SERVICE MESH

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CADEC 2019.01.24 & 2019.01.30 | CALLISTAENTERPRISE.SE

CALLISTA

— ENTERPRISE —

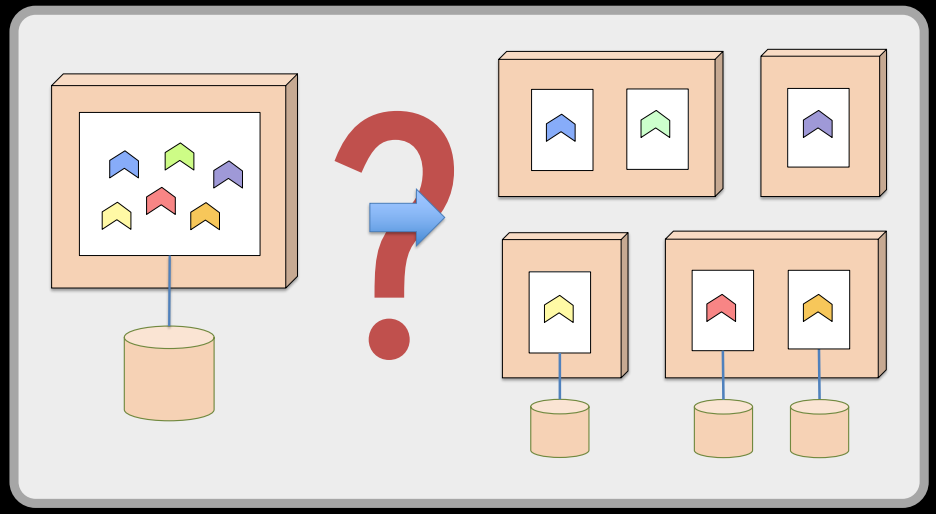
AGENDA

- Problem definition
- Previous solutions
- Service Mesh
  - Architecture
  - Capabilities
  - Products
- DEMO, DEMO, DEMO
- Summary

PROBLEM DEFINITION

DISCOVERY SERVER
WHERE ARE THE SERVICES?
WHICH SERVICE TO CALL?

EDGE SERVER
HOW TO HIDE PRIVATE SERVICES?
HOW TO PROTECT PUBLIC SERVICES?



RESILIENCE
HOW TO HANDLE FAULTS?
- SLOW OR NO RESPONSE
- TEMPORARY FAULTS
- OVERLOAD

DISTRIBUTED TRACING
WHO IS CALLING WHO?

CENTRALIZED CONFIGURATION
WHERE IS MY CONFIGURATION?
ARE ALL SERVICES
CONFIGURATION UP TO DATE?

TRAFFIC MANAGMENT
HOW TO CONTROL ROUTING?
- RATE LIMITING
- CANARY & BLUE/GREEN UPGRADES

SERVICE MANAGEMENT
HOW TO
- DEPLOY SERVICES?
- SCALE SERVICES?
- UPGRADE SERVICES?
- RESTART FAILING SERVICES?

