

# **Tencent Cloud Mesh**

## **Product Introduction**

### **Product Documentation**



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# Product Introduction

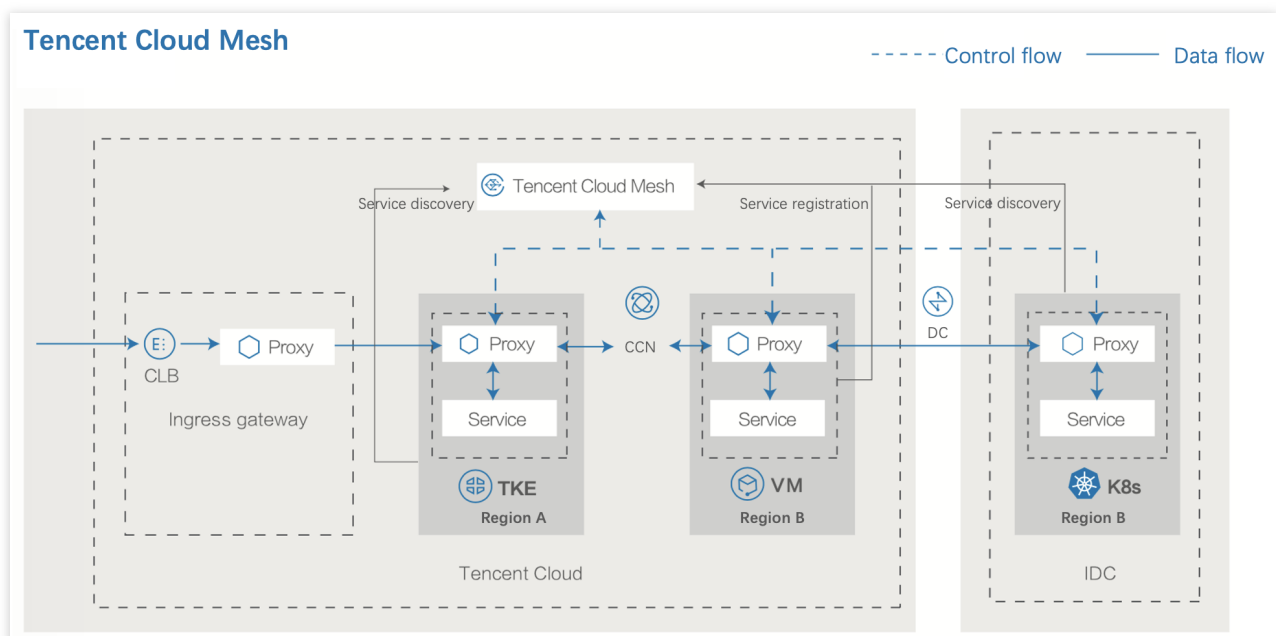
## Overview

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## Overview

Tencent Cloud Mesh is a consistent, reliable, and transparent communication network management and control platform for cloud-native applications. It is fully compatible with Istio APIs. It is natively integrated with the Tencent Cloud infrastructure, and provides fully-managed service-oriented support capabilities, thereby easily guaranteeing and managing mesh lifecycles.

Being seamlessly connected to IaaS networking and integrated with monitoring components, Tencent Cloud Mesh is out of the box, which reduces operations costs. It flexibly accesses and manages applications across clusters, environments, and architectures to obtain consistent discovery, traffic, observation, and security management and control capabilities, thereby accelerating cloud-native transformation and migration of services. It has extended and enhanced high-level features such as data plane operations, ingress gateway, and configuration telemetry. In addition, it has been deeply optimized to provide better data plane forwarding performance, and comprehensively cover north-south and east-west communication connections of applications.



## Core Concepts

## Service mesh

A service mesh is logical isolation space that manages and controls communication networks between services, and provides a consistent and transparent service discovery, traffic, and full-link observation management environment. A same mesh can manage services from multiple Kubernetes clusters and even heterogeneous VMs. Services in the same mesh can communicate with each other by default.

## Service

A service is a basic unit for a service mesh to manage traffic. One service can correspond to multiple endpoint instances. The corresponding relationship can come from automatic discovery of the service mesh on K8s services of Kubernetes clusters, or the corresponding relationship between endpoint instances and services can be manually registered.

## Data plane

A data plane includes a gateway and a sidecar proxy. The gateway is deployed as an independent pod in a Kubernetes service discovery cluster of a mesh to control and observe north-south traffic. The sidecar proxy is deployed in a service pod or a service virtual machine to control and observe east-west traffic.

