

# **Tencent Cloud Mesh**

## **Getting Started**

### **Product Documentation**



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  - Authentication

  - Authorization

# Getting Started

## Overview

Last updated : 2023-12-26 10:42:13

This document describes how to deploy and manage the demo application to help you quickly get started with Tencent Cloud Mesh, including common operations such as high service availability configuration, traffic management, multi-cluster disaster recovery, active-active deployment, and security enhancement.

### Prerequisites

You have created a service mesh instance as instructed in [Creating Mesh](#).

You have deployed the Tencent Cloud Mesh demo application as instructed in [Deploying Demo Application](#).

### Directions

After deploying the demo application, quickly get started with common features of a mesh as instructed below.

[Configuring Public Network Access](#)

[Multi-Version Routing](#)

[Canary Release](#)

[Fault Injection Test](#)

[Service Timeout Configuration](#)

[Session Persistence](#)

[Limiting Concurrency Through Connection Pool](#)

[Cross-Cluster Service Disaster Recovery](#)

[Locality Load Balancing](#)

[Nearby Access](#)

[Authentication](#)

[Authorization](#)

If you encounter any problems during deployment, [submit a ticket](#) for assistance.

# Demo Application Deployment

Last updated : 2023-12-26 10:42:45

## Demo Application Overview

The demo application is an ecommerce website based on the Istio sample [Bookinfo](#). It consists of six services:

**frontend**: It is the website frontend that calls the user, product, cart, and order services.

**product**: It is the product service that provides product information and has two editions with and without an advertising banner at the top.

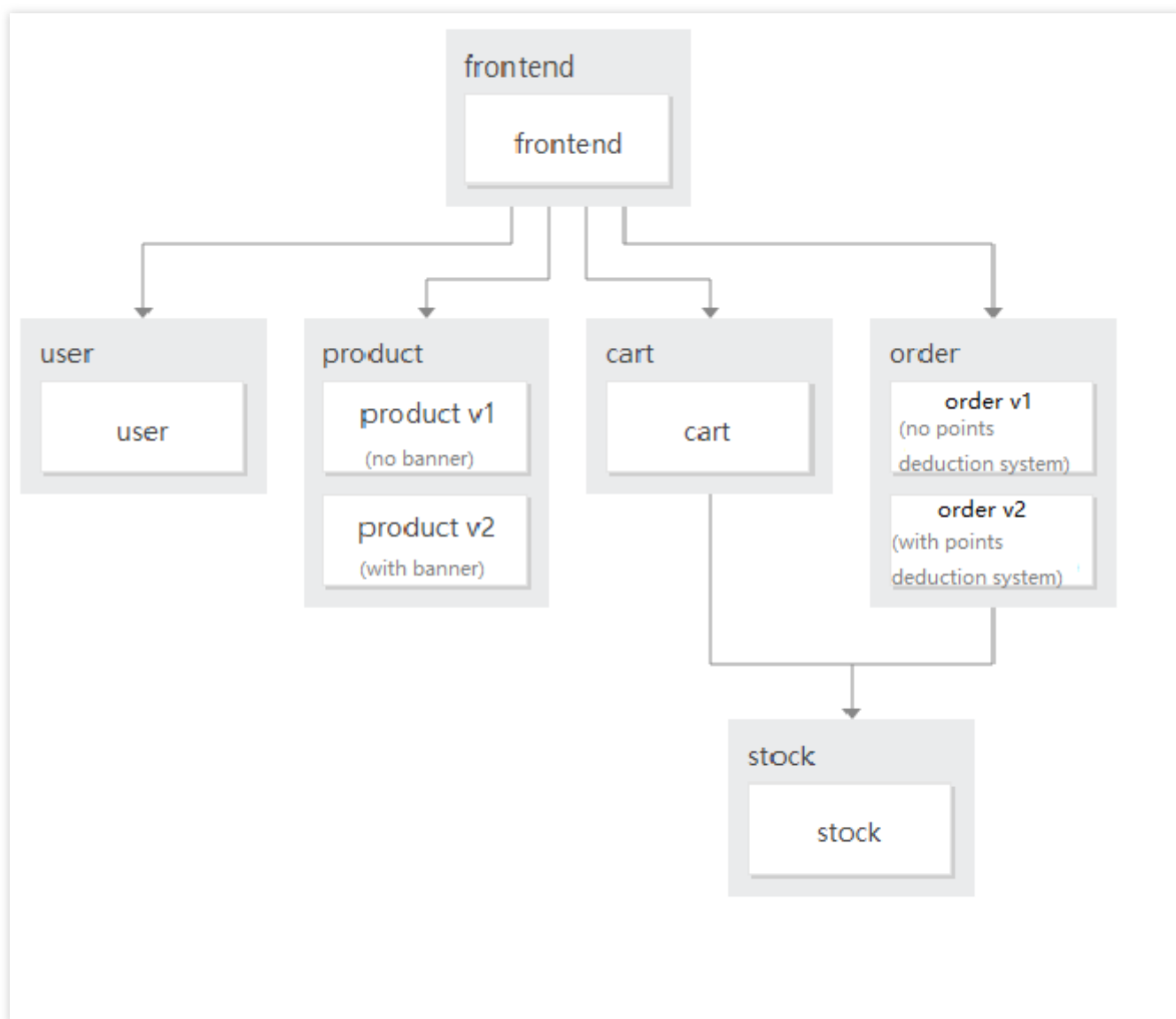
**user**: It is the user login service.

**cart**: It is the cart service that allows adding items to the cart and viewing the cart and reports stock alarms after calling the stock service. An order can be placed after login.


**order**: It is the order checkout service that has two editions with and without freight deduction based on points. After logging in, click **CHECKOUT** to start the checkout process, which needs to call the stock service to query the stock. An order cannot be placed if the stock is insufficient.

**stock**. It is the stock service that provides stock information for stock alarming of the cart service and stock querying of the order checkout service.


## Demo application architecture




### Demo application homepage

 **Tencent Cloud Mesh Demo**


[Shop](#) [About](#) [Information](#) [Service](#)




CATEGORY  
**TENCENT CLOUD MESH**  
**\$100** ~~\$199~~



CATEGORY  
**CORE-DNS**  
**\$200** ~~\$299~~



CATEGORY  
**ENVOY**  
**\$300** ~~\$399~~



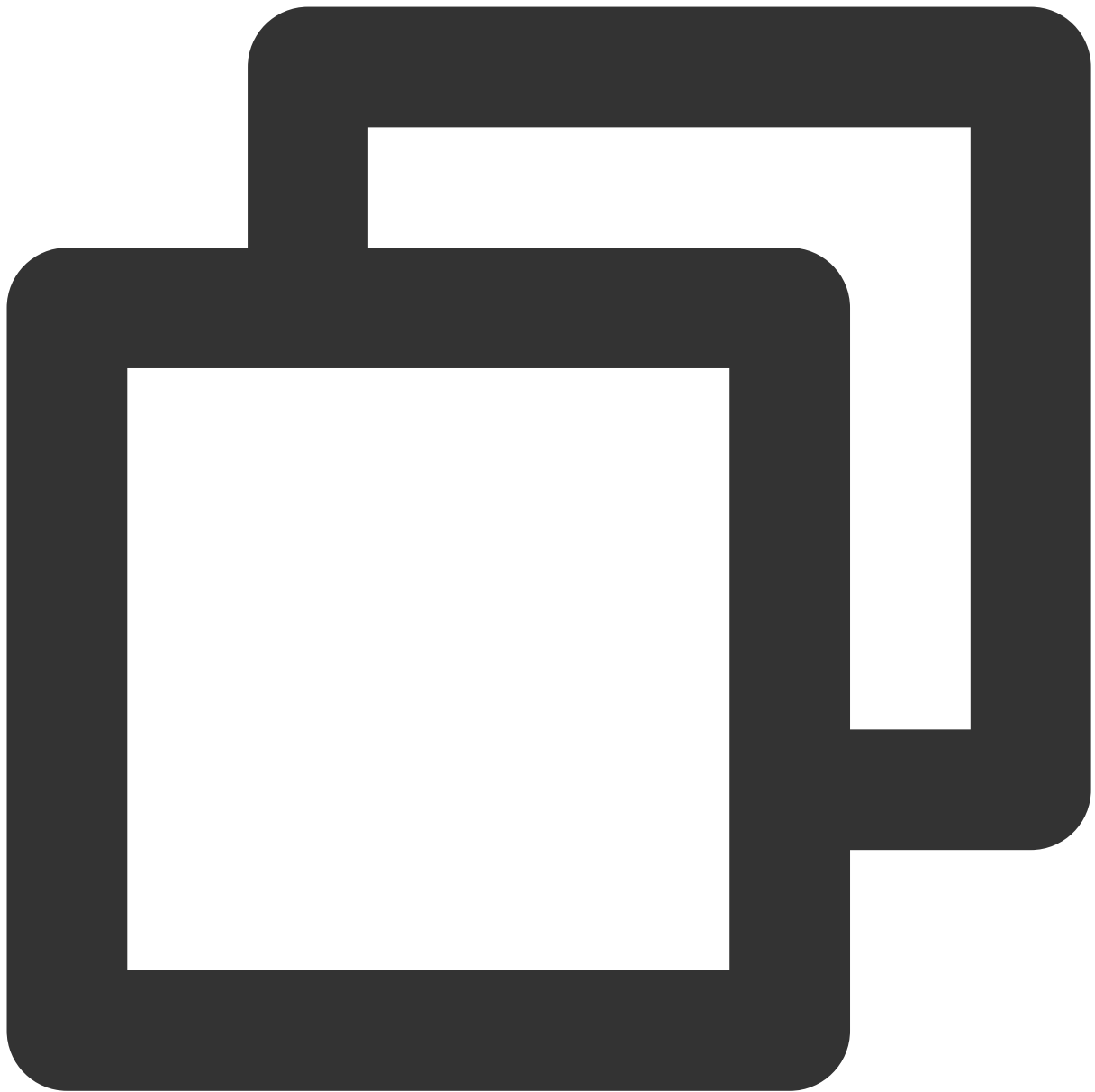
X

product	region	guangzhou
	version	v1
	pod name	product-v1-785dd66758-f2bp7

+

## Demo Application Installation

You can go to the Tencent Cloud Mesh demo repository at [GitHub](#) to get the demo application. As Tencent Cloud Mesh's automatic sidecar injection requires labeling the Istio version, you need to select a branch on the same version as Istio or modify the master branch, specifically, the version label of the base namespace in the `mesh-demo/yamls/step01-apps-zone-a.yaml` path:

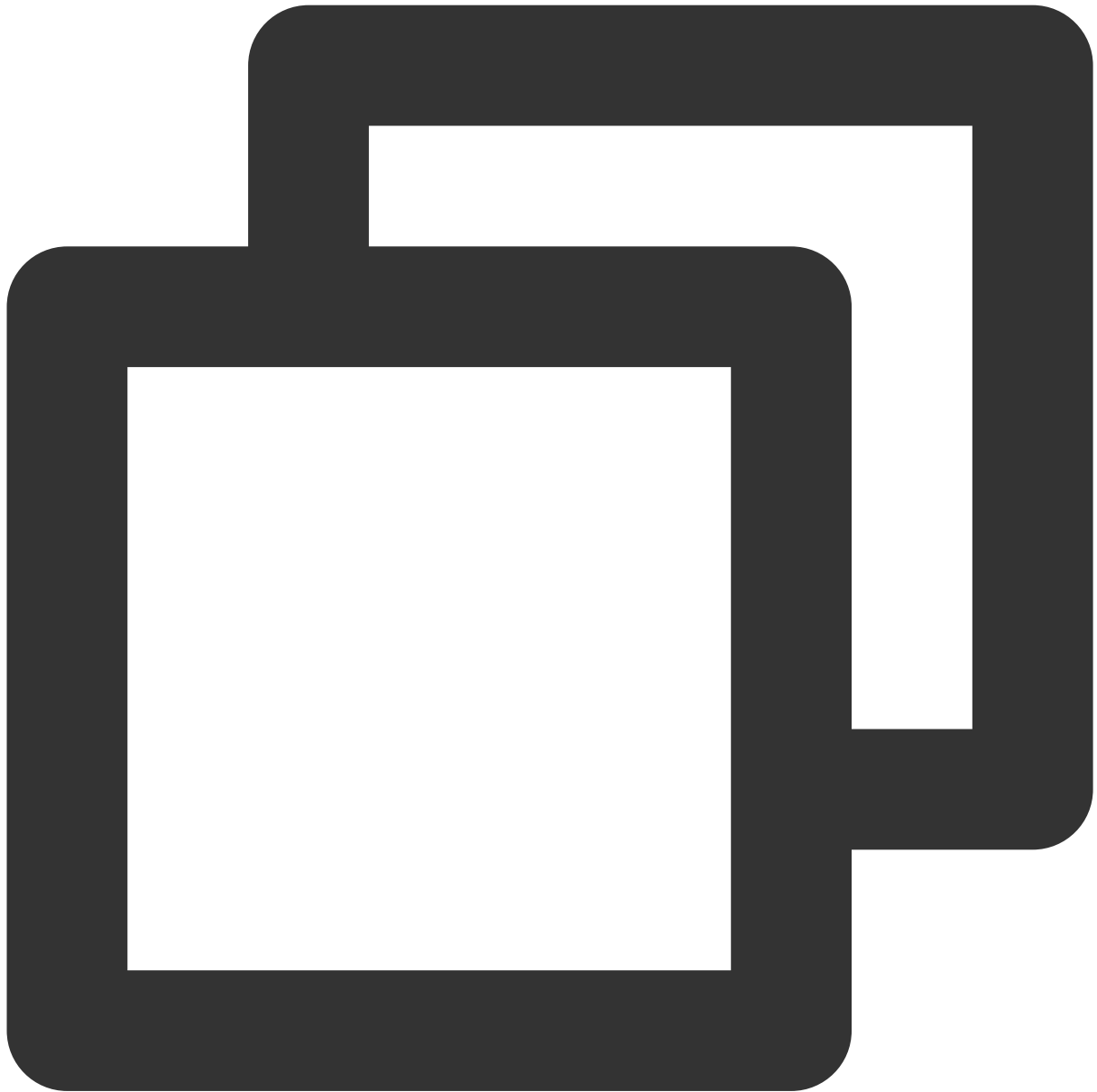


```
apiVersion: v1
kind: Namespace
metadata:
  name: base
  labels:
    istio.io/rev: 1-10-3
spec:
  finalizers:
    - kubernetes
```



For example, if your Istio version is 1.8.1, you need to change `istio.io/rev: 1-10-3` to `istio.io/rev: 1-8-1`; otherwise, sidecar injection will fail.

You can use the following command to quickly deploy the demo application:



```
kubect1 apply -f yamls/step01-apps-zone-a.yaml
```

You can also go to the [TKE console](#), select **Cluster Details > Workload > Deployment**, select **Create Via YAML**, and copy the above YAML content to quickly create demo application resources.

# Application Configuration

## Configuring Public Network Access

Last updated : 2023-12-26 10:43:18

After the sample environment is created, all the website services are deployed in the Guangzhou cluster (the product and order services only have v1 deployed). The envoy sidecar is automatically injected to take over service traffic, `istio-ingressgateway` is created, but no listener or routing rules are configured to connect the frontend service to the public network.

### 1. Creating a gateway and configuring the listener rule

Create a gateway resource, configure the `istio-ingressgateway` listener rule, and set the port to 80 and protocol to HTTP. You only need to configure the gateway rule, and the Tencent Cloud Mesh backend will automatically sync the configurations of Pod, service, and associated CLB of `istio-ingressgateway`.

Via the console

Via kubectl

1. Log in to the [Tencent Cloud Mesh console](#).
2. Click the target service mesh ID to enter the management page of created service meshes.
3. In **Gateway**, click **Create**.
4. In **Create Gateway**, set the gateway parameters as shown below:

[←](#) **Create gateway**

Gateway Name \*

demo

Namespace \*

default

Specify Ingress gateway \*

Type \*

☒ ingress ☐ egress

Access type \*

☒ Public network ☐ Private network

Ingress (Egress) gateway list \*

Singapore istio-ingressgateway

Selector

app: istio-ingressgateway  
istio: ingressgateway

Port configuration

Protocol port \*

HTTP

:

—

80

+

Please ensure that the port-level configuration for the same port of the same gateway (such as SSL termination configuration) does not conflict.

Hosts \*

Enter domain names or IPs (one per line). Wildcard \*\*\* is supported;  
separate multiple lines with carriage returns.

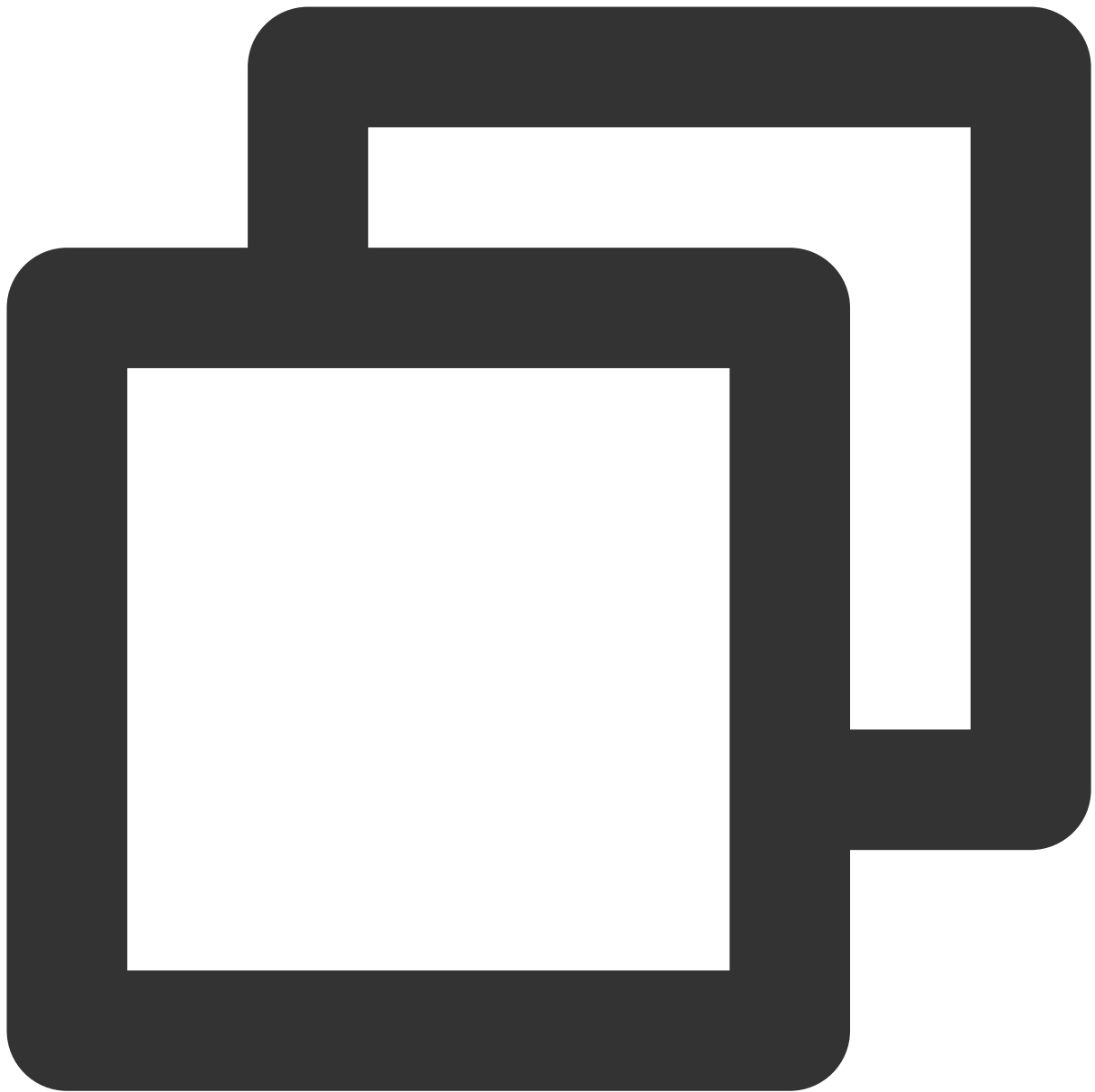
[Add Port](#)

Save

Cancel

5. Click **Save**.

Submit the following YAML file to the **primary cluster** via kubectl:



```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: frontend-gw
  namespace: base
spec:
  servers:
    - port:
        number: 80
        name: http
        protocol: HTTP
```

```
hosts:
  - '*'
selector:
  app: istio-ingressgateway
  istio: ingressgateway
```

## 2. Configuring the routing rule

After configuring the listener rule, configure the routing rule through the `VirtualService` resource to route the traffic from `istio-ingressgateway` to the frontend service.

Via the console

Via kubectl

1. Log in to the [Tencent Cloud Mesh console](#).
2. Click the target service mesh ID to enter the management page of created service meshes.
3. In **Virtual Service**, click **Create**.
4. In **Create Virtual Service**, set the parameters as shown below:

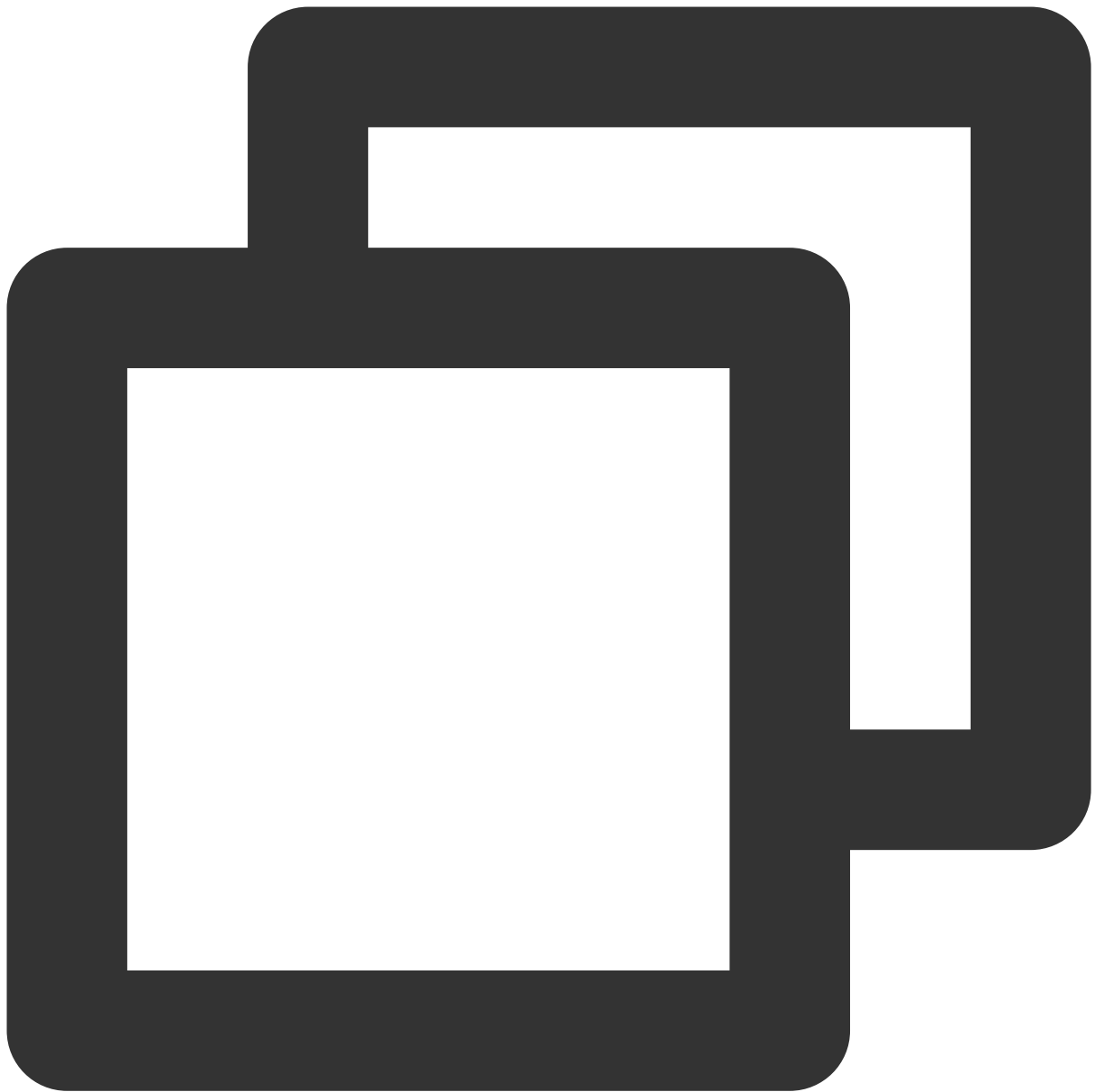
The screenshot shows the 'Create Virtual Service' form in the Tencent Cloud Mesh console. The form is divided into several sections:

- Name:** frontend-vs
- Namespace:** base
- Associate hosts:** A text input field with a placeholder 'Please enter the host, and press Enter to complete'.
- Mount gateway:** base/frontend-gw
- Routing configuration:**
  - Type:** HTTP (selected), TCP, TLS
  - Condition:** uri exact
  - Destination:** frontend.base.svc.cluster.local

At the bottom of the form, there are 'Save' and 'Cancel' buttons.

