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# Istio - Service Mesh?!

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# @alexvb

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# ISTIO: What it does?!

## Why should you use it

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# ISTIO: How it does it?!

Istio Internals

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# Istio: in Action

Fingers crossed for live demo

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# 0.2

Don't use in production, yet

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# Virtual Machine

In the “Cloud” beginning...

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# Container

Everything is getting smaller

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# Microservice / Polyglot

so much boundary boilerplate

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# What is missing?

Getting rid of the boilerplate

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# The network itself?

Well kinda...

# Istio is...

Open Platform for

- Connect
- Manage
- Secure

or in short… a Service Mesh

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# Service Mesh, but how ?!

# Application layer offload

Connectivity

Resiliency / Reliability

Security

Visibility / Observability

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# Before the mesh

Application Frameworks

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# Before the mesh

## L3 Network Security

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# Service Mesh Replaces

Application Boundary Logic and L3 Network configuration

# Service Mesh Is Not

The Application

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# Service Mesh Is

## Everything in Between

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# Smart Network

Push non-functionals to another layer

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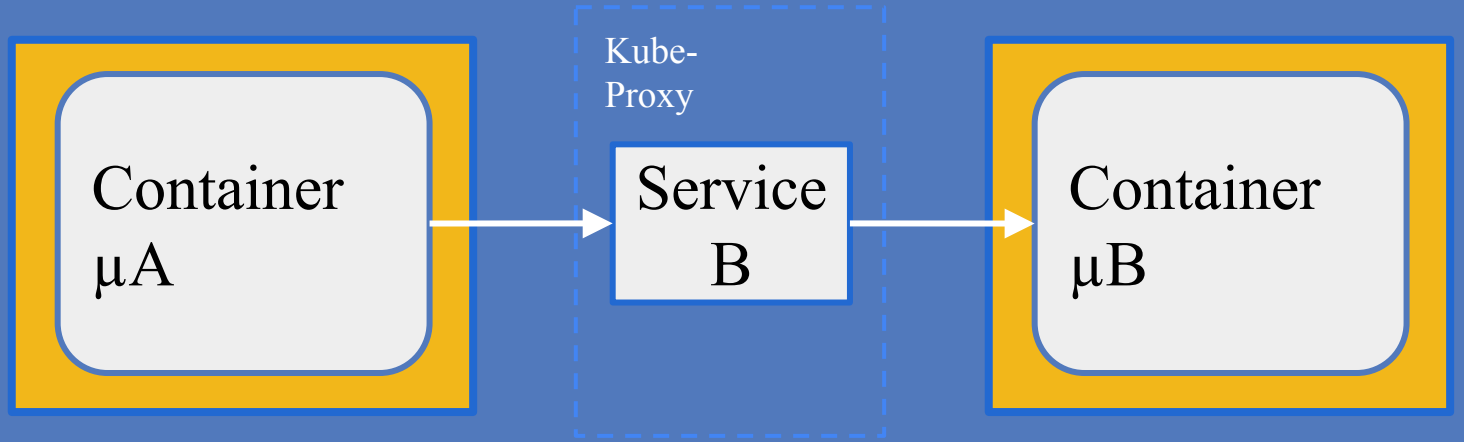
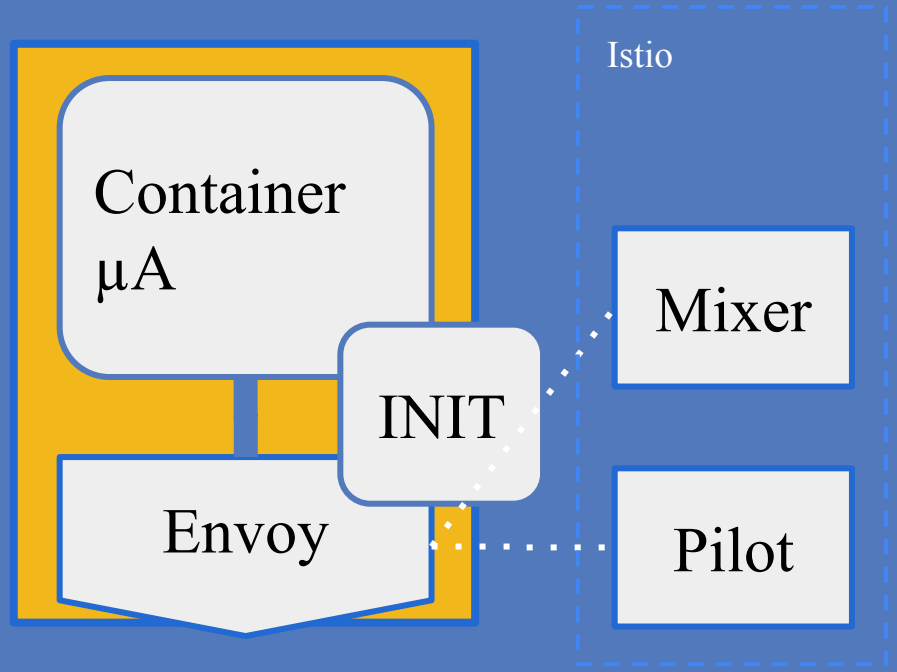
# LET’s show some BOXES

