# PacketMAX™

## Advanced Features

User Guide By Garland Technology

AF1G40AC

Garland Technology: Advanced Features System
**Firmware Rev Level: 3.0.6.r2**

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# 1 Preface

## 1.1 Declaration

This document updates at irregular intervals because of product upgrade or other reason.

This document is for your reference only.

## 1.2 Suggestion feedback

If you have any questions when using our product and reading this document, please contact us:

Email:

## 1.3 Audience

This document is for the following audiences:

- System maintenance engineers
- Debugging and testing engineers
- Network monitoring engineers
- Field maintenance engineers

# 2 Brief Introduction

This document describes the basic conceptions, applications and usages (include network topology, configuration examples and limitations) of TAP series devices.

## 2.1 TAP Group introduction

A TAP Group has at least one ingress port and one egress port. The ingress and egress ports should be link aggregation or physical ports. TAP series devices support 2 modes: PORT and PORT WITH FLOW.

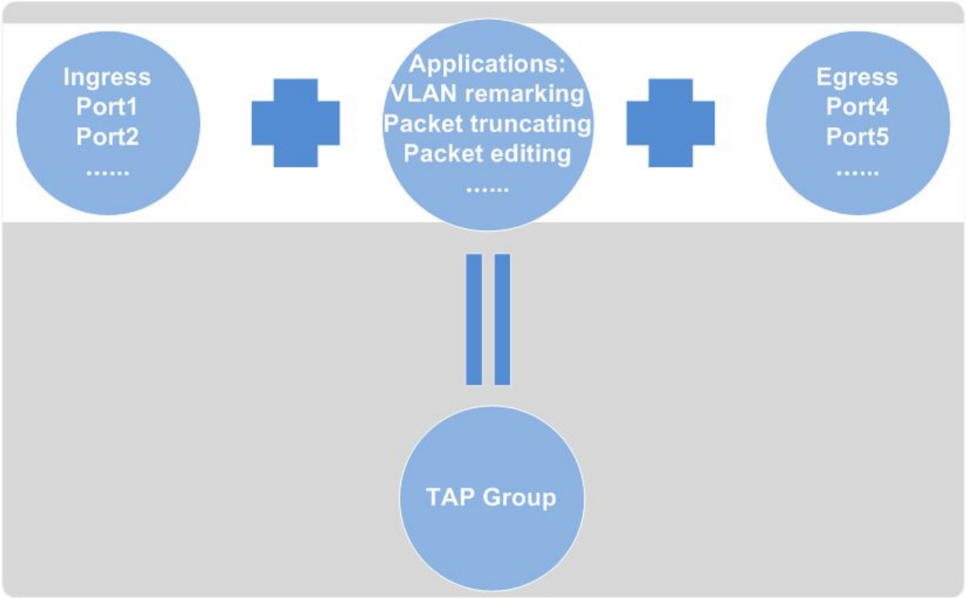


**Figure 2-1** Composition of TAP group

### 2.1.2 Port mode

Applications are taking effect on all packets which pass through the port.

One ingress port can only belong to one TAP group. One Egress port can belong to several TAP groups.

All packets enter the ingress port should be forward to the egress port.

### 2.1.3 Port with flow mode

Applications are taking effect on packets which pass through the port and match the flow rule. One ingress port with different flow rules can join different TAP Groups. One Egress port can join several TAP groups.

Packets enter the ingress port should compare with the flow rule, only the packets matching the flow rule can be forward to the egress port.

E.g.: eth-0-1 with Flow A is the ingress member of TAP group 1; eth-0-1 with Flow B is the ingress member of TAP group 2. When the packets enter the port eth0-01, packets which match Flow A should forward to TAP group1's egress port; packets which match Flow B should forward to TAP group2's egress port.

## 2.2 FLOW types

TAP series devices support 2 types of the flow: default (UDF) Flow; decap (inner-match) Flow. Default Flow is used for matching normal packets.

Decap Flow is used for matching the inner header of the packet which is encapsulated with GRE/NVGRE/VXLAN, etc.

## 2.3 Precondition

The following actions are supported for both PORT and PORT WITH FLOW mode:

- VLAN remarking
- VLAN heading stripping
- Packet editing
- Packet truncating
- Time stamp

The following actions are only supported on PORT WITH FLOW mode:

- GRE/NVGRE/VXLAN/IPIP/ERSPAN/MPLS/PPPOE/header stripping and UDF header
- L2-GRE/L3-GRE/VXLAN/ERSPAN header adding
- Inner header field matching

: Supported actions for different mode

| Action\Mode | PORT | PORT with FLOW |
|---|---|---|
| VLAN remarking | √ | √ |
| VLAN heading stripping | √ | √ |
| Packet truncating | √ | √ |
| Packet editing | √ | √ |
| Inner header field matching | × | √ |
| Packet header stripping | × | √ |
| Inner VXLAN header stripping | × | √ |
| Time STAMP (Apply to the egress port of TAP Group) | √ | √ |

## 2.4 Limitations

**Table 2-1** Mutual exclusion table

| | VLAN header stripping | VLAN remarking | Packet truncating | Packet editing | Packet head stripping | Time stamp | Inner VXLAN header stripping |
|---|---|---|---|---|---|---|---|
| VLAN header stripping | N/A | × | × | √ | × | √ | × |
| VLAN remarking | × | N/A | × | √ | √ | √ | √ |
| Packet truncating | × | × | N/A | × | × | × | × |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Packet editing | √ | √ | × | N/A | √ | × | √ |
| Packet head stripping | × | √ | × | √ | N/A | √ | √ |
| Time stamp | √ | √ | × | × | √ | N/A | √ |
| Inner VXLAN header stripping | × | √ | × | √ | √ | √ | N/A |

- √ : These 2 actions can be configured together.
- × : These 2 actions are mutually exclusive and cannot be configured together.

# 3 Device Management Configuration

TAP series devices have 2 types of management ports: Ethernet port and console port. Users can choose any of these management ports to manage the device.

## 3.1 Configuring console port for management

### 3.1.1 Configuration

Before you can assign switch information, make sure you have connected a PC or terminal to the console port, and configured the PC or terminal software parameters to match the default console port parameters.

The follow list describes the default value of console parameters for TAP series switches:

- Baud rate default is 115200.
- Data bits default is 8.
- Stop bits default is 1.
- Parity settings default is none.

Users can modify the console parameters after login in the switch. The following example shows how to set the baud rate as 9600:

```
TAP# configure terminal
TAP(config)# line console 0
TAP(config-line)# speed 9600
```

### 3.1.2 Validation

The following example shows how to display the configuration of the console port:

```
TAP# show console
Current console configuration:
------------------------------------------------------------
line console 0
 speed 9600
 parity none
 databits 8
 stopbits 1
 exec-timeout 10 0
```

```
privilege level 1
no line-password
no login
```

## 3.2 Configuring out band Ethernet port for management

Users should set the management IP address by console port before managing the device by out band Ethernet port.

### 3.2.1 Configuration

Set the management IP address as 10.10.10.11/23:

```
TAP# configure terminal
TAP(config)# management ip address 10.10.10.11/23
```

(optional) Set the management gateway address:

```
TAP# configure terminal
TAP(config)# management route gateway 10.10.10.1
```

### 3.2.2 Validation

The following example shows how to display the configuration:

```
TAP# show management ip address
Management IPv4 address:  10.10.10.11/23
IPv4 Gateway:  10.10.10.1
```

## 3.3 Configuring Temperature

TAP series switches support temperature alarm management.

Users can configure three temperature thresholds: low, high and critical. When the temperature of the device is lower than low threshold or higher than higher threshold, the device will give an alarm. If the temperature of the device is higher than the critical threshold, the device will cut off its power automatically.

**NOTE** The critical threshold is not recommended to set too low, otherwise it may lead the device reboot unnecessary

### 3.3.1 Configuration

The following example shows how to set the low threshold of the device as 10°C; high threshold of the device as 70°C; critical threshold of the device as 85°C:

```
TAP# configure terminal
TAP(config)# temperature 10 70 85
```

**NOTE**

Users can set the temperature of the board. The temperature of the chip cannot be changed.

### 3.3.2 Validation

The following example shows how to display the configuration of the temperature:

```
TAP# show environment
Fan tray status:
Index      Status       SpeedRate    Mode
----------+------------+------------+------------
1-1        OK           40%          AUTO
1-2        OK           40%          AUTO
1-3        OK           40%          AUTO
1-4        OK           40%          AUTO

Power status:
Index      Status       Power        Type         Alert
----------+------------+------------+------------+------------
1          PRESENT      OK           AC           NO
2          PRESENT      FAIL         -            ALERT

Sensor status (Degree Centigrade):
Index      Temperature  Lower_alarm  Upper_alarm  Critical     Position
----------+------------+------------+------------+------------+------------
1          41           10           70           85           BEFORE_CHIP
2          43           10           70           85           BEHIND_CHIP
3          34           10           70           85           AROUND_FAN
4          41           10           70           85           AROUND_CPU
5          65           -10          100          110          SWITCH_CHIP0
```

## 3.4 Configuring Fan

TAP series switches support fans automatically according to the temperature of the board and chip.

**Table 3-1** Correspondence of the chip temperature and the fan speed

| Chip temperature (˚C) | Work mode of the FAN | Speed rate of the FAN |
|---|---|---|
| ≥100 | Full | 100% |
| 90≤ Temperature < 100 | High | 80% |
| 80≤ Temperature < 90 | Low | 60% |
| ≤80 | Bottom | 40% |

**Table 3-2** Correspondence of the board temperature and the fan speed

| Board temperature (˚C) | Work mode of the FAN | Speed rate of the FAN |
|---|---|---|

| | | |
|---|---|---|
| ≥80 | Full | 100% |
| 65 ≤ Temperature < 80 | High | 80% |
| 50 ≤ Temperature < 65 | Low | 60% |
| ≤50 | Bottom | 40% |

**NOTE** e.g. When the chip and the board are both 65 ˚C, according to Table 2-1 the FAN speed should be 40%, according to Table 2-2 the FAN speed should be 80%. The real speed should be according to the higher one (80%).

### 3.4.2 Configuration

This application does not have any command line.

### 3.4.3 Validation

This application does not have any command line.

```
TAP# show environment
Fan tray status:
Index      Status       SpeedRate    Mode
----------+------------+------------+------------
1-1        OK           40%          AUTO
1-2        OK           40%          AUTO
1-3        OK           40%          AUTO
1-4        OK           40%          AUTO

Power status:
Index      Status       Power        Type         Alert
----------+------------+------------+------------+------------
1          PRESENT      OK           AC           NO
2          PRESENT      FAIL         -            ALERT

Sensor status (Degree Centigrade):
Index      Temperature  Lower_alarm  Upper_alarm  Critical     Position
----------+------------+------------+------------+------------+------------
1          41           10           70           85           BEFORE_CHIP
2          43           10           70           85           BEHIND_CHIP
3          34           10           70           85           AROUND_FAN
4          41           10           70           85           AROUND_CPU
5          65           -10          100          110          SWITCH_CHIP0
```

## 3.5 Configuring Power

TAP series switches support to manage power status automatically. When the power is failed or the fan is failed because of the power issue, the device should give an alarm. If power is removed or inserted, the switch should give an alarm too.

### 3.5.1 Configuration

This application does not have any command line.

### 3.5.2 Validation

The following example shows how to display the power information

```
TAP# show environment
Fan tray status:
Index      Status       SpeedRate    Mode
----------+------------+------------+------------
1-1        OK           40%          AUTO
1-2        OK           40%          AUTO
1-3        OK           40%          AUTO
1-4        OK           40%          AUTO

Power status:
Index      Status       Power        Type         Alert
----------+------------+------------+------------+------------
1          PRESENT      OK           AC           NO
2          PRESENT      FAIL         -            ALERT

Sensor status (Degree Centigrade):
Index      Temperature  Lower_alarm  Upper_alarm  Critical     Position
----------+------------+------------+------------+------------+------------
1          41           10           70           85           BEFORE_CHIP
2          43           10           70           85           BEHIND_CHIP
3          34           10           70           85           AROUND_FAN
4          41           10           70           85           AROUND_CPU
5          65           -10          100          110          SWITCH_CHIP0
```

## 3.6 Configuring Transceiver

TAP series switches support to check up the information of the transceiver. The transceiver information includes basic information and diagnostic information. The basic information includes transceiver type, vendor name, PN, S/N, wavelength and link length for supported type. The diagnostic information includes real-time temperature, voltage, current, optical transmit power, optical receive power and the threshold about these parameters. When the transceiver is inserted or removed or the real-time parameter is out of threshold, the switch should notice the users.

### 3.6.1 Configuration

This application does not have any command line.

### 3.6.2 Validation

The following example shows how to display the basic transceiver information:

```
TAP# show transceiver
```

```
Port eth-0-1 transceiver info:
Transceiver Type: 1000BASE-SX
Transceiver Vendor Name : FINISAR CORP.
Transceiver PN          : FTLF8519P3BNL
Transceiver S/N         : PL36KUC
Transceiver Output Wavelength: 850 nm
Supported Link Type and Length:
      Link Length for 50/125um multi-mode fiber: 300 m
      Link Length for 62.5/125um multi-mode fiber: 150 m
```

The following example shows how to display the detailed transceiver information:

```
TAP# show transceiver detail eth-0-1

Port eth-0-1 transceiver info:
Transceiver Type: 1000BASE-SX
Transceiver Vendor Name : FINISAR CORP.
Transceiver PN          : FTLF8519P3BNL
Transceiver S/N         : PL36KUC
Transceiver Output Wavelength: 850 nm
Supported Link Type and Length:
      Link Length for 50/125um multi-mode fiber: 300 m
      Link Length for 62.5/125um multi-mode fiber: 150 m
--------------------------------------------------------------------------------
Transceiver is internally calibrated.
mA: milliamperes, dBm: decibels (milliwatts), NA or N/A: not applicable.
++ : high alarm, +  : high warning, -  : low warning, -- : low alarm.
The threshold values are calibrated.
--------------------------------------------------------------------------------
                                  High Alarm  High Warn   Low Warn    Low Alarm
                Temperature       Threshold   Threshold   Threshold   Threshold
Port            (Celsius)         (Celsius)   (Celsius)   (Celsius)   (Celsius)
---------------+-----------------+-----------+-----------+-----------+----------
eth-0-1      39.10             110.00      93.00       -30.00      -40.00
--------------------------------------------------------------------------------
                                  High Alarm  High Warn   Low Warn    Low Alarm
                Voltage           Threshold   Threshold   Threshold   Threshold
Port            (Volts)            (Volts)     (Volts)     (Volts)     (Volts)
---------------+-----------------+-----------+-----------+-----------+----------
eth-0-1      3.32              3.60        3.50        3.10        3.00
--------------------------------------------------------------------------------
                                  High Alarm  High Warn   Low Warn    Low Alarm
                Current           Threshold   Threshold   Threshold   Threshold
Port            (milliamperes)      (mA)        (mA)        (mA)        (mA)
---------------+-----------------+-----------+-----------+-----------+----------
eth-0-1      6.56              13.00       12.50       2.00        1.00
--------------------------------------------------------------------------------
                Optical           High Alarm  High Warn   Low Warn    Low Alarm
                Transmit Power    Threshold   Threshold   Threshold   Threshold
Port             (dBm)              (dBm)       (dBm)       (dBm)       (dBm)
---------------+-----------------+-----------+-----------+-----------+----------
eth-0-1      -5.11             0.00        -3.00       -9.50       -13.50
--------------------------------------------------------------------------------
                Optical           High Alarm  High Warn   Low Warn    Low Alarm
                Receive Power     Threshold   Threshold   Threshold   Threshold
Port             (dBm)              (dBm)       (dBm)       (dBm)       (dBm)
---------------+-----------------+-----------+-----------+-----------+----------
eth-0-1      -6.15             0.50        -1.00       -16.99      -21.02
```

# 4 Interface configuration

## 4.1 Configuring Interface Split

### 4.1.1 Configuration

The following example shows how to split a 40G port into four 10G ports:

```
TAP# configure terminal
TAP(config)# split interface eth-0-1 10giga
```

NOTE Users must reboot the switch to take effect.

### 4.1.2 Validation

The following example shows how to display the splitting information:

```
TAP# show interface status
Name       Status      Duplex   Speed    Mode     Type         Description
----------+-----------+--------+--------+-------+------------+----------------
eth-0-1/1  down        auto     auto     trunk   UNKNOWN
eth-0-1/2  down        auto     auto     trunk   UNKNOWN
eth-0-1/3  down        auto     auto     trunk   UNKNOWN
eth-0-1/4  down        auto     auto     trunk   UNKNOWN
```

## 4.2 Configuring Interface State

### 4.2.1 Configuration

The following example shows how to turn up eth-0-1 and turn down eth-0-2:

### 4.2.2 Validation

The following example shows how to display the interface information:

```
TAP# show interface status
Name       Status      Duplex   Speed    Mode     Type         Description
----------+-----------+--------+--------+-------+------------+----------------
eth-0-1     up          a-full   a-1000   trunk   1000BASE_SX
eth-0-2     admin down  auto     a-1000   trunk   1000BASE_SX
```

# 4.3 Configuring Interface Duplex

## 4.3.1 Configuration

The following example shows how to set duplex of eth-0-1 to full and duplex of eth-0-2 to auto:

```
TAP# configure terminal
TAP(config)# interface eth-0-1
TAP(config-if-eth-0-1)# duplex full
TAP(config-if-eth-0-1)# exit
TAP(config)# interface eth-0-2
TAP(config-if-eth-0-2)# duplex auto
```

## 4.3.2 Validation

The following example shows how to display the duplex information:

```
TAP# show interface status
Name       Status      Duplex   Speed    Mode    Type         Description
----------+-----------+--------+--------+-------+------------+----------------
eth-0-1     up          full     a-1000   trunk   1000BASE_SX
eth-0-2     up          a-full   a-1000   trunk   1000BASE_SX
```

# 4.4 Configuring Interface Speed

## 4.4.1 Configuration

The following example shows how to set speed of eth-0-1 to 1000M:

```
TAP# configure terminal
TAP(config)# interface eth-0-1
TAP(config-if-eth-0-1)# speed 1000
```

## 4.4.2 Validation

The following example shows how to display the speed information:

```
TAP# show interface status
Name       Status      Duplex   Speed    Mode    Type         Description
----------+-----------+--------+--------+-------+------------+----------------
eth-0-1     up          full     1000     trunk   1000BASE_SX
```

# 4.5 Configuring Unidirectional

## 4.5.1 Configuration

The following example shows how to set unidirectional of eth-0-1:

```
TAP# configure terminal
TAP(config)# interface eth-0-1
TAP(config-if-eth-0-1)# unidirectional enable
TAP(config-if-eth-0-1)# speed 1000
TAP(config-if-eth-0-1)# duplex full
TAP(config-if-eth-0-1)# end
```

The following example shows how to set unidirectional rx-only of eth-0-2:

```
TAP# configure terminal
TAP(config)# interface eth-0-2
TAP(config-if-eth-0-1)# unidirectional rx-only
TAP(config-if-eth-0-1)# speed 1000
TAP(config-if-eth-0-1)# duplex full
TAP(config-if-eth-0-1)# end
```

### 4.5.2 Validation

The following example shows how to display the unidirectional information:

```
TAP# show interface status
Name       Status      Duplex   Speed    Mode    Type         Description
----------+-----------+--------+--------+-------+------------+----------------
eth-0-1     up          full     1000     trunk   1000BASE_SX
eth-0-2     up          full     1000     trunk   1000BASE_SX
```

**NOTE** Interface state is always up when unidirectional is enabled. Duplex auto and speed auto are not supported when unidirectional is enabled, users should set proper duplex and speed values.

## 4.6 Configuring Interface Errdisable

### 4.6.1 Overview

#### 1 Function Introduction

Errdisable is a mechanism to protect the system through shutdown the abnormal interface. If an interface enters errdisable state, there are two ways to recovery it from errdisabled state. The first one is to enable errdisable recovery of this reason before errdisable detection; the interface will be recovered automatically after the configured time. But if errdisable occurred first, then errdisable recovery is enabled, the errdisable will not be recovered automatically. The secondary one is configuring “no shutdown” command on the errdisabled interface.