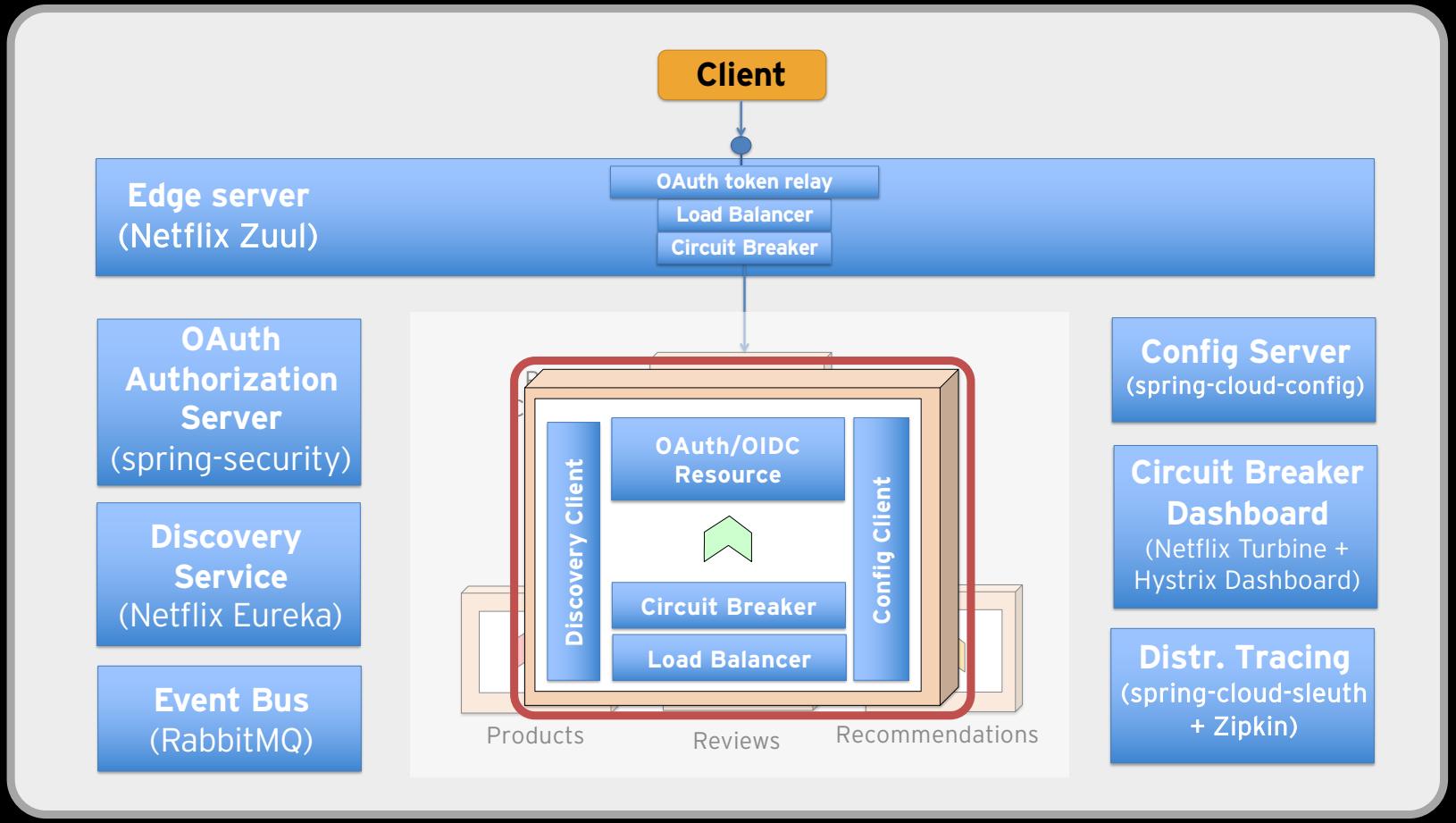
OBSERVABILITY
HOW ARE MY SERVICES PERFORMING?

LOG ANALYSIS
WHERE ARE THE LOGS?
HOW TO CORRELATE LOGS
FROM DIFFERENT SERVICES?

MONITORING
WHAT HARDWARE RESOURCES ARE USED?

PREVIOUS SOLUTIONS: SPRING CLOUD/NETFLIX OSS

1. Discovery server
2. Edge server
3. Centralized configuration
4. Distributed tracing
5. Resilience



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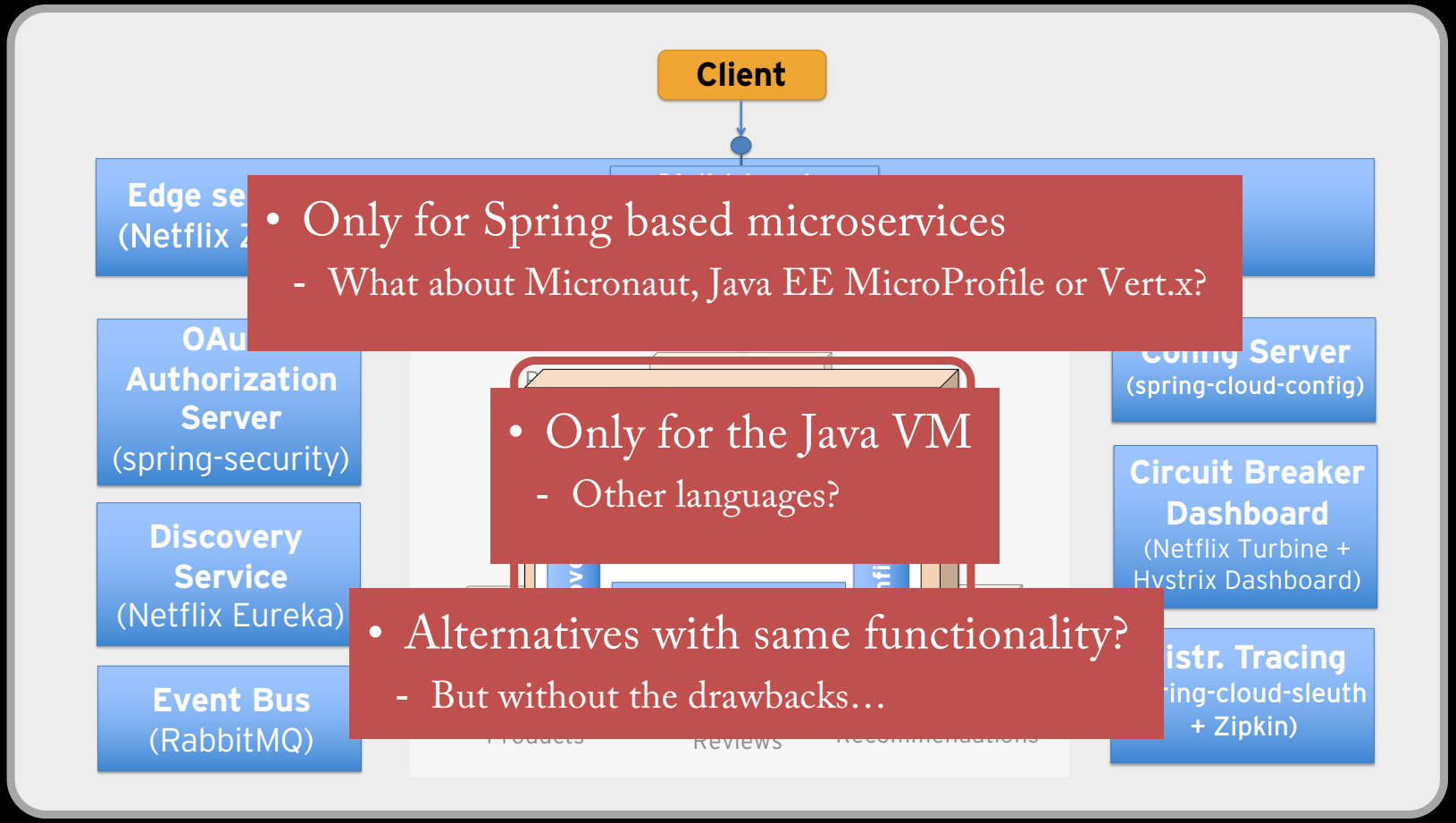
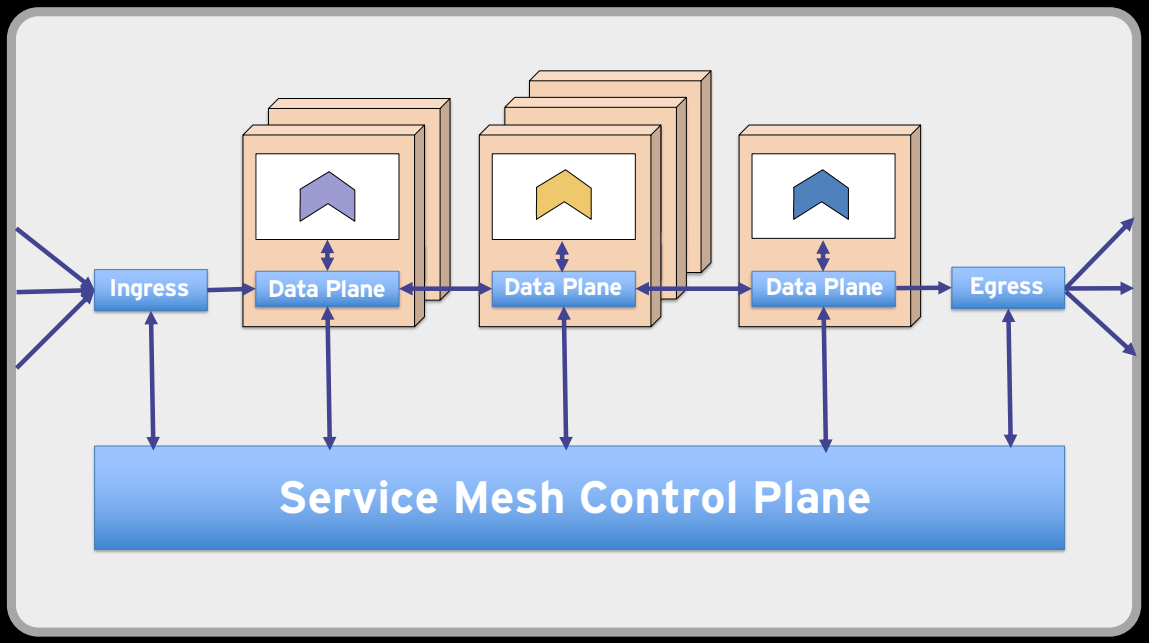