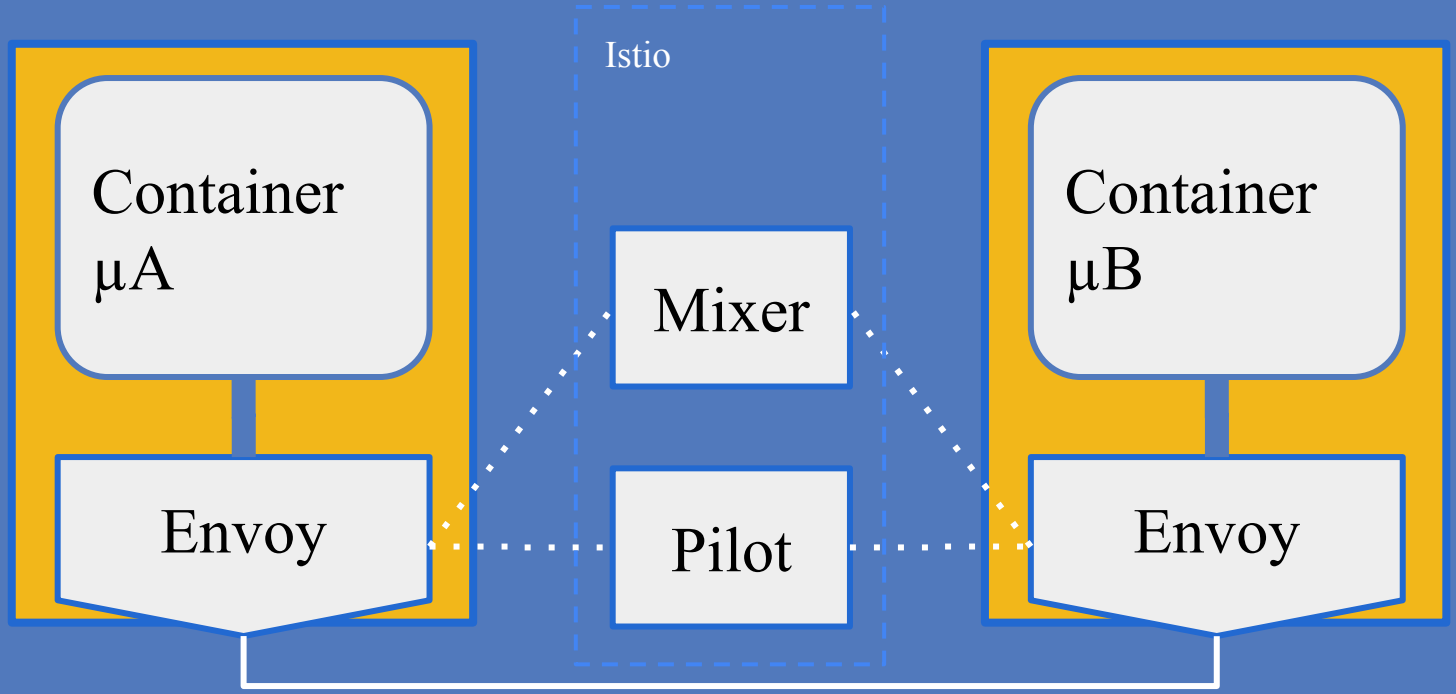
# Typical A > B in Kubernetes



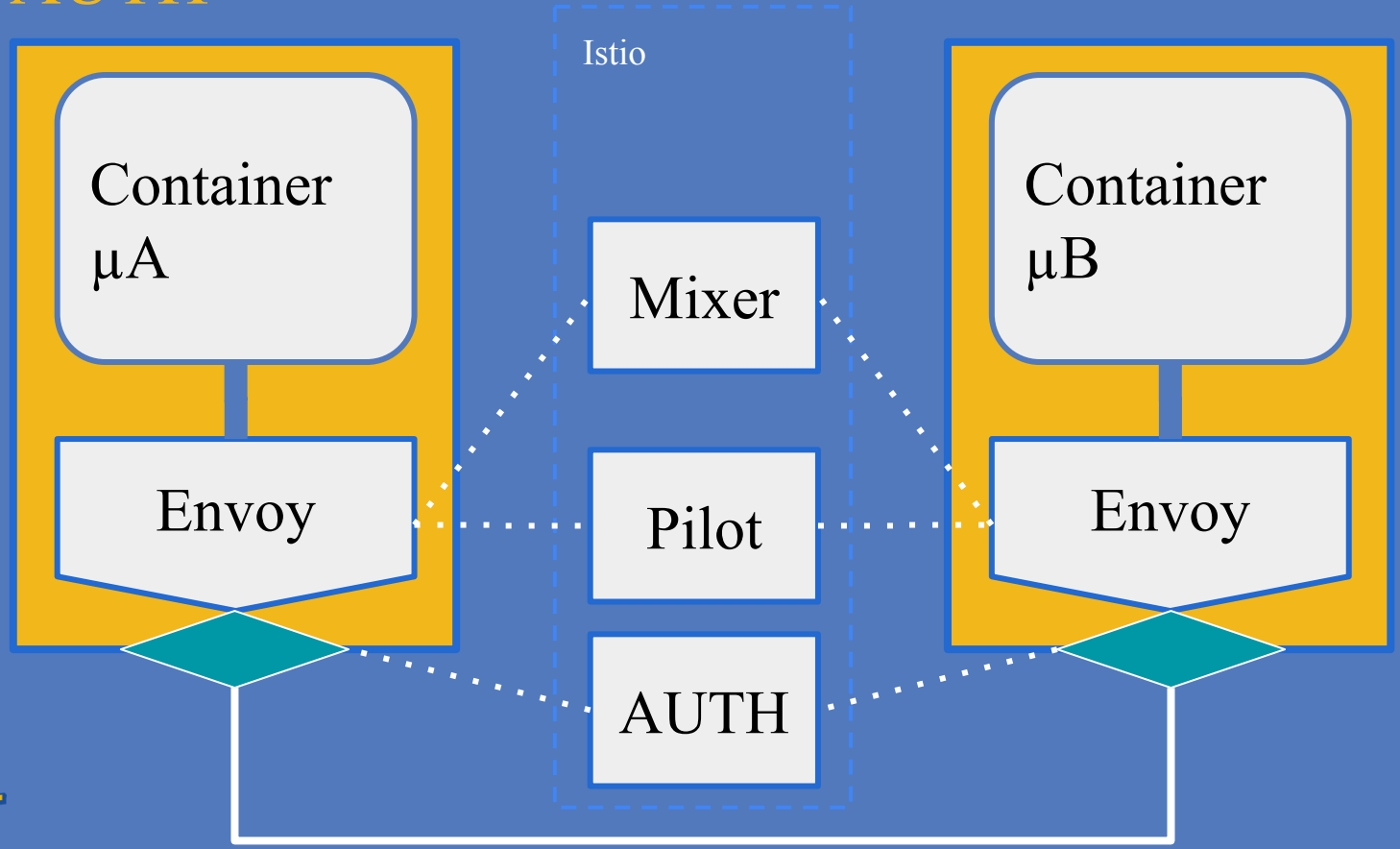
# A > B In the Istio Mesh world



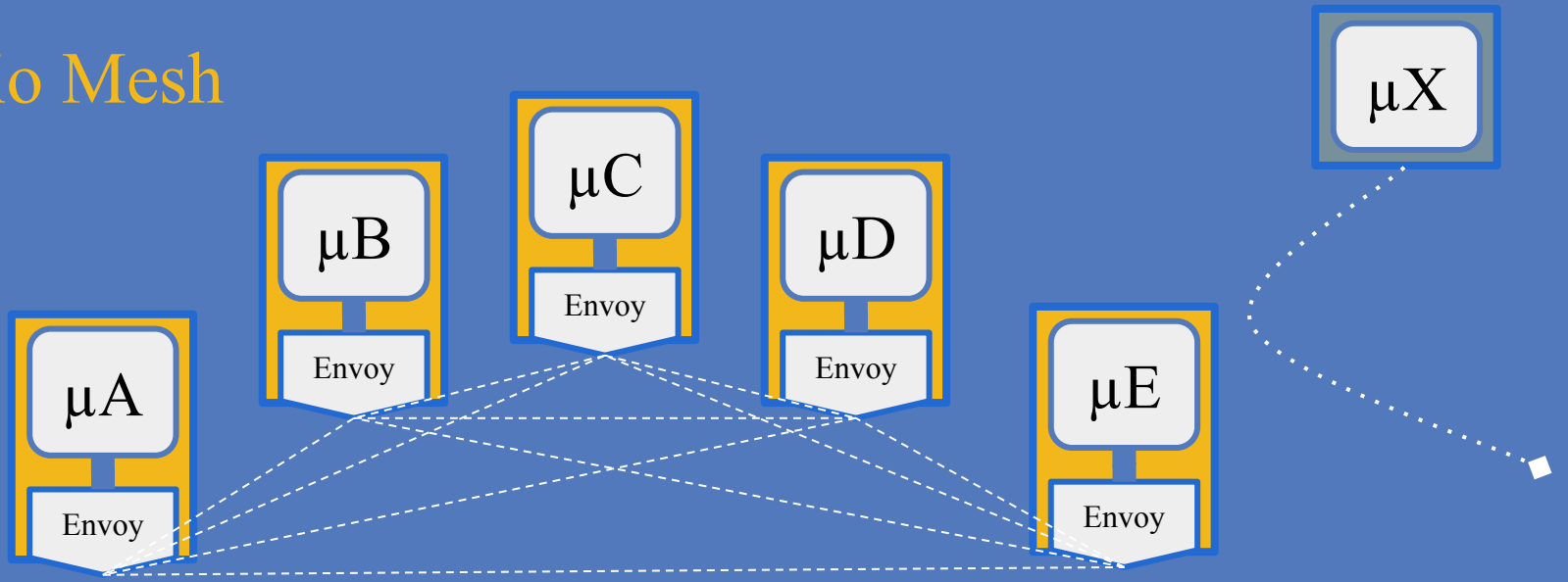
# A > B In the Istio Mesh world



# Istio AUTH



# The Istio Mesh



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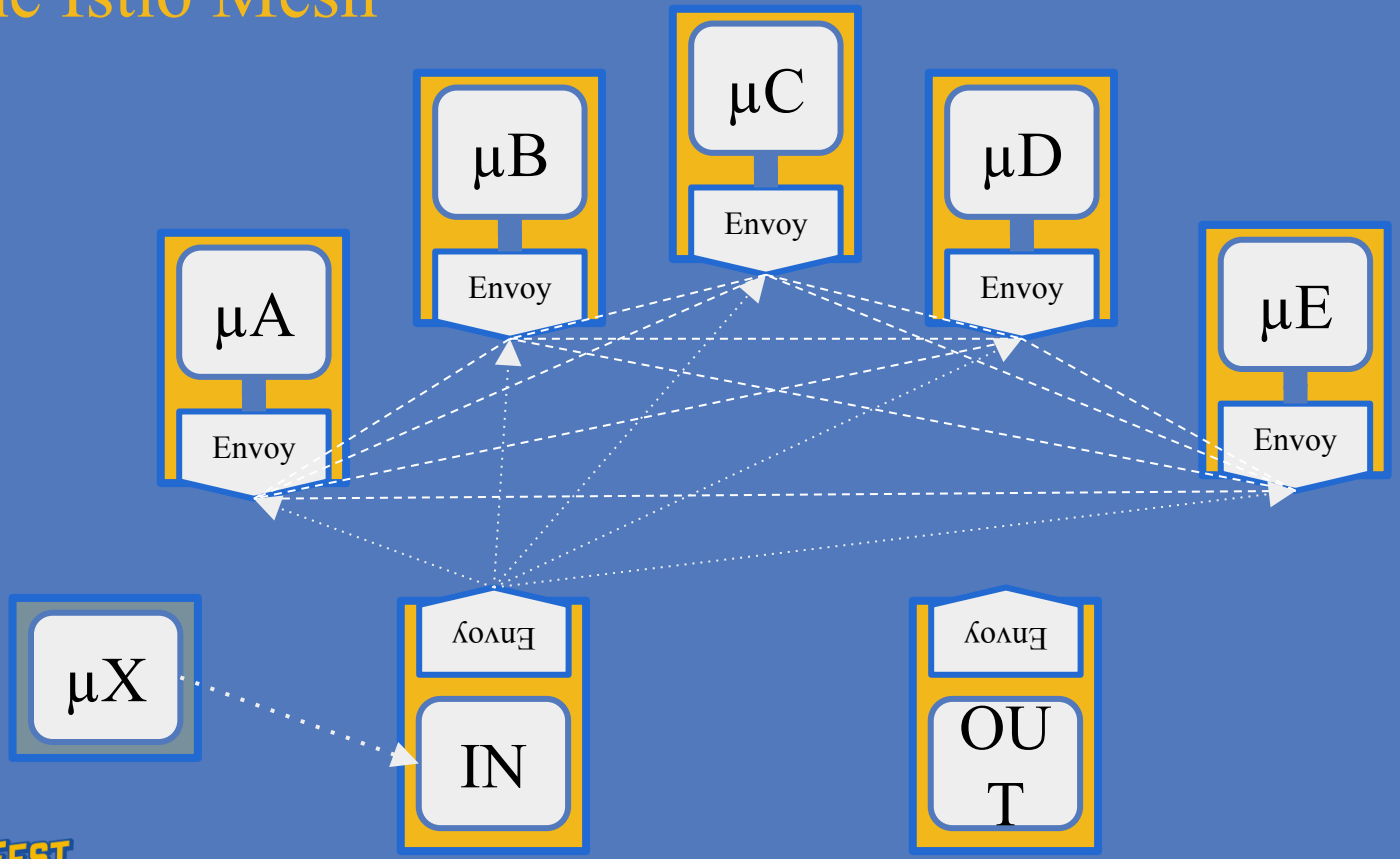

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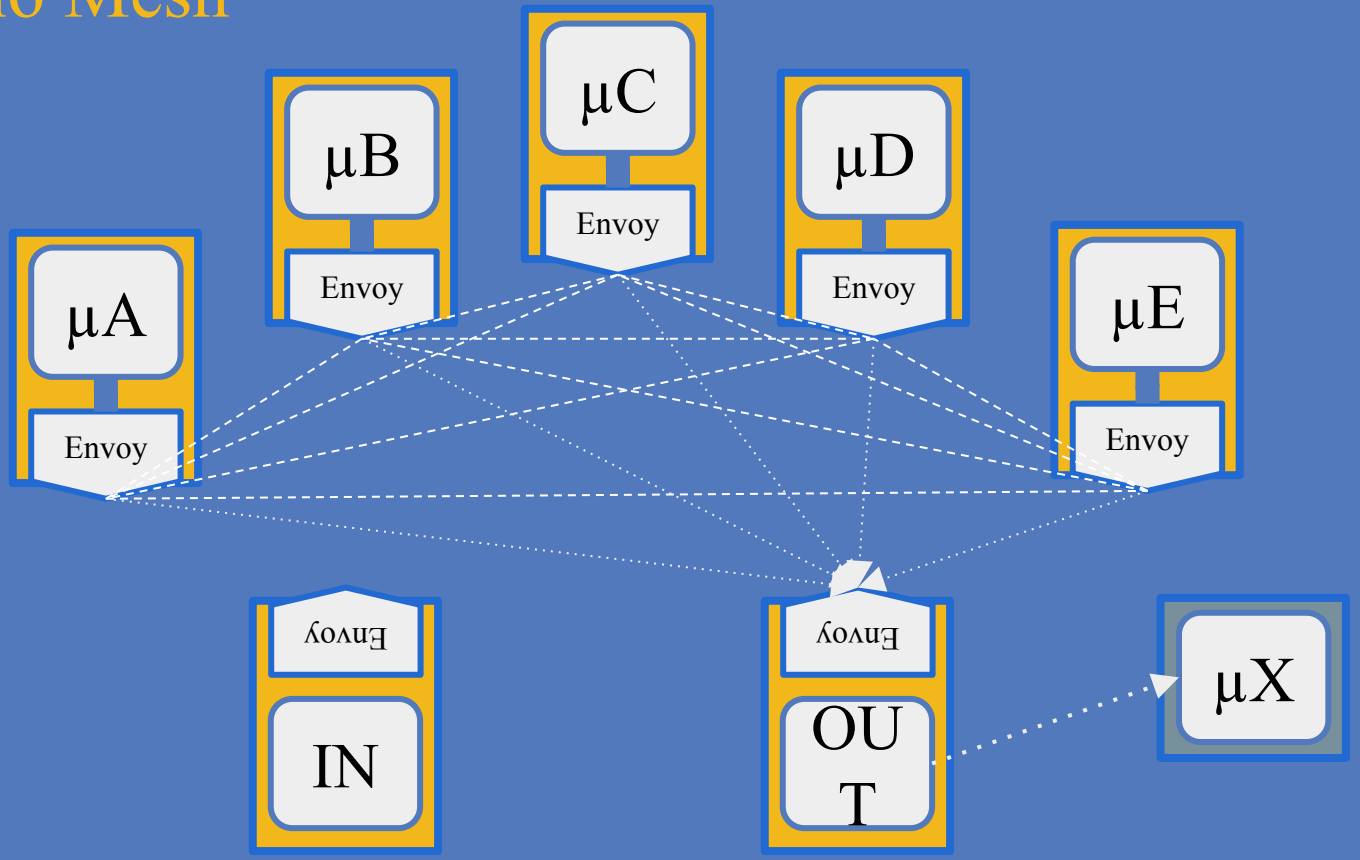
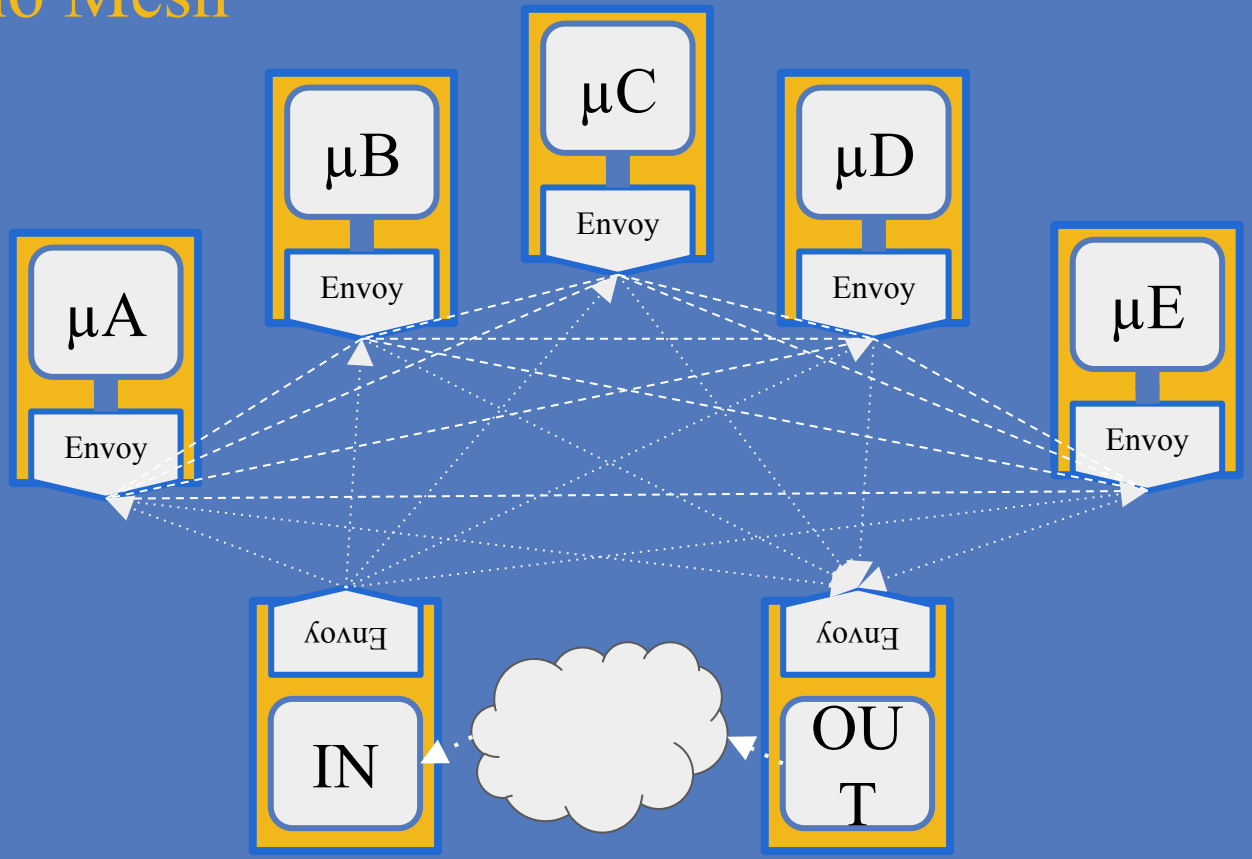
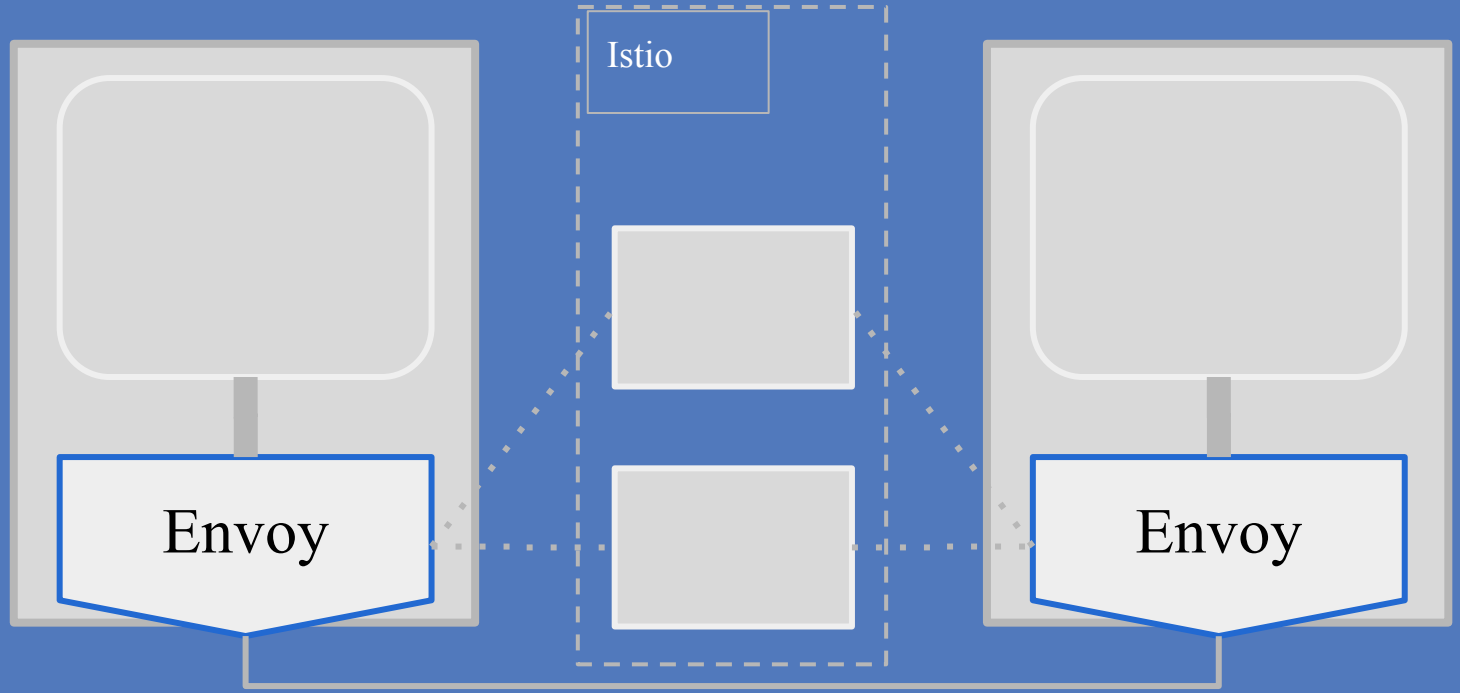


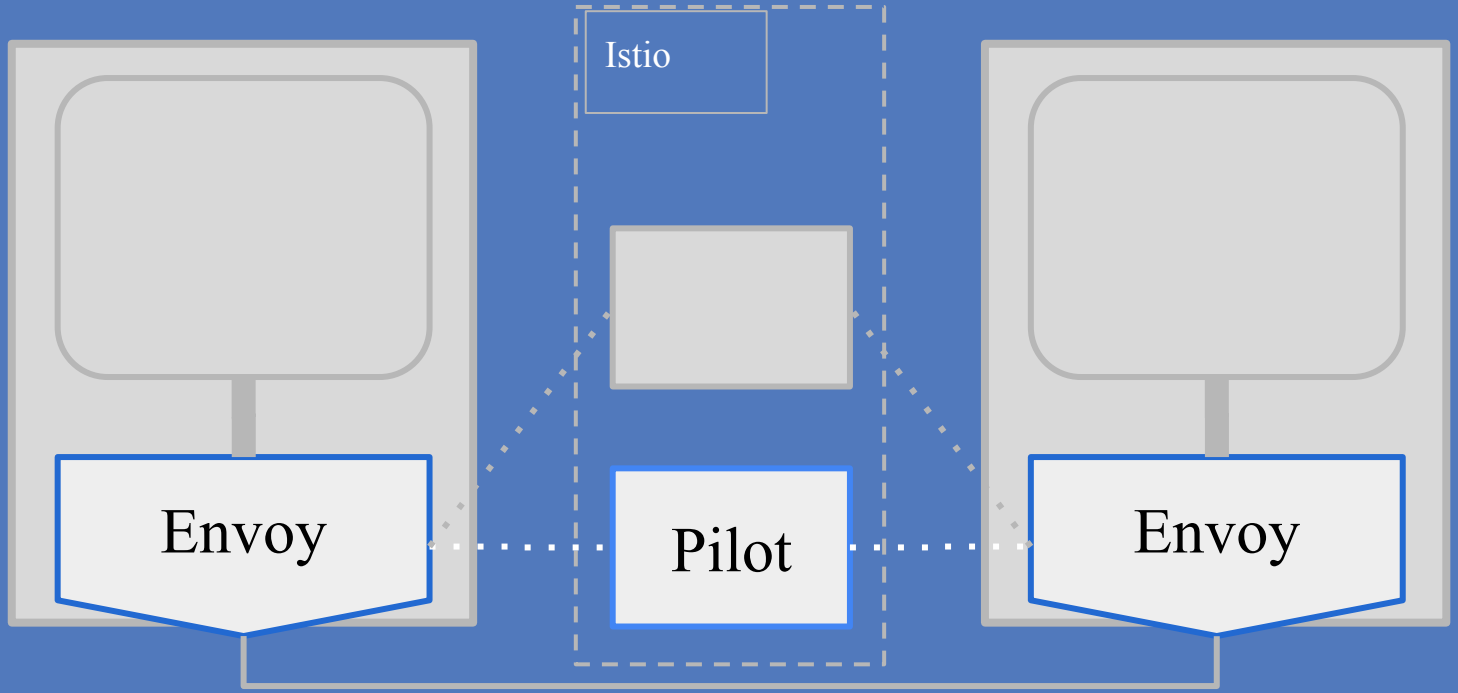
# The Istio Mesh



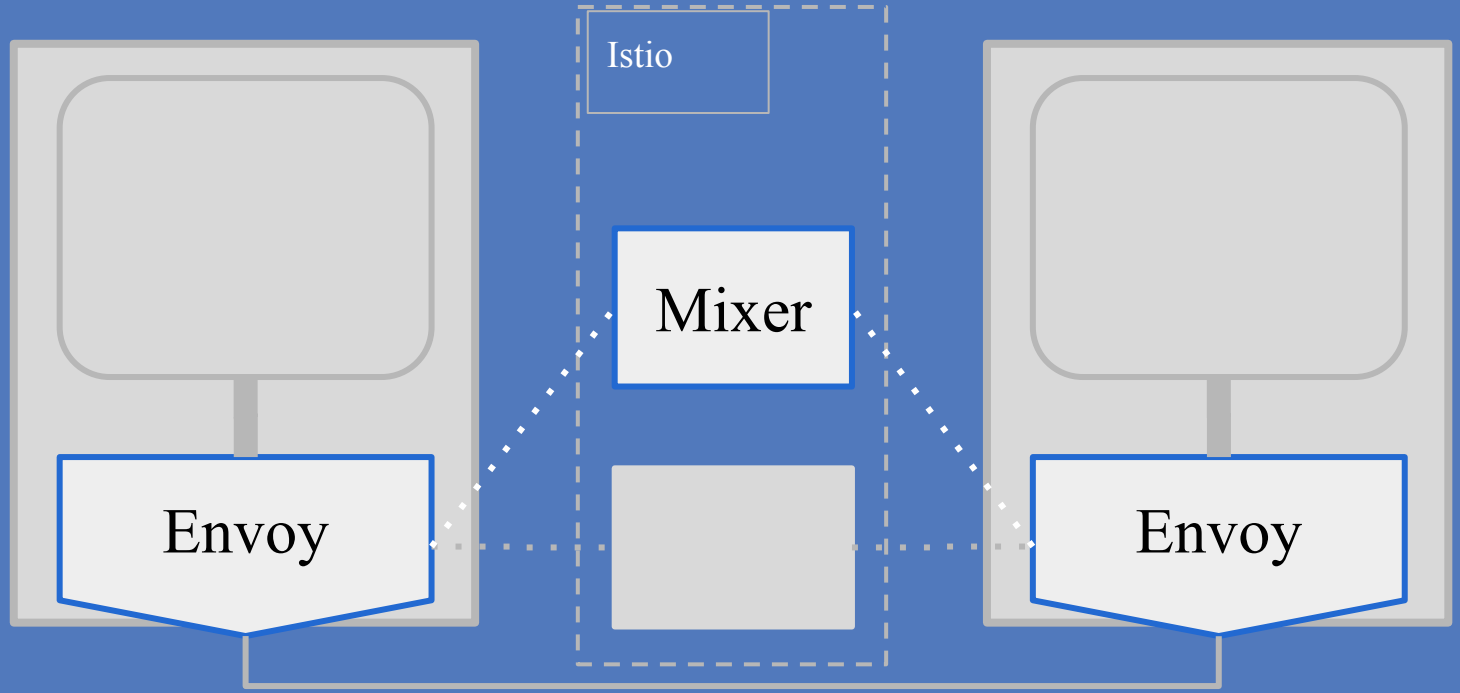
# Envoy (the workhorse)



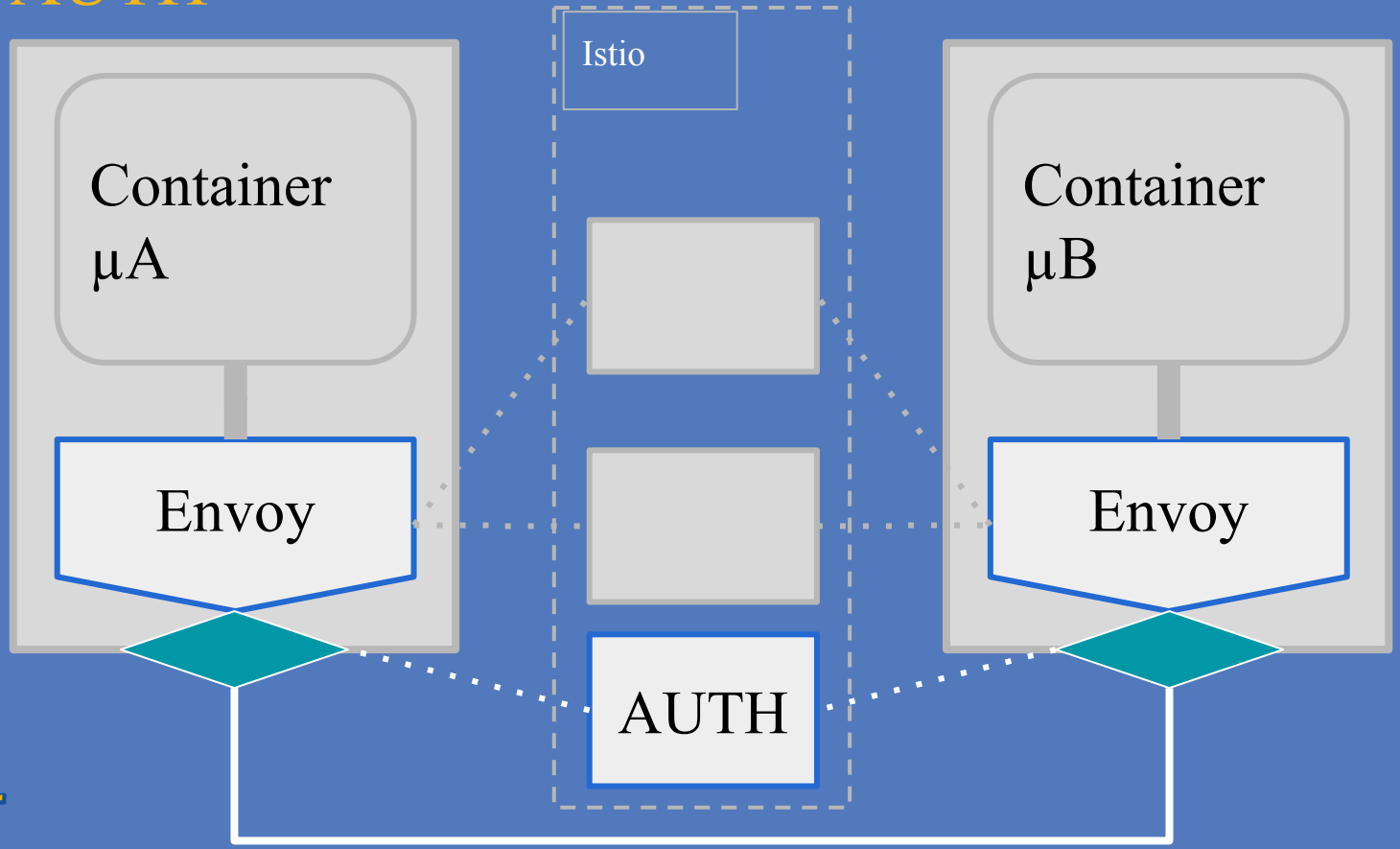
# Pilot



# MIXER



# Istio AUTH



# DEMO PART - DEPLOY REACTOR

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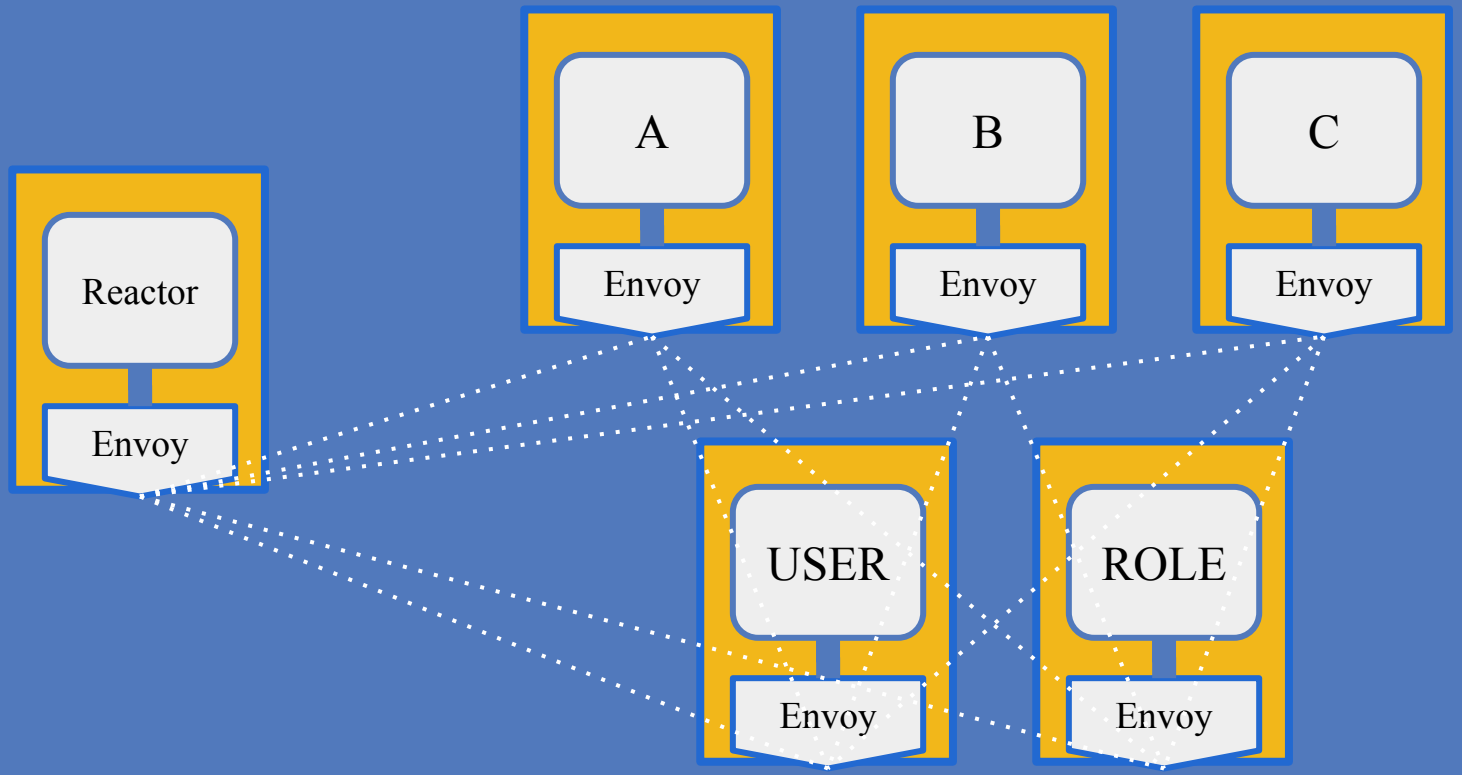
# Reactor service (Demo)



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# Resilience

Make it reliable

# Circuit Breaker

protect your service

```
metadata:
  name: reviews-cb-policy
  namespace: default
spec:
  destination:
    name: reviews
    labels:
      version: v1
  circuitBreaker:
    simpleCb:
      maxConnections: 100
```

# Load Balancing

with failover

```
metadata:
  name: reviews-lb-policy
  namespace: default
spec:
  destination:
    name: reviews
  loadBalancing:
    name: RANDOM
```

# Retries

with exponentiation backoff

```
metadata:
  name: my-rule
  namespace: default
spec:
  destination:
    name: ratings
  route:
  - labels:
      version: v1
  httpReqRetries:
    simpleRetry:
      attempts: 3
      perTryTimeout: 2s
```

# Timeouts

can’t wait any longer

```
metadata:
  name: my-rule
  namespace: default
spec:
  destination:
    name: ratings
  route:
  - labels:
      version: v1
  httpReqTimeout:
    simpleTimeout:
      timeout: 10s
```

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# Fault Injection

Resilience testing

# Delays

let’s wait longer

```
...
spec:
  destination:
    name: b
    namespace: reactor
  precedence: 2
  route:
  - labels:
      version: '1'
    weight: 100
  httpFault:
    delay:
      percent: 75
      fixedDelay: 5s
```

# Errors

http error code of your choice

```
...
spec:
  destination:
    name: a
    namespace: reactor
  precedence: 2
  route:
  - labels:
      version: '1'
    weight: 100
  httpFault:
    abort:
      percent: 60
          httpStatus: 500
```

# Traffic Management

Policy

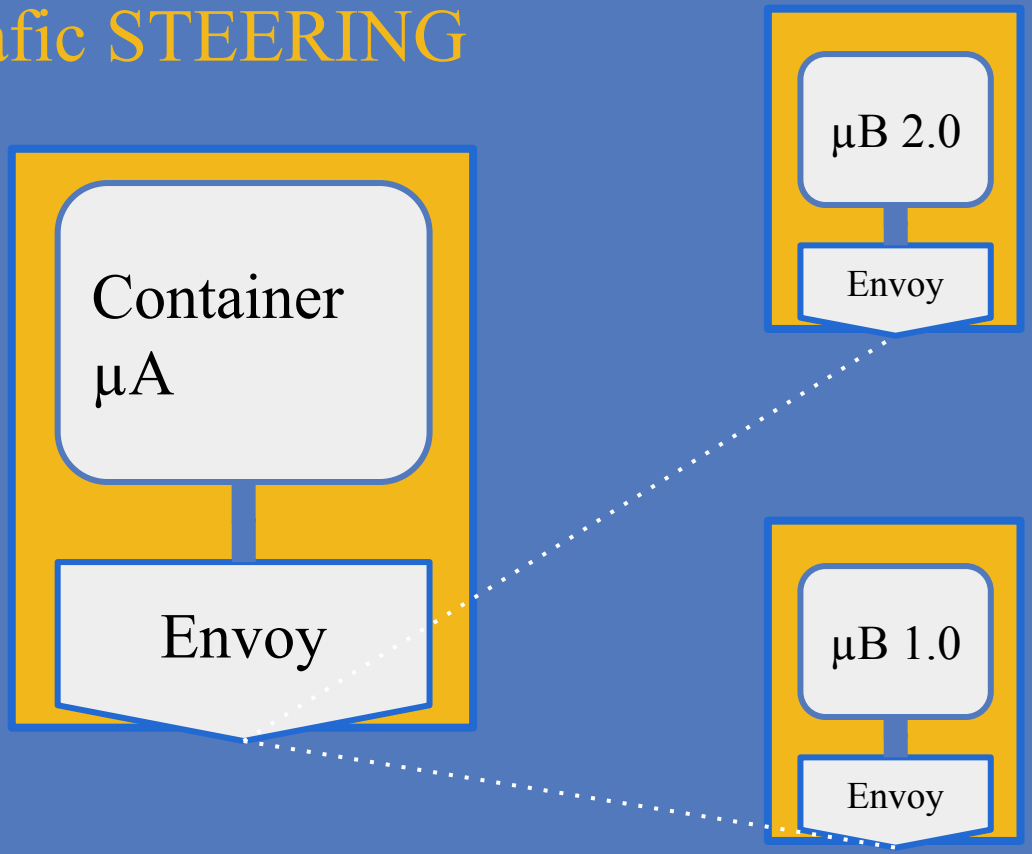
# Traffic Splitting

50/50 please

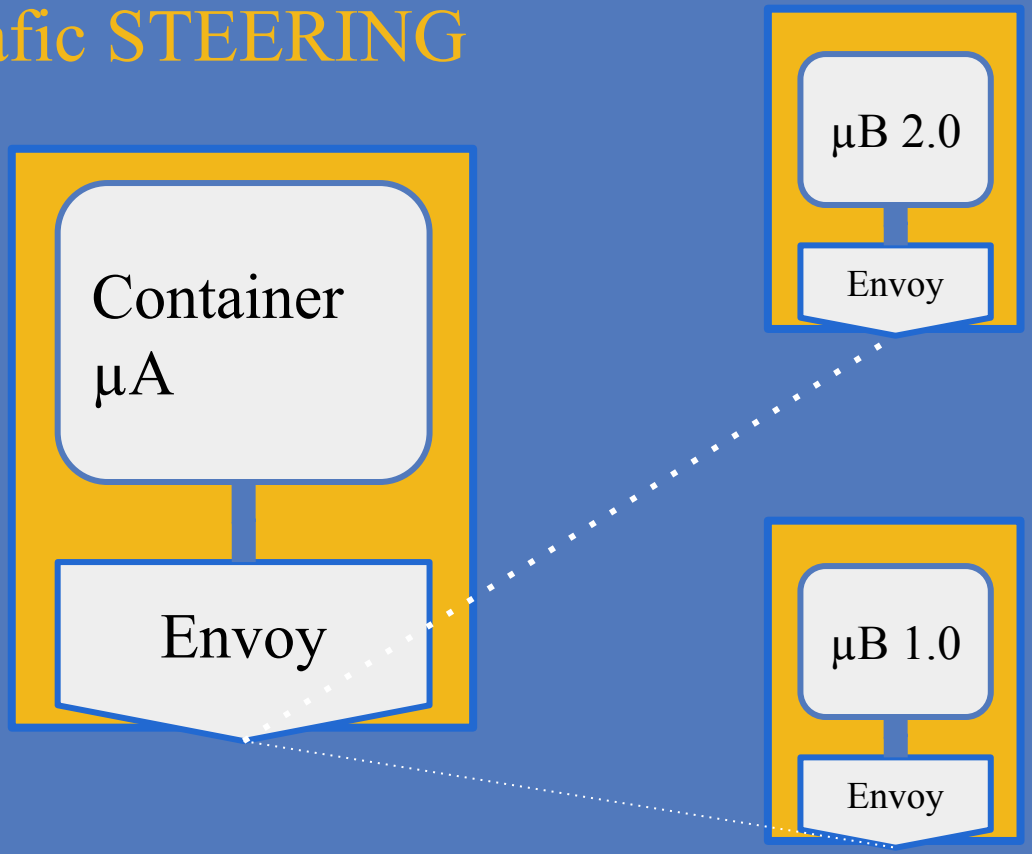


```
metadata:
  name: rule-3-weight50
spec:
  destination:
    name: user
    namespace: reactor
  precedence: 2
  route:
  - labels:
      version: '2'
    weight: 50
  - labels:
      version: '1'
    weight: 50
```

# Trafic STEERING



# Trafic STEERING



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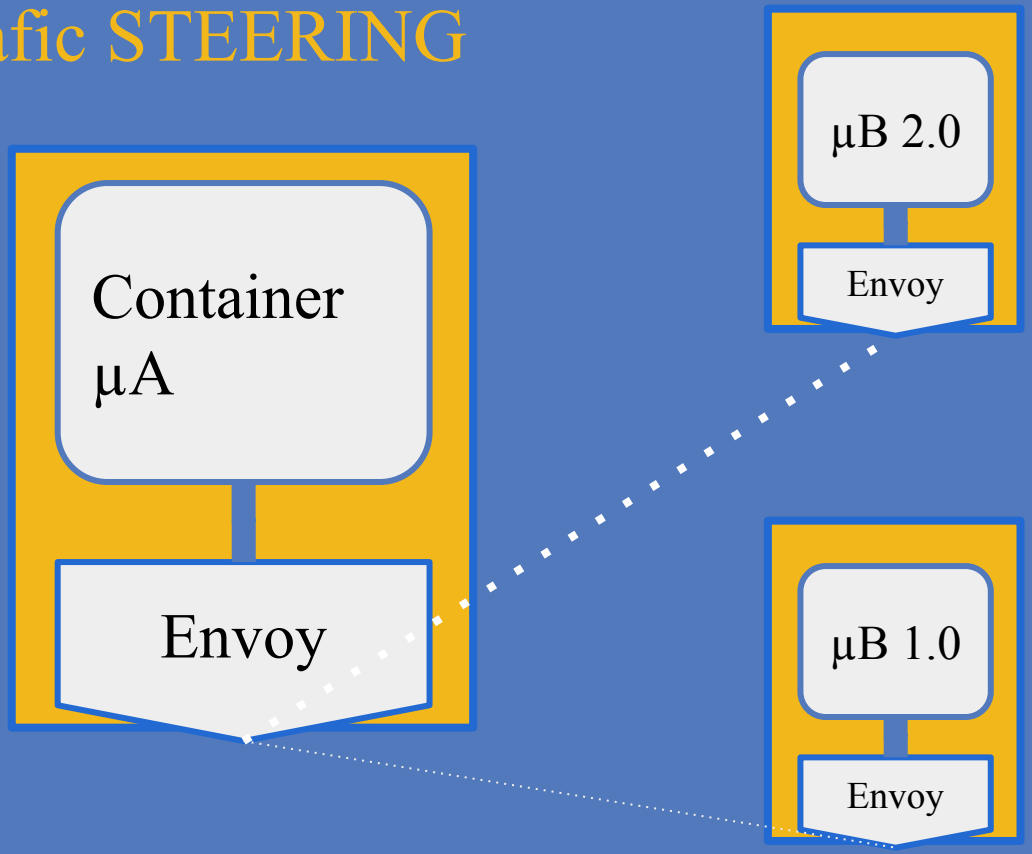
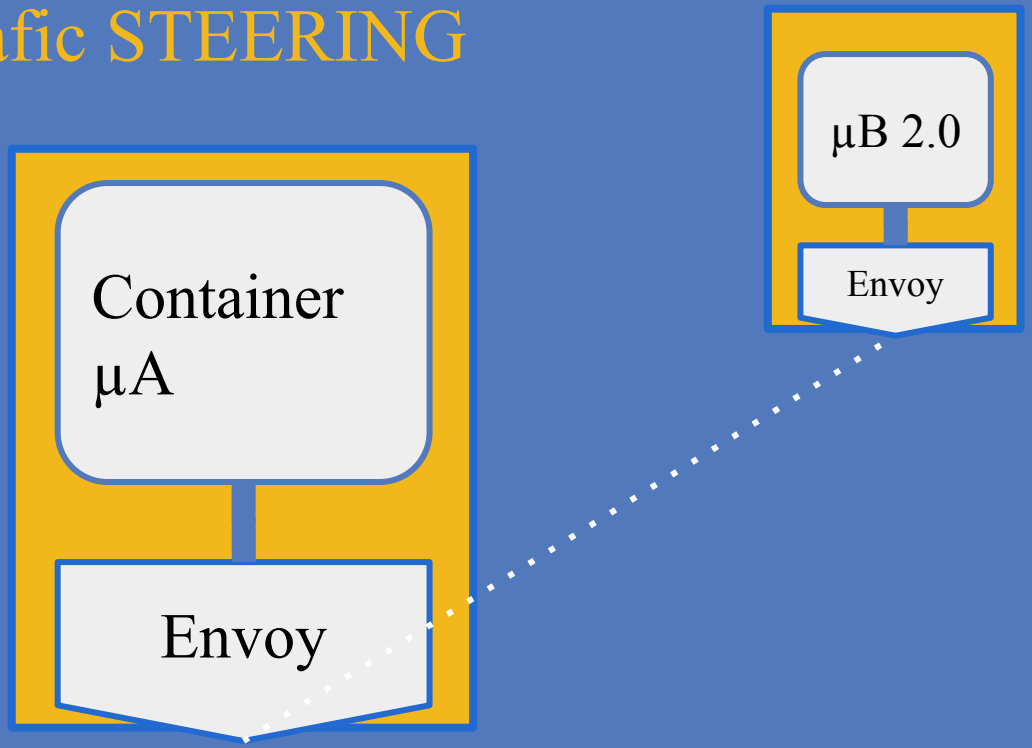


