Google Developer Groups
Cloud Chennai

Unifying Kubernetes: Live Multi-Cloud Migration to GKE with Istio

cloud community days 2025

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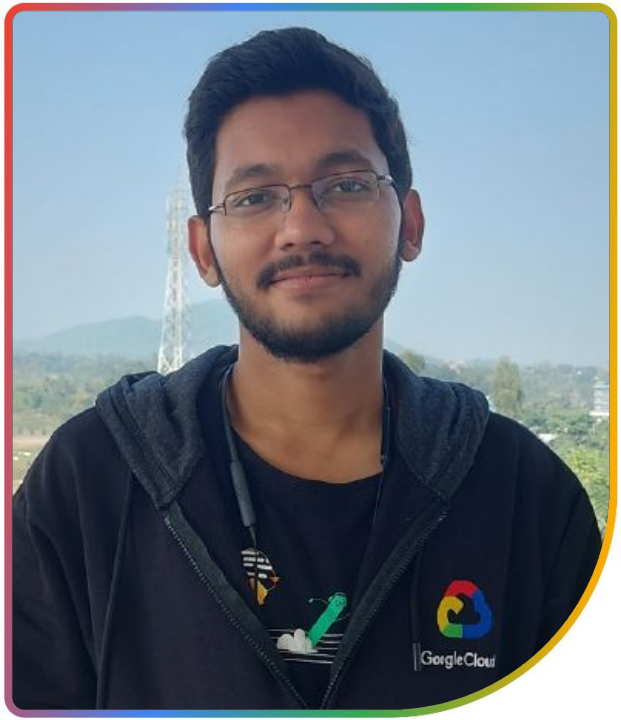
Cloud Chennai

Sayed Imran

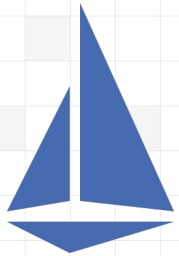
DevOps Engineer

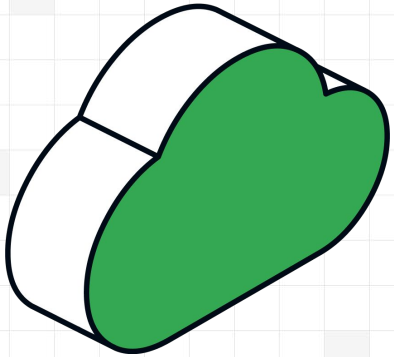


CNCF Kubestronaut
4x Google Cloud Certified
Lead Mentor at CertDirectory.io

Agenda

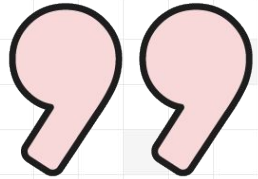
- Exploring Multi Cloud
- Service Mesh
- Istio and its modes
- Gateways in Istio
- Sample Application (Animal Album)
- Live Demo





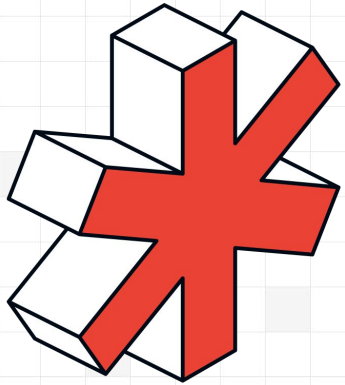
Multi-Cloud Isn’t a Marketing Ploy. It is a Necessity.

- Rory Monaghan



Why Multi-Cloud? 🤔

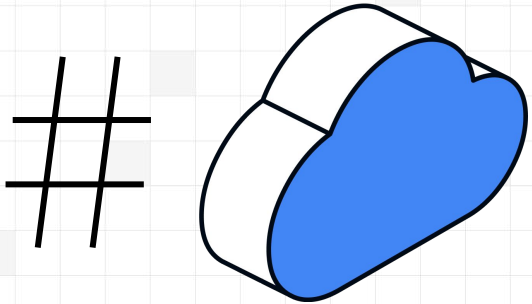
How is it even a necessity ?