5. Click **Save**.

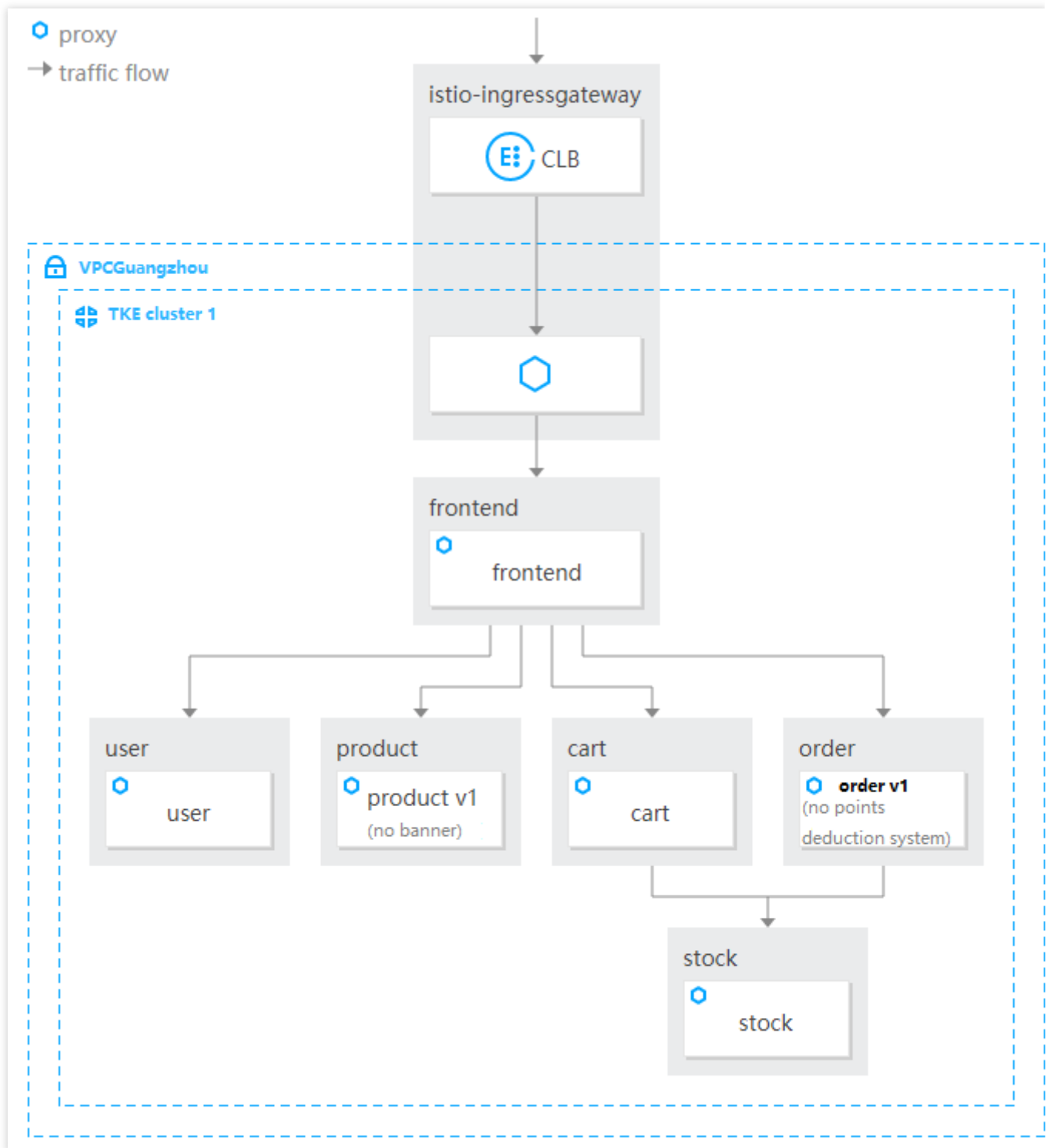
Submit the following YAML file to the **primary cluster** via kubectl:



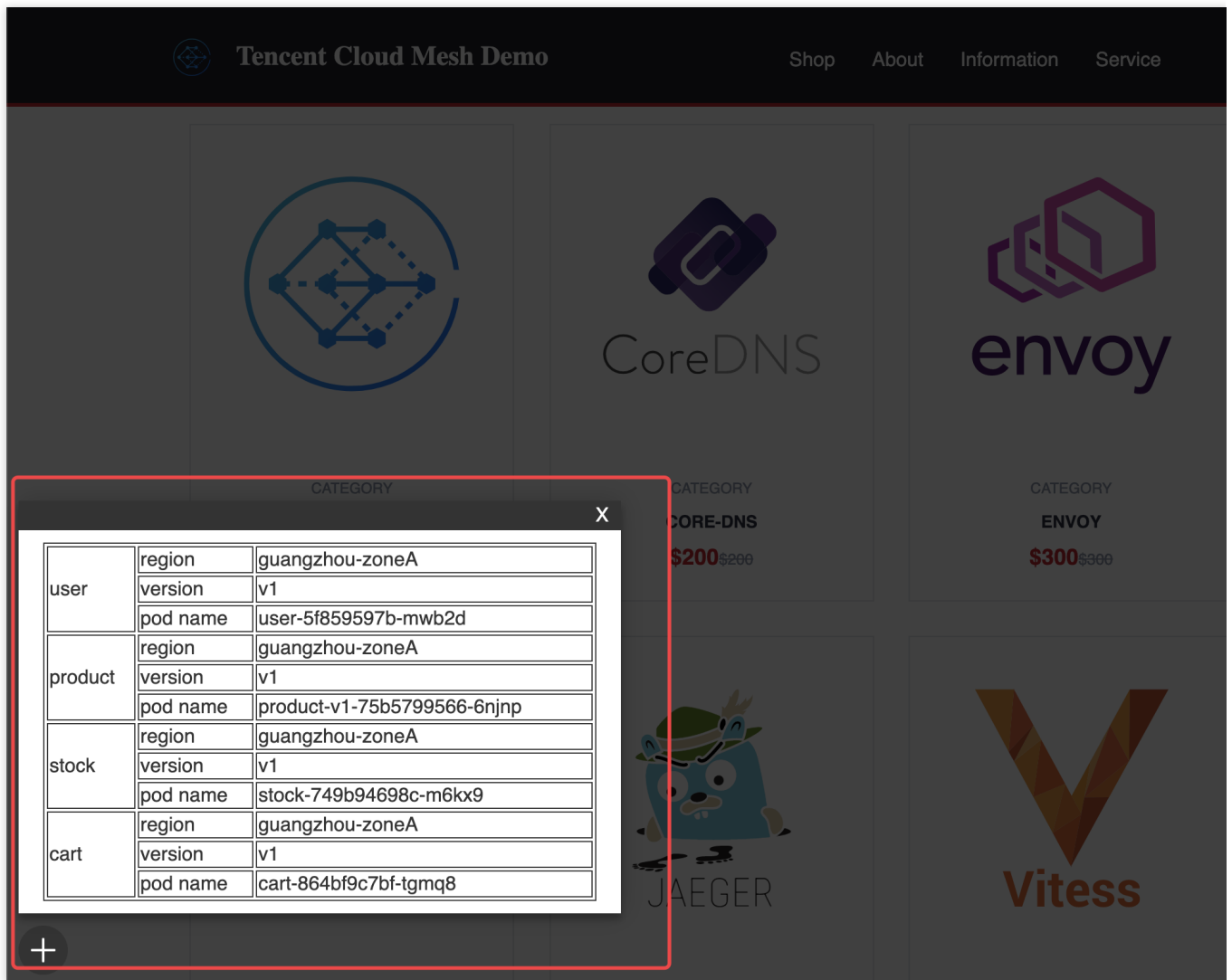
```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: frontend-vs
  namespace: base
spec:
  hosts:
    - '*'
  gateways:
    - base/frontend-gw
  http:
```

```
- route:
  - destination:
      host: frontend.base.svc.cluster.local
```

After the configuration, the demo website can be accessed through the public network IP address of `istio-ingressgateway`. The currently deployed website is as structured below:



Click the website link to log in (with accounts 1–5, including member accounts 1–3 and non-member accounts 4 and 5), add an item to the cart, and place an order to generate requests to call all the deployed services. The bottom-left floating window of the page displays the name, region, version, and Pod name of the service called by the frontend service, as shown below:



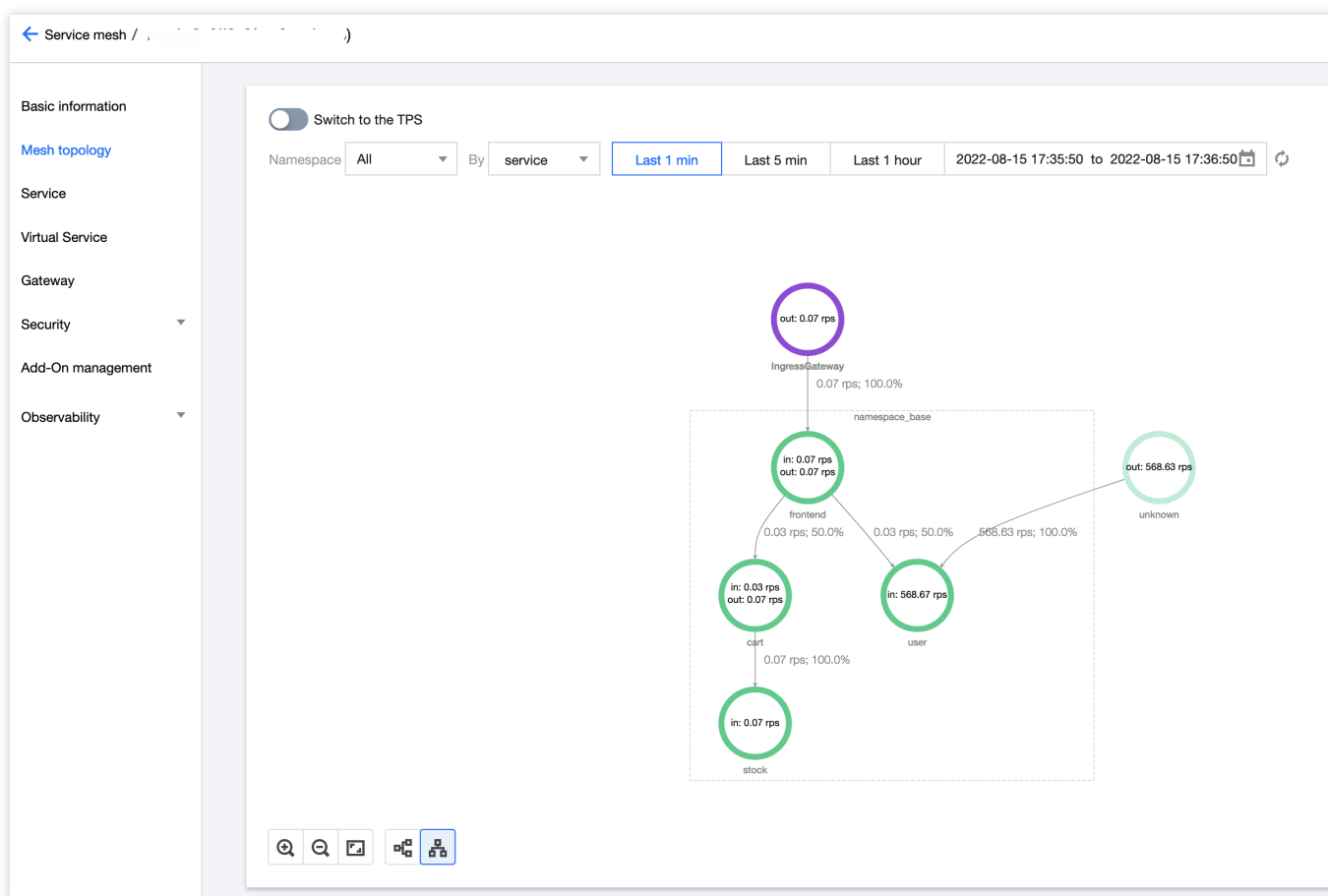
After traffic data is generated, click the **Network Topology** tab to view the network traffic topology in the mesh. Click the **Service** tab to enter the service details page, where you can view the call linkage of the request as well as the full linkage and details at each layer when the stock service is called.

As the business accommodates more services, nearly each frontend request will have a complex call linkage. This calls for fast fault locating and analysis to determine the impact, organizing service call dependencies to determine their reasonableness, or analyzing performance parameters of the linkage, such as request duration, to optimize the call logic with serial/parallel analysis.

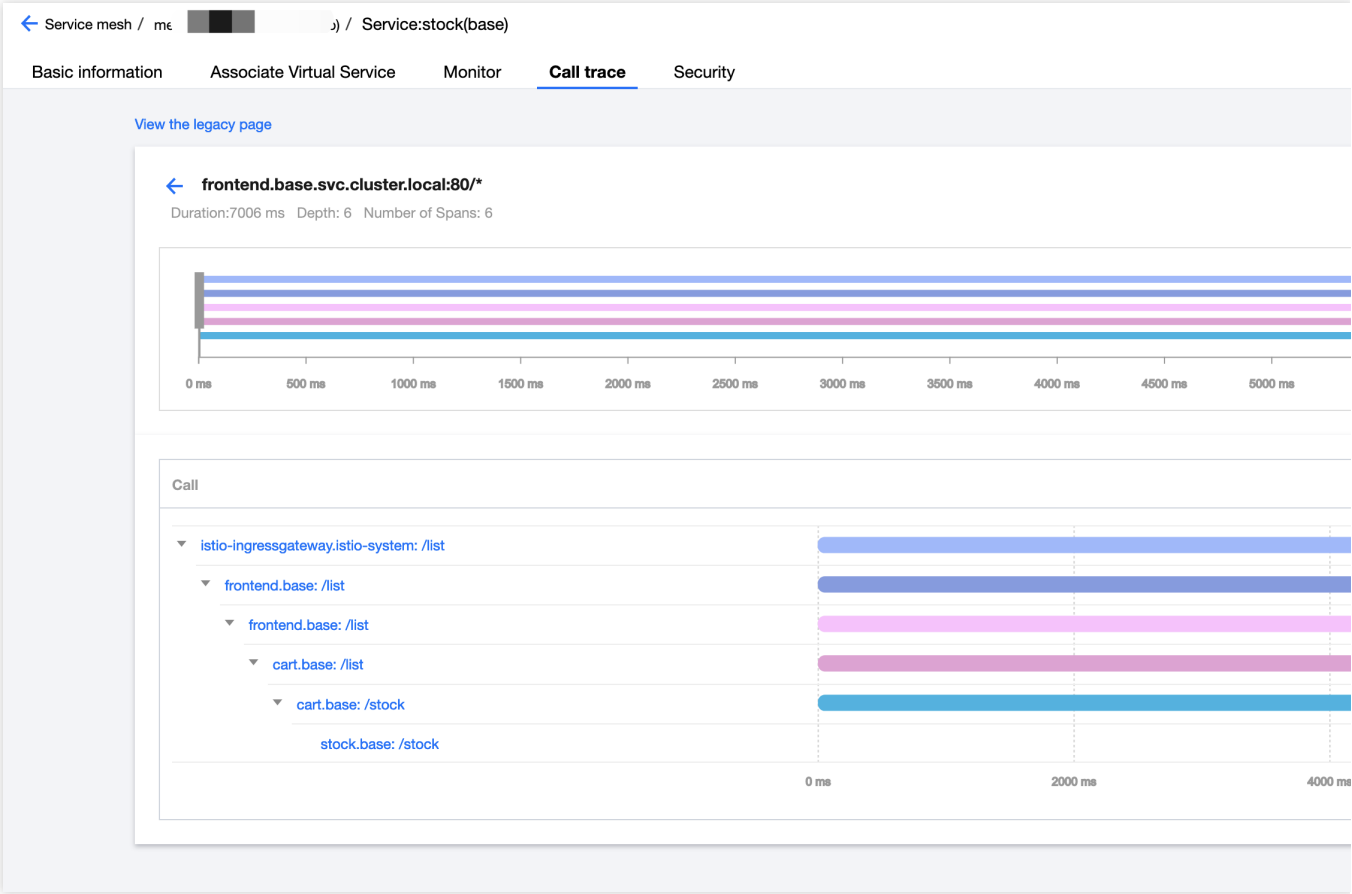
The full-linkage tracking system describes the traffic characteristics of the entire network to help you analyze the linkage.

The network topology is as shown below:





Linkage tracking is as shown below:



# Traffic Control

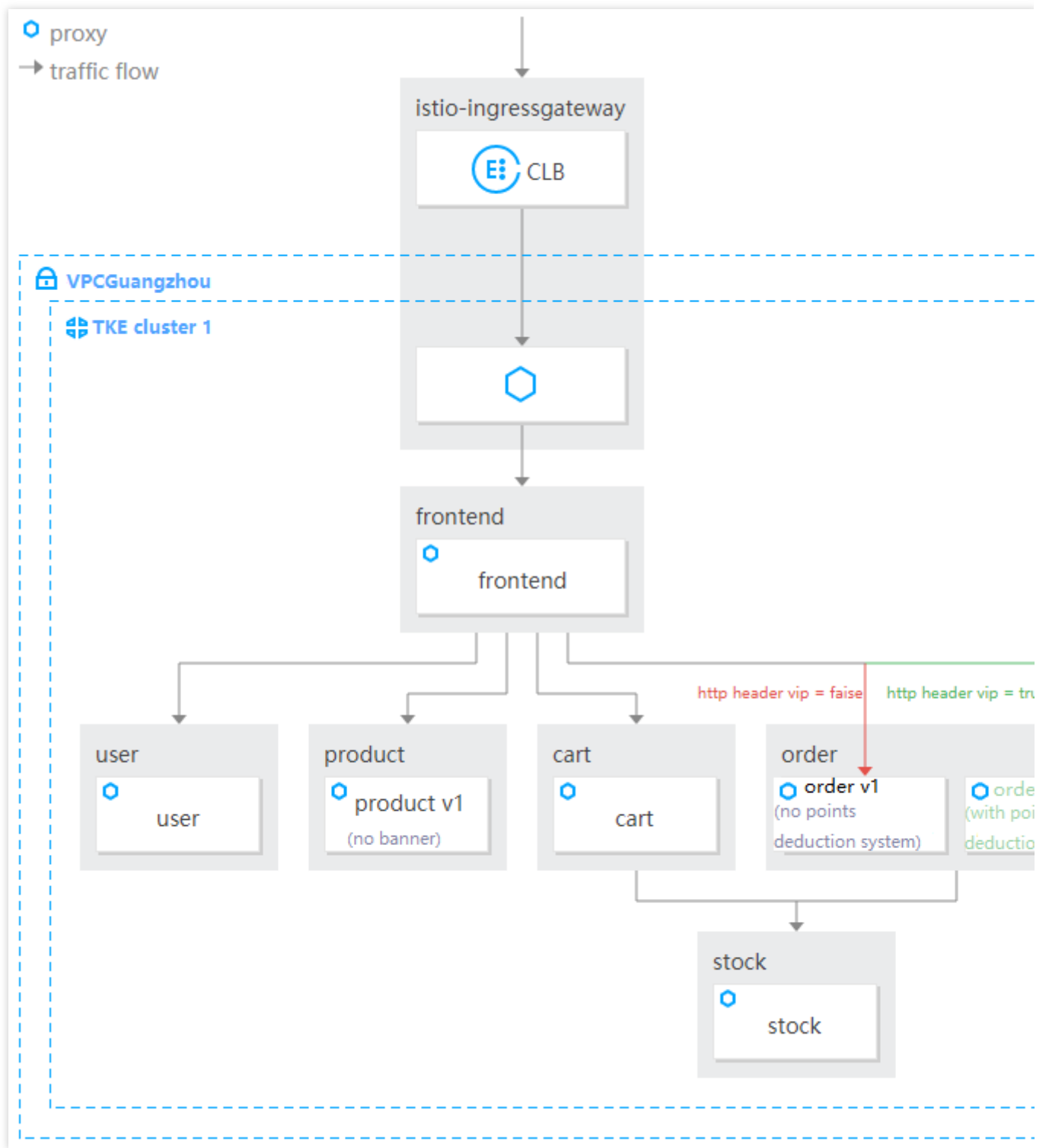
## Multi-version Routing

Last updated : 2023-12-26 11:29:32

### Overview

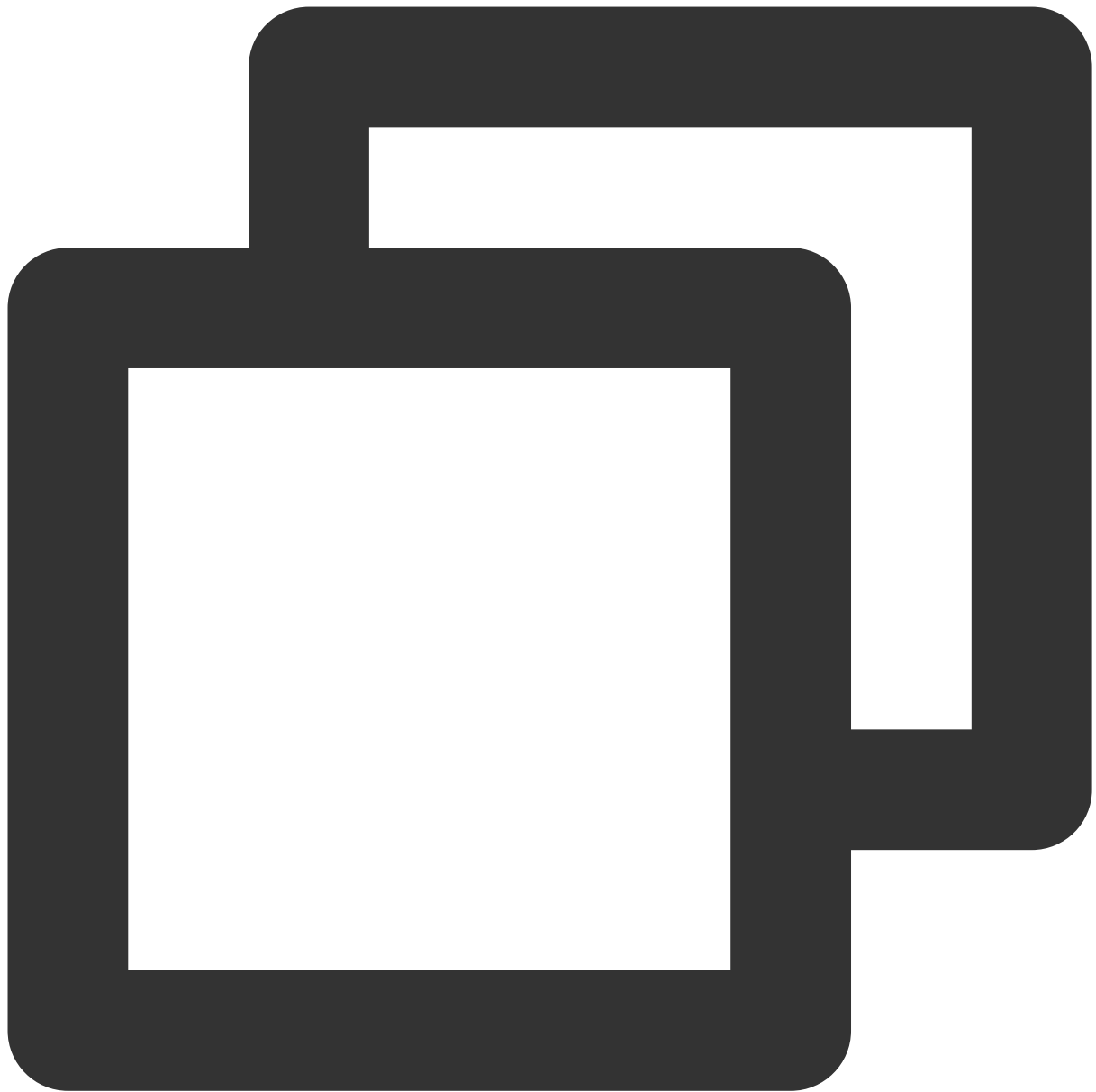
This document describes the feature of deducting the freight with member points designed to win over more members for an ecommerce website. The currently deployed order service provided by Deployment v1 does not support this feature, while the newly developed v2 of the order service does. Ideally, traffic is routed based on the cookies in the header; if a user is a member of the website as indicated in the cookies, traffic will be routed to order v2 (with freight deduction); otherwise, traffic will be routed to order v1 (without freight deduction).