SERVICE MESH - ARCHITECTURE

- Data Plane injected **at Run Time**
  - **Data Plane** acts as a Proxy
  - **Runs as a "sidecar"**
- Ingress and Egress acts a external proxies
- Operators declares a desired state to the Control Plan
- **Control Plane** send commands to the Data Plan
- Data Plan reports metrics to the Control Plane
- No affect on development
  - Trace Ids still need to be managed
- Polyglot



SERVICE MESH - CAPABILITIES

- Traffic Management
- Resilience
- Edge Server
- Observability
- Distributed Tracing
- Monitoring

SERVICE MESH - PRODUCTS

- Linkerd
  - Developed by Buoyant
  - Open Source
  - Written in Scala
  - Launched in February 2016
    - » Based on Twitter Finagle, from 2011
  - Reached one hundred billion production requests in March 2017
  - Also see: How ForeSee processes billions of events with Linkerd per day, Aug 2017
  - Concerns
    - » Heavyweight sidecar…
    - » Upfront complex configuration
- Linkerd 2
  - Launched in September 2018
  - Written in Rust
  - Targeting Kubernetes, highly opinionated
    - » Zero Configration

SERVICE MESH - PRODUCTS

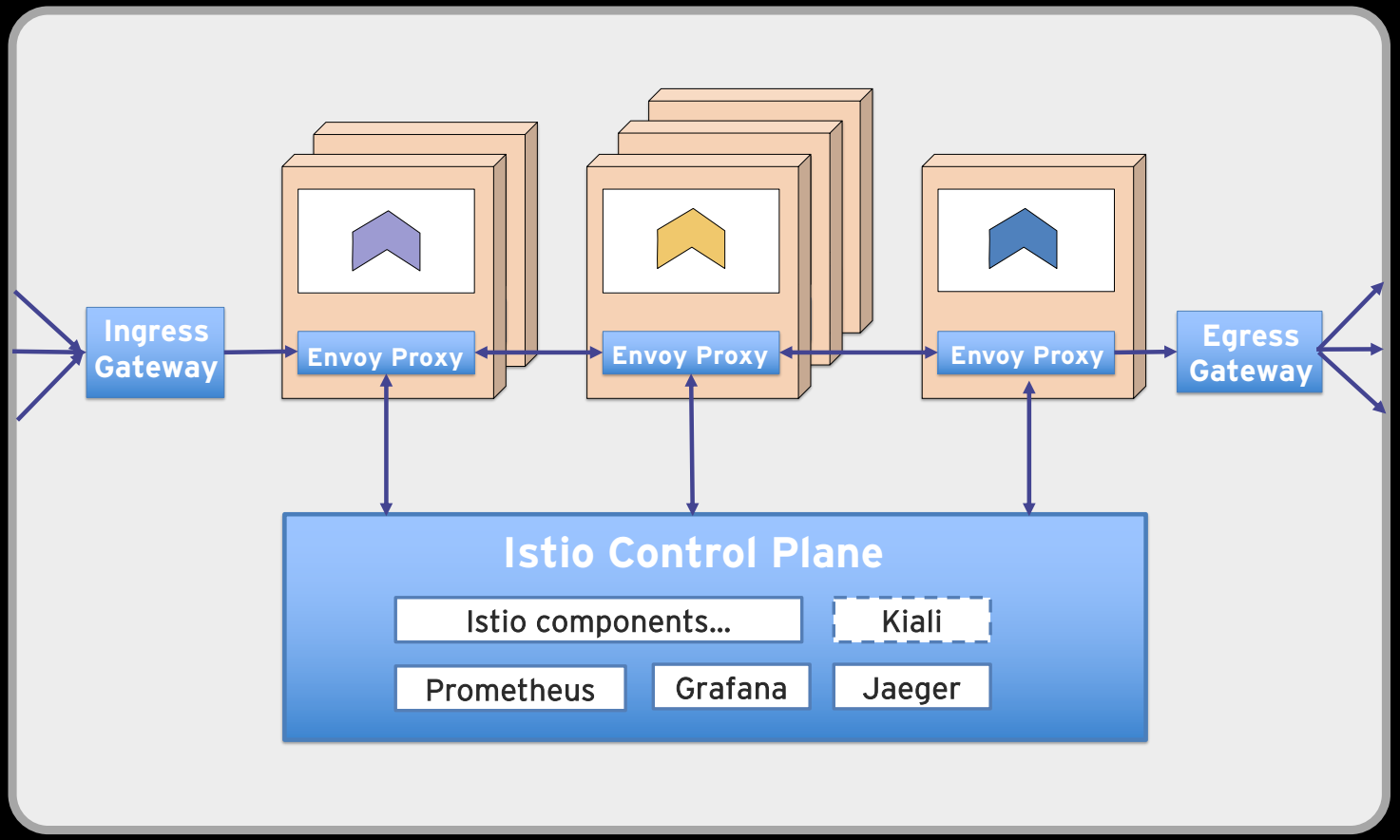
