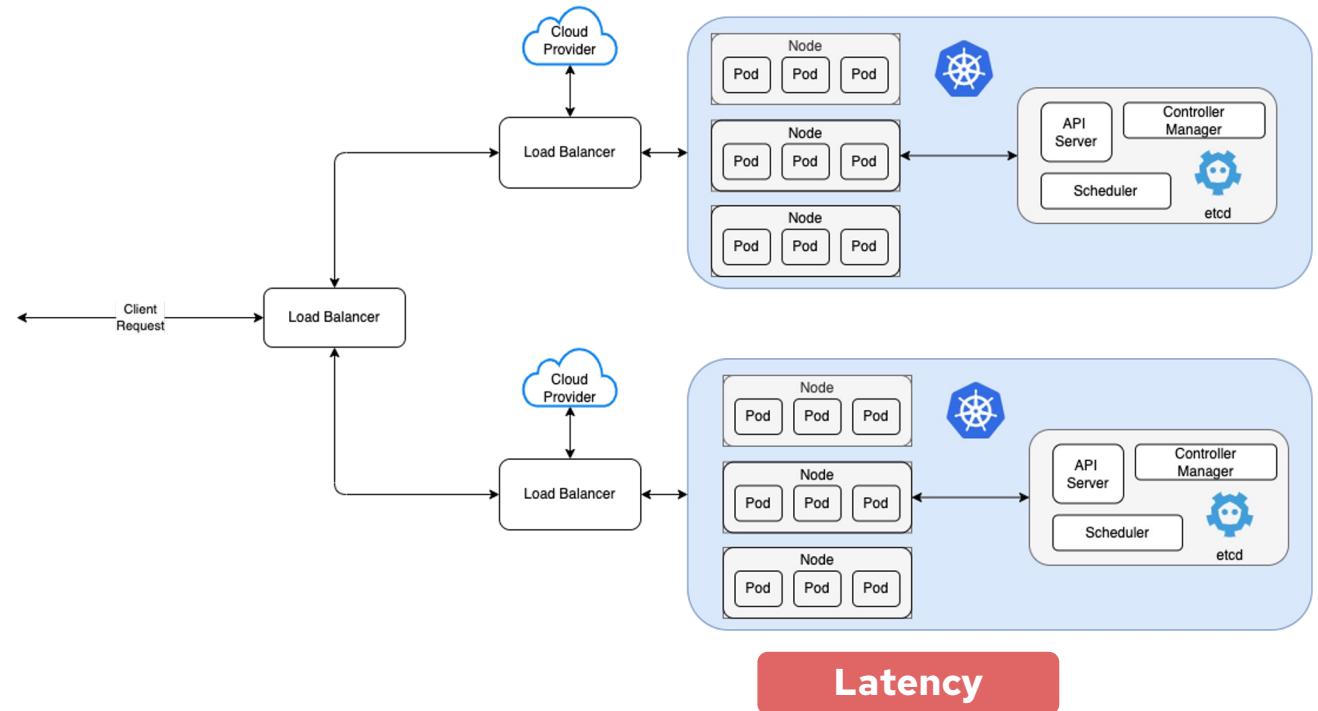
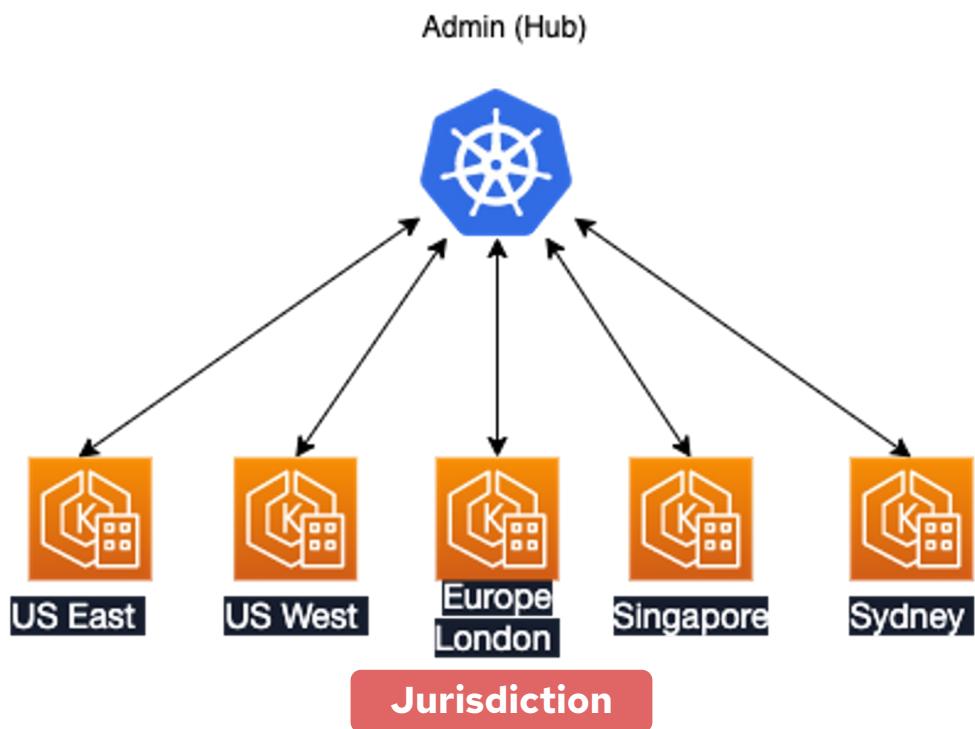
What we'll discuss today