# Trafic STEERING



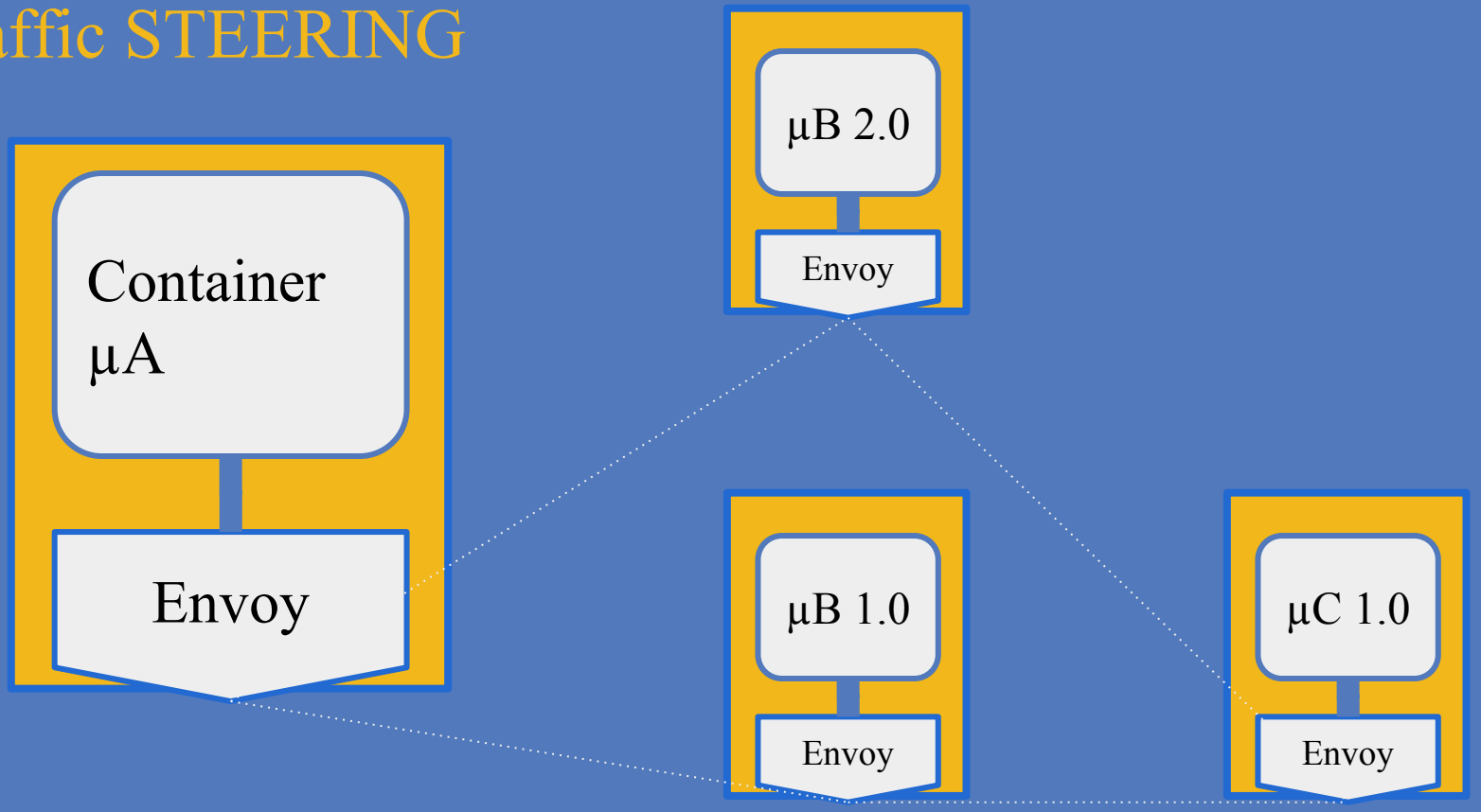
# Traffic Steering

I know you, go their

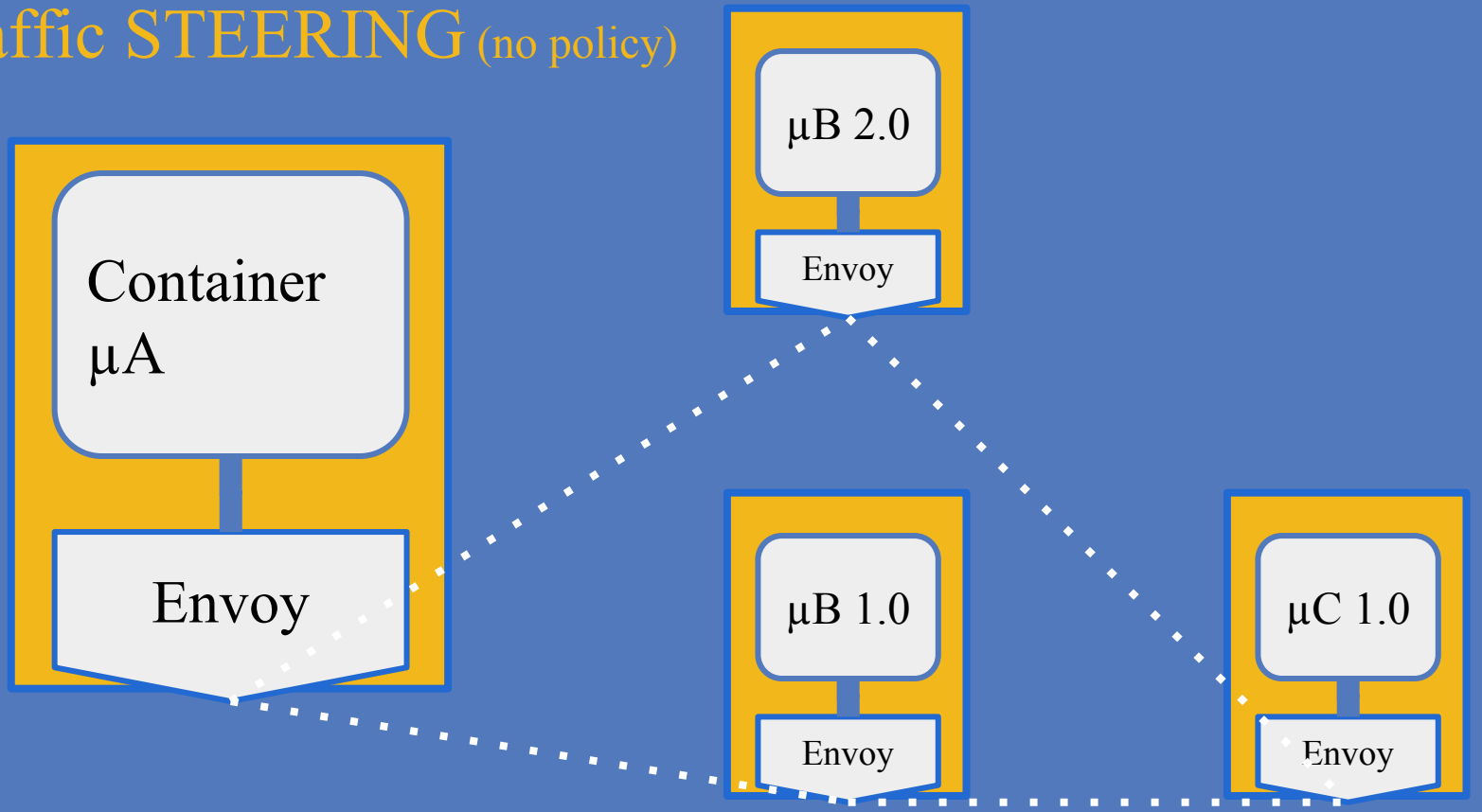
Routing Rule

```
spec:
  destination:
    name: role
    namespace: reactor
  precedence: 2
  match:
    request:
      headers:
        x-segment:
          exact: "test"
  route:
  - labels:
      version: '2'
```