In today’s rapidly evolving cloud landscape, relying on a single cloud provider can expose organizations to significant risks.

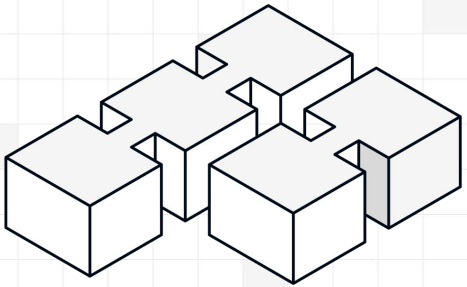
As the cloud ecosystem continues to grow, adopting a multi-cloud strategy is no longer just a choice, but a necessity for resilience and innovation.

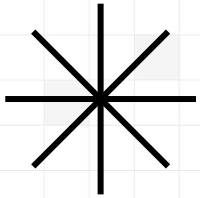
Why Multi Cloud ? (cont.)



Avoid Vendor Lock-in:

Reduces dependence on a single cloud provider.

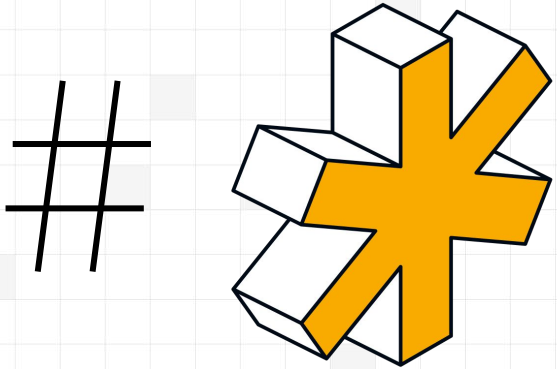




Flexibility & Agility.

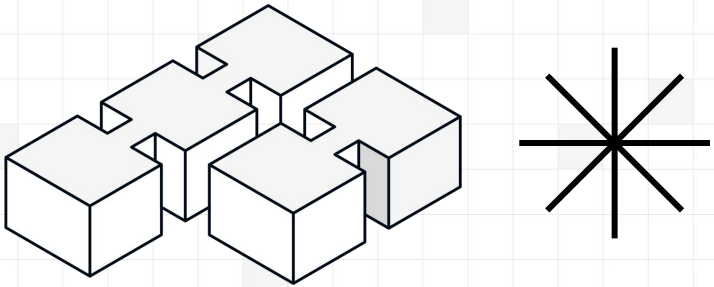
Leverage the best of each cloud provider's offerings for different use cases.

Why Multi Cloud ? (cont.)



Cost Optimization.

Maximize cost efficiency by selecting the best pricing model across clouds.

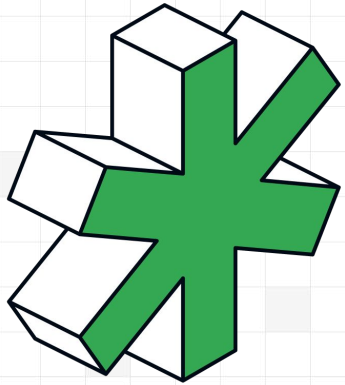


Disaster Recovery & Resilience.

Ensures high availability and business continuity by spreading workloads.

Service Mesh

Extending Kubernetes capabilities

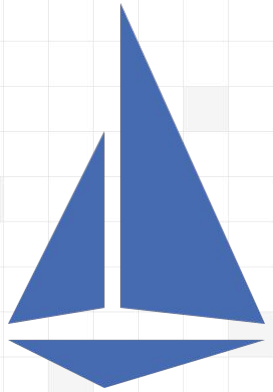


A service mesh is a dedicated infrastructure layer that manages service-to-service communication in a microservices architecture.

It acts as a transparent and configurable way to handle traffic routing, security, observability, and other network concerns, freeing developers from managing these aspects within individual services.

Istio

The de facto service mesh



istio.io

Istio addresses the challenges developers and operators face with a distributed or microservices architecture. Whether you're building from scratch, migrating existing applications to cloud native, or securing your existing estate.