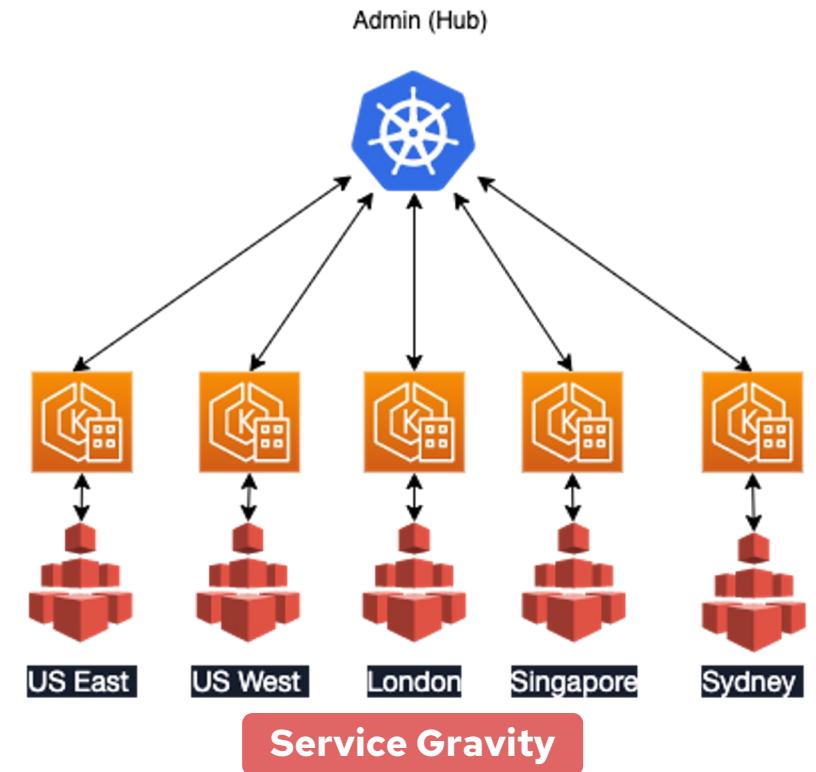
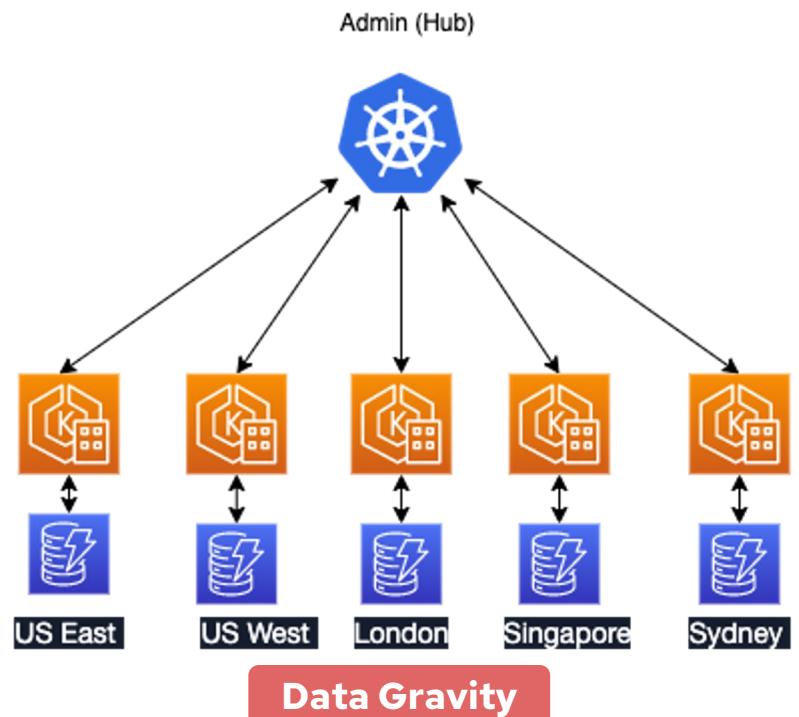
- ▶ What is a Multi-Cluster setup ?
- ▶ Need for Multi-Cluster and Challenges
- ▶ What is Open Cluster Management (OCM) ?
- ▶ GitOps Principles
- ▶ What is ArgoCD ?
- ▶ Multi-Cluster Deployments Using ArgoCD
- ▶ Demo
- ▶ Questions

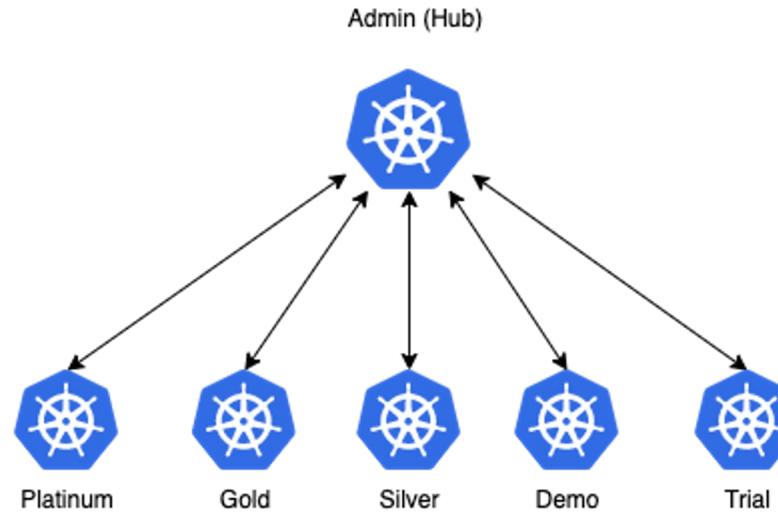
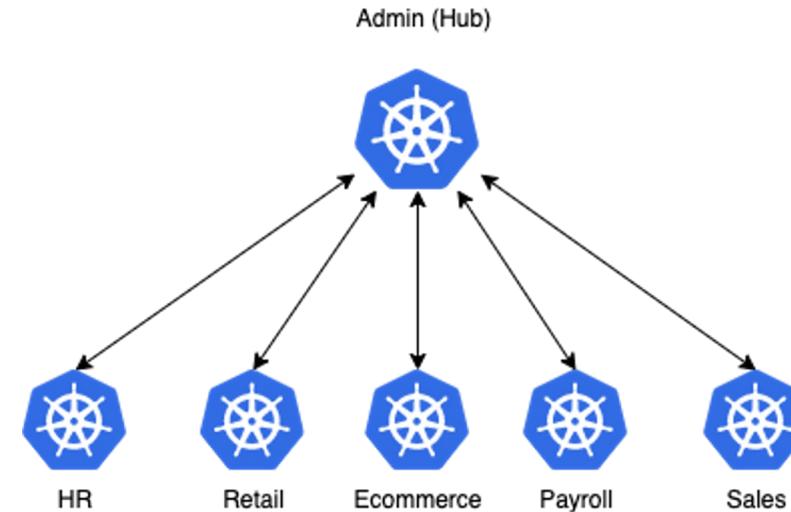
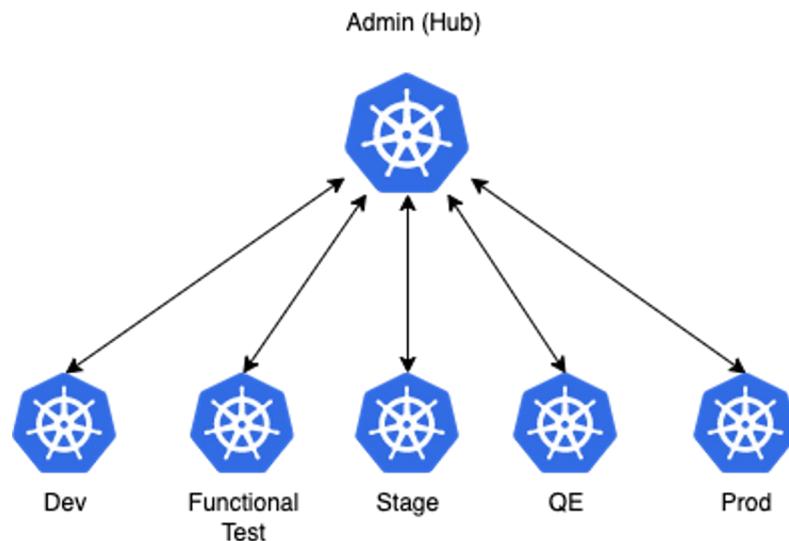
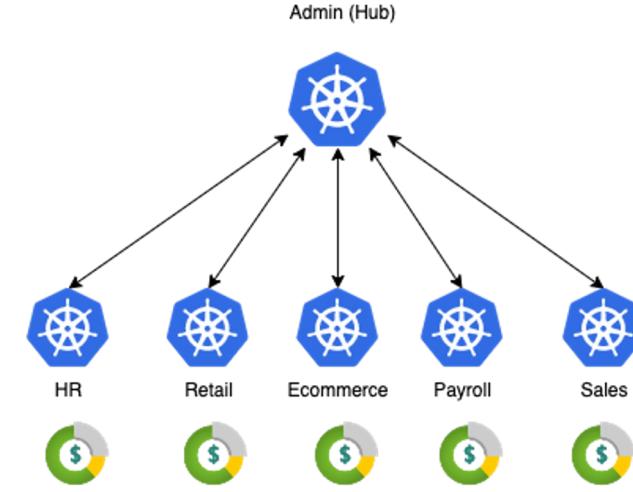