The flap of interface link state is a potential error caused by hardware or line problems. The administrator can also configure the detection conditions of interface link flap to suppress the flap.

## 2 Principle Description

N/A

## 4.6.2 Configuration

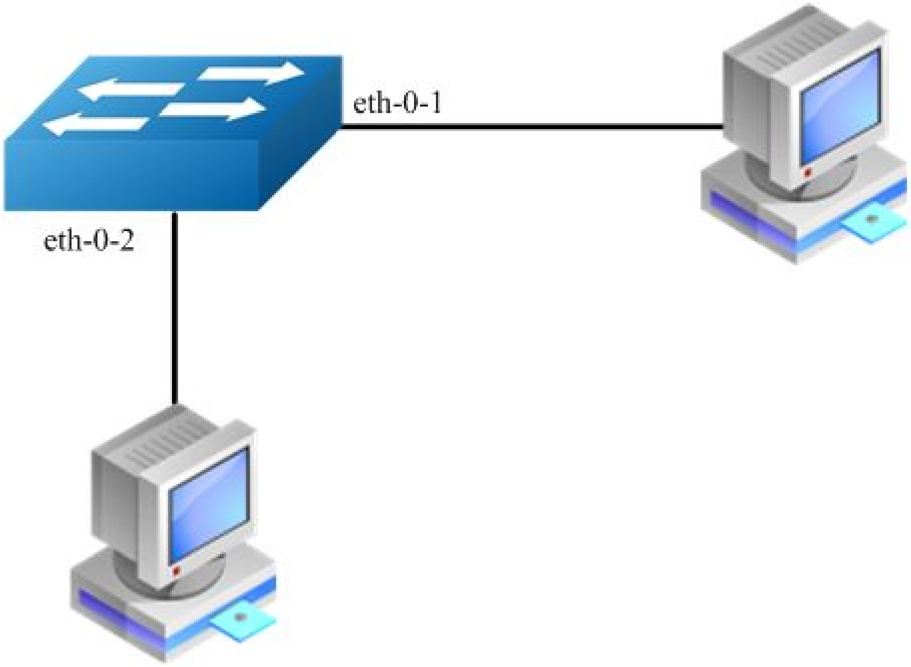


**Figure 4-1** Errdisable topology

## 2 Configuring Errdisable Detection

### step 1 Enter the configure mode

```
Switch# configure terminal
```

### step 2 Enable detect link flap errdisable

```
Switch(config)# errdisable detect reason link-flap
```

### step 3 Exit the configure mode

```
Switch(config)# end
```

### step 4 Validation

Use the following command to display the configuration of error disable :

```
Switch# show errdisable detect
ErrDisable Reason         Detection status
------------------------+--------------------
link-flap                 Enabled
```

## 3 Configuring Errdisable Recovery

### step 1 Enter the configure mode

```
Switch# configure terminal
```

### step 2 Enable errdisable and set recovery interval

```
Switch(config)# errdisable recovery reason link-flap
Switch(config)# errdisable recovery interval 30
```

### step 3 Exit the configure mode

```
Switch(config)# end
```

### step 4 Validation

Use the following command to display the configuration of error disable recovery :

```
Switch# show errdisable recovery
ErrDisable Reason         Timer status
------------------------+--------------------
link-flap                 Enabled

Timer interval: 30 seconds
```

## 4 Configuring suppress Errdisable link Flap

### step 1 Enter the configure mode

```
Switch# configure terminal
```

### step 2 Set link flap condition

```
 Switch(config)# errdisable flap reason link-flap 20 60
```

### step 3 Exit the configure mode

```
Switch(config)# end
```

### step 4 Validation

Use the following command to display the configuration of error disable flap :

```
Switch# show errdisable flap
ErrDisable Reason        Flaps     Time (sec)
-----------------        ------    ----------
link-flap                20        60
```

## 5 Checking Errdisable Status

Administrators can check the interface's errdisable status through two commands.

### Case 1 Enable errdisable recovery

If link flap errdisable is enabled recovery, the command will display the left time for recovery, Otherwise, will display “unrecovery”.

```
Switch# show errdisable recovery
ErrDisable Reason        Timer Status
-----------------        --------------
link-flap                Enabled
Timer interval: 300 seconds
Interfaces that will be enabled at the next timeout:
Interface Errdisable Reason Time Left(sec)
--------- ----------------- --------------
eth-0-3   link-flap           25
```

### Case 2 Disable errdisable recovery

```
Switch# show errdisable recovery
ErrDisable Reason        Timer Status
-----------------        --------------
link-flap                Disabled

Timer interval: 300 seconds
```

### case 3 Display interface brief information to check errdisable state.

```
Switch# show interface status
Port       Status     Duplex   Speed    Mode    Type         Description
-----------------------------------------------------------------------------
eth-0-1    up         a-full   a-1000   TRUNK   1000BASE_SX
eth-0-2    down       auto     auto     TRUNK   Unknown
eth-0-3    errdisable a-full   a-1000   TRUNK   1000BASE_SX
eth-0-4    down       auto     auto     ACCESS  Unknown
```

### 4.6.3 Application cases

N/A

# 5 SSH configuration

The Secure Shell (SSH) is a protocol that provides a secure, remote connection to a device. SSH provides more security for remote connections than Telnet does by providing strong encryption when a device is authenticated. SSH supports the Data Encryption Standard (DES) encryption algorithm, the Triple DES (3DES) encryption algorithm, and password-based user authentication. The SSH feature has an SSH server and an SSH integrated client, which are applications that run on the switch. You can use an SSH client to connect to a switch running the SSH server. The SSH server works with the SSH client supported in this release and with SSH clients. The SSH client also works with the SSH server supported in this release and with SSH servers.

## 5.1.1 Configuration

The following example shows how to create a key which is named by “a”:

```
TAP# configure terminal
TAP(config)# rsa key a generate
```

The following example shows how to generate private key “a.pri” and public key “a.pub”, then put them on the FTP server:

```
TAP(config)# rsa key a export mgmt-if url
ftp://username:password@host:port/a.pri private ssh2
TAP(config)# rsa key a export mgmt-if url
ftp://username:password@host:port/a.pub public ssh2
```

The following example shows how to download the public key from the FTP server and configure the user name of the device which need to login with SSH:

```
TAP(config)# rsa key a.pub import mgmt-if url ftp://
username:password@host:port/a.pub public ssh2
TAP(config)# username aaa privilege 4 password 123
TAP(config)# username aaa assign rsa key a.pub
```

## 5.1.2 Validation

The following example shows how to download the private key on the client and login with SSH:

```
[TAP@localhost]$ ssh -i a.pri aaa@10.10.33.122
```

# 6 Syslog configuration

System information can be saved in a log file or be sent to other servers on the network. By default, The TAP series devices logs normal but significant system messages to its internal buffer and sends these messages to the system console.

Users can check out the messages on the system console or the specified log server. The messages are time-stamped to enhance real-time debugging and management.

**Table 6-1** System message types

| Name | definition |
|---|---|
| kern | Kernel message |
| user | Random user level message |
| mail | Mail system message |
| daemon | System daemon message |
| auth | Security/certification message |
| syslog | Inner message generated by daemon “syslogd” |
| lpr | Line printer message |
| news | Network news message |
| uucp | UUCP message |
| cron | Clock daemon message |
| authpriv | Privacy security certification message |
| ftp | FTP message |

# 6.2 Configuring log server

## 6.2.1 Configuration

The following shows how to enable the log server, how to set the IP address of the server and how to set the log level:

```
TAP# configure terminal
TAP(config)# logging server enable
TAP(config)# logging server address mgmt-if 10.10.22.204
TAP(config)# logging server severity debug
```

**Table 6-1** Log level definition

| Severity Level | Definition |
|---|---|
| emergency | system is unusable(0) |
| alert | action must be taken immediately(1) |
| critical | critical conditions(2) |
| error | error conditions(3) |
| warning | warning conditions(4) |
| notice | normal but significant condition(5) |
| information | Informational(6) |
| debug | debug-level messages(7) |

## 6.2.2 Validation

The following example shows how to display the system log configuration information:

```
TAP# show logging
Current logging configuration:
------------------------------------------------------------
logging buffer 500
logging timestamp bsd
logging file enable
logging level file warning
logging level module debug
logging server enable
logging server severity debug
logging server facility local4
logging server address 10.10.22.204
logging merge enable
logging merge fifo-size 1024
logging merge timeout 10
```

# 6.3 Configuring Logging Buffer Size

## 6.3.1 Configuration

The following example shows how to set the logging buffer size to 700 messages:

```
TAP# configure terminal
TAP(config)# logging buffer 700
```

## 6.3.2 Validation

The following example shows how to display the system log configuration information:

```
TAP# show logging
Current logging configuration:
------------------------------------------------------------
logging buffer 700
logging timestamp bsd
logging file enable
logging level file warning
logging level module debug
logging server enable
logging server severity debug
logging server facility local4
logging server address 10.10.22.204
logging merge enable
logging merge fifo-size 1024
logging merge timeout 10
```

# 7 Time configuration

The devices need the correct system time in order to co-work with other devices. Users can set the system date and time manually if there is no timer source outside.

## 7.1.1 Configuration

The following example shows how to set system time:

```
TAP# configure terminal
TAP(config)# clock set datetime 10:10:12 3 7 2017
```

The following example shows how to display the system time:

```
TAP# show clock
10:10:16 Beijing Tue Mar 07 2017
Time Zone(Beijing) : UTC+08:00:00
```

# 8 User Management configuration

User management can improve the security level of the system. Only the authorized users can login to the system.

**Table 8-1** Login modes for TAP series devices

| mode | definition |
|---|---|
| Login local | Login with the username and password configured in the system. |
| Login | Login with the password configured in the ”line vty” mode. |
| No login | Login without password |

## 8.2 Configuring the user management in login local mode

### 8.2.1 Configuration

The following example shows how to use the “login local” mode. Set username to “test”, set password to “123”, and choose “login local” mode:

```
TAP# configure terminal
TAP(config)# line vty 0 7
TAP(config-line)# login local
TAP(config-line)# exit
TAP(config)# username test privilege 4 password 123
```

### 8.2.2 Validation

The following example shows how to login the device via Telnet:

```
Username: test
Password:
TAP#
```

# 8.3 Configuring the user management in login mode

## 8.3.1 Configuration

The following example shows how to use the “login” mode. Set password to “123”, and choose “login” mode:

```
TAP# configure terminal
TAP(config)# line vty 0 7
TAP(config-line)# login
TAP(config-line)# line-password 123
TAP(config-line)# privilege level 4
```

## 8.3.2 Validation

The following example shows how to login the device via Telnet:

```
Password:
TAP#
```

**NOTE**

The examples above show how to configure an Ethernet management port. The configuration of the console management port is similar to Ethernet port. Use “line console 0” to enter the console configuration mode.

# 8.4 Password recovery

## 8.4.1 Configuration

If the password is forgotten unfortunately, it can be recovered by following steps. Connect the device by console port.

Reset the system by plug out and plug in the power. The follow information will be printed on Console:

```
NAND read: device 0 offset 0x200000, size 0x400000
 4194304 bytes read: OK
Press ctrl+b to stop autoboot:  5
```

Choose “no pass” mode in bootrom:

```
Bootrom# boot_flash_nopass
Bootrom# Do you want to revert to the default config file ? [Y|N|E]: Y
```

**NOTE**

After recovering the password the configuration on the device may be lost. Please remember the password to avoid the service interruption.

### 8.4.2 Validation

Then the system will reboot without loading startup-configuration. No password will be required. ## Configuring the user login with ACL ## set login acl ,and the acl name is loginACL

```
TAP# configure terminal
TAP(config)# line vty 0 7
TAP(config-line)# ip access-class loginAcl in
Notice: ACL applied on vty can only match source IP,destination IP,source
port,or destination port for TCP packets, behaviour as WhiteList by default.
```

### 8.4.3 Validation

User can display the configuration files as below:

```
TAP# show running-config

line vty 0 7
exec-timeout 0 0
privilege level 4
no line-password
ip access-class loginACL in
```

## 8.5 user login limit

```
TAP# configure terminal
TAP(config)# login-security enable
TAP(config)# login-security lock-duration 7
TAP(config)# login-security max-fail-num 6 6
```

### 8.5.1 Validation

User can display the configuration files as below: TAP# show running-config

```
Login Security:            Enable
Max Fail Number:           6
Fail Period:               6 min
Lock Duration:             7 min
Current Invalid Users:     0/5

Login Security Records:
User name                       Local   Locked     Resume Time(s)      Fail
Count
--------------------------------+-------+----------+------------------+---------
--
```

# 9 Security Configuration Guide

## 9.1 Configuring Line VTY ACL

### 9.1.1 Overview

### 1 Function Introduction

Login through the user interface is restricted by reference to the access control list. IPv4 acls can be referenced, and login through the user interface is not restricted by default.

Currently, only matching of source IP, destination IP, source port, or destination port for TCP packets is supported, and the default is WhiteList.

### 2 Principle Description

N/A

### 9.1.2 Configuration

#### step 1 Enter the configure mode

```
Switch# configure terminal
```

#### step 2 Create ACL

```
Switch(config)# ip access-list a4
Switch(config-ip-acl-a4)# permit any src-ip host 10.0.0.1 dst-ip any
Switch(config-ip-acl-a4)# exit
```

#### step 3 Apply the ACL under Line VTY

```
Switch(config)# line vty 0 7
Switch(config-line)# ip access-class a4 in
Notice: ACL applied on vty can only matching of source IP,destination
IP,source port,or destination port for TCP packets, behaviour as WhiteList by
default.
Switch(config-line)# end
```

### step 4 Validation

```
Switch# show vty
line vty maximum 8
line vty 0 7
 privilege level 4
 no line-password
 ip access-class a4 in
 no login
```

## 9.1.3 Application cases

When it is necessary to restrict the login through the user interface, that is, to control the source IP, destination IP, source port or destination port, the control action is to allow access or deny access, which can be achieved through this command.

# 10 SNMP configuration

SNMP is a communication protocol to connect a network management system (NMS) and agents. It defines the standardized management framework, common communication language, security and access control mechanism for monitoring and managing the devices in the network environment. Via SNMP, the administrator can connect to the device to query the information, modify the configuration, monitor the state, get the failures and generate a report automatically.

**NOTE** TAP series devices support SNMP V1/V2, Only part of the OID and trap are supported.

## 10.1 Configuring SNMP GET

### 10.1.1 Configuration

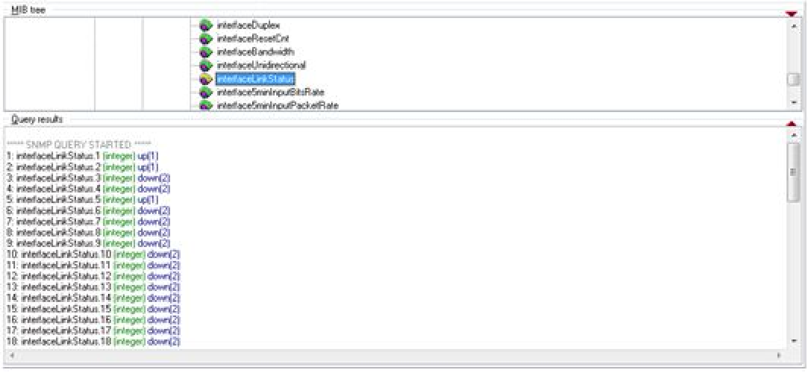
The following example shows how to set the SNMP community word:

```
TAP(config)# snmp-server community test read-only
```

The following example shows how to enable SNMP service:

```
TAP(config)# snmp-server enable
```

### 10.1.2 Validation



```
***** SNMP QUERY STARTED *****
1: interfaceLinkStatus.1 (integer) up(1)
2: interfaceLinkStatus.2 (integer) up(1)
3: interfaceLinkStatus.3 (integer) down(2)
4: interfaceLinkStatus.4 (integer) down(2)
5: interfaceLinkStatus.5 (integer) up(1)
6: interfaceLinkStatus.6 (integer) down(2)
7: interfaceLinkStatus.7 (integer) down(2)
8: interfaceLinkStatus.8 (integer) down(2)
9: interfaceLinkStatus.9 (integer) down(2)
10: interfaceLinkStatus.10 (integer) down(2)
11: interfaceLinkStatus.11 (integer) down(2)
12: interfaceLinkStatus.12 (integer) down(2)
13: interfaceLinkStatus.13 (integer) down(2)
14: interfaceLinkStatus.14 (integer) down(2)
15: interfaceLinkStatus.15 (integer) down(2)
16: interfaceLinkStatus.16 (integer) down(2)
17: interfaceLinkStatus.17 (integer) down(2)
18: interfaceLinkStatus.18 (integer) down(2)
```

**Figure 10-1** Display the OID interfaceLinkStatus by applications

# 10.2 Configuring SNMP TRAP

## 10.2.1 Configuration

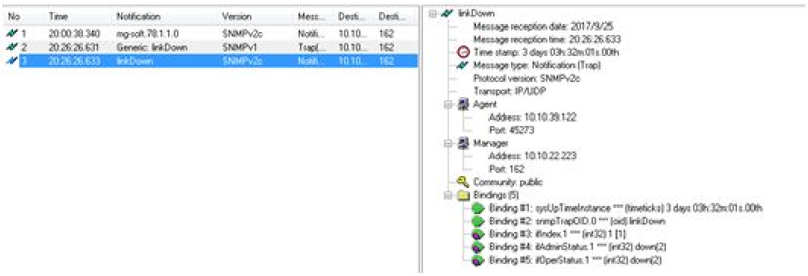
The following example shows how to set the SNMP TRAP server IP and the SNMP community word:

```
TAP(config)# snmp-server trap target-address mgmt-if 10.10.22.215 community
public
```

The following example shows how to enable SNMP TRAP service:

```
TAP(config)# snmp-server trap enable all
```

## 10.2.2 Validation



| No | Time | Notification | Version | Mess... | Desti... | Desti... |
|---|---|---|---|---|---|---|
| 1 | 20:00:38.340 | mg-soft.78.1.1.0 | SNMPv2c | Notifi... | 10.10... | 162 |
| 2 | 20:26:26.631 | Generic: linkDown | SNMPv1 | Trap(... | 10.10... | 162 |
| 3 | 20:26:26.633 | linkDown | SNMPv2c | Notifi... | 10.10... | 162 |

```
linkDown
    Message reception date: 2017/9/25
    Message reception time: 20:26:26.633
    Time stamp: 3 days 03h:32m:01s.00th
    Message type: Notification (Trap)
    Protocol version: SNMPv2c
    Transport: IP/UDP
    Agent
        Address: 10.10.38.122
        Port: 45273
    Manager
        Address: 10.10.22.223
        Port: 162
    Community: public
    Bindings (5)
        Binding #1: sysUpTimeInstance *** (timeticks) 3 days 03h:32m:01s.00th
        Binding #2: snmpTrapOID.0 *** (oid) linkDown
        Binding #3: ifIndex.1 *** (int32) 1 (1)
        Binding #4: ifAdminStatus.1 *** (int32) down(2)
        Binding #5: ifOperStatus.1 *** (int32) down(2)
```

**Figure 10-1** Display the Trap information of linkDown by applications

# 10.3 Configuring SNMPv3 Groups, Users and Accesses

You can specify an identification name (engine ID) for the local SNMP server engine on the switch. You can configure an SNMP server group that maps SNMP users to SNMP views, you can add new users to the SNMP group, and you can add access for the SNMP group.

Beginning in privileged EXEC mode, follow these steps to configure SNMP on the switch.