Istio ensures that cloud native and distributed systems are resilient, helping modern enterprises maintain their workloads across diverse platforms while staying connected and protected.

Modes of Istio

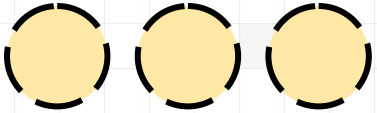
Sidecar Mode

Istio has been built on the sidecar pattern from its first release in 2017. Sidecar mode is well understood and thoroughly battle-tested, but comes with a resource cost and operational overhead.

Ambient Mode

Launched in 2022, ambient mode was built to address the shortcomings reported by users of sidecar mode. As of Istio 1.22, it is production-ready for single cluster use cases.

Gateway in Istio.



Ingress Gateway

Manages external traffic entering the mesh. It routes incoming requests to internal services, applying security, routing, and observability policies at the edge.

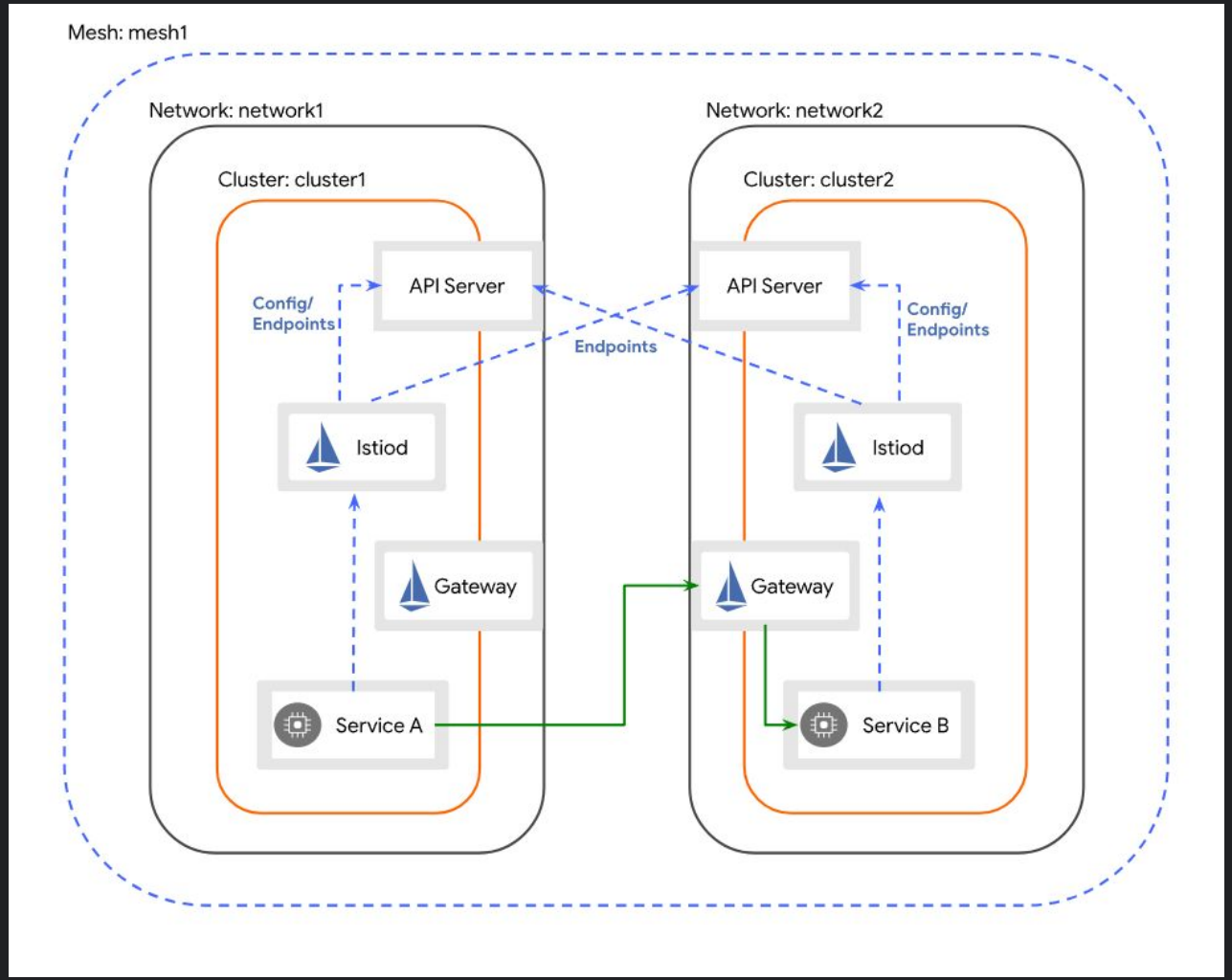
Egress Gateway.

