



***AN EXPERIMENTAL STUDY OF **KUBERNETES**
CLUSTER **PEER TO PEER** APPLICATION LEVEL
FEDERATION VIA ISTIO SERVICE MESH***



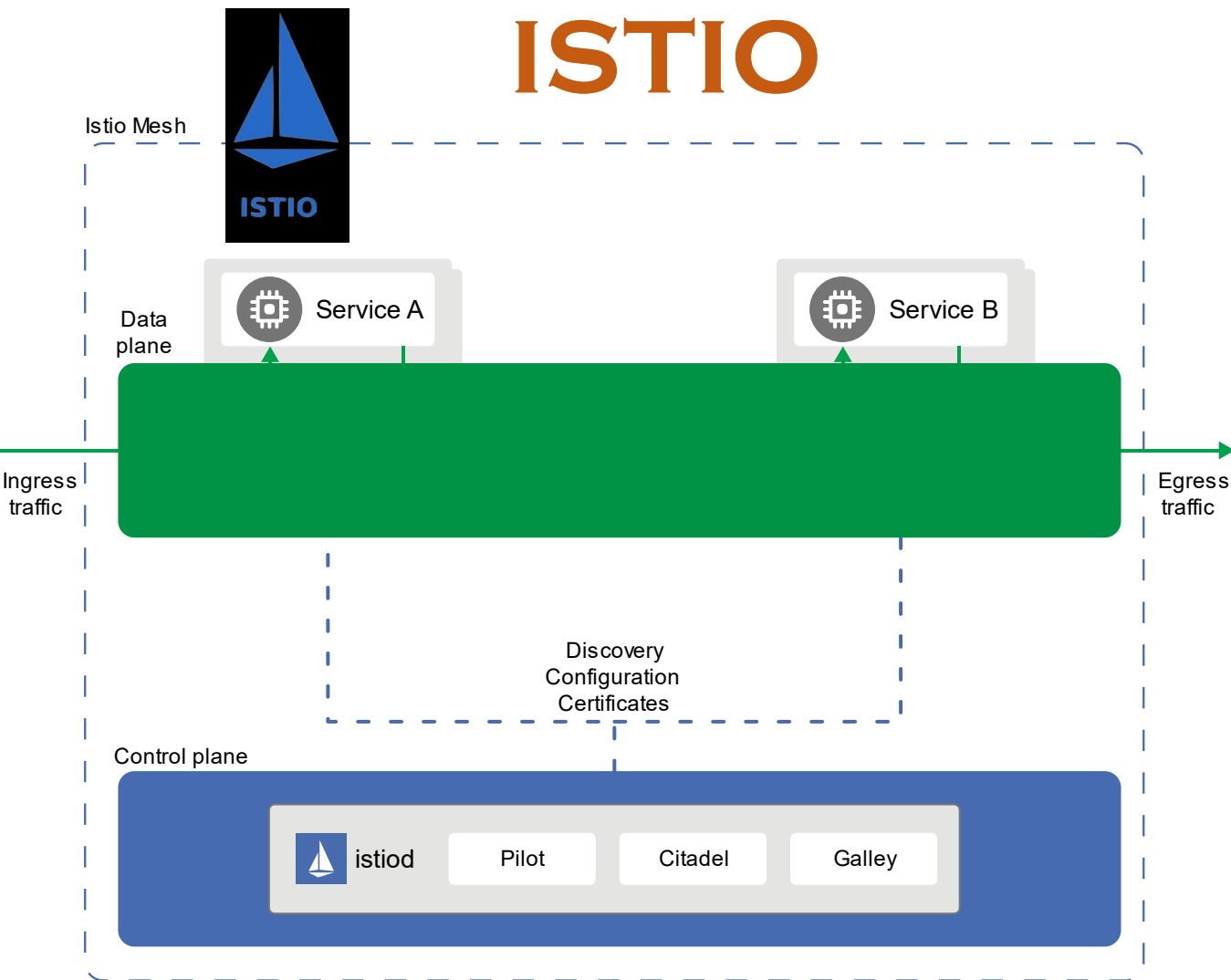
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Outline

- **WHAT IS AN **ISTIO**? HOW IT MATTER?**
- **THE **PROPOSED** IMPLEMENTATION OF FEDERATION'S FRAMEWORK**
- ****DEMONSTRATION** CASES**





An Istio service mesh is logically split into a **data plane** and a **control plane**