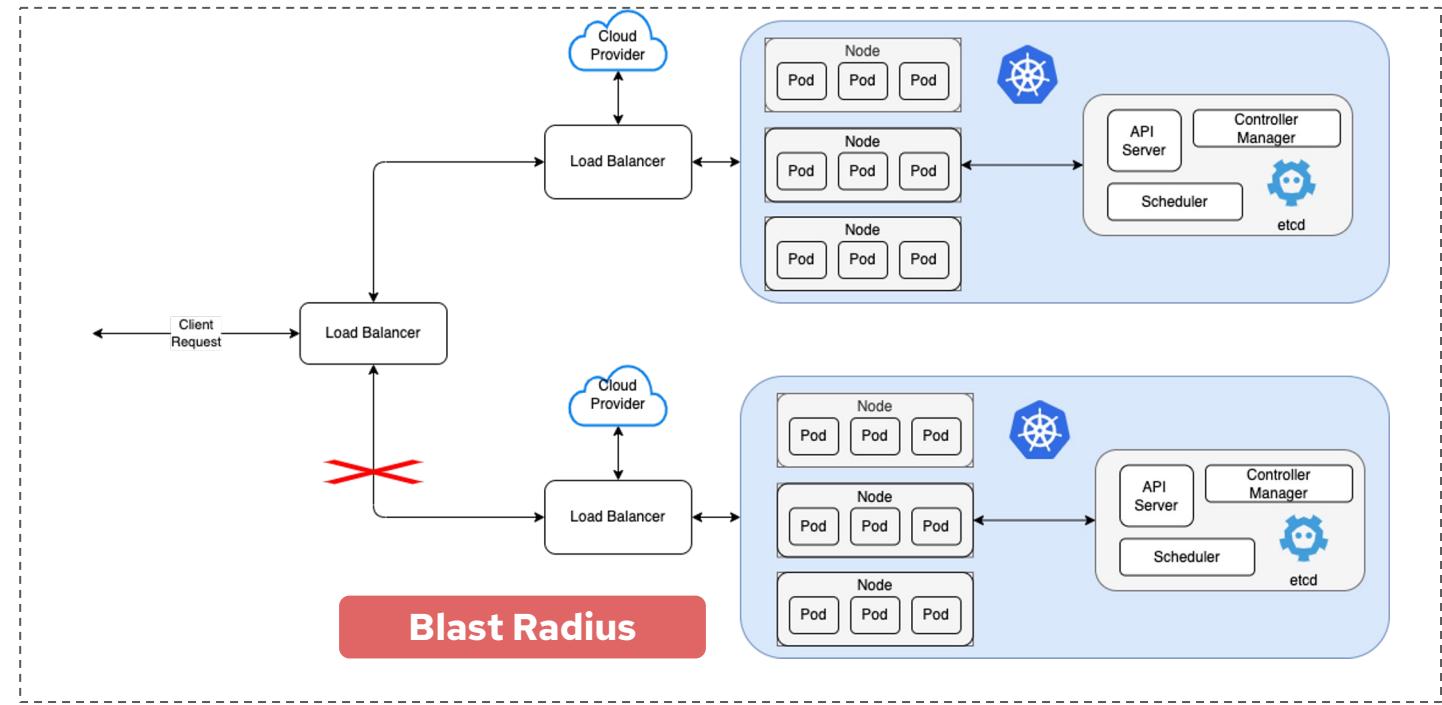
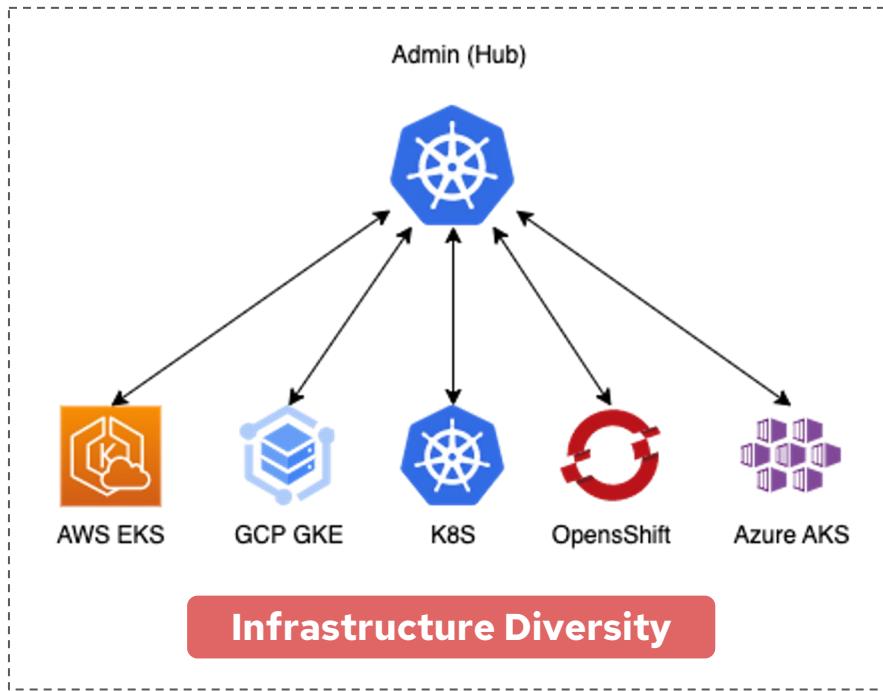