Controls outbound traffic from the mesh to external services. It enforces policies and provides visibility for traffic leaving the mesh.

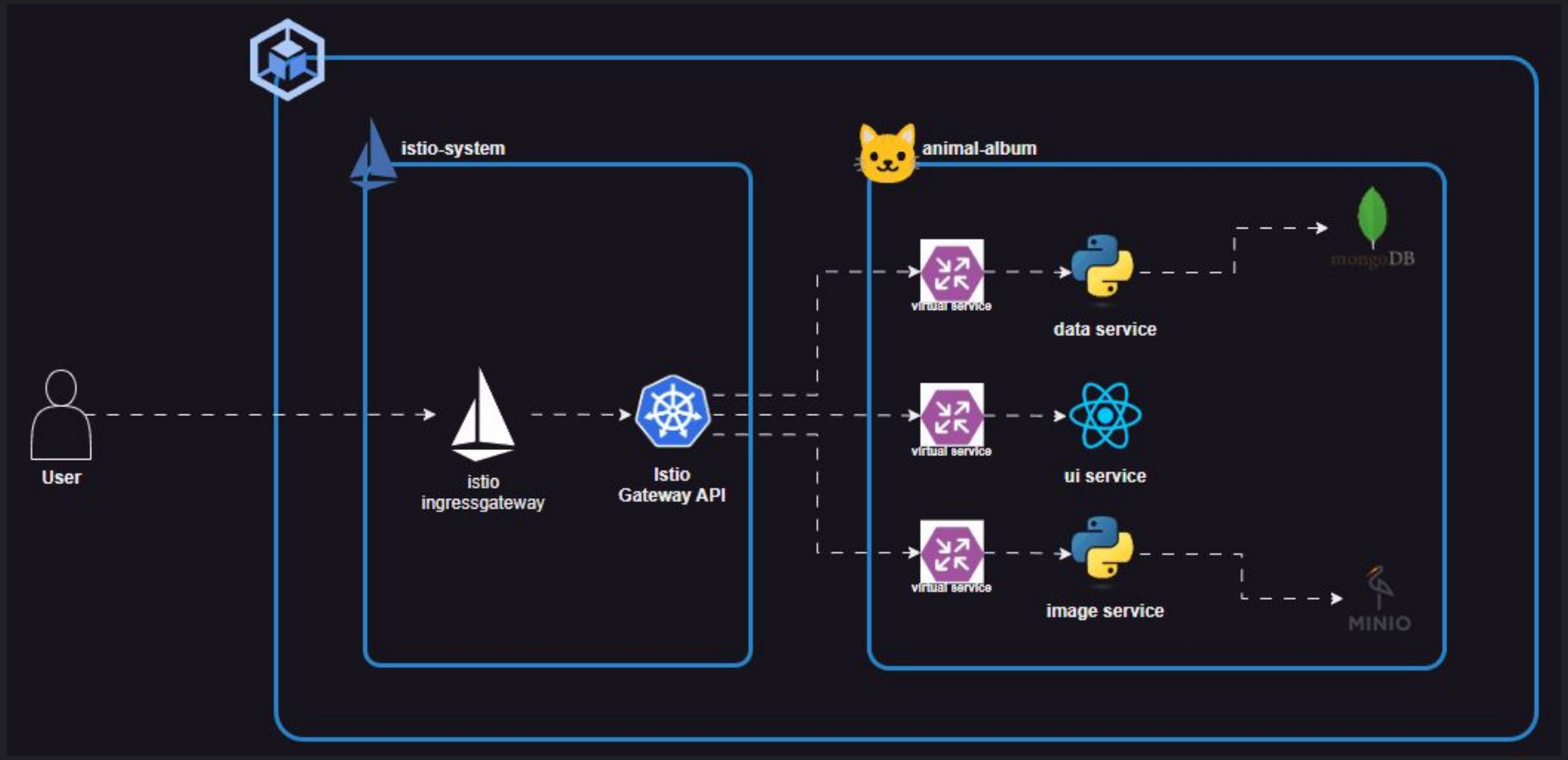
East West Gateway.