An overview of multi-version service routing is as shown below:



## Directions

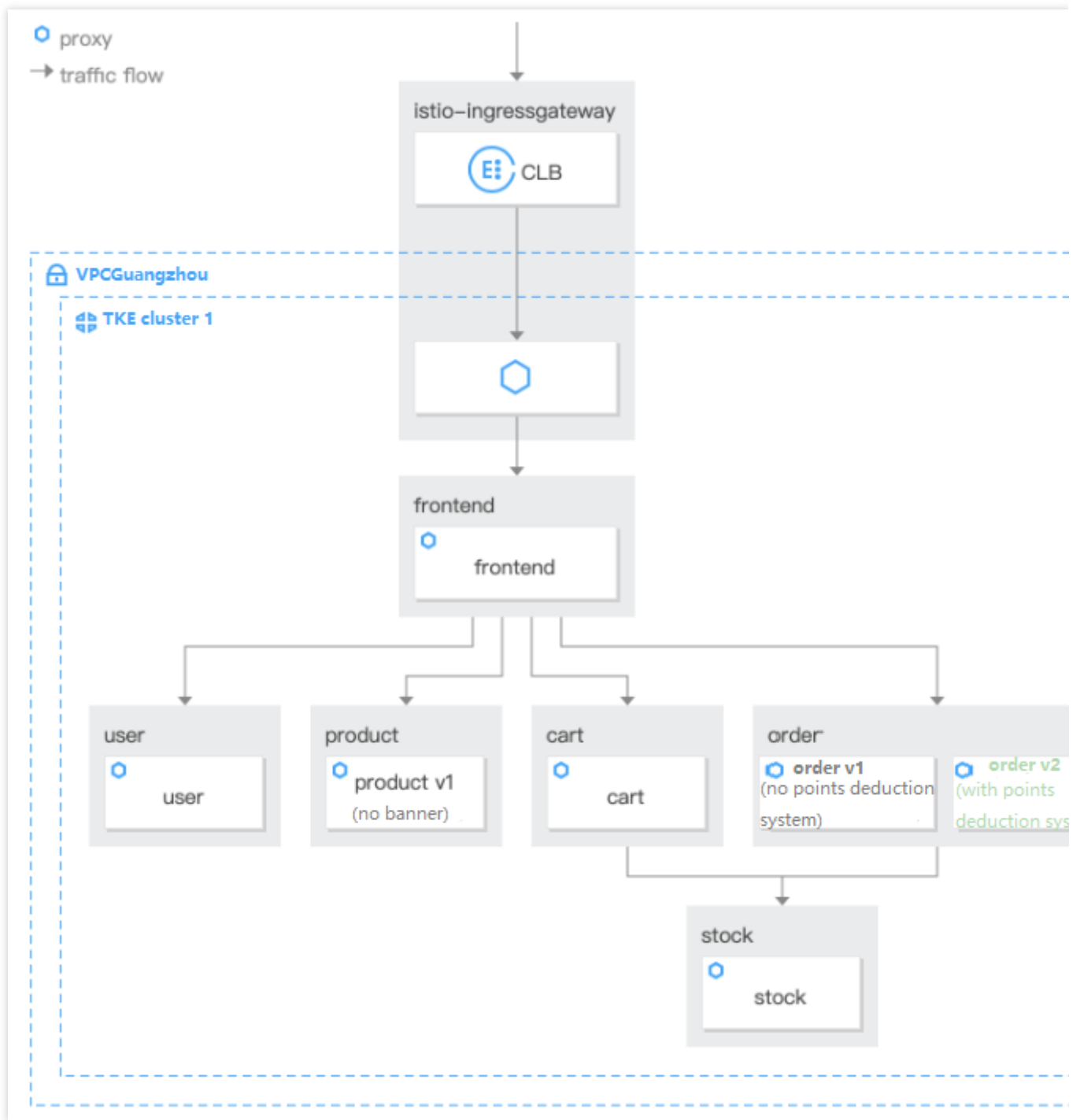
Submit the following YAML file to the primary cluster to deploy order v2 to the cluster.



```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: order-v2
  namespace: base
  labels:
    app: order
    version: v2
spec:
  replicas: 1
  selector:
```

```
matchLabels:
  app: order
  version: v2
template:
  metadata:
    labels:
      app: order
      version: v2
  spec:
    containers:
      - name: order
        image: ccr.ccs.tencentyun.com/zhulei/testorder2:v1
        imagePullPolicy: Always
        env:
          - name: POD_NAME
            valueFrom:
              fieldRef:
                fieldPath: metadata.name
          - name: REGION
            value: "guangzhou-zoneA"
        ports:
          - containerPort: 7000
            protocol: TCP
```

After the deployment, as no routing rule is configured, traffic to the order service will be randomly routed to v1 or v2 as shown below:



To configure a routing rule based on traffic characteristics, define the two versions of the order service through

`DestinationRule` as shown below:

Define the versions of the order service as shown below:

Create Destination Rule

Service version

Add Version

Service Version 1

Collapse Delete

Name

v1

Labels

version

:

v1

×

Add label

Labels apply a filter over the endpoints of a service in the service registry.

Corresponding workload

product-v

Service Version 2

Collapse Delete

Name

v2

Labels

version

:

v2

×

Add label

Labels apply a filter over the endpoints of a service in the service registry.

Corresponding workload

-

Traffic policy

Add policy

Save

Cancel

The versions of the order service are as defined below:

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Destination Rule: product

Service version

Create

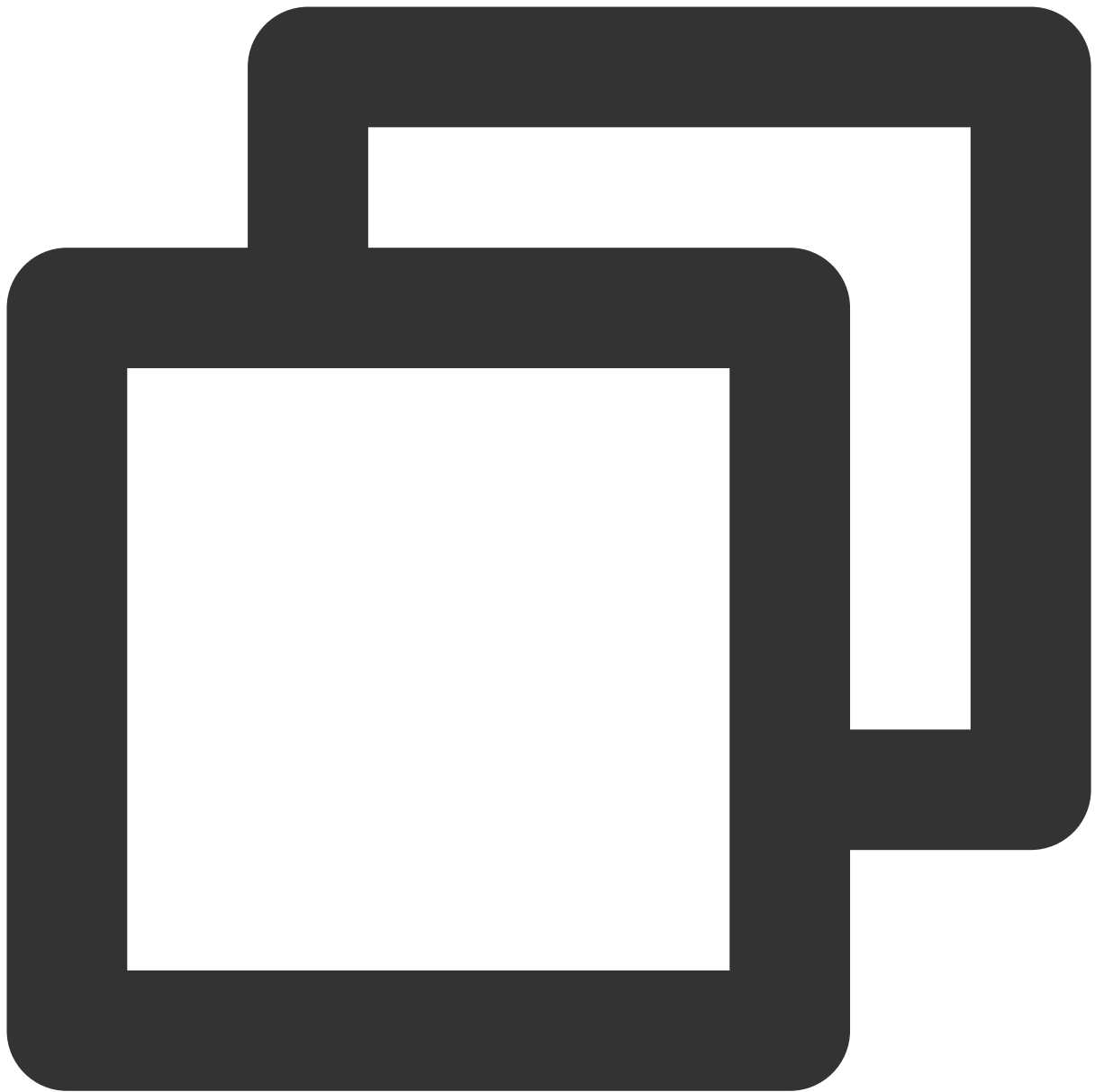
Name	Tag	Corresponding workload
v1	version:v1	product-v1
v2	version:v2	-

Traffic policy

Create

Version range	Load Balancing policy	Connection pool	Locality load balancing	He
No traffic policy				

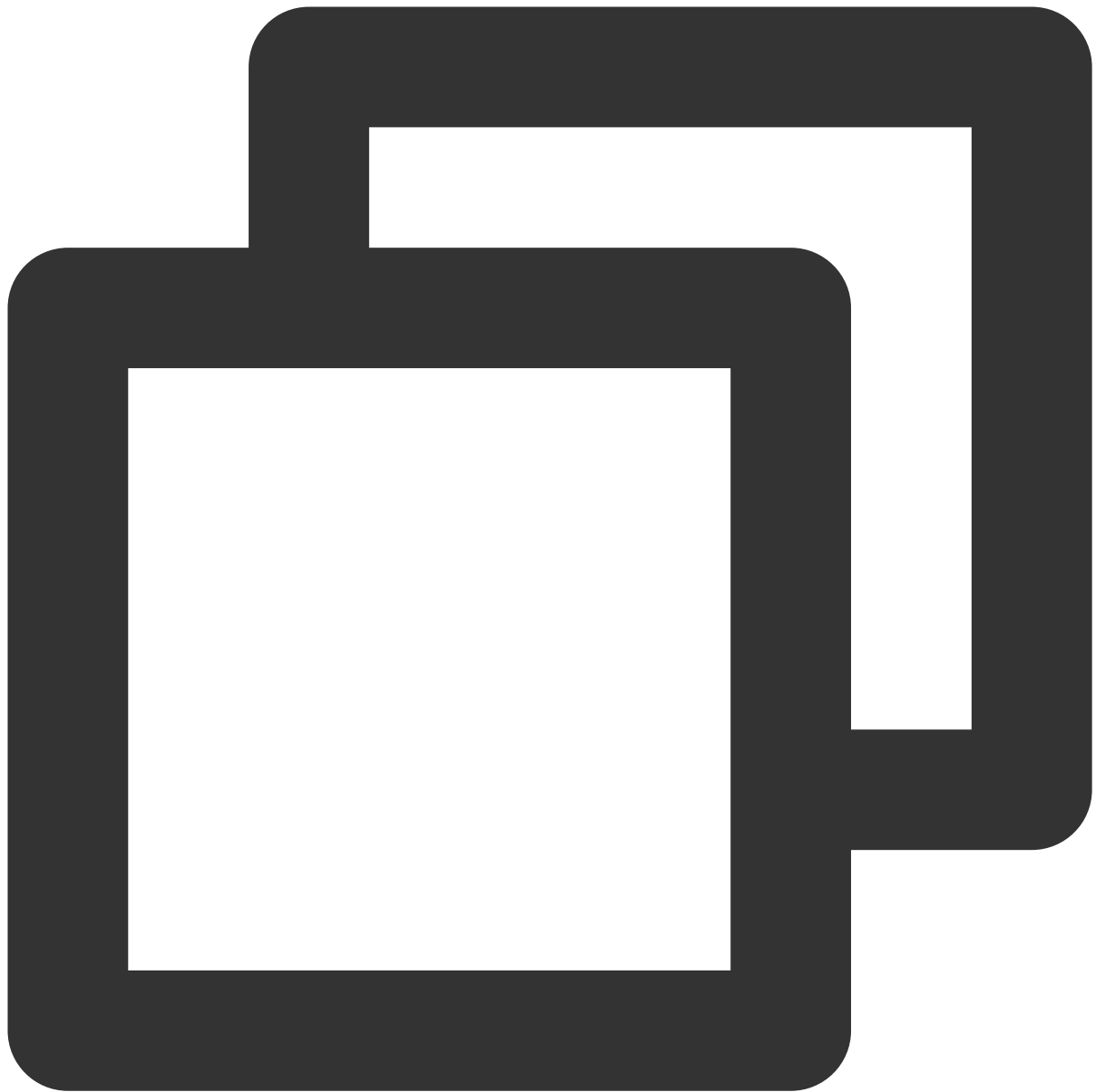
Or you can submit the following YAML file to the primary cluster to create a destination rule:



```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: order
  namespace: base
spec:
  host: order
  subsets:
    - name: v1
      labels:
        version: v1
```

```
- name: v2
  labels:
    version: v2
exportTo:
- '*'
```

After the two versions are defined, routing will be performed based on traffic characteristics through the `VirtualService` definition. If the `header-cookie` of a request contains `vip=false`, traffic will be routed to v1 subset of the order service; otherwise, traffic will be routed to v2 subset. That is, member requests and non-member requests will be routed to order v2 and order v1, respectively. This configuration can be performed by submitting the following YAML file to the primary cluster.



```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: order-vs
  namespace: base
spec:
  hosts:
    - order.base.svc.cluster.local
  http:
    - match:
        - headers:
```

```

      cookie:
        exact: vip=false
    route:
      - destination:
          host: order.base.svc.cluster.local
          subset: v1
- match:
  - headers:
      cookie:
        exact: vip=true
    route:
      - destination:
          host: order.base.svc.cluster.local
          subset: v2

```

After the configuration, if you log in to a member account (ID: 1-3), add an item to the cart, and make the payment, you will find that the freight is deducted, and the traffic is routed to order v2; if you log in to a non-member account (ID: 4-5), add an item to the cart, and make the payment, you will find that the freight is not deducted, and according to the `VIP` field in the header, the traffic is routed to the originally deployed order v1. Version information can be viewed in the floating window in the bottom-left corner.

The request from a member is routed to v2 as shown below:

The screenshot shows the 'Tencent Cloud Mesh Demo' application. The top navigation bar includes 'Shop', 'About', 'Information', and 'Service'. A user profile icon is labeled 'user : James'. The main content area displays 'Your Order' with a table of products:

Products	Total
core-dns	\$200.00
<b>Subtotal</b>	<b>\$ 200.00</b>
Shipping	\$10.00
<b>Total</b>	<b>\$200.00</b>

A floating window in the bottom-left corner shows the following metadata:

	region	value
user	region	guangzhou-zoneA
	version	v1
	pod name	user-5f859597b-mwb2d
stock	region	guangzhou-zoneA
	version	v1
	pod name	stock-749b94698c-m6kx9
order	region	guangzhou-zoneA
	version	v2
	pod name	order-v2-675bb7bd8c-9gtn4

The bottom of the page features an 'INFORMATION' section with 'Copyright © 2020 Tencent TCM Team' and a 'SERVICE' section with 'MyAccount'.

The request from a non-member user is routed to v1 as shown below:

Tencent Cloud Mesh Demo

ShopAboutInformationService

user : John

Your Cart

Your Order

Products	Total
Tencent Cloud Mesh	\$100.00
Subtotal	\$ 100.00
Shipping	\$10.00
Total	\$110.00

×

user	region	guangzhou-zoneA
	version	v1
	pod name	user-5f859597b-mwb2d
stock	region	guangzhou-zoneA
	version	v1
	pod name	stock-749b94698c-m6kx9
order	region	guangzhou-zoneA
	version	v1
	pod name	order-v1-797bd5df47-hh28q

+

connect

secure

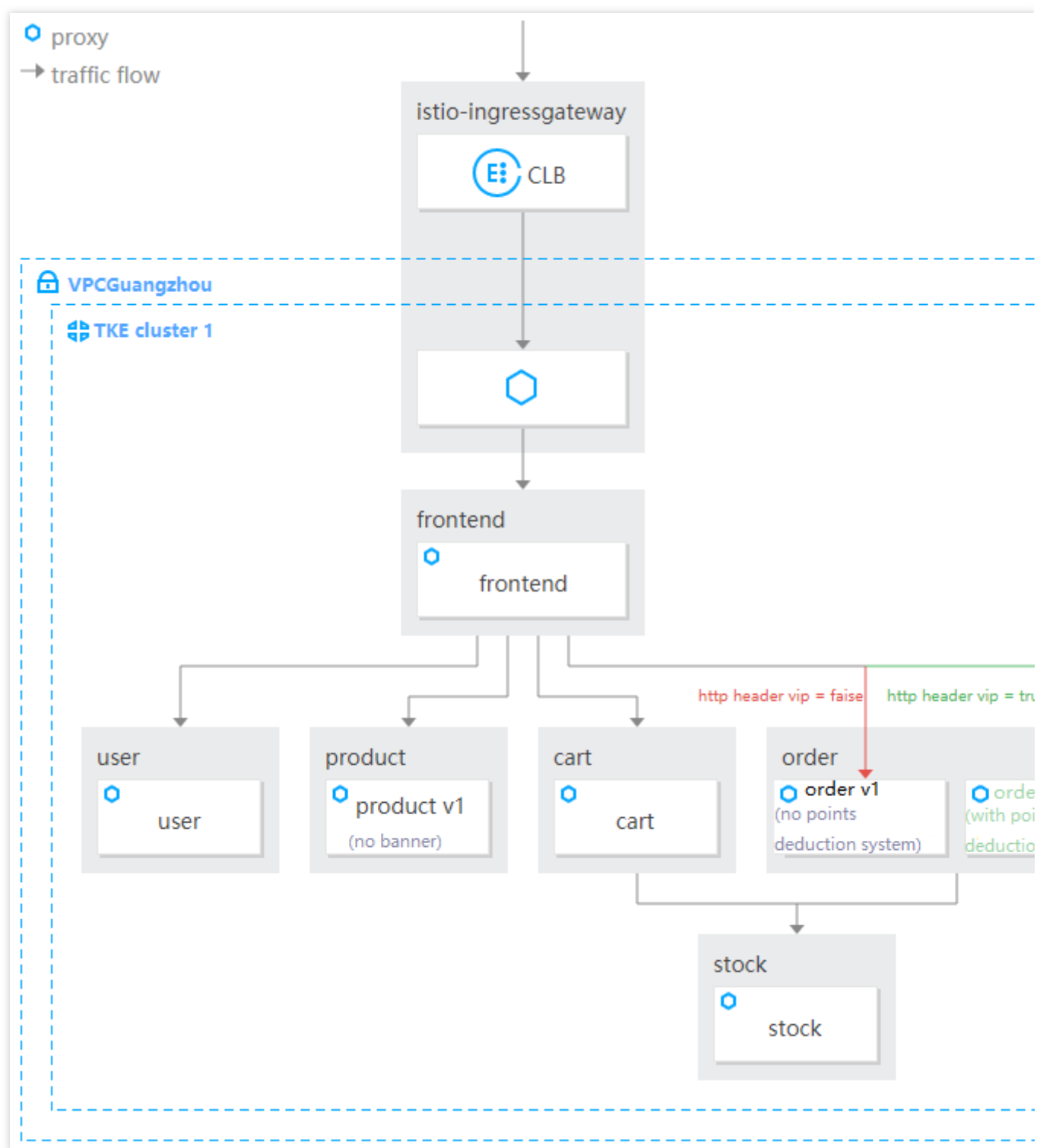
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腾讯云服务网格

MyAccount

ViewCart

Routing based on traffic rules is as shown below:



# Canary Release

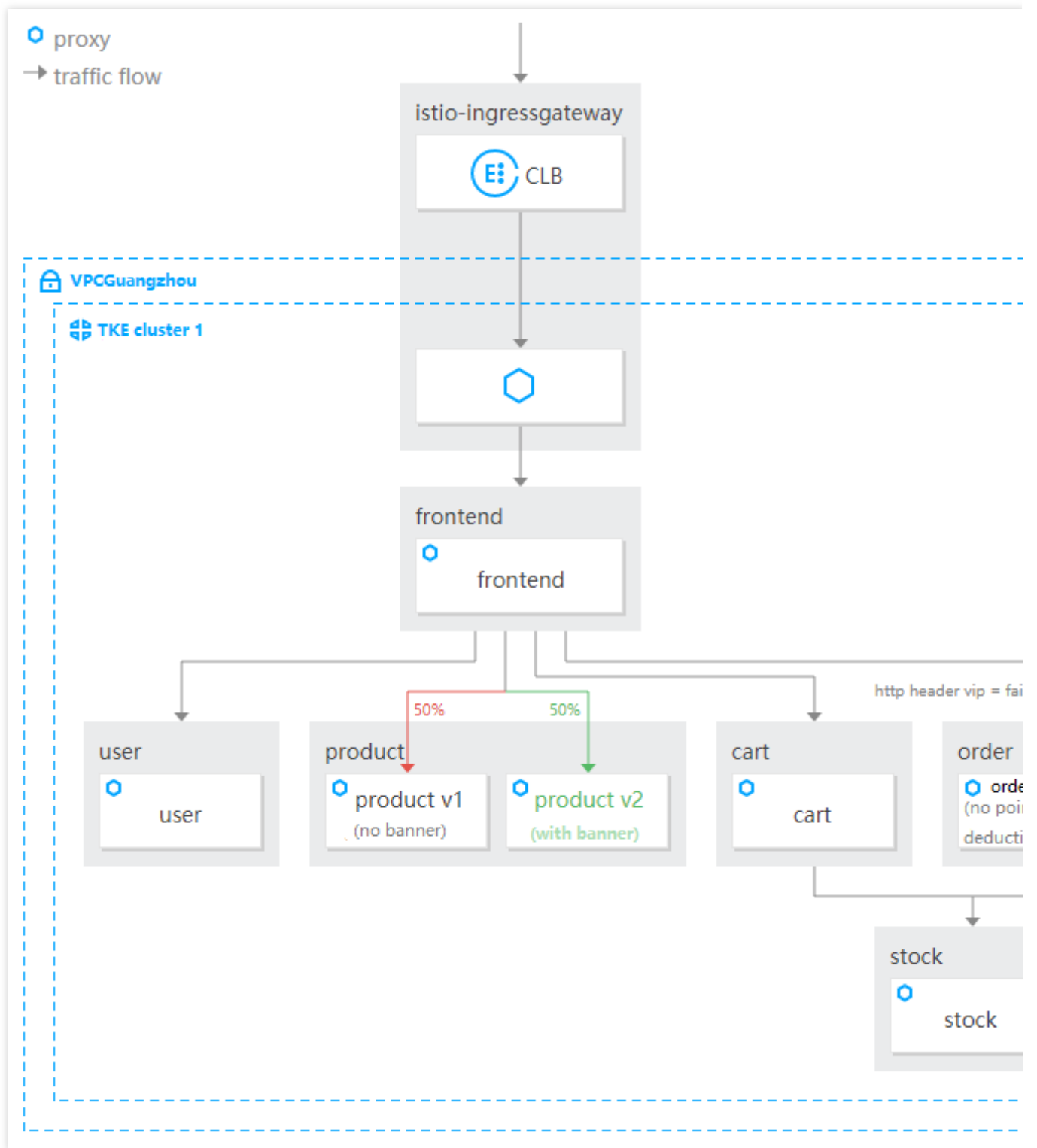
Last updated : 2023-12-26 10:44:22

## Overview

Website traffic increase brings along the need to place ads on the product page. Therefore, website developers developed the product v2 as a Deployment and wish to perform a canary release.

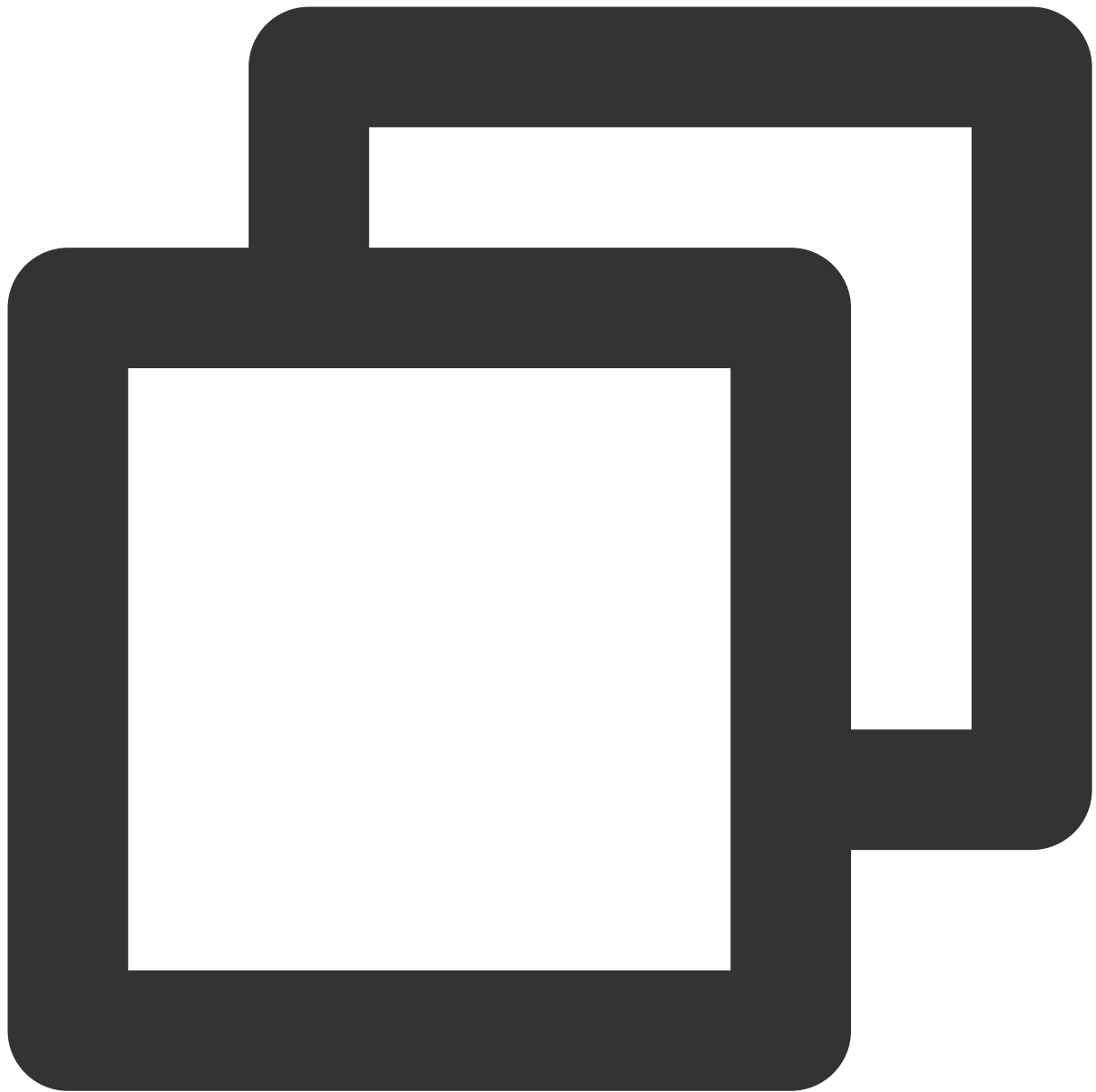
An overview of the canary release is as shown below:





## Directions

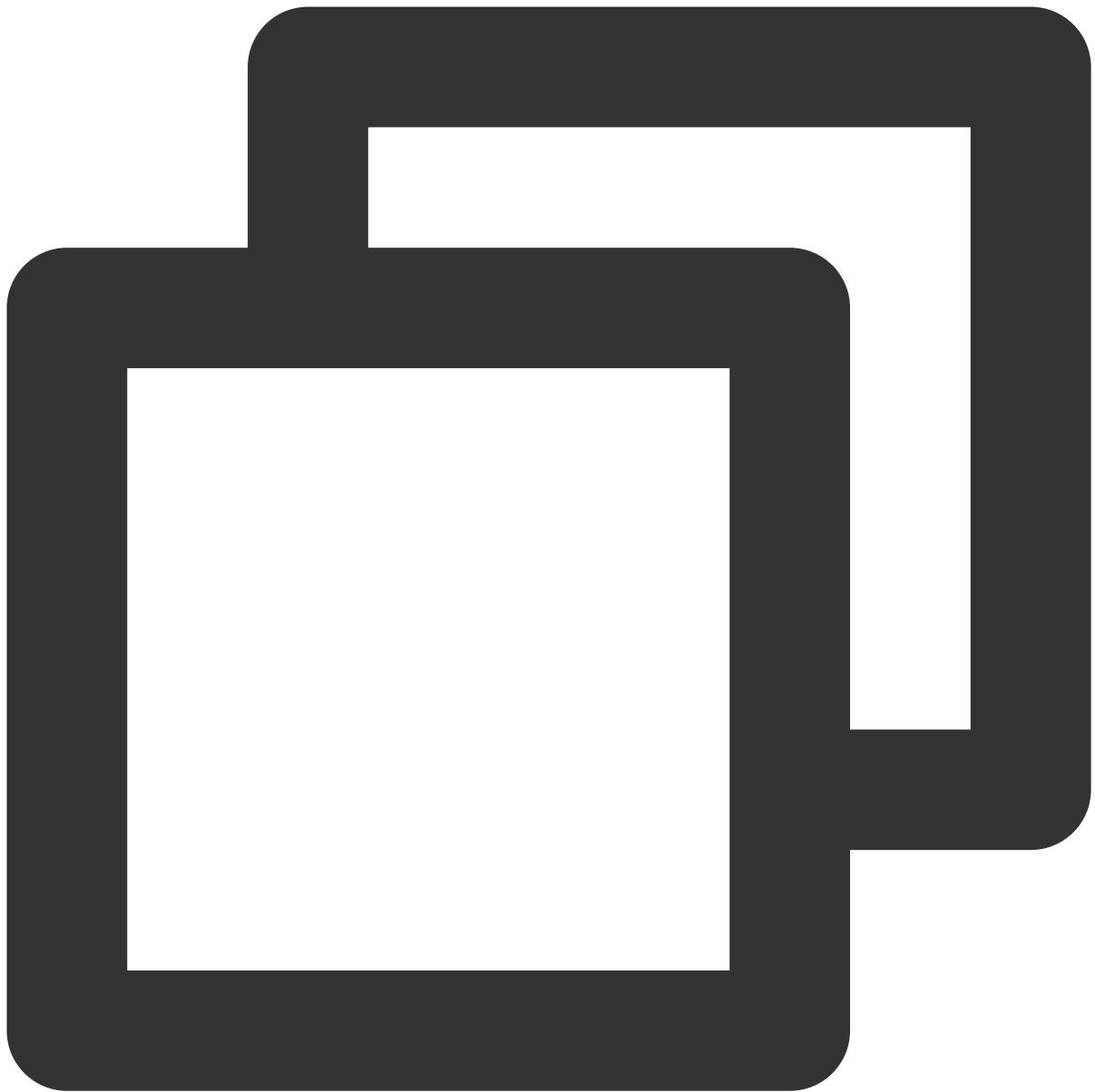
Deploy the product v2 Deployment to the primary cluster first:



```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: product-v2
  namespace: base
  labels:
    app: product
    version: v2
spec:
  replicas: 1
  selector:
```

```
matchLabels:
  app: product
  version: v2
template:
  metadata:
    labels:
      app: product
      version: v2
  spec:
    containers:
      - name: product
        image: ccr.ccs.tencentyun.com/zhulei/testproduct2:v1
        imagePullPolicy: Always
        env:
          - name: POD_NAME
            valueFrom:
              fieldRef:
                fieldPath: metadata.name
          - name: REGION
            value: "guangzhou-zoneA"
        ports:
          - containerPort: 7000
```

In the first step, define the service version through disaster recovery and the weighted routing through `VirtualService` . Route 50% of the traffic to the product v2 subset for verification and the other 50% to product v1. This can be configured by submitting the following YAML file to the primary cluster.



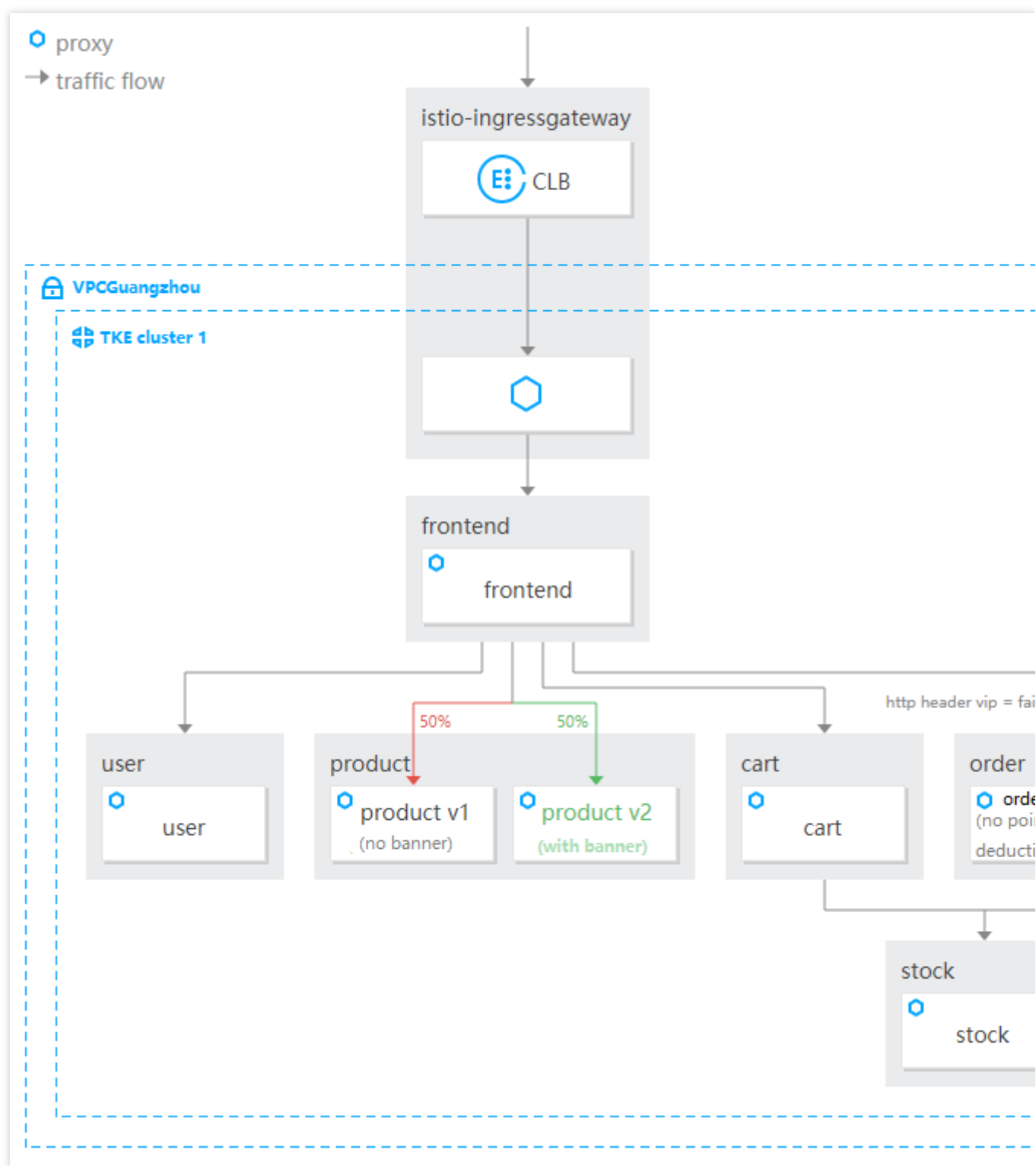
```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: product-vs
  namespace: base
spec:
  hosts:
    - "product.base.svc.cluster.local"
  http:
    - match:
        - uri:
```

```
        exact: /product
route:
  - destination:
      host: product.base.svc.cluster.local
      subset: v1
      port:
        number: 7000
      weight: 50
  - destination:
      host: product.base.svc.cluster.local
      subset: v2
      port:
        number: 7000
      weight: 50
---

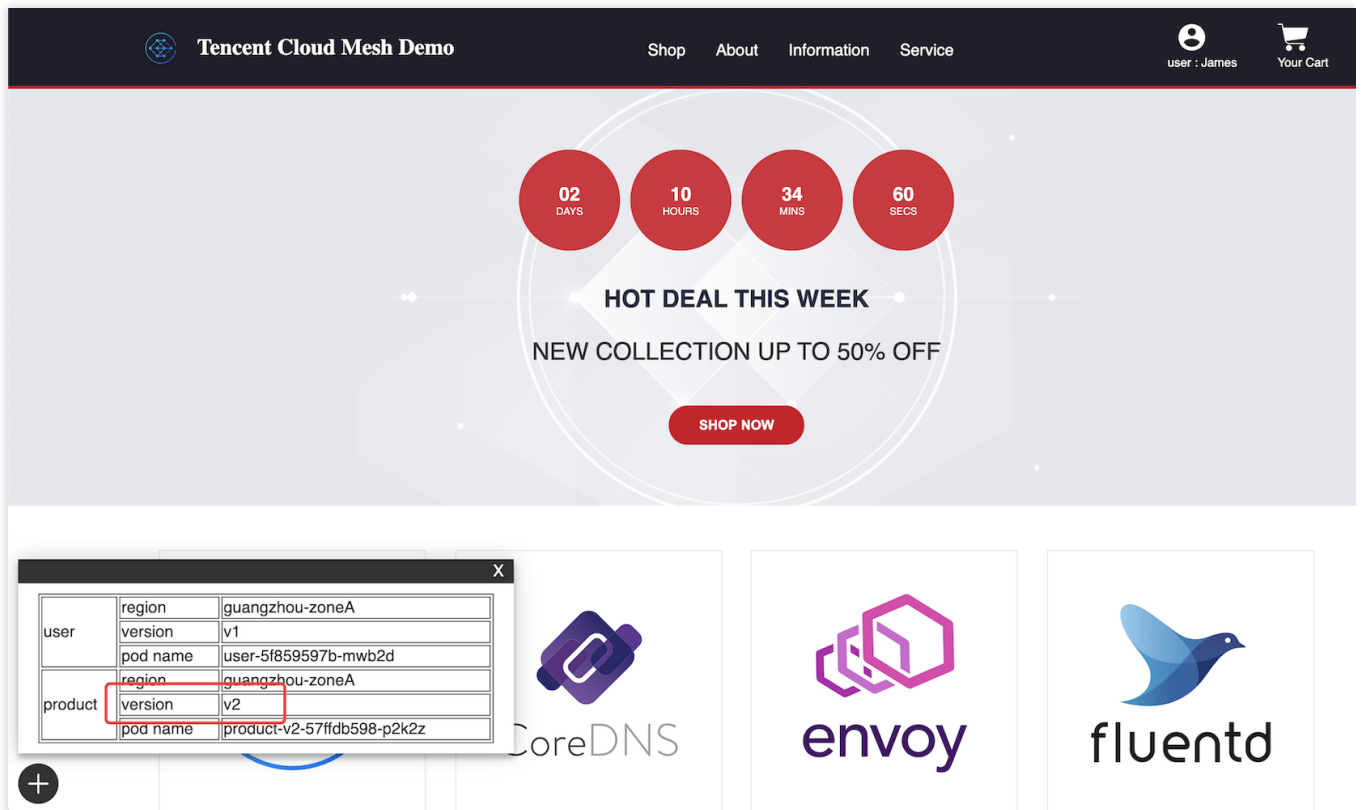
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: product
  namespace: base
spec:
  host: product
  subsets:
    - name: v1
      labels:
        version: v1
    - name: v2
      labels:
        version: v2
```

After the configuration, 50% of the traffic to the product service will be routed to product v1 and the other 50% to product v2. Refresh the product page for verification.

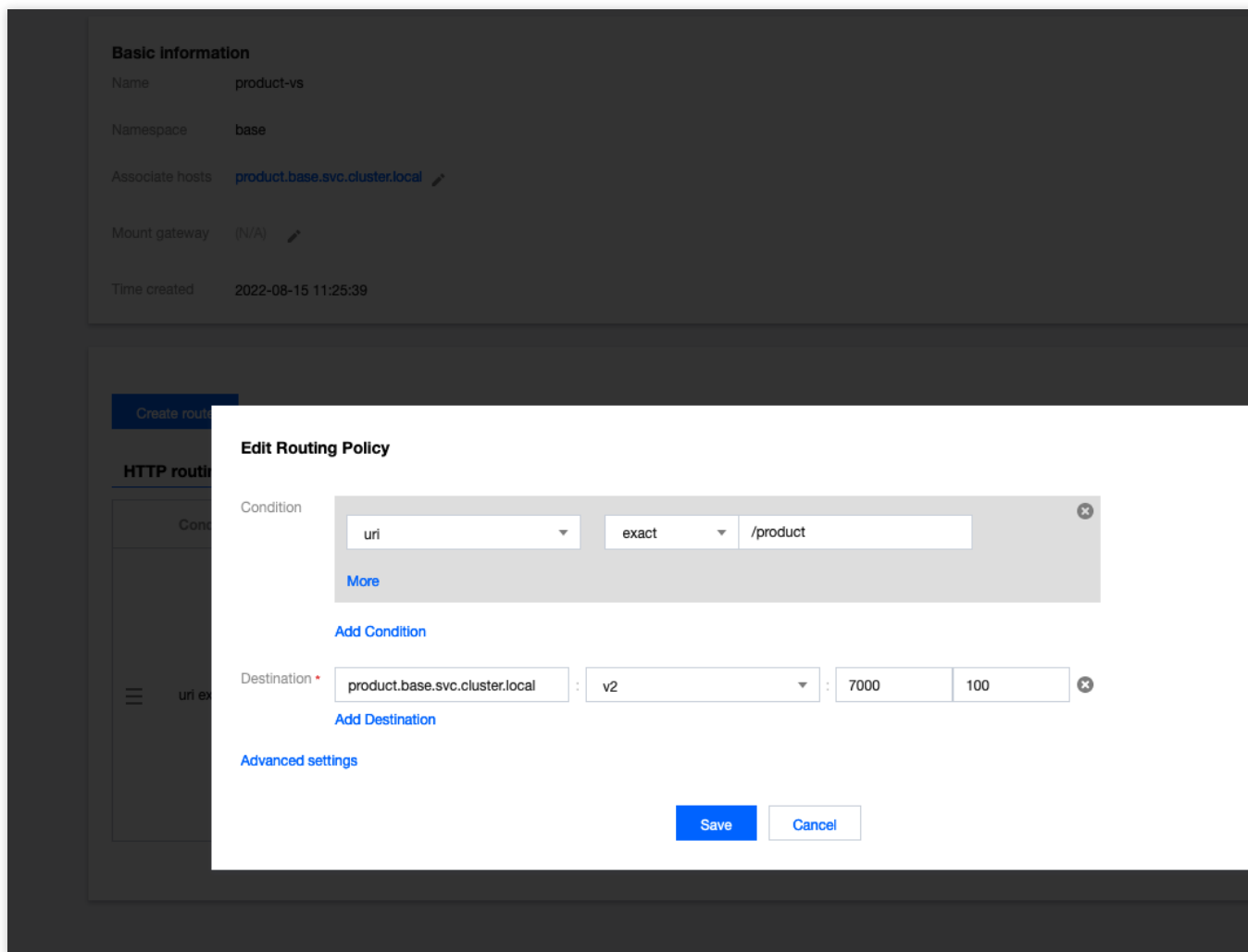
The weighted routing is as shown below:



50% of the request traffic is routed to product v2 as shown below:

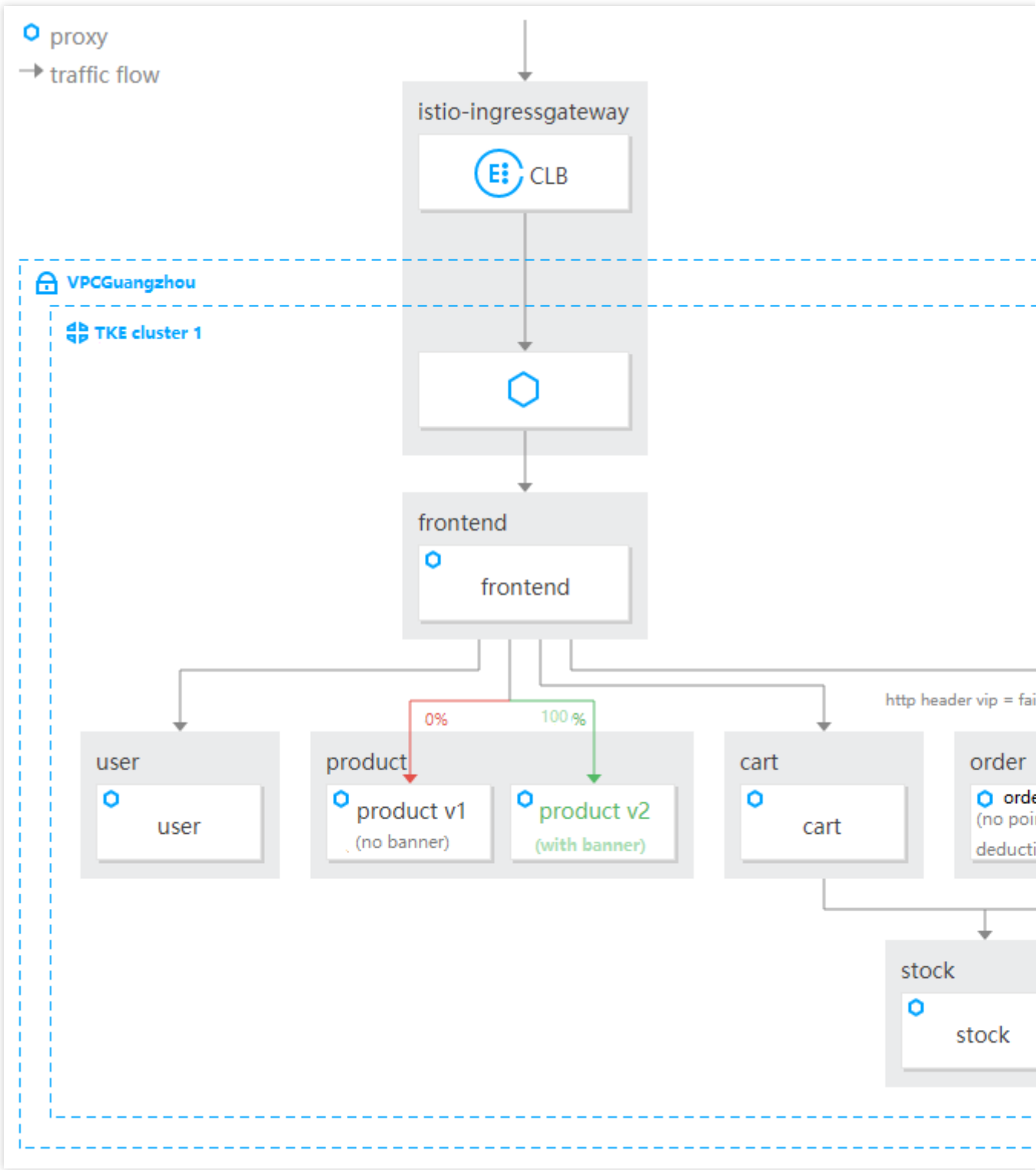


After product v2 passes the verification, modify the destination weight of the routing rule of the associated `VirtualService`. Set to route all the traffic (100%) to the product service to product v2 and refresh the product list page for verification. The weight is adjusted based on `VirtualService` as shown below:



Canary release is completed as shown below:





# Service HA

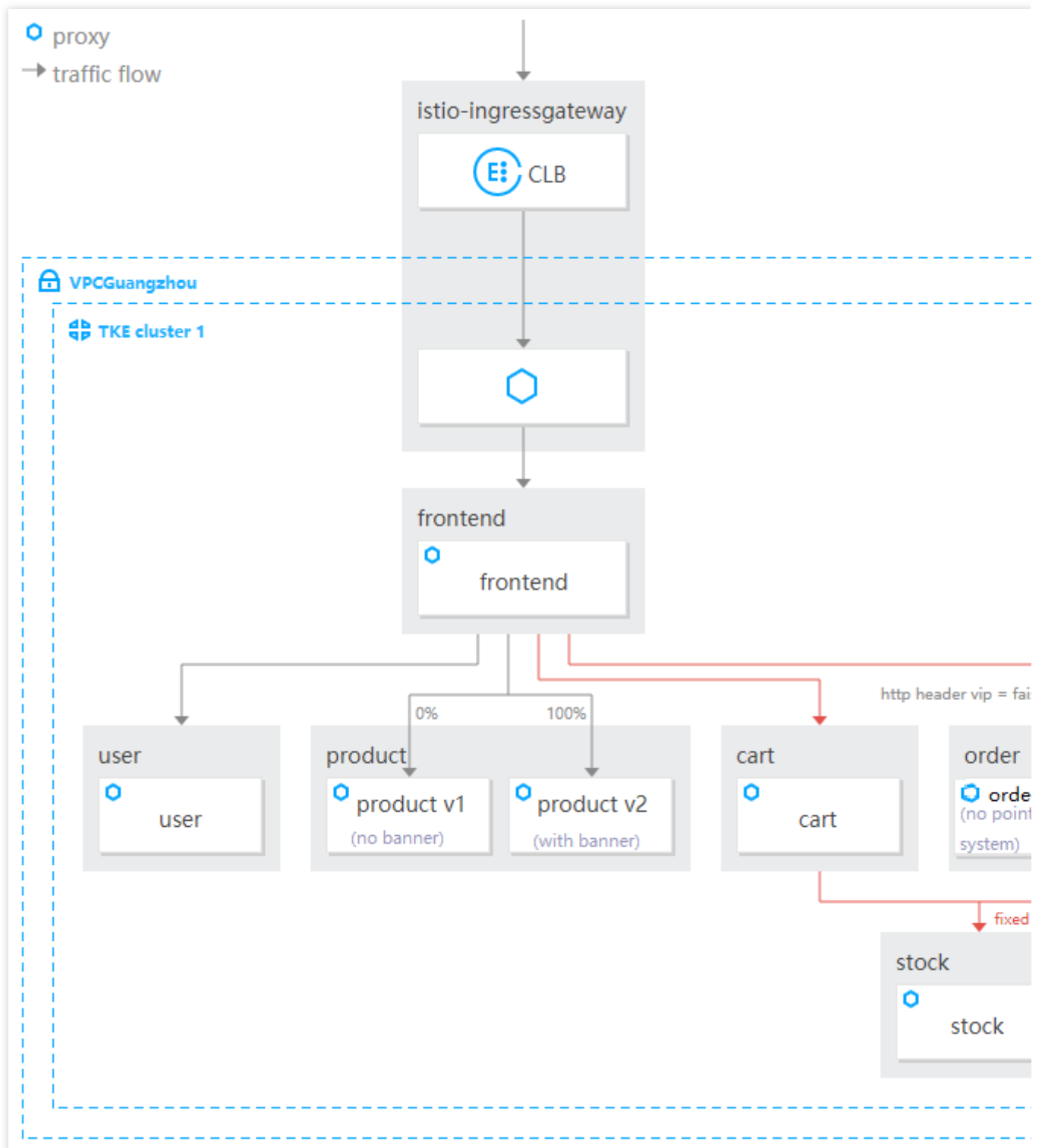
## Fault Injection Testing

Last updated : 2023-12-26 11:31:04

### Overview

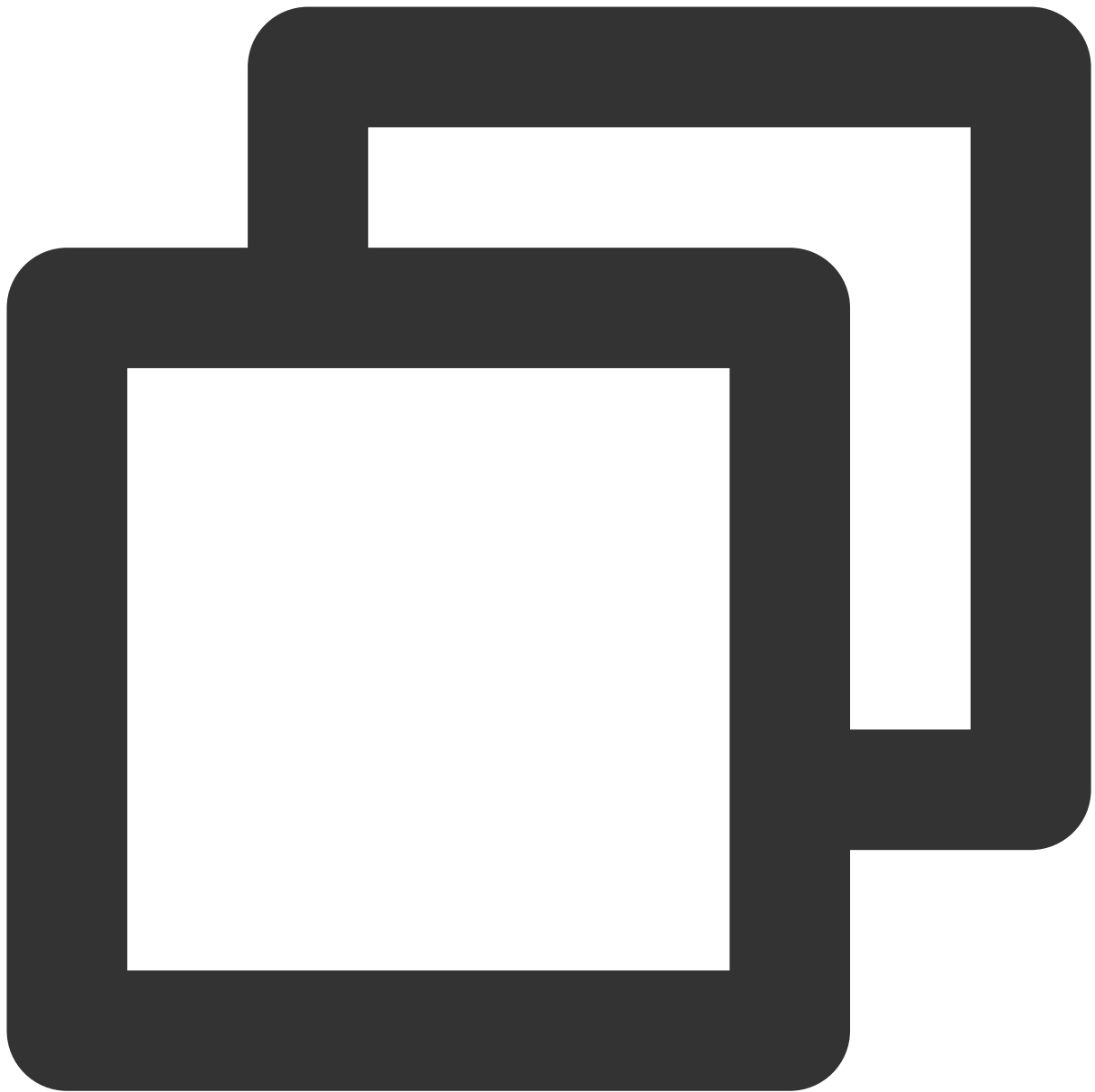
This document simulates website system behaviors upon latency faults when the stock service is accessed, aiming to test the service elasticity and optimize the access experience of website users.

The stock service has a fixed latency of seven seconds as shown below:



## Directions

Configure the `VirtualService` bound to the stock service and set the fault injection policy for accessing the stock service: 100% of the requests will have a fixed latency of seven seconds.

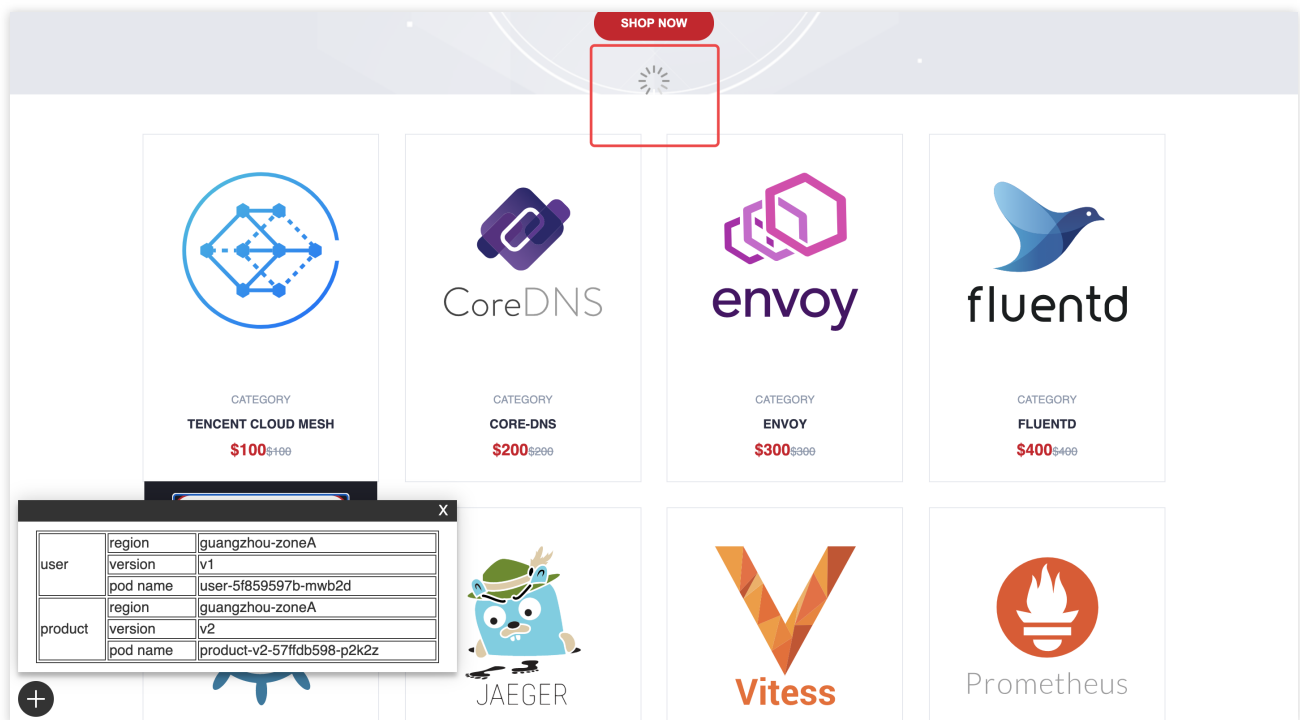


```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: stock-vs
  namespace: base
spec:
  hosts:
    - stock.base.svc.cluster.local
  http:
    - route:
        - destination:
```

```
host: stock.base.svc.cluster.local
fault:
  delay:
    fixedDelay: 7000ms
    percentage:
      value: 100
```

After the configuration, click **ADD TO CART** on the demo website page to add an item to the cart or click **YOUR CART** to call the cart service. The cart service will then call the stock service to query the stock, and the stock service will experience a fixed latency of seven seconds. Click **CHECKOUT** on the cart page to start the checkout process to call the order service. The order service will then call the stock service to query the stock, and the stock service will experience a fixed latency of seven seconds. The latency means that the page will be in the loading status for seven seconds until the fault disappears, which adversely affects users' browsing experience.

The waiting status after the cart service calls the stock service is as shown below:



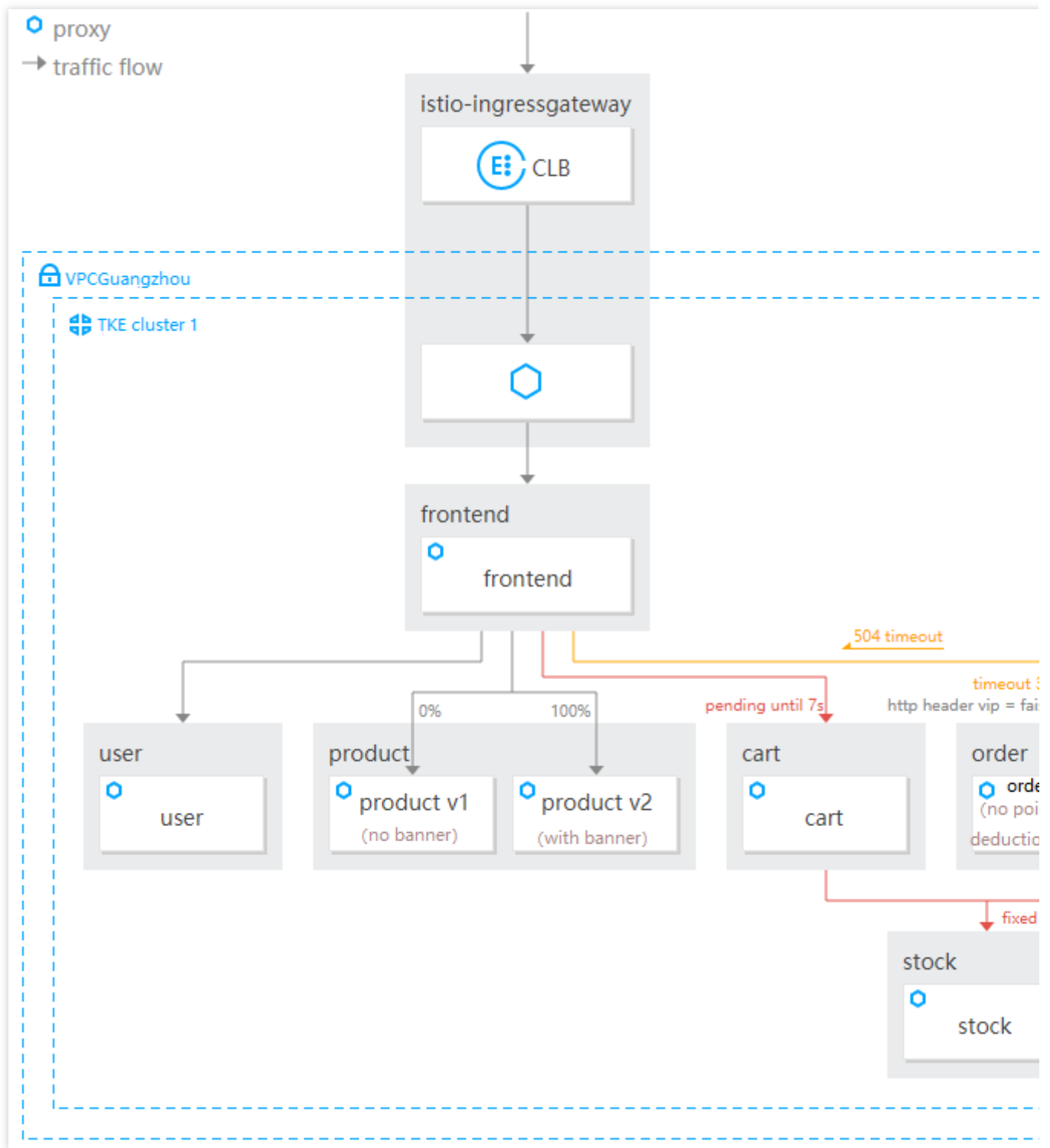
A timeout period can be configured to optimize the browsing experience of website users.

# Service Timeout Configuration

Last updated : 2023-12-26 10:45:52

## Overview

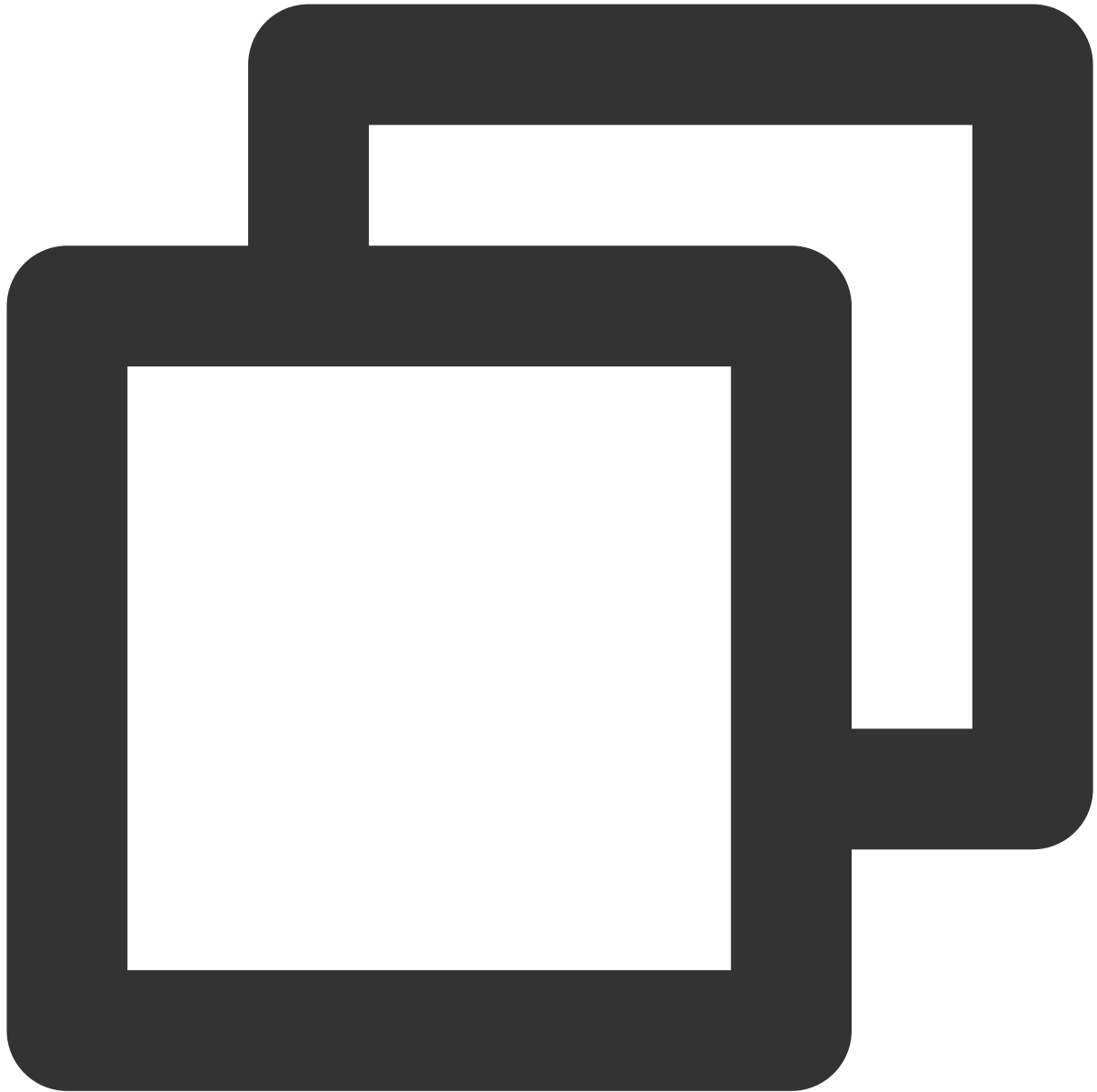
The order service has a timeout period of three seconds as shown below:



After fault injection is configured for the stock service, it is found that user requests to the website will be in the waiting status due to the fault. To optimize the browsing experience, a timeout period needs to be configured.

## Directions

Configure a timeout period of three seconds for the order service by applying the following `VirtualService` and no timeout period for the cart service.



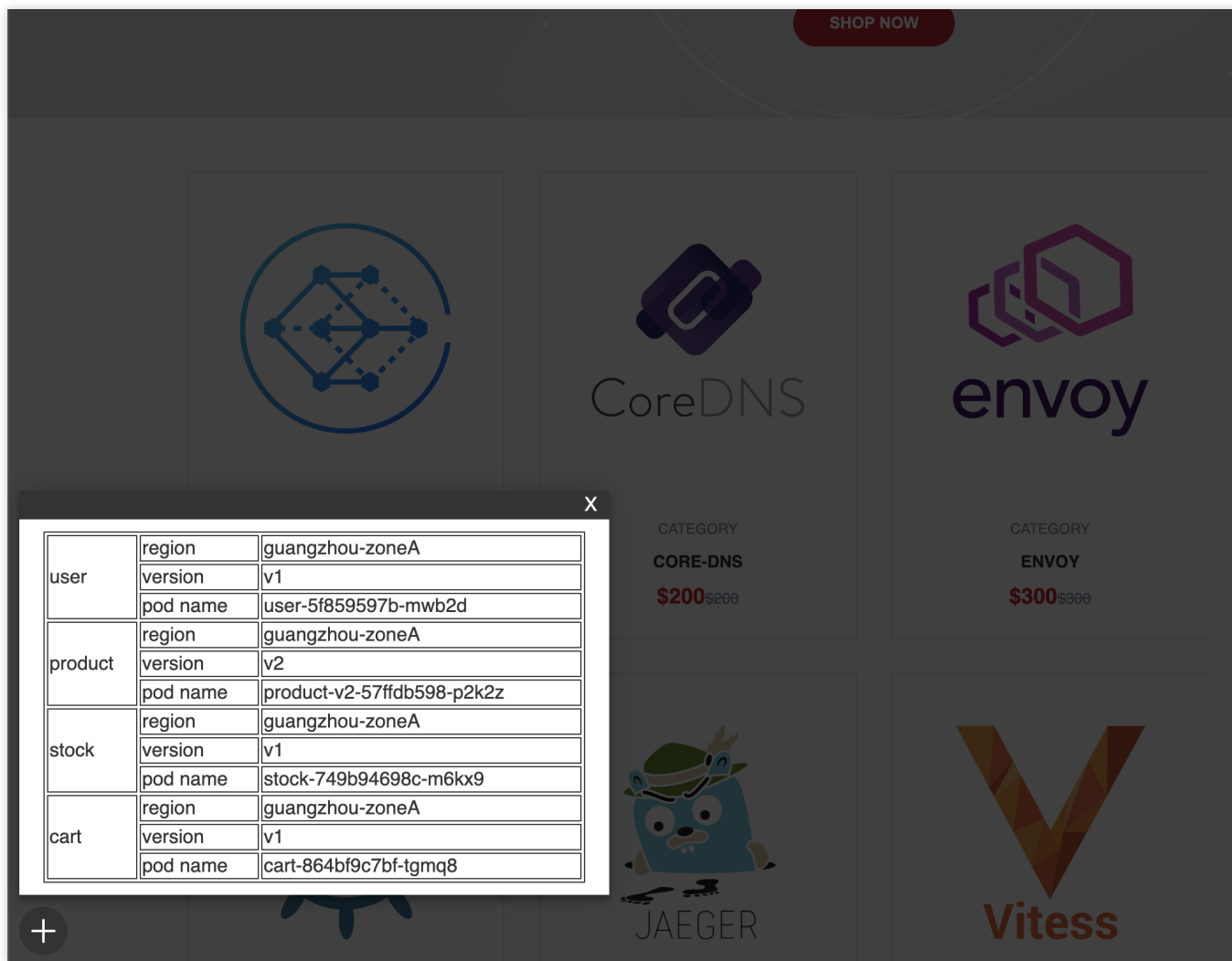
```
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: order-vs
  namespace: base
spec:
  hosts:
    - order.base.svc.cluster.local
```



```
http:
  - match:
    - headers:
      cookie:
        exact: vip=false
    route:
      - destination:
        host: order.base.svc.cluster.local
        subset: v1
    timeout: 3000ms
  - match:
    - headers:
      cookie:
        exact: vip=true
    route:
      - destination:
        host: order.base.svc.cluster.local
        subset: v2
    timeout: 3000ms
```

After the configuration, add an item to the cart, and the cart service will experience an access latency of seven seconds due to the injected fault, without a timeout. Then, click **CHECKOUT** to start the checkout process and call the order service, and, in addition to the access latency of seven seconds, the order service will experience a timeout period of three seconds, which means a timeout will occur if no operation is performed within three seconds after the order service is called.

The timeout occurring when the cart service calls the order service is as shown below:



After completing the timeout configuration and the fault injection test on the service, delete the `VirtualService` resource associated with the stock service to disassociate the configured fault injection policy from the stock service. Delete the `VirtualService` associated with the stock service as shown below:

<div>Create</div> <div>Namespace All</div>				
Name	Hosts	Gateway	HTTP routing	TCP routing
frontend-vs	*	base/frontend-gw	1	0
order-vs	order.base.svc.cluster.local	-	2	0
product-vs	product.base.svc.cluster.local	-	1	0
stock-vs	stock.base.svc.cluster.local	-	1	0

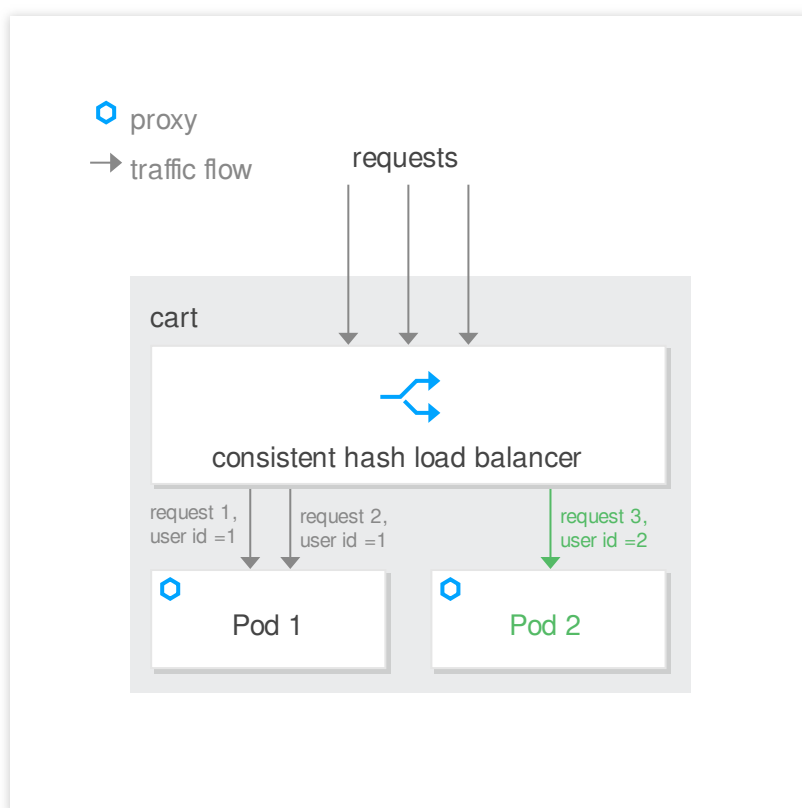
# Session Persistence

Last updated : 2023-12-26 10:46:12

## Overview

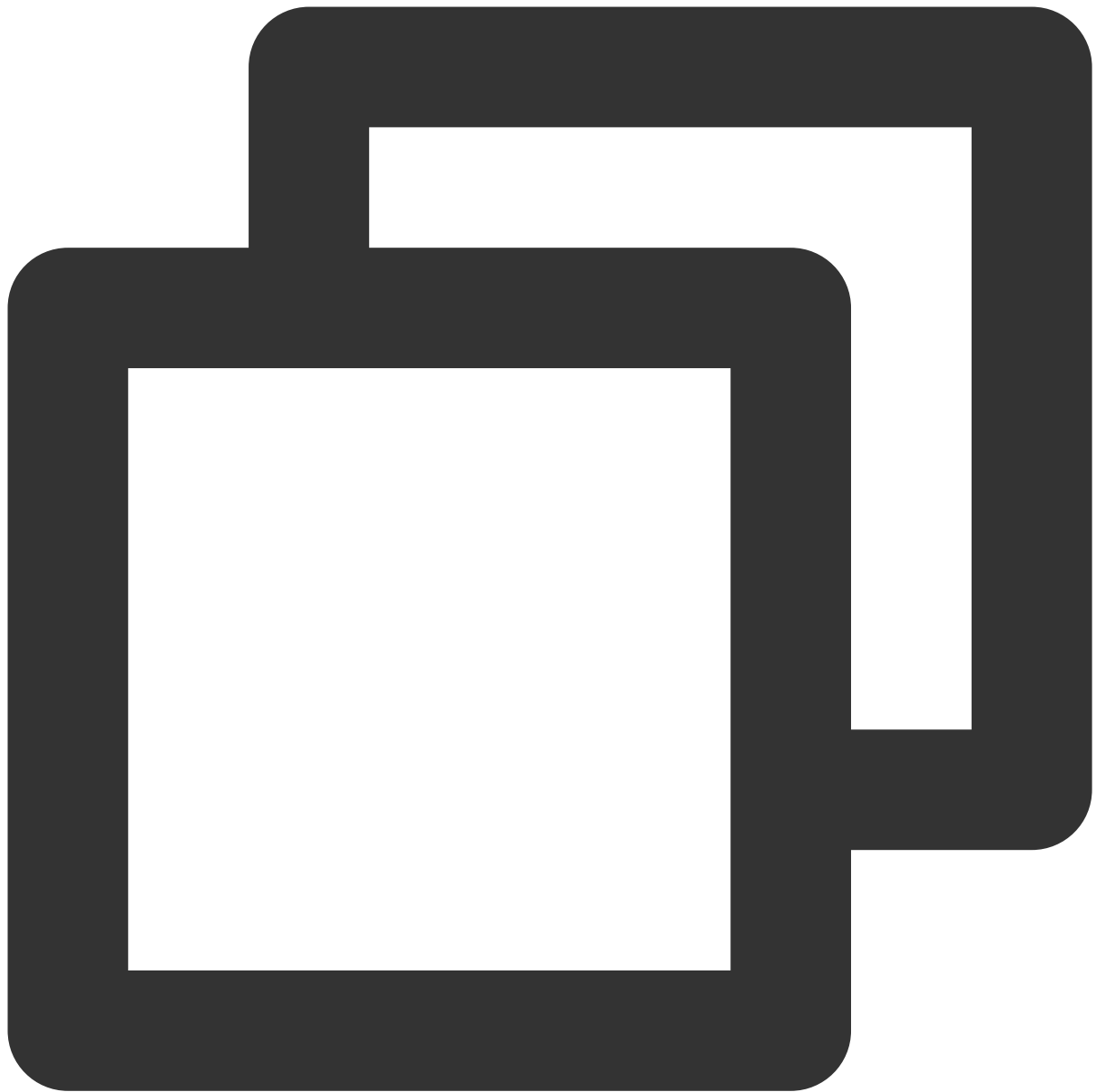
The cart service has multiple running Pods, requiring the session persistence feature to ensure that requests from the same user are routed to the same Pod and the user's cart information will not be lost.

Session persistence is as shown below:



## Directions

Implement the session persistence feature by setting the `DestinationRule` loading balancing policy of the cart service, with `UserID` in the request header for consistent hashing.



```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: cart
  namespace: base
spec:
  host: cart
  trafficPolicy:
    loadBalancer:
      consistentHash:
        httpHeaderName: UserID
```

```
exportTo:
- '*'
```

After the configuration, click **YOUR CART** multiple times or **ADD TO CART** after login to call the cart service to verify whether requests from the same user are routed to the same Pod. The name of the Pod providing the cart service can be viewed in the bottom-left floating window, which is the same for requests from the same user. Requests from the same user are load balanced to the same Pod as shown below:

The screenshot displays the Tencent Cloud Mesh Demo application. The main interface features a dark theme with a navigation bar at the top containing 'Shop', 'About', 'Information', and 'Service'. A central promotional banner reads 'HOT DEAL THIS WEEK' and 'NEW COLLECTION UP TO 50% OFF' with a 'SHOP NOW' button. On the right, a 'Cart' sidebar shows a single item 'core-dns' for \$200.00, with a quantity of 1. The bottom of the page includes a 'SubTotal: \$ 200.00' and a 'CHECKOUT' button. A floating window in the bottom-left corner displays a table of pod information for different services. The 'cart' service's pod name, 'cart-864bf9c7bf-rjbzf', is highlighted with a red box.

Service	Property	Value
user	region	guangzhou-zoneA
	version	v1
	pod name	user-5f859597b-mwb2d
product	region	guangzhou-zoneA
	version	v2
	pod name	product-v2-57fdb598-p2k2z
stock	region	guangzhou-zoneA
	version	v1
	pod name	stock-749b94698c-m6kx9
cart	region	guangzhou-zoneA
	version	v1
	pod name	cart-864bf9c7bf-rjbzf

# Connection Pool-based Concurrency Limiting

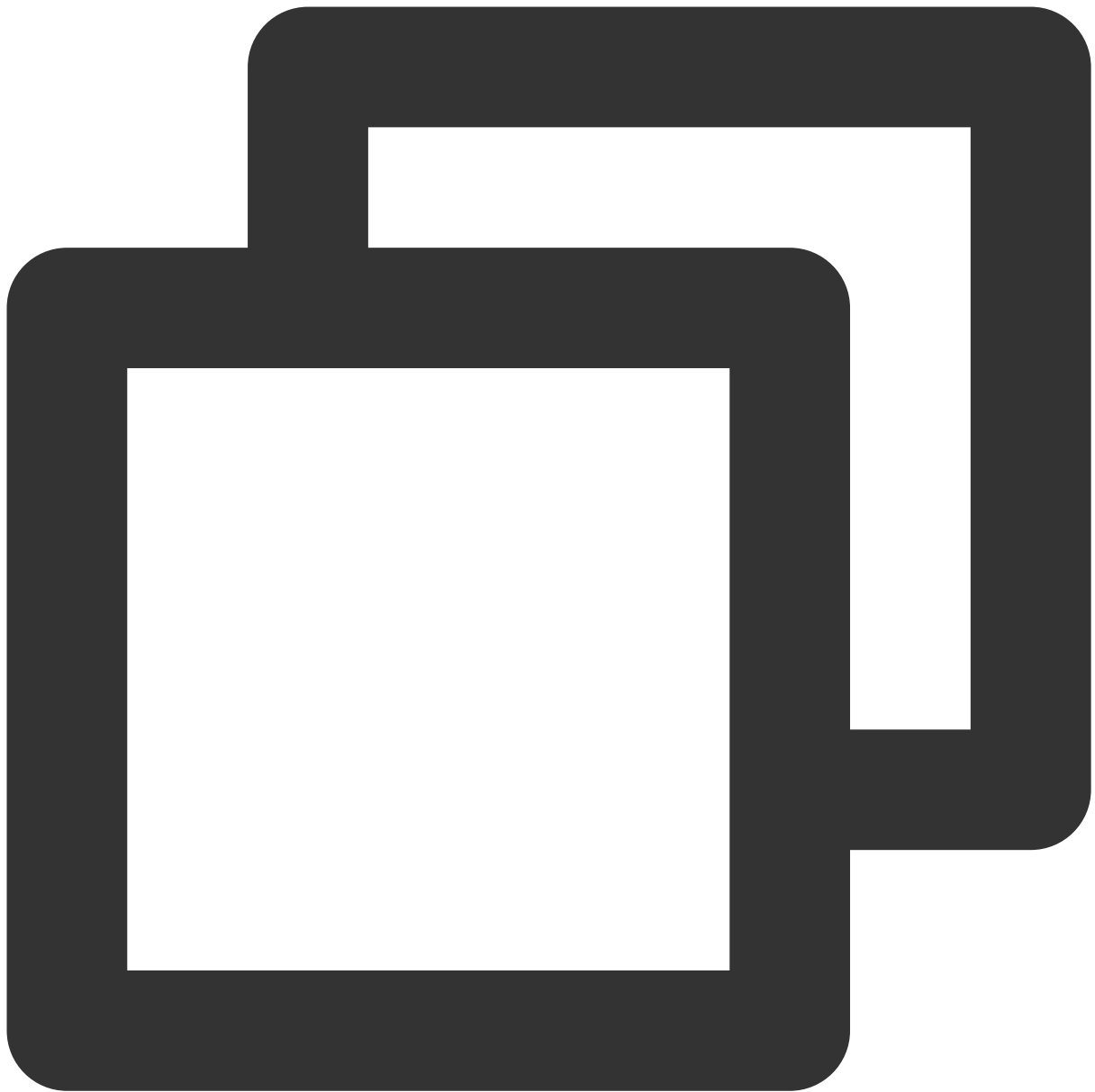
Last updated : 2023-12-26 11:35:08

## Overview

This document describes how to limit the maximum number of concurrent access requests to an ecommerce website to ensure robust service running.

## Directions

To simulate a high number of concurrent requests to the user service, submit the following YAML file to deploy the client service (with ten Pods).



```
apiVersion: v1
kind: Namespace
metadata:
  name: test
  labels:
    istio-injection: enabled
spec:
  finalizers:
    - kubernetes
---
apiVersion: apps/v1
```

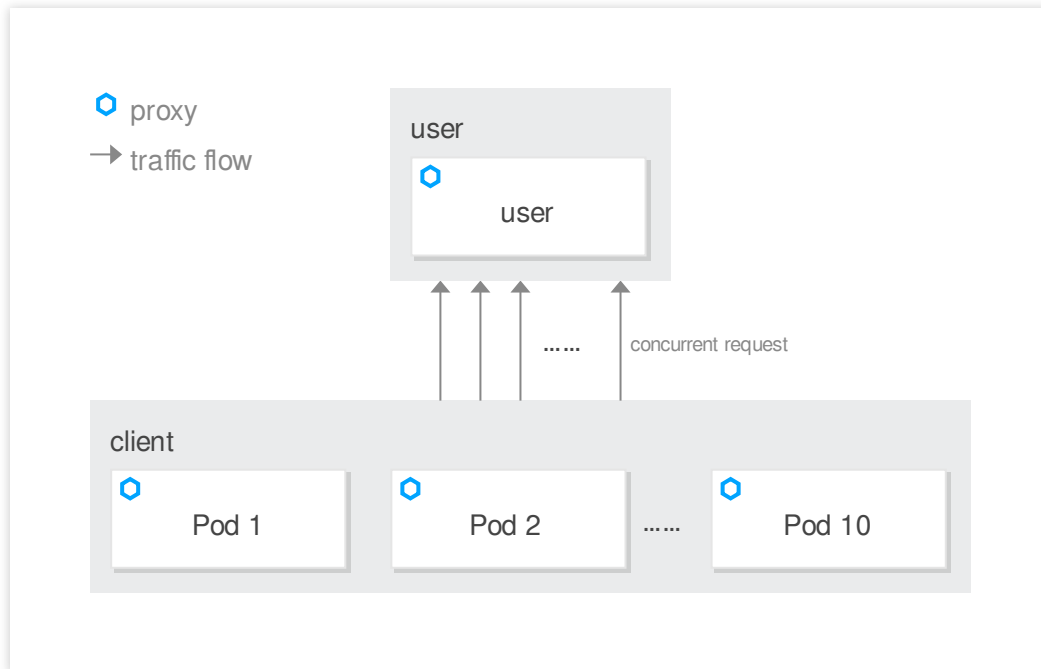
```
kind: Deployment
metadata:
  name: client
  namespace: test
  labels:
    app: client
spec:
  replicas: 10
  selector:
    matchLabels:
      app: client
  template:
    metadata:
      labels:
        app: client
    spec:
      containers:
        - name: client
          image: ccr.ccs.tencentyun.com/zhulei/testclient:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneA"
          ports:
            - containerPort: 7000
              protocol: TCP
---

apiVersion: v1
kind: Service
metadata:
  name: client
  namespace: test
  labels:
    app: client
spec:
  ports:
    - name: http
      port: 7000
      protocol: TCP
  selector:
    app: client
  type: ClusterIP
```



At this point, all the requests to the user service can pass, as there is no limit on the maximum concurrency. View the client Pod log through the client Deployment in the TKE console, which shows that all the requests returned the username `Kevin` , indicating that requests succeeded.

A high number of concurrent requests is as shown below:



All the requests succeeded as shown below:

Tencent Cloud

Overview Products +

Tencent Kubernetes Engine

Overview

Cluster

Register Cluster

Service Mesh

Application

Helm

Images

Ops

Cluster Ops

TMP

Log Collection(Legacy)

Cluster (Singapore) / Deployment:client(test)

Pod management Update history Event Log Details YAML

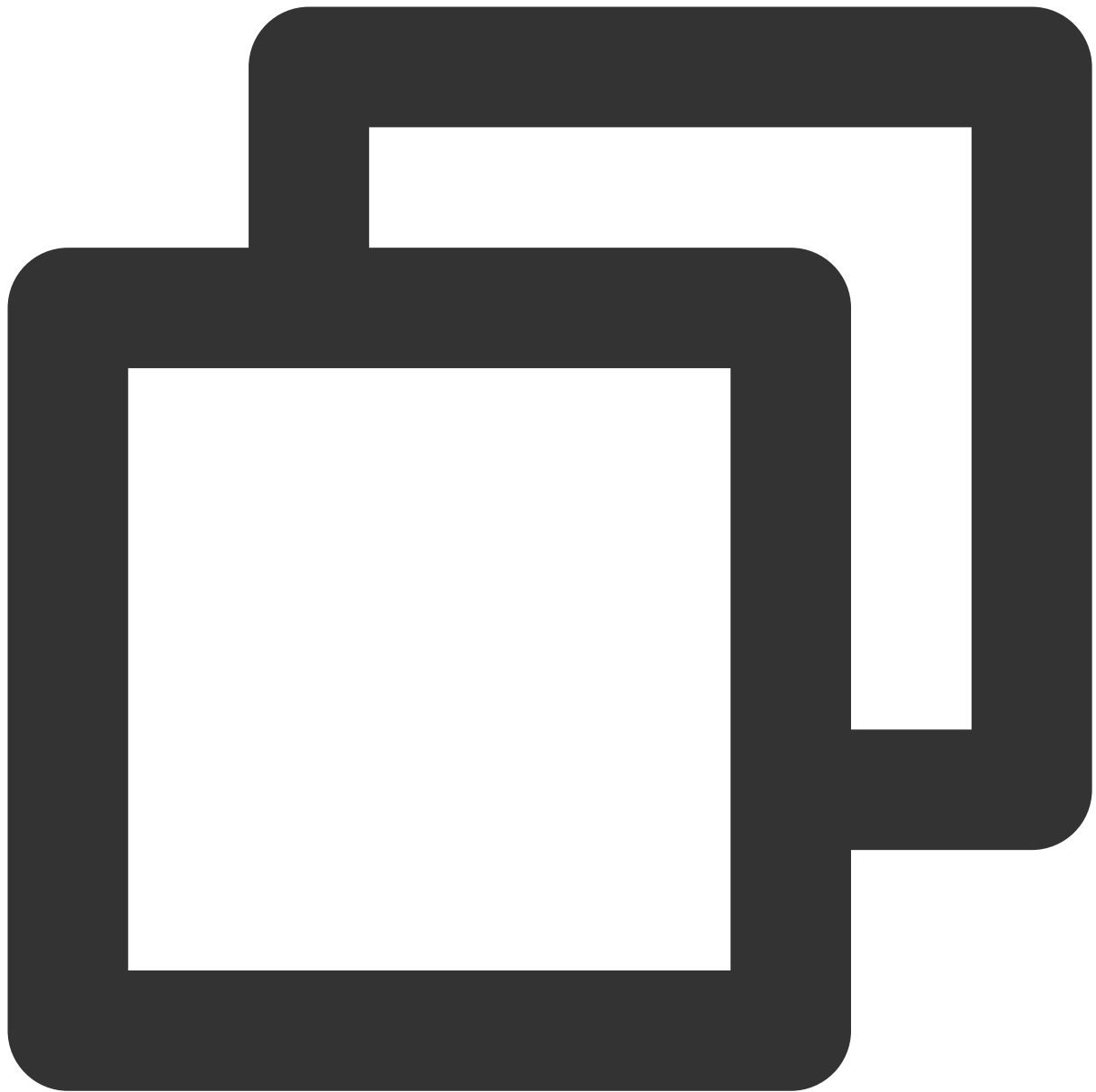
Conditional filtering

Pod options client-74cb78b985-6zgns client

Other options 100 data entries

```
1 UserID: 1, Vip: true, Name: Kevin
2 UserID: 1, Vip: true, Name: Kevin
3 UserID: 1, Vip: true, Name: Kevin
4 UserID: 1, Vip: true, Name: Kevin
5 UserID: 1, Vip: true, Name: Kevin
6 UserID: 1, Vip: true, Name: Kevin
7 UserID: 1, Vip: true, Name: Kevin
8 UserID: 1, Vip: true, Name: Kevin
9 UserID: 1, Vip: true, Name: Kevin
10 UserID: 1, Vip: true, Name: Kevin
11 UserID: 1, Vip: true, Name: Kevin
12 UserID: 1, Vip: true, Name: Kevin
13 UserID: 1, Vip: true, Name: Kevin
14 UserID: 1, Vip: true, Name: Kevin
15 UserID: 1, Vip: true, Name: Kevin
16 UserID: 1, Vip: true, Name: Kevin
17 UserID: 1, Vip: true, Name: Kevin
18 UserID: 1, Vip: true, Name: Kevin
19 UserID: 1, Vip: true, Name: Kevin
20 UserID: 1, Vip: true, Name: Kevin
21 UserID: 1, Vip: true, Name: Kevin
22 UserID: 1, Vip: true, Name: Kevin
```

Configure the `Destination Rule` of the user service to limit the maximum concurrency to `1` :



```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: user
  namespace: base
spec:
  host: user
  trafficPolicy:
    connectionPool:
      http:
        http1MaxPendingRequests: 1
```

```
http2MaxRequests: 1
maxRequestsPerConnection: 1
exportTo:
- '*'
```

View the client Pod log, which shows that some requests are abnormal and failed, with no username returned. In this case, the connection pool succeeded in limiting the maximum number of concurrent requests to the service.

Some access requests failed as shown below:

The screenshot displays the Tencent Cloud Kubernetes Engine console. The left sidebar shows the navigation menu with 'Cluster' selected. The main panel shows the 'Log' tab for the deployment 'client(test)'. The 'Conditional filtering' section shows 'Pod options' set to 'client-5f968b69b4-29448' and 'client'. The 'Other options' section shows '100 data entries'. The log output shows a sequence of requests. Lines 1 through 11 are highlighted with a red box, showing 'UserID: 0, Vip: false, Name:' followed by a blank. Lines 12 and 15 show 'UserID: 1, Vip: true, Name: Kevin'. The remaining lines (13, 14, 16 through 23) show 'UserID: 0, Vip: false, Name:' followed by a blank.

After the connection pool testing, delete the traffic policy configuration of the connection pool on the details page of the user service.

# Multi-cluster Disaster Recovery and Multi-active

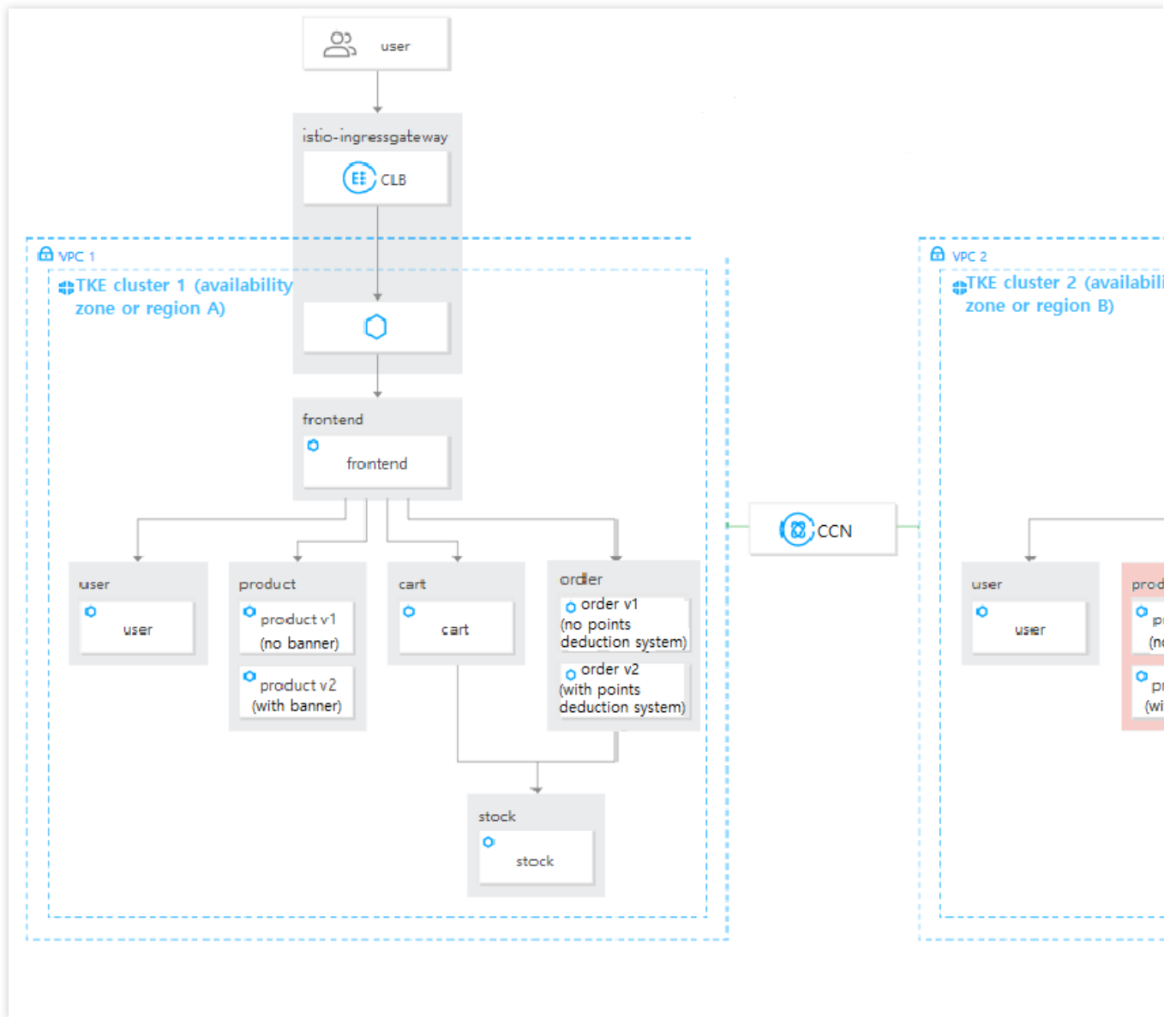
## Cross-Cluster Disaster Recovery

Last updated : 2023-12-26 11:35:33

### Overview

This document describes how to implement disaster recovery capabilities across regions (AZs) for all services. In this way, when a service in a region (AZ) fails, traffic to the service will be automatically switched to another region (AZ).

Cross-region service disaster recovery is as shown below:




## Verification

By default, Tencent Cloud Mesh provides cross-region (AZ) service disaster recovery capabilities, as verified below.

To begin with, set the number of Pods in the `product-v2` Deployment of the primary cluster to `0` in the TKE console. This is to simulate product service failures in the AZ of the primary cluster.

Adjust the number of Pods as shown below:

**Basic information**

Region Southeast Asia(Singapore)  
Cluster ID ck   
Namespace base  
Resource name cart (Deployment)

Current Pods 3

Number of instances ☒ Manual adjustment ☐ Auto adjustment


Set the number of pods directly

Number of instances  3

After the configuration, access the demo ecommerce website through the IP address of the edge gateway of the primary cluster. Even if the product service in AZ A of the primary cluster fails, you can still access the product page and view service calls in the floating window in the bottom-left corner. The current page calls the product service in another AZ, indicating that access requests to the product service in AZ A are routed to the product service in AZ B, implementing cross-AZ disaster recovery at the service level.

Deploy two clusters in different regions to implement cross-region disaster recovery at the service level.

Cross-AZ disaster recovery of the product service is as shown below:

 **Tencent Cloud Mesh Demo**

ShopAboutInformationService

02  
DAYS

10  
HOURS


34  
MINS


60  
SECS

**HOT DEAL THIS WEEK**  
NEW COLLECTION UP TO 50% OFF

SHOP NOW

user	region	guangzhou-zoneA
	version	v1
	pod name	user-5f859597b-mwb2d
product	region	guangzhou-zoneB
	version	v2
	pod name	product-v2-8686cb99f5-mvh5k

  
CoreDNS

  
envoy

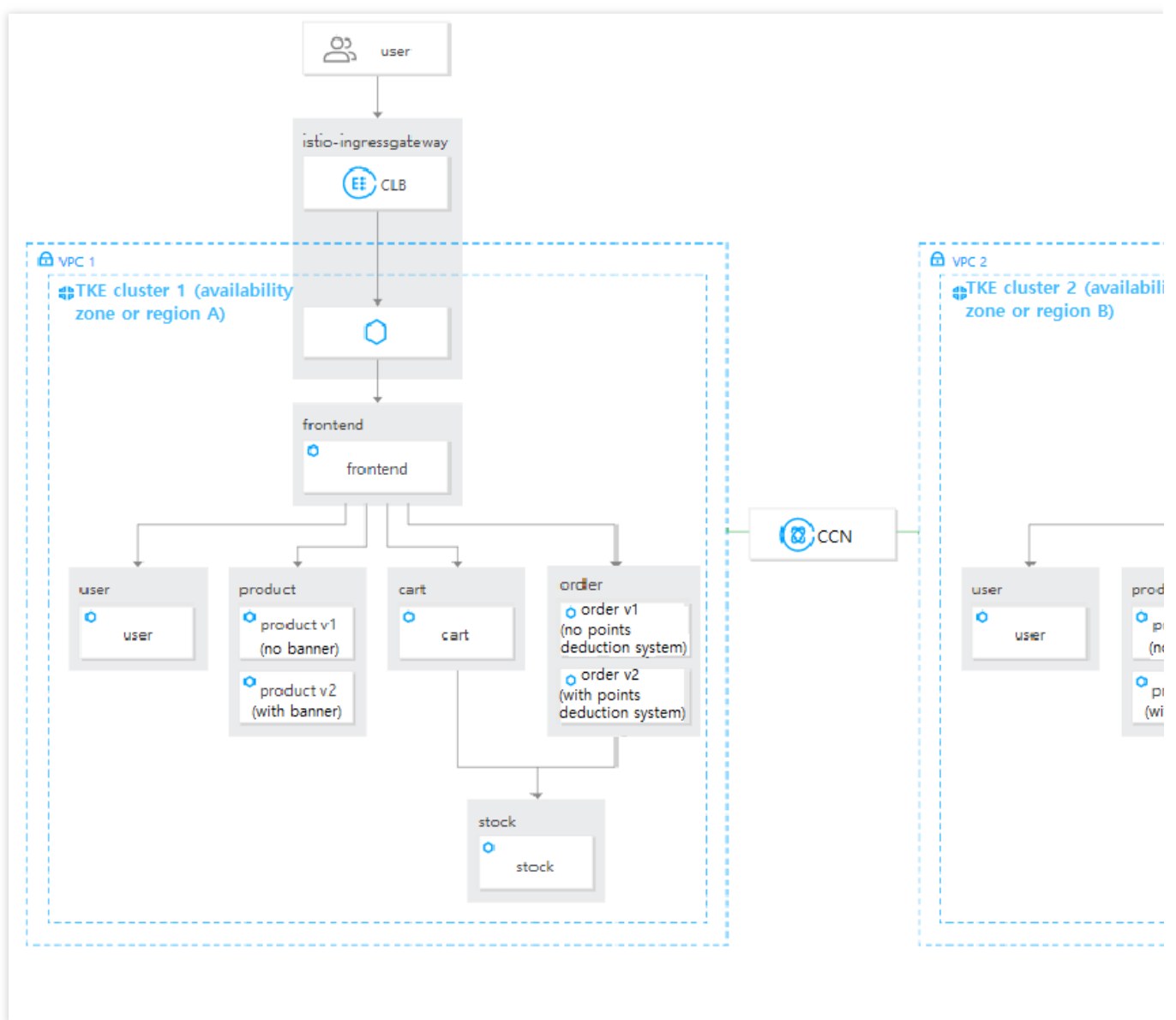


# Locality Load Balancing

Last updated : 2023-12-26 11:36:12

## Overview

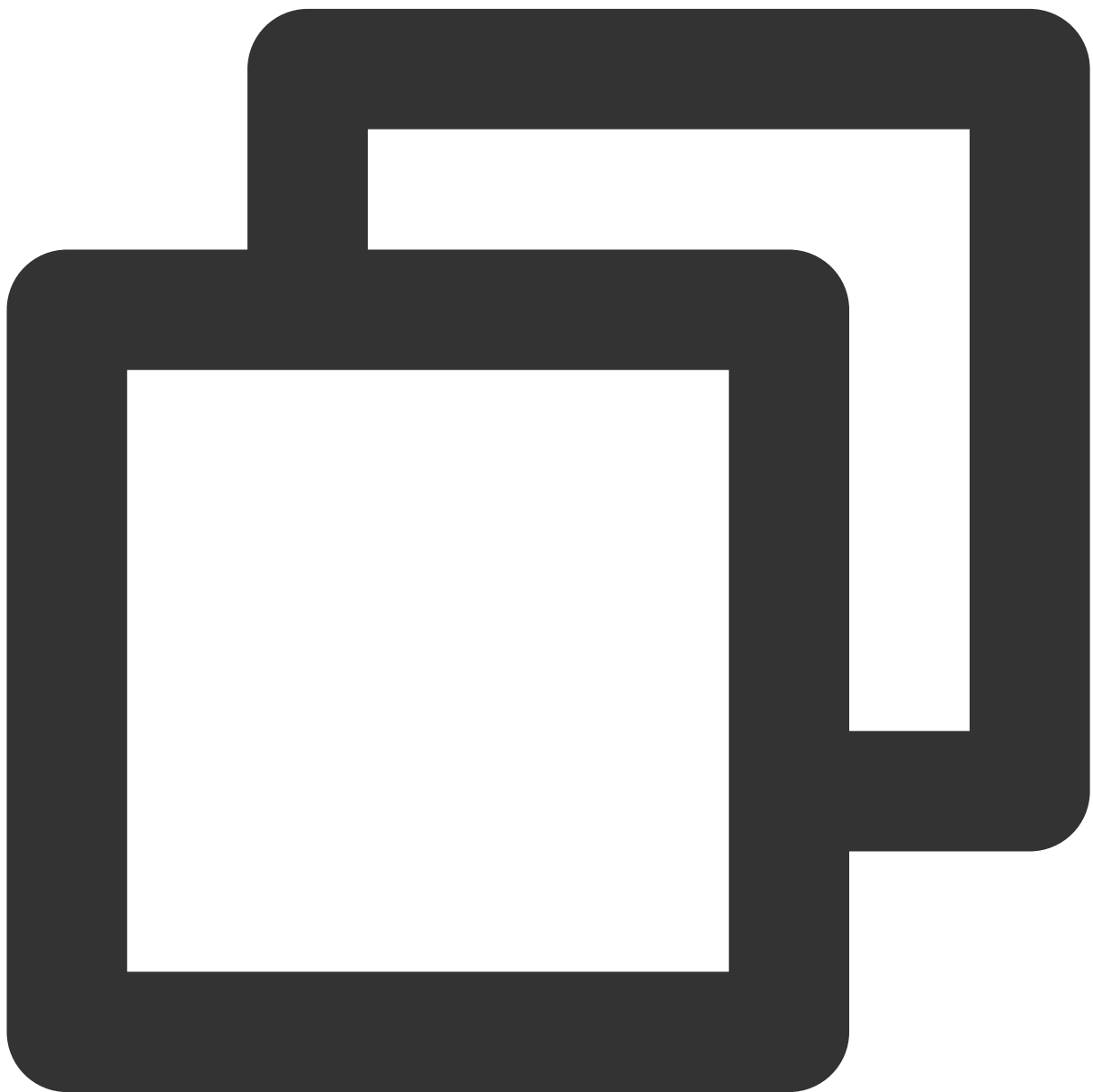
This document describes how to deploy another set of website businesses in a cluster in another AZ to increase availability when the business expands. In particular, two sets of the same website businesses are available in two clusters at the same time. Locality load balancing is as shown below:



## Directions

When the two sets of website businesses run normally, the ingress gateway will preferentially route traffic to the frontend service in the local region or AZ, even though the other cluster also has the frontend service. In addition, the frontend service will access the user, product, order, and cart services in the same AZ, and the order and cart services will access the stock service in the same AZ.

In Kubernetes, the Pod region is determined by the region and zone labels of the deployed node. The zone label is set for a workload in the YAML content of the demo application. First, deploy all the website services to the cluster (sub-cluster) in another AZ:



```
apiVersion: v1
kind: Namespace
```

```
metadata:
  name: base
  labels:
    istio.io/rev: 1-6-9
spec:
  finalizers:
    - kubernetes
---
apiVersion: apps/v1
kind: Deployment
metadata:
  name: frontend
  namespace: base
  labels:
    app: frontend
spec:
  replicas: 1
  selector:
    matchLabels:
      app: frontend
  template:
    metadata:
      labels:
        app: frontend
    spec:
      containers:
        - name: frontend
          image: ccr.ccs.tencentyun.com/chloeyhuang/demo:v202007101540
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 80
---

apiVersion: v1
kind: Service
metadata:
  name: frontend
  namespace: base
  labels:
    app: frontend
```

```
spec:
  ports:
    - port: 80
      name: http
  selector:
    app: frontend
---

apiVersion: apps/v1
kind: Deployment
metadata:
  name: product-v1
  namespace: base
  labels:
    app: product
    version: v1
spec:
  replicas: 1
  selector:
    matchLabels:
      app: product
      version: v1
  template:
    metadata:
      labels:
        app: product
        version: v1
    spec:
      containers:
        - name: product
          image: ccr.ccs.tencentyun.com/zhulei/testproduct1:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 7000
---

apiVersion: apps/v1
kind: Deployment
metadata:
  name: product-v2
```

```
namespace: base
labels:
  app: product
  version: v2
spec:
  replicas: 1
  selector:
    matchLabels:
      app: product
      version: v2
  template:
    metadata:
      labels:
        app: product
        version: v2
    spec:
      containers:
        - name: product
          image: ccr.ccs.tencentyun.com/zhulei/testproduct2:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 7000
---

apiVersion: v1
kind: Service
metadata:
  name: product
  namespace: base
  labels:
    app: product
spec:
  ports:
    - port: 7000
      name: http
  selector:
    app: product
---

apiVersion: apps/v1
```

```
kind: Deployment
metadata:
  name: user
  namespace: base
  labels:
    app: user
spec:
  replicas: 1
  selector:
    matchLabels:
      app: user
  template:
    metadata:
      labels:
        app: user
    spec:
      containers:
        - name: user
          image: ccr.ccs.tencentyun.com/zhulei/testuser:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 7000
---

apiVersion: v1
kind: Service
metadata:
  name: user
  namespace: base
  labels:
    app: user
spec:
  ports:
    - port: 7000
      name: http
  selector:
    app: user
---

apiVersion: apps/v1
```

```
kind: Deployment
metadata:
  name: stock
  namespace: base
  labels:
    app: stock
spec:
  replicas: 1
  selector:
    matchLabels:
      app: stock
  template:
    metadata:
      labels:
        app: stock
    spec:
      containers:
        - name: stock
          image: ccr.ccs.tencentyun.com/zhulei/teststock:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 7000
---

apiVersion: v1
kind: Service
metadata:
  name: stock
  namespace: base
  labels:
    app: stock
spec:
  ports:
    - port: 7000
      name: http
  selector:
    app: stock
---

apiVersion: apps/v1
```

```
kind: Deployment
metadata:
  name: cart
  namespace: base
  labels:
    app: cart
spec:
  replicas: 3
  selector:
    matchLabels:
      app: cart
  template:
    metadata:
      labels:
        app: cart
    spec:
      containers:
        - name: cart
          image: ccr.ccs.tencentyun.com/zhulei/testcart:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 7000
              protocol: TCP
---

apiVersion: v1
kind: Service
metadata:
  name: cart
  namespace: base
  labels:
    app: cart
spec:
  ports:
    - name: http
      port: 7000
      protocol: TCP
  selector:
    app: cart
  type: ClusterIP
```



```
---

apiVersion: apps/v1
kind: Deployment
metadata:
  name: order-v1
  namespace: base
  labels:
    app: order
    version: v1
spec:
  replicas: 1
  selector:
    matchLabels:
      app: order
      version: v1
  template:
    metadata:
      labels:
        app: order
        version: v1
    spec:
      containers:
        - name: order
          image: ccr.ccs.tencentyun.com/zhulei/testorder1:v1
          imagePullPolicy: Always
          env:
            - name: POD_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: REGION
              value: "guangzhou-zoneB"
          ports:
            - containerPort: 7000
              protocol: TCP
```

```
---

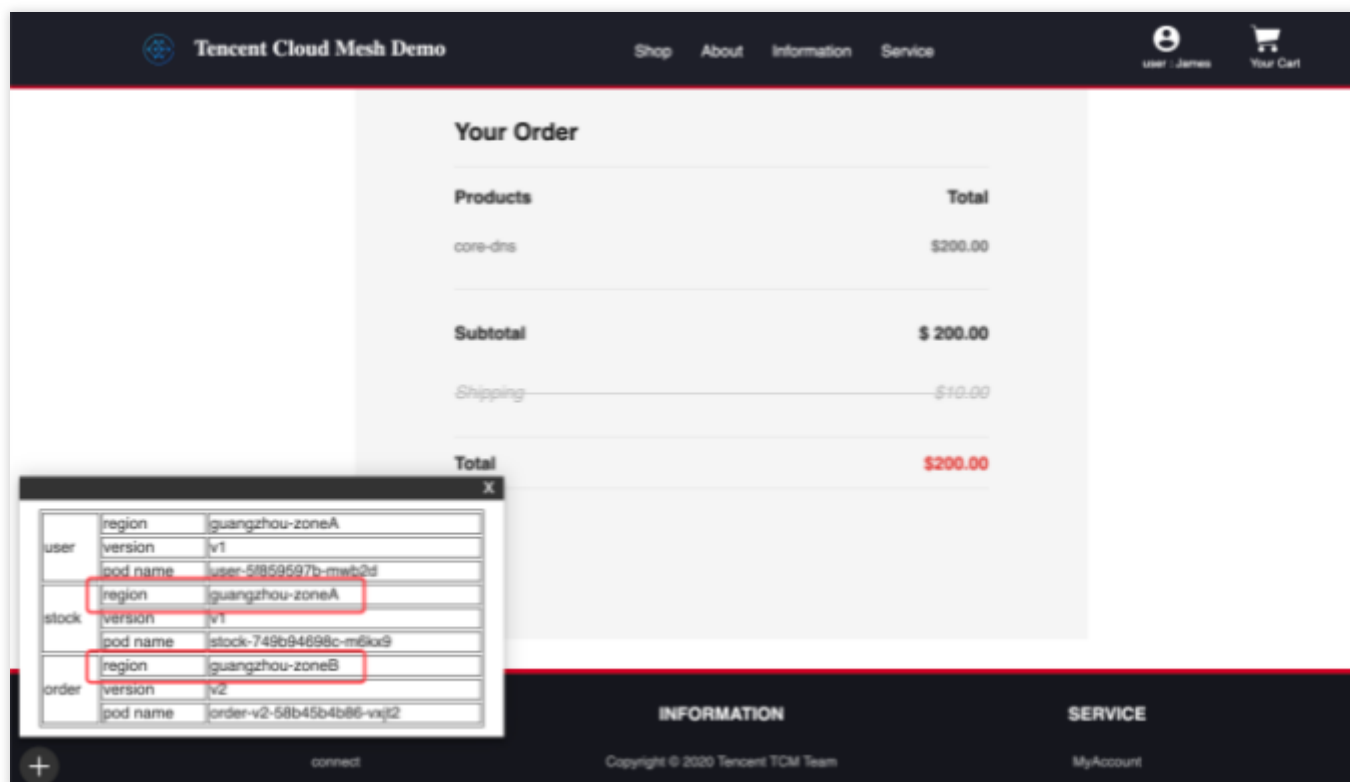
apiVersion: apps/v1
kind: Deployment
metadata:
  name: order-v2
  namespace: base
  labels:
    app: order
    version: v2
spec:
```

```
replicas: 1
selector:
  matchLabels:
    app: order
    version: v2
template:
  metadata:
    labels:
      app: order
      version: v2
  spec:
    containers:
      - name: order
        image: ccr.ccs.tencentyun.com/zhulei/testorder2:v1
        imagePullPolicy: Always
        env:
          - name: POD_NAME
            valueFrom:
              fieldRef:
                fieldPath: metadata.name
          - name: REGION
            value: "guangzhou-zoneB"
        ports:
          - containerPort: 7000
            protocol: TCP
---

apiVersion: v1
kind: Service
metadata:
  name: order
  namespace: base
  labels:
    app: order
spec:
  ports:
    - name: http
      port: 7000
      protocol: TCP
  selector:
    app: order
  type: ClusterIP
```

After the deployment, locality load balancing will not take effect if health check is not configured. In this case, services are called randomly in the two AZs, without adherence to the nearby access principle.

The order service calls the stock service in another AZ as shown below:



To enable locality load balancing for service access, you need to configure the health check feature for all the services by submitting the following YAML file to the primary cluster:



```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: cart
  namespace: base
spec:
  host: cart
  trafficPolicy:
    loadBalancer:
      consistentHash:
        httpHeaderName: UserID
```

```
    outlierDetection:
      consecutiveErrors: 5
      interval: 10000ms
      baseEjectionTime: 30000ms
      maxEjectionPercent: 10
      minHealthPercent: 50
  exportTo:
    - '*'

---
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: frontend
  namespace: base
spec:
  host: frontend
  trafficPolicy:
    outlierDetection:
      consecutiveErrors: 5
      interval: 10000ms
      baseEjectionTime: 30000ms
      maxEjectionPercent: 10
      minHealthPercent: 50
  exportTo:
    - '*'

---
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: order
  namespace: base
spec:
  host: order
  trafficPolicy:
    outlierDetection:
      consecutiveErrors: 5
      interval: 10000ms
      baseEjectionTime: 30000ms
      maxEjectionPercent: 10
      minHealthPercent: 50
  subsets:
    - name: v1
      labels:
        version: v1
    - name: v2
```

```
    labels:
      version: v2
  exportTo:
  - '*'

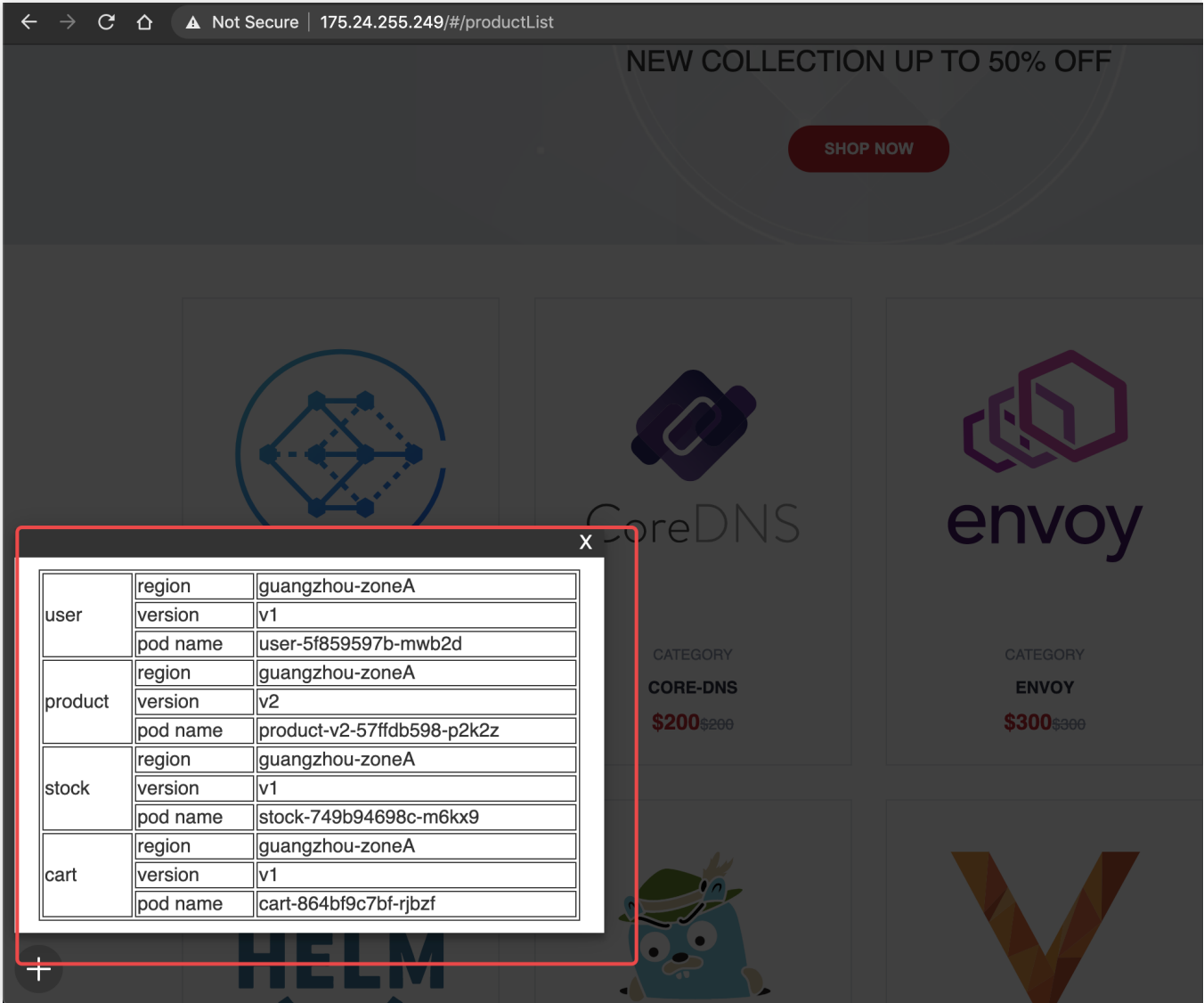
---
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: product
  namespace: base
spec:
  host: product
  trafficPolicy:
    outlierDetection:
      consecutiveErrors: 5
      interval: 10000ms
      baseEjectionTime: 30000ms
      maxEjectionPercent: 10
      minHealthPercent: 50
  subsets:
  - name: v1
    labels:
      version: v1
  - name: v2
    labels:
      version: v2

---
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: stock
  namespace: base
spec:
  host: stock
  trafficPolicy:
    outlierDetection:
      consecutiveErrors: 5
      interval: 10000ms
      baseEjectionTime: 30000ms
      maxEjectionPercent: 10
      minHealthPercent: 50
  exportTo:
  - '*'

---
```

```
apiVersion: networking.istio.io/v1alpha3
kind: DestinationRule
metadata:
  name: user
  namespace: base
spec:
  host: user
  trafficPolicy:
    outlierDetection:
      consecutiveErrors: 5
      interval: 10000ms
      baseEjectionTime: 30000ms
      maxEjectionPercent: 10
      minHealthPercent: 50
  exportTo:
    - '*'
```

After health check is configured, when a user accesses a website service, browses a product page, adds an item to the cart, or places an order through the edge gateway in the cluster of AZ A, the gateway will route the traffic to the frontend service in the same AZ, and the frontend service will also call the user, cart, order, and stock services in the same AZ. Similarly, when a user accesses a website service through the edge gateway of AZ B, the request will be routed to the frontend service in AZ B, and services in AZ B will be called. You can view the AZ information of the currently called service in the floating window in the bottom-left corner of the demo page. Locality load balancing is as shown below:



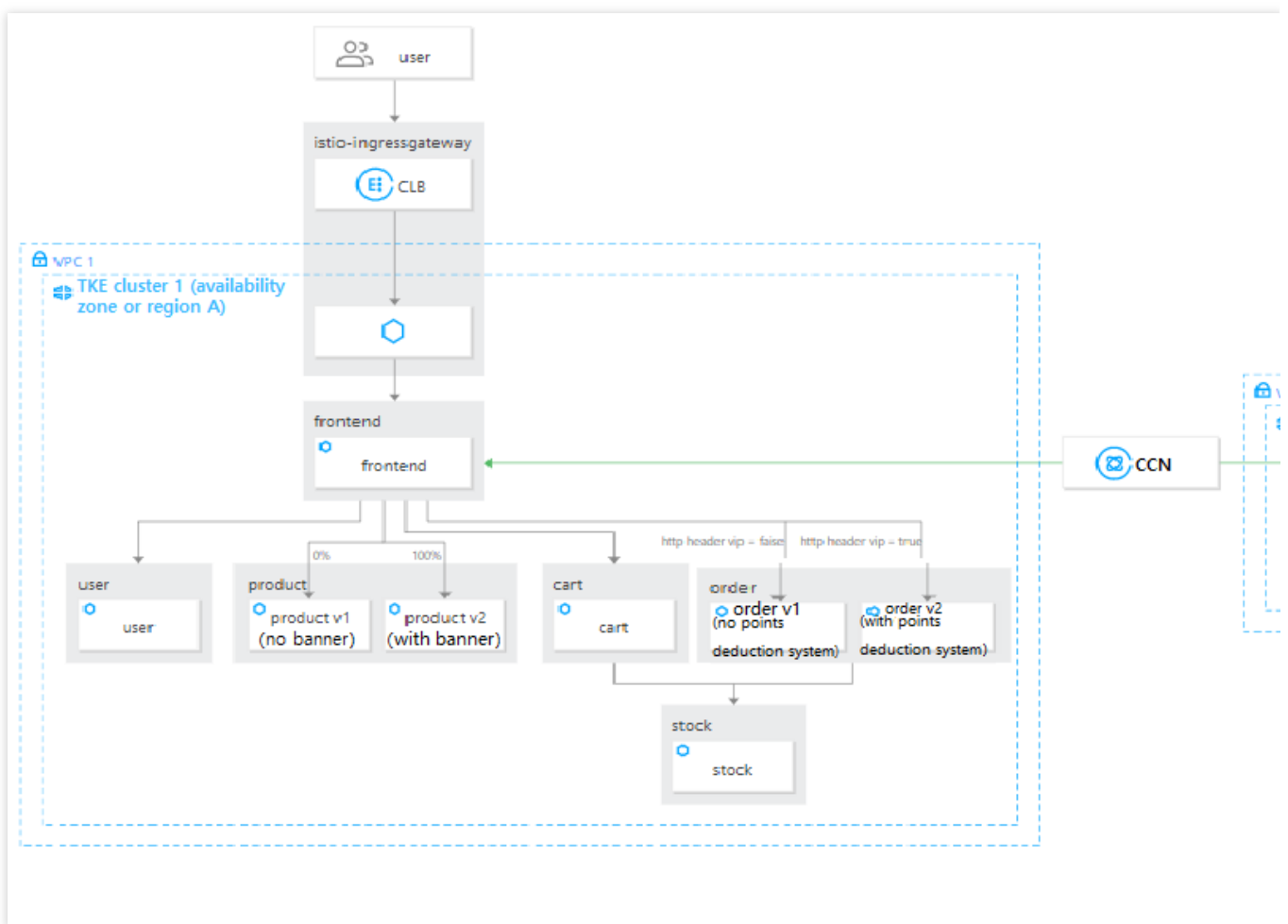


# Nearby Access

Last updated : 2023-12-26 11:37:02

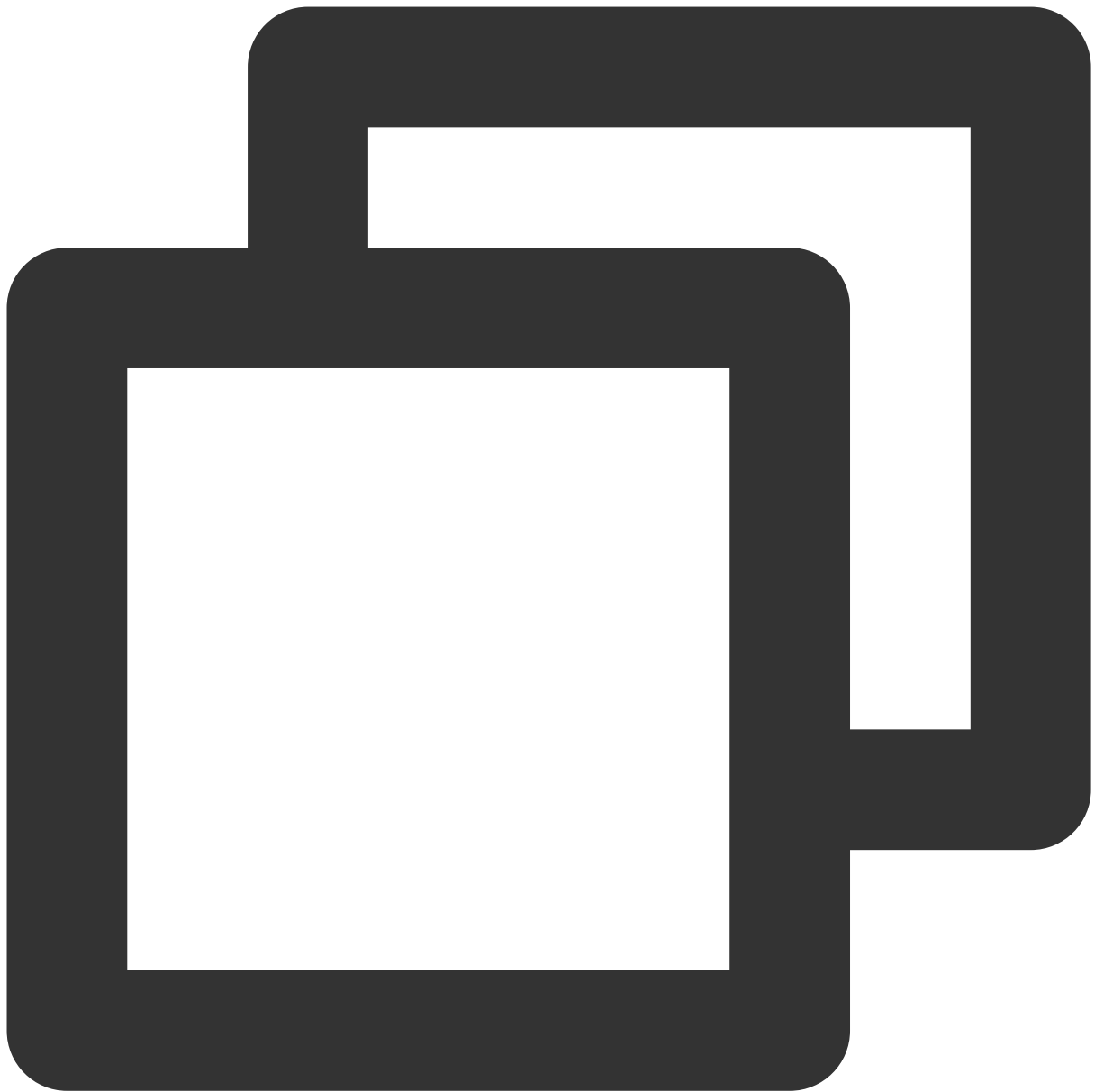
## Overview

As the ecommerce website business expands, businesses need to be quickly deployed to and accessed from a cluster in another region/AZ. Instead of deploying a complete set of businesses, you only need to deploy an edge gateway in the meshed cluster and configure the listener rule. Nearby access is as shown below:



## Directions

Apply the following configuration to the primary cluster. Configure the listener rule of the edge gateway in cluster 2 (sub-cluster), open port 80, and configure the HTTP protocol and `VirtualService` to route the traffic from the edge gateway to the frontend service.



```
apiVersion: networking.istio.io/v1alpha3
kind: Gateway
metadata:
  name: frontend-gw-2
  namespace: base
spec:
  servers:
    - port:
        number: 80
        name: http
        protocol: HTTP
```

```
    hosts:
      - '*'
  selector:
    app: istio-ingressgateway-1
    istio: ingressgateway

---
apiVersion: networking.istio.io/v1alpha3
kind: VirtualService
metadata:
  name: frontend-vs
  namespace: base
spec:
  hosts:
    - '*'
  gateways:
    - base/frontend-gw
    - base/frontend-gw-2
  http:
    - route:
        - destination:
            host: frontend.base.svc.cluster.local
```

After the configuration, the ecommerce website can be accessed through the IP address of the edge gateway in cluster 2 (sub-cluster), as traffic is routed to the service in the primary cluster, even when no ecommerce website services are configured in the Shanghai cluster.

Requests from the secondary cluster are routed to the nearby service in the primary cluster as shown below:

Tencent Cloud Mesh Demo

ShopAboutInformationService

CATEGORY  
TENCENT CLOUD MESH  
\$100\$100

CATEGORY  
CORE-DNS  
\$200\$200

CATEGORY  
ENVOY  
\$300\$300

JAEGER

Viteess

product	region	guangzhou-zoneA
	version	v1
	pod name	product-v1-5b6f956789-79869

# Security Reinforcement Authentication

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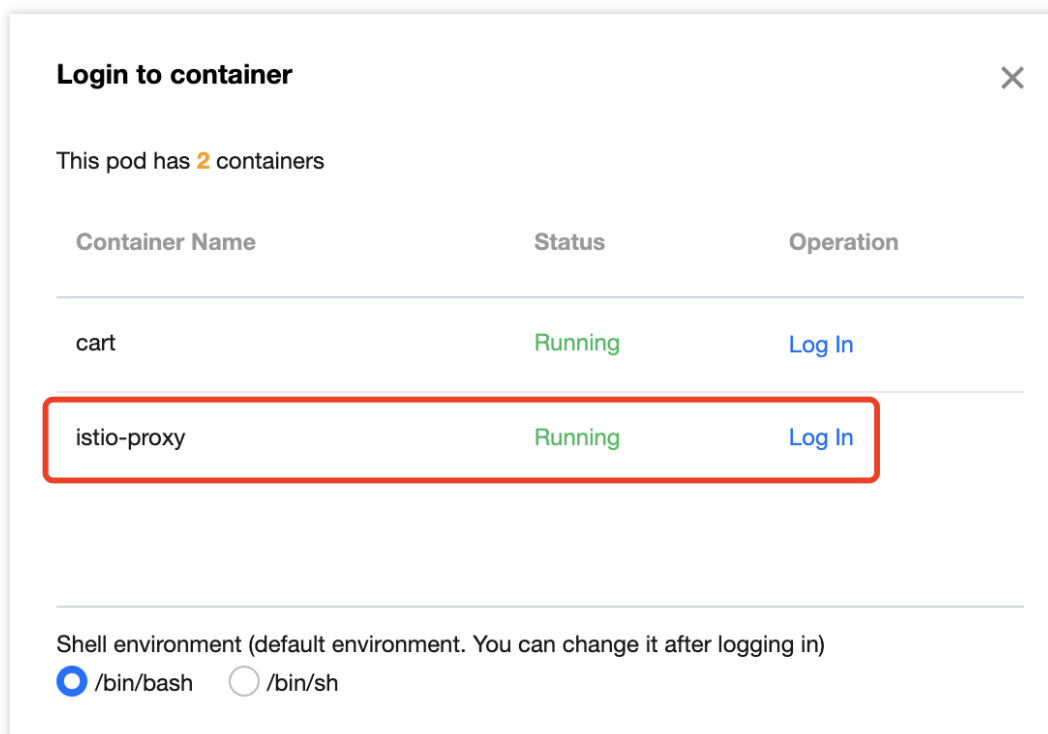
## Overview

This document describes how to implement mutual authentication of mTLS for all service accesses in the production environment (base namespace) to prevent man-in-the-middle attacks.

## Directions

The mTLS mode defaults to `PERMISSIVE`, that is, both mTLS encryption and plaintext connection can be used for service communications.

Log in to the `istio-proxy` container in the TKE console and use plaintext connection to send the `curl http://product.base.svc.cluster.local:7000/product` request to the product service in the production environment (base namespace). In this case, the product service can be accessed via plaintext connection, as shown below:

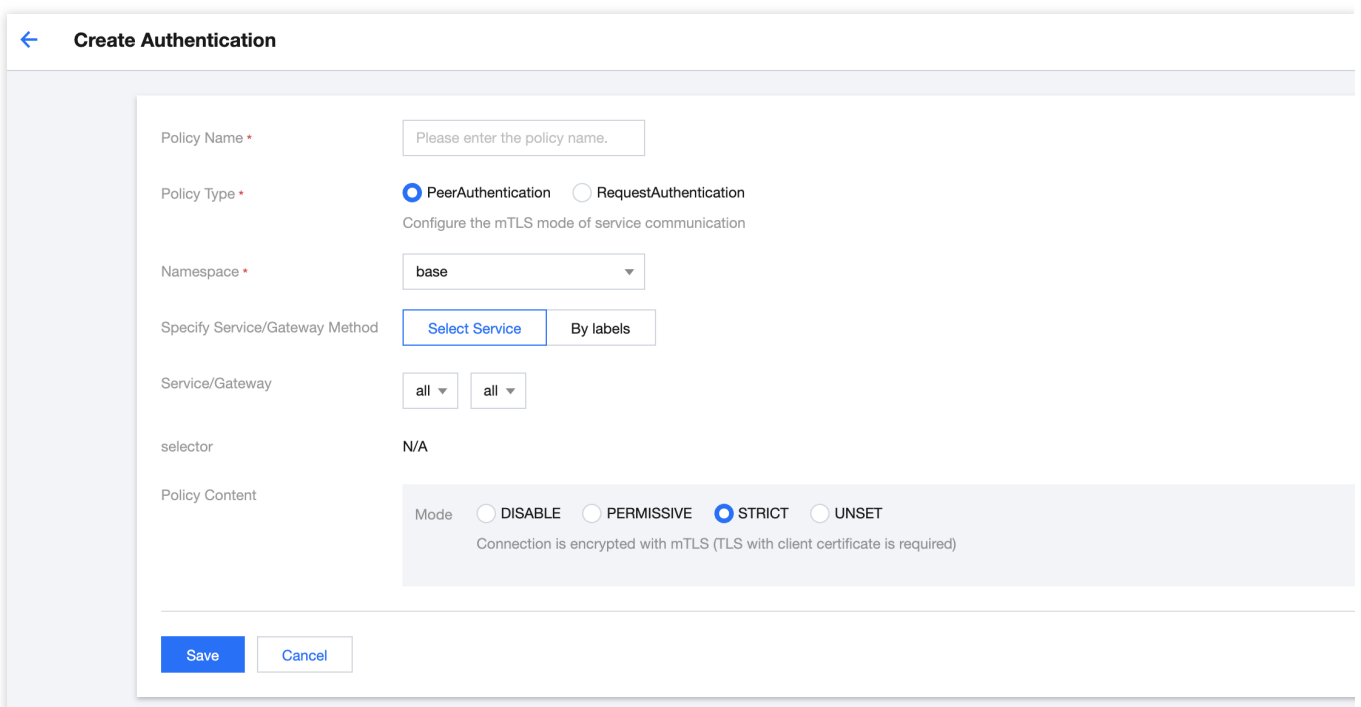


The access via plaintext connection is successful as shown below:



```
tkecache.cloud.tencent.co
Select to copy the texts you want, and press Shift + Insert to paste.
$ curl http://product.base.svc.cluster.local:7000/product
{"product": [{"name": "Tencent Cloud Mesh", "pid": 1, "price": 100, "url": "https://landscape.cncf.io/logos/contai
price": 200, "url": "https://landscape.cncf.io/logos/core-dns.svg"}, {"name": "envoy", "pid": 3, "price": 300, "ur
vg"}, {"name": "fluentd", "pid": 4, "price": 400, "url": "https://landscape.cncf.io/logos/fluentd.svg"}, {"name":
s://landscape.cncf.io/logos/helm.svg"}], "url": "https://landscape.cncf.io/logos/kubernetes.svg", "info": [{"Servi
7797-2d648", "Region": "shanghai"}]}
```

Implement the mTLS mode for service communications in the base namespace by setting the mTLS mode to **STRICT** in the **PeerAuthentication** policy:



**Create Authentication**

Policy Name \*

Policy Type \* ☒ PeerAuthentication ☐ RequestAuthentication  
Configure the mTLS mode of service communication

Namespace \*

Specify Service/Gateway Method

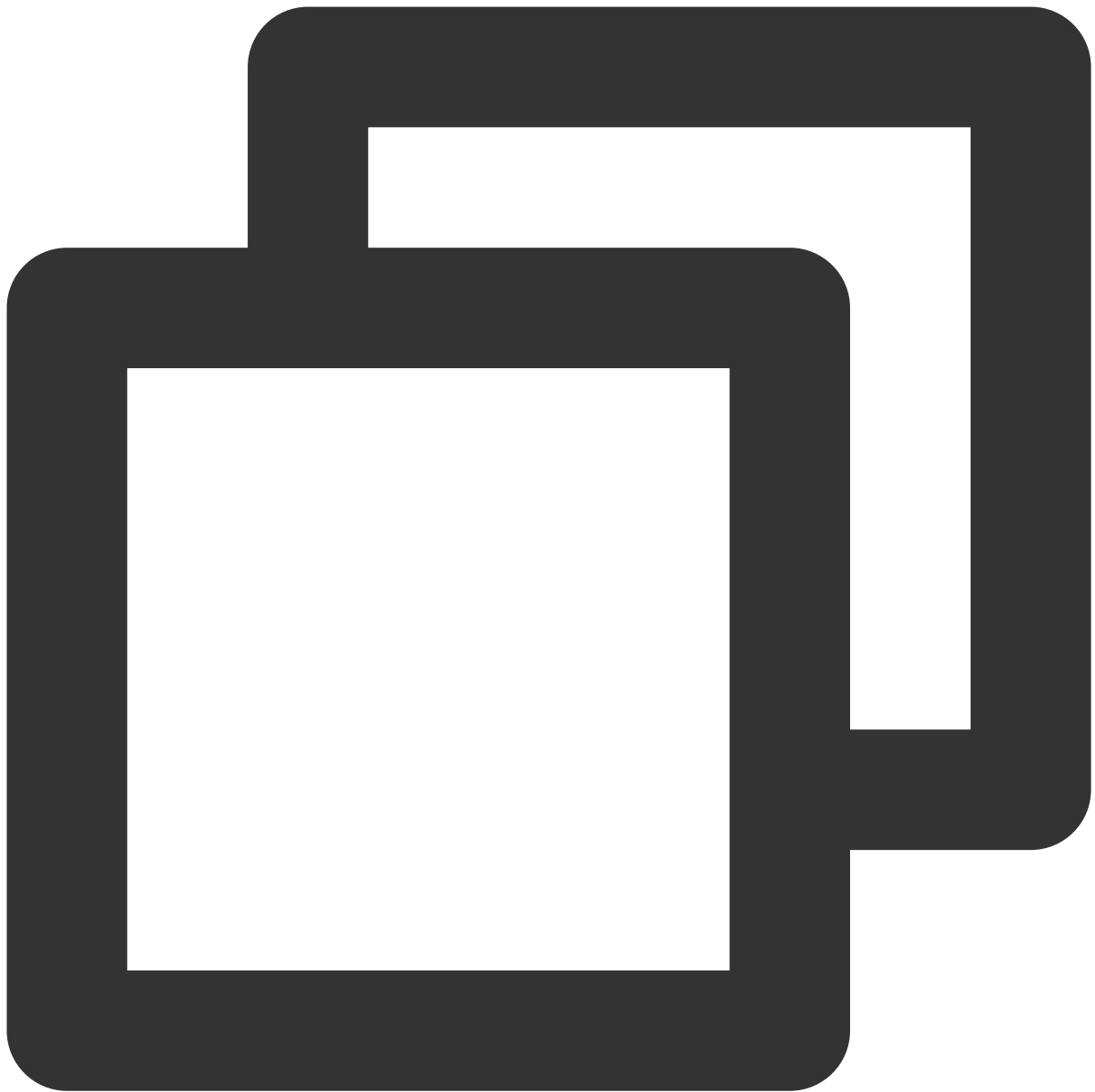
Service/Gateway

selector N/A

Policy Content

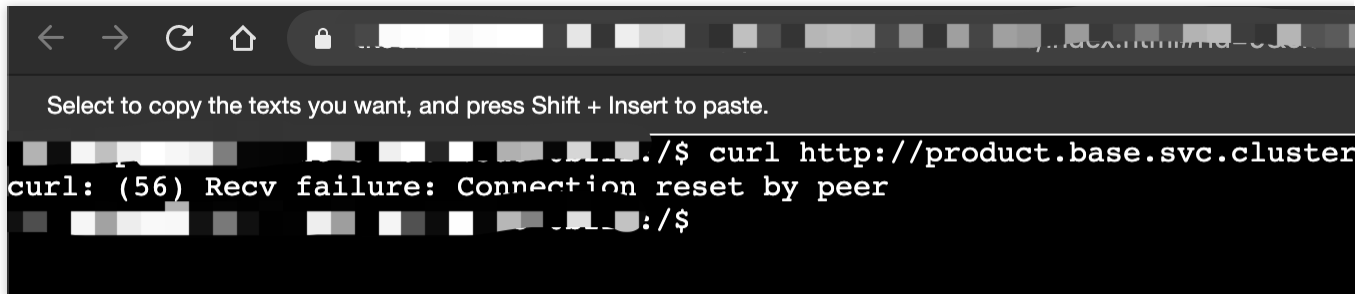
Mode ☐ DISABLE ☐ PERMISSIVE ☒ STRICT ☐ UNSET  
Connection is encrypted with mTLS (TLS with client certificate is required)

Or submit the following YAML file to the primary cluster via kubectl:



```
apiVersion: security.istio.io/v1beta1
kind: PeerAuthentication
metadata:
  name: base-strict
  namespace: base
spec:
  mtls:
    mode: STRICT
```

After the configuration, log in to the `istio-proxy` container in the TKE console and use plaintext connection to send the `curl http://product.base.svc.cluster.local:7000/product` request to the product service in the production environment (base namespace). In this case, the product service cannot be accessed via plaintext connection, as shown below:

A terminal window screenshot showing a failed curl command. The terminal has a dark background with light gray text. At the top, there's a prompt character followed by a command: `curl http://product.base.svc.cluster.local:7000/product`. The output shows an error: `curl: (56) Recv failure: Connection reset by peer`. The prompt character is followed by a colon and a dollar sign, indicating the command prompt is ready for the next input.

```
Select to copy the texts you want, and press Shift + Insert to paste.
[REDACTED] /$ curl http://product.base.svc.cluster.local:7000/product
curl: (56) Recv failure: Connection reset by peer
[REDACTED]:/$
```



# Authorization

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## Overview

This document describes how to implement permission controls to prevent running services in the production environment (base namespace) from being accessed by those in the test environment (test namespace).

## Directions

Configure the following `AuthorizationPolicy` to prevent services in the test namespace from accessing those in the base namespace.

Configure the authorization rule in the console as shown below:

**Create Authorization Policy**

Policy Name \*

Namespace \*

Specify Service

Service/Gateway

selector

Policy ☐ ALLOW ☒ DENY

Matching Rule

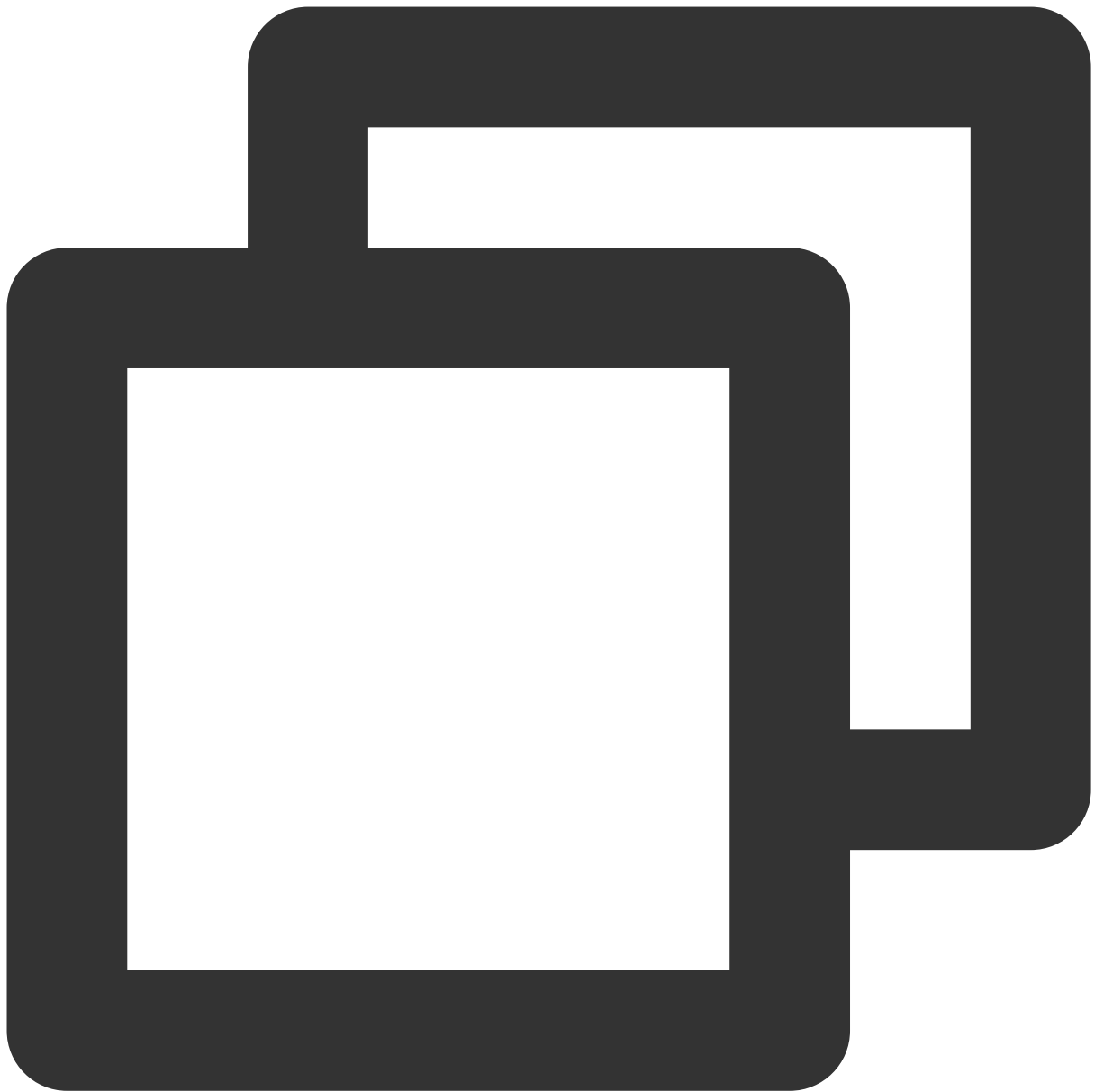
**Rule 1**

Source  :

Operation

Condition

Or submit the following YAML file to the primary cluster:



```
apiVersion: security.istio.io/v1beta1
kind: AuthorizationPolicy
metadata:
  name: base-authz
  namespace: base
spec:
  action: DENY
  rules:
    - from:
      - source:
          namespaces:
```

```
- test
```

After the configuration, view the Pod log of the client service in the test namespace in the TKE console, which shows that the client service failed to access the user service in the base namespace. In this case, the authorization policy is effective.

After the authorization rule is configured, a failed access is as shown below:

