ServiceComb’s Exploration of Service Mesh

Tian Xiaoliang
Huawei Cloud BU
2018-10-12
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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
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
- Prometheus
- Zipkin
- HUAWEI CLOUD

Heterogeneous Infrastructure
- CCE
- Kubernetes
- Docker
- VM
- Bare metal
Registration and Discovery

- Unified cache model
- Flexibly selection from client registration discovery and platform registration
Route Management Based on Microservice Metadata

- 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.

Request Characteristics:
- Service Name
- Headers
- Consumer metadata

Target Service Info:
- Service name
- Metadata

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

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

- 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

- 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.
- 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

```yaml
apiVersion: v1
kind: Pod
metadata:
  name: server-mesher
  annotations:
    sidecar.mesher.io/inject: "yes"
    sidecar.mesher.io/discoveryType: "sc"
  labels:
    app: default
spec:
  containers:
    - name: server
      image: savita3828/server-go
      imagePullPolicy: Always
      ports:
        - containerPort: 9099
...
```

Kubernetes Master -> Call -> Kube API server -> Sidecar Injector -> Kubernetes Node

Pod
- Service
- Mesher
Deployment — Commercial Solution

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.
Cases

Beacon and asset labels in each space in a building

Building 1

Advanced management

System maintenance

Administrator

Operator

web

Building n

Advanced management

System maintenance

Administrator

Operator

web
Mesher Technology Roadmap

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

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

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

1.7
Supports the per host running mode.
Supports Skywalking.

1.8
Supports ubiquitous service and MySQL.

1.9
Supports more ecosystems.

2017.11
2018.9
2018.11
2018.12
2019.2
2019.3
Scan for More Information
Thank you.

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

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