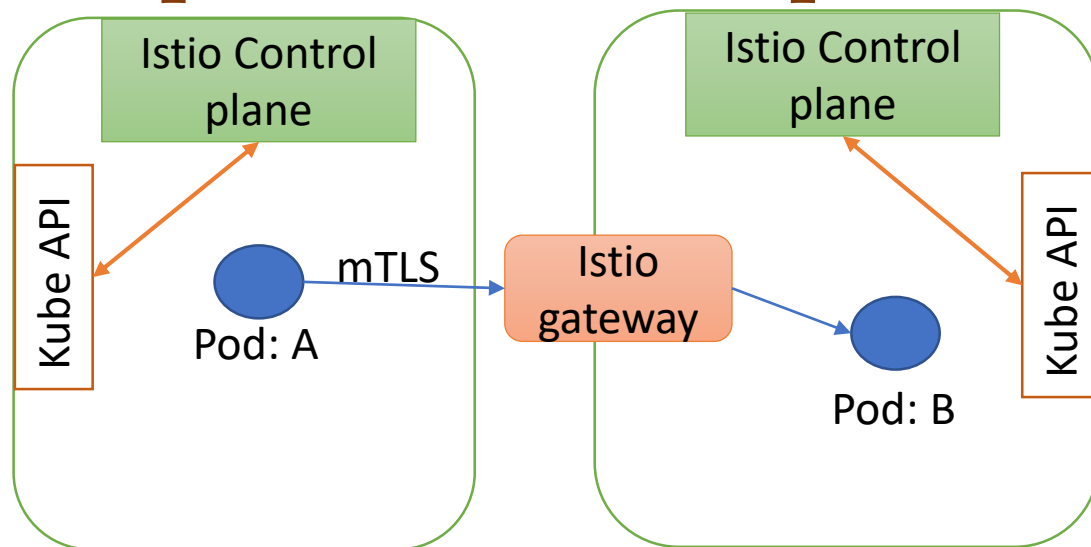
Service meshes are built using **service proxies**.

Decoupling application from networking

Declaratively define network behavior and traffic flow policy

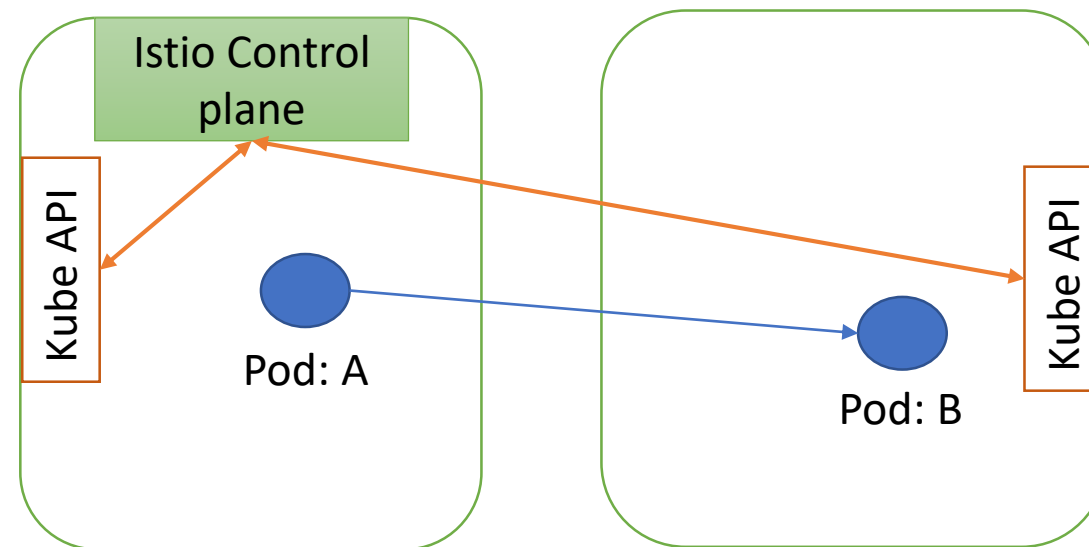
ISTIO MULTICLUSTER

Replicated control planes



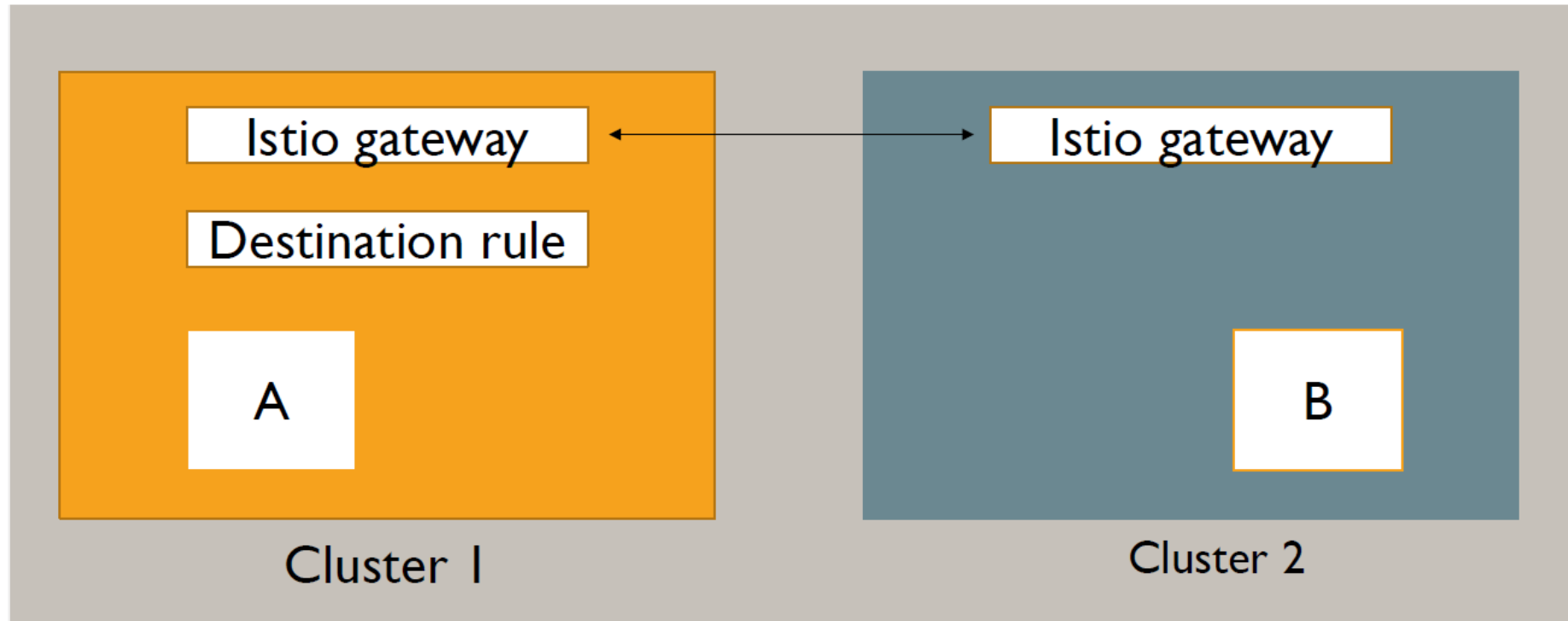
- Identical Istio control plane in each cluster
- Service are created locally via `ServiceEntry`
- There is **no hierarchical** relationship