## 10.3.1 Configuration

### step 1 Enter the configure mode

```
Switch# configure terminal
```

### step 2 Set the global configurations for SNMP

Set engineID; Set the user name, password, and authentication type; Create SNMP server; Set the authority for the group member.

```
Switch(config)# snmp-server engineID 8000123456
Switch(config)# snmp-server usm-user usr1 authentication md5 mypassword privacy
des yourpassword
Switch(config)# snmp-server group grp1 user usr1 security-model usm
Switch(config)# snmp-server access grp1 security-model usm noauth
```

### step 3 Exit the configure mode

```
Switch(config)# end
```

## 10.3.2 Validation

```
Switch# show running-config
snmp-server engineID 8000123456
snmp-server usm-user usr1 authentication md5 mypassword privacy des yourpassword
snmp-server group grp1 user usr1 security-model usm
snmp-server access grp1 security-model usm noauth
```

# 10.4 SNMPv1 and SNMPv2 notifications configure

Beginning in privileged EXEC mode, follow these steps to configure SNMP on the switch.

## 10.4.1 Configuration

### step 1 Enter the configure mode

```
Switch# configure terminal
```

### step 2 Set the global configurations for SNMP

Enable all supported traps; Configure a remote trap manager which IP is “10.0.0.2”; Configure a remote trap manager which IPv6 address is “2001:1000::1”.

```
Switch(config)# snmp-server trap enable all
Switch(config)# snmp-server trap target-address 10.0.0.2 community public
Switch(config)# snmp-server trap target-address 2001:1000::1 community public
```

### step 3 Exit the configure mode

```
Switch(config)# end
```

### 10.4.2 Validation

```
Switch# show running-config
snmp-server trap target-address 10.0.0.2 community public
snmp-server trap target-address 2001:1000::1 community public
snmp-server trap enable system
snmp-server trap enable coldstart
snmp-server trap enable warmstart
snmp-server trap enable linkdown
snmp-server trap enable linkup
```

## 10.5 Configuring SNMPv3 notifications

### 10.5.1 Configuration

#### step 1 Enter the configure mode

```
Switch# configure terminal
```

#### step 2 Set the global configurations for SNMP

Enable all supported traps; Configure a trap notify item for SNMPv3; Configure a remote trap manager’s IP address; Configure a remote trap manager’s IPv6 address; Add a local user to SNMPv3 notifications.

```
Switch(config)# snmp-server trap enable all
Switch(config)# snmp-server notify notif1 tag tmptag trap
Switch(config)# snmp-server target-address targ1 param parm1 10.0.0.2 taglist
tmptag
Switch(config)# snmp-server target-address t1 param p1 2001:1000::1 taglist tag1
Switch(config)# snmp-server target-params parm1 user usr1 security-model v3
message-processing v3 noauth
```

#### step 3 Exit the configure mode

```
Switch(config)# end
```

### 10.5.2 Validation

```
Switch# show running-config
snmp-server notify notif1 tag tmptag trap
snmp-server target-address t1 param p1  2001:1000::1 taglist tag1
snmp-server target-address targ1 param parm1  10.0.0.2 taglist tmptag
snmp-server target-params parm1 user usr1 security-model v3 message-processing
v3 noauth
snmp-server trap enable system
snmp-server trap enable coldstart
snmp-server trap enable warmstart
snmp-server trap enable linkdown
snmp-server trap enable linkup
```

# 10.6 Configuring SNMP ACL

## 10.6.1 Configuration

### step 1 Enter the configure mode

```
Switch# configure terminal
```

### step 2 Configuring ACL

Either the acl is configured to continue to configure the ace before it is applied to SNMP, or the acl is configured to be applied to SNMP before it is configured to.

```
Switch(config)# ip access-list a4
Switch(config-ip-acl-a4)# permit src-ip host 10.10.25.25
Switch(config-ip-acl-a4)# exit
Switch(config)#
```

### step 3 Apply ACL to SNMP

```
Switch(config)# snmp-server access-group a4 in
```

### step 4 Exit the configure mode

```
Switch(config)# end
```

## 10.6.2 Validation

```
Switch# show running-config
Building configuration...
version 2.1.9.8.1
!
!
snmp-server enable
snmp-server access-group a4 in
!
snmp-server community public read-write
!
ip access-list a4
 10 permit src-ip host 10.10.25.25
 exit
!
!
!
interface eth-0-1
!
interface eth-0-2
!
interface eth-0-3
!
interface eth-0-4
!
interface eth-0-5
```

```
!
interface eth-0-6
!
interface eth-0-7
!
interface eth-0-8
!
interface eth-0-9
!
interface eth-0-10
!
interface eth-0-11
!
interface eth-0-12
!
interface eth-0-13
!
interface eth-0-14
!
interface eth-0-15
!
interface eth-0-16
!
interface eth-0-17
!
interface eth-0-18
!
interface eth-0-19
!
interface eth-0-20
!
interface eth-0-21
!
interface eth-0-22
!
interface eth-0-23
!
interface eth-0-24
!
!
!
line console 0
 no line-password
 no login
line vty 0 7
 privilege level 4
 no line-password
 no login
```

# 11 File Copy Configuration

## 11.1 Copy the file form the flash of device

The following example shows how to copy the file named “diagnostic-information.txt”.

### 11.1.1 Copy to TFTP server

```
TAP# copy flash:/diagnostic-information.txt mgmt-if tftp://10.10.38.160
TFTP server [10.10.38.160]
Name of the TFTP file to access []diagnostic-information.txt
```

### 11.1.2 Copy to FTP server

```
TAP# copy flash:/diagnostic-information.txt  mgmt-if ftp://10.10.25.33
FTP server [10.10.25.33]
User name [] test
Password []
Name of the FTP file to access []diagnostic-information.txt
```

### 11.1.3 Copy to USB disk

```
TAP# copy flash:/diagnostic-information.txt  udisk:
```

## 11.2 Copy the file to the flash of device

### 11.2.1 Copy from TFTP server

```
TAP# copy mgmt-if tftp://10.10.38.160/diagnostic-information.txt flash:
```

### 11.2.2 Copy from FTP server

```
TAP# copy mgmt-if ftp://10.10.25.33/diagnostic-information.txt flash:/
FTP server [] 10.10.25.33
User name [] test
Password []
Name of the FTP file to access []diagnostic-information.txt
```

### 11.2.3 Copy from USB disk

```
TAP# copy disk:/diagnostic-information.txt  flash:
```

# 12 M:N configuration

## 12.1 Networking requirements

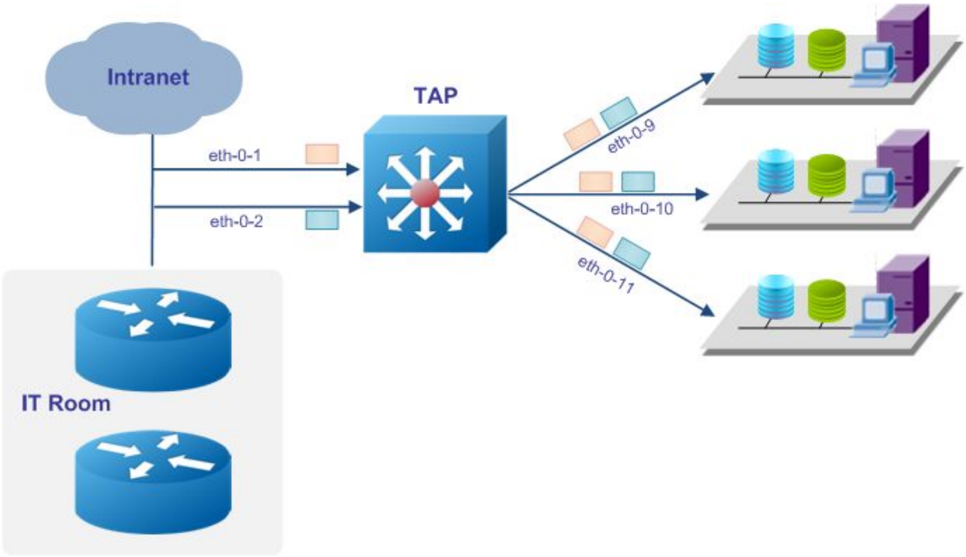


**Figure 12-1** Topology of M:N networking:

## 12.2 Configuration Ideas

In some cases, packets entering the device from different ports need to be sent to different monitors. Therefore TAP M:N mode is required. The packets enter the ingress ports will send copies to all egress ports. Reference to Figure 10-1: Packets enter eth-0-1 will send copies to eth-0-9/eth-0-10/eth-0-11. Packets enter eth-0-1 will also send copies to eth-0-9/eth-0-10/eth-0-11.

## 12.3 Configuration

The following example shows to create a TAP group with ingress port eth-0-1/eth-0-2, with egress port eth-0-9/eth-0-10/eth-0-11:

```
TAP# configure terminal
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1
TAP(config-tap-tap1)# ingress eth-0-2
TAP(config-tap-tap1)# egress eth-0-9
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# egress eth-0-11
```

## 12.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
  ID: 1
  Ingress:
        eth-0-1
        eth-0-2
  egress:
        eth-0-9
        eth-0-10
        eth-0-11
```

## 12.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config

tap-group tap1 1
 ingress eth-0-1
 ingress eth-0-2
 egress eth-0-9
 egress eth-0-10
 egress eth-0-11
```

# 13 Load Balance Configuration(HASH)

## 13.1 Networking requirements

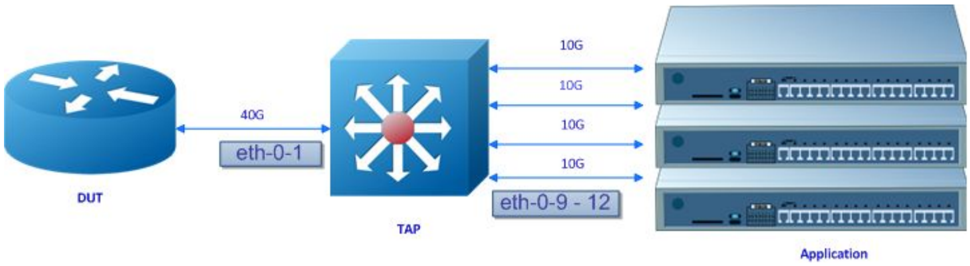


**Figure 13-1** Topology of load balance:

## 13.2 Configuration Ideas

In some cases, the capability of the port is 40G/s, but the capability of the server or analyzer is 10G/s. Therefore, load balance is required to resolve this problem. Reference to Figure 11-1, eth-0-1 is a 40G port, Agg1 is a link aggregation port with four 10G members (eth-0-9/eth-0-10/eth-0-11/eth-0-12). Packets entering eth-0-1 should choose an outgoing port among eth-0-9/eth-0-10/eth-0-11/eth-0-12, according to the load balance rule.

## 13.3 Configuration

The following example shows how to add eth-0-9/eth-0-10/but-0-11/eth-0-12 into the link aggregation port Agg1:

```
TAP# configure terminal
TAP(config)# interface eth-0-9
TAP(config-if-eth-0-9)# static-channel-group 1
TAP(config-if-eth-0-9)# interface eth-0-10
TAP(config-if-eth-0-10)# static-channel-group 1
TAP(config-if-eth-0-10)# interface eth-0-11
TAP(config-if-eth-0-11)# static-channel-group 1
TAP(config-if-eth-0-11)# interface eth-0-12
TAP(config-if-eth-0-12)# static-channel-group 1
```

The flowing example shows how to create a TAP group with ingress port eth-0-1, egress port Agg1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1
TAP(config-tap-tap1)# egress agg1
```

The flowing example shows how to set the load balance rule to hash by source MAC address (The default rule is hash by source IP, destination IP, source port, destination port):

```
TAP(config)# port-channel load-balance set src-mac
TAP(config)# end
```

(Optional) support detailed hash rule, e.g. inner IP/ liner MAC, .etc.

```
TAP(config)# port-channel load-balance set inner-dst-ip
TAP(config)# end
```

The follow command is necessary if user enable to load balance by inner fields:

```
TAP(config)# port-channel load-balance tunnel-hash-mode both
```

## 13.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1
  egress:
        agg1
```

The following example shows how to display the load balance rule:

```
TAP# show port-channel load-balance
Port-channel load-balance hash fields:
--------------------------------------
src-mac
src-ip
dst-ip
src-port-l4
dst-port-l4
```

## 13.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
port-channel load-balance set src-mac
!
interface eth-0-9
 static-channel-group 1
!
interface eth-0-10
 static-channel-group 1
!
interface eth-0-11
```

```
 static-channel-group 1
!
interface eth-0-12
 static-channel-group 1
!
tap-group tap1 1
  ingress eth-0-1
  egress agg1
```

**Table 13-1** load balance fields

| Load balance field | Description |
|---|---|
| src-mac | Load balance by source MAC address |
| dst-mac | Load balance by destination MAC address |
| src-ip | Load balance by source IP address |
| dst-ip | Load balance by destination IP address |
| ip-protocol | Load balance by ip-protocol |
| src-port-l4 | Load balance by source port |
| dst-port-l4 | Load balance by destination port |
| vxlan-vni | Vni of vxlan |
| inner-dst-mac | Inner Source MAC address based load balancing |
| inner-src-mac | Inner Destination MAC address based load balancing |
| inner-src-ip | Inner Source IP address based load balancing |
| inner-dst-ip | Inner Destination IP address based load balancing |
| gre-key | Key of GRE |
| nvgre-vsid | Vsid of nvgre |
| nvgre-flow-id | Flow ID of GRE |

# 14 Load Balance Configuration(RR)

## 14.1 Networking requirements

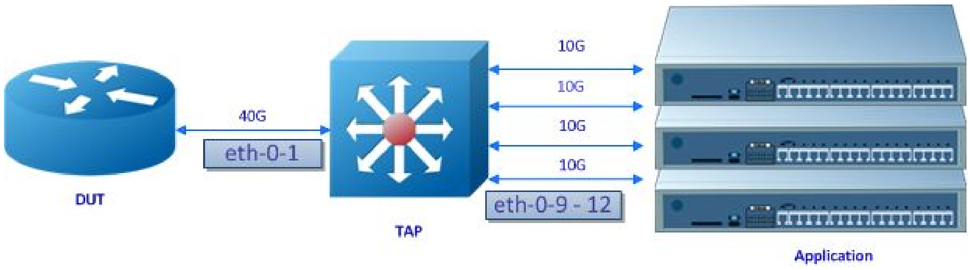


**Figure 14-1** Topology of load balance

## 14.2 Configuration Ideas

In some cases, the capability of the port is 40G/s, but the capability of the server or analyzer is 10G/s. Therefore, load balance is required to resolve this problem. Reference to Figure 11-1, eth-0-1 is a 40G port, Agg1 is a link aggregation port with four 10G members (eth-0-9/eth-0-10/eth-0-11/eth-0-12). Packets entering eth-0-1 should choose an outgoing port among eth-0-9/eth-0-10/eth-0-11/eth-0-12, according to the round-robin rule.

## 14.3 Configuration

The flowing example shows how to set the load balance mode to round-robin:

```
TAP# configure terminal
TAP(config)# port-channel 1 load-balance-mode round-robin
```

**NOTE**

TAP series device supports at most 16 link aggregation ports to use round-robin mode. Round-robin mode must be configured before link aggregation port is created.

The following example shows how to add eth-0-9/eth-0-10/eth-0-11/eth-0-12 into the link aggregation port Agg1:

```
TAP# configure terminal
TAP(config)# interface eth-0-9
TAP(config-if-eth-0-9)# static-channel-group 1
TAP(config)# interface eth-0-10
TAP(config-if0)# static-channel-group 1
TAP(config)# interface eth-0-11
TAP(config-if1)# static-channel-group 1
TAP(config)# interface eth-0-12
TAP(config-if2)# static-channel-group 1
```

The flowing example shows how to create a TAP group with ingress port eth-0-1, egress port Agg1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1
TAP(config-tap-tap1)# egress agg1
```

## 14.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group
!
TAP-group tap1
ID: 1
  Ingress:
        eth-0-1
  egress:
        agg1
```

## 14.5 Configuration file

The following example shows how to display the information of the TAP group:

```
TAP# show running-config
!
port-channel 1 load-balance-mode round-robin
!
interface eth-0-9
 static-channel-group 1
!
interface eth-0-10
 static-channel-group 1
!
interface eth-0-11
 static-channel-group 1
!
interface eth-0-12
 static-channel-group 1
!
tap-group tap1 1
  ingress eth-0-1
  egress agg1
```

# 15 Ingress PORT with FLOW configuration

## 15.1 Configuring basic Flow

### 15.1.1 Networking requirements

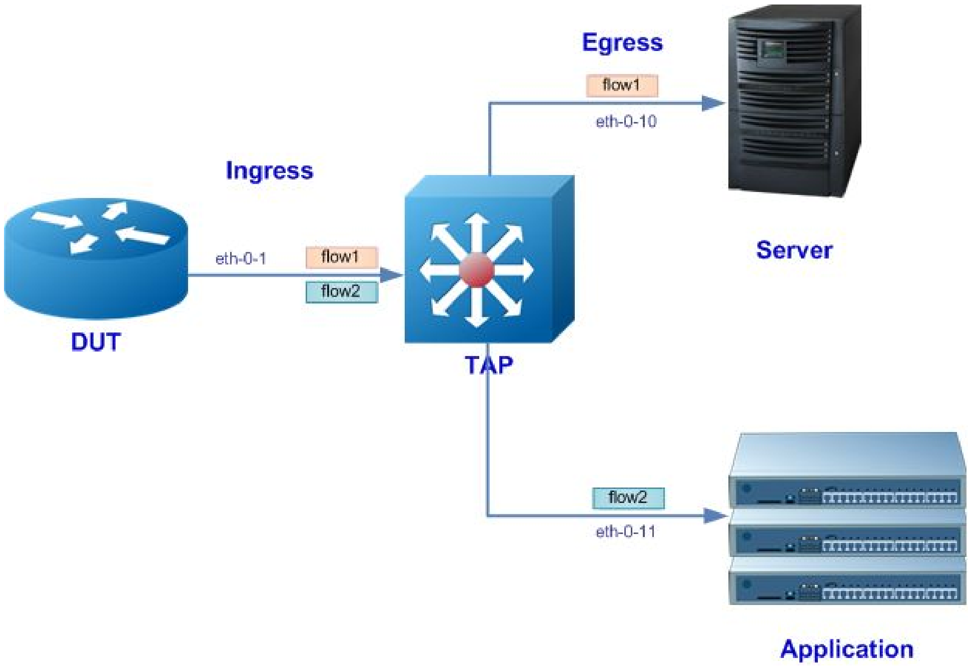


**Figure 15-1** Figure 13-1 Topology of PORT with FLOW

### 15.1.2 Configuration Ideas

In some cases, packets from one interface need to copy to different outgoing ports. Using the PORT with FLOW TAP groups can redirect the packets to different ports. Reference to Figure 13-1 packets with source IP address 1.1.1.0/24 or 2.2.2.0/24 should copy to eth-0-10. Packets with source IP address 10.1.1.0/24 or 20.1.1.0/24 should copy to eth-0-11 Packets with other source IP addresses should be discarded.

### 15.1.3 Configuration

The follow example shows how to create a Flow rule:

```
TAP# configure terminal
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip 1.1.1.0 0.0.0.255 dst-ip any
TAP(config-flow-flow1)# permit any src-ip 2.2.2.0 0.0.0.255 dst-ip any
TAP(config-flow-flow1)# exit
TAP(config)# flow flow2
TAP(config-flow-flow2)# permit any src-ip 10.1.1.0 0.0.0.255 dst-ip any
TAP(config-flow-flow2)# permit any src-ip 20.1.1.0 0.0.0.255 dst-ip any
```

**NOTE** The packets not matched by the flow rule should be discarded by default.

The following example shows how to create a TAP group with flow1 and flow2:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# exit
TAP(config)# tap-group tap2
TAP(config-tap-tap2)# ingress eth-0-1 flow flow2
TAP(config-tap-tap2)# egress eth-0-11
```

### 15.1.4 Validation

The following example shows how to display the flow rule information:

```
TAP# show flow1
flow flow1
 sequence-num 10 permit any src-ip 1.1.1.0 0.0.0.255 dst-ip any
 sequence-num 20 permit any src-ip 2.2.2.0 0.0.0.255 dst-ip any
flow flow2
 sequence-num 10 permit any src-ip 10.1.1.0 0.0.0.255 dst-ip any
 sequence-num 20 permit any src-ip 20.1.1.0 0.0.0.255 dst-ip any
```

