



Istio - A modern service mesh



Iris Ding

dingsj@cn.ibm.com



Agenda



- Background
- Istio architecture
- Istio Installation
- Istio Components Glance
- Demo - Traffic Management



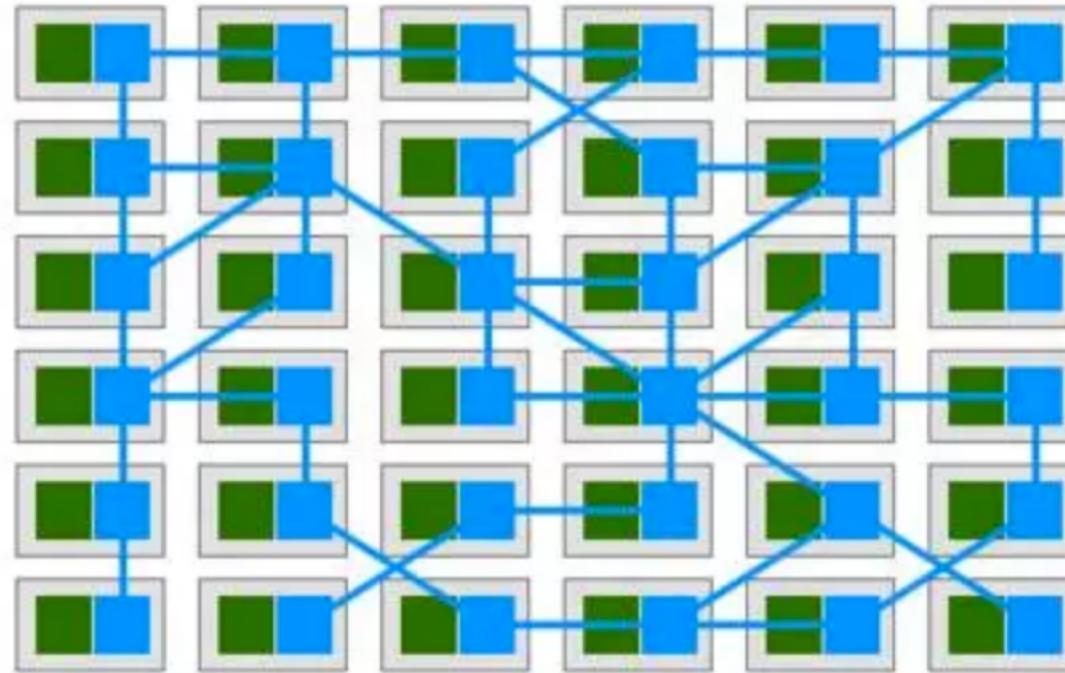
An engineering approach focused on **decomposing** an application into **single function** modules with **well defined interfaces** which are **independently** deployed and operated by a **small team** who owns the **entire lifecycle** of the service.

Service Mesh

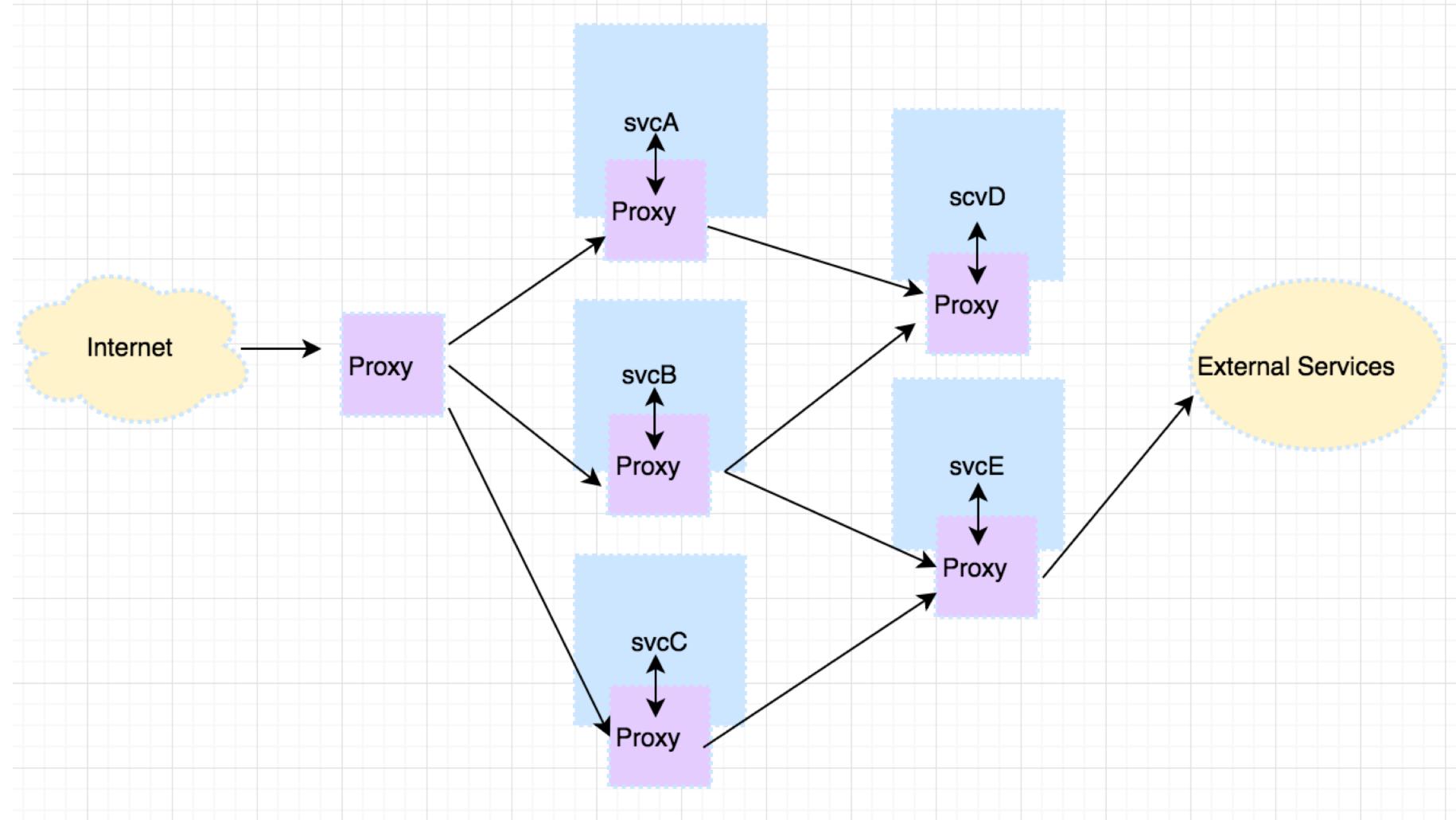


A network for services

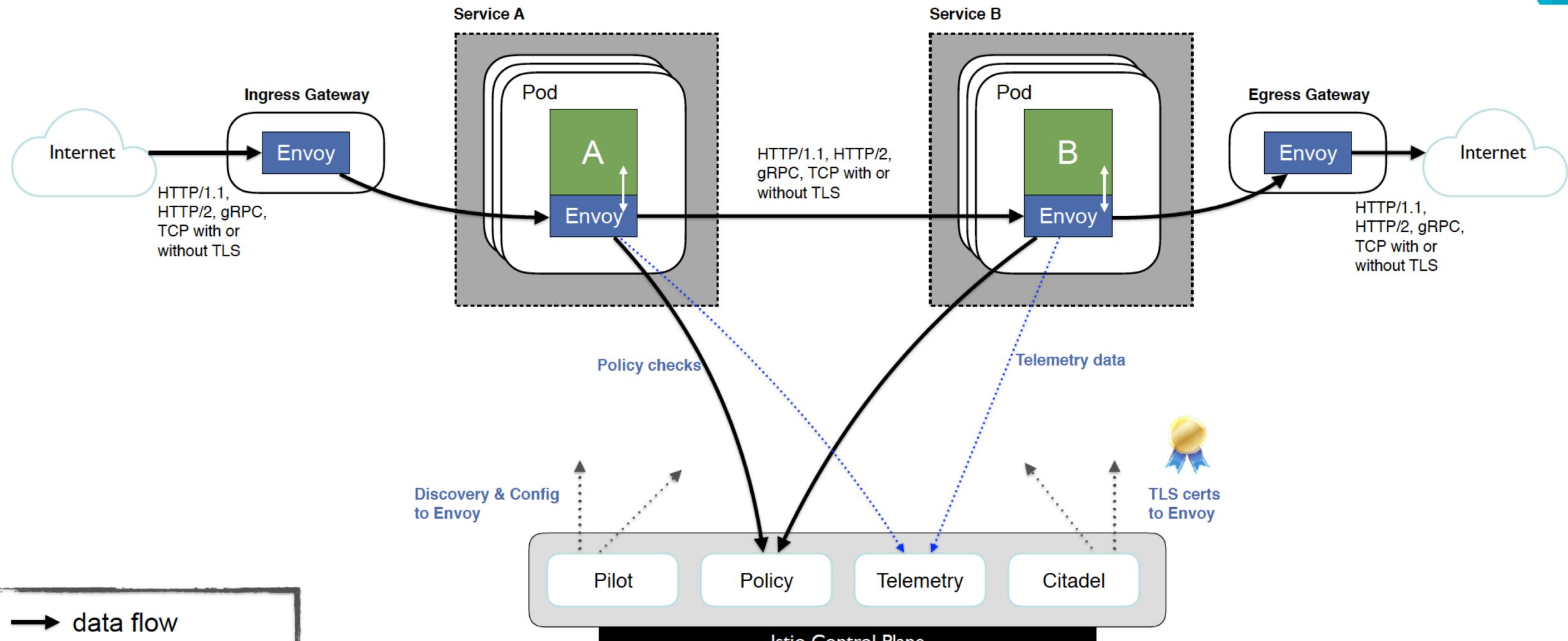
- Visibility
- Resiliency & Efficiency
- Traffic Control
- Security
- Policy Enforcement



Weaving the mesh



Istio architecture





- Istio-demo.yaml - Dev/Test
- Helm Render
- Helm
- Minimum Istio
- Notice: Apply crds first

What have installed

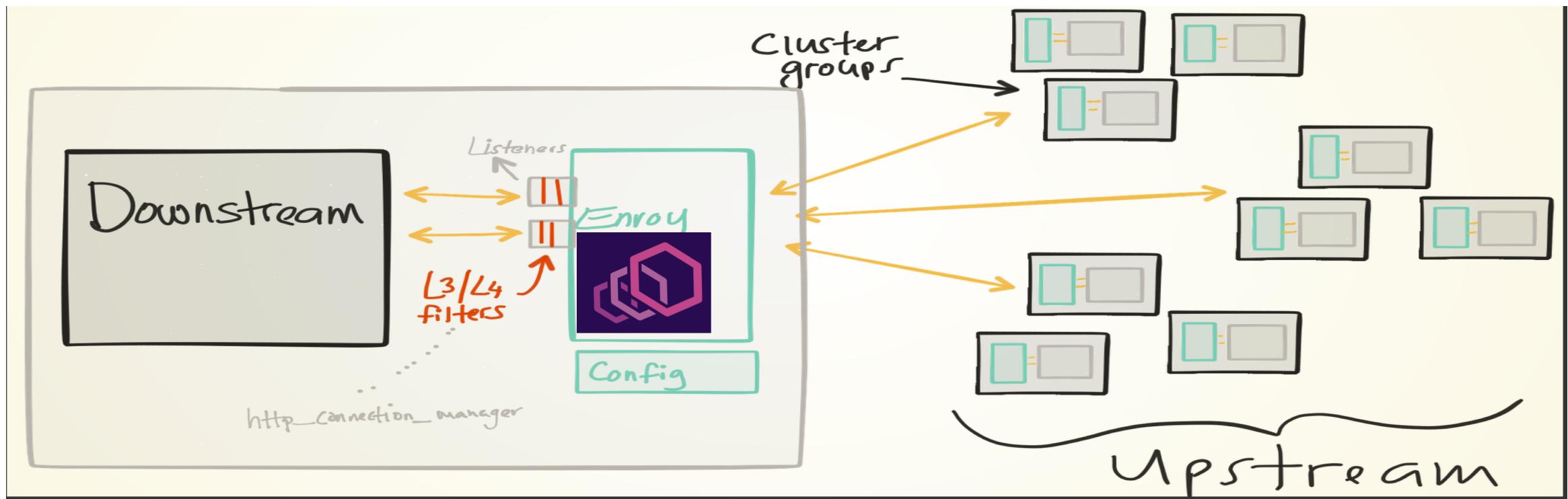


NAME	READY	STATUS	RESTARTS	AGE
grafana-85dbf49c94-txvzp	1/1	Running	0	9d
istio-citadel-545f49c58b-bmg57	1/1	Running	0	9d
istio-cleanup-secrets-tpvfd	0/1	Completed	0	9d
istio-egressgateway-79f4b99d6f-l295r	1/1	Running	0	9d
istio-galley-5b6449c48f-k95gj	1/1	Running	0	9d
istio-grafana-post-install-q4rvc	0/1	Completed	0	9d
istio-ingressgateway-6894bd895b-2lw8l	1/1	Running	0	9d
istio-pilot-cb58b65c9-zmfhb	2/2	Running	0	9d
istio-policy-69cc5c74d5-666q9	2/2	Running	0	9d
istio-sidecar-injector-75b9866679-fj8nv	1/1	Running	0	9d
istio-statsd-prom-bridge-549d687fd9-tgtfg	1/1	Running	0	9d
istio-telemetry-d8898f9bd-6cnbx	2/2	Running	0	9d
istio-tracing-7596597bd7-v9gfv	1/1	Running	0	9d
prometheus-6ffc56584f-9f5vn	1/1	Running	0	9d
servicegraph-5d64b457b4-dw8dj	1/1	Running	0	9d

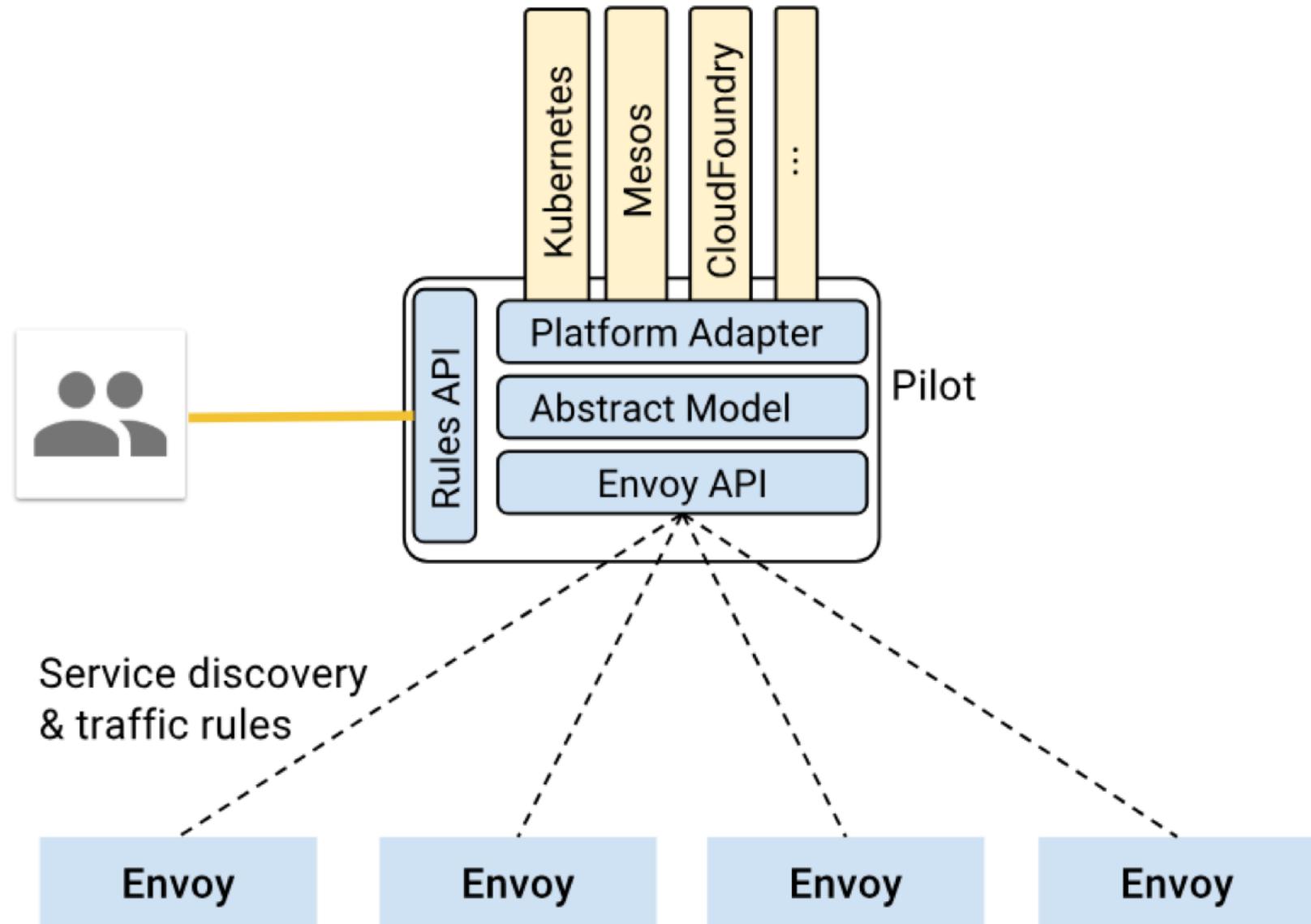
Envoy- sidecar proxy in Istio



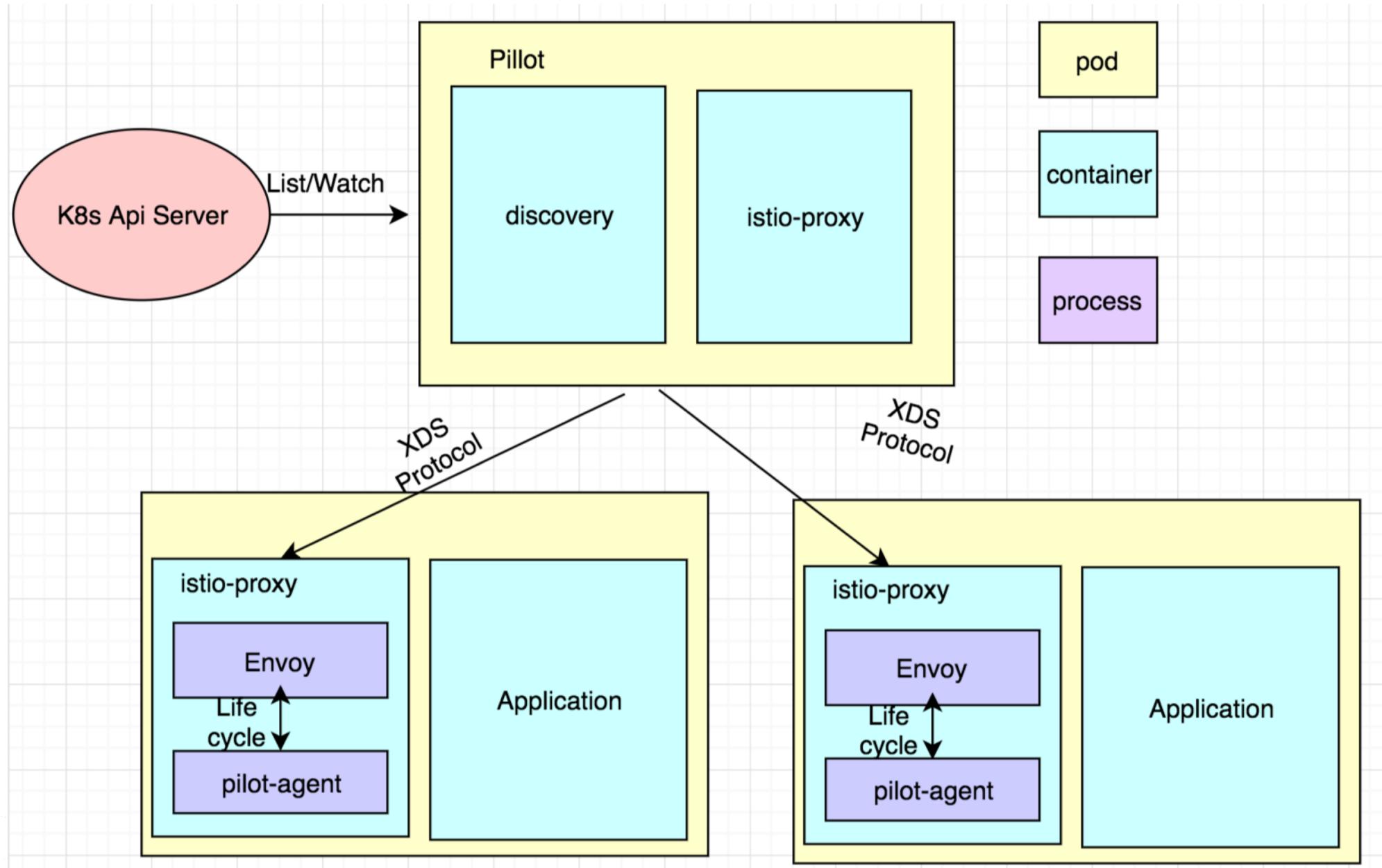
- A C++ based L4/L7 proxy
- Battle-tested @ Lyf
- Low memory footprint



Pilot Architecture



Pilot details





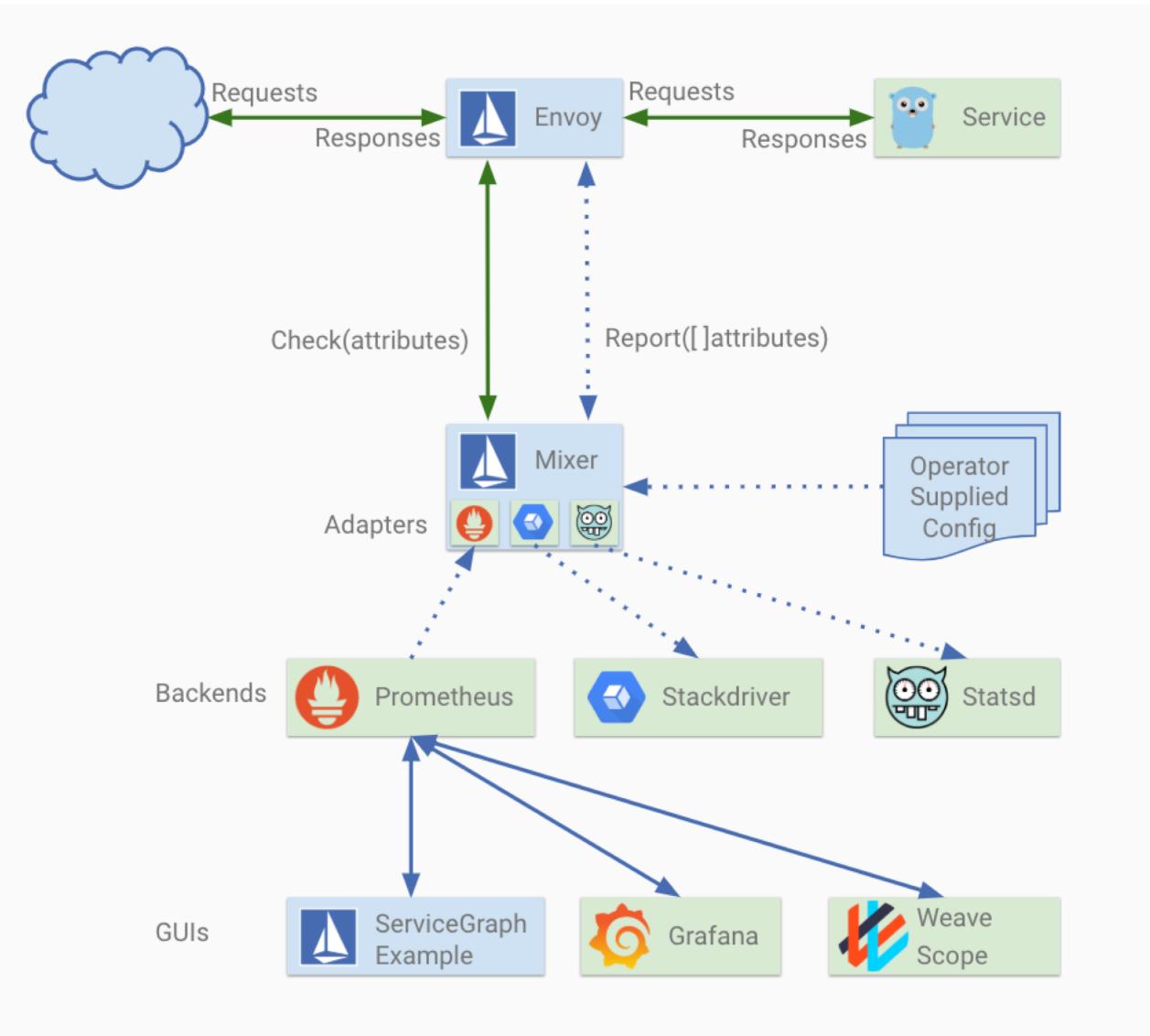
Telemetry Generation

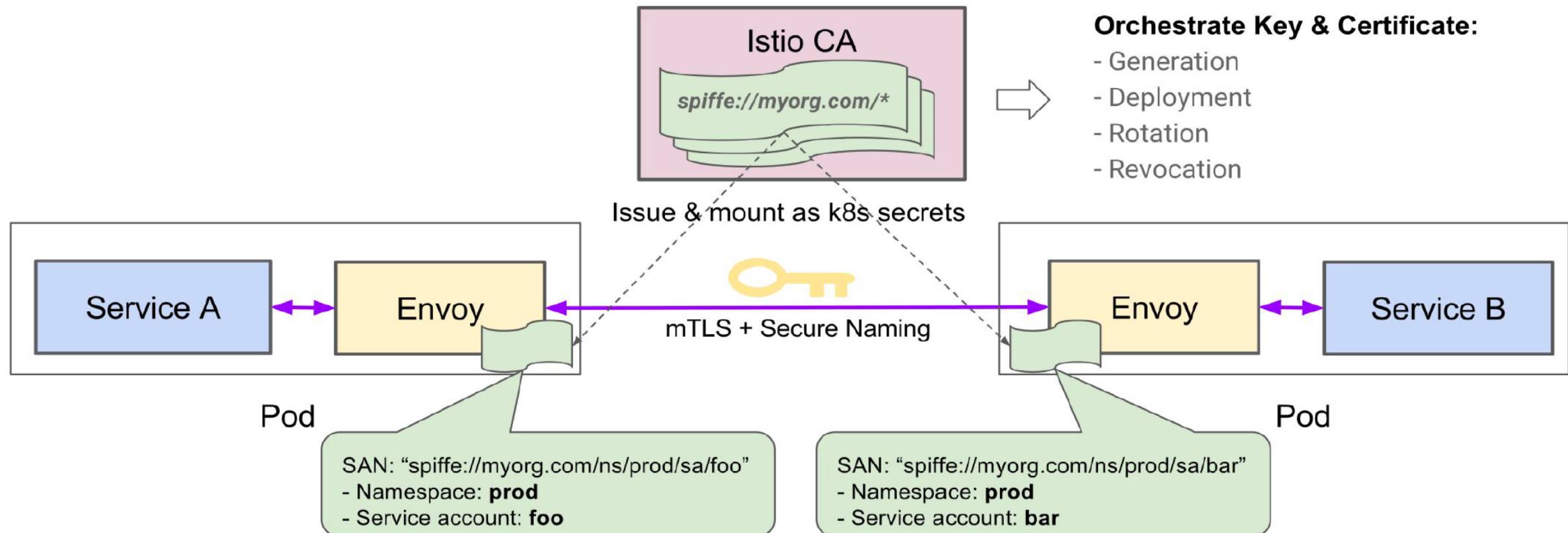
Envoy sends information to Mixer about requests and responses in the form of *attributes* (typed key-value pairs).

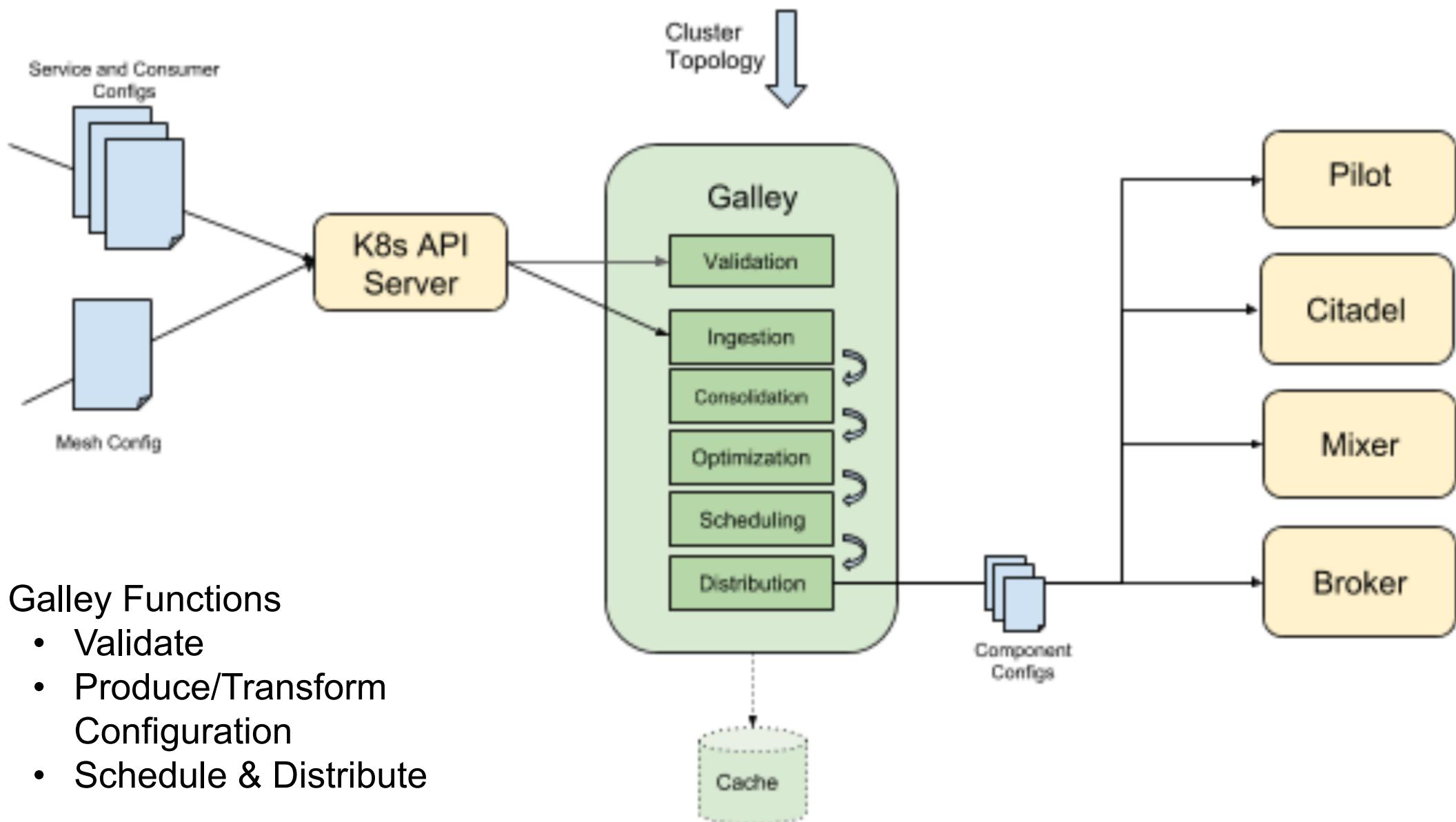
Mixer transforms attribute sets into structured values, according to operator-supplied configuration.

Mixer dispatches the derived values to a set of *adapters*, according to the operator-supplied configuration.

Adapters publish telemetry data to backend systems, making it available for further consumption and analysis.

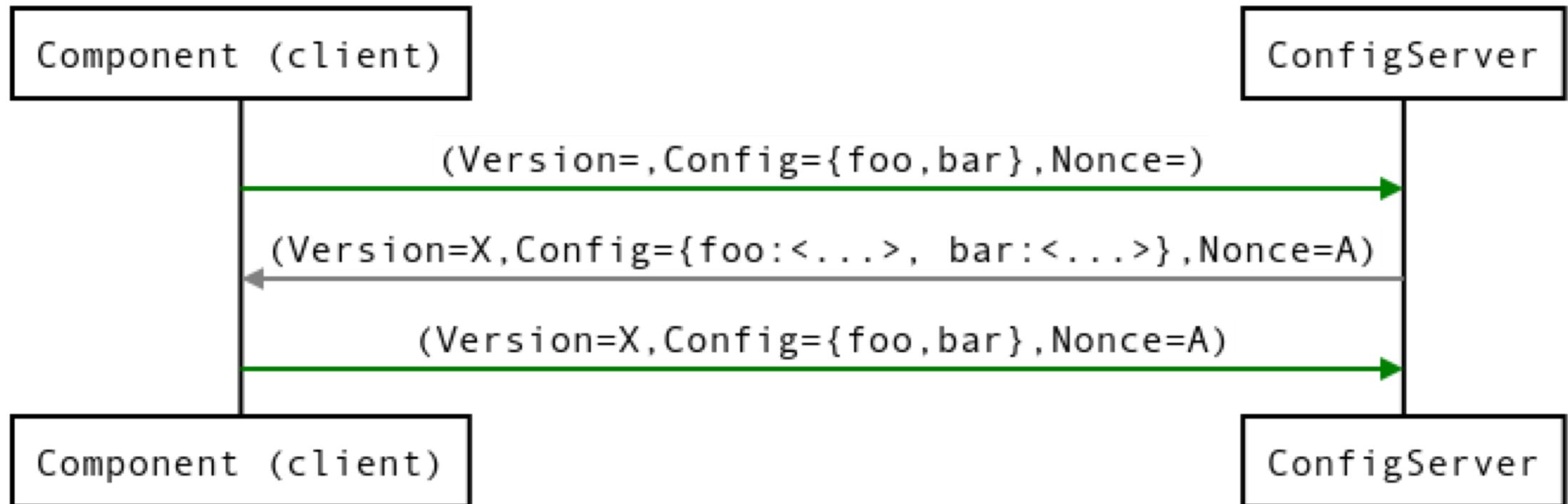




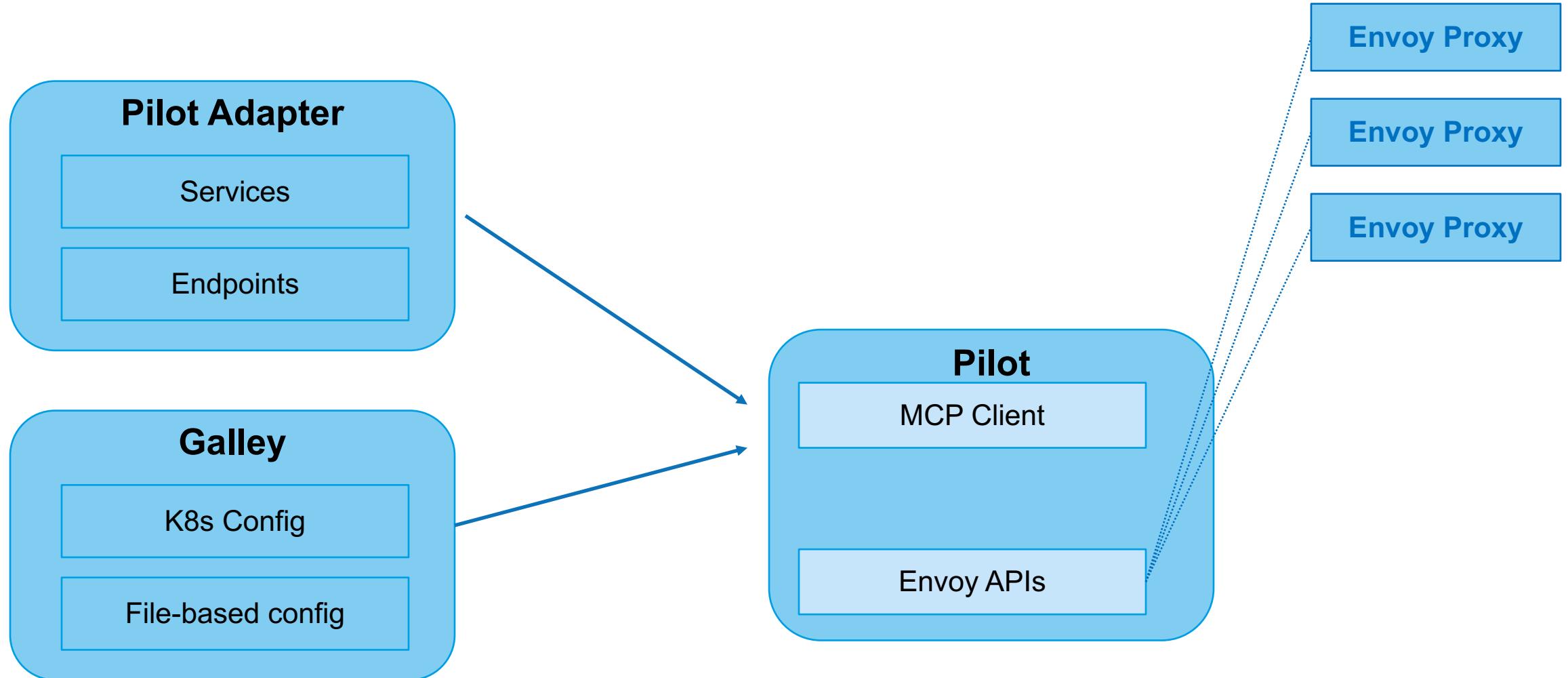


- **Galley Functions**
 - Validate
 - Produce/Transform Configuration
 - Schedule & Distribute

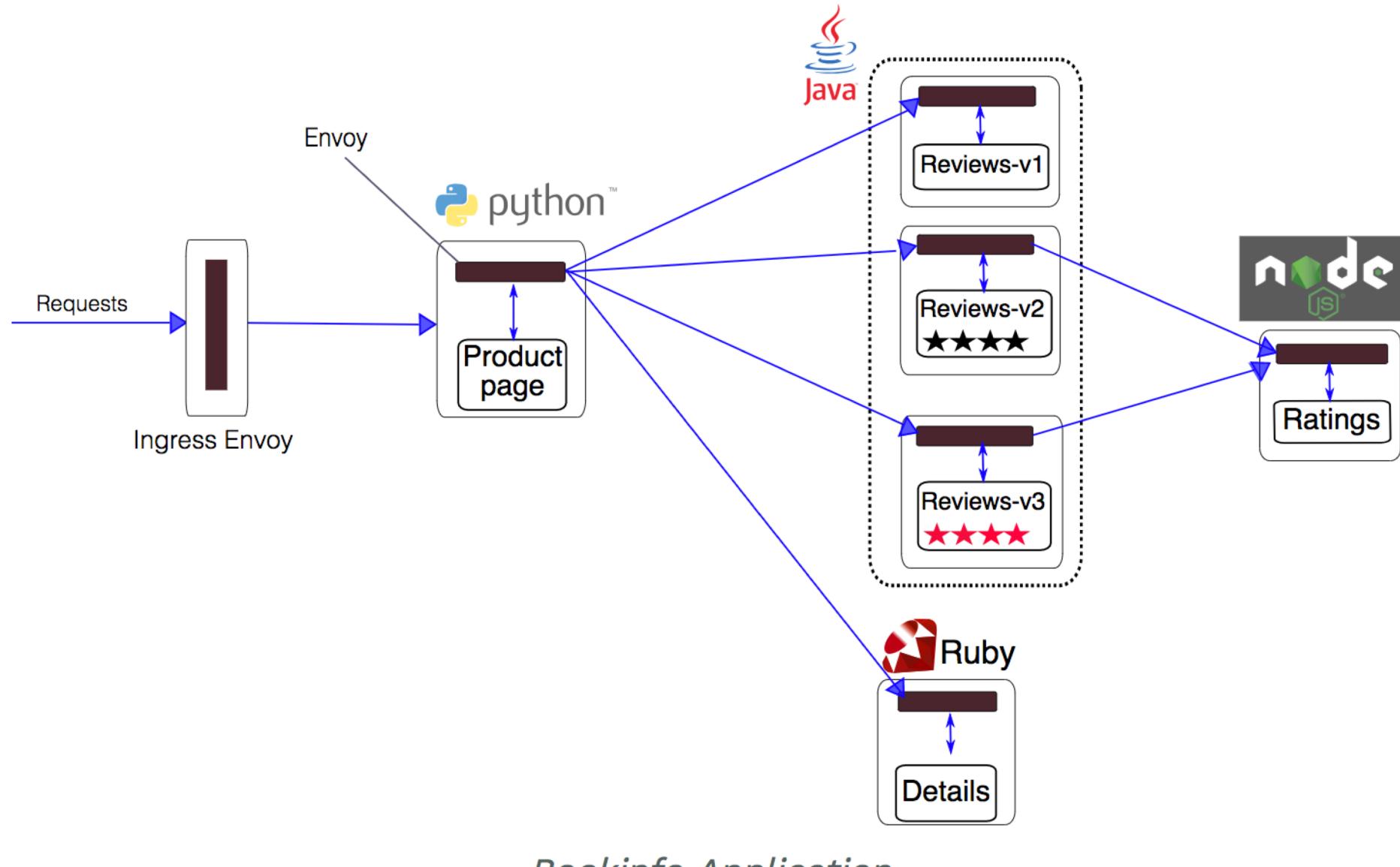
Galley - Mesh Config Protocol (MCP)



Pilot Adapter Decomposition



Demo -Bookinfo



Demo



```
apiVersion: extensions/v1beta1
kind: Deployment
metadata:
  name: reviews-v3
spec:
  replicas: 1
  template:
    metadata:
      labels:
        app: reviews
        version: v3
    spec:
      containers:
        - name: reviews
          image: istio/examples-bookinfo-reviews:v3:1.8.0
          imagePullPolicy: IfNotPresent
          ports:
            - containerPort: 9080
```

```
apiVersion: v1
kind: Service
metadata:
  name: productpage
labels:
  app: productpage
spec:
  ports:
    - port: 9080
      name: http
      selector:
        app: productpage
```

```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: bookinfo-gateway
spec:
  selector:
    istio: ingressgateway # use istio default controller
  servers:
    - port:
        number: 80
        name: http
        protocol: HTTP
      hosts:
        - "*"
```

Istio Ingress
Gateway

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: bookinfo
spec:
  hosts:
    - "*"
  gateways:
    - bookinfo-gateway
  http:
    - match:
        - uri:
            exact: /productpage
        - uri:
            exact: /login
        - uri:
            exact: /logout
        - uri:
            prefix: /api/v1/products
      route:
        - destination:
            host: productpage
            port:
              number: 9080
```

```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: reviews
spec:
  host: reviews
  subsets:
    - name: v1
      labels:
        version: v1
      - name: v2
        labels:
          version: v2
        - name: v3
          labels:
            version: v3
```

```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: reviews
spec:
  hosts:
    - reviews
  http:
    - route:
        - destination:
            host: reviews
            subset: v1
```



- Request Routing
 - route all traffic to review v1
 - route jason to review v2, all others still keep in v1
- Traffic Shifting
 - route traffic 90% to v1, 10% to v2
- Request Time out
 - Route all traffic to review v2
 - Set time out as 2s for ratings
 - Set time out as 0.5s for reviews
- Control Egress Traffic
 - Deploy sleep service
 - Add service entry for httpbin.org

Resources



- <https://github.com/istio>
- <https://istio.io/docs/examples/bookinfo/>
- <https://istio.io/docs/tasks/traffic-management/request-routing/>
- <https://istio.io/zh/docs/>