Shared control planes



- Single shared Istio control plane
- There is **hierarchical** relationship

THE **PROPOSED** IMPLEMENTATION OF FEDERATION'S FRAMEWORK



SERVICE ENTRY

```
apiVersion: networking.istio.io/v1alpha3
kind: ServiceEntry
metadata:
  name: a
spec:
  hosts:
  - a.istio.svc.cluster.local
  ports:
  - name: http
    number: 80
    protocol: http
  resolution: STATIC
  location: MESH_INTERNAL
  endpoints:
  - address: #IP address of Istio gateway in cluster 2
  locality: us-west1/us-west1-b
  ports:
  http: 15443
```

Service entry adds
service B as another
endpoint of service A

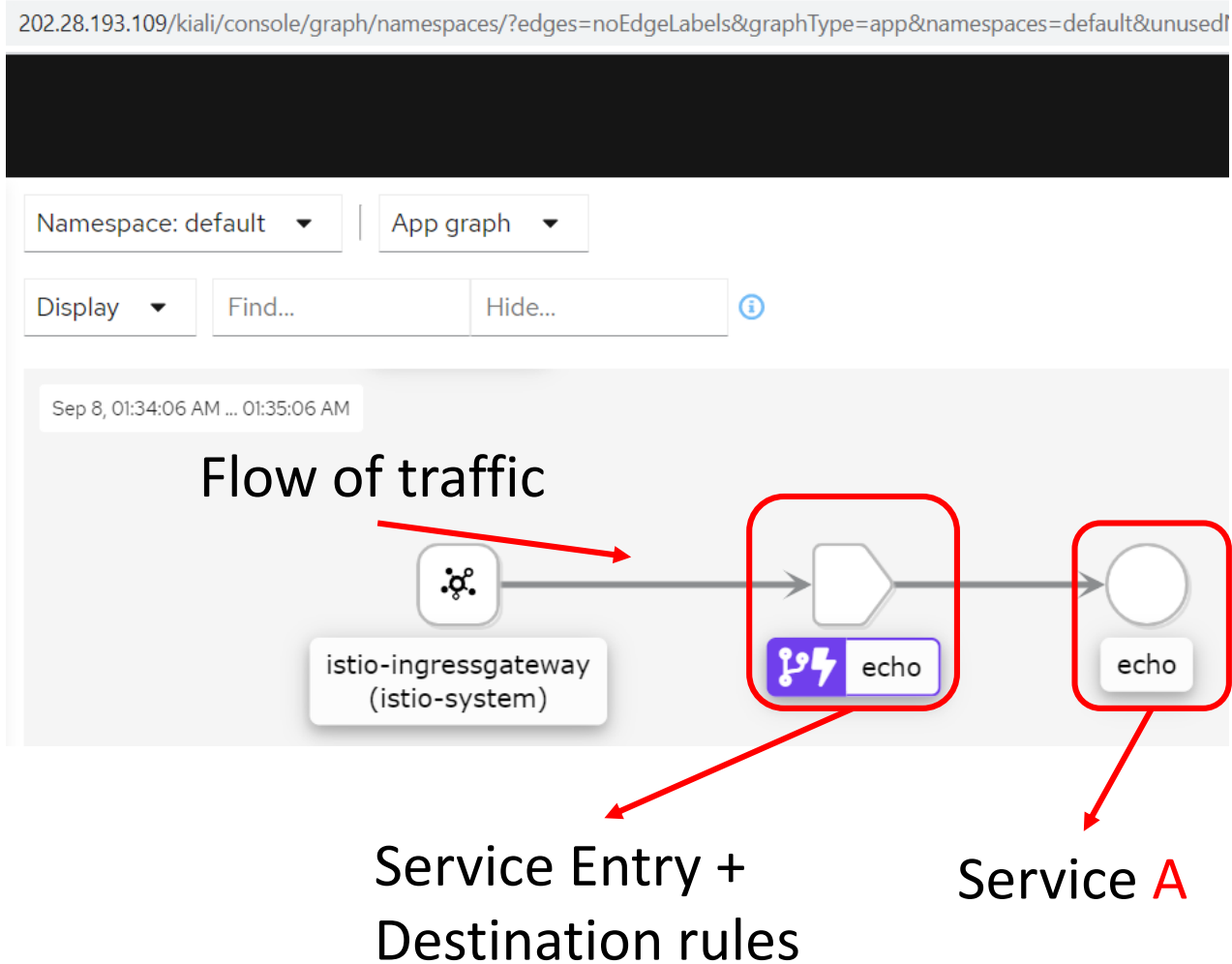
DESTINATION RULE

```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: a
spec:
  host: a.istio.svc.cluster.local
  trafficPolicy:
    connectionPool:
      tcp:
        maxConnections: 1
      http:
        http2MaxRequests: 1
        maxRequestsPerConnection: 1
        http1MaxPendingRequests: 1
    outlierDetection:
      consecutiveErrors: 1
      interval: 1s
      baseEjectionTime: 1m
      maxEjectionPercent: 100
  tls:
    mode: "ISTIO_MUTUAL"
```

