30-Port
Layer 3 Industrial Ethernet Switch
CLI User Manual

Version 01

Issue Date: 10/22/2020

Preface

Switch CLI user manual has introduced:

- CLI configuration interface login
- CLI configuration rule and method
- Network management functions related CLI introduction

Readers

This manual mainly suits for engineers as follows:

- Network administrator responsible for network configuration and maintenance
- On-site technical support and maintenance staff
- Network Engineer

Text Format Convention

Format	Description
“”	Words with “” represent the interface words. e.g.: "The port number".
>	Multi-level paths are separated by ">". Such as opening the local connection path description: Open "Control Panel> Network Connection> Local Area Connection".
Light Blue Font	It represents the words clicked to achieve hyperlink. The font color is as follows: ‘Light Blue’.
About this chapter	The section ‘about this chapter’ provides links to various sections of this chapter, as well as links to the Principles Operations Section of this chapter.

Icon Convention

Format	Description
 Notice	Remind the announcements in the operation, improper operation may result in data loss or equipment damage.
 Warning	Pay attention to the notes on the mark, improper operation may cause personal injury.

Format	Description
 Notes	Make a necessary supplementary instruction for operation description.
 Key	Configuration, operation, or tips for device usage.
 Tips	Pay attention to the operation or information to ensure success device configuration or normal working.

Port Convention

The port number in this manual is only an example, and does not represent the actual port with this number on the device. In actual use, the port number existing on the device shall prevail.

Revision Record

Version NO.	Revision Date	Revision Description
01	10/22/2020	Product release

Content

1 Login the Switch Configuration

1.1 Login the Switch Function Overview

There are two ways for users to manage devices: CLI and WEB.

- CLI
  After logging into the device through the Console port, Telnet, or SSH, use the command line provided by the device to manage and configure the device. This approach requires configuring the user interface for the corresponding login mode.
- WEB
  When the device acts as a server, users can log in to the device through the WEB administration. The device provides a graphical interface with the built-in WEB server to facilitate users to manage and maintain the device intuitively and conveniently. This method can only realize the management and maintenance part of functions of the device. If more complex or fine management of the device is needed, the CLI method is still needed.

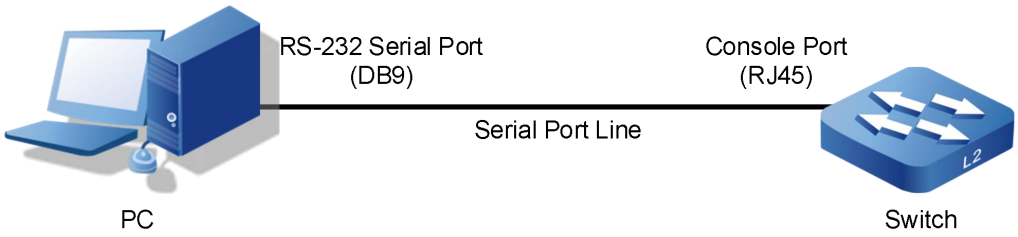
1.2 Login the Switch

1.2.1 Login the Switch via Serial Port

Logging in through the Console port is the basic way to log in a device, and is the basis for configuring a device logged in through other means. By default, users can log into the device directly through the serial port, and the switch baud rate is 115200bit/s. The PC can log into the command line interface of the device by connecting to its Console port.

Operation Steps

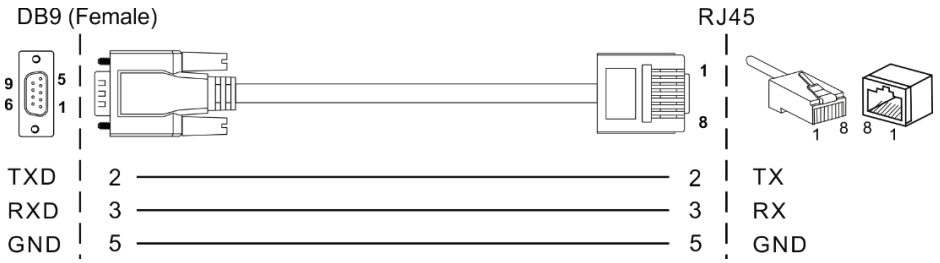
Step 1 Connect the serial port of the computer to the Console port of the device through the serial port line to establish a local configuration environment, as shown in the topology diagram below.



1. Connect DB9 at one end of serial port line to RS-232 serial port of PC.
2. Connect the RJ45 on the other end of the serial line to the Console port of the device.

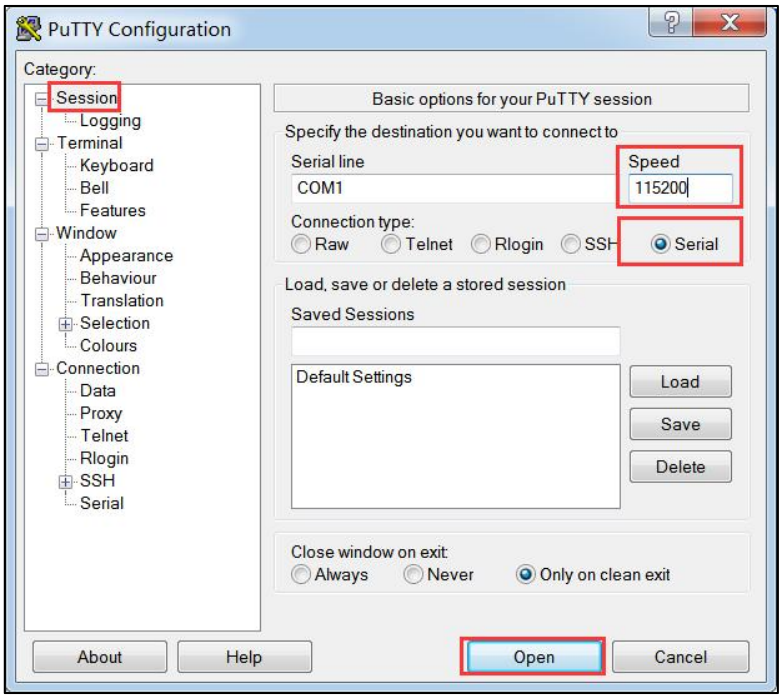
Notes:

Diagram of internal connection line of serial port line/communication cable is shown below.