- Istio
  - Developed by Google, IBM and Lyft
  - Open Source
  - Written in Go
  - Data plane based on Lyft's Envoy proxy
    - » Written in C++
  - Launched in May 2017
  - Production ready since July 2018

  - The most functionally rich Service Mesh product as of today

  - Will be used in the **DEMO**!

- AWS App Mesh
  - Proprietary
  - Launched at **re:Invent** in November 2018
  - Based on Envoy proxy
  - Public Preview today

ISTIO - HIGH LEVEL ARCHITECTURE



WHEN IS A SERVICE MESH APPLICABLE?

- Synchronous vs asynchronous communication
  - Istio operates on TCP level, so actually doesn't care…
- Macro-, mini- or micro-services?
  - Or a mix…
  - A service mesh is agnostic to size, but was born in the land of microservices
- In cloud or on premises?
  - A service mesh does not care
- With or without containers?
  - Works without containers, but complex setup and configuration
  - Most used with a container orchestrator, e.g. Kubernetes

CAPABILITY MAPPING

SPRING CLOUD/NETFLIX
KUBERNETES
ISTIO
EFK

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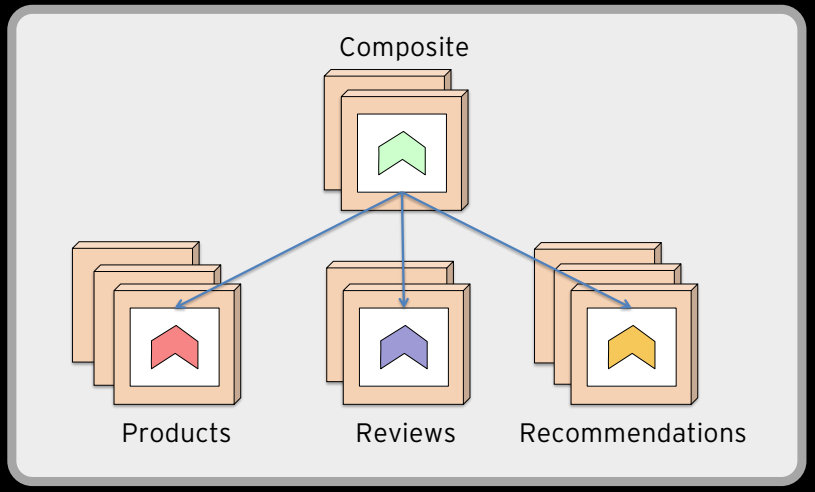

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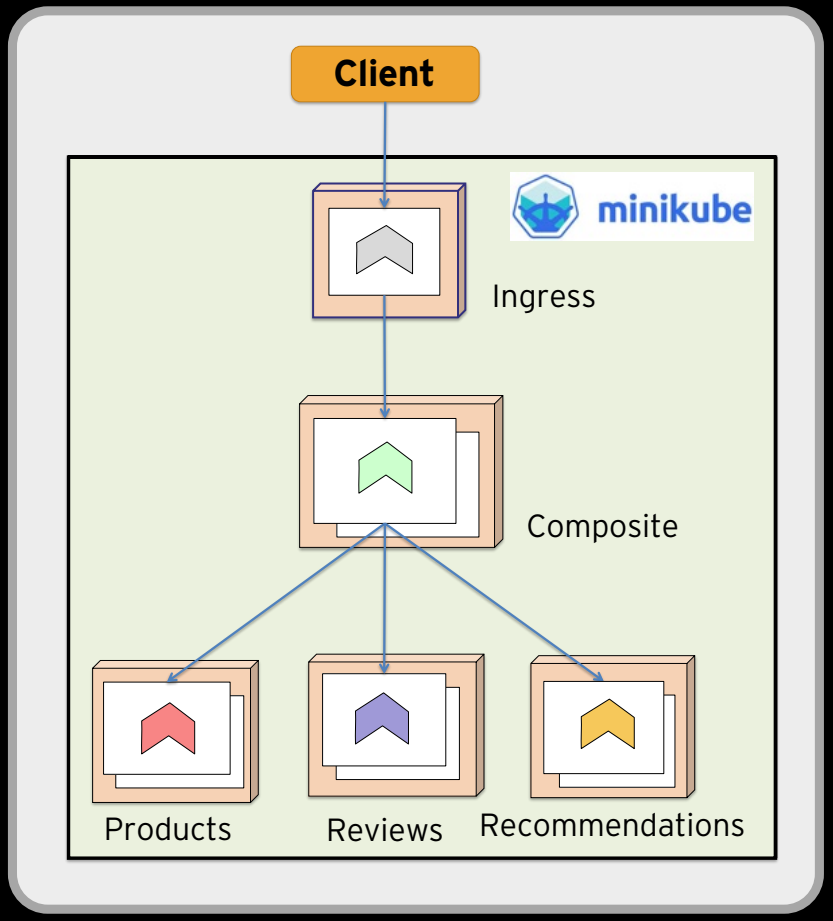
DEMO, DEMO, DEMO

1. Observability
   - Kiali, Grafana and Jaeger
2. Resilience
   - Fault injection and retries
3. Rolling Upgrades
   - Canary
   - Blue/Green

DEMO LANDSCAPE

- Use Minikube
- Istio Control plane installed
- Istio Ingress Gateway configured
- V1 services deployed
  - Plain Spring Boot
  - No data storage
  - Istio Data plane injected



DEMO LANDSCAPE

- Prepared V2 services
  - Not Deployed!
  - No changes in API (nor in the databases)
- Log statements
  - Product – Go

