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# SIG MultiCluster Intro

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**Tuesday, December 11 • 1:45pm - 2:20pm**



# Agenda

- Mission
- Sub-projects: Current status and roadmap
  - Federation v2
  - Cluster Registry
  - Kubemci tool (multicluster ingress)
- Demo: Federated Istio
- Q&A

# SIG-Multicluster Mission



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- Solving common challenges related to the **management of multiple Kubernetes clusters, and applications that exist therein**
- Designing, discussing, implementing and maintaining
  - **API's, tools and documentation**
  - related to multi-cluster administration and application management
- Includes **not only active automated approaches** such as Cluster Federation
  - also those that employ batch workflow-style continuous deployment systems
- Includes:
  - standalone building blocks (for example a cluster registry), and
  - proposed changes to kubernetes core where appropriate
- See more at <https://github.com/kubernetes/community/blob/master/sig-multicluster/README.md>

# SIG-Multicluster Sub-projects



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- **Federation v2**
  - Control Plane for Multicluster-specific workload APIs.
    - Currently supports both:
      - **Simple Propagation** of Kubernetes objects to multiple clusters.
      - **Higher Level Features** (e.g. cross cluster replica distribution for deployments, service discovery, load balancing, etc.).
    - Plan to Beta in Q1 2019.
- **Cluster Registry**
  - Common abstraction for a Registry of Clusters that can store per-Cluster metadata.
    - **Managed Kubeconfig**
- **Kubemci (Kube Multi-cluster Ingress)**
  - Standalone tool to create ingress with load balancing across multiple clusters
    - Similar functionality to **Federation v1 Federated Ingress**
    - Currently only supports Google Cloud, but can be expanded to others.

# Sub-project: Federation v2

- Building on the definition of federation as a **common API surface to a set of multiple kubernetes clusters**.
- Allows simple **federation of any k8s type, via configuration**, including CRDs:
  - Achieve using ``kubefed2 federate``.
- Implemented as a set of CRDs.
- Uses the Cluster Registry as a source of Kubernetes Cluster Endpoints.
- More details of workflow, architecture and API in deep dive at 14:20 tomorrow.

# SIG-Multicluster community



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- **Currently active contributors**

- Cisco
- CERN
- Google
- Hauwei
- IBM
- RedHat
- ...

# Federation V2: What we have achieved



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- Federation API deployable as CRDs (k8s 1.11+).
- Push reconciliation of arbitrary types.
- Puggable DNS based service discovery (external-dns).
- Config based reconciliation of types (TypeConfig).
- Simple federation of any k8s type (including CRDs), without writing code.
- High level replica scheduling behaviour.
- Per cluster overrides of arbitrary fields.

# Federation V2 Roadmap



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- Status aggregation - (simple version completed)
  - Individual per cluster
  - Consolidated cross-cluster
- More high level scheduling behaviours.
- Tooling to ease translating a k8s resource into federated equivalent
  - **`kubefed2 federate resource`**.
- Higher level user facing federation API.
- Pull reconciliation.
- ....

# Sub-project: Cluster Registry Update



- Simple Status field has been added to the Cluster object.
- There are ongoing discussions on how best to provide credentials to access a cluster.
- Intention is to move to beta after these discussions are resolved.

# Sub-project: Kubemci Update



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- Collecting feedback from users:

<https://github.com/GoogleCloudPlatform/k8s-multicloud-ingress/issues/117>.

# Federation Use Case:



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## Federated Istio

# Federated Istio



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## Kick Off Demo

# Why Federate Istio?



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- Multicluster support
- Limitations with Istio v1.0 multicluster solutions
- Manage Istio like any other multicluster application
- Cross Cluster Service Discovery
- A simple user experience
- The best of both worlds.. **uniformity** and flexibility
- A strong, diverse community

# What Does Federated Istio Do?



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- Use Federation v2 APIs to:
  - Manage individual Istio control-planes in each Kubernetes clusters.
  - Manage Istio-based micro services across multiple Kubernetes clusters.
  - Manage Istio capabilities (Traffic Management, Security, etc.) across multiple Kubernetes clusters.

# References



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- Federated Istio Repo:

<https://github.com/danehans/federated-istio>

- Upstream Istio Docs Issue:

<https://github.com/istio/istio.io/issues/2843>

# Federated Istio



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Check on the Demo

# What's Next?



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- Add [docs](#) and e2e tests upstream
- Continue to explore other use-cases. Live Upgrades?
- Federated Istio Operator/Operator Lifecycle Manager
- Suggestions?

# Please join in the conversation...



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- SIG Info Page  
<https://github.com/kubernetes/community/tree/master/sig-multicluster>
- <https://kubernetes.slack.com/messages/sig-multicluster>
- Regular SIG Meeting: [Tuesdays at 9:30 PT \(Pacific Time\)](#)
- Federation sub-project sync: [Wednesdays at 7:30 PT \(Pacific Time\)](#)
- Mailing list:  
<https://groups.google.com/forum/#!forum/kubernetes-sig-multicluster>



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