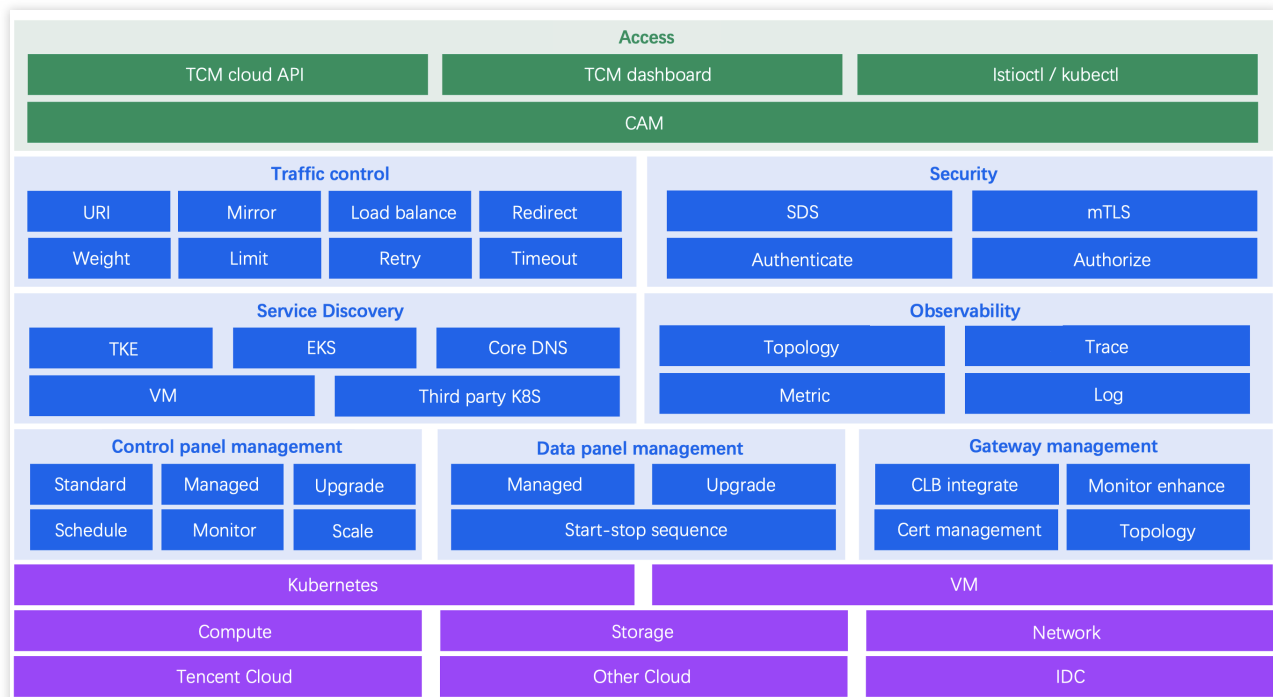
## Control plane

A control plane manages and configures the data plane to route and forward traffic.

## Istio CRD

A custom resource definition (CRD) is an extension of a default Kubernetes API. Tencent Cloud Mesh is compatible with Istio's Kubernetes CRD APIs and uses them to configure east-west and north-south service traffic control policies in a mesh.

# Features



## Pricing

Tencent Cloud Mesh is billed based on two dimensions, that is, the number of clusters and the number of online sidecars. For details, see [Billing Overview](#).

## Additional Services

**Tencent Kubernetes Engine (TKE):** Services managed by a service mesh come from TKE clusters through automatic service discovery.

**Cloud Connect Network (CCN):** When services managed by a service mesh come from different VPCs or regions, CCN is required to connect cross-VPC networks.

**Cloud Load Balancer (CLB):** An ingress gateway of a service mesh is integrated with CLB to realize fine-grained traffic management at the access layer of the service mesh.

**Managed Service for Prometheus (TMP):** Tencent Cloud Mesh supports connecting monitoring metrics to Prometheus instances managed by TMP, which automatically configures and collects mesh monitoring data and is preset with a Tencent Cloud Mesh Grafana dashboard.

**Cloud Log Service (CLS):** Tencent Cloud Mesh supports collecting access logs to CLS. The logs can be viewed and retrieved on the CLS console.

# Strengths

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## Reliable Support

Tencent Cloud Mesh provides industry-leading service-oriented mesh support capabilities, and supports both fully-managed and stand-alone deployment modes, to flexibly meet the operations controllability and availability of the mesh control plane and guarantee mesh lifecycle management. It supports canary upgrades of components, and provides consistent Istio CRD forwarding management capabilities across clusters, to reduce operations and use costs.

## Performance Optimization

Long-term in-depth optimization is made on the user state and kernel state to provide high-performance data-plane Envoy versions and support the eBPF traffic-hijacking forwarding mode, thereby reducing CPU overhead by 15% to 20% and P99 latency by 20% to 40%.

## Capability Extension

On the basis of native Istio capabilities, data-plane operations and management capabilities of Tencent Cloud Mesh are enhanced to support management features such as sidecar status monitoring and hot upgrades, which are decoupled from service applications. High-level features of the ingress gateway are enhanced to support listening management, SSL/certificates, ingress migration, and closed-loop traffic access scenarios. Mesh telemetry data calculation and output capabilities are enhanced to flexibly enable telemetry data and output ranges of different levels of granularity based on service requirements, thereby optimizing resource utilization.

## Unified Management

Service discovery supports dynamic K8s cluster access, addition, and deletion, VM load registration and access, and multi-cluster and heterogeneous application management. Tencent Cloud Mesh provides a unified multi-cluster service management dashboard, which enables you to easily perceive mesh resources and components and realize visualized mesh configuration management. The dashboard also supports aggregated display of mesh-level multi-cluster telemetry data and provides traffic scheduling, awareness, and analysis capabilities of distributed applications.

## Service Integration

Tencent Cloud Mesh is seamlessly connected to IaaS services such as VPC, CCN, and CLB, to easily implement cross-cluster/VPC/region networking and traffic access. It is integrated with Tencent Cloud Observability Platform, Prometheus, Cloud Log Service, and other products to provide out-of-the-box observation capabilities.

## Perfect Ecosystem

Tencent Cloud Mesh is fully compatible with native Istio & Envoy APIs and keeps pace with community version updates. Tencent's internal Service Mesh open-source collaborative support platform collaboratively outputs internal co-construction capabilities to contribute to customers and communities.

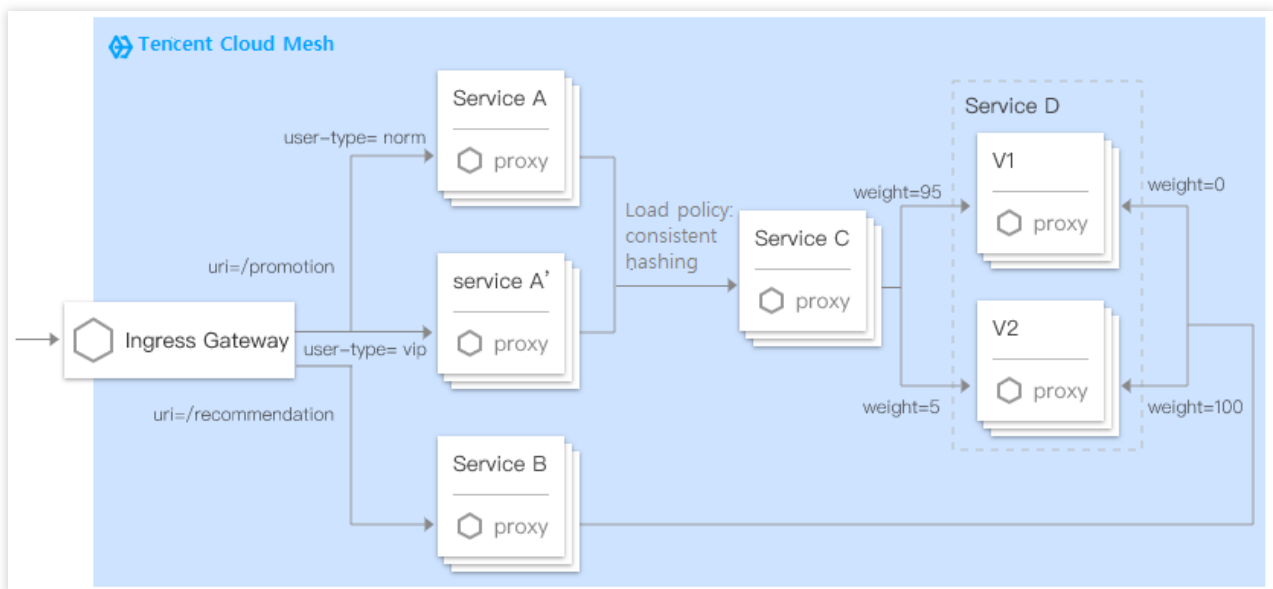


# Scenarios

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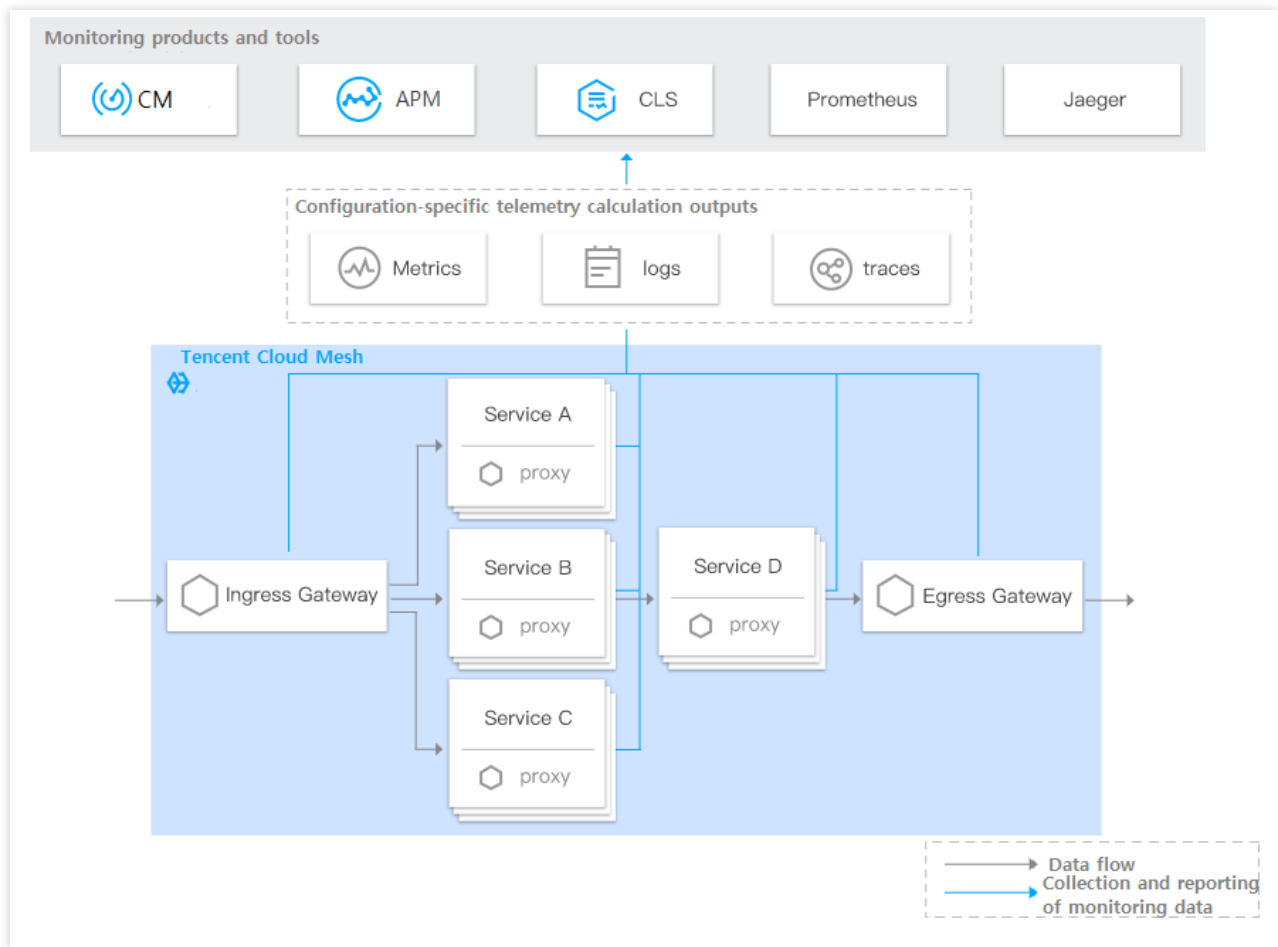
## Update Publishing

Based on north-south and east-west traffic control capabilities of Tencent Cloud Mesh, without the need for awareness of service transformation, you can easily control online and offline publishing at the service and API levels, version definition/canary release, characteristic routing, and load balancing policies, and improve the efficiency and controllability of publishing updates.



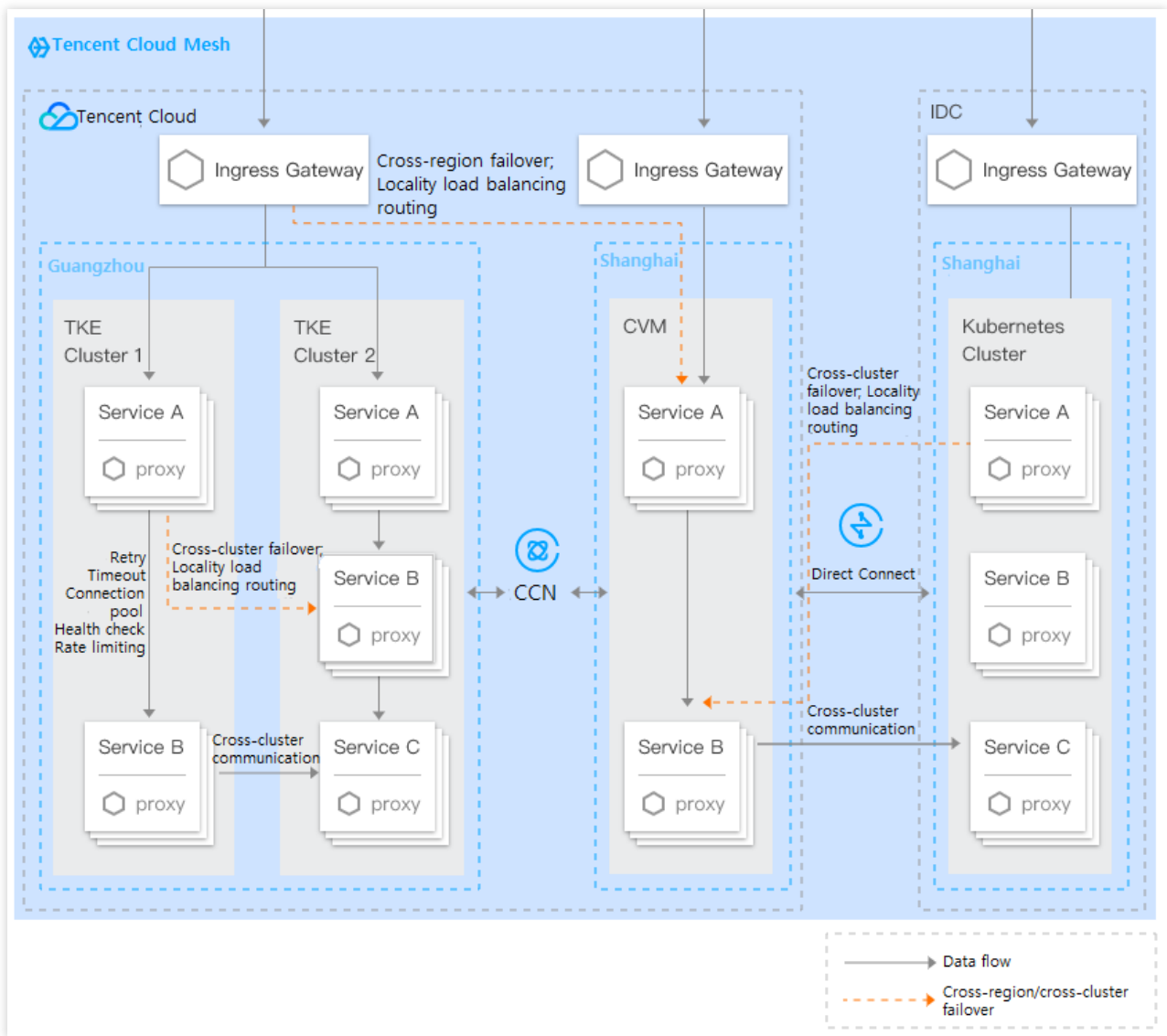
## Multi-Level Observation

Non-intrusive acquisition of Metric, Trace, and Access log telemetry data for application communication supports construction of multi-level observation capabilities. The capabilities cover real-time monitoring of the application communication performance, full-link call and tracing and link analysis, downstream analysis of traffic access and backtracking of proxy forwarding and access behaviors, and quantification of the application communication performance and quality.



## Distributed High-Available Architecture

Tencent Cloud Mesh improves the availability of the application communication and application architecture, uses mechanisms such as retry, timeout, connection pool management, health check, and rate limiting to control and ensure communication fault tolerance between applications. In a distributed application deployment architecture in an intra-city active-active or two-city three-center scenario, through region/fault-aware scheduling capabilities, automatic failover and controllable distributed multi-cluster traffic scheduling are realized, and three-level (that is, DNS, Ingress, and Service) disaster recovery management is flexibly realized.



## Secure Isolation

With a service-based authentication and authorization mechanism, in a containerized dynamic IP scenario, controllable service authentication and access control management is realized. Tencent Cloud Mesh supports JWT request-based authentication, automatic mTLS for zero trust networking, and access permission restriction based on identities and traffic characteristics.