The following example shows how to display the TAP group information:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1          flow flow1
  egress:
        eth-0-10
TAP-group tap2
ID: 2
  Ingress:
        eth-0-1          flow flow2
  egress:
        eth-0-11
```

### 15.1.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
 sequence-num 10 permit any src-ip 1.1.1.0 0.0.0.255 dst-ip any
 sequence-num 20 permit any src-ip 2.2.2.0 0.0.0.255 dst-ip any
!
flow flow2
 sequence-num 10 permit any src-ip 10.1.1.0 0.0.0.255 dst-ip any
 sequence-num 20 permit any src-ip 20.1.1.0 0.0.0.255 dst-ip any
!
tap-group tap1 1
ingress eth-0-1 flow flow1
egress eth-0-10
!
tap-group tap2 2
ingress eth-0-1 flow flow2
egress eth-0-11
```

**Table 15-1** Flow rule fields

| Field | Description |
|---|---|
| IP protocol[number\| any\| icmp\| igmp\|gre\| nvgre\| tcp \|udp\|] | Specify the IP protocol number of the flow rule. Well known IP protocols can also be specified by name. e.g. IP protocol 1 = icmp, 2 = igmp, 6 = tcp, 17 = udp, 47 = gre/nvgre (gre protocol 0x0800 = gre, 0x6558 = nvgre). Parameter “any” indicates packets with any IP protocol can match this rule. |
| src-ip/src-ipv6 | Source IPv4/IPv6 address |
| dst-ip/dst-ipv6 | Destination IPv4/IPv6 address |
| flow-label | Flow label of IPv6 |
| Inner-match | Specify the inner match profile of the flow rule. The inner-match profile is created by the “inner-match” command in global configuration mode. |
| ip-precedence | IP precedence |
| src-port | Source layer 4 port |
| dst-port | Destination layer 4 port |
| first-fragment | Match packets with first fragment |
| non-first-fragment | Match packets with non first fragment |

| | |
|---|---|
| non-fragment | Match packets with non fragment |
| non-or-first-fragment | Match packets with non first fragment |
| small-fragment | Match packets with small fragment |
| any-fragment | Match packets with any fragment |
| options | Match packets with IP options |
| dscp | DSCP in IPv4 packets value |
| vxlan-vni | VNI of VXLAN |
| vlan | Vlan ID |
| inner-vlan | Inner vlan ID |
| cos | CoS value in vlan header |
| inner-cos | CoS value in inner vlan header |
| ether-type | Ether type |
| src-mac | Source mac address |
| dst-mac | Destination mac address |
| udf | UDF based ACL |

**Table 15-2** Flow rule actions

| Action | Description |
|---|---|
| un-tag/un-tag-outer-vlan/un-tag-inner-vlan | Remove vlan tags of the packets. |
| mark-source | Specify additional outer vlan id of the outgoing packets. |
| edit-macda | Edit the destination mac address of the outgoing packet. |
| edit-macsa | Edit the source mac address of the outgoing packet. |
| edit-ipda/edit-ipv6da | Edit the destination IPv4/IPv6 address of the outgoing packet. |

| | |
|---|---|
| edit-ipsa/edit-ipv6sa | Edit the source IPv4/IPv6 address of the outgoing packet. |
| edit-vlan | Edit the vlan tag of the outgoing packet |
| strip-header | Strip the gre/nvgre/vxlan header |
| truncation | Truncate the packet |

## 15.2 Configuring UDF Flow

### 15.2.1 Networking requirements

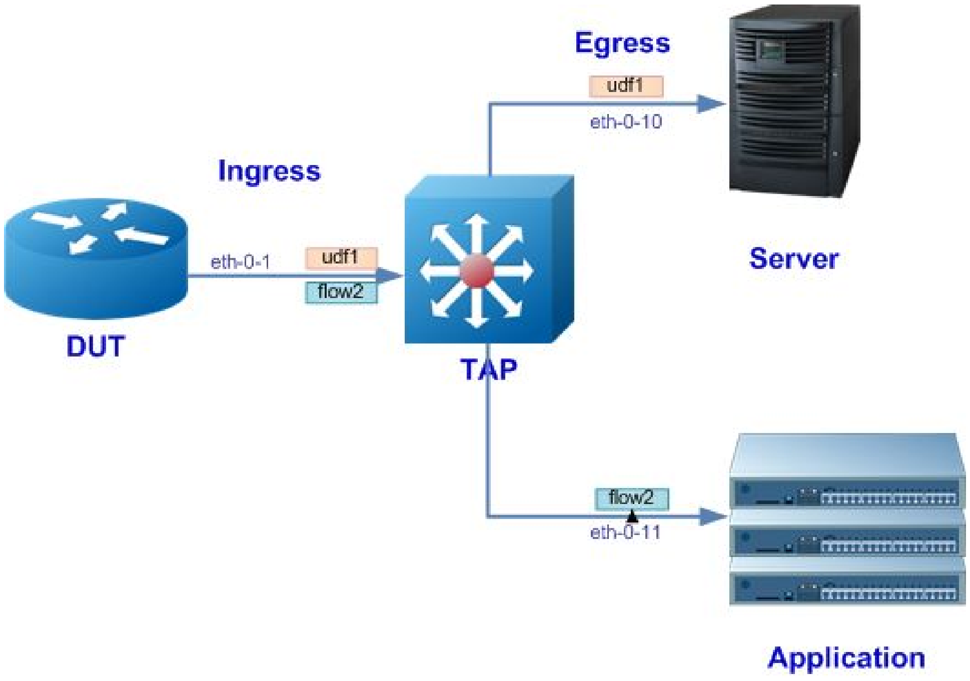


**Figure 15-1** Topology of UDF FLOW

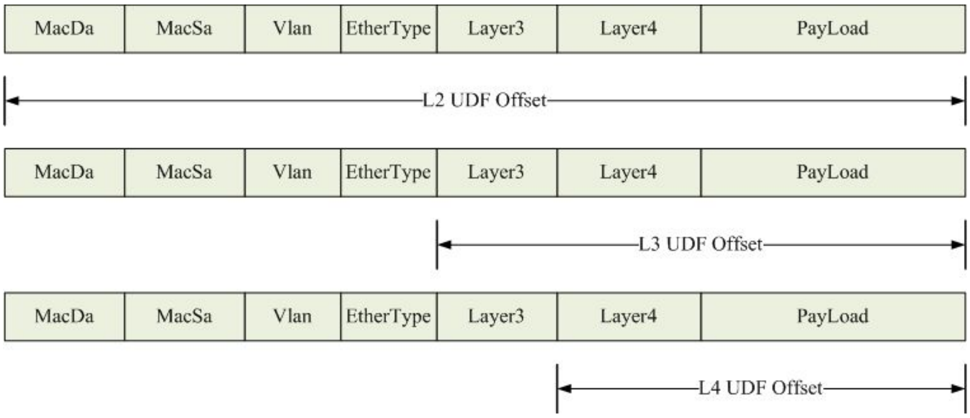


**Figure 15-2** Packet structure for match the UDF flow rule

**Table 15-1** L2-L4 header for common packets

| type | l2-head offset | l3-head offset | l4-head offset |
|---|---|---|---|
| TCP | Ethernet header | IP header | TCP header |
| UDP | Ethernet header | IP header | UDP header |
| ICMP | Ethernet header | IP header | ICMP header |
| GRE | Ethernet header | Outer IP header | GRE header |
| VXLAN | Ethernet header | Outer IP header | Outer UDP header |
| MPLS | Ethernet header | Outer MPLS label | IP header |
| VPLS | Ethernet header | Outer MPLS label | Inner Ethernet header |

## 15.2.2 Configuration Ideas

In some cases, users need more detailed rules to filter the packets. The TAP UDF (User defined format) can accurately match the specified field UDF using the specified value and the reversed wildcard bits to match the field which is concerned. An offset is needed to point out the position in the packet to match the UDF field.

## 15.2.3 Configuration

The UDF function is enhanced on the TAP product and configured by the new CLI. UDF support gets maximum 16 bytes from 4 separated offset positions from packets' L2-L4 header.

```
TAP# configure terminal
TAP(config)# udf 5 offset-type l3-header
TAP (config-udf-5)# match ip-protocol tcp dst-port 1111
TAP (config-udf-5)# offset offset0 0 offset1 20
```

The following example shows how to create UDF flow rule:

```
TAP(config)# flow udf
TAP(config-flow-udf)# permit any src-ip 10.1.1.0 0.0.0.255 dst-ip any udf udf-id
5
udf0 0x12 0x0 udf1 0x34 0x0
```

The following example shows how to create a TAP group with UDF applied on ingress port:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow udf
TAP(config-tap-tap1)# egress eth-0-2
```

**NOTE** The maximum number of UDF entries on the system is 16.

### 15.2.4 Validation

The following example shows how to display the UDF flow configuration:

```
TAP# show flow
flow udf
 sequence-num 10 permit any src-ip 10.1.1.0 0.0.0.255 dst-ip any udf udf-id 5 ud
f0 0x00000012 0x00000000 udf1 0x00000034 0x00000000
```

The following example shows how to display the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1          flow udf
  egress:
        eth-0-2
```

The following example shows how to display the UDF entry configuration:

```
TAP# show udf
Udf Global Information:
  Offset Unit : 4 Bytes

Udf Index 5
  Udf Type : l3 header
  Udf Match-Field:
    ip-protocol tcp dst-port 1111
  Offset : 0|20|n/a|n/a
```

### 15.2.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
udf 5 offset-type l3-header
```

```
 match ip-protocol tcp dst-port 1111
 offset offset0 0 offset1 20
!
flow udf
 sequence-num 10 permit any src-ip 10.1.1.0 0.0.0.255 dst-ip any udf udf-id 5 ud
f0 0x00000012 0x00000000 udf1 0x00000034 0x00000000
 exit
!
tap-group tap1 1
ingress eth-0-1 flow udf1
egress eth-0-2
```

**NOTE**

Each UDF flow supports 4 offsets (offset 0-3), each offset must begin at the multiple of 4 bytes, each offset support to match up to 4 bytes. The offsets can be continuous, e.g. 0,4,8,12; or can be discontinuous, e.g. 0,12,24,60.

If the field to match is less than 4 byte, the user should configure only one offset(any one among 0-3 is available). If the field to match is more than 4 byte, more than one offset is required. An UDF flow can match the content up to 4byte*4=16bytes.

In the practical application， if the fields to match are not more than 16 bytes and can be separated to 4 blocks with each block note more than 4 bytes, One UDF flow can match the requirement. The match fields in the UDF flow can be “match any” in this case.

The following example shows how to match these 3 types of packets:

- The packets with offset 16 bytes after L3 header, and with the content “AAAA”, forward to interface eth-0-2
- The packets with offset 60 bytes after L3 header, and with the content “BBBB”, forward to interface eth-0-3
- The packets with offset 32 bytes after L3 header, and with the content “CCCC”, forward to interface eth-0-3

```
udf 0 offset-type l3-header
 match any
 offset offset0 16 offset1 60 offset2 32 offset3 36
!
flow udf1
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 0 udf0 0xaaaaaaaa
0x0 udf1 any
 exit
!
flow udf2
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 0 udf0 any udf1
0xbbbbbbbb 0x0
flow udf3
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 0 udf0 any udf1 any
udf2 0xcccccccc 0x0 udf3 0xcccccccc 0x0
```

```
 exit
tap-group l3-offset-16-4A
 ingress eth-0-1 flow udf1
 egress eth-0-2
!
tap-group l3-offset-60-4B
 ingress eth-0-1 flow udf2
 egress eth-0-3
!
tap-group l3-offset-32-8C
 ingress eth-0-1 flow udf3
 egress eth-0-4
```

The key word “any” after UDF 0-3 means ignore these fields.

The device supports up to 16 UDF Flows. The priority of UDF Flows is decided by UDF Flow ID. The UDF Flow with the smaller ID has the higher priority.

In special cases, there are two types of packets to match, and each packet has the different offset and the characteristic fields are 16 bytes, then at least two UDF flows are needed. The two UDF Flows should specify different match conditions because UDF Flows have different priority. The following example shows how to match these 2 types of packets:

- The TCP packets with offset 16 bytes after L4 header, and with the content “A”*16, forward to interface eth-0-2
- The UDP packets with offset 40 bytes after L4 header, and with the content “B”*16, forward to interface eth-0-3

```
udf 0 offset-type l4-header
 match ip-protocol tcp
 offset offset0 16 offset1 20 offset2 24 offset3 28
!
udf 1 offset-type l4-header
 match ip-protocol udp
 offset offset0 40 offset1 44 offset2 48 offset3 52
!
flow udf-A
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 0 udf0 0xaaaaaaaa
0x0 udf1 0xaaaaaaaa 0x0 udf2 0xaaaaaaaa 0x0 udf3 0xaaaaaaaa 0x0
 exit
!
flow udf-B
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 1 udf0 0xbbbbbbbb
0x0 udf1 0xbbbbbbbb 0x0 udf2 0xbbbbbbbb 0x0 udf3 0xbbbbbbbb 0x0
 exit
tap-group email-group 1
 ingress eth-0-1 flow udf-A
 egress eth-0-2
!
tap-group context-group 2
 ingress eth-0-1 flow udf-B
 egress eth-0-3
```

The packets cannot match “TCP” and “UDP” at same time, the configuration above is suitable for the network which has TCP and UDP packets.

But in some case, if the packets are both TCP and they have different characteristic fields, it should reference to the following example:

The following example shows how to match these 2 types of packets:

- The TCP packets with offset 16 bytes after L4 header, and with the content “A”*16, forward to interface eth-0-2
- The TCP packets with offset 40 bytes after L4 header, and with the content “B”*16, forward to interface eth-0-3

```
udf 0 offset-type l4-header
 match ip-protocol tcp
 offset offset0 16
!
udf 1 offset-type l4-header
 match ip-protocol tcp
 offset offset0 40
!
flow udf-A
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 0 udf0 0xaaaaaaaa
 exit
!
flow udf-B
 sequence-num 10 permit any src-ip any dst-ip any udf udf-id 1 udf0 0xbbbbbbbb
 exit
tap-group email-group 1
 ingress eth-0-1 flow udf1
 egress eth-0-2
!
tap-group context-group 2
 ingress eth-0-1 flow udf2
 egress eth-0-3
!
```

If the packet can match the 2 UDF flow at same time(which means it has the content “AAAA” at 16 bytes after L4 header, and it has the content “BBBB” at 60 bytes after L4 header), the packets should match the UDF Flow with high priority(which has the smaller ID).

In the example above, UDF 0 has higher priority than UDF 1. Udf 0 is used by flow UDF-A. So the packet should only hit flow UDF-A, and should forward to eth-0-2.

Users should pay more attention to the priority issue.

# 15.3 Configuring Inner-match

## 15.3.1 Networking requirements

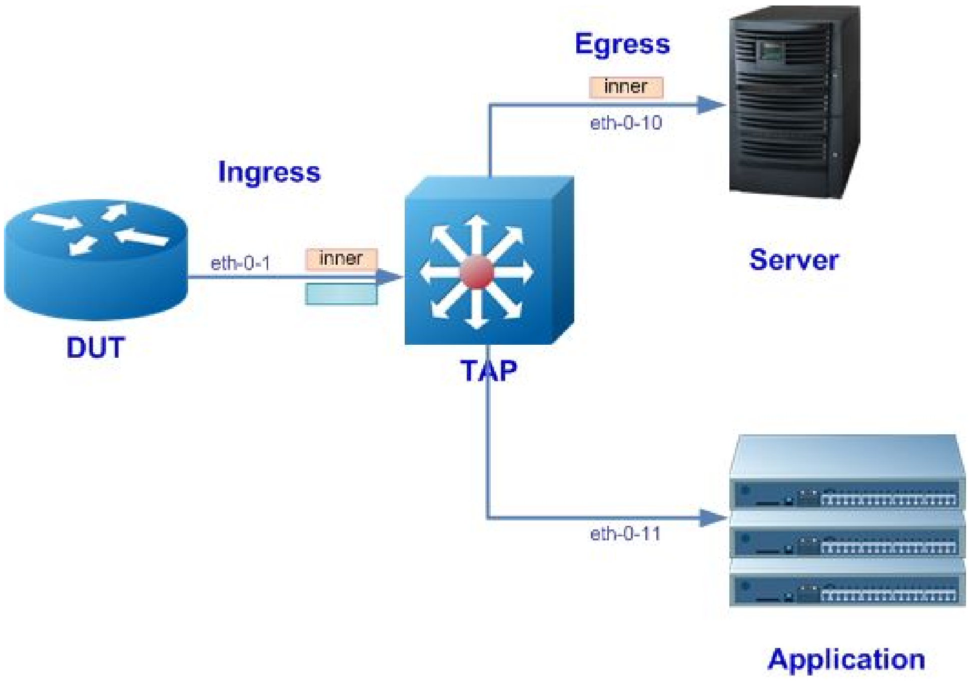
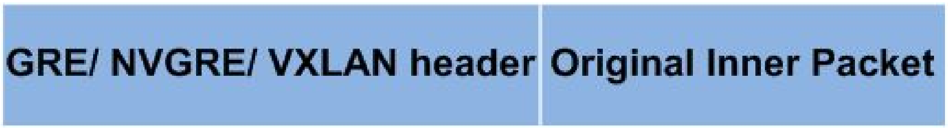


**Figure 15-1** Topology of Inner match



| GRE/ NVGRE/ VXLAN header | Original Inner Packet |
|---|---|

**Figure 15-2** Packet for inner-match

## 15.3.2 Configuration Ideas

In some cases, the user needs to match the inner field of GRE/NVGRE/VXLAN packets. To meet the requirement, use the inner-match configuration.

## 15.3.3 Configuration

The following example shows how to create a inner-match profile, matching the destination IP address 1.1.1.1 or 1.1.1.2:

```
TAP(config)# inner-match imf
TAP(config-inner-match-imf)# match any src-ip any dst-ip 1.1.1.1 0.0.0.0
TAP(config-inner-match-imf)# match any src-ip any dst-ip 1.1.1.2 0.0.0.0
TAP(config-inner-match-imf)# exit
```

The following example shows how to create a Flow with decap enabled, matching the GRE packets with destination IP address 11.1.1.1, NVGRE packets with the destination IP address 12.1.1.1, VXLAN packets with the destination IP address 13.1.1.1, and apply the inner-match imf to this flow:

```
TAP(config)# flow inner type decap
TAP(config-flow-inner)# permit gre src-ip any dst-ip 11.1.1.1 0.0.0.0
inner-match imf
TAP(config-flow-inner)# permit nvgre src-ip any dst-ip 12.1.1.1 0.0.0.0
inner-match imf
TAP(config-flow-inner)# permit udp dst-port eq 4789 src-ip any dst-ip 13.1.1.1
0.0.0.0 inner-match imf
```

**NOTE**

To match the VXLAN packets, set the type to UDP and set the destination port to 4789.

Create a TAP Group and apply the flow inner match to the ingress interface:

### 15.3.4 Validation

The following example shows how to display the inner-match rule and the flow rule:

```
TAP# show inner-match
inner-match imf
 sequence-num 1 match any src-ip any dst-ip host 1.1.1.1
 sequence-num 2 match any src-ip any dst-ip host 1.1.1.2

TAP# show flow
flow inner type decap
 sequence-num 10 permit gre src-ip any dst-ip host 11.1.1.1 inner-match imf
 sequence-num 20 permit nvgre src-ip any dst-ip host 12.1.1.1 inner-match imf
 sequence-num 30 permit udp dst-port eq 4789 src-ip any dst-ip host 13.1.1.1
inner-match imf
```

**NOTE**

Flows with decap enabled and disabled cannot bind to the same interface. E.g. eth-0-1 with decap flow inner is the ingress of TAP Group tap1, so eth-0-1 cannot bind with other flows without decap in any other TAP groups.

The following example shows the error notification when configure different types of flow:

```
DUT1(config)# flow flow1 type decap
DUT1(config-flow-flow1)# exit
DUT1(config)# flow flow2
DUT1(config-flow-flow2)# exit
DUT1(config)# tap-group tap1
DUT1(config-tap-tap1)# ingress eth-0-1 flow flow1
DUT1(config-tap-tap1)# exit
DUT1(config)# tap-group tap2
DUT1(config-tap-tap2)# ingress eth-0-1 flow flow2
% Interface mode conflict
```

Reference to the Topology of Inner match, packets remark with blue rectangle is not matched by any flow rule so they should be discarded.

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1          flow inner
  egress:
        eth-0-10
```

## 15.3.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
inner-match imf
 sequence-num 1 match any src-ip any dst-ip host 1.1.1.1
 sequence-num 2 match any src-ip any dst-ip host 1.1.1.2
!
flow inner type decap
 sequence-num 10 permit gre src-ip any dst-ip host 11.1.1.1 inner-match imf
 sequence-num 20 permit nvgre src-ip any dst-ip host 12.1.1.1 inner-match imf
 sequence-num 30 permit udp dst-port eq 4789 src-ip any dst-ip host 13.1.1.1
inner-match imf
!
tap-group tap1 1
ingress eth-0-1 flow inner
egress eth-0-10
```

# 16 Egress Port Filter configuration

## 16.1 Networking requirements

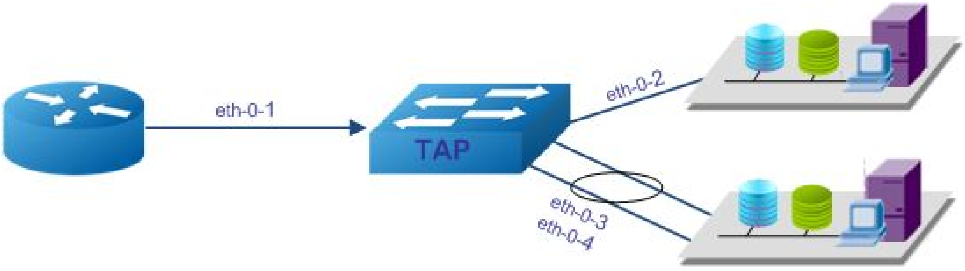


**Figure 16-1** Topology of port filter usage

## 16.2 Configuration Ideas

In some cases, after packets forward to the destination port, a filter is required to discard some unneeded packets. Reference to The Figure, packets with source IP address 1.0.0.0/24 from eth-0-1 should forward to eth-0-2 and Agg1(with two members eth-0-3/eth-0-4). Eth-0-3 needs to monitor the web packets, Agg1 needs to monitor all packets.

## 16.3 Configuration

The following example shows how to add eth-0-3/eth-0-4 into the link aggregation port Agg1:

```
TAP# configure terminal
TAP(config)# interface eth-0-3
TAP(config-if-eth-0-3)# static-channel-group 1
TAP(config-if-eth-0-3)# interface eth-0-4
TAP(config-if-eth-0-4)# static-channel-group 1
```

The following example shows how to create the filter:

```
TAP# configure terminal
TAP(config)# ip access-list filter1
TAP(config-acl-filter1)# permit tcp dst-port eq 80 src-ip any dst-ip any
TAP(config-acl-filter1)# exit
TAP(config)# ip access-list filter2
TAP(config-acl-filter2)# deny tcp dst-port eq 80 src-ip any dst-ip any
TAP(config-acl-filter2)# permit any src-ip any dst-ip any
TAP(config-acl-filter2)# end
```

NOTE

After applying the filter to the egress port, Packets which are not matched by any filter rule should be discarded by default.

The following example shows how to apply the filter:

```
TAP# configure terminal
TAP(config)# interface eth-0-2
TAP(config-if-eth-0-2)# egress filter1
TAP(config-if-eth-0-2)# exit
TAP(config)# interface agg1
TAP(config-if-agg1)# egress filter2
```

The following example shows to create a TAP group with ingress port eth-0-1, with egress port eth-0-2/Agg1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1
TAP(config-tap-tap1)# egress agg1
TAP(config-tap-tap1)# egress eth-0-2
```

## 16.4 Validation

The following example shows how to display the filter rules:

```
TAP# show ip access-list
ip access-list filter1
 sequence-num 10 permit tcp dst-port eq 80 src-ip any dst-ip any
ip access-list filter2
 sequence-num 10 deny tcp dst-port eq 80 src-ip any dst-ip any
 sequence-num 20 permit any src-ip any dst-ip any
```

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1
  egress:
        eth-0-2
        agg1
```

## 16.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
ip access-list filter1
 sequence-num 10 permit tcp dst-port eq 80 src-ip any dst-ip any
!
ip access-list filter2
```

```
 sequence-num 10 deny tcp dst-port eq 80 src-ip any dst-ip any
 sequence-num 20 permit any src-ip any dst-ip any
!
interface eth-0-2
 egress filter1
!
interface eth-0-3
 static-channel-group 1
!
interface eth-0-4
 static-channel-group 1
!
interface agg1
 egress filter2
!
tap-group tap1 1
 ingress eth-0-1
 egress eth-0-2
egress agg1
```

**Table 16-1** TAP Filter fields

| Field | Description |
|---|---|
| IP protocol[number\| any\| icmp\| igmp\|gre\| nvgre\| tcp \|udp\|] | Specify the IP protocol number of the flow rule. Well known IP protocols can also be specified by name. e.g. IP protocol 1 = icmp, 2 = igmp, 6 = tcp, 17 = udp, 47 = gre/nvgre (gre protocol 0x0800 = gre, 0x6558 = nvgre). Parameter “any” indicates packets with any IP protocol can match this rule. |
| src-ip/src-ipv6 | Source IPv4/IPv6 address |
| dst-ip/dst-ipv6 | Destination IPv4/IPv6 address |
| flow-label | Flow label of IPv6 |
| ip-precedence | IP precedence |
| first-fragment | Match packets with first fragment |
| non-first-fragment | Match packets with non first fragment |
| non-fragment | Match packets with non fragment |
| non-or-first-fragment | Match packets with non first fragment |
| small-fragment | Match packets with small fragment |
| any-fragment | Match packets with any fragment |

| | |
|---|---|
| options | Match packets with IP options |
| dscp | DSCP in IPv4 packets value |
| vlan | Vlan ID |
| inner-vlan | Inner vlan ID |
| cos | CoS value in vlan header |
| inner-cos | CoS value in inner vlan header |
| ether-type | Ether type |
| src-mac | Source mac address |
| dst-mac | Destination mac address |

# 17 VLAN Remarking Configuration

## 17.1 Networking requirements

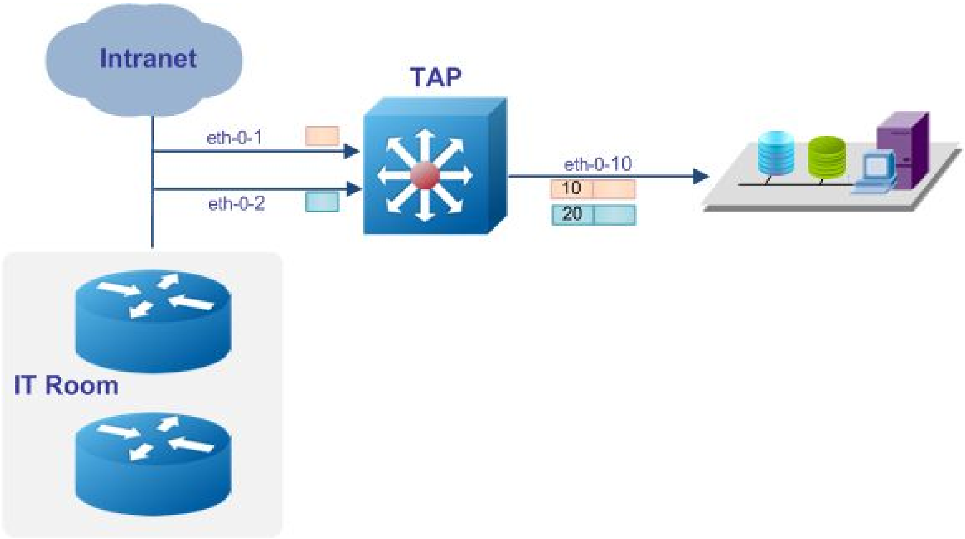


**Figure 17-1** Topology of VLAN Remarking

## 17.2 Configuration Ideas

In some cases, the server and analyzer need to separate different packets. The VLAN Remarking application can meet the requirement. Reference to the Figure Packets from eth-0-1 should add VLAN tag 10. Packets from eth-0-2 should add VLAN tag 20.

## 17.3 Configuration

PORT mode and PORT WITH FLOW mode both support VLAN remarking.

### 17.3.1 VLAN Remarking for PORT mode

The following example shows how to create TAP group, and remark the VLAN tag to 10 for the packets from eth-0-1, remark the VLAN tag to 20 for the packets from eth-0-2:

```
TAP# configure terminal
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 mark-source 10
TAP(config-tap-tap1)# ingress eth-0-2 mark-source 20
TAP(config-tap-tap1)# egress eth-0-10
```

### 17.3.2 VLAN Remarking for PORT WITH FLOW mode

The following example shows how to create TAP group, and remark the VLAN tag to 10 for the packets with destination IP 1.1.1.1 form eth-0-1, remark the VLAN tag to 20 for the packets with destination IP 1.1.1.2 form eth-0-2:

```
TAP(config)# flow flow1
TAP(config-flow-map1)# permit any src-ip any dst-ip 1.1.1.1 0.0.0.0 mark-source
10
TAP(config)# flow flow2
TAP(config-flow-map1)# permit any src-ip any dst-ip 1.1.1.2 0.0.0.0 mark-source
20
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# ingress eth-0-2 flow flow2
TAP(config-tap-tap1)# egress eth-0-10
```

## 17.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
  ID: 1
  Ingress:
        eth-0-1                  mark-src 10
        eth-0-2                  mark-src 20
  egress:
        eth-0-10
```

**NOTE** The result above shows the TAP group for PORT mode.

## 17.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
tap-group tap1 1
 ingress eth-0-1 mark-source 10
 ingress eth-0-2 mark-source 20
 egress eth-0-10
```

**NOTE** The result above shows the TAP group for PORT mode.

# 18 VLAN Stripping Configuration

## 18.1 Networking requirements

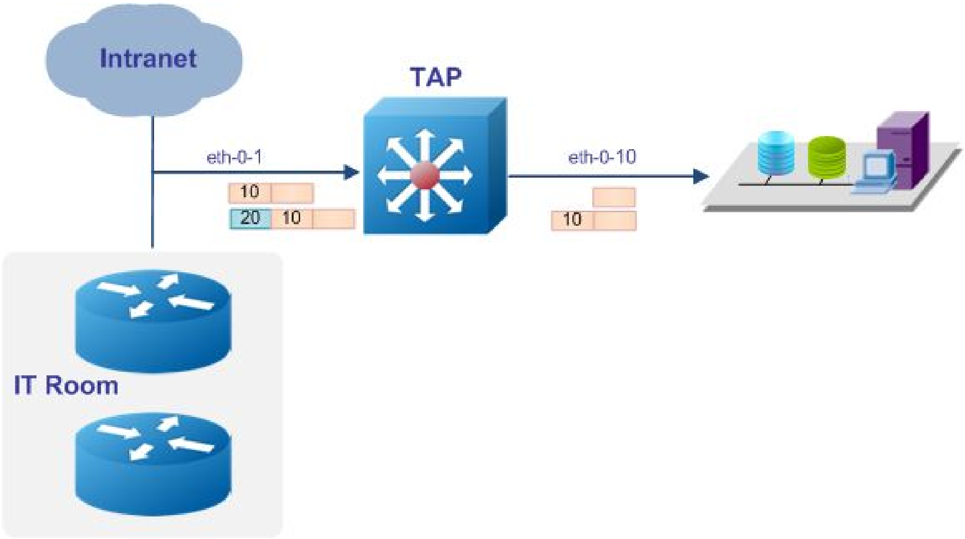


**Figure 18-1** Topology of VLAN stripping

## 18.2 Configuration Ideas

In some cases server or analyzer cannot deal with the packets with VLAN tag or double VLAN tags. The VLAN stripping application can resolve the problem.

Reference to the Figure, Packets from eth-0-1 with VLAN 10 should be stripped the VLAN tag, Packets from eth-0-1 with S-VLAN 20 C-VLAN 10 should be stripped the outer VLAN tag S-VLAN 20.

VLAN stripping applications should do nothing to untagged packets.

## 18.3 Configuration

PORT mode and PORT WITH FLOW mode both support VLAN stripping.

### 18.3.1 VLAN Stripping for PORT mode

The following example shows how to create TAP group, strip the VLAN for the packets from eth-0-1, and send a copy to eth-0-10:

```
TAP# configure terminal
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 un-tag-outer-vlan
TAP(config-tap-tap1)# egress eth-0-10
```

### 18.3.2 VLAN Stripping for PORT WITH FLOW mode

The following example shows how to create TAP group, strip the VLAN for the packets with destination IP address 1.1.1.1form eth-0-1, and send a copy to eth-0-2:

```
TAP(config)# flow flow1
TAP(config-flow-map1)# permit any src-ip any dst-ip 1.1.1.1 0.0.0.0
un-tag-outer-vlan
TAP(config-flow-map1)# permit any src-ip any dst-ip any
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-2
```

## 18.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show  tap-group

TAP-group tap1
  ID: 1
  Ingress:
        eth-0-1           un-tag-outer-vlan
  egress:
        eth-0-10
```

**NOTE** The result above shows the TAP group for PORT mode.

## 18.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
tap-group tap1 1
 ingress eth-0-1 un-tag-outer-vlan
egress eth-0-10
```

**NOTE** The result above shows the TAP group for PORT mode.

# 19 Packet Editing Configuration

## 19.1 Networking requirements

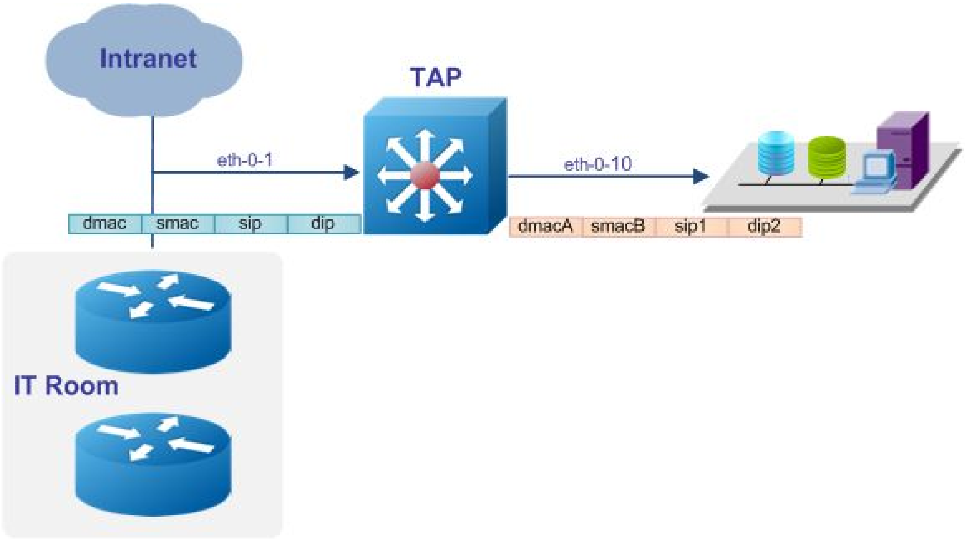


**Figure 19-1** Topology of packet editing

## 19.2 Configuration Ideas

In some cases, the server or analyzer can only receive the packets with the destination address equal to its own address. The packet editing application can meet the requirement. Source and destination MAC address, Source and destination IP address of the packets can be modified when entering the ingress port. Reference to the Figure, the device should modify the source and destination MAC address, Source and destination IP address of the packets from eth-0-1 and send a copy to eth-0-10.

## 19.3 Configuration

PORT mode and PORT WITH FLOW mode both support packet editing.

### 19.3.1 Packet editing for PORT mode

The following example shows how to create TAP group, edit the source and destination IP/MAC address of the packets from eth-0-1, and send a copy to eth-0-10:

```
TAP# configure terminal
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 edit-macsa a.a.a edit-macda b.b.b
edit-ipda 1.1.1.1 edit-ipsa 2.2.2.2
TAP(config-tap-tap1)# egress eth-0-10
```

### 19.3.2 Packet editing for PORT WITH FLOW mode

The following example shows how to create TAP group with flow rule, and edit the destination IP address to 100.100.100.1 for the packets with destination IP address 1.1.1.1, edit the destination IP address to 100.100.100.2 for the packets with destination IP address 1.1.1.2:

```
TAP(config)# flow flow1
TAP(config-flow-map1)# permit any src-ip any dst-ip 1.1.1.1 0.0.0.0 edit-ipda
100.100.100.1
TAP(config-flow-map1)# permit any src-ip any dst-ip 1.1.1.2 0.0.0.0 edit-ipda
100.100.100.2
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
```

## 19.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
  ID: 1
  Ingress:
        eth-0-1      edit-macda 000B.000B.000B
                     edit-macsa 000A.000A.000A
                     edit-ipda 1.1.1.1
                     edit-ipsa 2.2.2.2
  egress:
        eth-0-10
```

**NOTE** The result above shows the TAP group for PORT mode.

## 19.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
tap-group tap1 1
 ingress eth-0-1 edit-macda 000B.000B.000B edit-macsa 000A.000A.000A edit-ipda
```

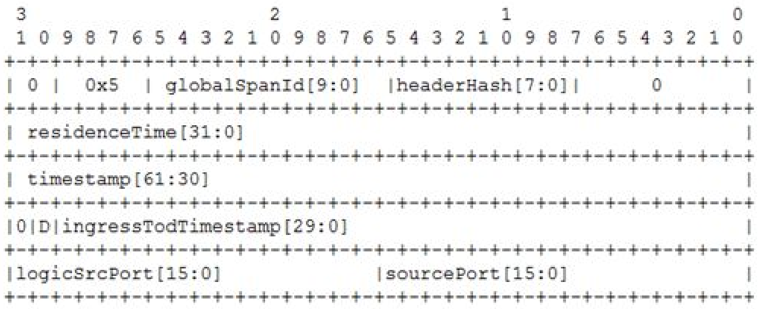
```
1.1.1.1 edit-ipsa 2.2.2.2
 egress eth-0-10
```

NOTE The result above shows the TAP group for PORT mode.

