ServiceComb's Exploration of Service Mesh

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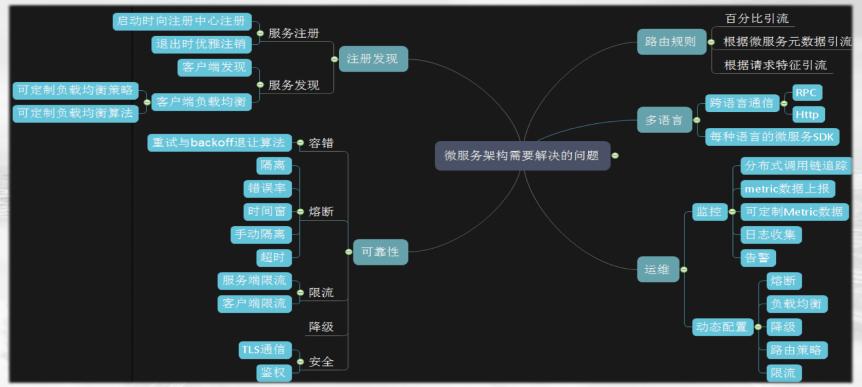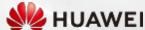
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Contents
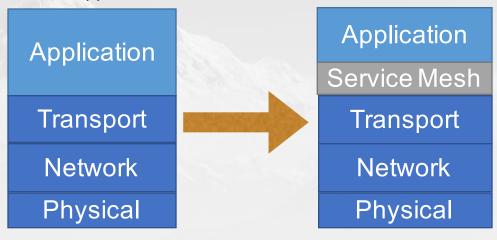
Microservice System Is Demanding But Is Hard to Create

Service Mesh

- Proposed by William Morgan in 2017
- An infrastructure layer that enables communications between services
- A network model based on TCP/IP
- A lightweight network proxy, which is deployed together with services
- Securely transmits requests in complex topology networks
- Converts traditional applications into cloud-native applications

Application
Transport
Network
Physical

→

Application
Service Mesh
Transport
Network
Physical

Service Mesh Evolution in Huawei

- - 2013: IR component in the microservice development platform
- - 2015: Sidecar component

Mesher

- Implementation of Service Mesh Theory
- Developed based on the Go language
- Connected to open-source ecosystems such as ServiceComb
- High performance, 11 MB resident memory, 1 millisecond delay

Mesher Architecture Overview

Key Components
- Control panel
- Registry
- Protocol
- Monitoring
- Security

Supported Ecosystems
- ServiceComb
- Istio
- Promethues
- Zipkin
- HUAWEI CLOUD

Heterogeneous Infrastructure
- CCE
- Kubernetes
- Docker
- VM
- Bare metal

Registration and Discovery

Service center		Service center	Istio	Kubern etes
Registrator		**Service Discovery**		

Instance Cache Management

- Unified cache model
- Flexibly selection from client registration discovery and platform registration

Route Management Based on Microservice Metadata

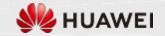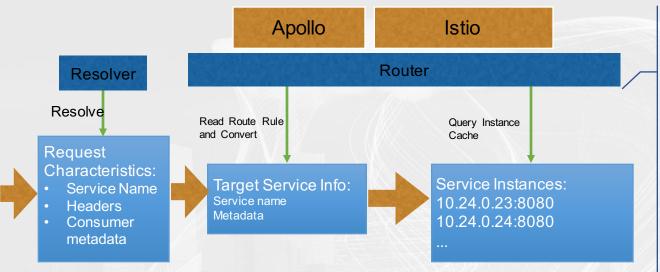| Apollo	Istio

Router

Resolver

Resolve →

Request Characteristics:
- Service Name
- Headers
- Consumer metadata

Read Route Rule and Convert

Target Service Info:
Service name
Metadata

Query Instance Cache

Service Instances:
10.24.0.23:8080
10.24.0.24:8080
...

- Matches the request header of the request.

- Matches metadata information of the request.

- Divides traffic by weight.

- The Router uses the unified configuration model and allows plug-ins to connect to different ecosystems.

After the name of the service to be accessed is determined, the routing rule can be matched. For example:
- Service A is running stably. The current version is 1.0. Version 1.1 has been issued recently. If you want to allow some users to experience this service, you can define the Header with **device-os=android**. In this way, 95% traffic is moved to the instances of version 1.0, and 5% is moved to the instances of version 1.1.
- If the metadata of the request contains **env=production**, the request will be routed to the instance whose metadata contains **env=production**.

Metadata-based route management is flexible and meets user requirements in most scenarios.

Support for Multiple Protocols

| HTTP Server | HTTP Request | | Invocation | | HTTP Request | | Provider Service |

```
HTTP Server        HTTP Request                  Invocation                   HTTP Request                 Provider Service
GRPC Server        GRPC Request     Transfer      Handler Chain    Transfer    GRPC Request     Forward
```
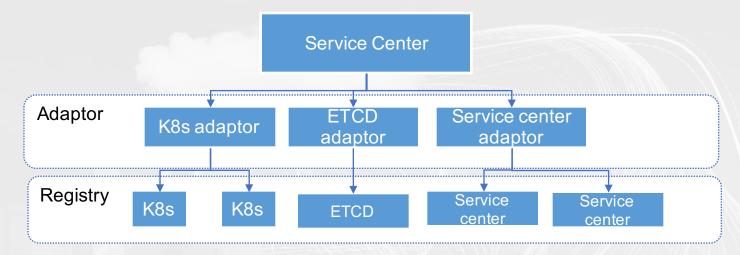
Consumer Service

-     The Invocation is used for abstraction.
-     Protocols can be quickly connected to Mesher and enjoy the same governance capabilities.

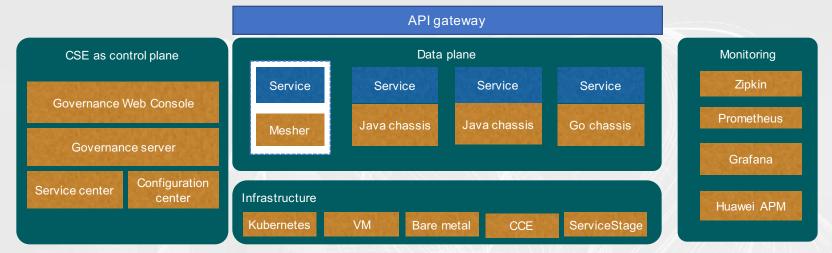# ServiceComb Service Center Architecture Evolution

- Supports multiple registration centers.

- Adopts the hybrid cloud architecture.

- Supports both client self-registration and platform registration.

- Streamlines infrastructure such as K8s and VMs to support smooth migration from VMs to containers.
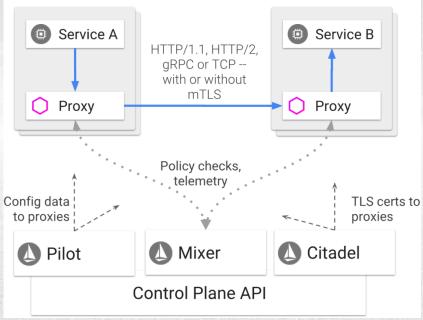
One-Stop Solution: Intermixed Use of Development Framework and Mesher

API gateway

CSE as control plane

- Governance Web Console
- Governance server
- Service center | Configuration center

Data plane

- Service / Mesher
- Service / Java chassis
- Service / Java chassis
- Service / Go chassis

Infrastructure

- Kubernetes
- VM
- Bare metal
- CCE
- ServiceStage

Monitoring

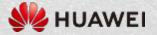- Zipkin
- Prometheus
- Grafana
- Huawei APM

- Builds a Huawei public cloud microservice engine based on the ServiceComb solution and components such as Mesher and go chassis.

- Supports Java and Go programming frameworks and multi-language access.

- Supports heterogeneous infrastructure.

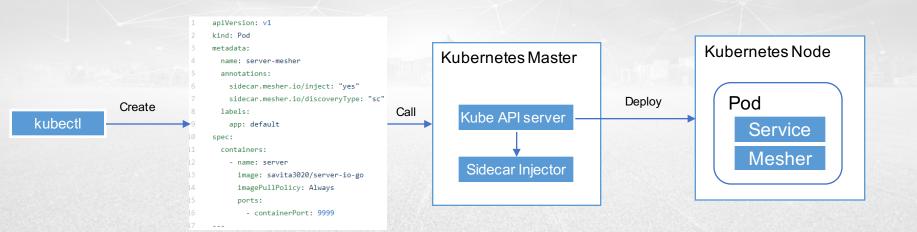- Supports interconnection with multiple monitoring systems.
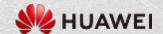
Embracing the Istio Ecosystem

- Provide new possibilities and choices for the Istio data plane by replacing Envoy with Mesher.
- Provide an intrusive framework for Istio by connecting go chassis to Istio.
- Not use Iptables forwarding.
- Not access the Mixer service but directly connect to different ecosystems.
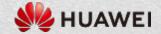
Deployment — Community Solution

```
1    apiVersion: v1
2    kind: Pod
3    metadata:
4      name: server-mesher
5      annotations:
6        sidecar.mesher.io/inject: "yes"
7        sidecar.mesher.io/discoveryType: "sc"
8      labels:
9        app: default
10   spec:
11     containers:
12       - name: server
13         image: savita3020/server-io-go
14         imagePullPolicy: Always
15         ports:
16           - containerPort: 9999
17   ---
```

kubectl

Create

Call

Kubernetes Master

Kube API server

Sidecar Injector

Deploy

Kubernetes Node

Pod

Service

Mesher

HUAWEI

Deployment — Commercial Solution

启用Service mesher 🔵 什么是mesher?
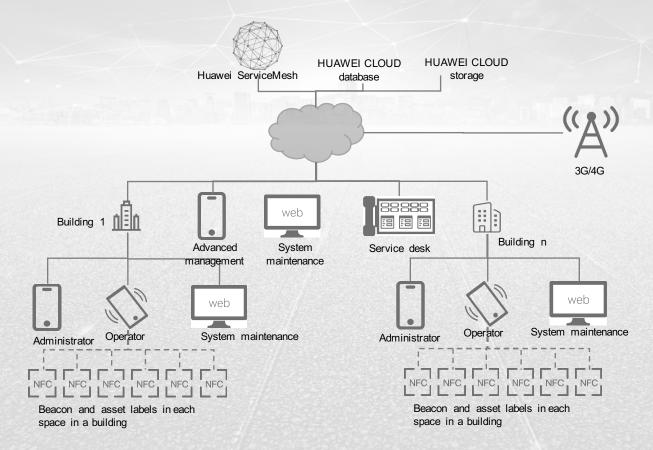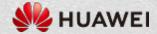
★ 版本　　　　1.0.1
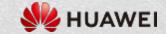
内部服务地址 ⑦　请输入内部服务地址，例: 127.0.0.1:3000

What happened?
- Set the environment variable http_proxy for the application container.
- Set the CSE address for Mesher (registration center and configuration center).
- Interconnect Mesher with APM for collecting logs.
- Interconnect Mesher with APM for collecting metrics.
- Interconnect Mesher with APM for tracing call chains.
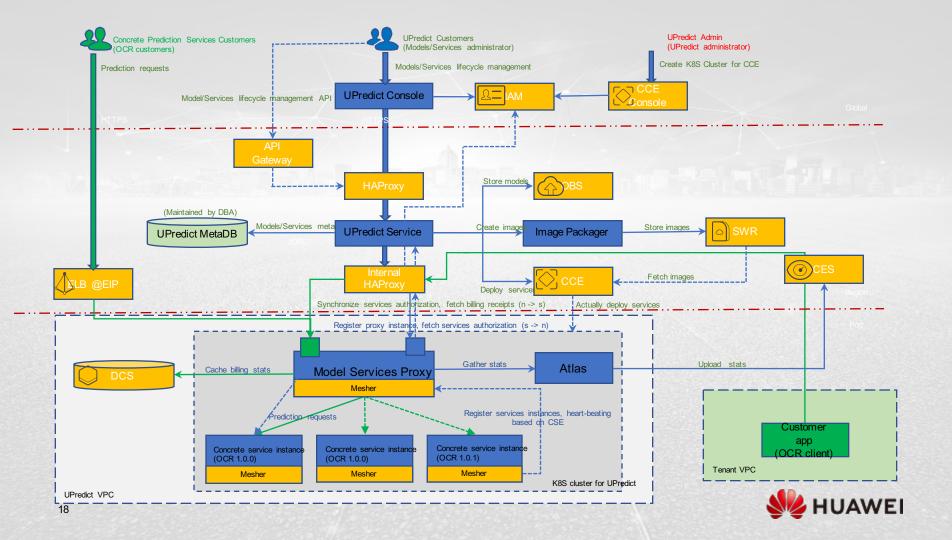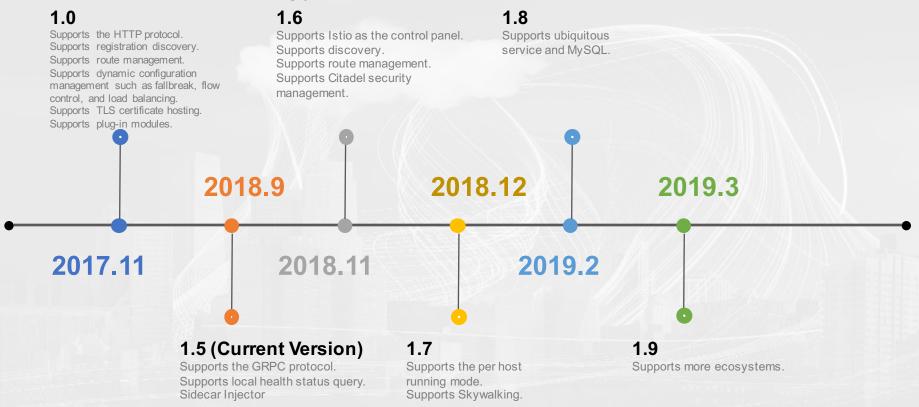- Notify the user of the mesher service version and monitoring port.

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Cases

Huawei ServiceMesh

HUAWEI CLOUD
database

HUAWEI CLOUD
storage

3G/4G

Building 1

Advanced
management

System
maintenance

web

Service desk

Building n

Administrator

Operator

web

System maintenance

Administrator

Operator

web

System maintenance

NFC NFC NFC NFC NFC NFC

NFC NFC NFC NFC NFC NFC

Beacon and asset labels in each
space in a building

Beacon and asset labels in each
space in a building

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Mesher Technology Roadmap

1.0
Supports the HTTP protocol.
Supports registration discovery.
Supports route management.
Supports dynamic configuration management such as fallbreak, flow control, and load balancing.
Supports TLS certificate hosting.
Supports plug-in modules.

1.6
Supports Istio as the control panel.
Supports discovery.
Supports route management.
Supports Citadel security management.

1.8
Supports ubiquitous service and MySQL.

2018.9

2018.12

2019.3

2017.11

2018.11

2019.2

1.5 (Current Version)
Supports the GRPC protocol.
Supports local health status query.
Sidecar Injector

1.7
Supports the per host running mode.
Supports Skywalking.

1.9
Supports more ecosystems.

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Scan for More Information

Huawei Confidential

Thank you.

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Bring digital to every person, home and organization for a fully connected, intelligent world.