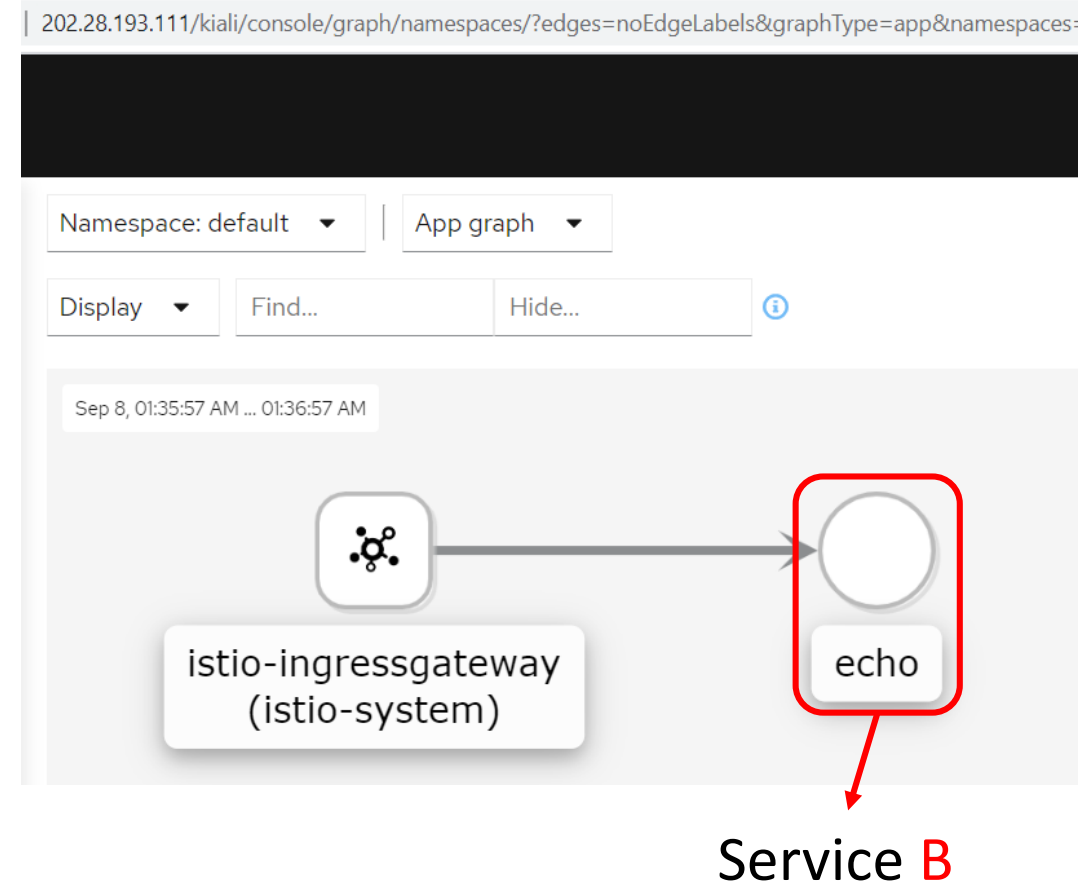
Traffic criteria for triggering the redirecting process are assigned in the 'connectionPool' and 'consecutiveErrors' field

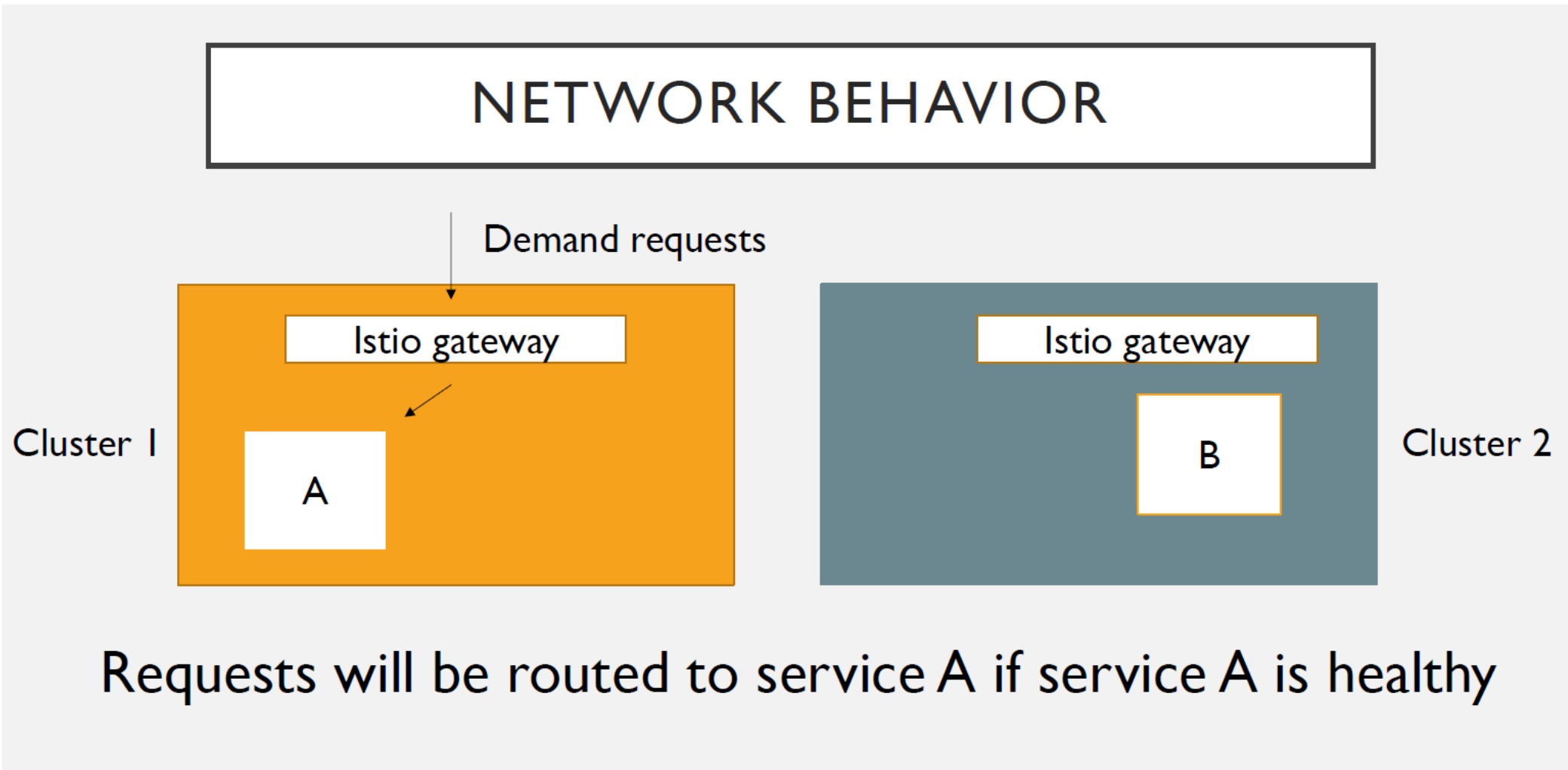
DEMONSTRATION SETTING

Monitoring service in Cluster1

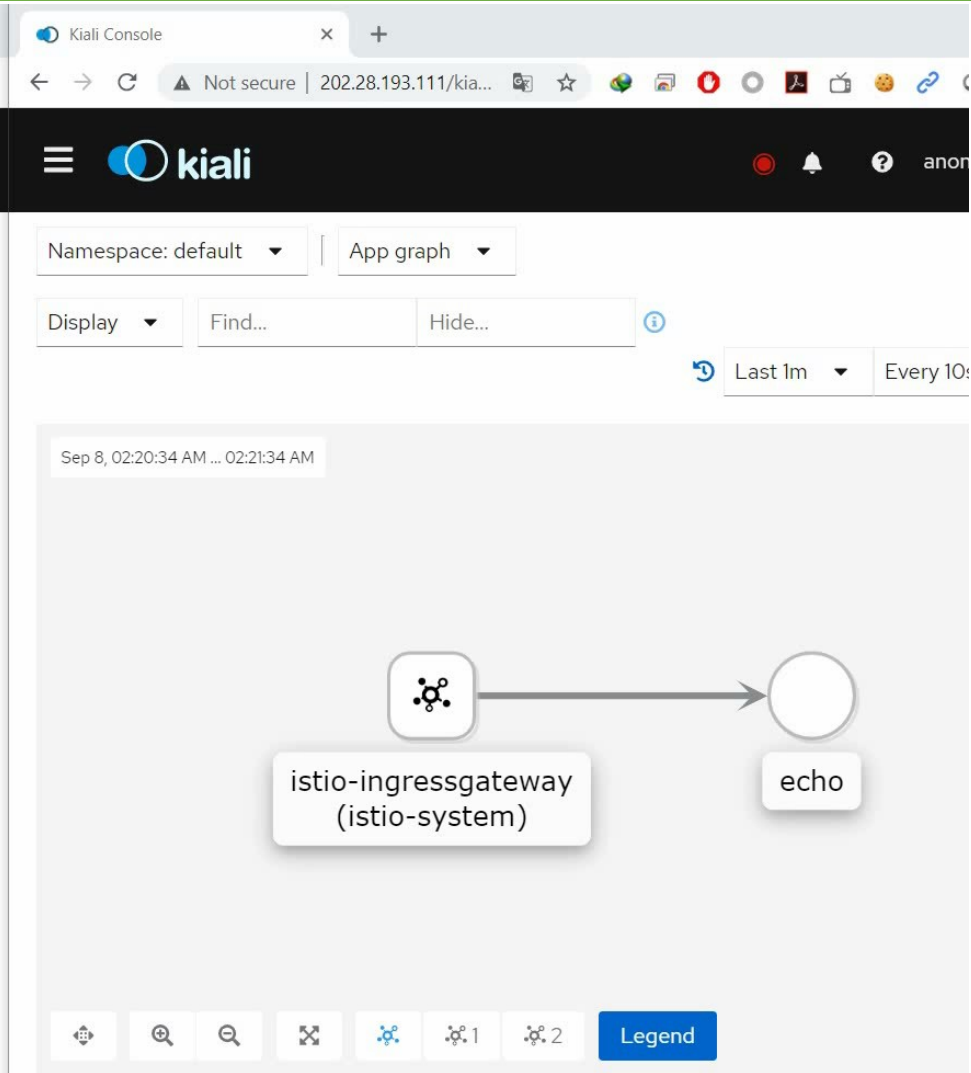
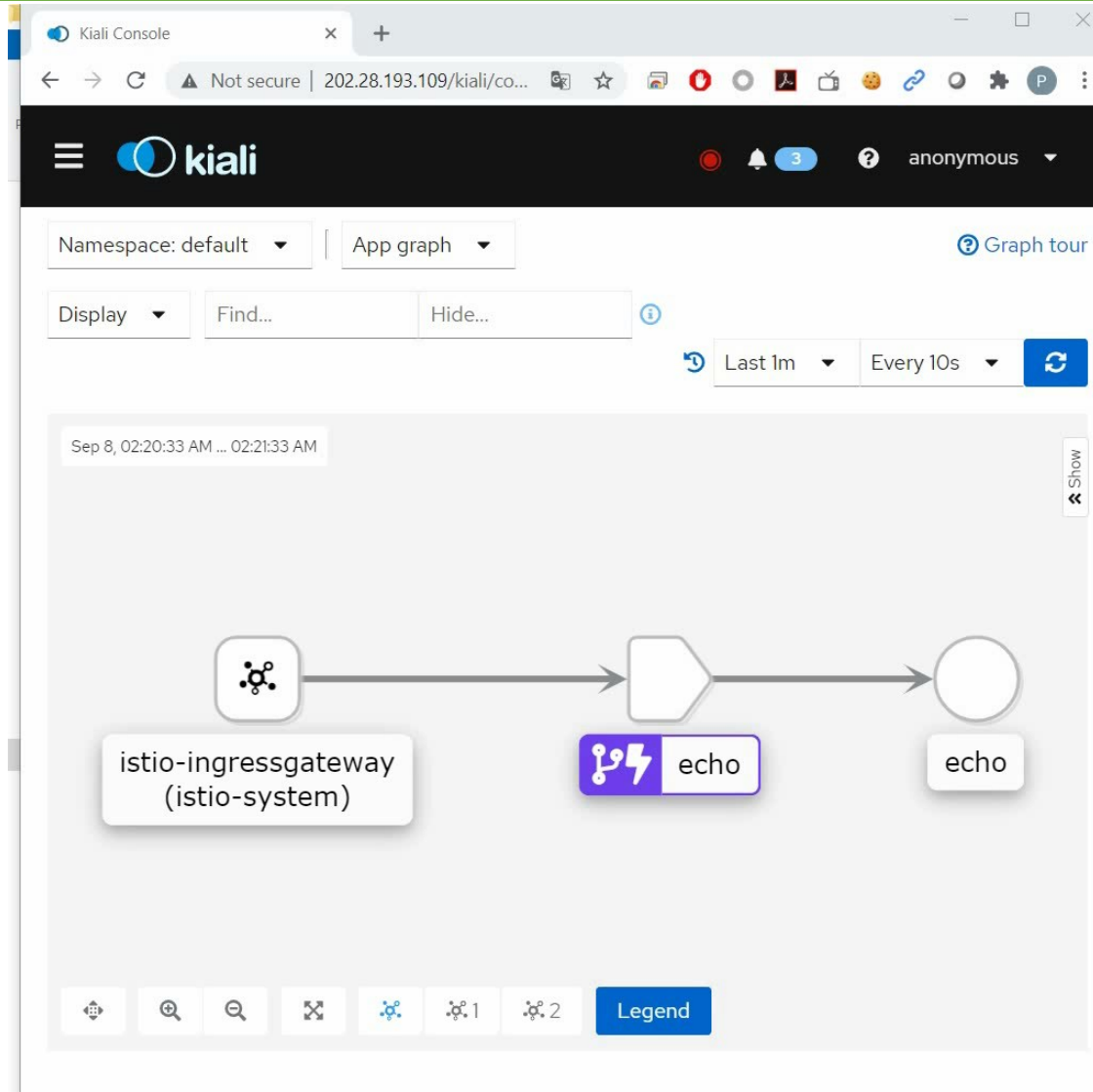