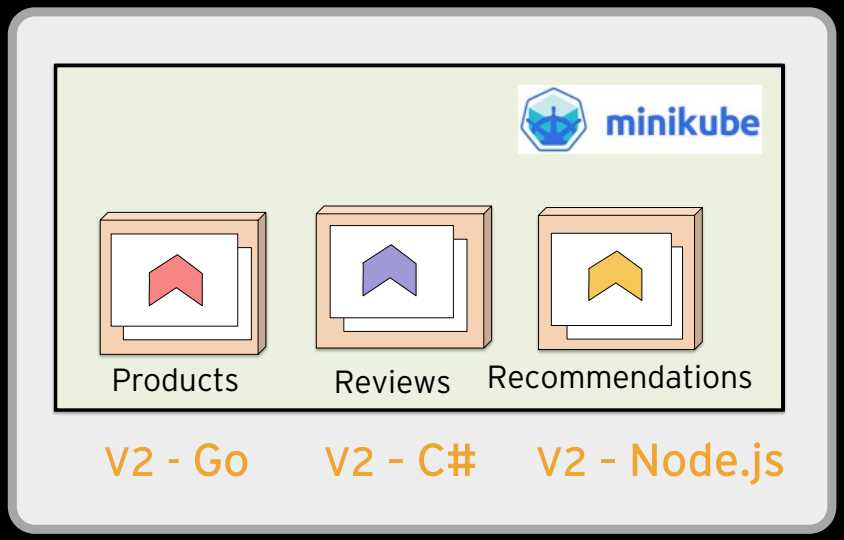
```
log.Printf("GET /product v2 (Go), productId: %v\n", id)
```

  - Recommendation – Node.js

```
console.log("GET /recommendation v2 (Node), productId: " + productId)
```

  - Review – .Net Core C#

```
Console.WriteLine( DateTime.Now.ToString("o") + " GET /review v2 (C#), productId: " + productId);
```



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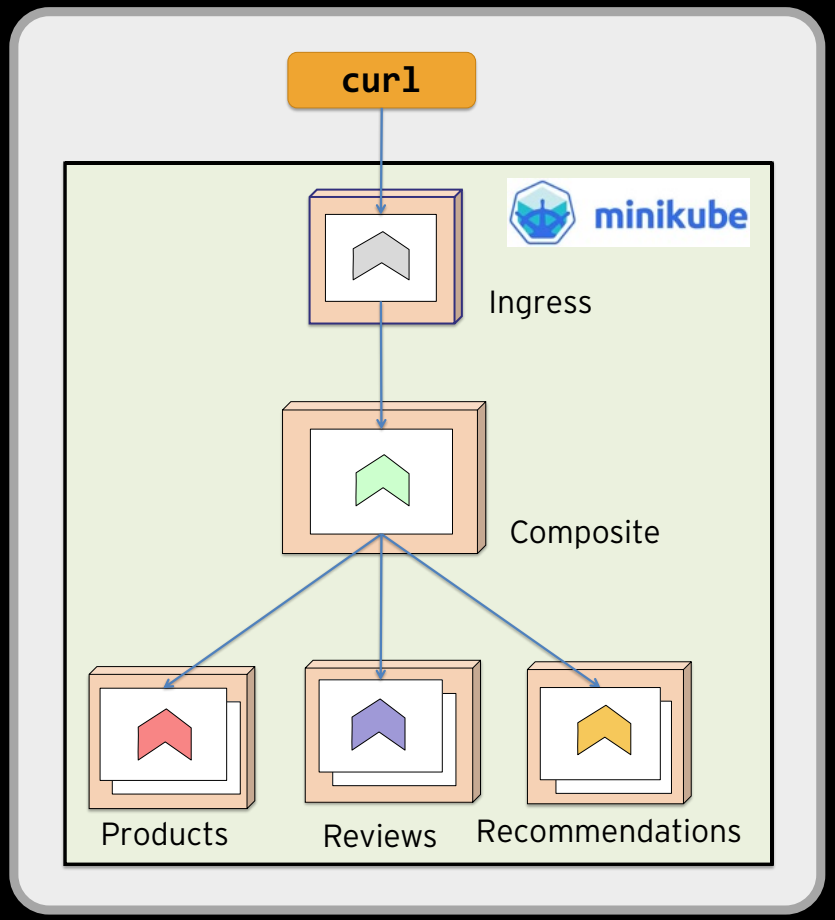

SUMMARY - SERVICE MESH

1. Next generation management tools for distributed systems, e.g. microservices
   - Traffic Management
   - Resilience
   - Edge Server
   - Observability
2. Works for
   - Synch and Asynch communication
   - Macro, Mini & Micro-services
   - In Cloud & On Premises
   - Polyglot, any language
3. Only affects runtime
4. Container environment (e.g. Kubernetes) preferred
   - Reduced complexity for installation and configuration