# 20 Time Stamp Configuration

## 20.1 Overview

To monitor the outgoing traffic of the data center is a common application scenario of TAP. With the increase of data center scale and the improvement of the performance requirements, users need to monitor the inner traffic of the data center and get more detailed information. TAP series device provides flexible packet remarking applications, which can insert an additional header before the original packet header. The additional header uses an ether-type defined by private protocol, which can carry 20 bytes of private data.



```
 3                   2                   1                   0
 1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1 0
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| 0 |   0x5   | globalSpanId[9:0]  |headerHash[7:0]|      0      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| residenceTime[31:0]                                           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| timestamp[61:30]                                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|0|D|ingressTodTimestamp[29:0]                                  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|logicSrcPort[15:0]              |sourcePort[15:0]              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

**Figure 20-1** Packet structure

- GlobalSpanId[9:0]: Global Span ID, used to identify the source of the SPAN.
- headerHash[7:0]: Hash value.
- redidenceTime[31:0]: The duration of the packet in the ASIC chip, which is also called “Latency”.
- Timestamp[61:30]: Timestamp in the unit of seconds.
- ingressTodTimestamp[29:0]: Timestamp in the unit of nanosecond.
- D: txToDtimestamp type， should be set to 0.
- LogicSrcPort[15:0]: The ingress port of the packet.
- sourcePort[15:0]: The ingress port ID of the SPAN packets.

Note: The timestamp function needs to be used in conjunction with the timestamp sync systime command.

Timestamp uses the standard Time of Day format. The [61:30] bits record seconds (since 1970-01-01， 08:00:00), the low [29:0] bits record nanosecond.

The analyzer can recognize the time stamp packets by ether header, and analyze the TCP traffic by the information carried in the packets.

## 20.2 Networking requirements

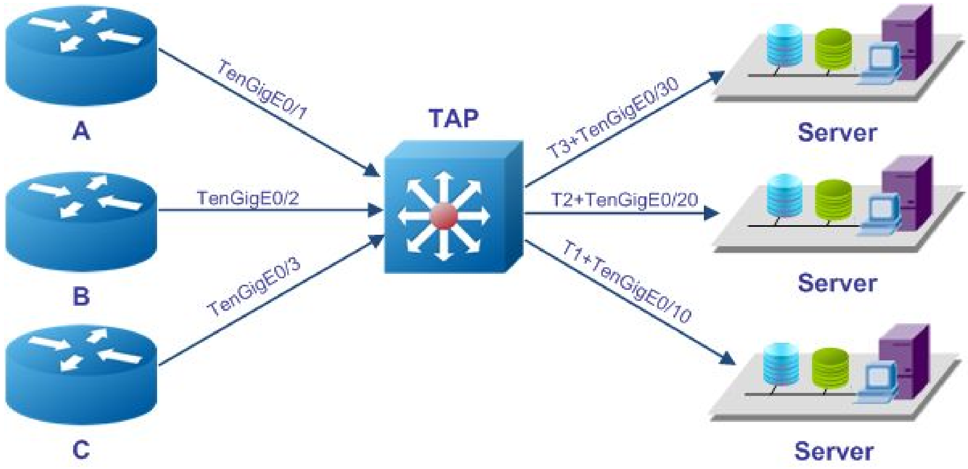


**Figure 20-1** Topology of Time stamp

## 20.3 Configuration Ideas

Reference to the Figure, the cluster of the server can get the accurate duration the packet spent on each node of the data center by the source port and timestamp information. Use the source port to identify different devices, use the information in timestamp to get the latency.

## 20.4 Configuration

The following example shows how to set private ether-type to 0xFF12, and set the destination MAC address to 1.1.1, set the source MAC address to 2.2.2; use the system time as time source for time-stamp:

```
TAP# configure terminal
TAP(config)# timestamp-over-ether 1.1.1 2.2.2 0xff12
TAP(config)# timestamp sync systime
```

The following example shows how to create 3 TAP groups, with 3 source ports eth-0-1/eth-0-2/eth-0-3, and with 3 destination ports eth-0-10/eth-0-20/eth-0-30 which enabled time stamp:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1
TAP(config-tap-tap1)# egress eth-0-10 timestamp
TAP(config-tap-tap1)# exit
TAP(config)# tap-group tap2
TAP(config-tap-tap2)# ingress eth-0-2
TAP(config-tap-tap2)# egress eth-0-20 timestamp
TAP(config-tap-tap2)# exit
TAP(config)# tap-group tap3
TAP(config-tap-tap3)# ingress eth-0-3
TAP(config-tap-tap3)# egress eth-0-30 timestamp
TAP(config-tap-tap3)# exit
```

## 20.5 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID:
  Ingress:
        eth-0-1
  egress:
        eth-0-10         time-stamp
TAP-group tap2
ID: 2
  Ingress:
        eth-0-2
  egress:
        eth-0-20         time-stamp
TAP-group tap3
ID: 3
  Ingress:
        eth-0-3
  egress:
        eth-0-30         time-stamp
```

## 20.6 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
timestamp-over-ether 0001.0001.0001 0002.0002.0002 0xff12
!
timestamp sync systime
!
tap-group tap1 1
 ingress eth-0-1
egress eth-0-10 timestamp
```

```
!
tap-group tap2 2
 ingress eth-0-2
 egress eth-0-20 timestamp
!
tap-group tap3 3
 ingress eth-0-3
 egress eth-0-30 timestamp
```

# 21 Packet truncation Configuration

## 21.1 Overview

PACKET TRUNCATION
IP HEADER
PAYLO

**Figure 21-1** sketch map of packet truncation

## 21.2 Configuration Ideas

In some cases, packets need to be truncated in order to reduce the pressure of the server or in order to protect privacy. The packet truncation application can meet the requirement. E.g. The size of the packet enters the TAP device from eth-0-1 is 1518 bytes. The size of the packet leaves destination port eth-0-10 is 64 byte.

## 21.3 Configuration

PORT mode and PORT WITH FLOW mode both support packet truncation.

### 21.3.1 Packet Truncation for PORT mode

The following example shows how to set the packet length after truncated to 64 byte:

```
TAP# configure terminal
TAP(config)# truncation 64
```

The follow example shows how to create TAP group with ingress port eth-0-1 and enable packet truncation:

```
TAP# configure terminal
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 truncation
TAP(config-tap-tap1)# egress eth-0-10
```

## 21.3.2 Packet Truncation for PORT WITH FLOW mode

The following example shows how to set a flow rule to match the packets with destination IP address 1.1.1.0/24 and enable truncation. Packets with other destination IP address should not be truncated:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip any dst-ip 1.1.2.0 0.0.0.255
truncation
TAP(config-flow-flow1)# permit any src-ip any dst-ip any
TAP(config-flow-flow1)# exit
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

## 21.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           truncation
  egress:
        eth-0-10
```

**NOTE** The result above shows the TAP group for PORT mode.

## 21.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
truncation 64
!
tap-group tap1 1
 ingress eth-0-1 truncation
egress eth-0-10
```

**NOTE** Packet truncation is mutually exclusive to other actions. E.g. Only Packet truncation is effective and all other configuration(egress-filter/time stamp etc.) is invalid in the following configuration:

```
ip access-list filter1
sequence-num 10 deny any src-ip any dst-ip any
!
interface eth-0-2
```

```
  egress filter1
!
timestamp-over-ether 000A.000A.000A 000B.000B.000B 0xff12
!
tap-group tap1
 ingress eth-0-1 truncation
 egress eth-0-2 timestamp
```

# 22 Packet header stripping Configuration

## 22.1 Configuring strip the VXLAN header

### 22.1.1 Networking requirements

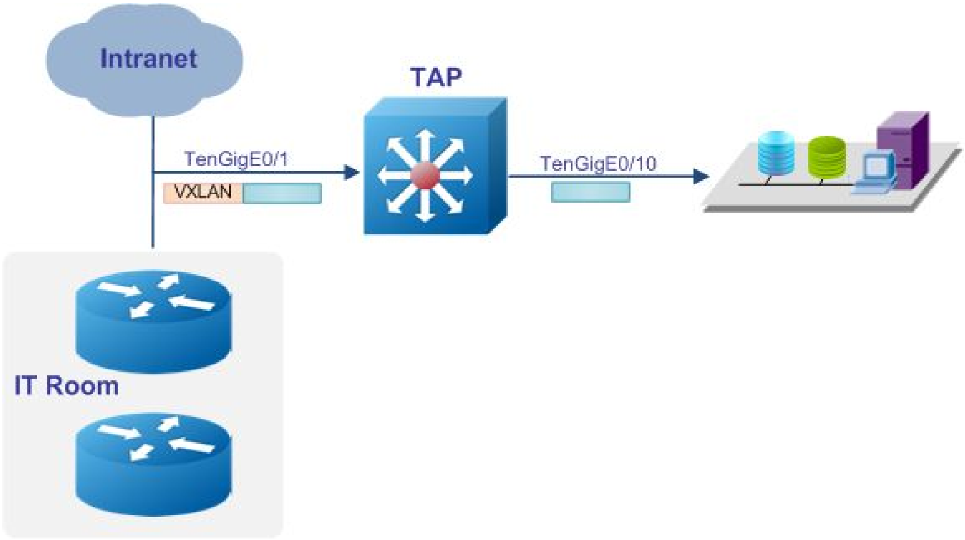


**Figure 22-1** Topology of stripping VXLAN header

### 22.1.2 Configuration Ideas

In some cases, the server or analyzer cannot parse the packet with VXLAN/NVGRE/GRE header. The packet header stripping application can resolve the problem.

Reference to the Figure the packet enter eth-0-1, the VLAN header should be stripped

### 22.1.3 Configuration

The following example shows how to create a flow rule the match the VXLAN packets and strip the header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit udp dst-port eq 4789 vxlan-vni any  src-ip any
```

```
dst-ip any strip-header
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

## 22.1.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
```

## 22.1.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
 sequence-num 10 permit udp dst-port eq 4789 vxlan-vni any src-ip any dst-ip any
strip-header
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10


TAP(config)# flow flow1
TAP(config-flow-map1)# permit udp dst-port eq 4789 vxlan-vni 1000 0x0 src-ip any
dst-ip any strip-header
TAP(config-tap-tap1)# end
```

**NOTE**

TAP series devices support to match the specified VNI. E.g. match VNI 1000 and strip the VXLAN header.you can configure flow udp dst-port not 4789 to match vxlan,but now you just can configure the same global vxlan dst-port .

```
TAP(config)# flow flow1
TAP(config-flow-map1)# permit udp dst-port eq 1234 vxlan-vni 1000 0x0 src-ip any
dst-ip any strip-header
TAP(config-flow-map1)# permit udp dst-port eq 1234 vxlan-vni 1200 0x0 src-ip any
dst-ip any strip-header
TAP(config-tap-tap1)# end
```

## 22.2 Configuring strip the NVGRE header

### 22.2.1 Networking requirements

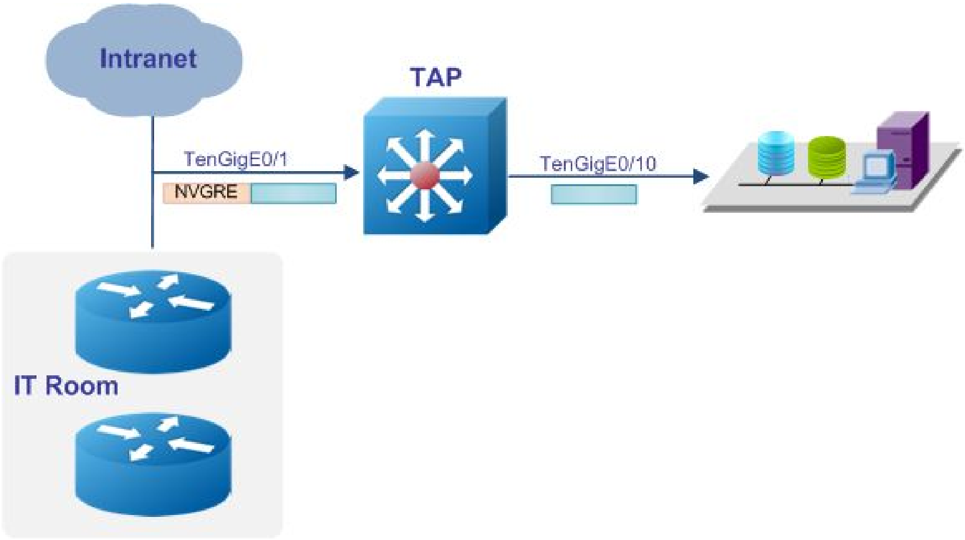


**Figure 22-1** Topology of stripping NVGRE header

### 22.2.2 Configuration Ideas

In some cases, the server or analyzer cannot parse the packet with VXLAN/NVGRE/GRE header. The packet header stripping application can resolve the problem.

Reference to the Figure the packet enter eth-0-1, the NVGRE header should be stripped

### 22.2.3 Configuration

The following example shows how to create a flow rule the match the NVGRE packets and strip the header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit nvgre src-ip any dst-ip any strip-header
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

### 22.2.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1            flow flow1
  egress:
        eth-0-10
```

### 22.2.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit nvgre src-ip any dst-ip any strip-header
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

## 22.3 Configuring strip the GRE header

### 22.3.1 Networking requirements

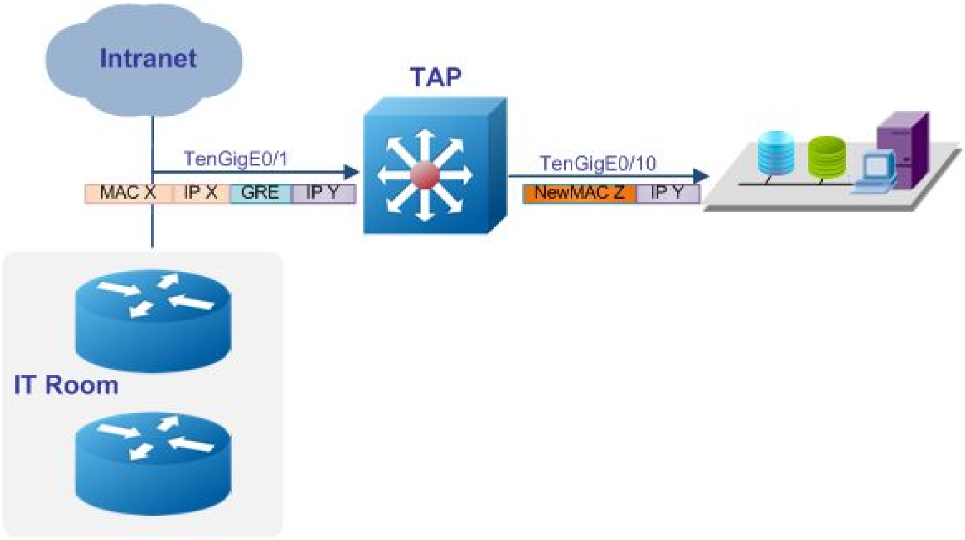


**Figure 22-1** Topology of stripping GRE header

### 22.3.2 Configuration Ideas

In some cases, the server or analyzer cannot parse the packet with VXLAN/NVGRE/GRE header. The packet stripping application for the GRE packet should strip the outer IP address, MAC address and GRE header, only the inner IP address and payload are left. Packet editing applications should be configured together with packet header stripping, in order to add an outer MAC address.

Reference to the Figure the packet enters eth-0-1, the GRE header should be stripped and a new MAC address should be added.

### 22.3.3 Configuration

The following example shows how to create a flow rule the match the GRE packets and strip the header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit gre src-ip any dst-ip any strip-header edit-macsa
a.a.a edit-macda b.b.b
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

### 22.3.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
```

**NOTE**

GRE header length is flexible. In the example above, the flow only matches the GRE field, and only strips the standard GRE header which is 4 bytes. If the packets need to strip header include GRE-key, the configuration is as follows(Match GRE and GRE-KEY field). It means that, if the flow only matches the GRE field, the stripped length is 4 bytes; if the flow matches the GRE and GRE-KEY field, the stripped length is 8 bytes. If the packet with a GRE header which is more than 8 byte, or with variable types of GRE packets(For example, the packets with 4/8/12/16 bytes GRE header exist at same time), please reference to the chapter “Configuring strip the User Defined header”.

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit gre gre-key any src-ip any dst-ip any
strip-header edit-macsa a.a.a edit-macda b.b.b
TAP(config-flow-flow1)# exit
```

### 22.3.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit gre src-ip any dst-ip any strip-header edit-macda
000B.000B.000B edit-macsa 000A.000A.000A
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

## 22.4 Configuring strip the IPIP header

### 22.4.1 Networking requirements

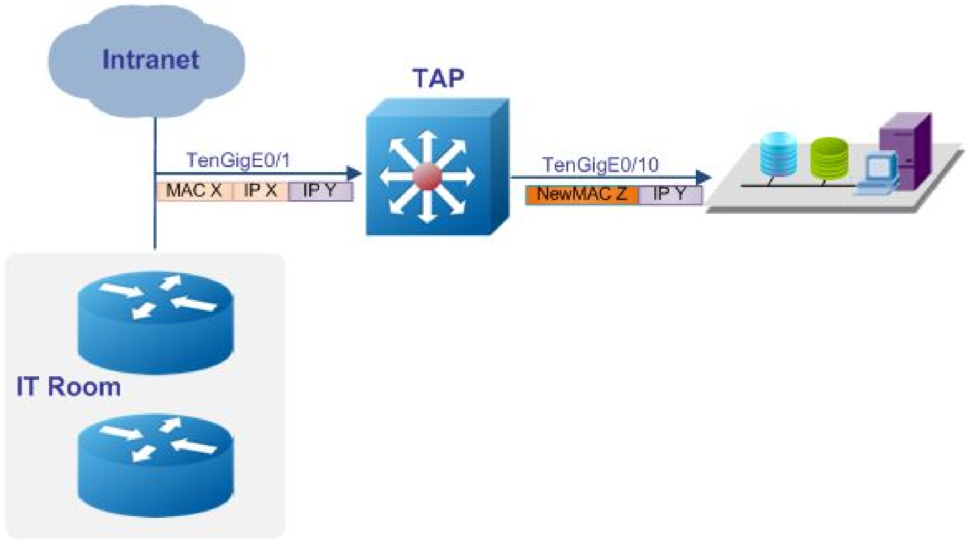


**Figure 22-1** Topology of stripping IPIP header

### 22.4.2 Configuration Ideas

In some cases, the server or analyzer cannot parse the packet with an IPIP header. The packet stripping application for IPIP packet should strip the outer IP address, MAC header, only inner IP address and payload are left. Packet editing applications should be configured together with packet header stripping, in order to add an outer MAC address.

Reference to the Figure the packet enters eth-0-1, the IPIP header should be stripped and a new MAC address should be added.

### 22.4.3 Configuration

The following example shows how to create a flow rule the match the IPIP packets and strip the header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit ipip src-ip any dst-ip any strip-header
edit-macsa a.a.a edit-macda b.b.b
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

### 22.4.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1            flow flow1
  egress:
        eth-0-10
```

### 22.4.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit ipip src-ip any dst-ip any strip-header edit-macda
000B.000B.000B edit-macsa 000A.000A.000A
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

# 22.5 Configuring strip the User Defined header

## 22.5.1 Networking requirements

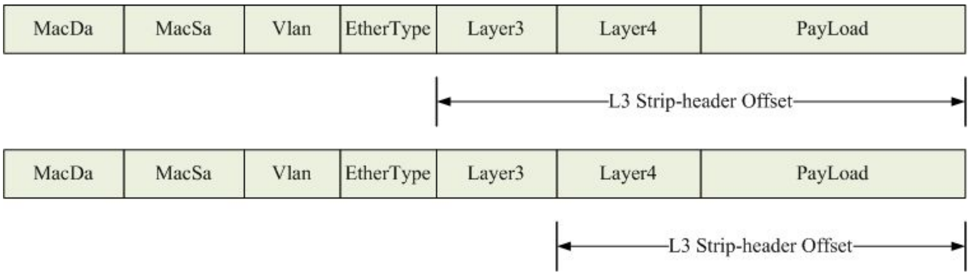


**Figure 22-1** Packet structure

## 22.5.2 Configuration Ideas

Normal packet header stripping applications can strip the standard VXLAN/GRE/NVGRE header, which cannot match all cases. e.g. GRE header may have variable length because GRE-KEY/Checksum/Sequence Num inserted. By default, packet header stripping can strip GRE header and one option field of 4 bytes. When the GRE packet has more than one option field, the packet header stripping cannot strip them correctly.

The user defined header stripping application can resolve the problem. A starting position (L2, L3 or L4) and offset (up to 30 bytes) should be specified before using user defined header stripping.

The following example shows how to strip the GRE packets with GRE-KEY/Checksum/Sequence Number

## 22.5.3 Configuration

Create a flow rule to match GRE packets and enable user defined stripping:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit gre src-ip any dst-ip any strip-header
strip-position l4 strip-offset 16 edit-macsa a.a.a edit-macda b.b.b
TAP(config-flow-flow1)# exit
```

**NOTE**

Strip-position is L4 and offset is 16 means remove 16 bytes after L4 header and remove all fields before L4 header.

Create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

### 22.5.4 Validation

The following example shows how to display the information of the TAP group:

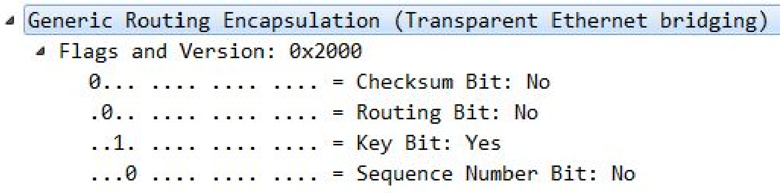
```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1            flow flow1
  egress:
        eth-0-10
```

### 22.5.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit gre src-ip any dst-ip any strip-header strip-position l4
strip-offset 16 edit-macda 000B.000B.000B edit-macsa 000A.000A.000A
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

The GRE header might be 4,8,12,16 bytes. UDF can match CheckSum/Key/Sequence number to judge the GRE header length. Each option has 4 bytes. If the packet has N options, the GRE header length is 4+N*4 bytes.



```
◢ Generic Routing Encapsulation (Transparent Ethernet bridging)
  ◢ Flags and Version: 0x2000
      0... .... .... .... = Checksum Bit: No
      .0.. .... .... .... = Routing Bit: No
      ..1. .... .... .... = Key Bit: Yes
      ...0 .... .... .... = Sequence Number Bit: No
```

**Figure 22-1** GRE Packet structure

Create an udf with offset type L4 header to match the GRE packets.

```
udf 1 offset-type l4-header
match ip-protocol gre
offset offset0 0
```

Configure a flow, attach an udf, specify the GRE header length according to the packet's CheckSum/Key/Sequence-number.

```
flow flow1
permit gre src-ip any dst-ip any udf udf-id 1 udf0 0x00000000 0x0fffffff
strip-header strip-position l4 strip-offset 4 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A

permit gre src-ip any dst-ip any udf udf-id 1 udf0 0x80000000 0x0fffffff
strip-header strip-position l4 strip-offset 8 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A
permit gre src-ip any dst-ip any udf udf-id 1 udf0 0x20000000 0x0fffffff
strip-header strip-position l4 strip-offset 8 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A
permit gre src-ip any dst-ip any udf udf-id 1 udf0 0x10000000 0x0fffffff
strip-header strip-position l4 strip-offset 8 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A

permit gre src-ip any dst-ip any udf udf-id 1 udf0 0xa0000000 0x0fffffff
strip-header strip-position l4 strip-offset 12 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A
permit gre src-ip any dst-ip any udf udf-id 1 udf0 0x90000000 0x0fffffff
strip-header strip-position l4 strip-offset 12 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A
permit gre src-ip any dst-ip any udf udf-id 1 udf0 0x30000000 0x0fffffff
strip-header strip-position l4 strip-offset 12 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A

permit gre src-ip any dst-ip any udf udf-id 1 udf0 0xb0000000 0x0fffffff
strip-header strip-position l4 strip-offset 16 edit-macda 000B.000B.000B
edit-macsa 000A.000A.000A

tap-group email-group 1
 ingress eth-0-1 flow flow1
 egress eth-0-2
!
```

# 22.6 Configuring strip the MPLS header

## 22.6.1 Networking requirements

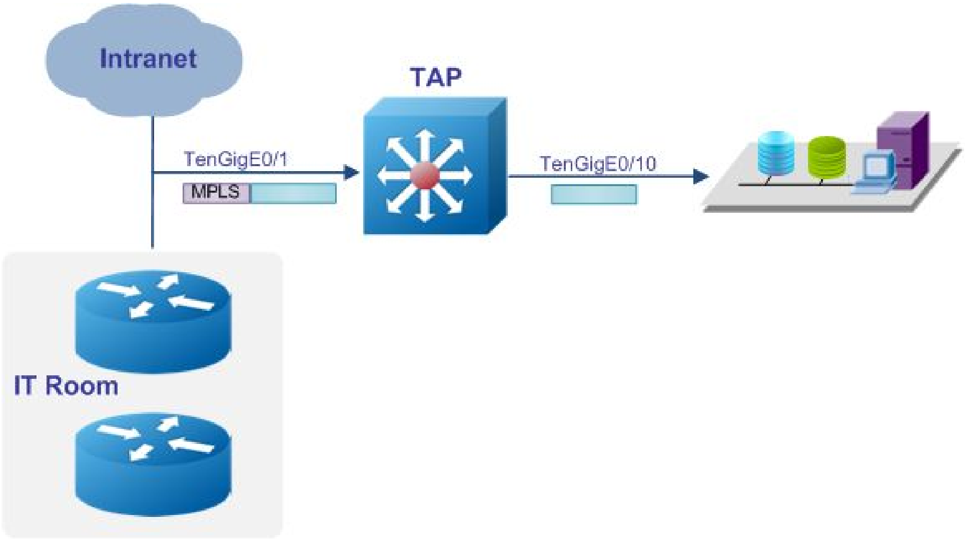


**Figure 22-1** Topology of stripping MPLS header

## 22.6.2 Configuration Ideas

In some cases, the server or analyzer cannot parse the packet with MPLS LABEL header. The packet header stripping application can resolve the problem. TAP supports matching the number of mpls labels(up to 9) and the value of mpls labels(upp to 3). If the striped message is a IPv4 message, the operation of adding a mac-header is supported.

Reference to the Figure the packet enter eth-0-1, the MPLS header should be stripped

## 22.6.3 Configuration

The following example shows how to create a flow rule the match the MPLS packets and strip the header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit mpls label-num 2 mpls-label1 any mpls-label2 100
strip-header
TAP(config-flow-flow1)# exit
```

The following example shows how to create a flow rule the match the MPLS packets, strip the header and add mac-header:

```
TAP(config)# flow flow2
TAP(config-flow-flow1)# permit mpls label-num 3 mpls-label1 any mpls-label2 100
mpls-label3 200 strip-header add-l2macda 1.1.1 add-l2macsa 2.2.2
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# exit

TAP(config)# tap-group tap2
TAP(config-tap-tap1)# ingress eth-0-1 flow flow2
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

## 22.6.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
TAP-group tap2
ID: 2
  Ingress:
        eth-0-1           flow flow2
  Egress:
        eth-0-10
```

## 22.6.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
 sequence-num 10 permit mpls label-num 2 mpls-label2 100 strip-header
 exit
!
flow flow2
 sequence-num 10 permit mpls label-num 3 mpls-label2 100 mpls-label3 100
strip-header add-l2macda 0001.0001.0001 add-l2macsa 0002.0002.0002
 exit
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
 egress eth-0-10
!
tap-group tap2 2
 ingress eth-0-1 flow flow2
 egress eth-0-10
```

# 22.7 Configuring strip the PPPOE header

## 22.7.1 Networking requirements

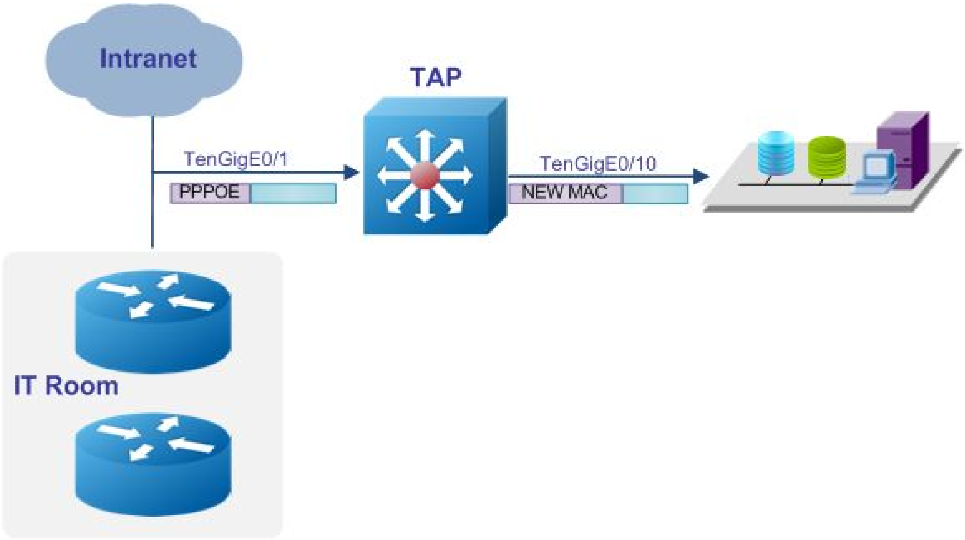


**Figure 22-1** Topology of stripping PPPOE header

## 22.7.2 Configuration Ideas

In some cases, the server or analyzer cannot parse the packet with PPPOE LABEL header. The packet header stripping application can resolve the problem. TAP supports a point-to-point protocol type of ipv4 or ipv6. Mac-header needs to be added after stripping.

Reference to the Figure the packet enters eth-0-1, the PPPOE header should be stripped and a new MAC address should be added.

## 22.7.3 Configuration

The following example shows how to create a flow rule the match the PPPOE packets:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit pppoe ppp-type ipv6
TAP(config-flow-flow1)# exit
```

The following example shows how to create a flow rule the match the PPPOE packets and strip the header:

```
TAP(config)# flow flow2
TAP(config-flow-flow1)# permit pppoe ppp-type ipv4 strip-header add-l2macda
1.1.1 add-l2macsa 2.2.2 add-l2vlan 10
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# exit
TAP(config)# tap-group tap2
TAP(config-tap-tap1)# ingress eth-0-1 flow flow2
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

## 22.7.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
TAP-group tap2
ID: 2
  Ingress:
        eth-0-1           flow flow2
  egress:
        eth-0-10
```

## 22.7.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
 sequence-num 10 permit pppoe ppp-type ipv6
 exit
!
flow flow2
 sequence-num 10 permit pppoe ppp-type ipv4 strip-header add-l2macda
0001.0001.0001 add-l2macsa 0002.0002.0002 add-l2vlan 10
 exit
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
 egress eth-0-10
!
tap-group tap2 2
 ingress eth-0-1 flow flow2
 egress eth-0-10
```

# 23 AAA Configuration

AAA(Authentication/Authorization/Accounting)is a security mechanism for network management, which supports 3 applications: Authentication, Authorization and Accounting. The TAP series devices support to certify the users access the network.

## 23.1 Configuring Radius Authentication

### 23.1.1 Networking requirements

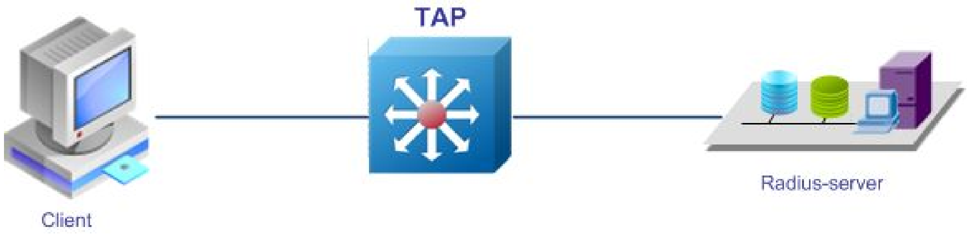


**Figure 23-1** Topology of Radius Authentication

### 23.1.2 Configuration Ideas

Radius is a distributed server/client system to prevent unauthorized access and to guarantee the security of the network.

Radius server keeps all information of users' authentication and network service accessing. Radius server should do Authentication/Authorization/Accounting according to the user information in the local database, after it receives a request from a client.

### 23.1.3 Configuration

The following example shows how to enable AAA and set the mode of Authentication/Authorization/Accounting:

```
TAP(config)# aaa new-model
TAP(config)# aaa authentication login radius-authen radius
TAP(config)# aaa authorization exec radius-author radius
TAP(config)# aaa accounting exec radius-acct start-stop radius
```

The following example shows how to set the parameter of the radius server:

```
TAP(config)# radius-server host mgmt-if 10.10.1.1 key test auth-port 1819
```

The following example shows how to set the login mode to radius:

```
TAP(config)# line vty 0 7
TAP(config-line)# login authentication radius-authen
TAP(config-line)# privilege level 4
TAP(config-line)# no line-password
```

### 23.1.4 Validation

Use the username and password on radius server to login the device.

### 23.1.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
aaa new-model
!
aaa authentication login radius-authen radius
!
aaa authorization exec radius-author radius
!
aaa accounting exec radius-acct start-stop radius
!
line vty 0 7
 exec-timeout 35791 0
 privilege level 4
 no line-password
 login authentication radius-authen
```

# 24 Sflow Configuration

Sflow (Sampled Flow) is a traffic monitoring technology based on packet sampling.

Sflow is used to analyze the network traffic.

Sflow has 2 types of message: statistics information for ports and sampled packets information.

## 24.1.1 Networking requirements

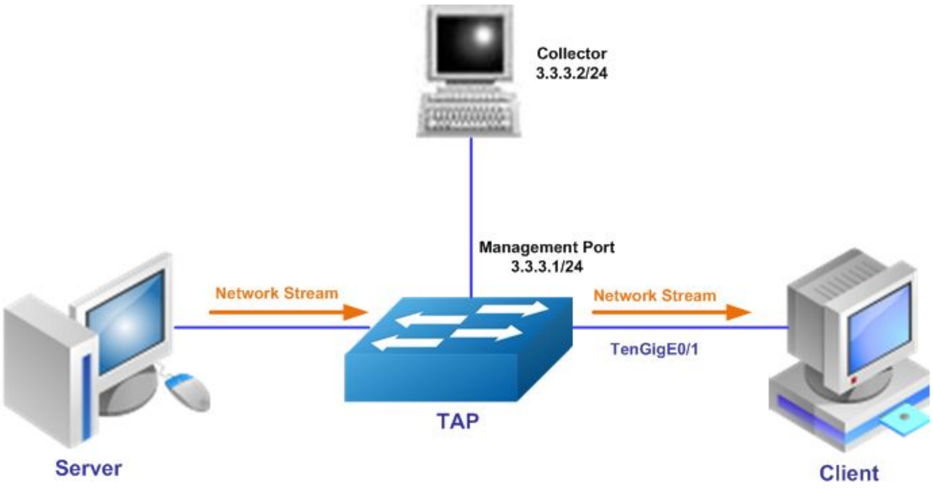


**Figure 24-1** Topology of Sflow

## 24.1.2 Configuration Ideas

Traffic monitoring is a basic requirement of network management.

Users need to find the source of abnormal traffic and attacking traffic in time. Sflow, which is a traffic monitoring technology based on packet sampling can meet the requirement.

### 24.1.3 Configuration

The following example shows how to enable sflow and set the sampling interval, IP address of the agent and IP address of the collector:

```
TAP(config)# sflow enable
TAP(config)# sflow counter interval 20
TAP(config)# sflow agent ip 3.3.3.1
TAP(config)# sflow collector mgmt-if 3.3.3.2
```

The follow example shows how to enable sflow on a port and set the sampling rate:

```
TAP(config)# interface eth-0-1
TAP(config-if-eth-0-1)# sflow flow-sampling rate 32768
TAP(config-if-eth-0-1)# sflow flow-sampling enable input
TAP(config-if-eth-0-1)# sflow counter-sampling enable
```

### 24.1.4 Validation

The following example shows how to display the information of sflow:

```
TAP# show sflow
sFlow Version: 4
sFlow Global Information:
 Agent IPv4 address            : 3.3.3.1
 Counter Sampling Interval     : 20 seconds
 Collector 1:
  IPv4 Address: 3.3.3.2
  Port: 6343

sFlow Port Information:
                                 Flow-Sample   Flow-Sample
 Port        Counter   Flow      Direction     Rate
 --------------------------------------------------------
 XGe0-1      enable    enable    Input         32768
```

### 24.1.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
sflow enable
sflow agent ip 3.3.3.1
sflow counter interval 20
!
sflow collector mgmt-if 3.3.3.2
!
interface eth-0-1
 speed 1000
 duplex full
 sflow counter-sampling enable
 sflow flow-sampling enable input
!
```

# 25 RPC API Configuration

RPC API service allows users to configure and monitor the switch system through Remote Procedure Calls (RPC) from your program.

RPC API service uses JSON over HTTP protocol to communicate the switch from your program. Users may issue switch CLI commands through the RPC method. By default, the CLI mode is in EXEC mode.

Users could send RPC requests via an HTTP POST request to URL: http://switch_management_ip_address:switch_tcp_port_number/api/cmd_api/ .

The detailed RPC request and response are shown below by JSON format.

RPC server and HTTP server listen to the same port by default. The HTTP server should be disabled first when we use the same port.

## 25.1.1 Configuration

## 25.1.2 RPC API Service configuration

RPC API service via http(tcp port 80) is disabled by default. The following example shows how to enable it:

```
TAP# configure terminal
TAP(config)# service rpc-api enable
TAP(config)# exit
```

RPC API service via https (tcp port 443) is enabled by default. The following example shows how to enable it:

```
Switch# configure terminal
Switch(config)# service rpc-api enable ssl
Switch(config)# exit
```

The following example shows how to disable RPC API:

```
Switch# configure terminal
Switch(config)# service rpc-api disable
Switch(config)# exit
```

# 25.2 JSON-RPC Request

## 25.2.1 Request

```
{
    "params":
        {
            "format":"json",
            "version":1,
            "cmds":["show services"]
        }
}
```

## 25.2.2 Response

```
0:
cmd: 'show version'
sequence: 0
sourceDetails: #cli output result
error: False
err_code: 0
err_reason:
1:
cmd: 'config terminal'
sequence: 1
sourceDetails: #cli output result
error: False
err_code: 0
err_reason:
2:
cmd: 'vlan 2'
sequence: 2
sourceDetails: #cli output result
error: False
err_code: 0
err_reason:
3:
cmd: 'end'
sequence: 3
sourceDetails: #cli output result
error: False
err_code: 0
err_reason:
4:
cmd: 'show running-config'
sequence: 4
sourceDetails: #cli output result
error: False
err_code: 0
err_reason:
```

## 25.2.3 RPC Error Code

| Error code | Description |
|---|---|
| RPC_ERROR_CLI_TIMEOUT = -1000 | RPC TIMEOUT, Don't load too much CLI to the system in one message. |
| RPC_ERROR_CLI_FAIL = -1001 | CLI Fail, User should Note the source Details information for detail |

| | |
|---|---|
| RPC_ERROR_CLI_AUTH_FAIL = -1002 | Username or password error |
| RPC_ERROR_CLI_AUTH_LOW = -1003 | User privilege is to low |
| RPC_ERROR_CLI_NOT_SUPPORT = -1004 | Unsupported CLI by RPC |
| RPC_ERROR_CHAR_NOT_SUPPORT = -1005 | RPC message format or version can't be supported. |
| RPC_ERROR_STRING_NOT_SUPPORT = -1006 | Unsupported string by RPC,<br>e.g. "service rpc-api disable","ssh","telnet","source","ovs-ofctl snoop","start sh","reboot","reload","format" |
| RPC_ERROR_MESSAGE_NOT_SUPPORT = -1007 | RPC packet format error or version error |

## 25.2.4 Validation

The following example shows how to display the information of system service:

```
DUT1# show services
Networking services configuration:
Service Name Status Port Protocol
----------------+-------------+----------+----------
dhcp                disable         67/68        UDP
http                disable         80            TCP
https               disable         443           TCP
rpc-api             enable          80            TCP
telnet              enable          23            TCP
ssh                  enable          22             TCP
snmp                 disable        161           UDP
```

The following example shows how to display the information of rpc-api service:

```
TAP # show services rpc-api
RPC-API service configuration:
 Server State        : enable
 Port                  : 80
 Authentication Mode : none
 SSL State              : disable
 Message Execute       : 0
 Message Deny          : 0
```

## 25.2.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
service rpc-api enable
!
```

# 26 Packet header add Configuration

## 26.1 Configuring add the L2-GRE header

### 26.1.1 Networking requirements

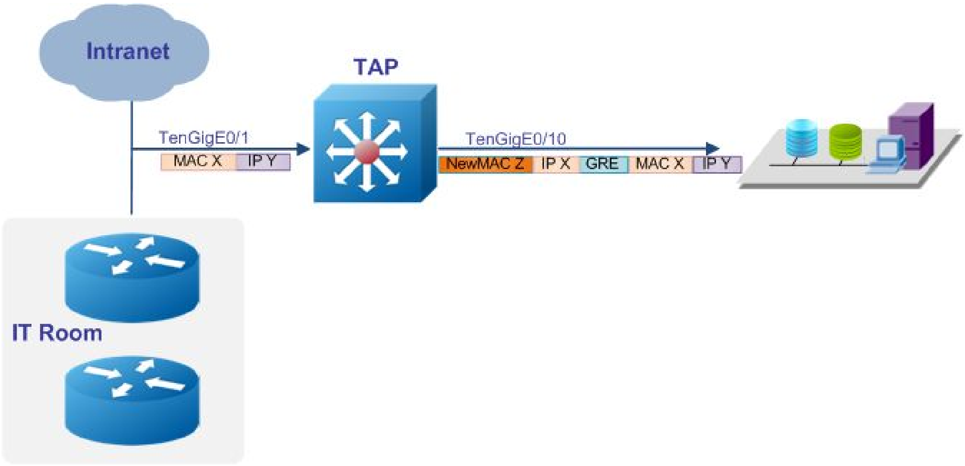


**Figure 26-1** Topology of add L2-GRE header

### 26.1.2 Configuration Ideas

In some cases, server sites are not in local places,so traffic with remote sites via L2-GRE. And hold original frame, client need that device have function adding L2-gre packet Header

### 26.1.3 Configuration

The following example shows how to create a flow rule the match the packets and add L2-GRE header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip any dst-ip 1.1.0.1 0.0.0.0 add-l2gre
l2gre-sip 10.0.0.1 l2gre-dip 10.2.1.1 l2gre-dmac a.a.a l2gre-key 1
l2gre-key-length 24
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

**NOTE**

The gre-key-length can config 16,20,24,32 about add-L2-GRE . gre-key-length 16 have gre-key range 1-65535,gre-key-length 20 have gre-key range 1-1048575,gre-key-length 24 have gre-key range 1-16777215,gre-key-length 32 have gre-key range 1-4294967295.

### 26.1.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
```

### 26.1.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit any src-ip any dst-ip host 1.1.0.1 add-l2gre l2gre-sip
10.0.0.1 l2gre-dip 10.2.1.1 l2gre-dmac 000a.000a.000a l2gre-key 1
l2gre-key-length 24!
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

# 26.2 Configuring add the L3-GRE header

## 26.2.1 Networking requirements

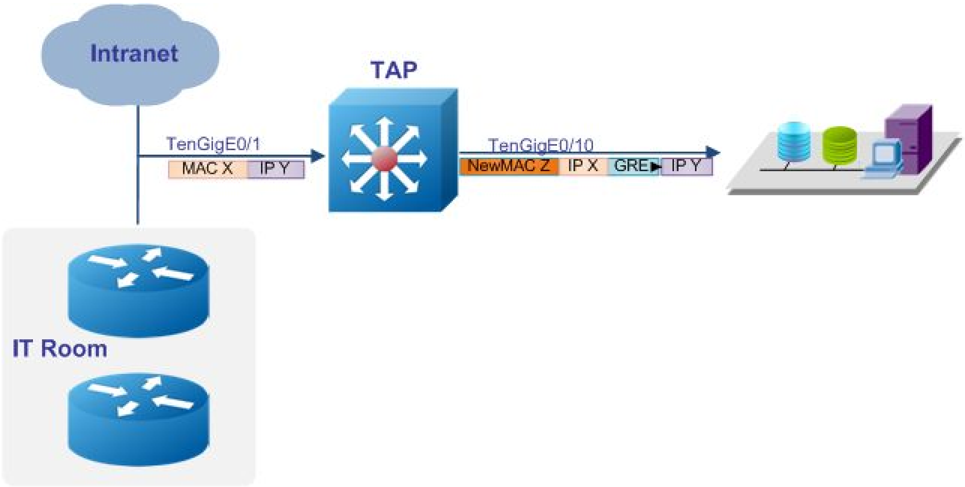


**Figure 26-1** Topology of add L3-GRE header

## 26.2.2 Configuration Ideas

In some cases, server site don not in local place,so traffic with remote sites via L3-GRE.client need that device have function adding L3-gre packet Header

## 26.2.3 Configuration

The following example shows how to create a flow rule the match the packets and add L3-GRE header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip host 1.1.0.2 dst-ip any add-l3gre
l3gre-sip 3.3.3.3 l3gre-dip 4.4.4.3 l3gre-dmac b.b.b
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

## 26.2.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group
```

```
TAP-group tap1
ID: 1
  Ingress:
        eth-0-1            flow flow1
  egress:
        eth-0-10
```

## 26.2.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10permit any src-ip host 1.1.0.2 dst-ip any add-l3gre l3gre-sip
3.3.3.3 l3gre-dip 4.4.4.3 l3gre-dmac b.b.b
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

# 26.3 Configuring add the VXLAN header

## 26.3.1 Networking requirements

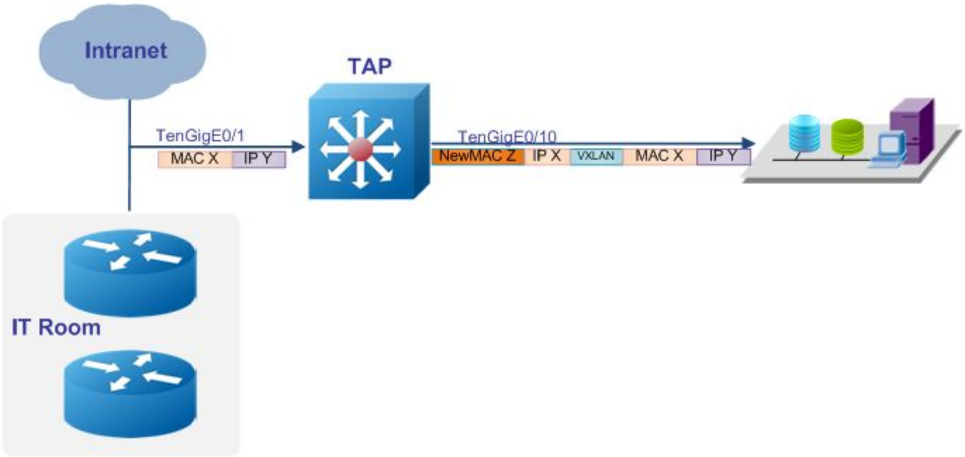


**Figure 26-1** Topology of add VXLAN header

## 26.3.2 Configuration Ideas

In some cases, server site does not in local place,so traffic with remote sites via VXLAN.client need that device have function adding VXLAN packet Header

## 26.3.3 Configuration

The following example shows how to create a flow rule the match the packets and add VXLAN header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip host 1.1.0.2 dst-ip any add-vxlan
vxlan-sip 1.1.1.1 vxlan-dip 2.2.2.2 vxlan-dmac a.a.a vxlan-set-vni 100
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

## 26.3.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
```

## 26.3.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit any src-ip host 1.1.0.2 dst-ip any add-vxlan vxlan-sip
1.1.1.1 vxlan-dip 2.2.2.2 vxlan-dmac a.a.a vxlan-set-vni 100
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

# 26.4 Configuring add the ERSPAN header

## 26.4.1 Networking requirements

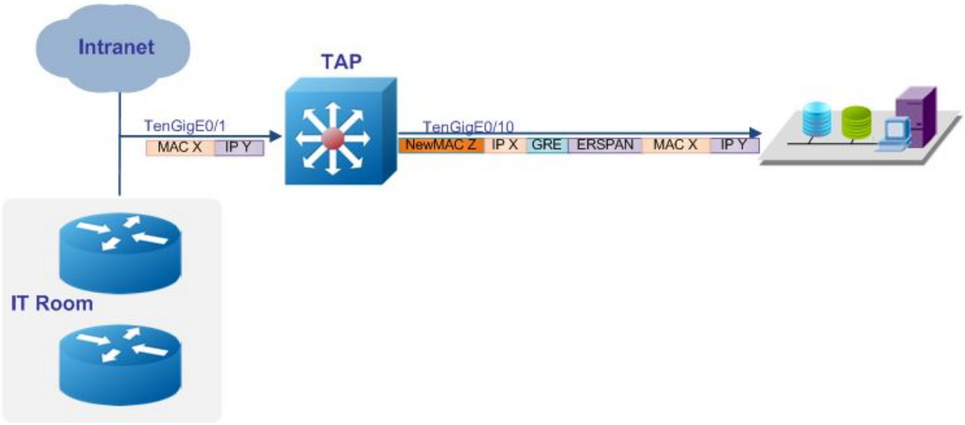


**Figure 26-1** Topology of add erspan header

## 26.4.2 Configuration Ideas

In some cases, the server site is not in a local place,so traffic with remote sites via erspan.client needs that device to have a function adding an erspan packet Header. There are two types of erspan, type1 and type2.

## 26.4.3 Configuration

The following example shows how to create a flow rule the match the packets and add erspan type1 header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip host 1.1.0.2 dst-ip any add-erspan
erspan-type1 erspan-sip 1.1.1.1 erspan-dip 2.2.2.2 erspan-dmac a.a.a
TAP(config-flow-flow1)# exit
```

The following example shows how to create a flow rule the match the packets and add erspan type2 header:

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit any src-ip host 1.1.0.3 dst-ip any add-erspan
erspan-type2 erspan-sip 1.1.1.1 erspan-dip 2.2.2.2 erspan-dmac a.a.a
erspan-spanid 100
TAP(config-flow-flow1)# exit
```

The following example shows how to create a TAP group with ingress port eth-0-1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress eth-0-1 flow flow1
TAP(config-tap-tap1)# egress eth-0-10
TAP(config-tap-tap1)# end
```

### 26.4.4 Validation

The following example shows how to display the information of the TAP group:

```
TAP# show tap-group

TAP-group tap1
ID: 1
  Ingress:
        eth-0-1           flow flow1
  egress:
        eth-0-10
```

### 26.4.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
sequence-num 10 permit any src-ip host 1.1.0.2 dst-ip any add-erspan
erspan-type1 erspan-sip 1.1.1.1 erspan-dip 2.2.2.2 erspan-dmac a.a.a
sequence-num 20 permit any src-ip host 1.1.0.3 dst-ip any add-erspan
erspan-type2 erspan-sip 1.1.1.1 erspan-dip 2.2.2.2 erspan-dmac 000a.000a.000a
erspan-spanid 100
!
tap-group tap1 1
 ingress eth-0-1 flow flow1
egress eth-0-10
```

# 27 Port-group Configuration

## 27.1 Configuring add the port-group

### 27.1.1 Networking requirements

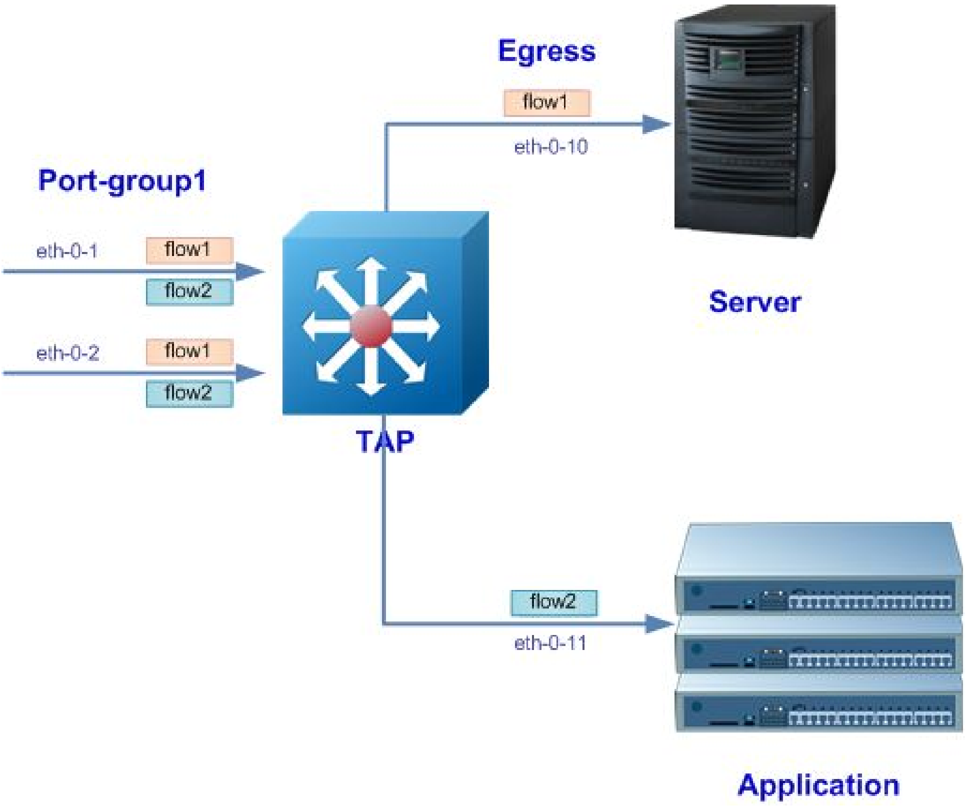


**Figure 27-1** Topology of Port-group

### 27.1.2 Configuration Ideas

In some cases, multiple ports join in a port-group to use an ACL flow resource together.

### 27.1.3 Configuration

The following example shows how to create a flow rule the match the packets :

```
TAP(config)# flow flow1
TAP(config-flow-flow1)# permit mpls any
TAP(config-flow-flow1)# permit gre src-ip any dst-ip any
TAP(config-flow-flow1)# exit
```

The following example shows how to create a port-group and add member interfaces :

```
TAP(config)# port-group portgroup1
TAP(config-port-portgroup1)# member interface eth-0-1
TAP(config-port-portgroup1)# member interface eth-0-2
TAP(config-port-portgroup1)# exit
```

The following example shows how to create a TAP group with ingress portgroup1 and flow1:

```
TAP(config)# tap-group tap1
TAP(config-tap-tap1)# ingress portgroup1 flow flow1
TAP(config-tap-tap1)# egress eth-0-9
TAP(config-tap-tap1)# end
```

The following example shows how to show port-group flow statistics:

```
TAP# show port-group flow statistics portgroup1
TAP group name: tap1
 flow name: flow1
 sequence-num 10 permit mpls any ( bytes 0 packets 0 )
 sequence-num 20 permit gre src-ip any dst-ip any ( bytes 0 packets 0 )
(total bytes 0 total packets 0 )
```

### 27.1.4 Validation

The following example shows how to display the information of the flow:

```
TAP# show flow
flow flow1
 sequence-num 10 permit mpls any
 sequence-num 20 permit gre src-ip any dst-ip any
```

The following example shows how to display the information of the port-group:

```
TAP# show port-group
port-group portgroup1 1
 member interface eth-0-1
 member interface eth-0-2
```

The following example shows how to display the information of the tap-group:

```
TAP# show tap-group
truncation           : 144
timestamp-over-ether : 0000.0000.0000 0000.0000.0000 0x0000

TAP-group tap1
 ID: 1
 Ingress:
        portgroup1       flow flow1
 Egress:
        eth-0-9
```

### 27.1.5 Configuration file

User can display the configuration files as below:

```
TAP# show running-config
!
flow flow1
 sequence-num 10 permit mpls any
 sequence-num 20 permit gre src-ip any dst-ip any
exit
!
tap-group tap1 1
 ingress portgroup1 flow flow1
 egress eth-0-9
!
port-group portgroup1 1
 member interface eth-0-1
 member interface eth-0-2
!
```

# 28 Configuring IPFIX

## 28.1 Overview

### 28.1.1 Function Introduction

Traffic on a data network can be seen as consisting of flows passing through network elements. For administrative or other purposes, it is often interesting, useful, or even necessary to have access to information about these flows that pass through the network elements. This requires uniformity in the method of representing the flow information and the means of communicating the flows from the network elements to the collection point. This is what IPFIX can do.

Before IPFIX was introduced, there was a Cisco private method NetFlow. IPFIX is similar to NetFlow and is based on NetFlow version 9.

### 28.1.2 Principle Description

N/A

## 28.2 Configuration

### 1 step 1 Enter the configure mode

```
Switch# configure terminal
```

### 2 step 2 Set ipfix enable globally

```
Switch(config)# ipfix enable
```

### 3 step 3 Set the aging time(optional)

Set the aging time as 300 seconds. The aging time is 1800 seconds by default.

```
Switch(config)# ipfix global
Switch(Config-ipfix-global)# flow aging 300
Switch(Config-ipfix-global)# exit
```

## 4 step 4 Configuring recorder

```
Switch(config)# ipfix recorder recorder1
Switch(Config-ipfix-reocrder)# match mac source address
Switch(Config-ipfix-reocrder)# match ipv4 source address mask 32
Switch(Config-ipfix-reocrder)# match ipv4 destination address mask 32
Switch(Config-ipfix-reocrder)# match vxlan-vni
Switch(Config-ipfix-reocrder)# collect counter bytes
Switch(Config-ipfix-reocrder)# collect counter packets
Switch(Config-ipfix-reocrder)# exit
```

## 5 step 5 Configuring sampler

```
Switch(config)# ipfix sampler sampler1
Switch(Config-ipfix-sampler)# 1 out-of 100
Switch(Config-ipfix-sampler)# exit
```

## 6 step 6 Configuring exporter

```
Switch(config)# ipfix exporter exporter1
Switch(Config-ipfix-exporter)# destination mgm-if ipv4 9.0.0.1
Switch(Config-ipfix-exporter)# flow data timeout 200
Switch(Config-ipfix-exporter)# event flow end timeout
Switch(Config-ipfix-exporter)# flow data flush threshold count 20
Switch(Config-ipfix-exporter)# exit
```

## 7 step 7 Configuring monitor

```
Switch(config)# ipfix monitor monitor1
Switch(Config-ipfix-monitor)# recorder recorder1
Switch(Config-ipfix-monitor)# exporter exporter1
Switch(Config-ipfix-monitor)# exit
```

## 8 step 8 Enter the interface configure mode and apply ipfix

```
Switch(config)# interface eth-0-1
Switch(config-if)# ipfix monitor input monitor1 sampler sampler1
Switch(config-if)# no shutdown
Switch(config-if)# exit
```

## 9 step 9 Exit the configure mode

```
Switch(config)# end
```

## 10 step 10 Send 100 ip packets to eth-0-1

## 11 step 11 Validation

Use the following commands to validate the configuration:

```
Switch# show ipfix global
IPFIX global information:
     Current flow cache number                  : 1(ingress: 1, egress: 0)
     Flow cache aging interval                  : 300 seconds
     Flow cache export interval                 : 5 seconds

Switch# show ipfix recorder recorder1
IPFIX recorder information:
    Name           : recorder1
    Description    :
    Match info     :
        match Source Mac Address
        match IPv4 Source Address
        match IPv4 Destination Address
        match Vxlanvni
    Collect info    :
        collect Flow Byte Number
        collect Flow Packet Number

Switch# show ipfix exporter exporter1
IPFIX exporter information:
    Name                             : exporter1
    Description                      :
    Domain ID                        : 0
    Collector Name                   : 9.0.0.1
    IPFIX message protocol           : UDP
    IPFIX message destination Port   : 2055
    IPFIX message TTL value          : 255
    IPFIX message DSCP value         : 63
    IPFIX data interval              : 200
    IPFIX template interval          : 1800
    IPFIX exporter events            :
        Flow aging event

Switch# show ipfix sampler sampler1
IPFIX sampler information:
    Name                             : sampler1
    Description                      :
    Rate                             : 100
    Sample mode                      : determinate
    Flow mode                        : all

Switch# show ipfix monitor monitor1
IPFIX monitor information:
    Name                             : monitor1
    Description                      :
    Recorder                         : recorder1
    exporter                         : exporter1

Switch# show ipfix cache observe-point interface eth-0-1 input
  Cache dir              : input
  Cache flow profile     : 0
  Cache key profile      : 0
  Cache key info    :
      Source mac          : 0000.0002.0001
      ipsa                : 10.10.10.3/32
      ipda                : 10.10.10.1/32
  Cache collect info:
      Byte number of ingress                  : 64
      Packet number of ingress                : 1
```

## 28.3 Application cases

N/A

# 29 Tips

- To fulfill the keyword of any command line in any command mode, use TAB on the keyboard. It is unnecessary to type every letter of the keywords.
- To get the help information of the command line, use the “?” symbol.
- To quit to the up level of the command mode, use “quit” or “exit”. To return to Privileged EXEC mode, use “end”.
- To save the current configuration, use “write memory”. Users should use the “write memory” command on time in order to prevent loss of configuration after device reboot.
- To get more description of the command line, please refer to the CLI guide.
- To get detailed information about the feature, please reference to the User guide.
- The “no” form of the command line is usually used to delete the configuration or restore the default value. E.g.: configuration “speed 1000”should be removed by “no speed”.

For questions, please contact Garland Technology Support at:
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