Security in Applications

API Management and Service Mesh (ISTIO)

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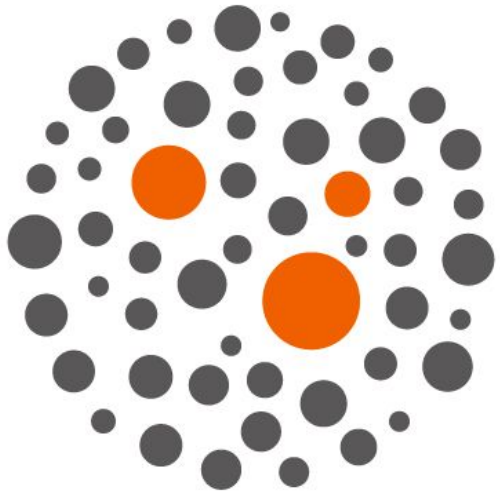
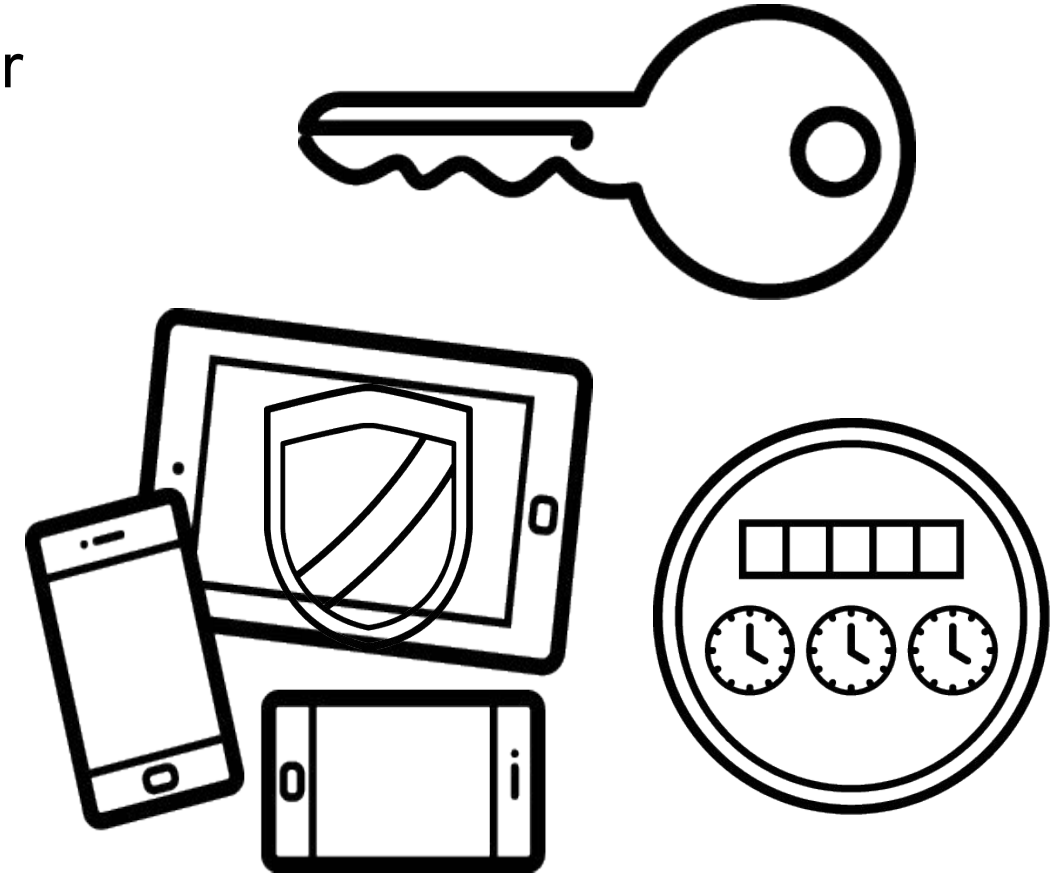
API Management (3 Scale)



APPLICATION API MANAGEMENT

Consider configuring an API gateway for container platform & application APIs

- Authentication and authorization
- LDAP integration
- End-point access controls
- Rate limiting



RED HAT 3SCALE API MANAGEMENT

Key capabilities

Control

- Security
- Key management
- Rate limiting
- Policy enforcement
- App and user management
- Provisioning

Visibility

- Analytics
- App tracking
- User tracking
- Traffic alerts
- Engagement
- Developer support

Flexibility

- Distributed
- Multi-department
- Multi-environment
- Highly scalable
- Powerful APIs
- Webhooks

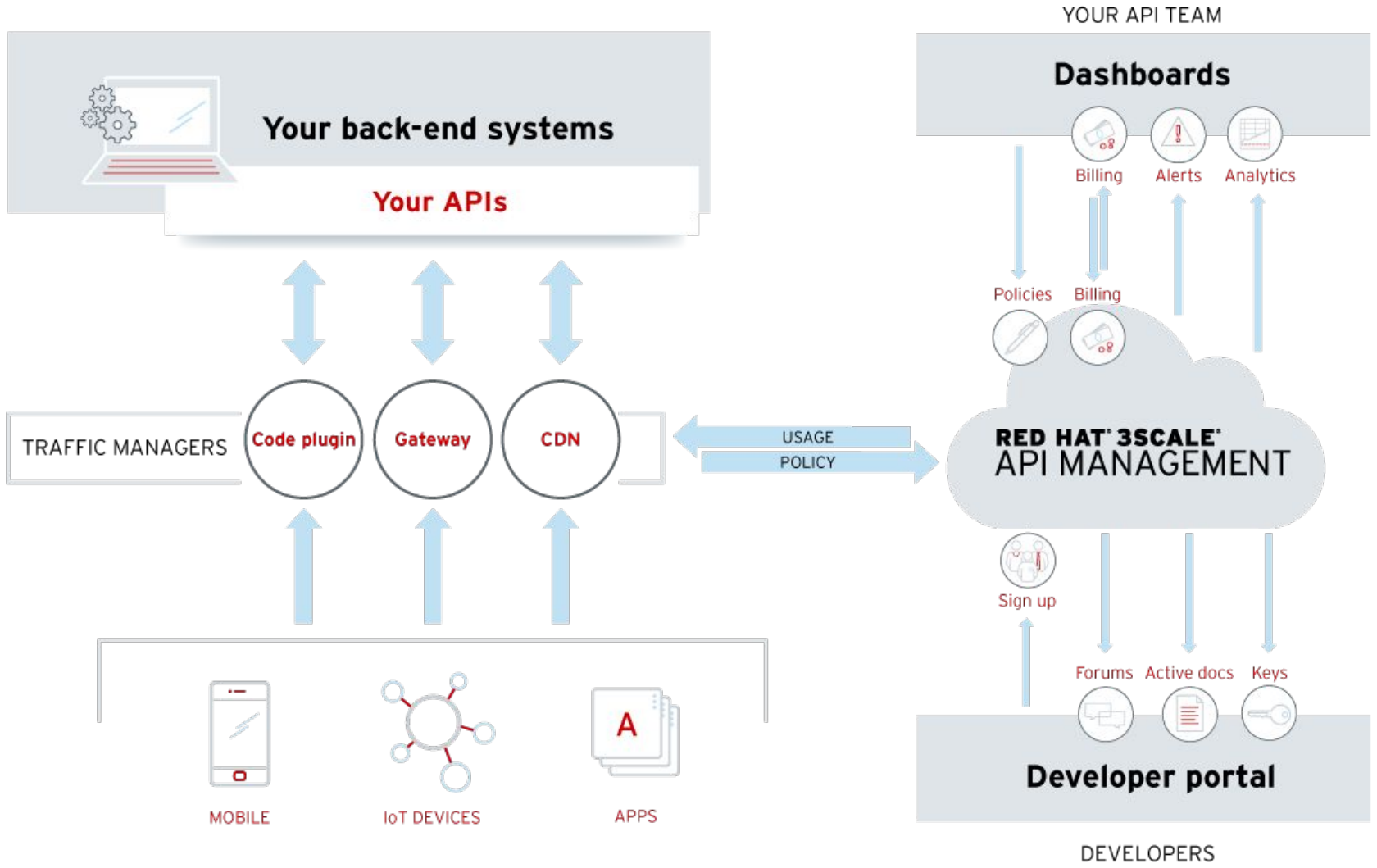
Flexible distributed control

Modular

No single point of failure

Hybrid cloud access

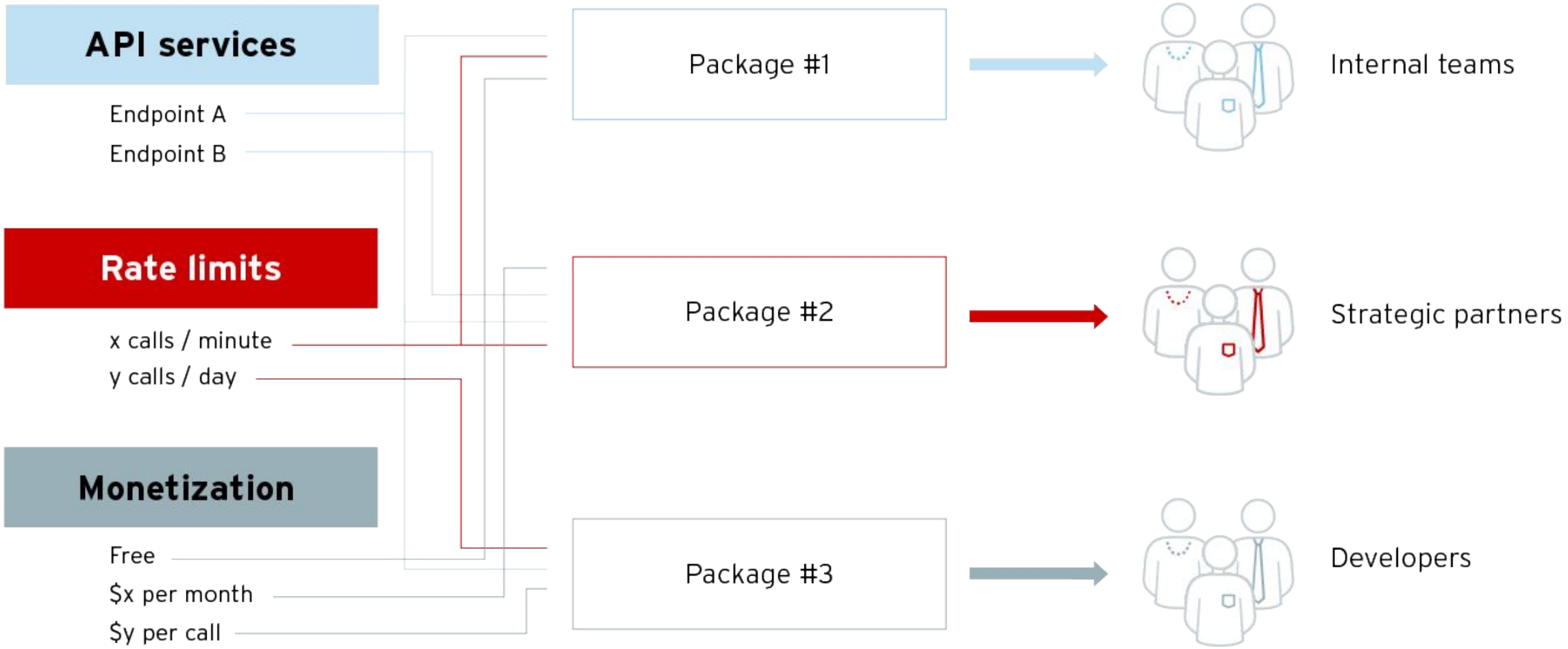
Highly scalable



API contracts and rate limits

Package your APIs. Create access tiers. Set rate limits.

Allow/restrict access to your API endpoints along with rate limits.



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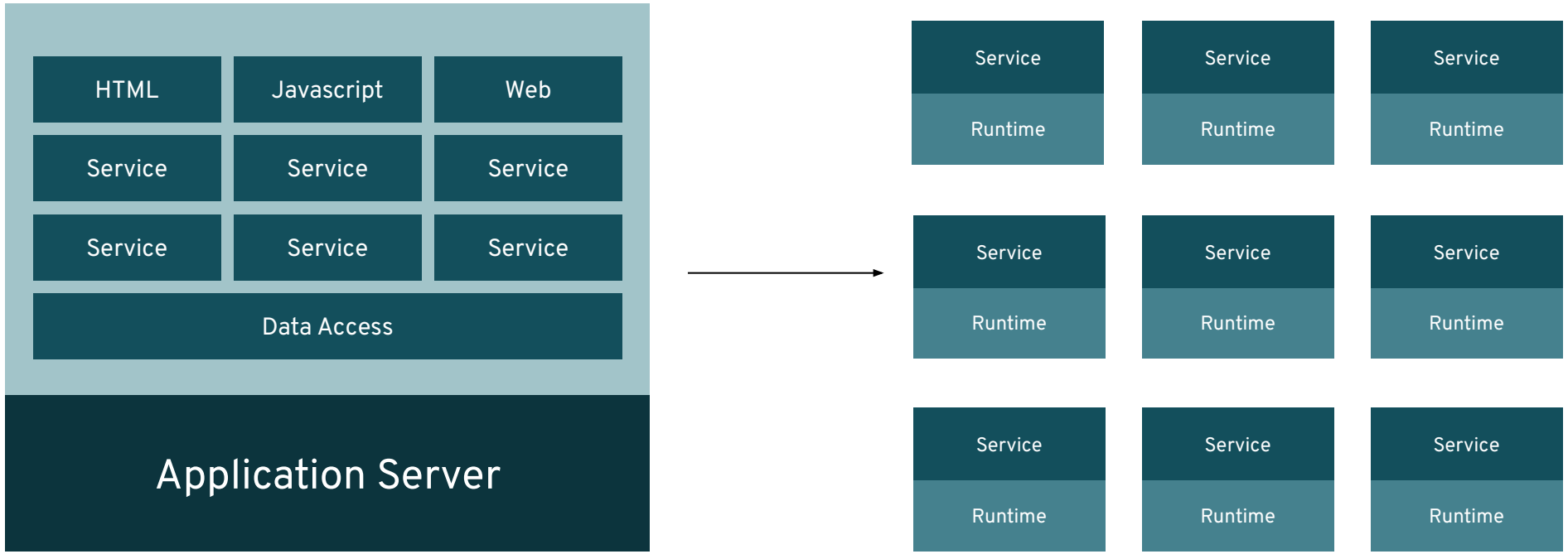
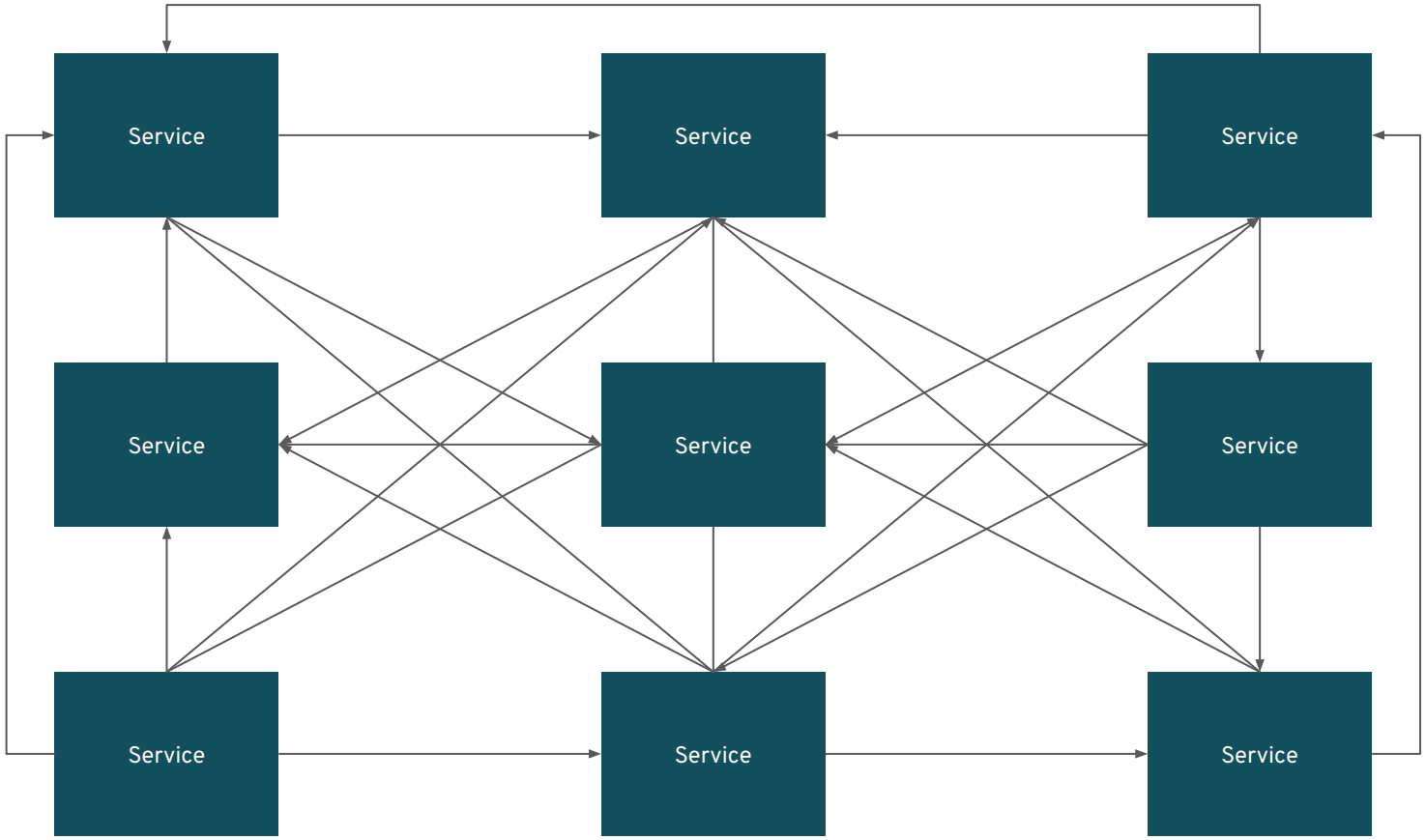
Red Hat Service Mesh (Istio)

~~MICROSERVICES~~ ARCHITECTURE

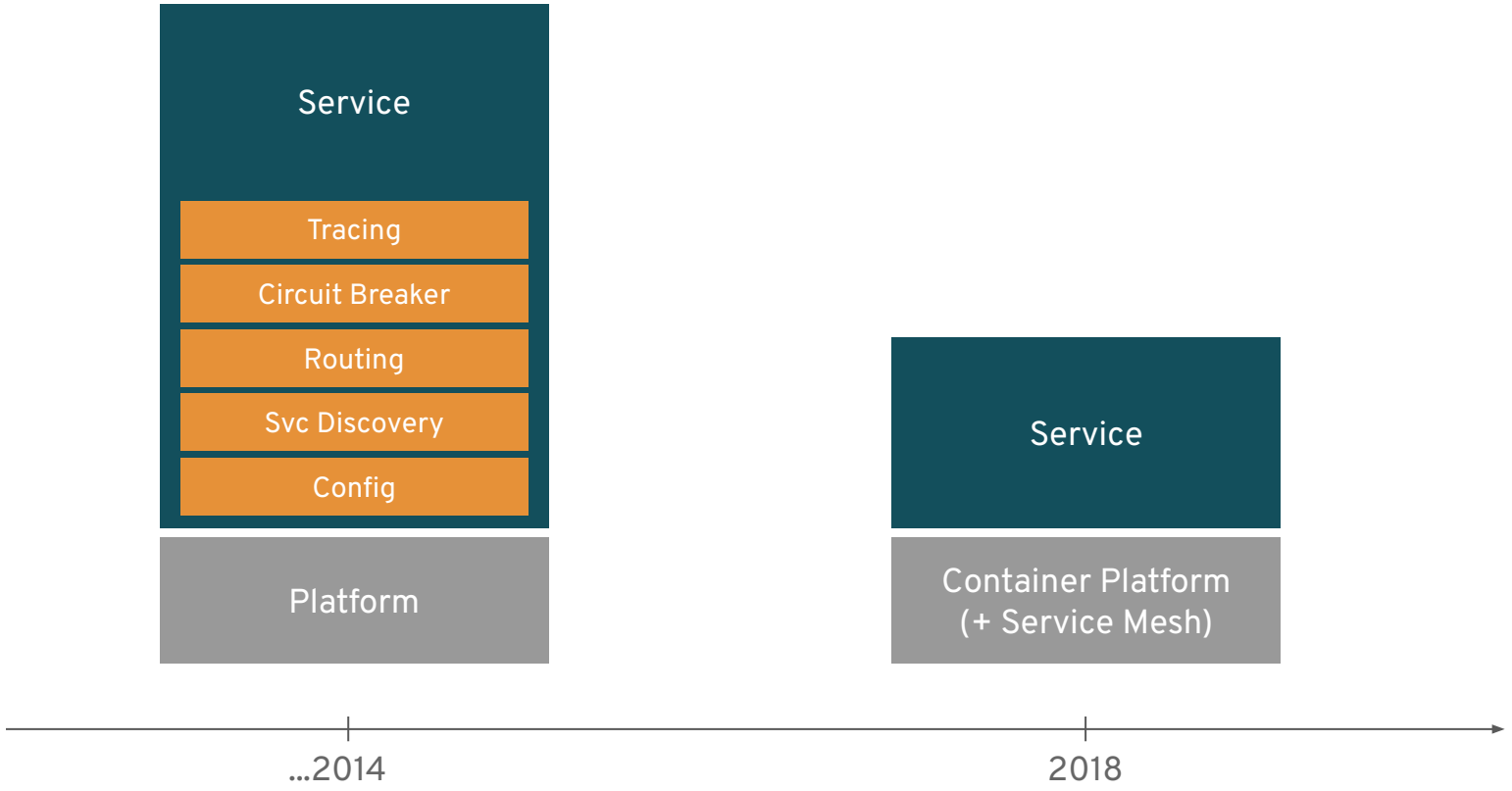
DISTRIBUTED



DISTRIBUTED ARCHITECTURE



A better way with a service mesh



A service mesh provides a **transparent** and **language-independent** network for connecting, observing, securing and controlling the connectivity between services.

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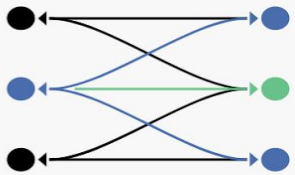
Istio

Connect, secure, control, and observe services.

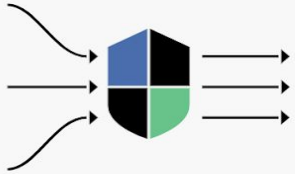


Connect

Intelligently control the flow of traffic and API calls between services, conduct a range of tests, and upgrade gradually with red/black deployments.

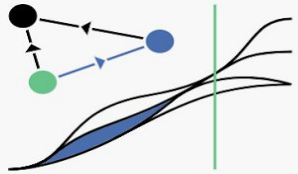
Secure

Automatically secure your services through managed authentication, authorization, and encryption of communication between services.



Control

Apply policies and ensure that they're enforced, and that resources are fairly distributed among consumers.

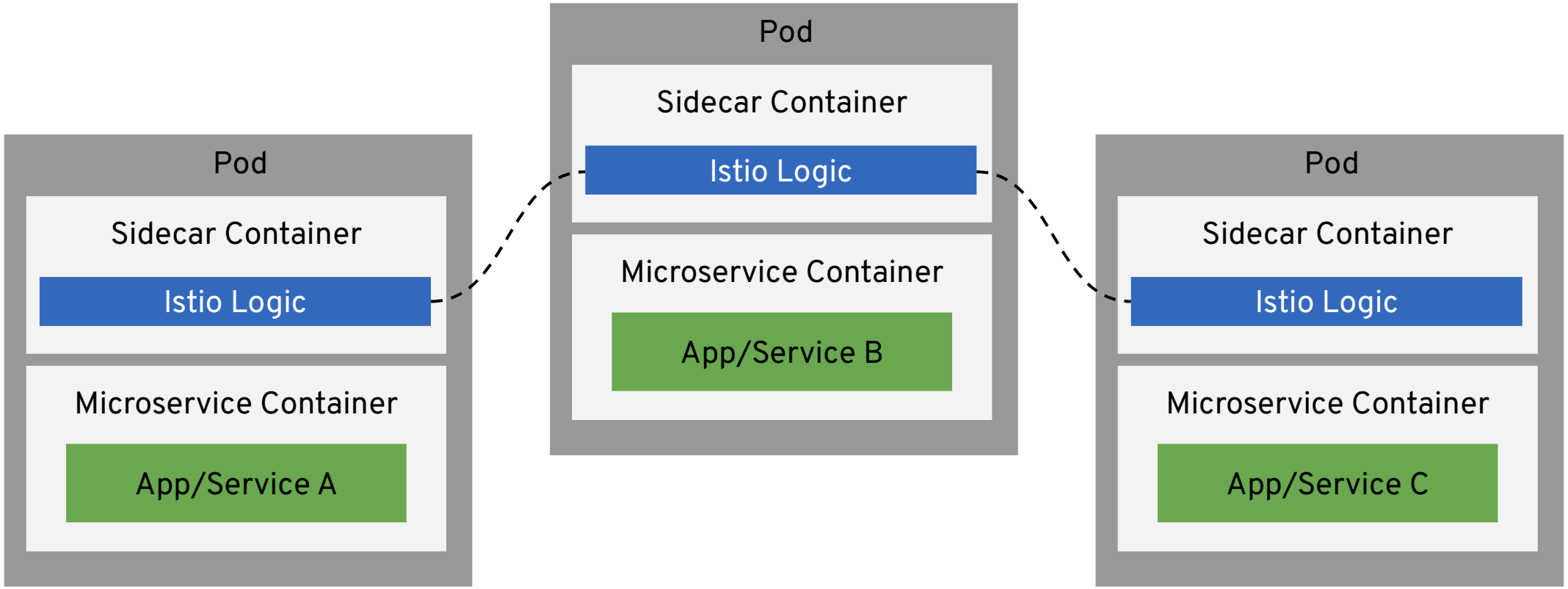


Observe

See what's happening with rich automatic tracing, monitoring, and logging of all your services.

MICROSERVICES WITH ISTIO

connect, manage, and secure microservices *transparently*



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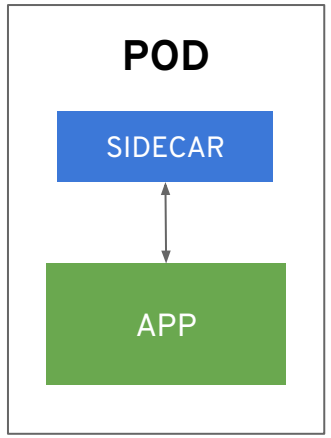
WHAT IS A SIDECAR?

A proxy instance that abstracts common logic away from individual services

SIDECAR PATTERN

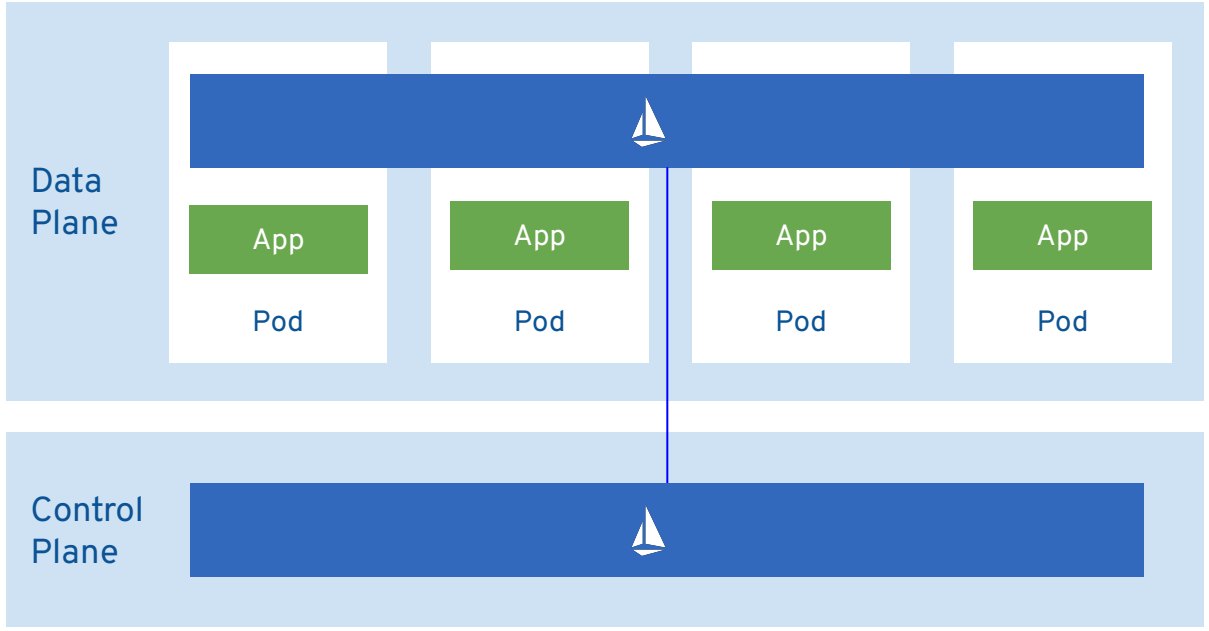
- A utility container in the same pod to enhance the main container's functionality
- Share the same network and lifecycle
- Istio uses an Istio Proxy (L7 Proxy) sidecar to proxy all network traffic between apps



ISTIO PROVIDES BOTH CONTROL AND DATA PLANES

The **data plane** is composed of a set of intelligent proxies (Envoy) deployed as sidecars that mediate and control all network communication between microservices.

The **control plane** is responsible for managing and configuring proxies to route traffic, as well as enforcing policies at runtime.



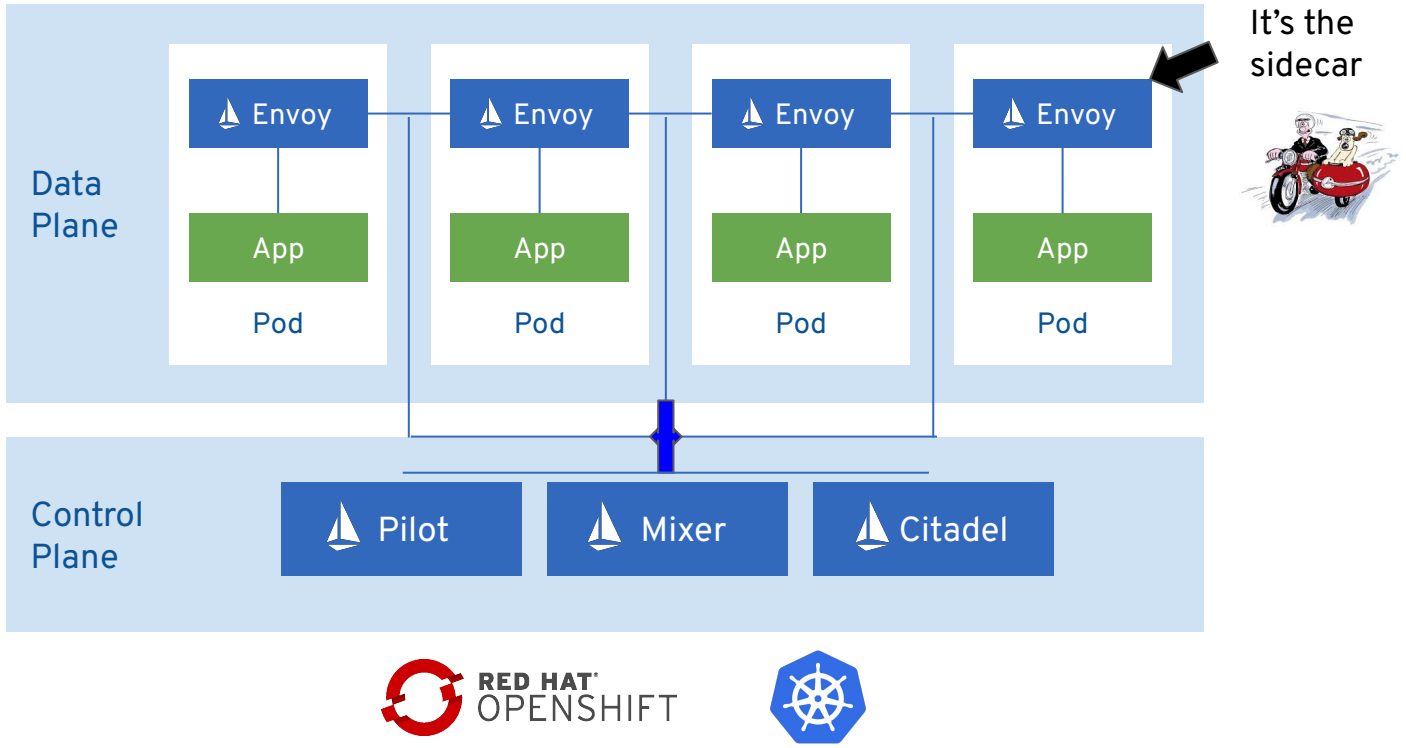
COMPONENTS OF ISTIO

Envoy, originally from Lyft - it's an intelligent proxy. Highly parallel non-blocking, network filtering, service discovery, health checking, dynamically configurable.

Pilot, the component responsible for managing a distributed deployment of Envoy proxies in the service mesh. Intelligent routing, traffic mgmt, resiliency

Mixer, which provides the policy and access control mechanisms within the service mesh. Monitoring, reporting, quotas - plugin-based.

Citadel, control service-service traffic based on origin and user. Key mgmt certificate authority.



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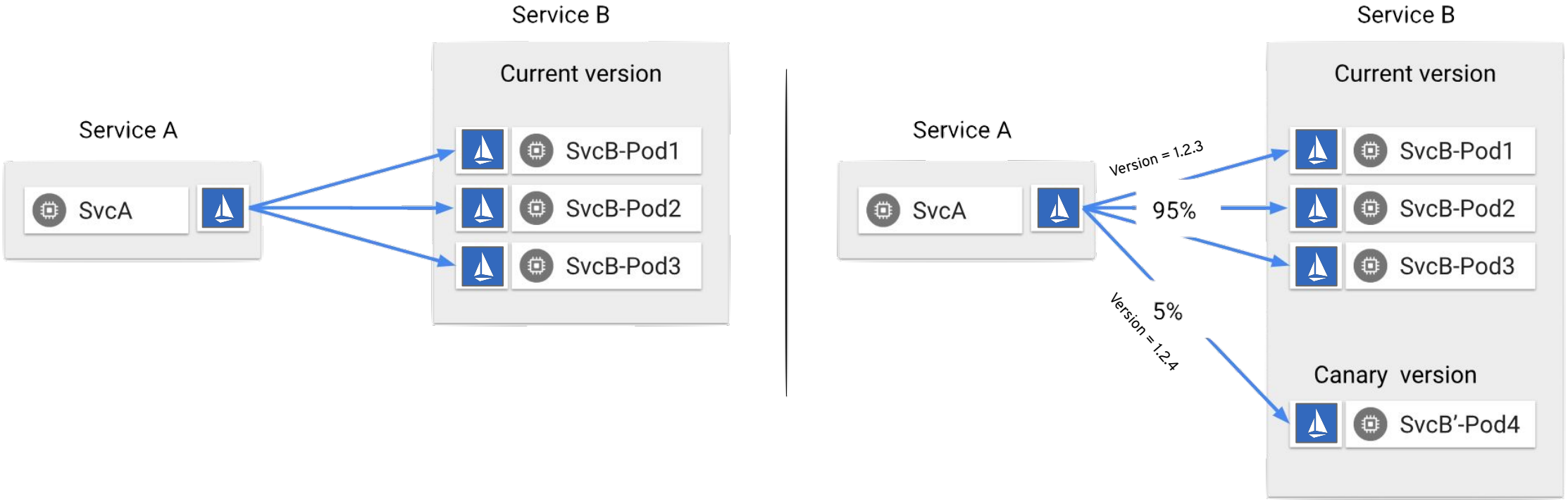
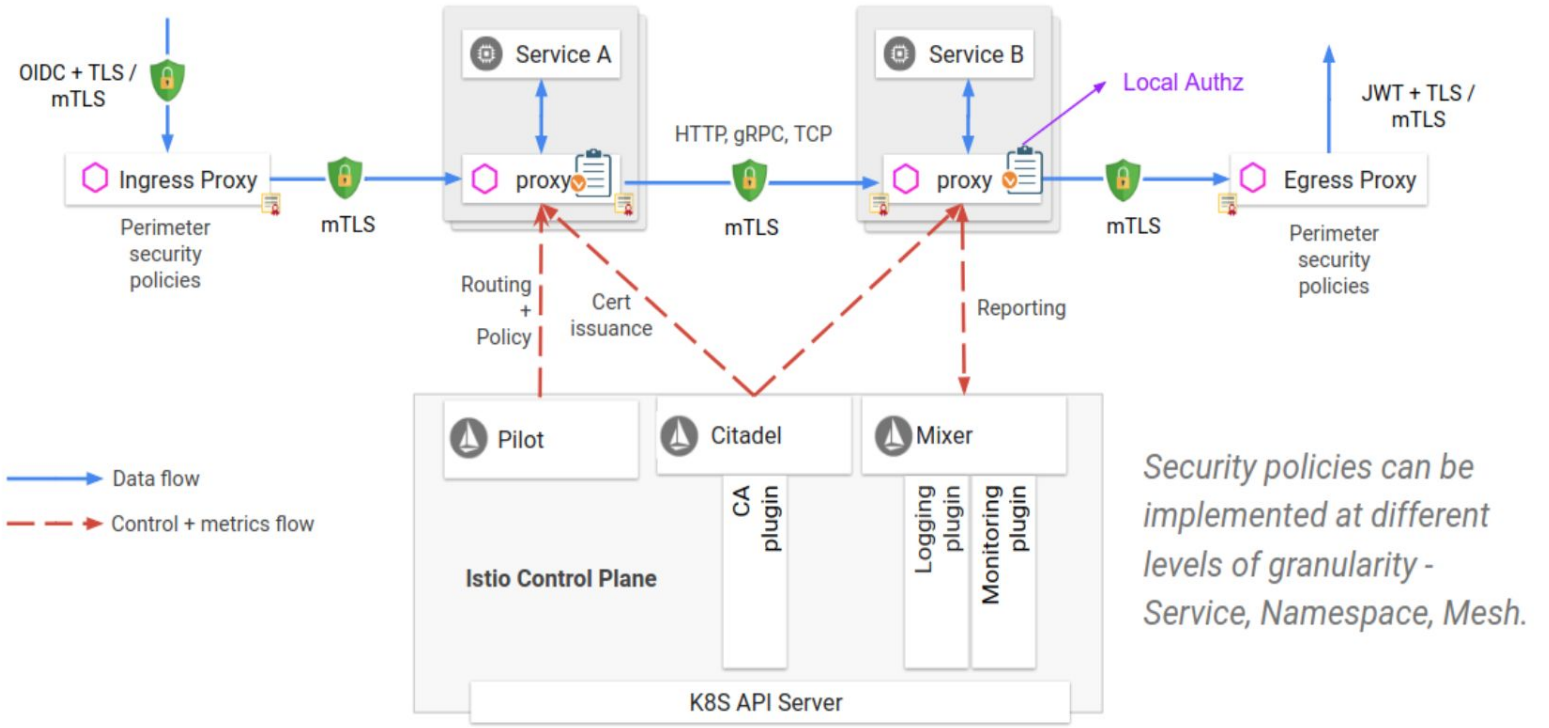
WHAT DOES CONNECT MEAN?



Discovery and Routing: Decoupled from infrastructure, load balancing modes, dynamic routing...
Advanced Deployments: A/B testing, gradual rollouts, canary releases, mirroring...
Failure, Health, and Testing: timeouts, retries, circuit breakers, fault injection, active health checks...

HOW DO YOU SECURE SERVICES?

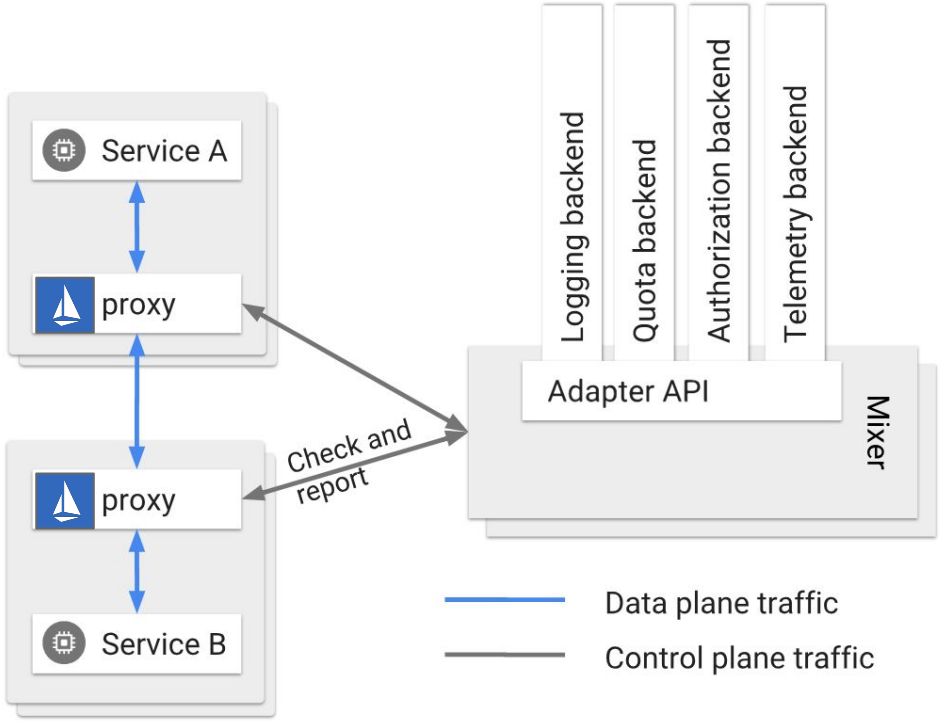


Security by default
no changes needed for application code and infrastructure

Defense in depth
integrate with existing security systems to provide multiple layers of defense

Zero-trust network
build security solutions on untrusted networks

WHAT CAN YOU CONTROL?



Restrict to 2 requests per second per IP :

```
quotas:
  - name: requestcount.quota.istio-system
      overrides:
      - dimensions:
              destination: someservice
                maxAmount: 2
```

Exempt if:

```
match(request.headers["cookie"], "user=*") == false
```

Set and Check Policy: Open-ended, connection limits, rate limits, simple denials, lists

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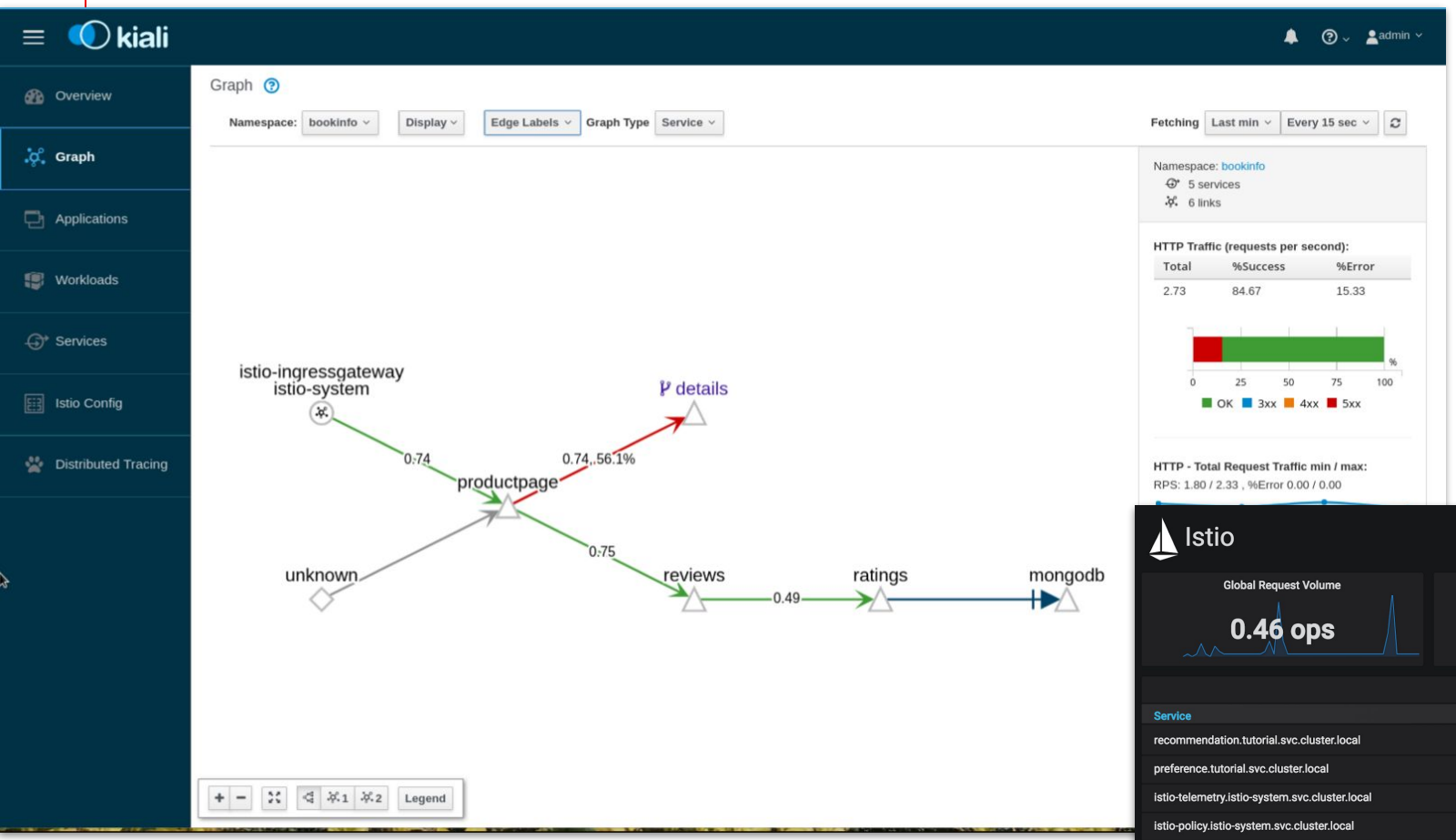
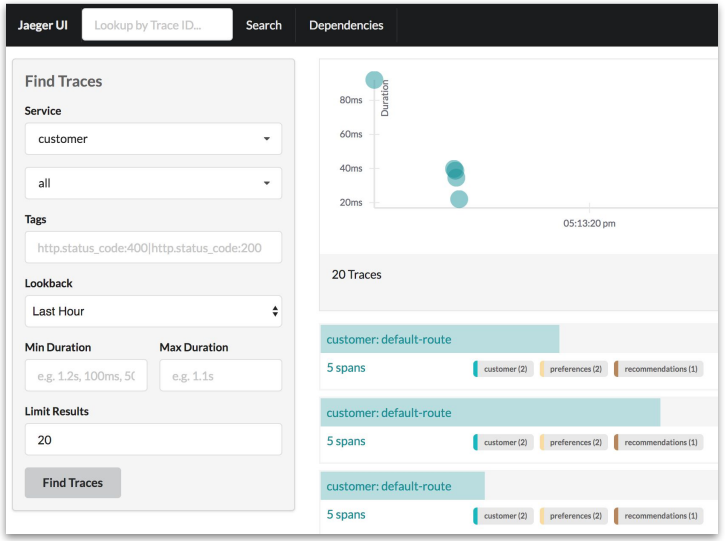
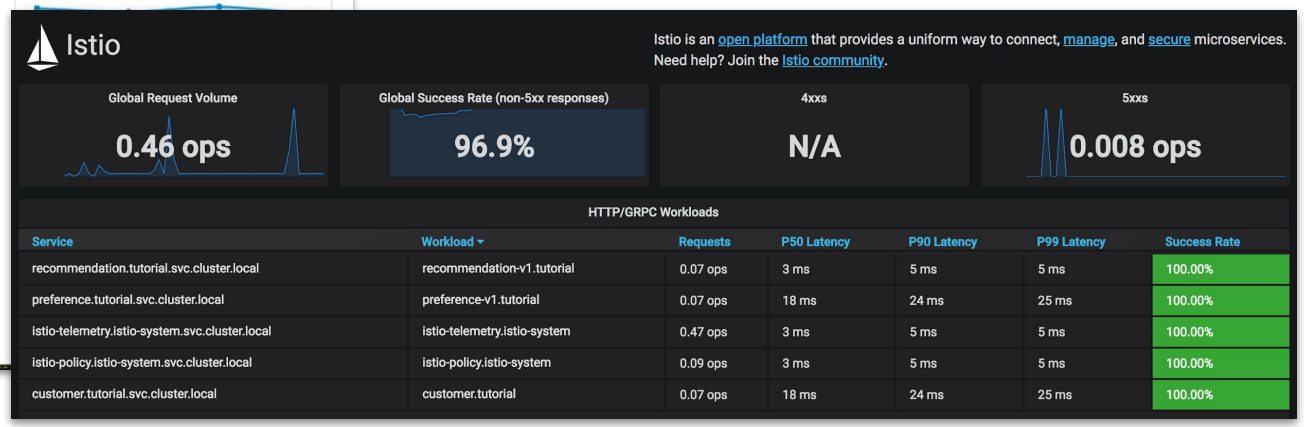
HOW CAN YOU OBSERVE?







Understand how your services are operating: Metrics, tracing, network visibility

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Thank you

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