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Multi-Cluster Ingress Powered by Kubernetes Cluster Registry

Nikhil Jindal, Google
Greg Harmon, Google

Agenda

- Why Multi-cluster
- Multi-cluster ingress
- Kubemci CLI
- Cluster Registry, with a controller
- Kubemci controller demo

Why Multiple Clusters?

- High availability
- Scalability
- Avoiding vendor lock-in
- Geo proximity to customers
- Many more ...

Multi-Cluster Requirements

- Keep your app synced across clusters
- Configure network resources (services, ingress) to route traffic across clusters
- Unified policies across clusters
- Failure domain isolation

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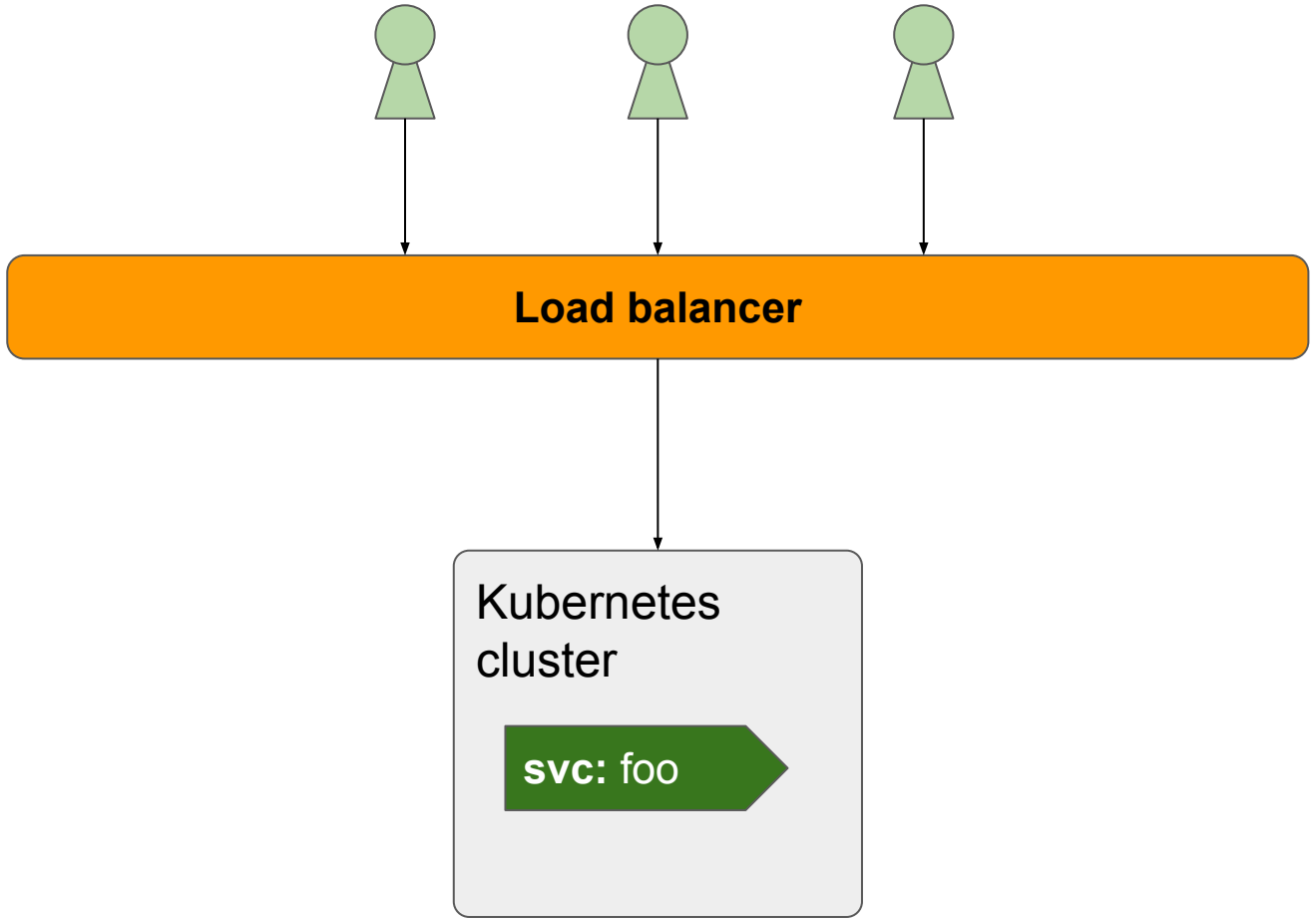
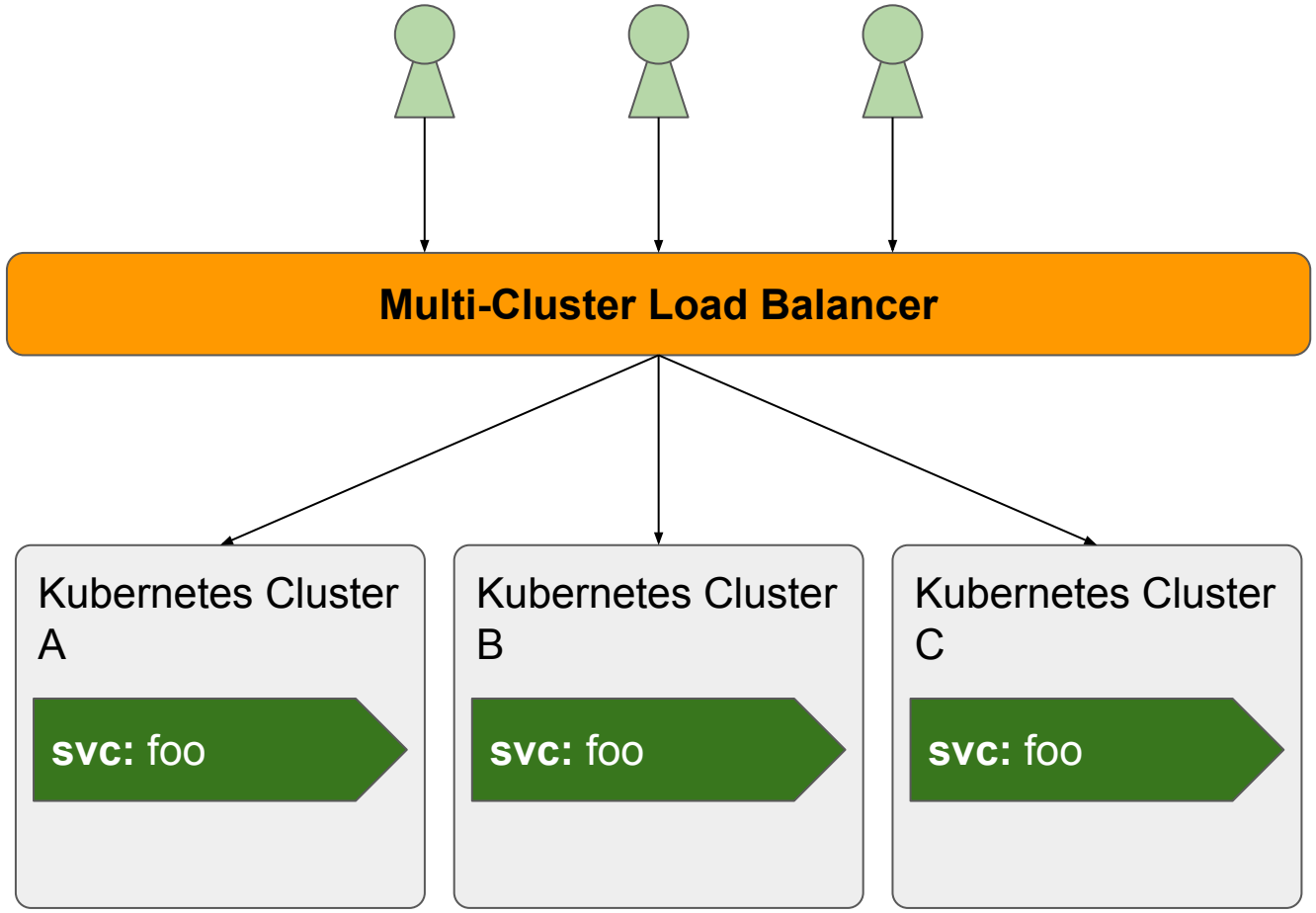
What is Multi-Cluster Ingress (MCI)?

Single Cluster Ingress



Multi-Cluster Ingress



Advantages

- Route to closest cluster (least latency routing)
- Resilient to clusters going down
- Scalability
- Canarying clusters
- Hybrid (multi-cloud and/or on-prem setup)

kubemci CLI

Problem: Given an ingress spec and list of clusters and configure the load balancer

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Next Step: More Magic

Implement as Cluster Registry controller

Cluster Registry

Cluster Registry: Overview

- Motivation
  - Currently: ad hoc methods (config files), homegrown tooling
- Solution
  - Cluster List
  - Labeling Cluster
  - Standard Kubernetes API

kubernetes / cluster-registry

View Repository | Watch 24 | Star 16 | Fork 12

Code | Issues 57 | Pull requests 2 | Insights

Cluster Registry API

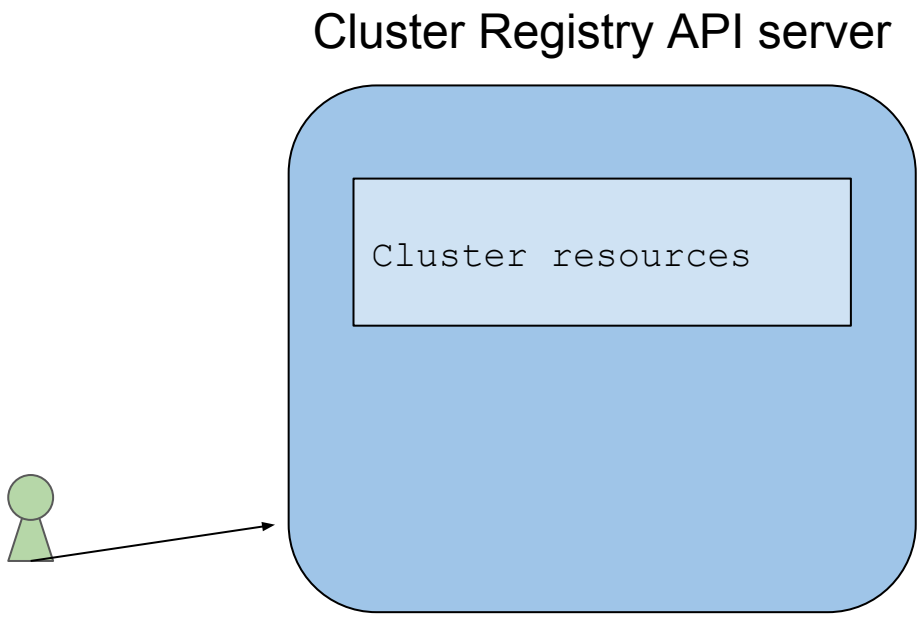
1,836 commits | 1 branch | 0 releases | 139 contributors | Apache-2.0

Branch: master | New pull request | Create new file | Upload files | Find file | Clone or download

```
kind: ClusterList
apiVersion: clusterregistry.k8s.io/v1alpha1
items:
- kind: Cluster
  apiVersion: clusterregistry.k8s.io/v1alpha1
  metadata:
    name: us-west1-a
  spec:
    kubernetesApiEndpoints:
      serverEndpoints:
      - "https://us-west1-a.example.com:443/"
      caBundle: (base64 encoded CA bundle)
```

Cluster Registry: Architecture

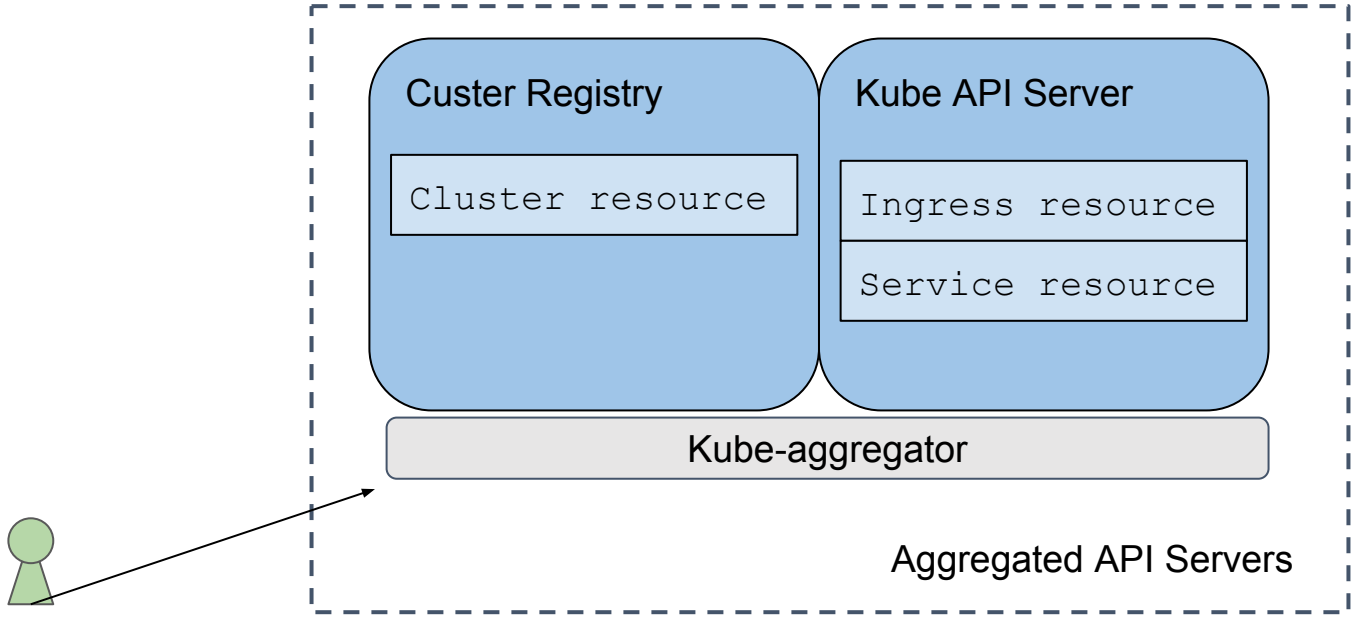
Cluster Registry: Cluster resource only



Cluster Registry: Architecture

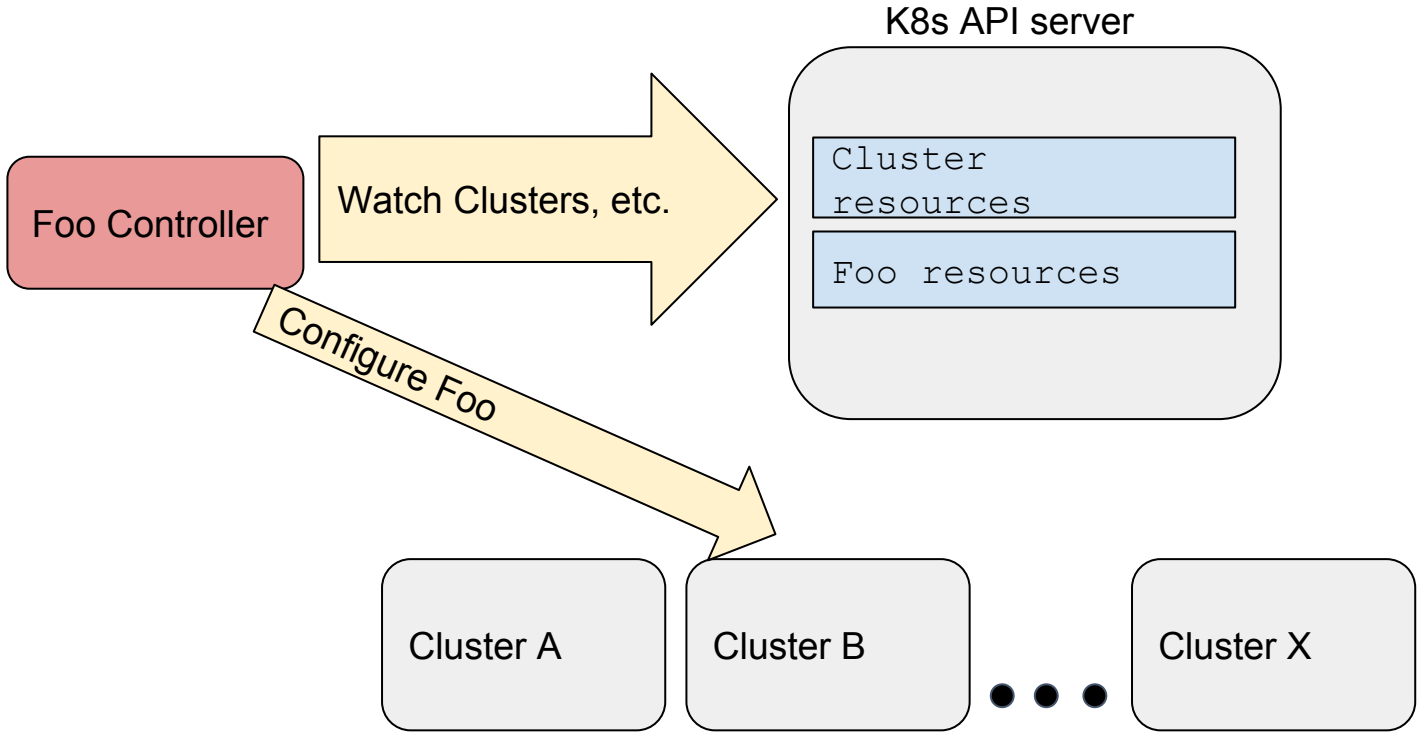
Cluster Registry, aggregated:

Cluster resource and usual k8s Resources



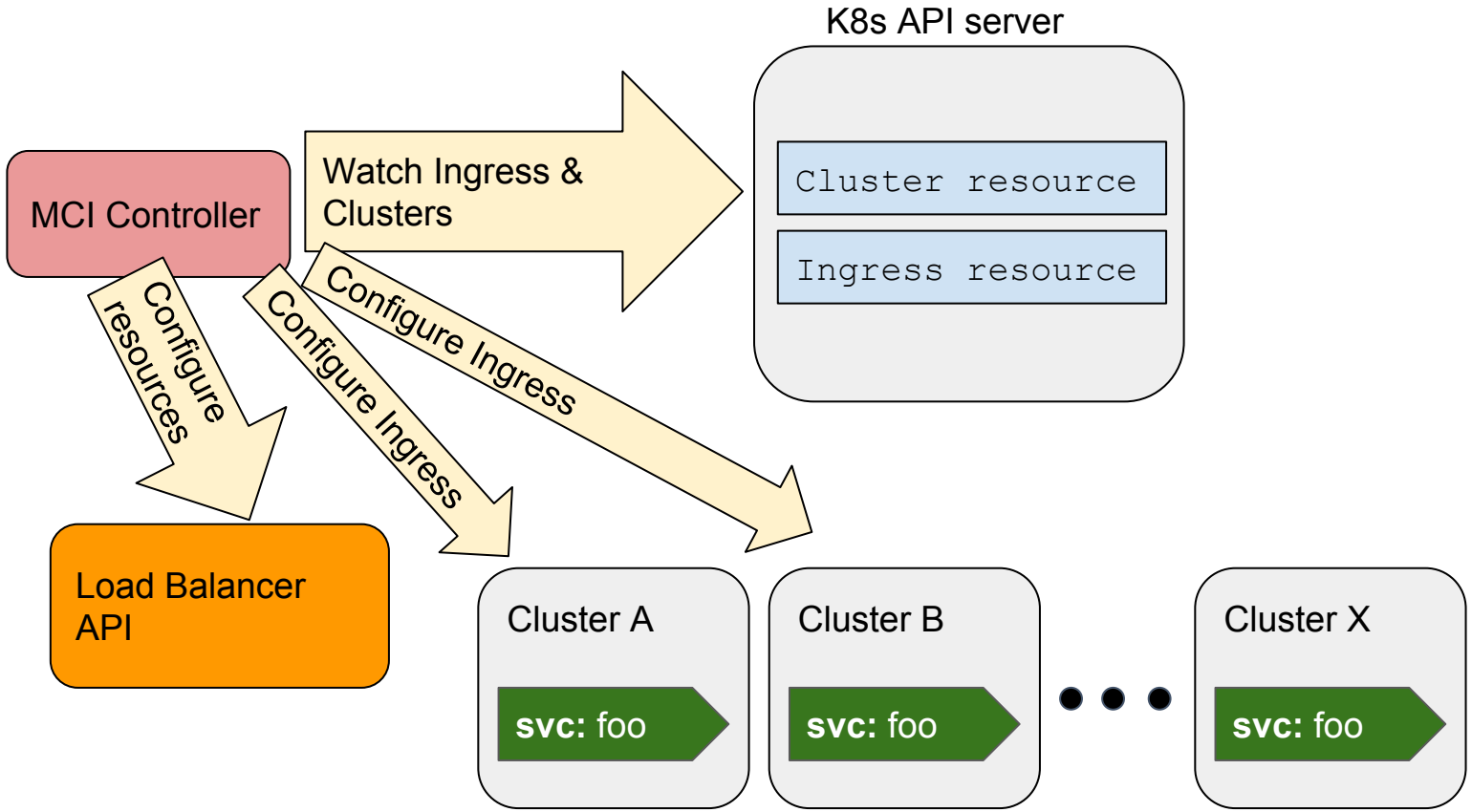
Cluster Registry: Architecture

Cluster Registry with a controller



Cluster Registry: Architecture

Multi-Cluster Ingress Controller example



Kubemci Controller advantages

- Automatically update all ingresses when adding/removing clusters
- Automatically update all clusters when changing Ingress spec

Controller Demo

End

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Questions

Resources

Cluster Registry repo:

https://github.com/kubernetes/cluster-registry

Example Controller:

https://github.com/kubernetes/cluster-registry/blob/master/examples/slackcontroller/slackcontroller.go

Kubemci CLI Tool repo:

https://github.com/GoogleCloudPlatform/k8s-multicluster-ingress