Monitoring service in Cluster2



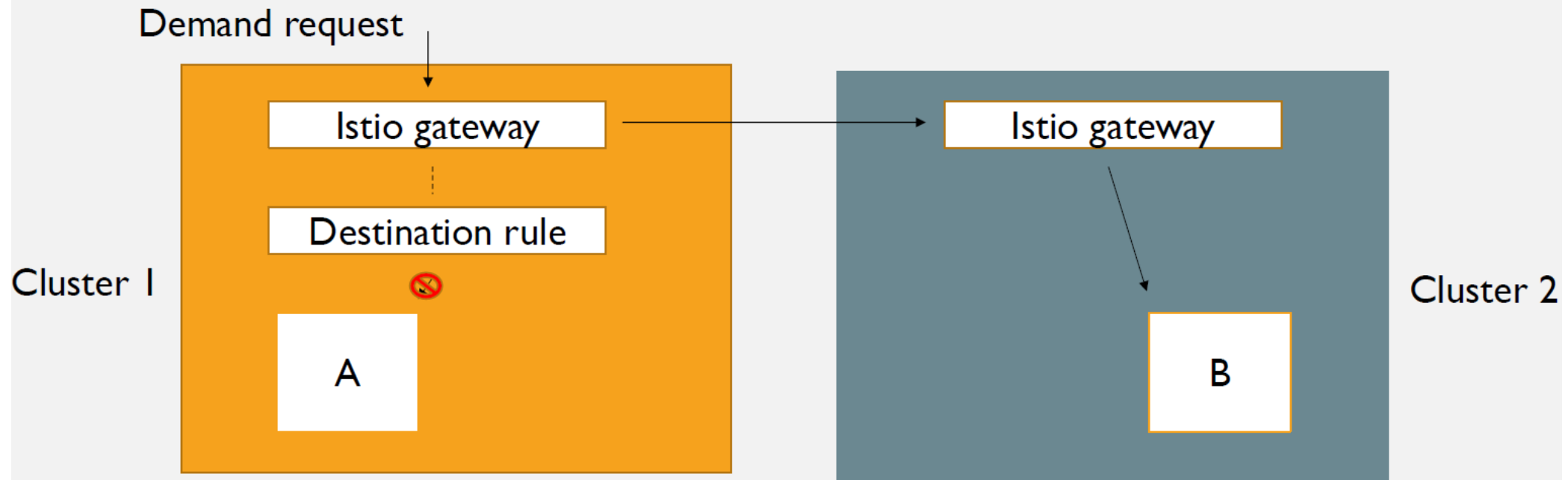


CLUSTER-1



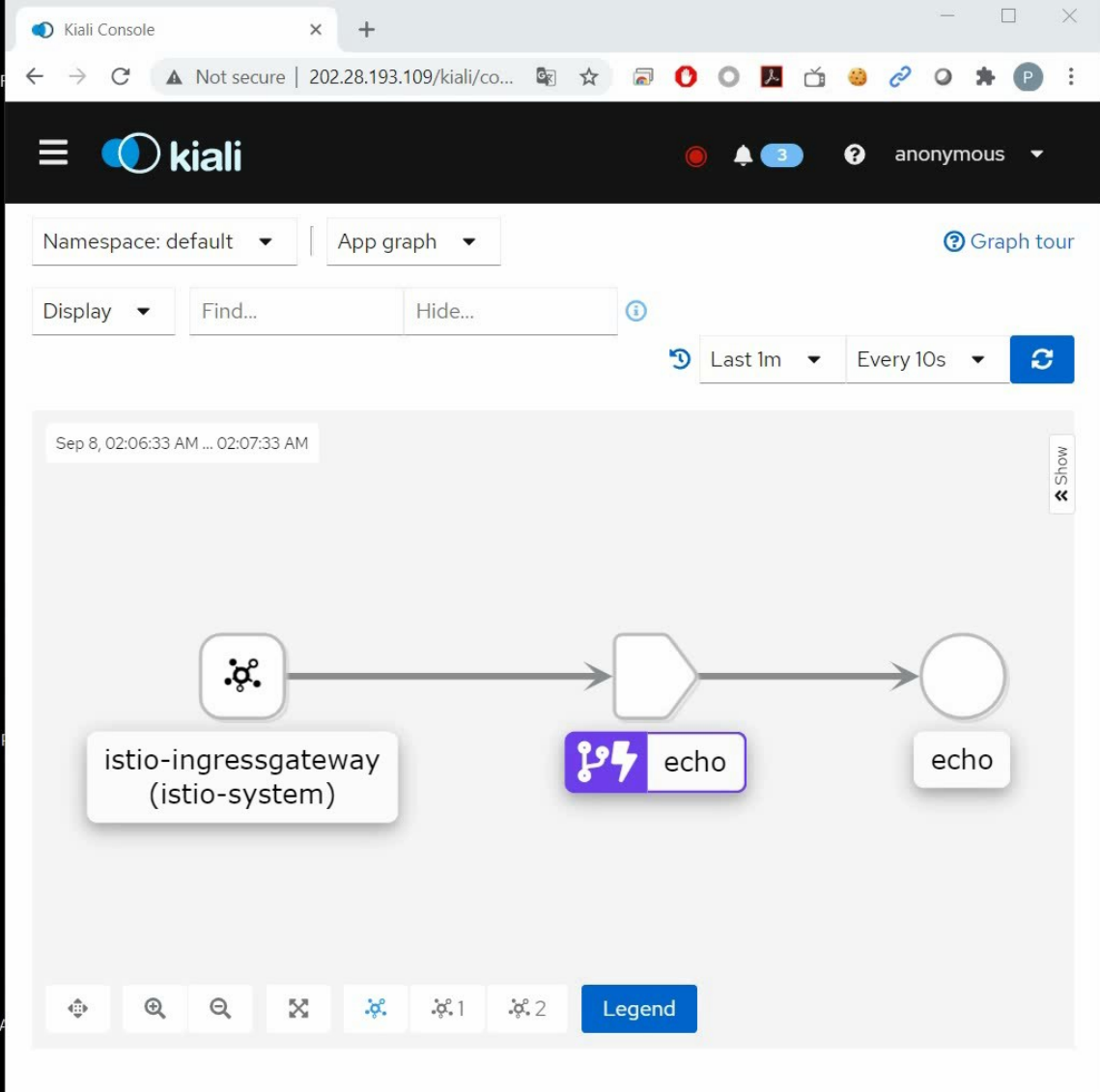
CLUSTER-2

NETWORK BEHAVIOR CONT.

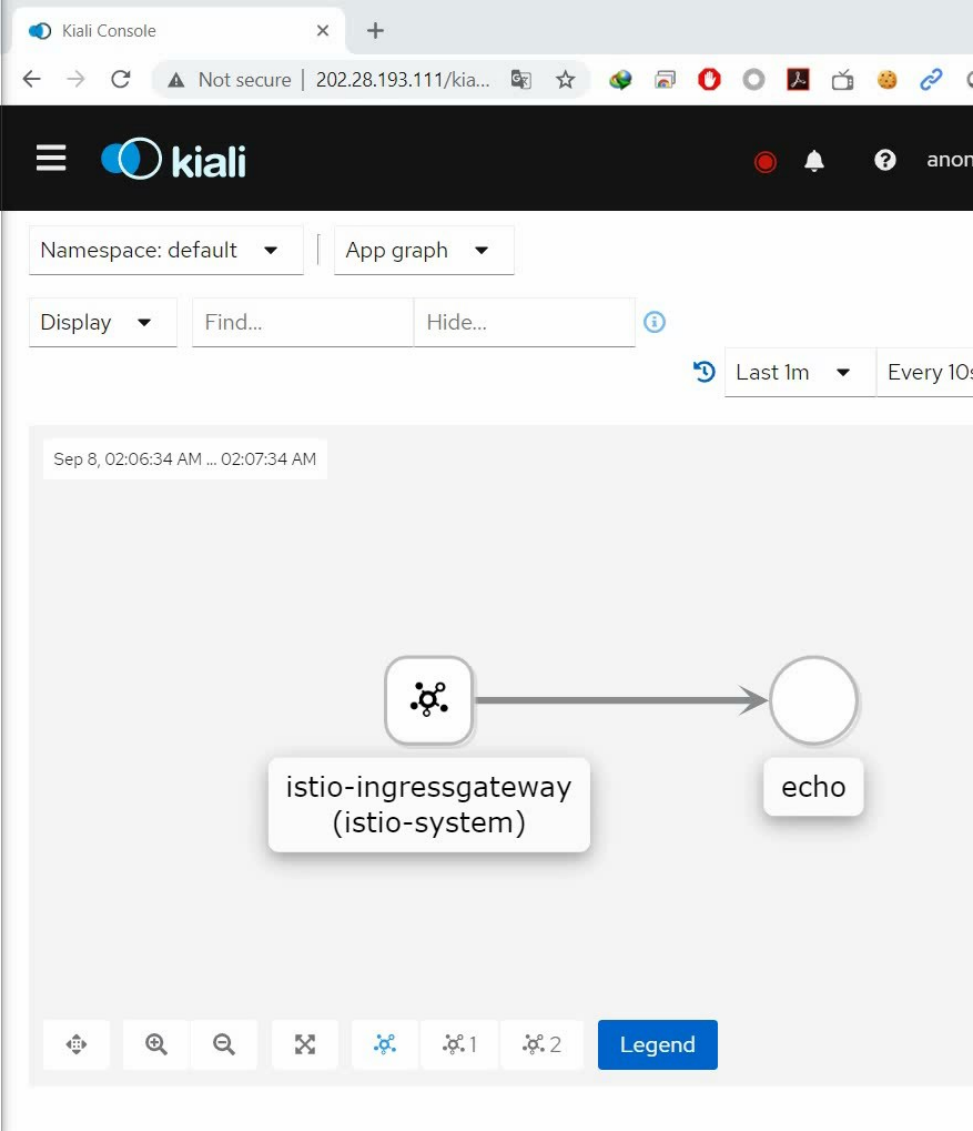


During peak load (service A becomes unhealthy), requests will be redirected to service B

CLUSTER-1



CLUSTER-2



Thank you

For more detail Please
visit GitHub