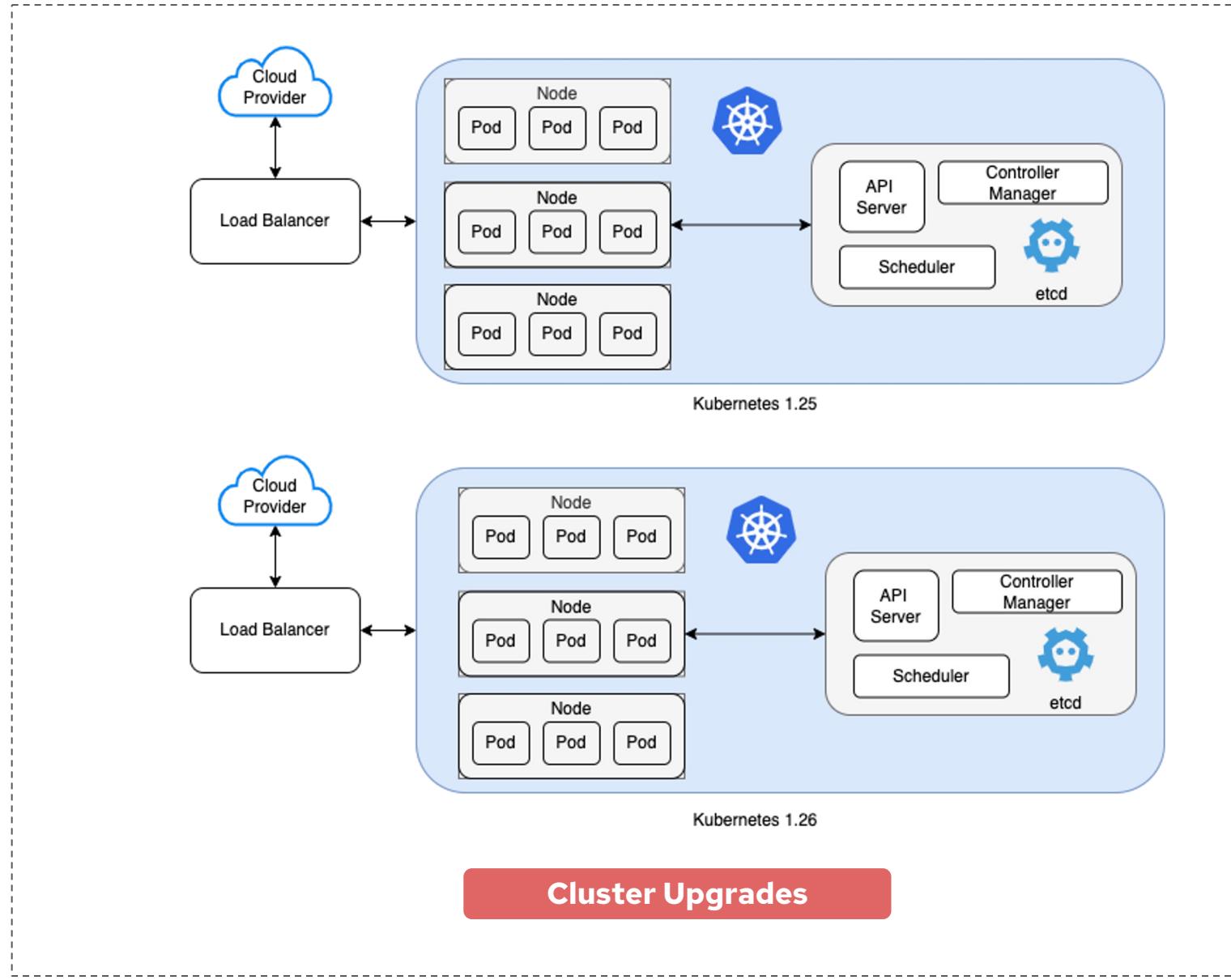


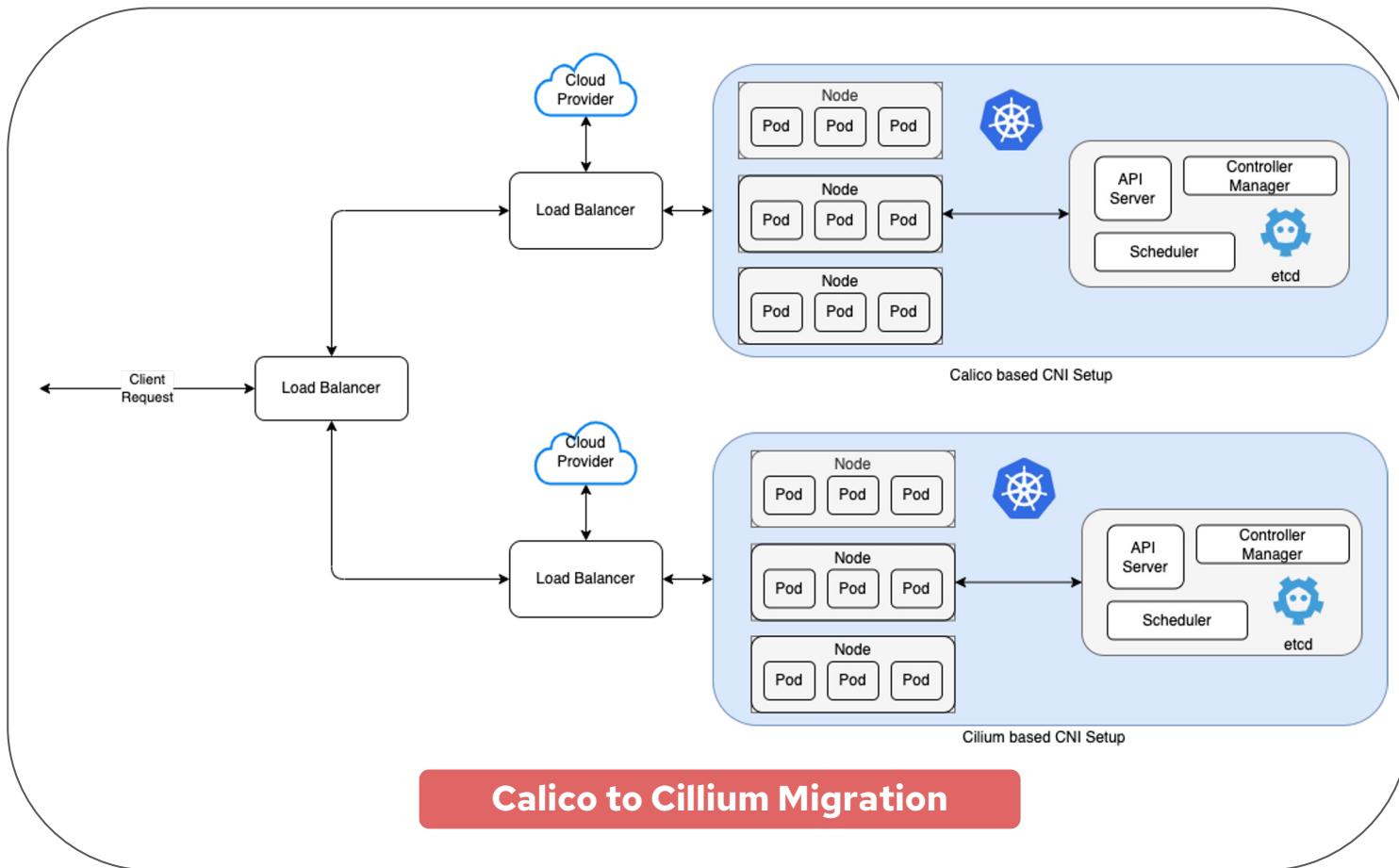
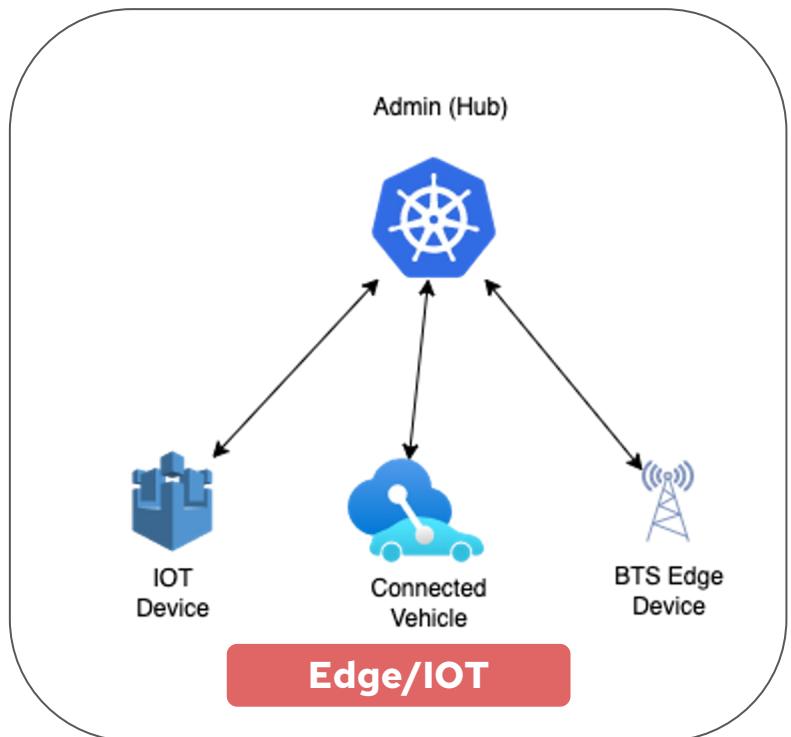




Performance**Organization****Environment****Cost Control**







INFRASTRUCTURE COST

More control plane nodes and load balancers are required, which increases cost.

COMPLEX CONFIGURATION

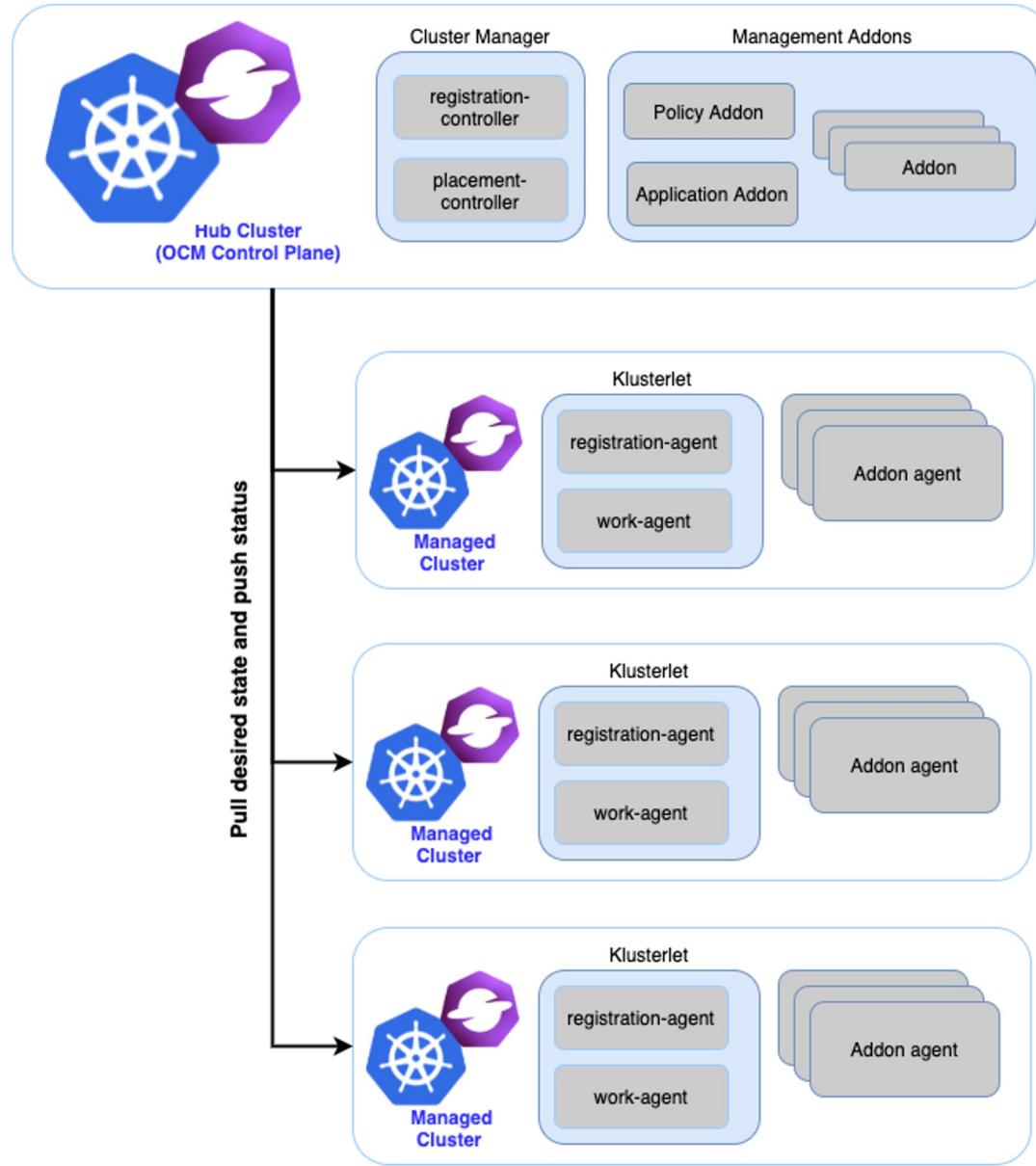
Network configurations like CIDR ranges, IP routing rules, DNS settings need to be carefully considered.

SECURITY

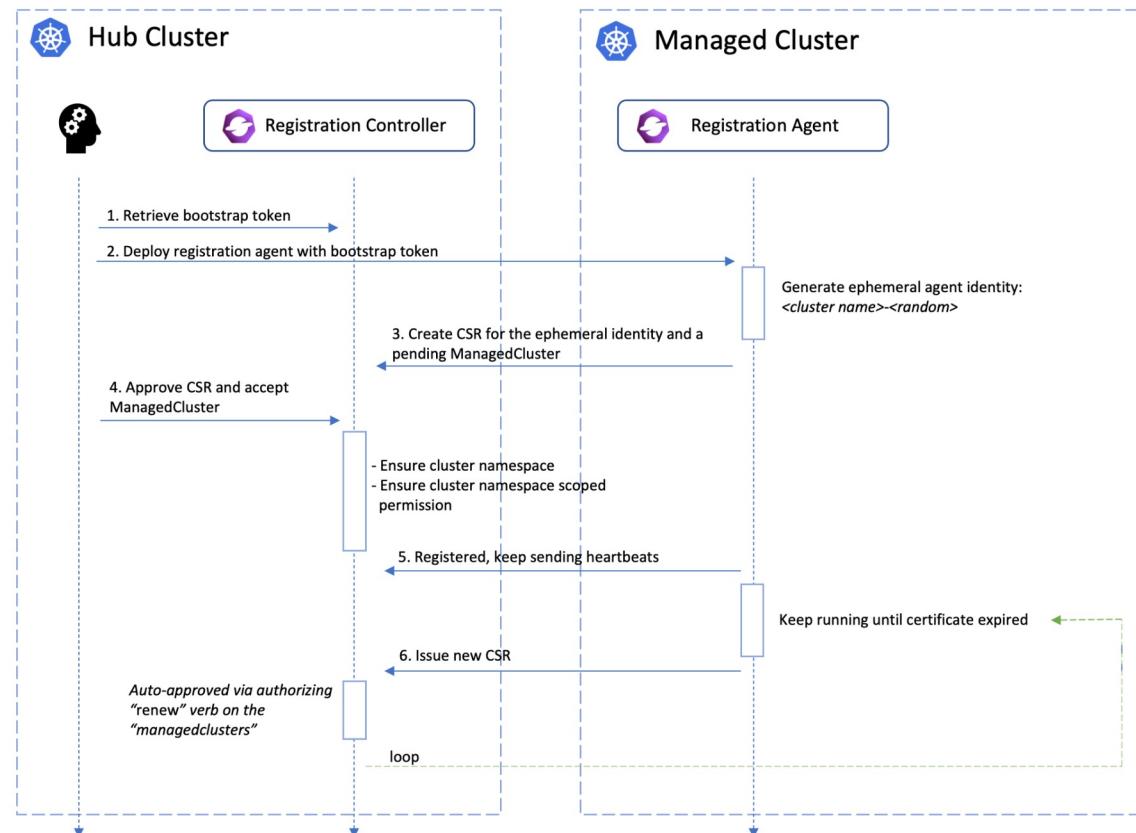
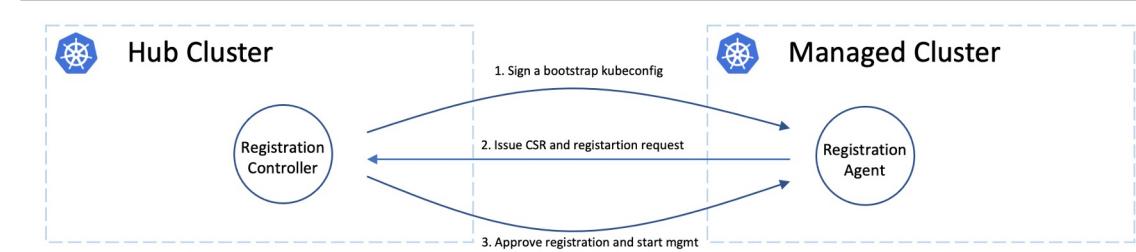
- Securing the inter cluster API calls
- Managing multiple security certificates across all clusters

What is Open Cluster Management (OCM)?

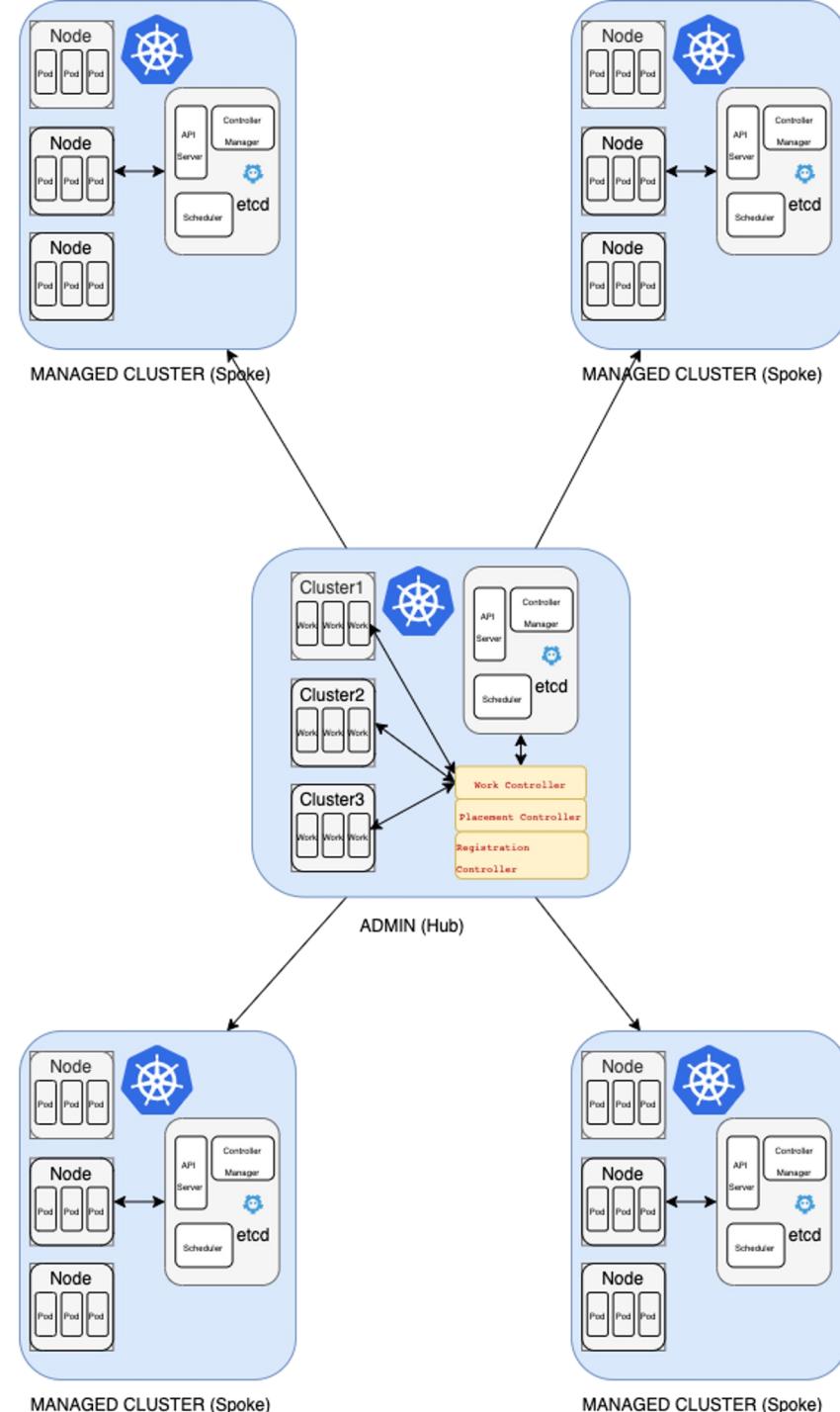
- ▶ is a community-driven, CNCF Sandbox project.
- ▶ is based on a **hub-spoke** architecture.
- ▶ **multi-cluster** and **multi-cloud** cluster management
- ▶ Simplifies fleet Management
- ▶ Provides a single pane of view of the entire fleet of clusters
- ▶ **Highly scalable:** OCM uses a pull based model and requires one-sided communication from the managed clusters to the hub cluster.
- ▶ resources are easily managed using a command-line interface (CLI) named [clusteradm](#).



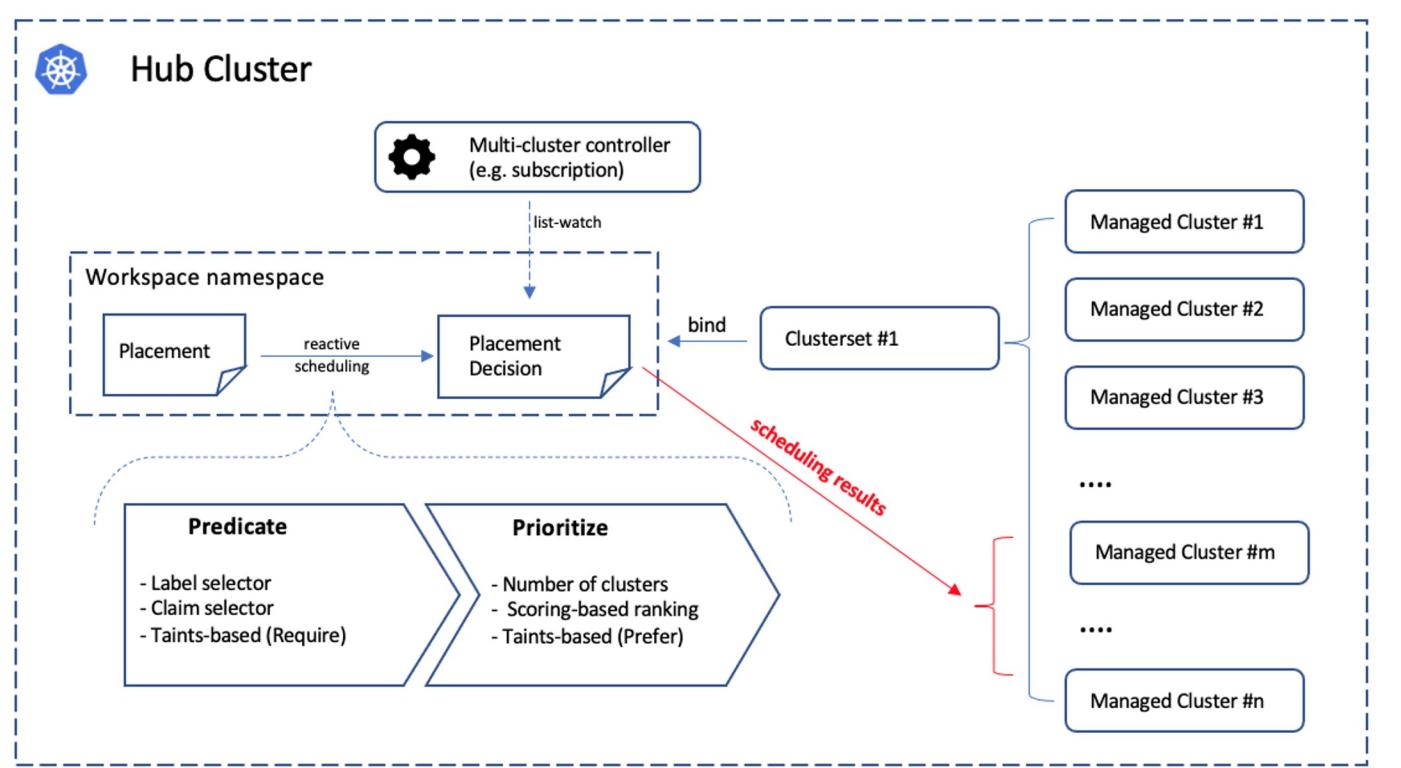
OCM - Cluster Registration Process



OCM - Hub & Spoke



- Managed Cluster/Cluster Set
- Placement/Placement Decision
- Cluster Claim
- Manifest Work
- Manifest Work ReplicaSet



```
apiVersion: cluster.open-cluster-management.io/v1
kind: ManagedCluster
metadata:
  name: cluster1
spec:
  hubAcceptsClient: true
  taints:
    - effect: NoSelect
      key: cluster.open-cluster-management.io/unavailable
      timeAdded: '2022-02-21T08:11:54Z'
```

```
apiVersion: cluster.open-cluster-
management.io/v1beta2
kind: ManagedClusterSet
metadata:
  name: example-clusterset
spec:
  clusterSelector:
    selectorType: ExclusiveClusterSetLabel
status:
  conditions:
    - lastTransitionTime: "2022-02-21T09:24:38Z"
      message: 1 ManagedClusters selected
      reason: ClustersSelected
      status: "False"
      type: ClusterSetEmpty
```

```
apiVersion: cluster.open-cluster-management.io/v1
kind: ManagedCluster
metadata:
  name: cluster1
spec:
  hubAcceptsClient: true
  taints:
    - effect: NoSelect
      key: cluster.open-cluster-management.io/unreachable
      timeAdded: '2022-02-21T08:11:06Z'
```

```
apiVersion: cluster.open-cluster-
management.io/v1beta2
kind: ManagedClusterSet
metadata:
  name: example-openshift-clusterset
spec:
  clusterSelector:
    labelSelector:
      matchLabels:
        vendor: OpenShift
  selectorType: LabelSelector
```

```
apiVersion: cluster.open-cluster-management.io/v1beta1
kind: Placement
metadata:
  name: placement1
  namespace: default
spec:
  numberOfWorkers: 3
  clusterSets:
    - prod
  predicates:
    - requiredClusterSelector:
        labelSelector:
          matchLabels:
            purpose: test
        claimSelector:
          matchExpressions:
            - key: platform.open-cluster-management.io
              operator: In
              values:
                - aws
```

```
apiVersion: cluster.open-cluster-management.io/v1beta1
kind: Placement
metadata:
  name: placement
  namespace: ns1
spec:
  numberOfWorkers: 1
  prioritizerPolicy:
    configurations:
      - scoreCoordinate:
          builtIn: ResourceAllocatableCPU
          weight: 2
      - scoreCoordinate:
          builtIn: ResourceAllocatableMemory
          weight: 2
```

```
apiVersion: work.open-cluster-management.io/v1
kind: ManifestWork
metadata:
  namespace: <target managed cluster>
  name: hello-work-demo
spec:
  workload:
    manifests:
      - apiVersion: apps/v1
        kind: Deployment
        metadata:
          name: hello
          namespace: default
        spec:
          selector:
            matchLabels:
              app: hello
          template:
            metadata:
              labels:
                app: hello
            spec:
              containers:
                - name: hello
                  image: quay.io/asmacdo/busybox
                  command:
                    ["sh", "-c", 'echo "Hello, Kubernetes!" && sleep 3600']
```

```
apiVersion: work.open-cluster-management.io/v1alpha1
kind: ManifestWorkReplicaSet
metadata:
  name: argo-guestbook
  namespace: default
spec:
  manifestWorkTemplate:
    workload:
      manifests:
        - apiVersion: argoproj.io/v1alpha1
          kind: Application
          metadata:
            name: guestbook
            namespace: argocd
          spec:
            destination:
              namespace: guestbook
              server: https://kubernetes.default.svc
            project: default
            source:
              path: guestbook
              repoURL: https://github.com/argoproj/argocd-example-apps.git
              targetRevision: HEAD

  placementRefs:
  - name: app-platform-clusters
```

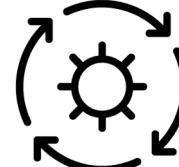
GitOps Principles



The system is described declaratively



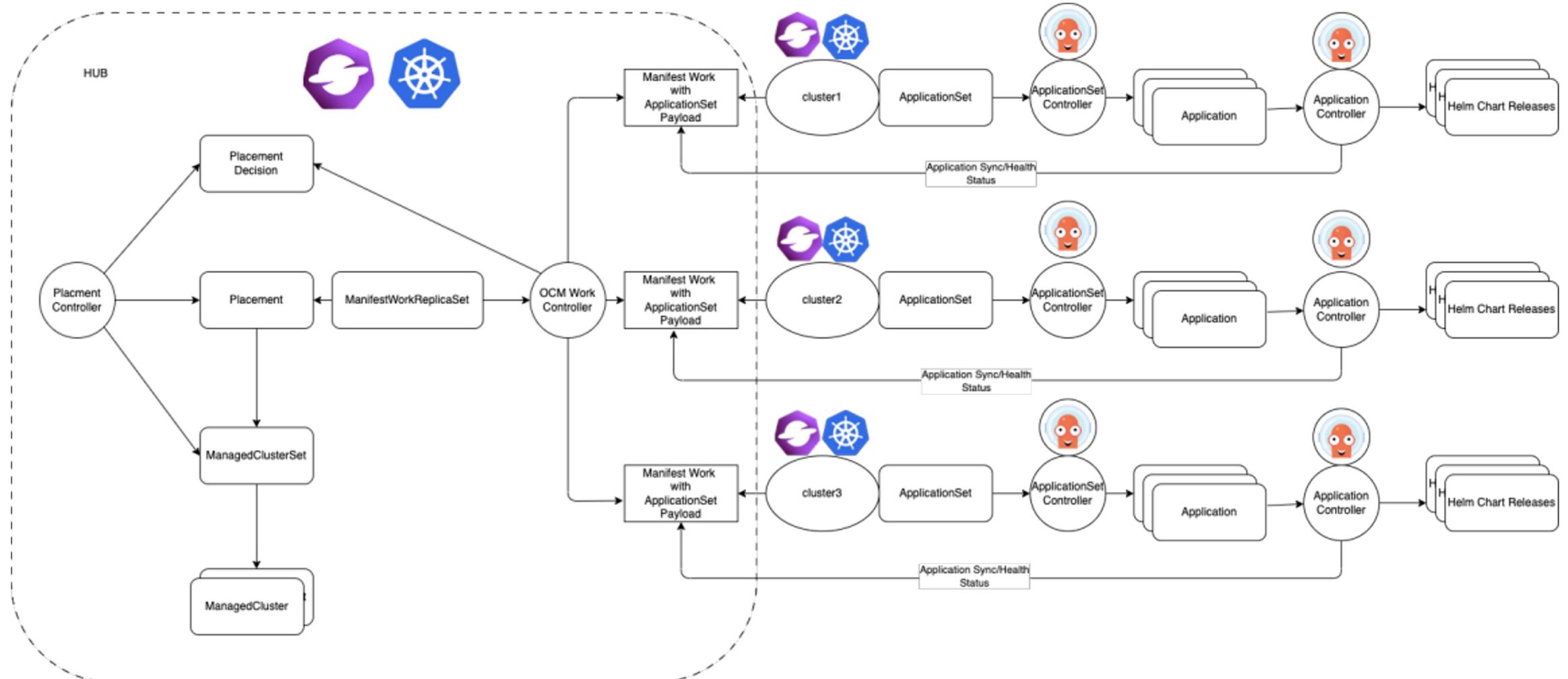
The desired state is versioned in Git



Approved changes can be applied automatically



A controller exists to detect and act on drift



Demo

Demo

Demo Source Code

<https://github.com/anandf/multicluster-gitops>

<https://github.com/anandf/app-platform-argocd>

Thank you

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