Facilitates secure service-to-service communication across clusters or regions. It's essential in multi-cluster or multi-network Istio deployments.

Multi Cluster Setup

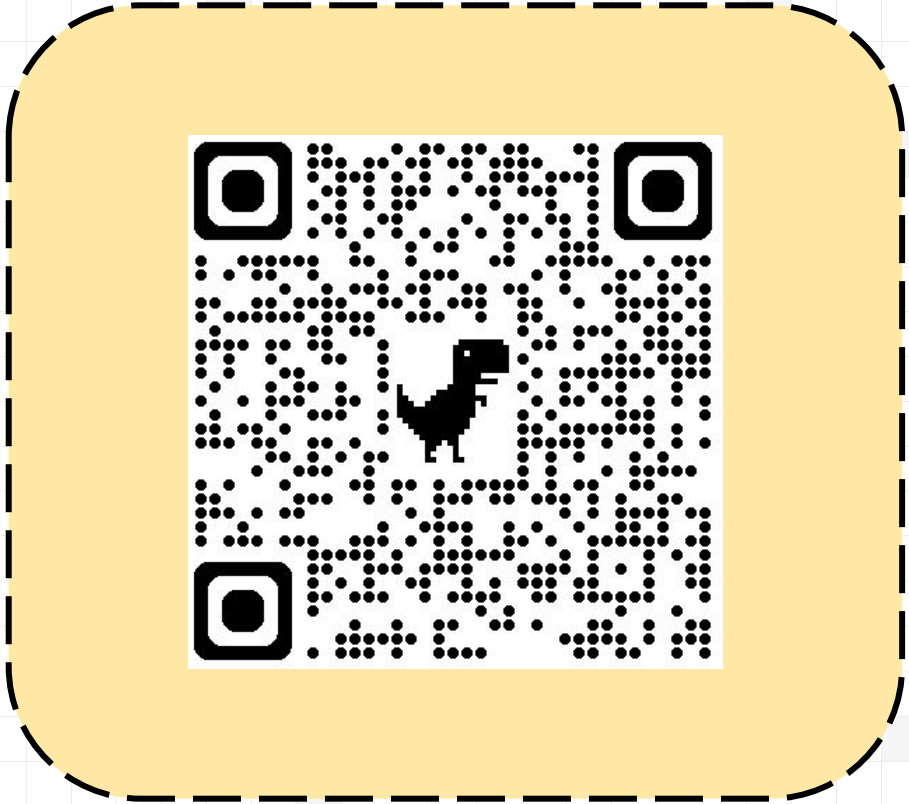

Mesh: mesh1
Network: network1
Network: network2
Cluster: cluster1
Cluster: cluster2
API Server
API Server
Config/
Endpoints
Endpoints
Config/
Endpoints
Istiod
Istiod
Gateway
Gateway
Service A
Service B

Sample App
(Animal Album)


istio-system
animal-album
User
istio
ingressgateway
Istio
Gateway API
virtual service
data service
mongoDB
virtual service
ui service
virtual service
image service
MINIO

Animal Album App

A simple application to demonstrate istio multi cluster connectivity and live migration process.



Thank you!

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Reach out to me here: