Tencent Cloud EdgeOne

L4 Proxy

Product Documentation

Service Statement

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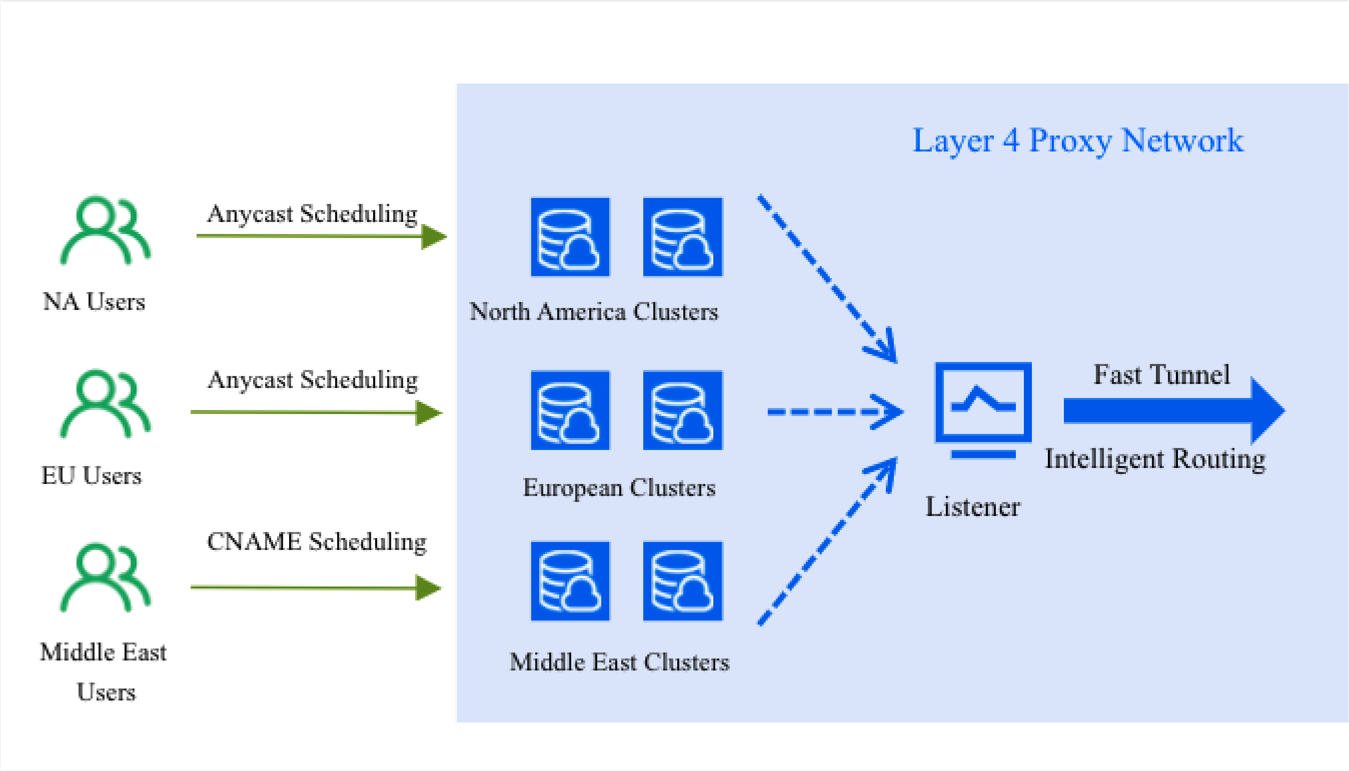
L4 Proxy
Overview

Last updated：2024-06-19 17:30:23

How It Works

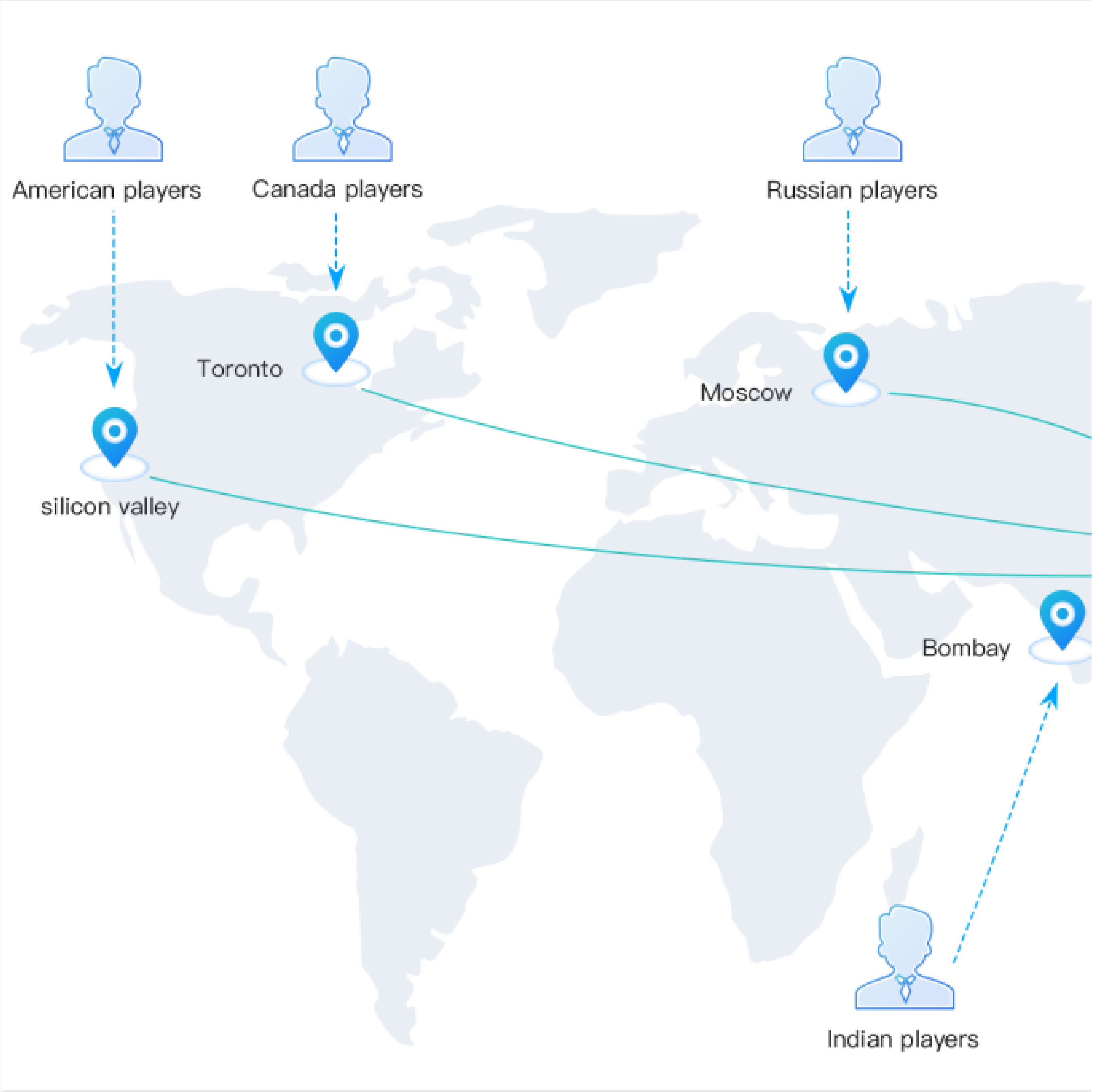
L4 proxy is the acceleration service of EdgeOne based on TCP/UDP. By leveraging widely distributed layer-4 proxy nodes, unique DDoS module, and smart routing technology, EdgeOne implements nearby access for end users, edge traffic cleansing, and port monitoring and forwarding. It thus offers high-availability and low-latency DDoS mitigation and acceleration services for layer-4 applications.



Use Cases

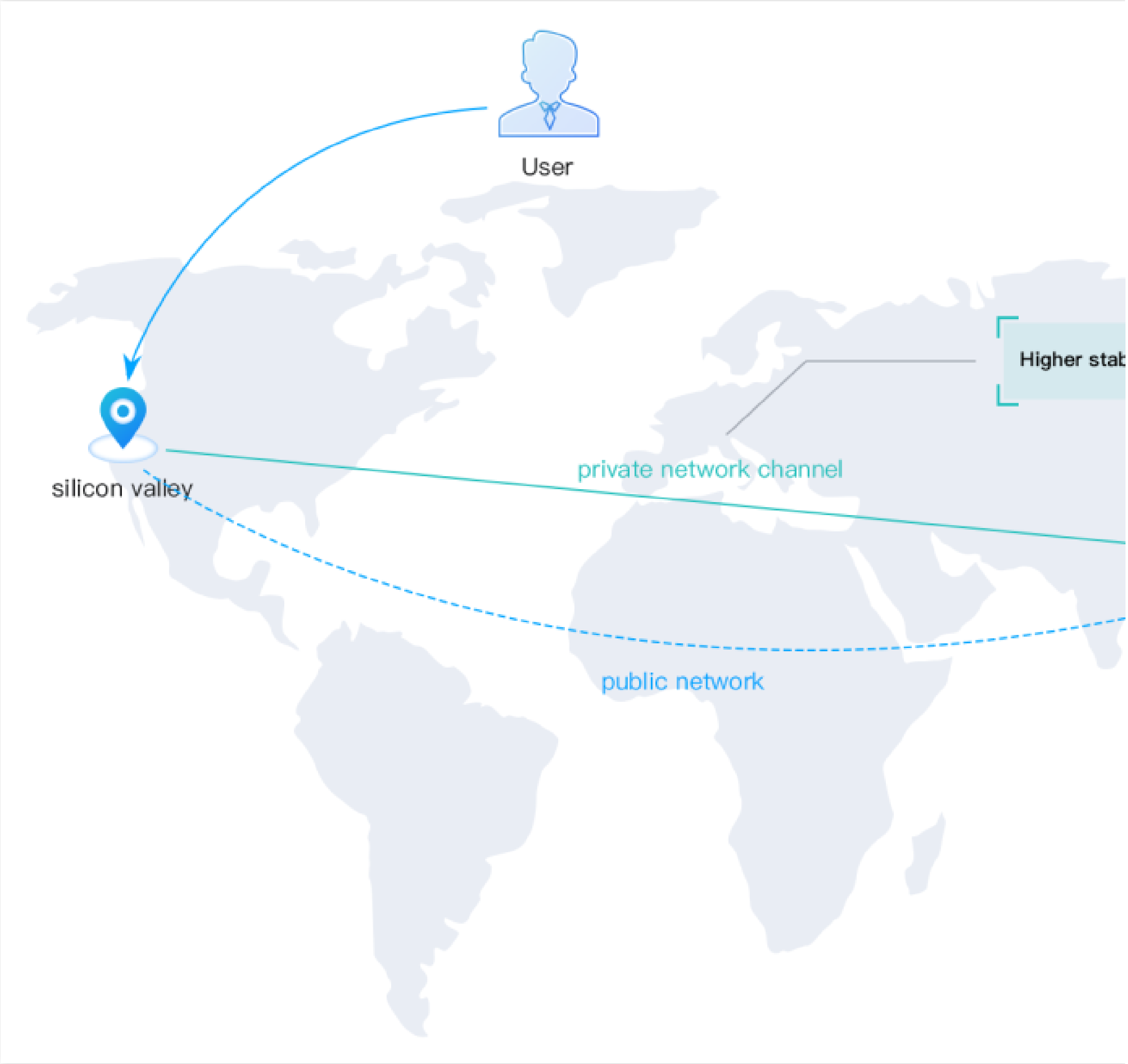
Game Acceleration

L4 proxy accelerates data transmission over TCP/UDP for mobile and PC games, such as real-time battle games and MMORPGs that require global access to a unified server. L4 proxy connects players to the nearest high-speed channels to reduce the packet loss rate and latency of the game due to varying network conditions across regions.



OA Application Acceleration

Generally, in cross-regional OA scenarios, the business data of a company is stored in the master data center at its headquarters. This often results in a high packet loss rate with high latency during cross-regional communication due to network issues, causing troubles in cross-regional business access and data synchronization. L4 proxy effectively solves those network issues and improves the business access experience by connecting users to the nearest EdgeOne nodes and optimizing the access links.



Real-time Audio/Video

L4 proxy supports forwarding acceleration over UDP. This ensures reliable audio and video transmission in real-time interactive scenarios, such as video meetings and video communication between anchors and audience members. L4 proxy solves network issues such as audio/video lags, packet loss, and high latency during cross-ISP, long distance, and cross-border communication.

Instance Quotas

By default, L4 proxy provides one instance in CNAME access mode. To connect through an anycast IP address or add more CNAME instances, go to the L4 Proxy page and click **Adjust quota**. For more information about the pricing of instances, see L4 proxy instance.

Creating an L4 Proxy Instance

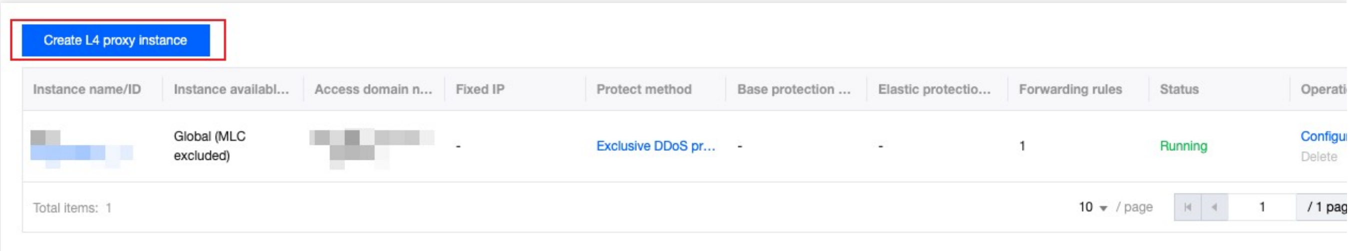
Last updated：2024-08-01 21:32:16

Use Cases

This document describes how to create and configure an L4 proxy instance.

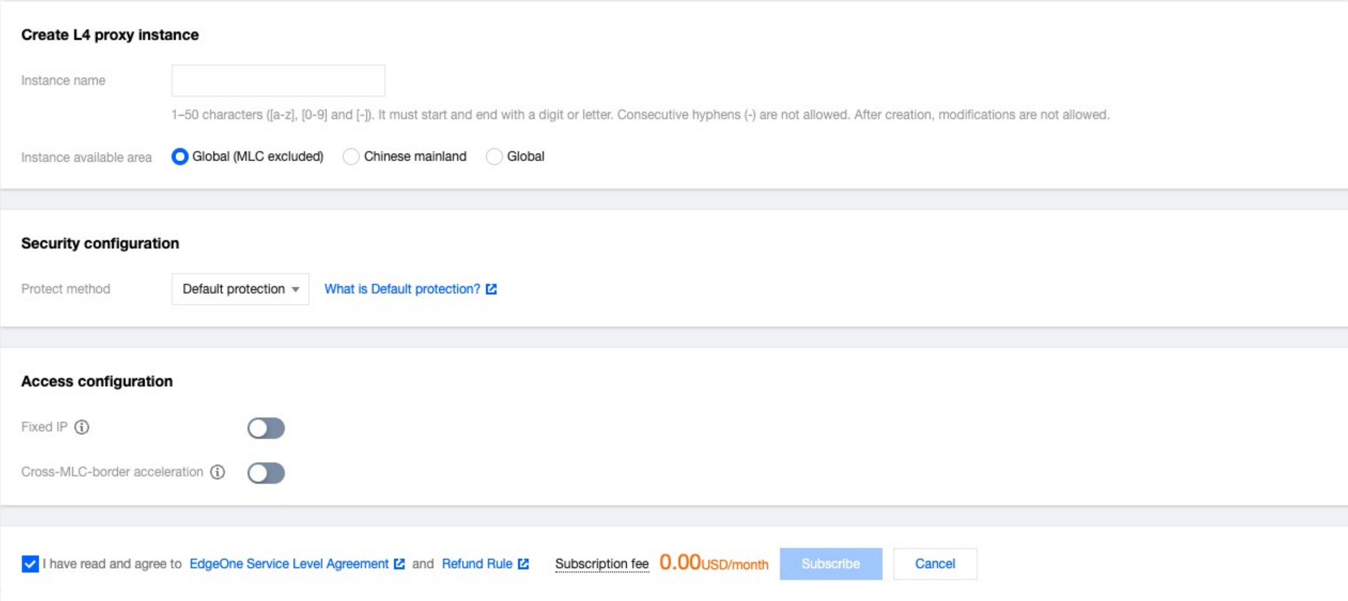
Directions

1. Log in to the EdgeOne console and click **Site List** in the left sidebar. In the site list, click the target site.
2. On the site details page, click **L4 proxy**.
3. On the page that appears, click **Create L4 proxy instance**.



Instance name/ID	Instance availabl...	Access domain n...	Fixed IP	Protect method	Base protection ...	Elastic protectio...	Forwarding rules	Status	Operati
[redacted]	Global (MLC excluded)	[redacted]	-	Exclusive DDoS pr...	-	-	1	Running	Configu Delete

4. Specify parameters on the **Service Configurations** page. By default, the service region is the accelerated region of the current site. The table below lists the parameters:



Create L4 proxy instance

Instance name

1–50 characters ([a-z], [0-9] and [-]). It must start and end with a digit or letter. Consecutive hyphens (-) are not allowed. After creation, modifications are not allowed.

Instance available area ● Global (MLC excluded) ○ Chinese mainland ○ Global

Security configuration

Protect method: Default protection ▾ What is Default protection?

Access configuration

Fixed IP ⓘ

Cross-MLC-border acceleration ⓘ

☑ I have read and agree to EdgeOne Service Level Agreement and Refund Rule

Subscription fee 0.00USD/month

Item	Description
Instance name	The name must be 1 to 200 characters in length and can contain uppercase and lowercase letters, digits, underscores (_), and hyphens (-).
Security Configuration	**Default protection:** Enabled by default, for details, please refer to DDoS Protection Overview. **Exclusive DDoS Protection:** For details, please refer to the usage of Exclusive DDoS Protection.
Fixed IP	When enabled, users can access through a fixed IP address.
IPv6 access	If you enable this feature, EdgeOne nodes can be accessed over the IPv6 protocol.
Chinese MLC-border acceleration	When enabled, it will optimize the access performance for Chinese mainland users. For details, please refer to Cross-Regional Secure Acceleration (Overseas Sites).

Note:

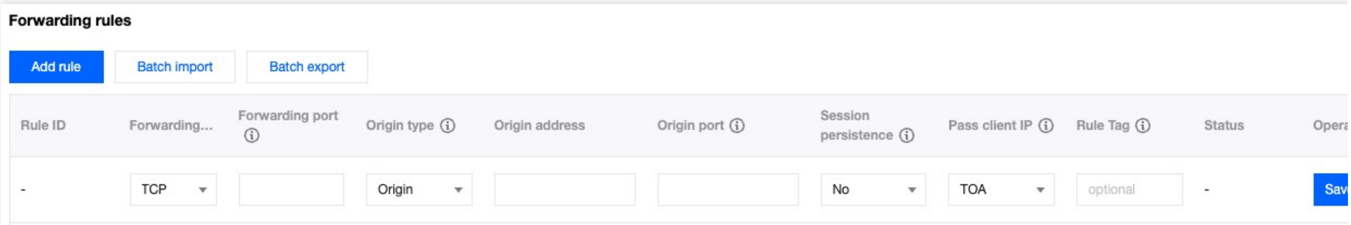
Fixed IP, IPv6 access, and Chinese MLC- border acceleration cannot be enabled at the same time, and there is a conflicting relationship between security protection configuration and access configuration in different acceleration regions. The conflicts are as follows:

Security Protection Configuration	Feature	Global (MLC Excluded)	Mainland China	Global
Platform default protection	Fixed IP	✓	×	×
	IPv6 access	✓	✓	✓

	Chinese MLC-border acceleration	✓	×	×
Exclusive DDoS protection	Fixed IP	✓	×	×
	IPv6 access	✓	×	×
	Chinese MLC-border acceleration	✓	×	×

5. View subscription fees, check and agree to the EdgeOne Service Level Agreement and Refund Policy below, and click Subscribe. For billing description, please refer to the Billing overview.

6. Specify the forwarding rules. On the L4 proxy page, select the newly created L4 proxy instance, click Configuration, enter the instance details page to configure forwarding rules.You can also import multiple forwarding rules at a time. For more information, see Batch Configuring Forwarding Rules. The table below lists the fields of a forwarding rule:


Forwarding rules

Rule ID	Forwarding...	Forwarding port	Origin type	Origin address	Origin port	Session persistence	Pass client IP	Rule Tag	Status	Opera
-	TCP		Origin			No	TOA	optional	-	Sav

Note:

1. If you specify `Origin group` for **Origin type**, you can specify only self-owned origins. In this case, a COS bucket is not supported as the origin.

2. You can specify at most 2,000 forwarding rules for each L4 proxy instance.

Item	Description
Rule ID	Auto-generated, not supported for modification, unique identifier of the rule.
Forwarding protocol	Forwarding protocol of L4 proxy. Valid values: TCP and UDP.
Forwarding port	The supported port number ranges from 1 to 64999. You can enter multiple ports separated with semicolons (;) or use a hyphen to enter a port range. You can enter up to 20 ports in a forwarding rule. The following ports are reserved for internal use, please do not use them: For TCP forwarding protocol: 3943, 3944, 6088, 36000, 56000. For UDP forwarding protocol: 4789, 4790, 6080, 61708.
Origin type and Origin address	**Single origin**: If you specify `Single origin` for **Origin type**, you can enter the IP address or domain name of a single origin. **Origin group**: If you specify `Origin group` for **Origin type**, you can select an origin from an existing origin group, or create an origin group.

Origin port	You can enter a single port or a port range. If it is a port range, the forwarding port must also be a port range, and the length of the origin port and forwarding port ranges must be consistent. For example: If the forwarding port range is `80-90` , the origin port range can be `80-90` or `90-100` .
Session persistence	As long as an origin server IP remains unchanged, traffic from the same client IP will always be forwarded to the same origin server IP.
Pass client IP	TOA: Pass client IPs via TCP Option (type 200), which only supports TCP protocols. Proxy Protocol V1 (recommended): Pass client IPs as plaintext by using the TCP header, which only supports TCP protocols. Proxy Protocol V2: Pass client IPs by using the header. V2 uses the binary format and supports both TCP and UDP protocols. The first packet of each TCP connection carries a PPv2 header., while only the first data packet carries the header for UDP. Not passed: Real client IPs will not be transferred.
Rule Tag	Optional, you can enter 1-50 any characters to identify the forwarding rule.

7. Click **Save** to complete the configuration of the L4 proxy rules.

Modifying an L4 Proxy Instance

Last updated：2023-09-11 17:25:53

Use Cases

This document describes how to modify the configuration of an L4 proxy instance.

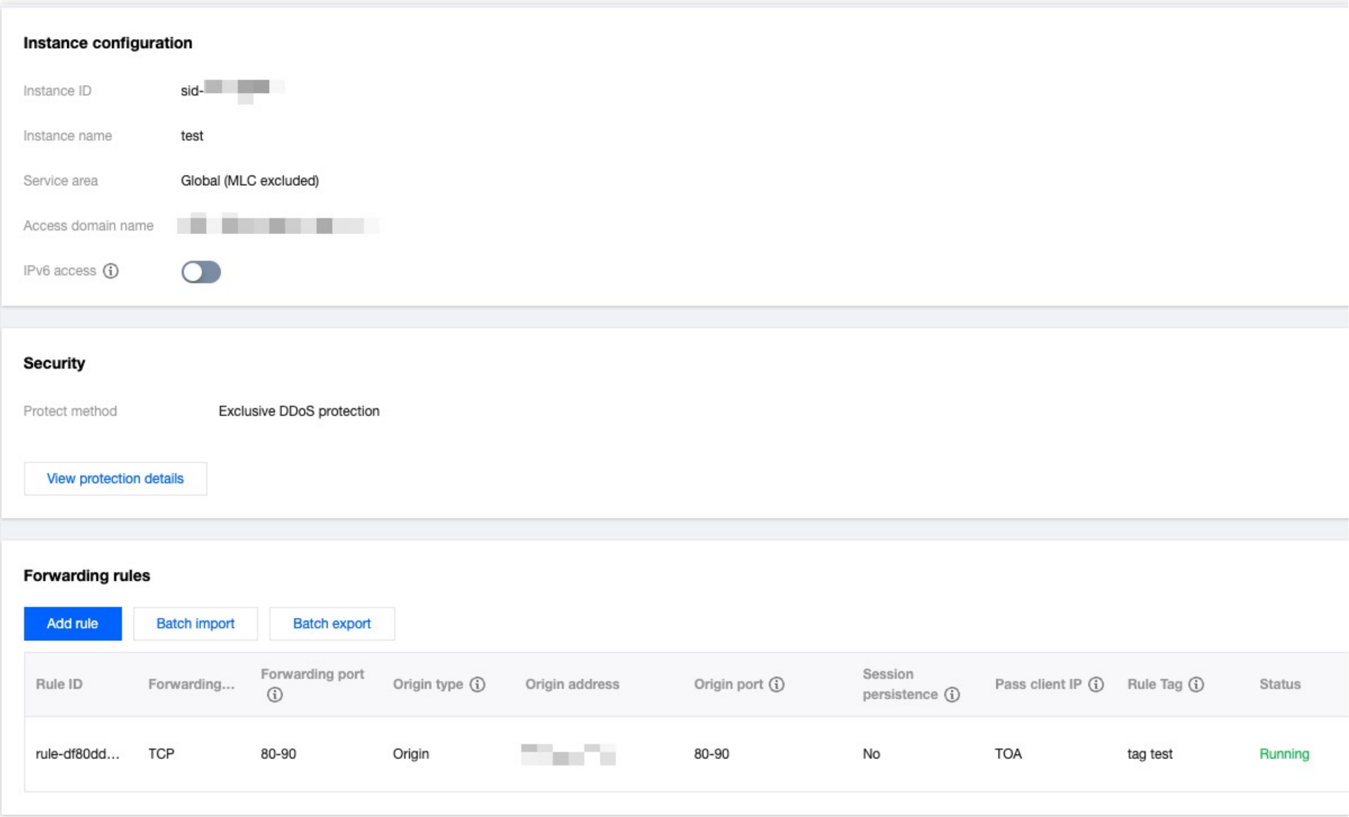
Note:

After an L4 proxy instance is created, you cannot modify its scheduling mode or proxy mode. To do so, you can delete the instance and create a new one.

You can disable and then delete a forwarding rule.

Directions

1. Log in to the EdgeOne console and click **Site List** in the left sidebar. In the site list, click the target site.
2. On the site details page, click **L4 proxy**.
3. On the page that appears, find the target L4 proxy instance and click **configure** in the **Operation** column.
4. On the page that appears, you can enable or disable IPv6 access and modify Chinese MLC- border acceleration. You can also add, edit, enable/disable, or delete a forwarding rules.



Instance configuration

Instance ID	sid-[redacted]
Instance name	test
Service area	Global (MLC excluded)
Access domain name	[redacted]
IPv6 access	

Security

Protect method Exclusive DDoS protection

Forwarding rules

Rule ID	Forwarding...	Forwarding port	Origin type	Origin address	Origin port	Session persistence	Pass client IP	Rule Tag	Status
rule-df80dd...	TCP	80-90	Origin	[redacted]	80-90	No	TOA	tag test	Running

Disabling or Deleting an L4 Proxy Instance

Last updated：2023-09-11 17:37:36

Use Cases

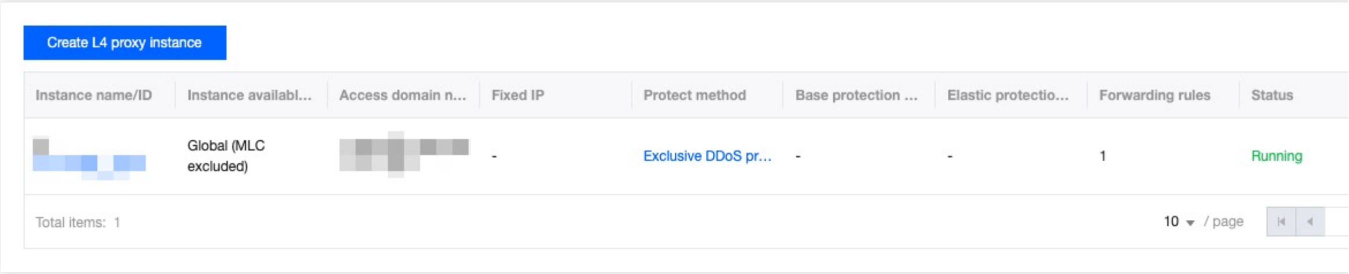
This document describes how to disable or delete an L4 proxy instance.

Note:

To delete an L4 proxy instance, you must disable it first, which usually takes a few minutes.

Directions

1. Log in to the EdgeOne console and click **Site List** in the left sidebar. In the site list, click the target site.
2. On the site details page, click **L4 proxy**.
3. On the page that appears, find the target L4 proxy instance and click **Disable** in the **Operation** column.



Instance name/ID	Instance availabl...	Access domain n...	Fixed IP	Protect method	Base protection ...	Elastic protectio...	Forwarding rules	Status
[redacted]	Global (MLC excluded)	[redacted]	-	Exclusive DDoS pr...	-	-	1	Running

4. Click **Delete** as needed.

Batch Configuring Forwarding Rules

Last updated：2023-09-11 17:38:37

Use Cases

Tencent Cloud EdgeOne allows you to configure multiple forwarding rules for an L4 proxy instance. This document describes how to import and export multiple forwarding rules at a time.

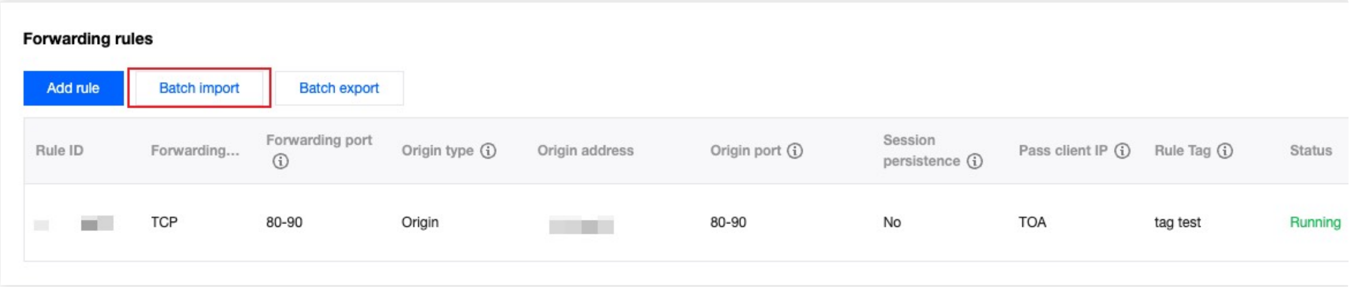
Note:

1. You can import up to 2,000 forwarding rules at a time. Each L4 proxy instance supports up to 2,000 forwarding rules.
2. The fields in batch imported forwarding rules are not case-sensitive.
3. The imported forwarding rules cannot use the forwarding ports of existing forwarding rules.

Directions

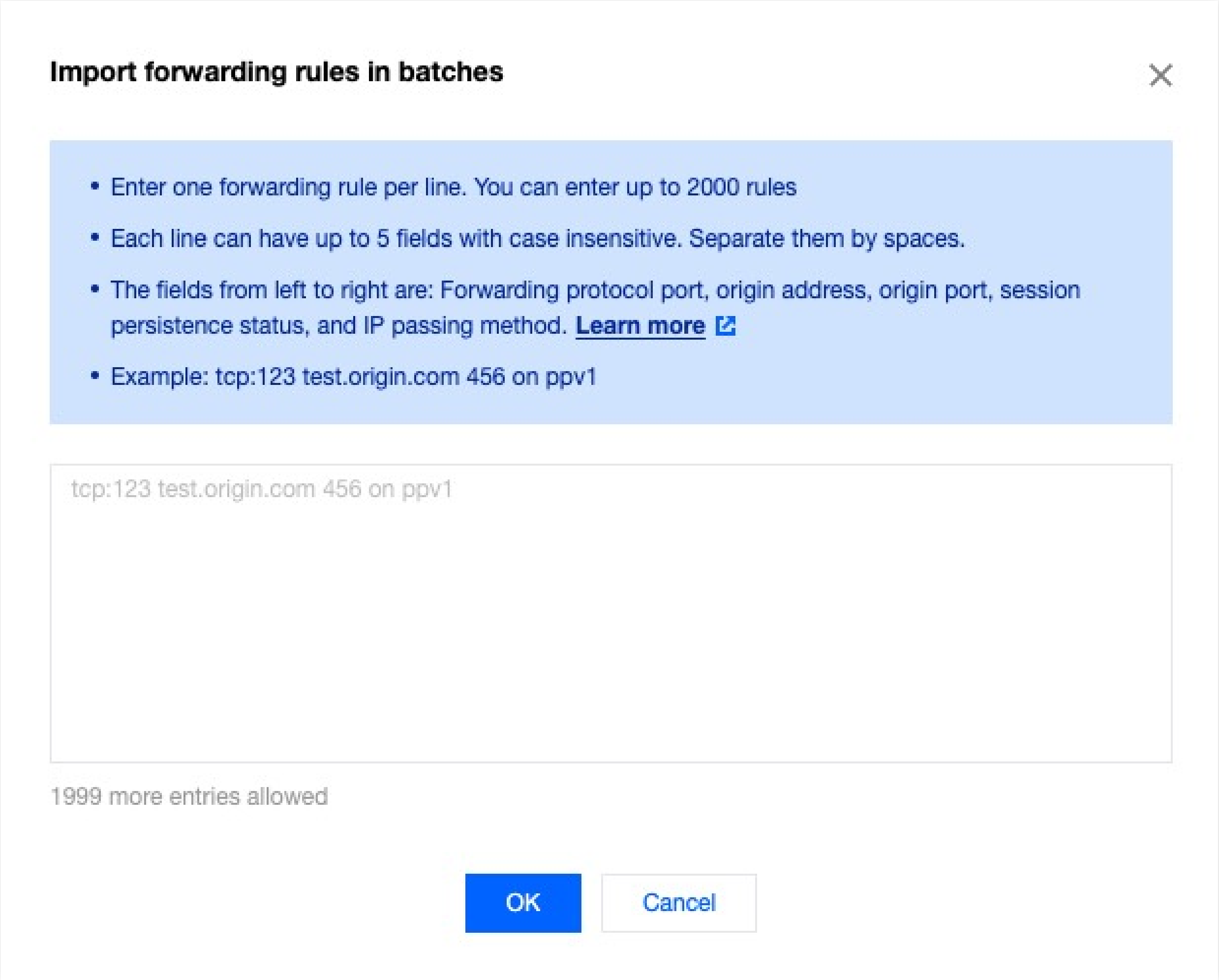
Importing multiple forwarding rules at a time

1. Log in to the EdgeOne console and click **Site List** in the left sidebar. In the site list, click the target site.
2. On the site details page, click **L4 proxy**.
3. On the page that appears, find the target L4 proxy instance and click **View** in the **Operation** column.
4. On the page that appears, click **Batch import**.



Rule ID	Forwarding...	Forwarding port	Origin type	Origin address	Origin port	Session persistence	Pass client IP	Rule Tag	Status
[redacted]	TCP	80-90	Origin	[redacted]	80-90	No	TOA	tag test	Running

5. In the pop-up window, enter the forwarding rules to be imported. You must enter one rule per row and specify the forwarding protocol, forwarding port, origin address, origin port, session persistence status, and IP passing mode. Separate fields with spaces. Example: `tcp:123 test.origin.com 456 on ppv1` .



Import forwarding rules in batches

- Enter one forwarding rule per line. You can enter up to 2000 rules
- Each line can have up to 5 fields with case insensitive. Separate them by spaces.
- The fields from left to right are: Forwarding protocol port, origin address, origin port, session persistence status, and IP passing method. Learn more
- Example: tcp:123 test.origin.com 456 on ppv1

tcp:123 test.origin.com 456 on ppv1
1999 more entries allowed
OK
Cancel

The table below lists the fields of a forwarding rule:

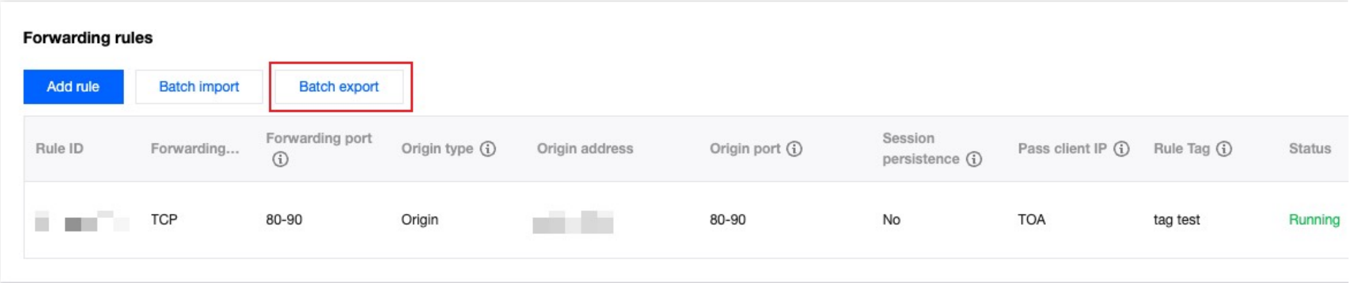
Field	Description
Forwarding protocol:Forwarding port	The supported forwarding protocols are TCP and UDP. The supported port number ranges from 1 to 64999,. You can enter multiple ports separated with semicolons (;) or use a hyphen to enter a port range. You can enter up to 20 ports in a forwarding rule. The following ports are reserved for internal use, please do not use them: For TCP forwarding protocol: 3943, 3944, 6088, 36000, 56000. For UDP forwarding protocol: 4789, 4790, 6080, 61708.
Origin address	If you specify `Single origin` for **Origin type**, you can enter the IP address or domain name of a single origin. If you specify `Origin group` for **Origin type**, you can enter the name of an existing origin group in the format of `og:{OriginGroupName}` . Example: `og:testorigin` .
Origin port	You can enter a single port or a port range. If it is a port range, the forwarding port must also be a port range, and the length of the origin port and forwarding port ranges must be consistent.

	For example: If the forwarding port range is `80-90` , the origin port range can be `80-90` or `90-100` .
Session persistence	Valid values: on and off.
Pass client IP	Valid values: toa, ppv1, ppv2, and off.
Rule Tag	Optional, you can enter 1-50 any characters to identify the forwarding rule.

6. Click **OK**.

Exporting multiple forwarding rules at a time

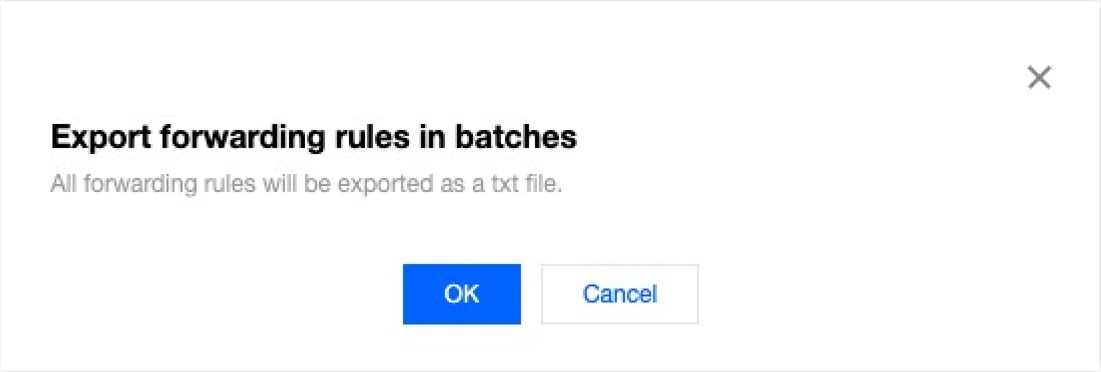
1. Log in to the EdgeOne console and click **Site List** in the left sidebar. In the site list, click the target site.
2. On the site details page, click **L4 proxy**.
3. On the page that appears, find the target L4 proxy instance and click **View** in the **Operation** column.
4. On the page that appears, click **Batch export**.



Forwarding rules

Rule ID	Forwarding...	Forwarding port ⓘ	Origin type ⓘ	Origin address	Origin port ⓘ	Session persistence ⓘ	Pass client IP ⓘ	Rule Tag ⓘ	Status
[redacted]	TCP	80-90	Origin	[redacted]	80-90	No	TOA	tag test	Running

5. In the pop-up window, click **OK** to export all forwarding rules to a .txt file. The format of the exported rules is the same as that of the imported rules.



Export forwarding rules in batches

All forwarding rules will be exported as a txt file.

Obtaining Real Client IPs

Obtaining Real TCP Client IPs via TOA

Last updated：2023-09-11 17:40:22

You can use this document to learn how to get the TCP client IP via TOA when using L4 proxy.

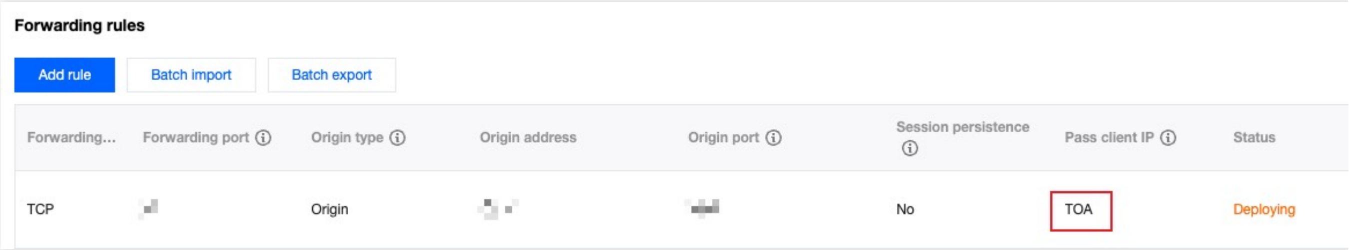
Use Cases

Using L4 acceleration for data packets will have the source IP and port modified, so the origin does not get the original information. To enable the origin to get the real client IP and port, you can pass the information using TOA when creating an acceleration channel. In this way, the real client IP and port are passed into the TCP option field. Meanwhile, you need to install TOA on the origin to get that information.

Directions

Step 1: Pass the client IP via TOA

To get the TCP client IP via TOA, set **Pass client IP** to **TOA** in L4 proxy forwarding rules in the console. For details on how to modify rules, see: Modifying an L4 Proxy Instance.



Forwarding...	Forwarding port ⓘ	Origin type ⓘ	Origin address	Origin port ⓘ	Session persistence ⓘ	Pass client IP ⓘ	Status
TCP	[redacted]	Origin	[redacted]	[redacted]	No	TOA	Deploying

Step 2: Load TOA on backend server

You can load the TOA module using either of the following methods:
Method 1 (recommended): Based on the Linux version the origin uses, download the complied toa.ko file and load it directly.
Method 2: If you cannot find the appropriate Linux version, download the TOA source code file and compile and load it yourself.

Note：

Due to the differences in installation environments, if you encounter issues during the loading process using Method 1, please try Method 2 and install the compilation environment manually.

Method 1: Download and load the compiled TOA module

Method 2: Compile and load the TOA module

1. Download and decompress the TOA package corresponding to the version of Linux OS on Tencent Cloud.

centos

CentOS-7.2-x86_64.tar.gz

CentOS-7.3-x86_64.tar.gz

CentOS-7.4-x86_64.tar.gz

CentOS-7.5-x86_64.tar.gz

CentOS-7.6-x86_64.tar.gz

CentOS-7.7-x86_64.tar.gz

CentOS-7.8-x86_64.tar.gz

CentOS-7.9-x86_64.tar.gz

CentOS-8.0-x86_64.tar.gz

CentOS-8.2-x86_64.tar.gz

debian

Debian-11.1-x86_64.tar.gz

Debian-10.2-x86_64.tar.gz

Debian-9.0-x86_64.tar.gz

suse linux

openSUSE-Leap-15.3-x86_64.tar.gz

ubuntu

Ubuntu-14.04.1-LTS-x86_64.tar.gz

Ubuntu-16.04.1-LTS-x86_64.tar.gz

Ubuntu-18.04.1-LTS-x86_64.tar.gz

Ubuntu-20.04.1-LTS-x86_64.tar.gz

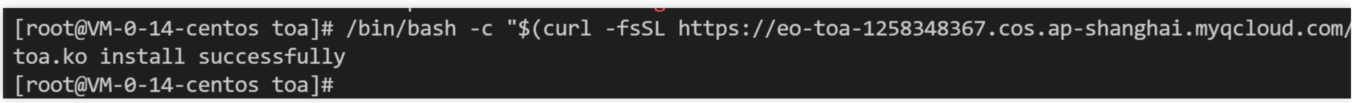
2. After decompression is complete, run the `cd` command to access the decompressed folder. Then load the module as follows:

Load TOA with a script

Manually load TOA

```
/bin/bash -c "$(curl -fsSL https://edgeone-document-file-1258344699.cos.ap-guangzho
```

When it is loaded successfully, you will see the following information:



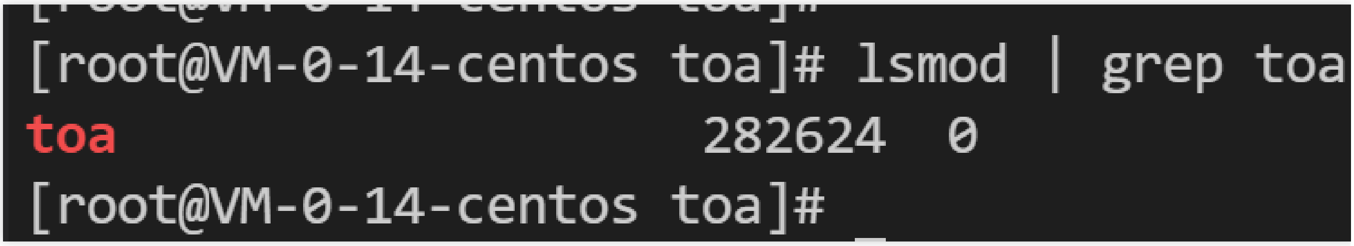
```
[root@VM-0-14-centos toa]# /bin/bash -c "$(curl -fsSL https://eo-toa-1258348367.cos.ap-shanghai.myqcloud.com/
toa.ko install successfully
[root@VM-0-14-centos toa]#
```

```
# Decompress the tar package.
tar -zxvf CentOS-7.2-x86_64.tar.gz
# Enter the directory of the decompressed package.
cd CentOS-7.2-x86_64
# Load the TOA module.
insmod toa.ko
# Copy the TOA module to the kernel module directory.
cp toa.ko /lib/modules/`uname -r`/kernel/net/netfilter/ipvs/toa.ko
# Configure the TOA module to load automatically at system startup.
echo "insmod /lib/modules/`uname -r`/kernel/net/netfilter/ipvs/toa.ko" >> /etc/rc.l
```

Run the following command to check whether the loading is successful:

```
lsmod | grep toa
```

If you see "TOA" in the message, the module is loaded successfully:



```
[root@VM-0-14-centos toa]#
[root@VM-0-14-centos toa]# lsmod | grep toa
toa                     282624  0
[root@VM-0-14-centos toa]# _
```

1. Install the compilation environment.

1.1 Make sure kernel-devel and kernel-headers are installed and consistent with the kernel version.

1.2 Make sure the gcc and make dependencies are installed.

1.3 If these environmental dependencies are not installed, run the installation command:

CentOS

Ubuntu/Debian

```
yum install -y gcc
yum install -y make
yum install -y kernel-headers kernel-devel
```

```
apt-get install -y gcc
apt-get install -y make
apt-get install -y linux-headers-$(uname -r)
```

2. After the compilation environment is installed, download, compile and load the source code.

Compile and load TOA with a script

Manually compile and load TOA

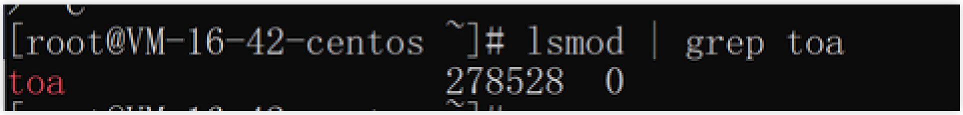
```
/bin/bash -c "$(curl -fsSL https://edgeone-document-file-1258344699.cos.ap-guangzho
# Create a compilation directory and enter it.
mkdir toa_compile && cd toa_compile
# Download the source code (tar.gz)
curl -o toa.tar.gz https://edgeone-document-file-1258344699.cos.ap-guangzhou.myqclo
# Decompress the tar package
tar -zxvf toa.tar.gz
# Compile the toa.ko file. After the compilation is successful, the file will be ge
make
# Load the TOA module.
insmod toa.ko
# Copy the TOA module to the kernel module directory.
```

```
cp toa.ko /lib/modules/`uname -r`/kernel/net/netfilter/ipvs/toa.ko
# Configure the TOA module to load automatically at system startup
echo "insmod /lib/modules/`uname -r`/kernel/net/netfilter/ipvs/toa.ko" >> /etc/rc.l
```

3. Run the following command to check whether the loading is successful:

```
lsmod | grep toa
```

If you see "TOA" in the message, the module is loaded successfully:



```
[root@VM-16-42-centos ~]# lsmod | grep toa
toa                    278528  0
```

Step 3: Verify the configuration

You can verify the configuration by building a TCP server to receive client requests from another server. See the sample:

1. On the current server, create an HTTP server in Python to act as a TCP server:

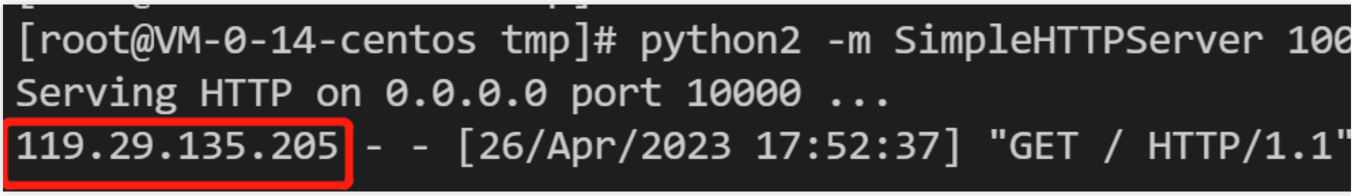
```
# Use python2
python2 -m SimpleHTTPServer 10000
```

```
# Use python3
python3 -m http.server 10000
```

2. Make another server work as a client to send requests:

```
# Use curl to initiate an HTTP request, where the hostname and forwarding port of t
curl -i "http://a8b7f59fc8d7e6c9.example.com.edgeonedy1.com:10000/"
```

3. If TOA is loaded, the real client address can be seen on the server:



```
[root@VM-0-14-centos tmp]# python2 -m SimpleHTTPServer 100
Serving HTTP on 0.0.0.0 port 10000 ...
119.29.135.205 - - [26/Apr/2023 17:52:37] "GET / HTTP/1.1"
```

You can also get either the IPv4 or IPv6 address of the client by following the steps above.

For origin IPv4 addresses, get the client IPv4 address.

For origin IPv6 addresses, get the client IPv6 address.

If you need to get both IPv4 and IPv6 addresses, modify the origin's business code while loading the TOA module as instructed here.

Getting Both IPv4 and IPv6 Addresses

Note:

This section provide guidance on how to get both IPv4 and IPv6 addresses by modifying the business code of the origin.

The origin can listen on requests in either of the following methods:

1. Use the structure `struct sockaddr_in` to listen on IPv4 addresses.
2. Use the structure `struct sockaddr_in6` to listen on IPv6 addresses.

Sample code

Listen on IPv4 addresses

Listen on IPv6 addresses

C

Java

```
#include <sys/socket.h>
#include <stdio.h>
#include <unistd.h>
#include <netinet/in.h>
#include <memory.h>
#include <arpa/inet.h>

int main(int argc, char** argv) {
        int     l_sockfd;
    // The server address is an IPv4 address.
        struct sockaddr_in serveraddr;
    // In this case, the client address must adopt the IPv6 structure.
    struct sockaddr_in6 clientAddr;
        int server_port = 10000;

        memset(&serveraddr, 0, sizeof(serveraddr));
    // Create a socket.
        l_sockfd = socket(AF_INET, SOCK_STREAM, 0);
        if (l_sockfd == -1){
                printf("Failed to create socket.\\n");
                return -1;
        }

    // Initialize the server.
        memset(&serveraddr, 0, sizeof(struct sockaddr_in));
        serveraddr.sin_family = AF_INET;
        serveraddr.sin_port = htons(server_port);
        serveraddr.sin_addr.s_addr = htonl(INADDR_ANY);

        int isReuse = 1;
        setsockopt(l_sockfd, SOL_SOCKET,SO_REUSEADDR,(const char*)&isReuse,sizeof(i

    // Associate the socket and server address.
        int nRet = bind(l_sockfd,(struct sockaddr*)&serveraddr, sizeof(serveraddr))
        if(-1 == nRet)
        {
                printf("bind error\\n");
                return -1;
        }
    // Listen on the socket.
        listen(l_sockfd, 5);

    int clientAddrLen = sizeof(clientAddr);
    memset(&clientAddr, 0, sizeof(clientAddr));
    // Accept connections from the client.
    int linkFd = accept(l_sockfd, (struct sockaddr*)&clientAddr, &clientAddrLen);
    if(-1 == linkFd)
    {
        printf("accept error\\n");
        return -1;
    }
    // Modifications to make: Decide whether the client is an IPv4 or IPv6 address
    //    AF_INET indicates that the client adopts IPv4. In this case, convert the
    //    AF_INET6 indicates that the client adopts IPv6. In this case, use struct
    if (clientAddr.sin6_family == AF_INET) {
        printf("AF_INET accept getpeername %s : %d successful\\n",
                inet_ntoa(((struct sockaddr_in*)&clientAddr)->sin_addr),
                ntohs(((struct sockaddr_in*)&clientAddr)->sin_port));
    }else if (clientAddr.sin6_family == AF_INET6){
        char addr_p[128] = {0};
        inet_ntop(AF_INET6, (void *)&((struct sockaddr_in6*)&clientAddr)->sin6_addr
        printf("AF_INET6 accept getpeername %s : %d successful\\n",
                addr_p,
                ntohs(((struct sockaddr_in6*)&clientAddr)->sin6_port));
    }else{
        printf("unknow sin_family:%d \\n", clientAddr.sin6_family);
    }
    close(l_sockfd);
        return 0;
}
```

```
import java.io.IOException;
import java.io.InputStream;
import java.io.OutputStream;
import java.net.InetAddress;
import java.net.InetSocketAddress;
import java.net.ServerSocket;
import java.net.Socket;
import java.net.SocketAddress;


public class ServerDemo {
    /** If using the IPv4 address structure to build the service, use IPV4_HOST */
    public static final String IPV4_HOST = "0.0.0.0";

    /** If using the IPv6 address structure to build the service, use IPV6_HOST */
    public static final String IPV6_HOST = "::";

    public static void main(String[] args) {
        int serverPort = 10000;
        try (ServerSocket serverSocket = new ServerSocket()) {
            // Setting address reuse
            serverSocket.setReuseAddress(true);
            // Bound server address and port, using IPv4 here
            serverSocket.bind(new InetSocketAddress(InetAddress.getByName(IPV4_HOST
            System.out.println("Server is listening on port " + serverPort);

            while (true) {
                // Accepting Client connections
                Socket clientSocket = serverSocket.accept();
                System.out.println("New client connected: " + clientSocket.getRemot

                // Processing Client requests
                handleClientRequest(clientSocket);
            }
        } catch (IOException e) {
            System.err.println("Failed to create server socket: " + e.getMessage())
        }
    }

    /**
     * Processing Function, site business implement, here is just an example
     * The purpose of this Function is to Return the Client's input verbatim to the
     */
    private static void handleClientRequest(Socket clientSocket) {
        try (InputStream inputStream = clientSocket.getInputStream();
             OutputStream outputStream = clientSocket.getOutputStream()) {

            // Reading the Data received from the Client
            byte[] buffer = new byte[1024];
            int bytesRead;
            while ((bytesRead = inputStream.read(buffer)) != -1) {
                // Reply the received Data to the Client as it is
                outputStream.write(buffer, 0, bytesRead);
            }


        } catch (IOException e) {
            // When the Client disconnects
            System.err.println("Failed to handle client request: " + e.getMessage()
        } finally {
            try {
                clientSocket.close();
            } catch (IOException e) {
                System.err.println("Failed to close client socket: " + e.getMessage
            }
        }
    }
}
```

C

Java

```
#include <sys/socket.h>
#include <stdio.h>
#include <unistd.h>
#include <netinet/in.h>
#include <memory.h>
#include <arpa/inet.h>

int main(int argc, char **argv)
{
        int     l_sockfd;
    // The server address is an IPv6 address.
```

```
        struct sockaddr_in6 serveraddr;
    // The client address is an IPv6 address.
    struct sockaddr_in6 clientAddr;
        int server_port = 10000;

        memset(&serveraddr, 0, sizeof(serveraddr));

    // Create a socket.
        l_sockfd = socket(AF_INET6, SOCK_STREAM, 0);
        if (l_sockfd == -1){
                printf("Failed to create socket.\\n");
                return -1;
        }
    // Set the server address.
        memset(&serveraddr, 0, sizeof(struct sockaddr_in6));
        serveraddr.sin6_family = AF_INET6;
        serveraddr.sin6_port = htons(server_port);
        serveraddr.sin6_addr = in6addr_any;

        int isReuse = 1;
        setsockopt(l_sockfd, SOL_SOCKET,SO_REUSEADDR,(const char*)&isReuse,sizeof(i
    // Associate the socket and server address.
        int nRet = bind(l_sockfd,(struct sockaddr*)&serveraddr, sizeof(serveraddr))
        if(-1 == nRet)
        {
                printf("bind error\\n");
                return -1;
        }
    // Listen on the socket.
        listen(l_sockfd, 5);

        int clientAddrLen = sizeof(clientAddr);
    memset(&clientAddr, 0, sizeof(clientAddr));

    // Accept connection requests from the client.
    int linkFd = accept(l_sockfd, (struct sockaddr*)&clientAddr, &clientAddrLen);
    if(-1 == linkFd)
    {
        printf("accept error\\n");
        return -1;
    }

    // The client addresses received here are all stored in the IPv6 structure.
    // The IPv4 addresses are mapped to IPv6 addresses, for example, "::ffff:119.29
    char addr_p[128] = {0};
    inet_ntop(AF_INET6, (void *)&clientAddr.sin6_addr, addr_p, (socklen_t )sizeof(a
    printf("accept %s : %d successful\\n", addr_p, ntohs(clientAddr.sin6_port));
    // Modifications to make: Use the macro definition IN6_IS_ADDR_V4MAPPED to deci
    if(IN6_IS_ADDR_V4MAPPED(&clientAddr.sin6_addr)) {
        struct sockaddr_in real_v4_sin;
        memset (&real_v4_sin, 0, sizeof (struct sockaddr_in));
        real_v4_sin.sin_family = AF_INET;
        real_v4_sin.sin_port = clientAddr.sin6_port;
        // The last four bytes represent the IPv4 address of the client.
        memcpy (&real_v4_sin.sin_addr, ((char *)&clientAddr.sin6_addr) + 12, 4);
        printf("connect %s successful\\n", inet_ntoa(real_v4_sin.sin_addr));
    }

        close(l_sockfd);
    return 0;
}
```

```
import java.io.IOException;
import java.io.InputStream;
import java.io.OutputStream;
import java.net.InetAddress;
import java.net.InetSocketAddress;
import java.net.ServerSocket;
import java.net.Socket;
import java.net.SocketAddress;

public class ServerDemo {
    /** If using the IPv4 address structure to build the service, use IPV4_HOST */
    public static final String IPV4_HOST = "0.0.0.0";

    /** If using the IPv6 address structure to build the service, use IPV6_HOST */
    public static final String IPV6_HOST = "::";

    public static void main(String[] args) {
        int serverPort = 10000;
        try (ServerSocket serverSocket = new ServerSocket()) {
            // Setting address reuse
            serverSocket.setReuseAddress(true);
            // Bound server address and port, using IPv4 here
            serverSocket.bind(new InetSocketAddress(InetAddress.getByName(IPV6_HOST
            System.out.println("Server is listening on port " + serverPort);

            while (true) {
                // Accepting Client connections
                Socket clientSocket = serverSocket.accept();
                System.out.println("New client connected: " + clientSocket.getRemot

                // Processing Client requests
                handleClientRequest(clientSocket);
            }
        } catch (IOException e) {
            System.err.println("Failed to create server socket: " + e.getMessage())
        }
    }

    /**
     * Processing Function, site business implement, here is just an example
     * The purpose of this Function is to Return the Client's input verbatim to the
     */
    private static void handleClientRequest(Socket clientSocket) {
        try (InputStream inputStream = clientSocket.getInputStream();
             OutputStream outputStream = clientSocket.getOutputStream()) {

            // Reading the Data received from the Client
            byte[] buffer = new byte[1024];
            int bytesRead;
            while ((bytesRead = inputStream.read(buffer)) != -1) {
                // Reply the received Data to the Client as it is
                outputStream.write(buffer, 0, bytesRead);
            }

        } catch (IOException e) {
            // When the Client disconnects
            System.err.println("Failed to handle client request: " + e.getMessage()
        } finally {
            try {
                clientSocket.close();
            } catch (IOException e) {
                System.err.println("Failed to close client socket: " + e.getMessage
            }
        }
    }
}
```

console output result

```
Server is listening on port 10000
New client connected: /127.0.0.1:50680
New client connected: /0:0:0:0:0:0:0:1:51124
New client connected: /127.0.0.1:51136
```

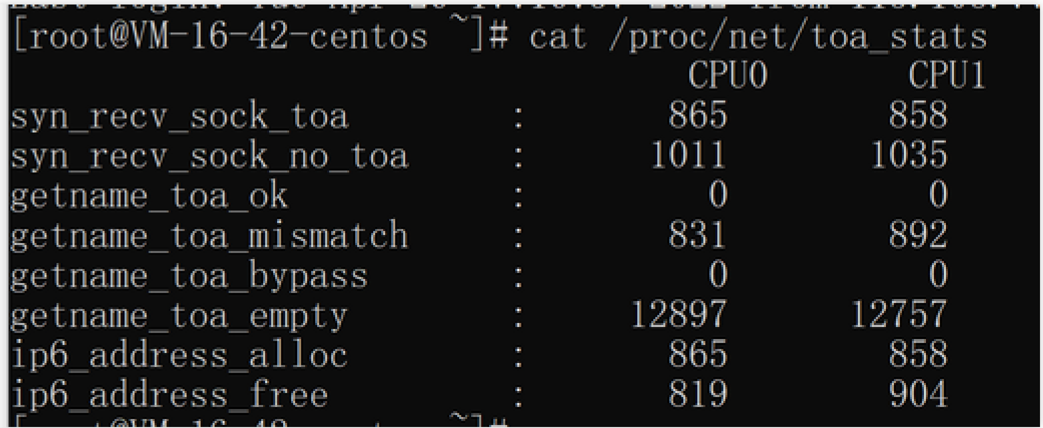
References

Monitoring TOA Running Status

To ensure execution stability, this kernel module allows you to monitor status. After inserting the `toa.ko` kernel module, you can monitor the TOA working status in either of the following ways.

```
cat /proc/net/toa_stats
```

This figure shows the TOA running status:



```
[root@VM-16-42-centos ~]# cat /proc/net/toa_stats
                              CPU0       CPU1
syn_recv_sock_toa        :     865        858
syn_recv_sock_no_toa     :    1011       1035
getname_toa_ok           :       0          0
getname_toa_mismatch     :     831        892
getname_toa_bypass       :       0          0
getname_toa_empty        :   12897      12757
ip6_address_alloc        :     865        858
ip6_address_free         :     819        904
```

The monitoring metrics are described as follows:

Metric	Description
syn_recv_sock_toa	Receives connections with TOA information.
syn_recv_sock_no_toa	Receives connections without TOA information.
getname_toa_ok	This count increases when you call `getsockopt` and obtain the source IP address successfully or when you call `accept` to receive client requests.
getname_toa_mismatch	This count increases when you call `getsockopt` and obtain a source IP address that does not match the required type. For example, if a client connection contains a source IPv4 address whereas you obtain an IPv6 address, the count will increase.
getname_toa_empty	This count increases when the `getsockopt` function is called in a client file descriptor that does not contain TOA.
ip6_address_alloc audio/video proxy	Allocates space to store the information when TOA obtains the source IP address and source port saved in the TCP data packet.
ip6_address_free audio/video proxy	When the connection is released, TOA will release the memory previously used to save the source IP and source port. If all connections are closed, the total count of `ip6_address_alloc` for each CPU should be equal to the count of this metric.

Obtaining Real Client IPs Through Protocol V1/V2

Overview

Last updated：2023-06-29 15:37:55

This document describes how to obtain real client IPs through Proxy Protocol V1/V2 when you enable the L4 proxy acceleration.

Scenarios

When the datagrams are accelerated through L4 acceleration connection, you can pass the real client IPs and Ports to the origin server through Proxy Protocol V1/V2. For introduction on the protocol, see Proxy Protocol V1/V2.

The origin can parse and obtain real client IPs with two methods based on the scenarios and deployment modes.
Method 1: If the TCP protocol is used on the origin, it is recommended to add a Nginx server that supports Proxy Protocol V1/V2 in front of the application server. For details, see Obtaining Real Client IPs Through Nginx.
Method 2: If the UDP protocol is used on the origin, or if you want to directly parse the real client IPs under the TCP protocol on the application server, you can parse the Proxy Protocol field on the application server by referring to the sample code in the Proxy Protocol. For details, see Parsing Real Client IPs on Application Server.

Method 1: Obtaining Real Client IPs Through Nginx

Last updated：2023-09-11 17:42:15

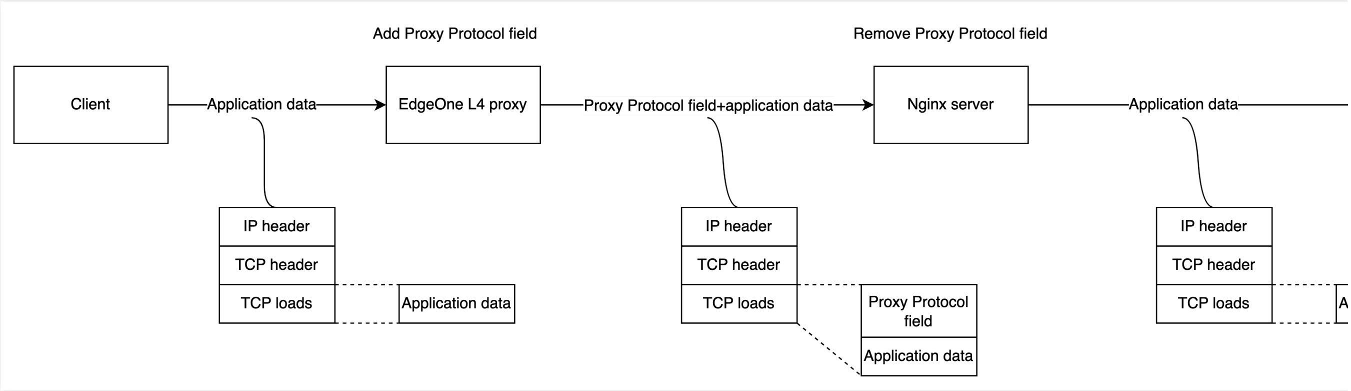
Overview

If the TCP protocol is used on the origin, it is recommended to add a Nginx server that supports Proxy Protocol V1/V2 in front of the application server to obtain real client IPs.

Note:

If the TCP protocol is used on the origin, and you want to directly parse the real client IPs on the application server, please see Parsing Real Client IPs on Application Server.

Deployment Mode



As shown in the above diagram, you need to deploy a Nginx server in front of the application server to remove the Proxy Protocol field. You can collect the real client IPs by analyzing Nginx logs on the Nginx server. At this time, you can point the origin address to the Nginx service when you configure the origin address in the EdgeOne L4 proxy service.

Directions

Step 1. Deploy Nginx service

Please select a Nginx version corresponding to the Proxy Protocol version you want to use.
For Proxy Protocol V1: Nginx Plus R11 and later versions, Nginx Open Source 1.11.4 and later versions.

For Proxy Protocol V2: Nginx Plus R16 and later versions, Nginx Open Source 1.13.11 and later versions.

For other Nginx versions, see Accepting the PROXY Protocol.

You need to install Nginx-1.18.0 and the stream module to enable L4 proxy service on Nginx. See installation directions below.

```
# Install the nginx build environment
yum -y install gcc gcc-c++ autoconf automake
yum -y install zlib zlib-devel openssl openssl-devel pcre-devel

# Decompress the source package
tar -zxvf nginx-1.18.0.tar.gz
```

```
# Enter the directory
cd nginx-1.18.0
# Set nginx compilation and installation configuration (with `--with-stream`)
./configure --prefix=/opt/nginx --sbin-path=/opt/nginx/sbin/nginx --conf-path=/opt/
# Compilation
make
# Installation
make install
```

Step 2: Configure the stream module in Nginx

If you select Nginx-1.18.0, you can run the following command to open the configuration file nginx.conf.

```
vi /opt/nginx/conf/nginx.conf
```

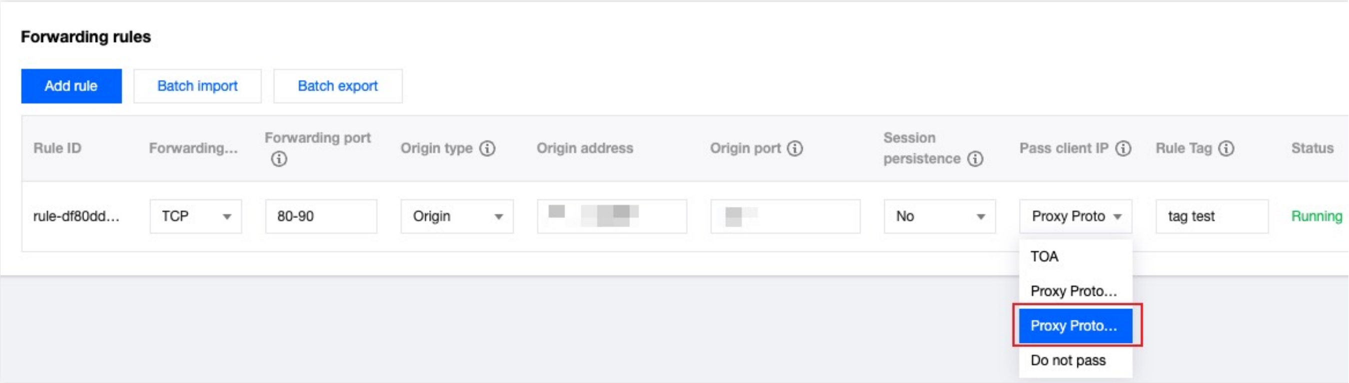
Configuration of the stream module is as follows:

```
stream {
    # Set the log format, where `proxy_protocol_addr` is the client address obtaine
    log_format basic '$proxy_protocol_addr -$remote_addr [$time_local] '
                      '$protocol $bytes_sent $bytes_received '
                      '$session_time';

      access_log  logs/stream.access.log  basic;
    # upstream configuration
        upstream RealServer {
                hash $remote_addr consistent;
        # 127.0.0.1:8888 is the IP address and port of the application server
```

```
                  server 127.0.0.1:8888 max_fails=3 fail_timeout=30s;
          }
      # server configuration
          server {
          # L4 listening port, which corresponds to the origin port configured in L4
                  listen 10000   proxy_protocol;
                  proxy_connect_timeout    1s;
                  proxy_timeout 3s;
                  proxy_pass RealServer;
          }
  }
```

Step 3: Configure L4 proxy forwarding rule

After configuring the Nginx service, you can modify the L4 proxy forwarding rule in the console. Change the origin address to the IP of the current Nginx service, and change the origin port to the L4 listening port configured in step 2. Select Proxy Protocol V1 or V2 for the Pass Client IP according to the forwarding protocol. For details, see Modifying L4 Proxy Forwarding Rules.



Forwarding rules

Rule ID	Forwarding...	Forwarding port	Origin type	Origin address	Origin port	Session persistence	Pass client IP	Rule Tag	Status
rule-df80dd...	TCP	80-90	Origin	[redacted]	[redacted]	No	Proxy Proto	tag test	Running

Step 4: Simulate client requests and verify results

You can build the TCP service, and simulate client requests on another server to verify the results. A sample is as below:

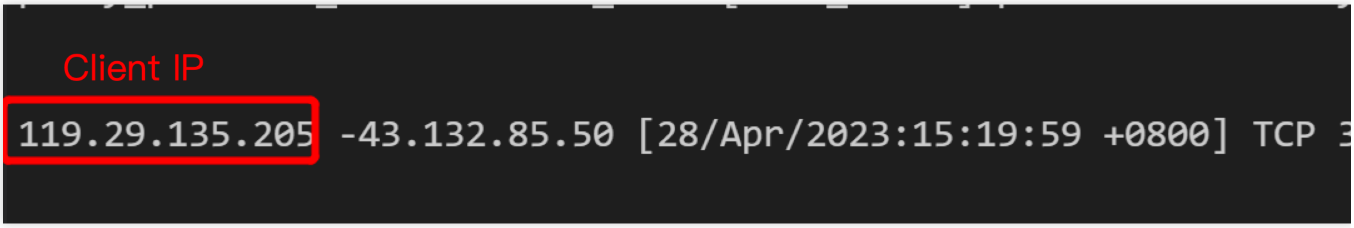
1. Create an HTTP service with Python on the current server to simulate the TCP service.

```
# Based on python2
python2 -m SimpleHTTPServer 8888

# Based on python3
python3 -m http.server 8888
```

2. Build a client request on another server, and simulate the TCP request with a curl request.

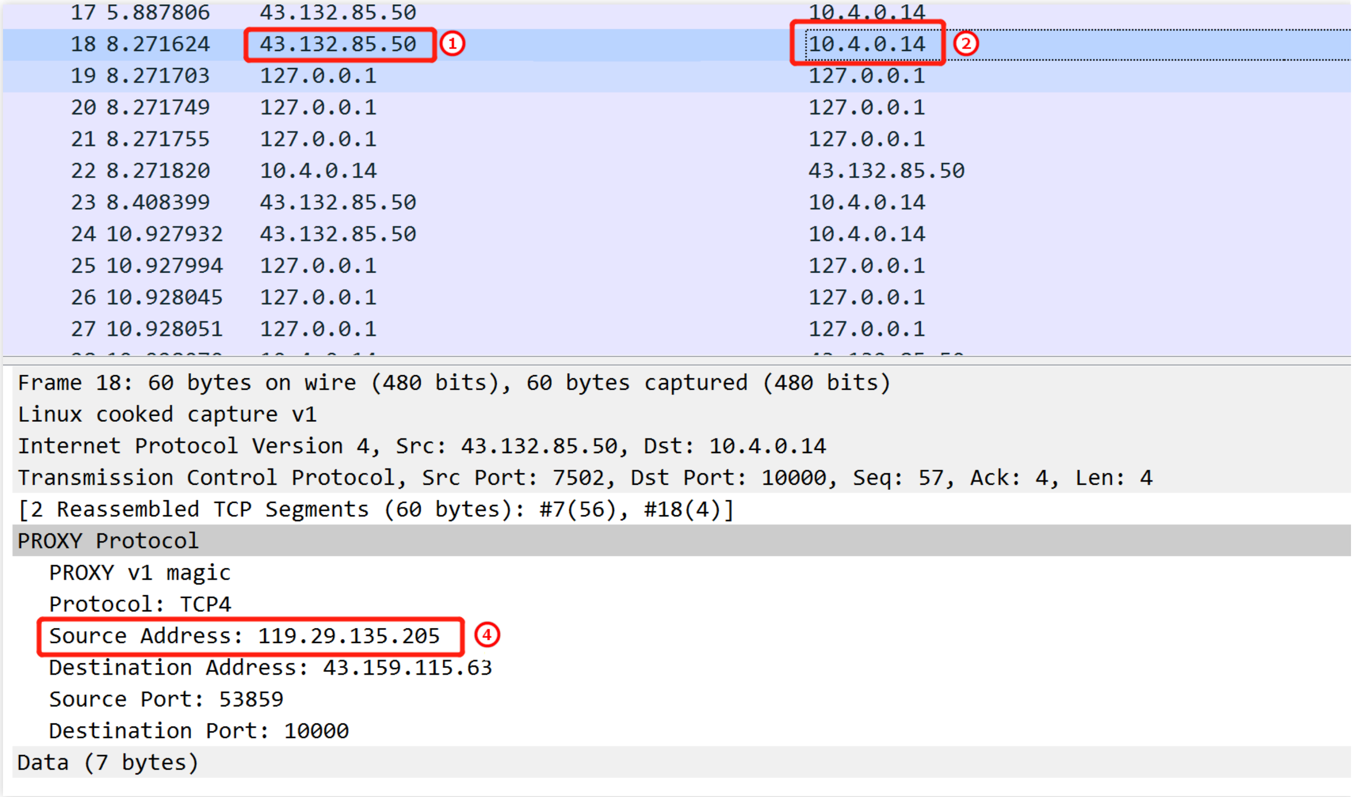
```
# Initiate an HTTP request with curl, where the domain is the L4 proxy domain, and
curl -i "http://d42f15b7a9b47488.davidjli.xyz.acc.edgeonedy1.com:8888/"
```

3. Check Nginx logs on the Nginx server:



```
119.29.135.205 -43.132.85.50 [28/Apr/2023:15:19:59 +0800] TCP 3
```

You can capture packets on the Nginx server and analyze the packets with Wireshark. After the TCP handshake is completed, the Proxy Protocol field is added in front of the first application data packet. Below is an example for Proxy Protocol V1. ① refers to the L4 proxy egress IP, ② refers to the Nginx server IP, ③ refers to the protocol version, ④ refers to the real client IP.



```
17 5.887806    43.132.85.50                              10.4.0.14
18 8.271624    43.132.85.50                              10.4.0.14
19 8.271703    127.0.0.1                                 127.0.0.1
20 8.271749    127.0.0.1                                 127.0.0.1
21 8.271755    127.0.0.1                                 127.0.0.1
22 8.271820    10.4.0.14                                 43.132.85.50
23 8.408399    43.132.85.50                              10.4.0.14
24 10.927932   43.132.85.50                              10.4.0.14
25 10.927994   127.0.0.1                                 127.0.0.1
26 10.928045   127.0.0.1                                 127.0.0.1
27 10.928051   127.0.0.1                                 127.0.0.1
```

```
Frame 18: 60 bytes on wire (480 bits), 60 bytes captured (480 bits)
Linux cooked capture v1
Internet Protocol Version 4, Src: 43.132.85.50, Dst: 10.4.0.14
Transmission Control Protocol, Src Port: 7502, Dst Port: 10000, Seq: 57, Ack: 4, Len: 4
[2 Reassembled TCP Segments (60 bytes): #7(56), #18(4)]
PROXY Protocol
  PROXY v1 magic
  Protocol: TCP4
  Source Address: 119.29.135.205
  Destination Address: 43.159.115.63
  Source Port: 53859
  Destination Port: 10000
Data (7 bytes)
```

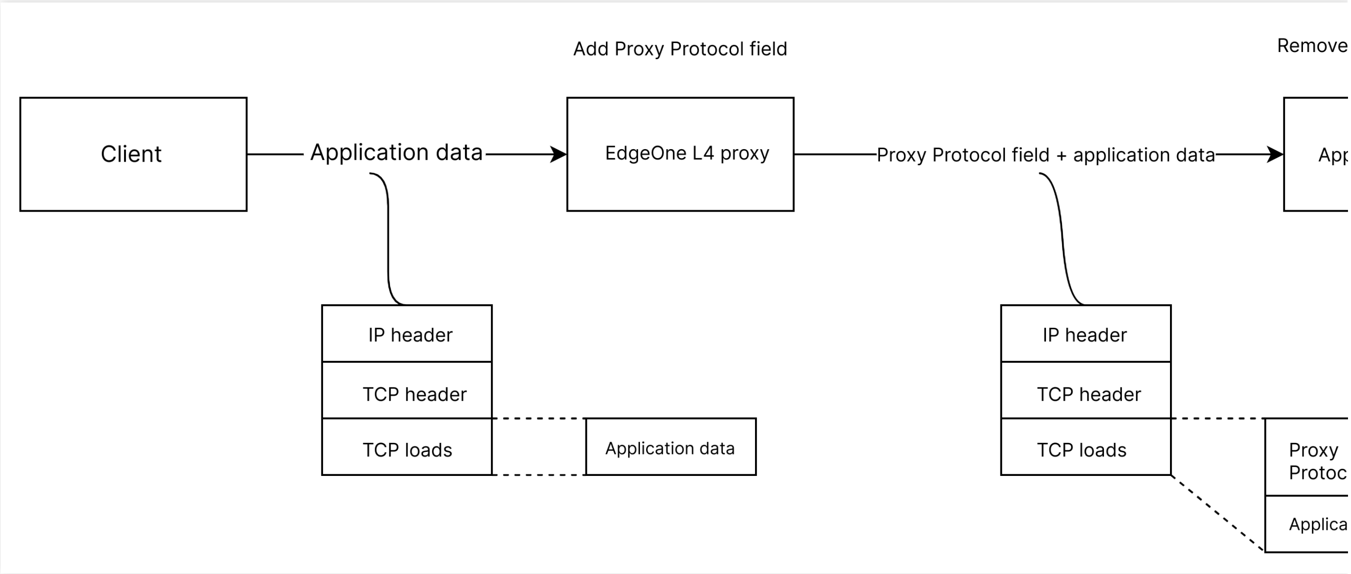
Method 2: Parsing Real Client IPs on Application Server

Last updated：2023-09-11 17:43:51

Scenarios

Scenario 1: If the UDP protocol is used on the origin, only Proxy Protocol V2 can be selected to pass the real client IPs. In this case, you need to parse the Proxy Protocol V2 on the application server to obtain the real client IPs.
Scenario 2: If the TCP protocol is used on the origin, and you want to implement application judgment via the real client IPs on the application server, you need to parse the Proxy Protocol V1/V2 on the application server to obtain the real client IPs.

Deployment Diagram

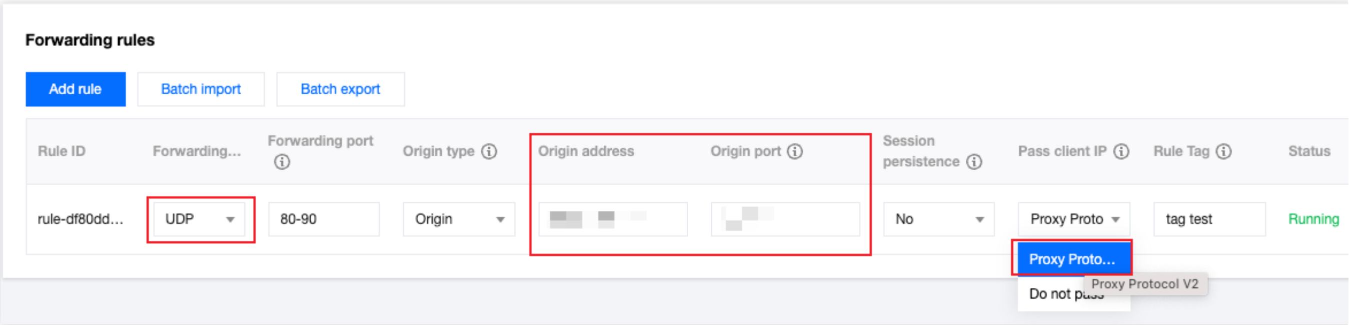


As shown in the above diagram, you can configure L4 proxy via EdgeOne L4 proxy module to point to the application server, and add the Proxy Protocol field to the application data by EdgeOne L4 proxy service. Parsing is implemented on the application server.

Directions

Step 1: Configure L4 proxy forwarding rule

Modify the L4 proxy forwarding rule in the console. You need to enter the origin address and origin port. If the forwarding protocol is UDP, select Proxy Protocol V2 for Pass client IP. If the forwarding protocol is TCP, you can select Proxy Protocol V1 or V2. For details, see Modifying L4 Proxy Forwarding Rules.

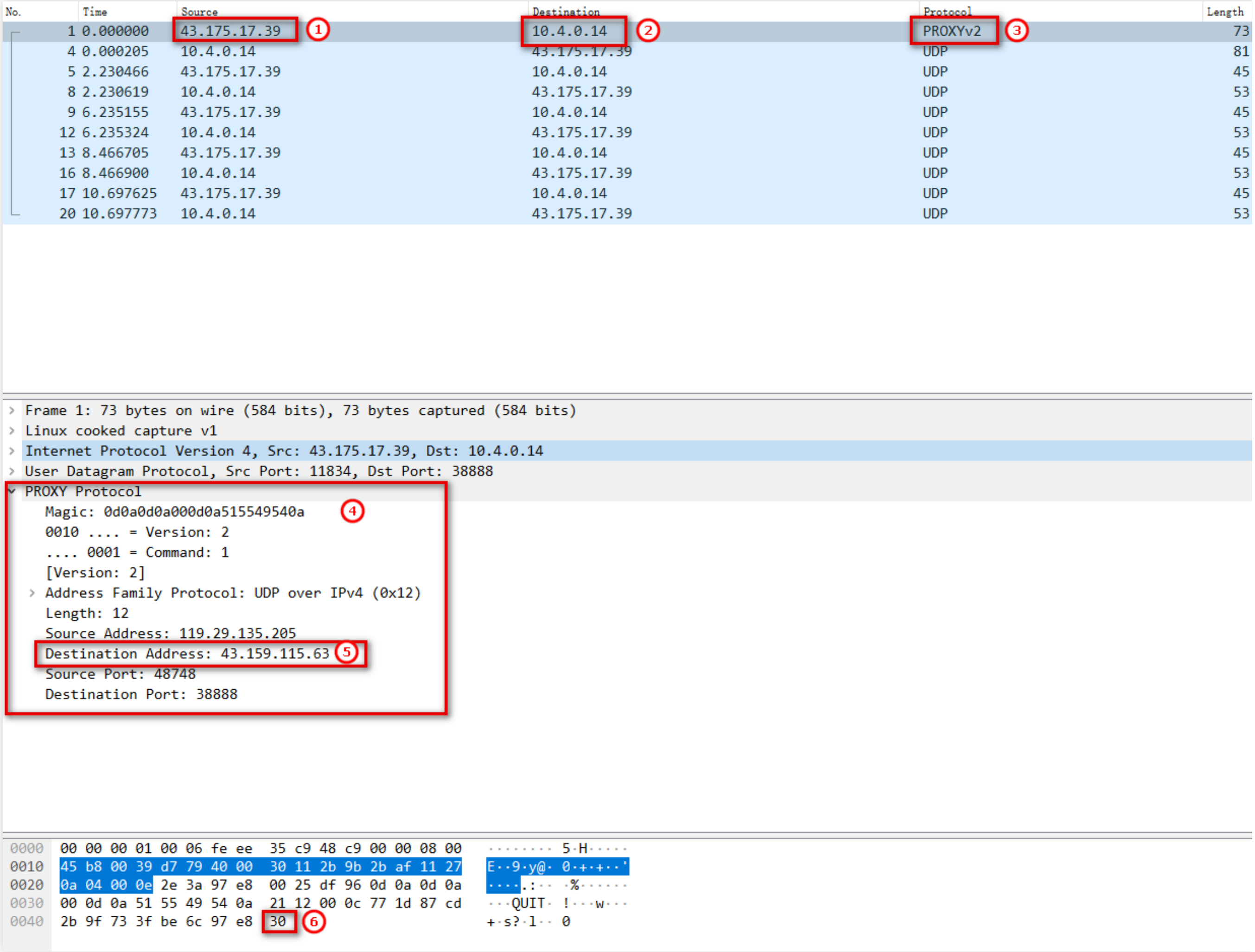


Rule ID	Forwarding...	Forwarding port ⓘ	Origin type ⓘ	Origin address	Origin port ⓘ	Session persistence ⓘ	Pass client IP ⓘ	Rule Tag ⓘ	Status
rule-df80dd...	UDP	80-90	Origin	[redacted]	[redacted]	No	Proxy Proto	tag test	Running

Step 2: Obtain real client IPs on the application server

You need to parse the Proxy Protocol filed with reference to the sample code in the Proxy Protocol. For the format of the client IPs, see Format of Real Client IPs Obtained Through Proxy Protocol V1/V2.

When the UDP protocol and Proxy Protocol V2 are selected, the Proxy Protocol field is added to the first UDP datagram. In the figure below, ① refers to the L4 proxy egress IP, ② refers to the origin address, ③ refers to the protocol version, ④ refers to the Proxy Protocol field, ⑤ refers to the real client IP address, and ⑥ refers to the application data.



```
No.   Time        Source          Destination     Protocol  Length
  1 0.000000     43.175.17.39    10.4.0.14       PROXYv2       73
  4 0.000205     10.4.0.14       43.175.17.39    UDP           81
  5 2.230466     43.175.17.39    10.4.0.14       UDP           45
  8 2.230619     10.4.0.14       43.175.17.39    UDP           53
  9 6.235155     43.175.17.39    10.4.0.14       UDP           45
 12 6.235324     10.4.0.14       43.175.17.39    UDP           53
 13 8.466705     43.175.17.39    10.4.0.14       UDP           45
 16 8.466900     10.4.0.14       43.175.17.39    UDP           53
 17 10.697625    43.175.17.39    10.4.0.14       UDP           45
 20 10.697773    10.4.0.14       43.175.17.39    UDP           53
```

```
> Frame 1: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
> Linux cooked capture v1
> Internet Protocol Version 4, Src: 43.175.17.39, Dst: 10.4.0.14
> User Datagram Protocol, Src Port: 11834, Dst Port: 38888
v PROXY Protocol
    Magic: 0d0a0d0a000d0a515549540a
    0010 .... = Version: 2
    .... 0001 = Command: 1
    [Version: 2]
  > Address Family Protocol: UDP over IPv4 (0x12)
    Length: 12
    Source Address: 119.29.135.205
    Destination Address: 43.159.115.63
    Source Port: 48748
    Destination Port: 38888
```

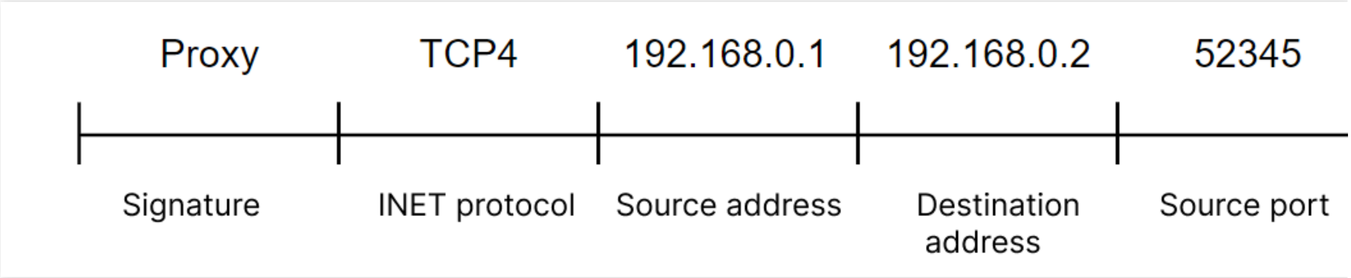
```
0000  00 00 00 01 00 06 fe ee  35 c9 48 c9 00 00 08 00   ········ 5·H·····
0010  45 b8 00 39 d7 79 40 00  30 11 2b 9b 2b af 11 27   E··9·y@· 0·+·+··'
0020  0a 04 00 0e 2e 3a 97 e8  00 25 df 96 0d 0a 0d 0a   ·····:·· ·%······
0030  00 0d 0a 51 55 49 54 0a  21 12 00 0c 77 1d 87 cd   ···QUIT· !···w···
0040  2b 9f 73 3f be 6c 97 e8  30                        +·s?·l·· 0
```

Format of Real Client IPs Obtained Through Proxy Protocol V1/V2

Last updated：2023-06-29 15:37:55

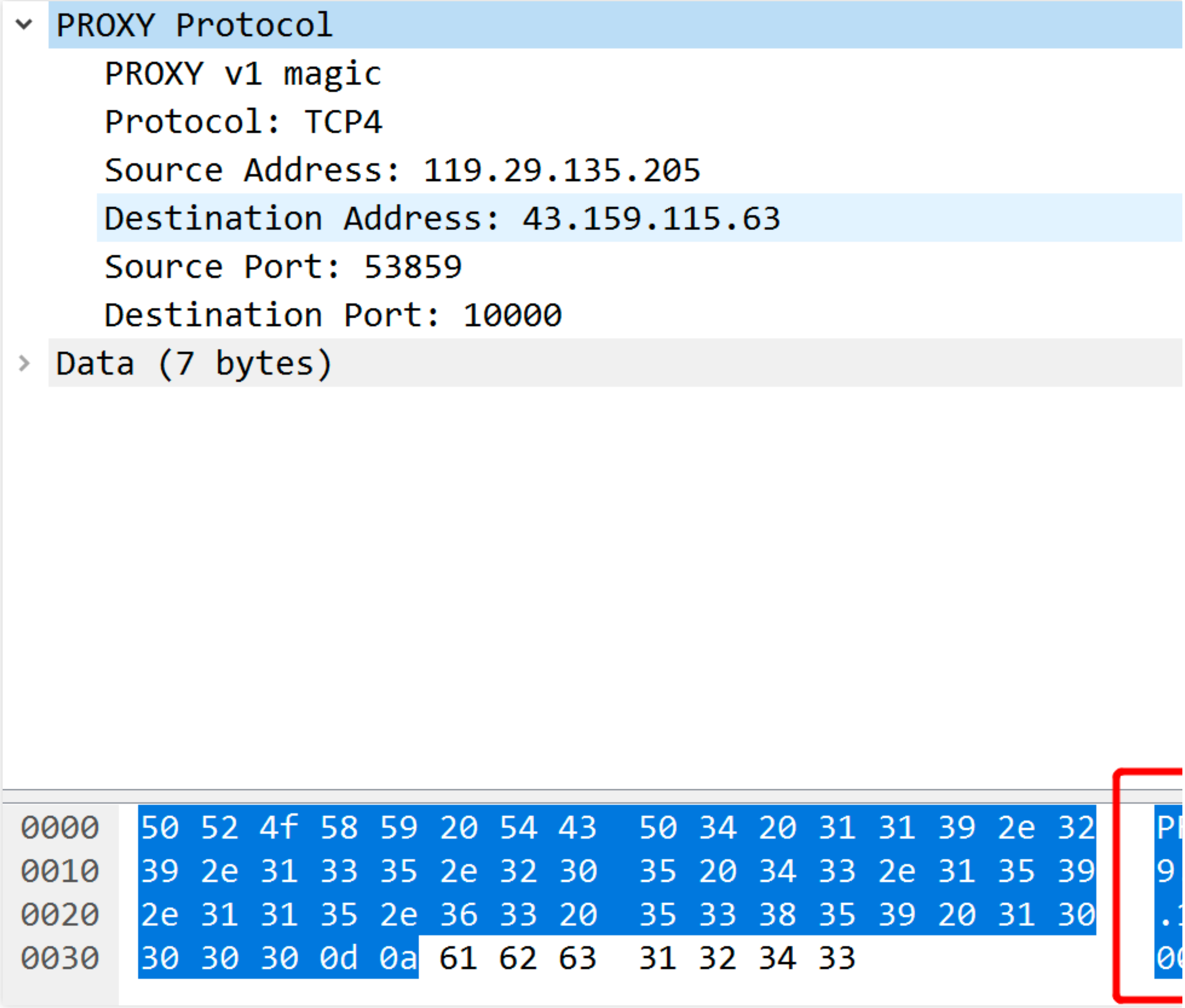
Proxy Protocol V1

Proxy Protocol V1 supports TCPv4 and TCPv6, and adopts string format. See details below:



```
PROXY TCP4 192.168.0.1 192.168.0.11 56324 443\\r\\n
```

You can check the following information with Wireshark.



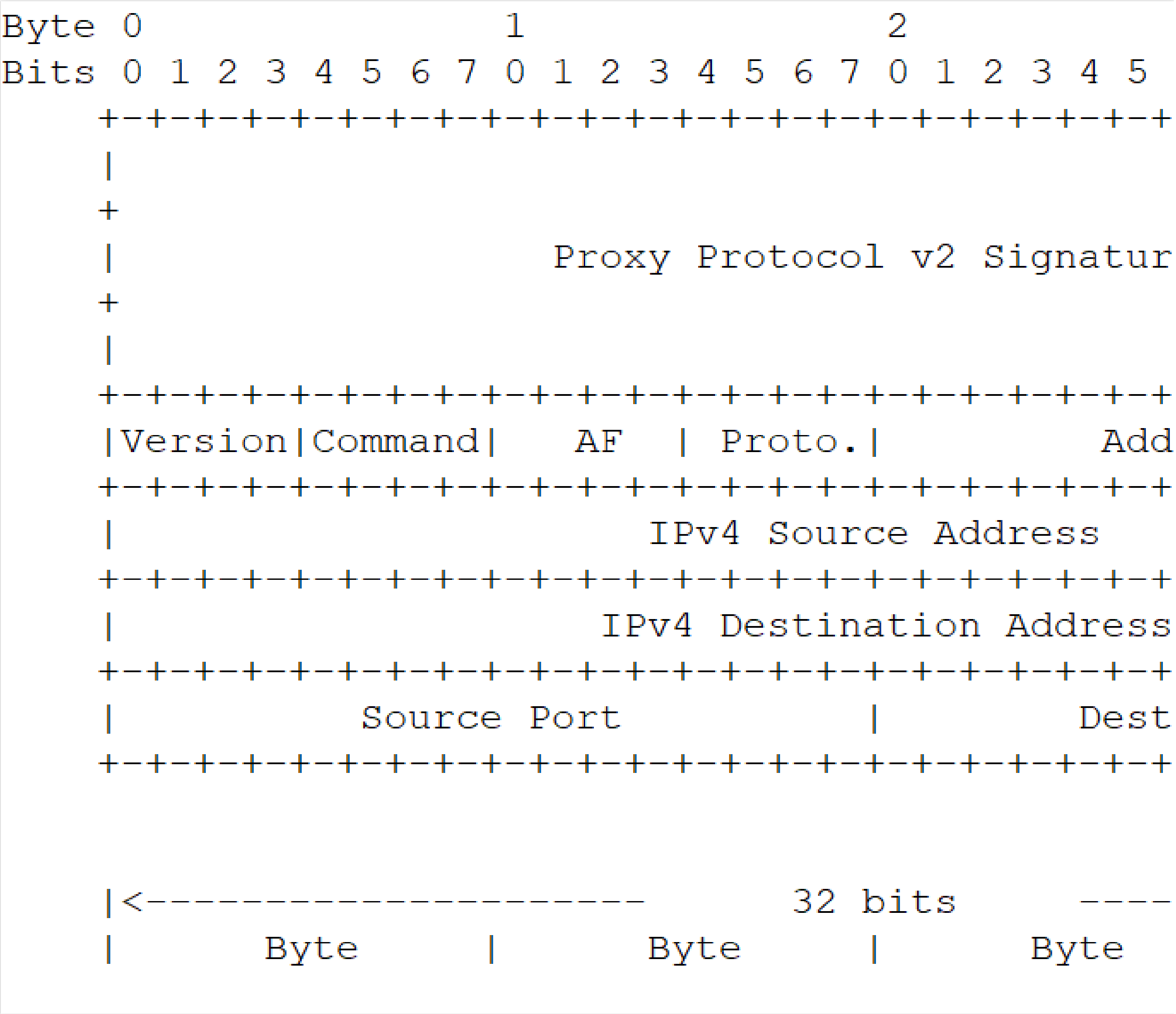
```
⌄ PROXY Protocol
      PROXY v1 magic
      Protocol: TCP4
      Source Address: 119.29.135.205
      Destination Address: 43.159.115.63
      Source Port: 53859
      Destination Port: 10000
› Data (7 bytes)
```

```
0000  50 52 4f 58 59 20 54 43  50 34 20 31 31 39 2e 32   P
0010  39 2e 31 33 35 2e 32 30  35 20 34 33 2e 31 35 39   9
0020  2e 31 31 35 2e 36 33 20  35 33 38 35 39 20 31 30   .
0030  30 30 30 0d 0a 61 62 63  31 32 34 33               0
```

Proxy Protocol V2

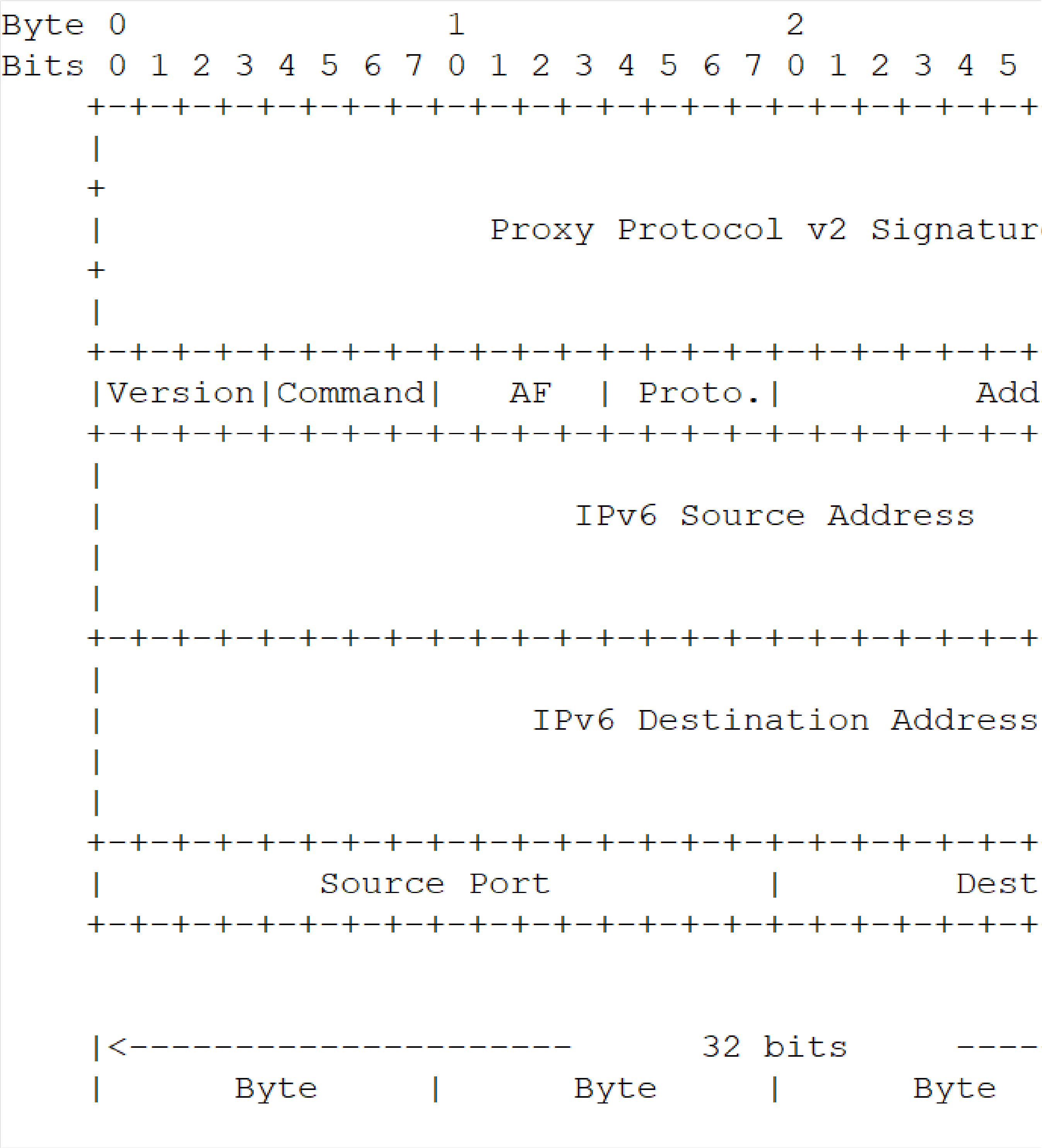
Proxy Protocol V2 supports TCPv4, TCPv6, UDPv4 and UDPv6, and adopts the binary format. See details below:

IPv4



```
Byte 0               1               2
Bits 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |
    +
    |                  Proxy Protocol v2 Signatur
    +
    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |Version|Command|   AF  | Proto.|         Add
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                      IPv4 Source Address
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |                    IPv4 Destination Address
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |          Source Port          |        Dest
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+


    |<---------------------      32 bits     ----
    |      Byte     |      Byte     |      Byte
```

IPv6



```
Byte 0               1               2
Bits 0 1 2 3 4 5 6 7 0 1 2 3 4 5 6 7 0 1 2 3 4 5
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |
    +
    |                 Proxy Protocol v2 Signatur
    +
    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |Version|Command|   AF   | Proto.|         Add
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |
    |                     IPv6 Source Address
    |
    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |
    |                   IPv6 Destination Address
    |
    |
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
    |          Source Port          |        Dest
    +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+


    |<---------------------      32 bits     ----
    |      Byte      |      Byte      |      Byte
```

Transmitting Client Real IP via SPP Protocol

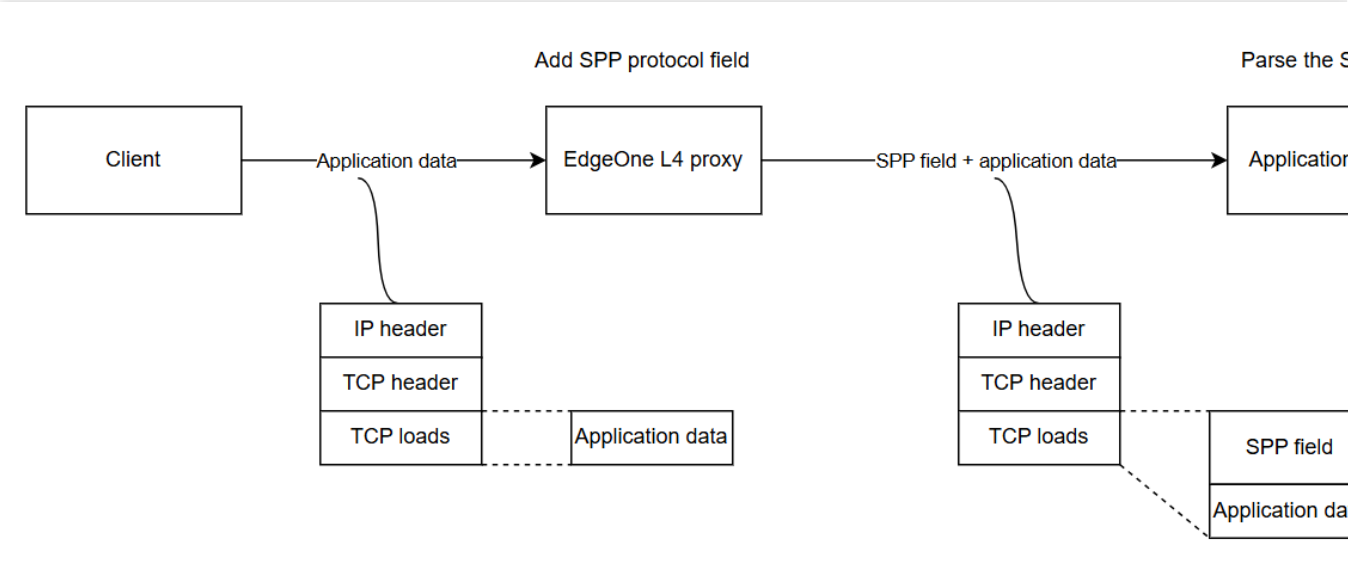
Last updated：2024-07-30 16:22:12

Application scenario

The SPP (Simple Proxy Protocol Header, hereinafter referred to as SPP) protocol is a custom header format used by proxy servers to transmit real client IP and other related information to backend servers. It is used for logging, access control, CLB, fault troubleshooting, and other scenarios. The SPP header has a fixed length of 38 bytes, making it simpler compared to the Proxy Protocol V2.
If your current backend business service is a UDP service and either already supports the SPP protocol or you prefer a simpler parsing method, you can use the SPP protocol to transmit the client real IP. EdgeOne's layer 4 proxy supports transmitting the real client IP to the business server based on the SPP protocol standard. You can parse this protocol at the server end to obtain the real client IP and port.

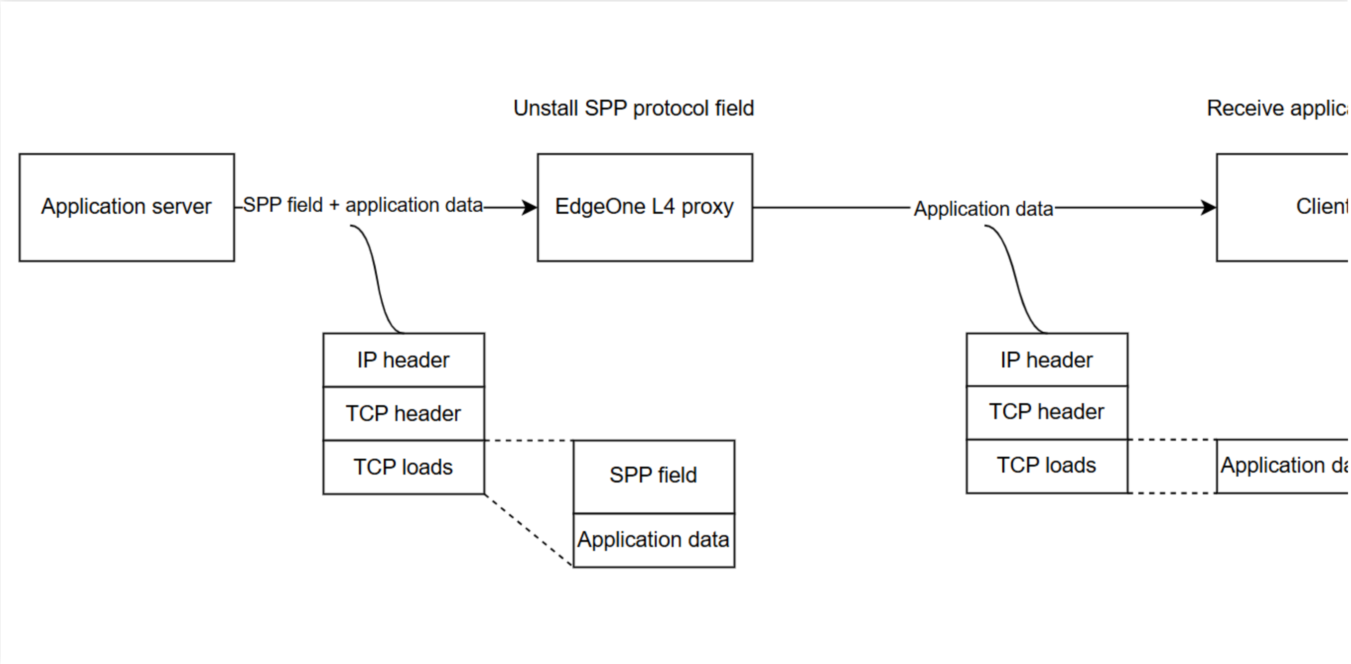
EdgeOne SPP Protocol Handling Process

Request Access



As shown in the above diagram, when you use the SPP protocol to transmit the Client IP and Port, the EdgeOne Layer 4 proxy will automatically append the client's real IP and Port in a fixed 38-byte length, following the SPP header format, before each payload. You need to parse the SPP header field on the origin server to obtain the client's real IP and Port.

Origin server response



As illustrated above, when the origin server responds, it must include the SPP header and return it to the EO Layer 4 proxy. The EO Layer 4 proxy will automatically uninstall the SPP header.

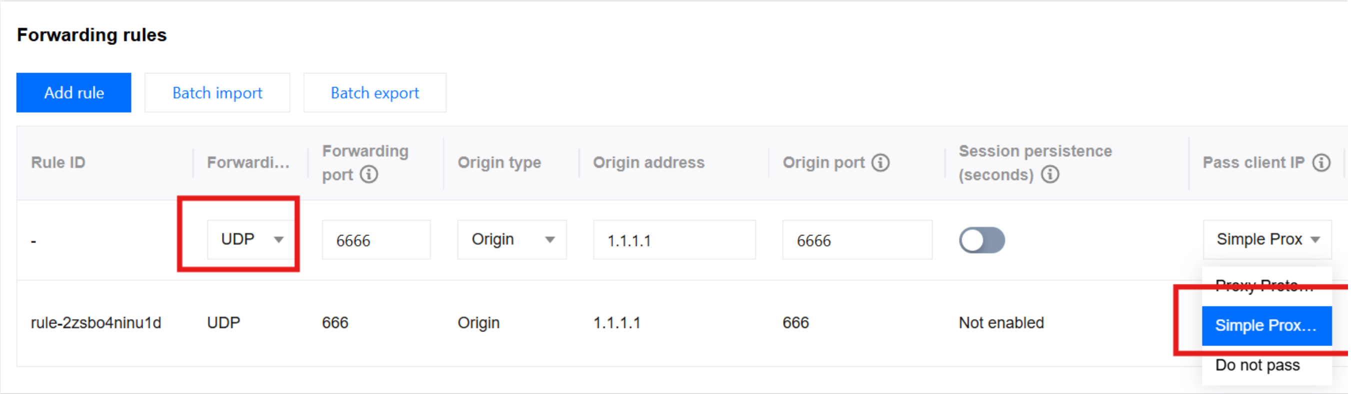
Note:

If the origin server does not return the SPP header, it will result in the EO Layer 4 proxy truncating the business data in the payload.

Directions

Step 1: Configure Layer 4 Proxy Forwarding Rules

1. Log in into the EdgeOne console, click on **Site List** in the left sidebar. Subsequently, within the Site List, select the **Site** you wish to configure.
2. On the site detail page, click **L4 Proxy**.
3. On the L4 Proxy page, select the L4 proxy instance you want to modify, and click **Configure**.
4. Select the Layer 4 proxy rule that requires passing the real client IP and click **Edit**.
5. Enter the corresponding business origin server address, origin server port, choose UDP for the forwarding protocol, select Simple Proxy Protocol for passing Client IP, and click **Save**.

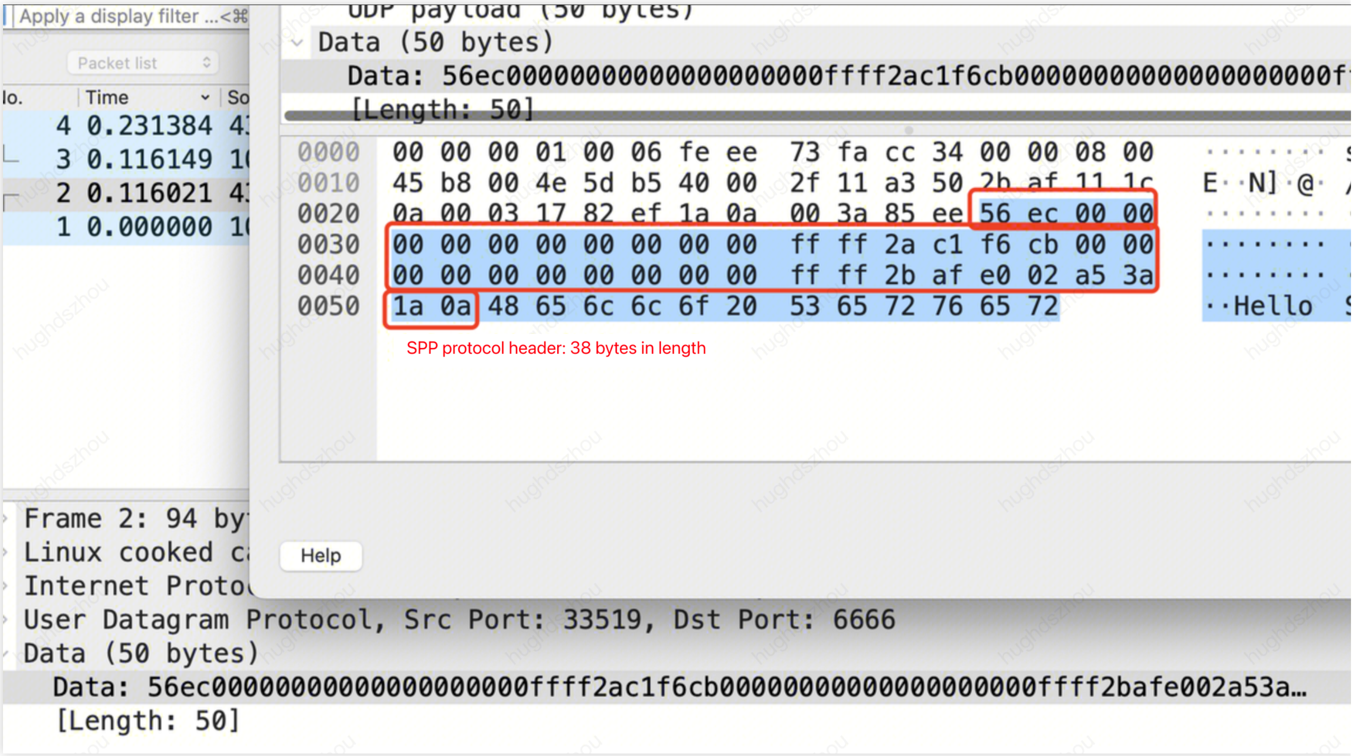


Forwarding rules

Rule ID	Forwardi...	Forwarding port	Origin type	Origin address	Origin port	Session persistence (seconds)	Pass client IP
-	UDP	6666	Origin	1.1.1.1	6666		Simple Prox
rule-2zsbo4ninu1d	UDP	666	Origin	1.1.1.1	666	Not enabled	Simple Prox...

Step 2: Parse the SPP field on the origin server to obtain the real client IP

You can refer to SPP Protocol Header Format and Sample Code to parse the SPP field on the origin server. When using the SPP protocol to transmit the real Client IP, the service packet data format obtained by the server is as follows:



```
UDP payload (50 bytes)
Data (50 bytes)
  Data: 56ec00000000000000000000ffff2ac1f6cb00000000000000000000f
  [Length: 50]

0000  00 00 00 01 00 06 fe ee  73 fa cc 34 00 00 08 00   ........ s
0010  45 b8 00 4e 5d b5 40 00  2f 11 a3 50 2b af 11 1c   E··N]·@· /
0020  0a 00 03 17 82 ef 1a 0a  00 3a 85 ee 56 ec 00 00   ........ ·
0030  00 00 00 00 00 00 00 00  ff ff 2a c1 f6 cb 00 00   ........
0040  00 00 00 00 00 00 00 00  ff ff 2b af e0 02 a5 3a   ........
0050  1a 0a 48 65 6c 6c 6f 20  53 65 72 76 65 72        ··Hello S
```

SPP protocol header: 38 bytes in length

```
Frame 2: 94 by
Linux cooked c
Internet Proto
User Datagram Protocol, Src Port: 33519, Dst Port: 6666
Data (50 bytes)
  Data: 56ec00000000000000000000ffff2ac1f6cb00000000000000000000ffff2bafe002a53a…
  [Length: 50]
```

You can

refer to the following sample code to parse the business data and obtain the real Client IP.

Go

C

```
package main

import (
        "encoding/binary"
        "fmt"
        "net"
)

type NetworkConnection struct {
        Magic      uint16
        ClientAddr net.IP
        ProxyAddr  net.IP
        ClientPort uint16
        ProxyPort  uint16
}

func handleConn(conn *net.UDPConn) {
        buf := make([]byte, 1024)             // Create a buffer
        n, addr, err := conn.ReadFromUDP(buf) // Read the packet from the connectio

        if err != nil {
                fmt.Println("Error reading from UDP connection:", err)
                return
        }

        // Convert the received bytes to a NetworkConnection struct
        nc := NetworkConnection{
                Magic:      binary.BigEndian.Uint16(buf[0:2]),
                ClientAddr: make(net.IP, net.IPv6len),
                ProxyAddr:  make(net.IP, net.IPv6len),
        }
        if nc.Magic == 0x56EC {
                copy(nc.ClientAddr, buf[2:18])
                copy(nc.ProxyAddr, buf[18:34])
                nc.ClientPort = binary.BigEndian.Uint16(buf[34:36])
                nc.ProxyPort = binary.BigEndian.Uint16(buf[36:38])

                // Print SPP header information, including magic, client's real IP
                fmt.Printf("Received packet:\\n")
                fmt.Printf("\\tmagic: %x\\n", nc.Magic)
                fmt.Printf("\\tclient address: %s\\n", nc.ClientAddr.String())
                fmt.Printf("\\tproxy address: %s\\n", nc.ProxyAddr.String())
                fmt.Printf("\\tclient port: %d\\n", nc.ClientPort)
                fmt.Printf("\\tproxy port: %d\\n", nc.ProxyPort)
                // Print the real and effective payload
                fmt.Printf("\\tdata: %v\\n\\tcount: %v\\n", string(buf[38:n]), n)
        } else {
                // Print the real and effective payload
                fmt.Printf("\\tdata: %v\\n\\tcount: %v\\n", string(buf[0:n]), n)
        }

        // Response package, note: The SPP 38-byte length must be returned unchange
        response := make([]byte, n)
        copy(response, buf[0:n])
        _, err = conn.WriteToUDP(response, addr) // Send data
        if err != nil {
                fmt.Println("Write to udp failed, err: ", err)
        }
```

```
}

func main() {
        localAddr, _ := net.ResolveUDPAddr("udp", ":6666") // Create a UDP address
        conn, err := net.ListenUDP("udp", localAddr)       // Create a listener
        if err != nil {
                panic("Failed to listen for UDP connections:" + err.Error())
        }

        defer conn.Close() // Close the connection when done
        for {
                handleConn(conn) // Handle the incoming connection
        }
}
```

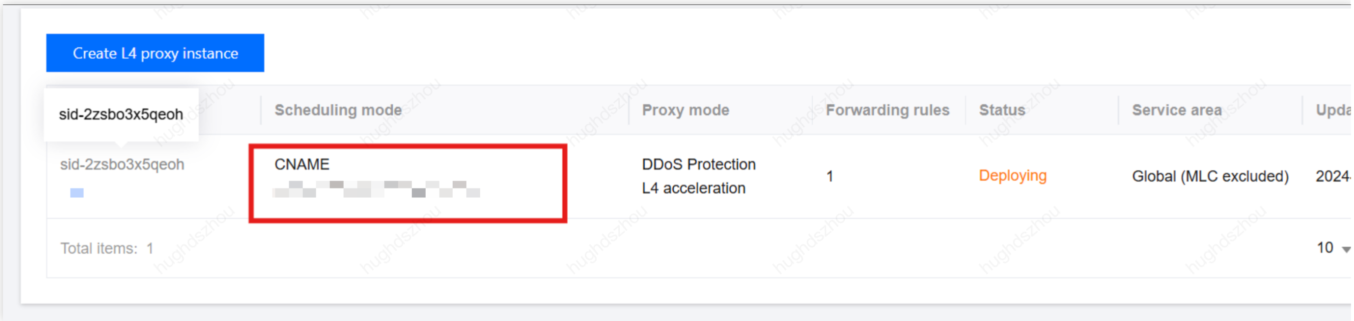
```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <arpa/inet.h>
#include <netinet/in.h>
#include <sys/socket.h>
#define BUF_SIZE 1024
struct NetworkConnection {
    uint16_t magic;
    struct in6_addr clientAddr;
    struct in6_addr proxyAddr;
    uint16_t clientPort;
    uint16_t proxyPort;
};
void handleConn(int sockfd) {
    struct sockaddr_in clientAddr;
    socklen_t addrLen = sizeof(clientAddr);
    unsigned char buf[BUF_SIZE];
    ssize_t n = recvfrom(sockfd, buf, BUF_SIZE, 0, (struct sockaddr *)&clientAddr,
    if (n < 0) {
        perror("Error reading from UDP connection");
        return;
    }
    // Convert the received bytes to a NetworkConnection struct
    struct NetworkConnection nc;
    nc.magic = ntohs(*(uint16_t *)buf);
    if (nc.magic == 0x56EC) { // Magic value 0x56EC indicates an SPP header
        memcpy(&nc.clientAddr, buf + 2, 16);
        memcpy(&nc.proxyAddr, buf + 18, 16);
        nc.clientPort = ntohs(*(uint16_t *)(buf + 34));
        nc.proxyPort = ntohs(*(uint16_t *)(buf + 36));
        printf("Received packet:\\n");
        printf("\\tmagic: %x\\n", nc.magic);
        char clientIp[INET6_ADDRSTRLEN];
        char proxyIp[INET6_ADDRSTRLEN];
        inet_ntop(AF_INET6, &nc.clientAddr, clientIp, INET6_ADDRSTRLEN);
        inet_ntop(AF_INET6, &nc.proxyAddr, proxyIp, INET6_ADDRSTRLEN);

        // Print SPP header information, including magic, client's real IP and port
        printf("\\tclient address: %s\\n", clientIp);
        printf("\\tproxy address: %s\\n", proxyIp);
        printf("\\tclient port: %d\\n", nc.clientPort);
        printf("\\tproxy port: %d\\n", nc.proxyPort);
        // Print the actual payload
        printf("\\tdata: %.*s\\n\\tcount: %zd\\n", (int)(n - 38), buf + 38, n);
    } else {
        printf("\\tdata: %.*s\\n\\tcount: %zd\\n", (int)n, buf, n);
    }
    // Send response packet, note: the SPP 38-byte length must be returned as-is
    sendto(sockfd, buf, n, 0, (struct sockaddr *)&clientAddr, addrLen);
}
int main() {
    int sockfd = socket(AF_INET, SOCK_DGRAM, 0);
    if (sockfd < 0) {
        perror("Failed to create socket");
        exit(EXIT_FAILURE);
    }
    // Create a UDP address using the local address and port
    struct sockaddr_in serverAddr;
    serverAddr.sin_family = AF_INET;
    serverAddr.sin_addr.s_addr = INADDR_ANY;
    serverAddr.sin_port = htons(6666);
    if (bind(sockfd, (struct sockaddr *)&serverAddr, sizeof(serverAddr)) < 0) {
        perror("Failed to bind");
        exit(EXIT_FAILURE);
    }
    while (1) {
        handleConn(sockfd);
    }
}
```

Step 3: Testing and Validation

You can use a server as the client, construct client requests, and use the nc command to simulate UDP requests. The details of the command are as follows:

```
echo "Hello Server" | nc -w 1 -u <IP/DOMAIN> <PORT>
```

Here, IP/Domain refers to the IP or domain of your fourth-layer proxy instance, which you can view in the EdgeOne console. Port refers to the forward port configured for the rule in Step 1.

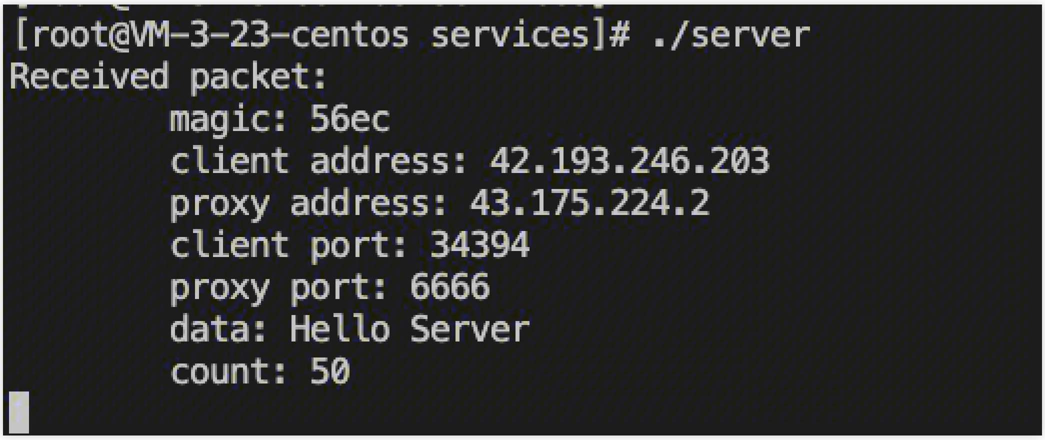


sid-2zsbo3x5qeoh	Scheduling mode	Proxy mode	Forwarding rules	Status	Service area	Upda
sid-2zsbo3x5qeoh	CNAME [redacted]	DDoS Protection L4 acceleration	1	Deploying	Global (MLC excluded)	2024

Total items: 1

10

The server receives the request and parses the Client IP address as follows:



```
[root@VM-3-23-centos services]# ./server
Received packet:
        magic: 56ec
        client address: 42.193.246.203
        proxy address: 43.175.224.2
        client port: 34394
        proxy port: 6666
        data: Hello Server
        count: 50
```

Related References

SPP Protocol Header Format

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Magic Number         |                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               +
|                                                               |
+                                                               +
|                                                               |
+                          Client Address                       +
|                                                               |
+                               +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                               |                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+                               +
|                                                               |
+                                                               +
|                                                               |
+                          Proxy Address                        +
|                                                               |
+                               +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                               |          Client Port          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|           Proxy Port          |           Payload...          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Magic Number

In the SPP Protocol format, Magic Number is 16 bits with a fixed value of 0x56EC, mainly used to identify the SPP Protocol. It also defines that the SPP protocol header is a fixed length of 38 bytes.

Client Address

The client's request IP address is 128 bits long. If initiated by an IPV4 client, the value represents IPV4; if initiated by an IPV6 client, the value represents IPV6.

Proxy Address

The proxy server's IP address is 128 bits long and can be parsed in the same way as the Client Address.

Client Port

The port for the client to send UDP packets is 16 bits long.

Proxy Port

The port for the proxy server to receive UDP packets is 16 bits long.

payload

Payload, the data following the header in the data packet.