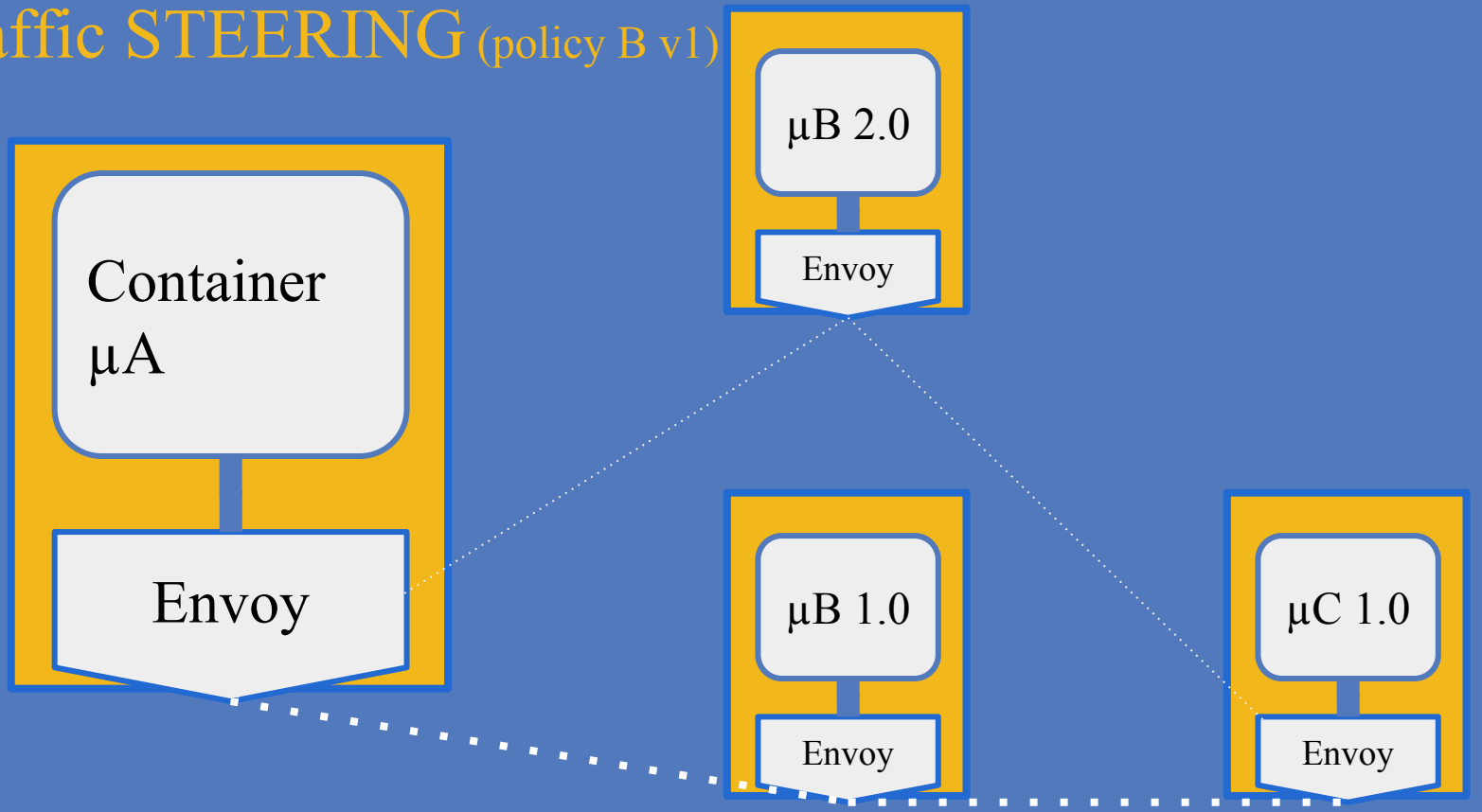
# Traffic STEERING



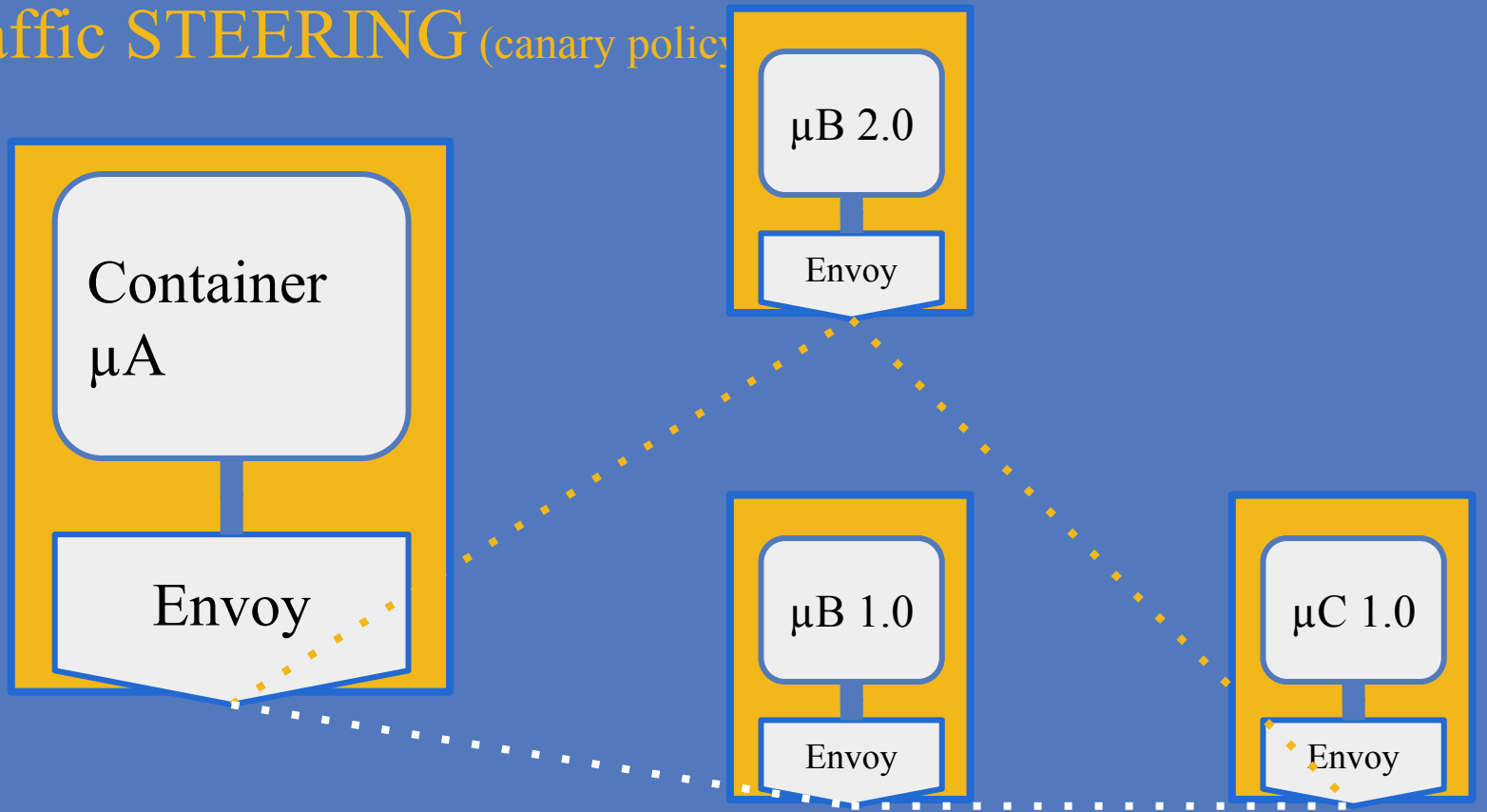
# Traffic STEERING (no policy)



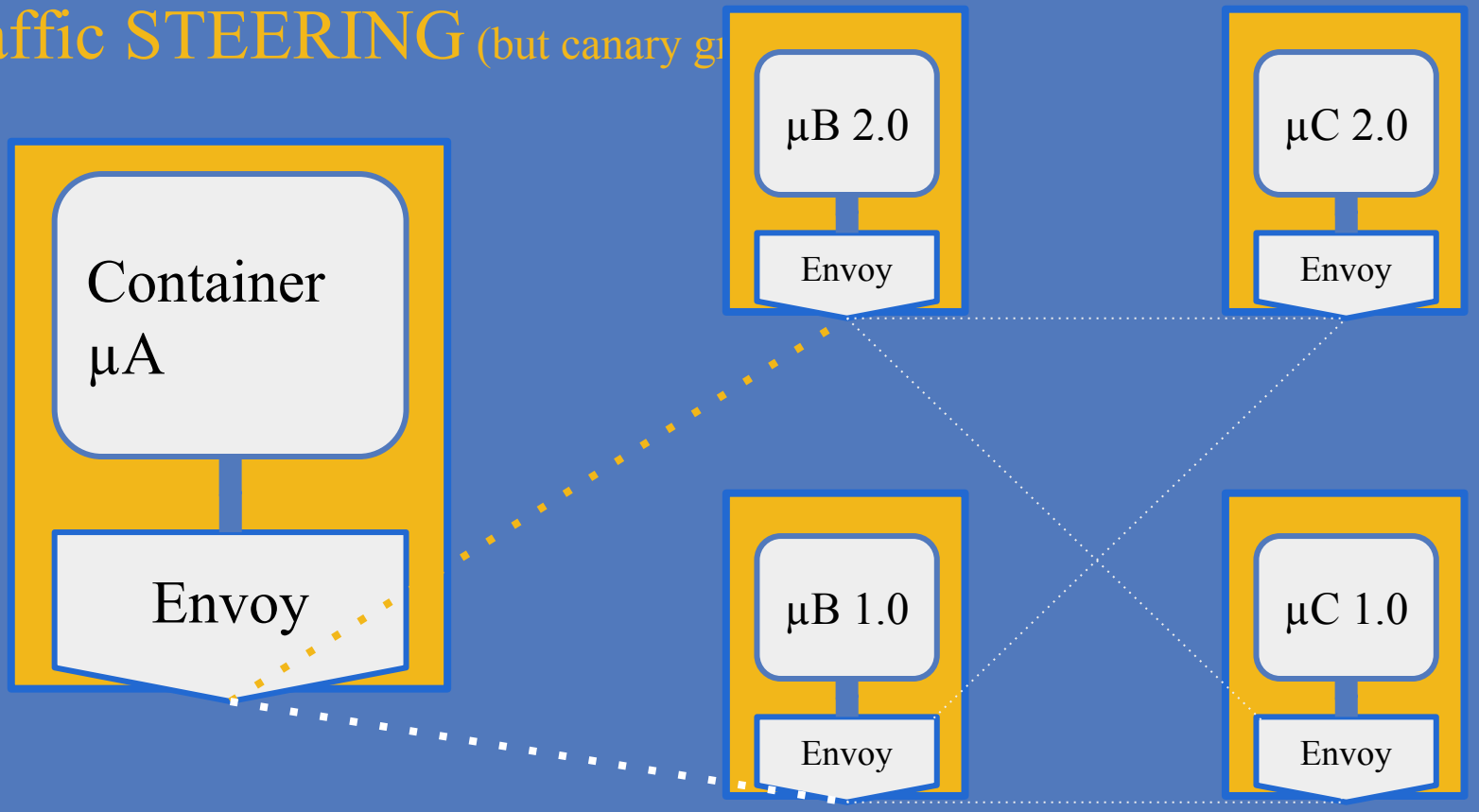
# Traffic STEERING (policy B v1)



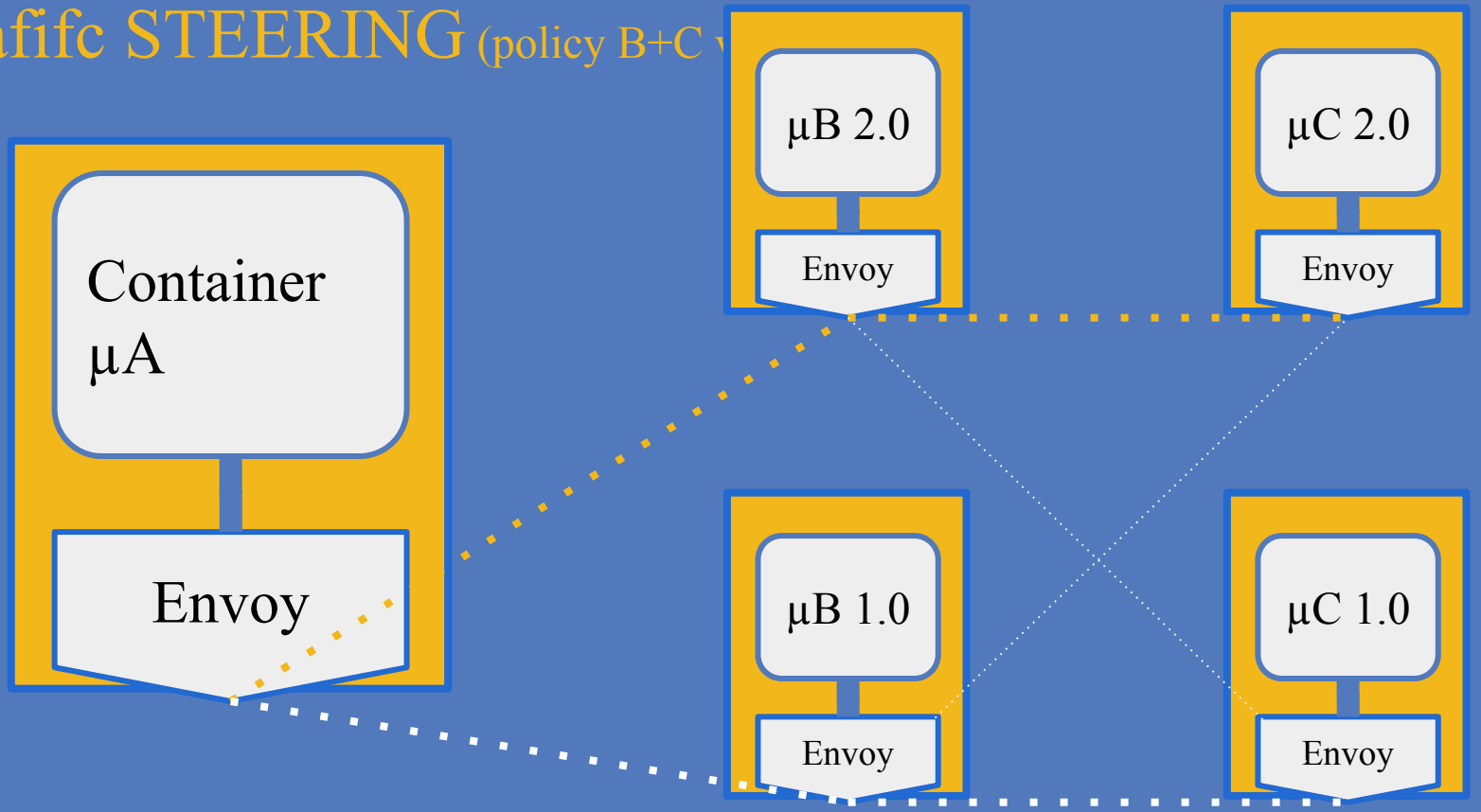
# Traffic STEERING (canary policy)



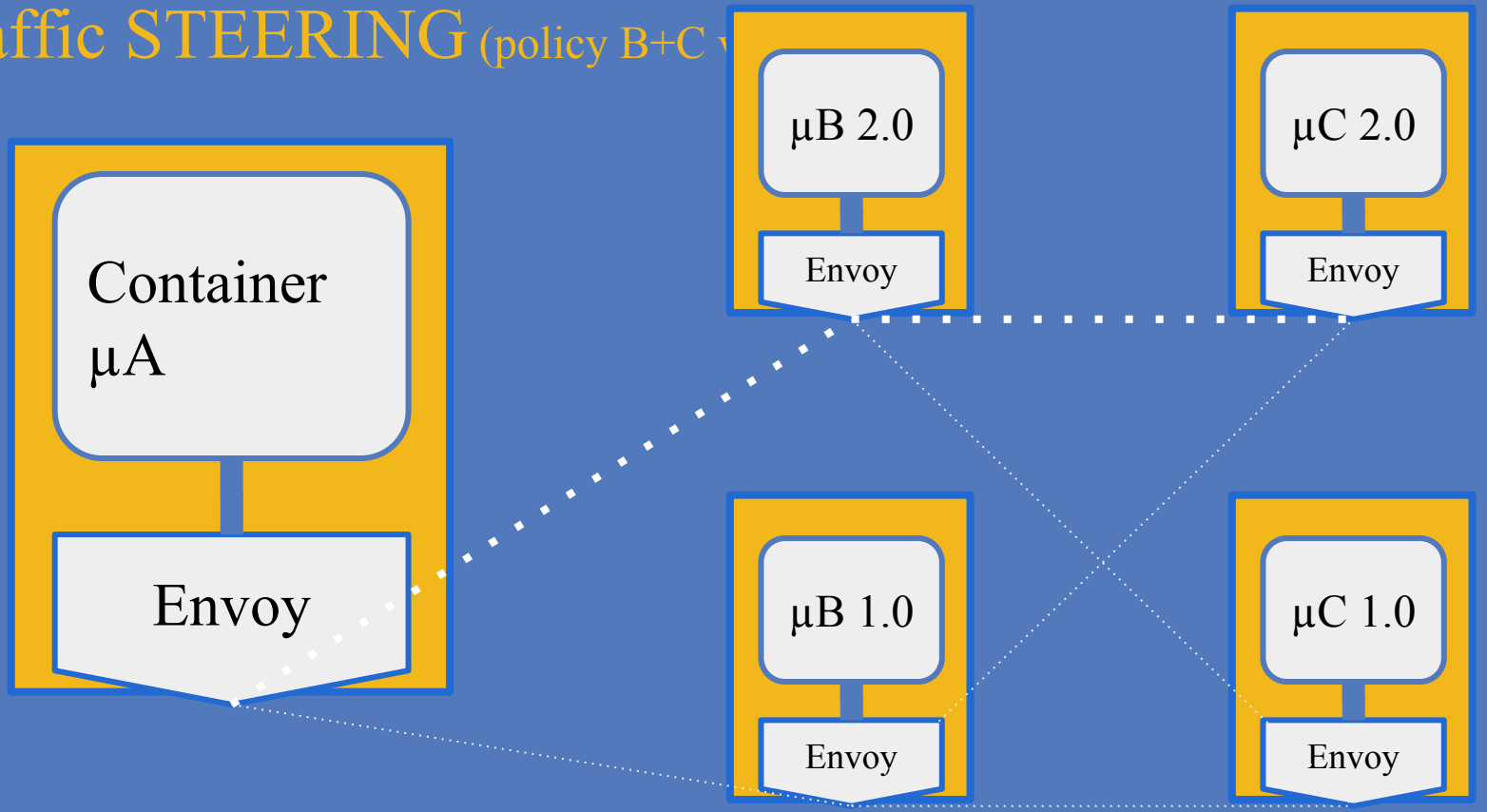
# Traffic STEERING (but canary gr



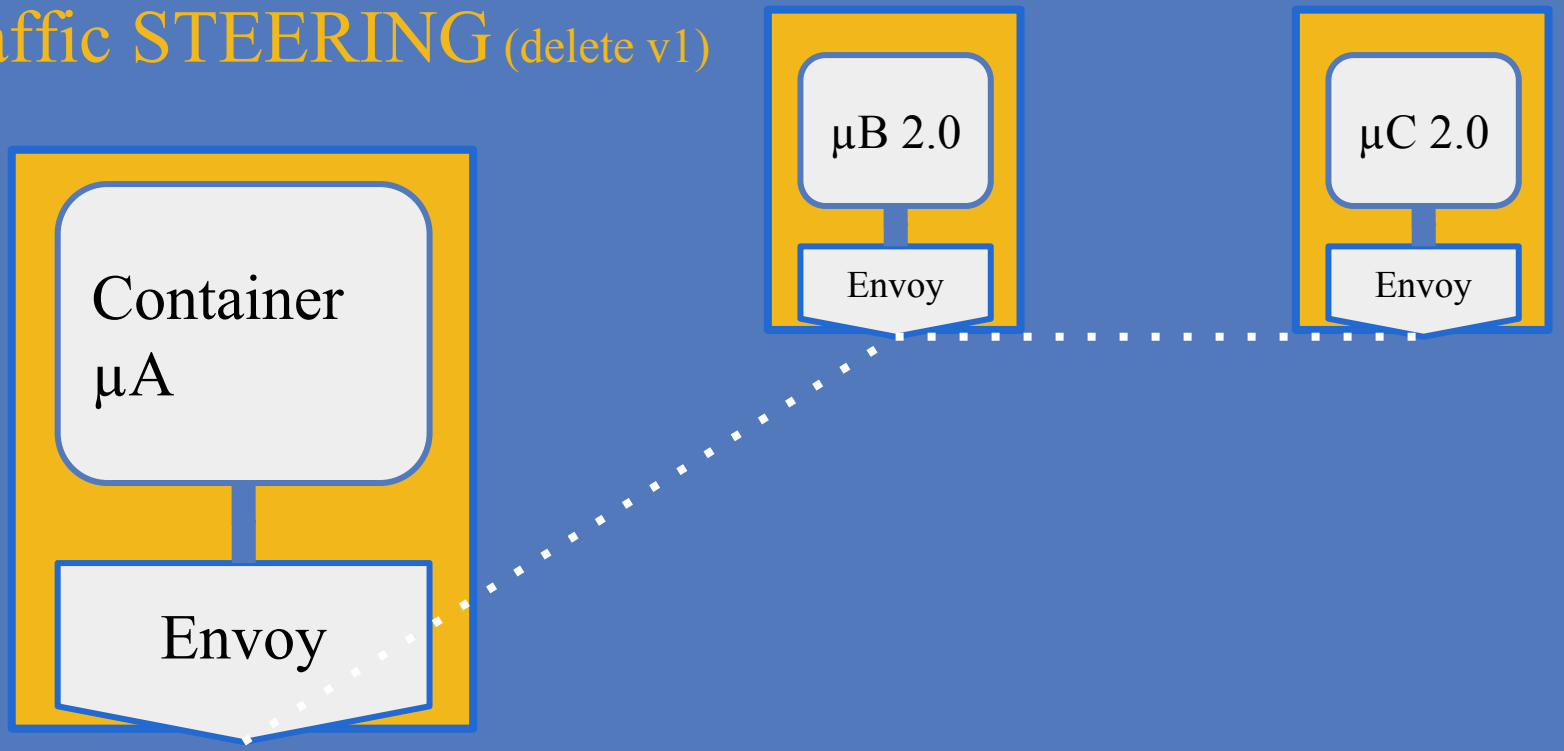
# Trafifc STEERING (policy B+C v



# Traffic STEERING (policy B+C v



# Traffic STEERING (delete v1)



# Other Traffic Management features

HTTP Rewrite

HTTP Redirect

# EGRESS Routing

Existing the mesh

```
kind: EgressRule
metadata:
  name: foo-egress-rule
spec:
  destination:
    service: *.foo.com
  ports:
    - port: 80
      protocol: http
    - port: 443
      protocol: https
```

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# Visibility

Out of the box metrics

# Tracing

auto http/grpc tracing

- Without app instrumentation
- Trace across services
- Portable over providers

# Metrics

ad hoc injection

```
metrics:
  - name: request_count
    kind: COUNTER
    value: INT64
    displayName: "Request Count"
    description: Request count 4p
    labels:
      source: STRING
      target: STRING
      service: STRING
      responseCode: INT64
```

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# Authentication

Security

# SPIFFE

Secure Production Identity Framework
for Everyone

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# MORE Control...

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# Roadmap

This is only the beginning

# Roadmap (my favorites)

- Basic Authorization using RBAC.
- Global load balancing with autoscaling.
- API Management functionality.
- ...

# Q & A

Questions

https://istio.io

Slider and github repo:
@alexvb

# Destination Policy