Step 2 Open the terminal simulation software on the PC, create a new connection, and set the interface and communication parameters of the connection. (Using PuTTY as an example here.)

1. Open PuTTY and click “Session” on the menu bar.
2. In the "Basic options for your PuTTY session" input box on the right, do the following:
   - Select "Connection type" to "Serial".
   - Enter "115200" in the "Speed" text box;
   - Click “Open”.



3. The "COM1-PutTTY" command line edit dialog box pops up. Press enter key to enter user name and password. The user name and password are both “admin123” by default, as shown below.

Step 3 End.

1.2.2 Login the Switch via Telnet

Log into the switch by Telnet, and the device acts as Telnet-Server By default, the Telnet-Server function is enabled. Therefore, before using Telnet to log into the switch, it is necessary to configure the IP of the switch through serial port to ensure the normal communication between PC and DUT.

Telnet-Server Configuration

Operation	Command	Remark
Enter Configure Mode	`configure terminal`	-
Enable Telnet Server	`telnet-server enable`	Optional

Disable Telnet Server	`no telnet-server enable`	Optional

Notes

DUT acts as a Telnet server, if the logged client does not do any operation for a long time, it will automatically disconnect, i.e. timeout exit, and the function is enabled by default with 30m.

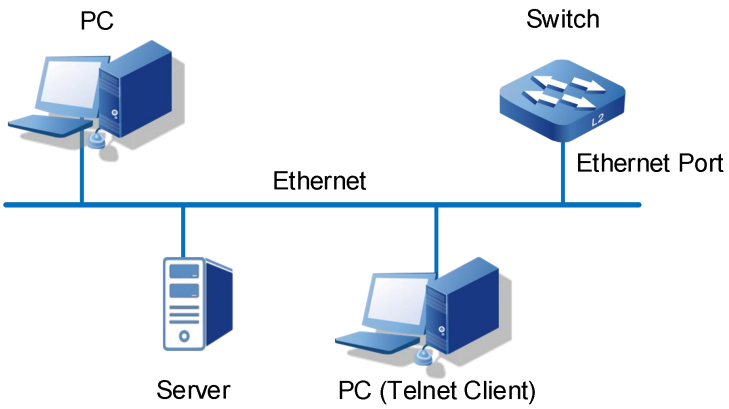
Through Telnet client login to the command line interface of the device, the client and the device should meet the following requires:

1. Configure the IP address of the switch correctly.
2. If the Telnet client and the device are in the same LAN, the IP address of the device and the client must be configured in the same network segment. Otherwise, the route between Telnet client and device must be accessible.

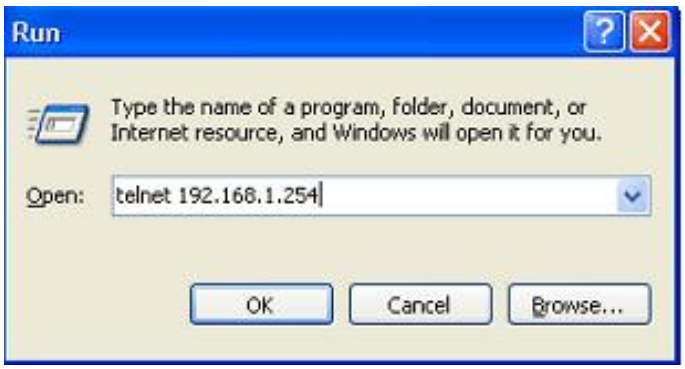
User can log in to the switch device through the Telnet client and configure the device if the two requires above are met.

Operation Steps

Step 1 As shown in the figure below, set up the configuration environment to connect the Ethernet port of the computer to the Ethernet port of the device through the LAN.



1. Run the Telnet client on the computer and input the administrative IP address of the Ethernet port connected the computer to the switch, as shown in the figure below.
2. Press "Win+R" to pop up the running window;
3. Enter “Telnet+ space + device IP address” in the “Open (O)” input box.
4. Click "OK” button.



Notes:

- Using the command line prompt interface of Win7/Win8/Win10 and other operating systems to configure the device needs to enable Telnet client in advance, user can check and enable Telnet client in the Windows function window under the path of "Control Panel > Program and Function > Enable or Disable Windows function", if Telnet client has been enabled, user can ignore this instruction.
- If the computer operating system does not support Telnet clients, a third party software PuTTY can be used as a Telnet client.
- The default IP address of the device is “192.168.1.254”.

Step 2 The "Telnet" dialog box pops up and user can enter user name and password according to the hint. The default user name and password of the device is “admin123”. Shown as below figure.

Step 3 End.

1.2.3 Login the Switch via SSH

The switch can be used as an SSH server, but can not used as an SSH client.

By default, the SSH server function of the device is disabled. When SSH is used to log in to the device, first of all, user needs to log in to the device through the Console port to enable the SSH server function and configure other properties correspondingly, to ensure normal login to the device through SSH.

SSH Configuration

Operation	Command	Remark
Enter Configure Mode	configure terminal	-

Operation	Command	Remark
Enable SSH server	ssh-server enable	Optional
Disable SSH server	no ssh-server enable	Optional

Notes

If SSH login to DUT is needed, the simplest operations are:

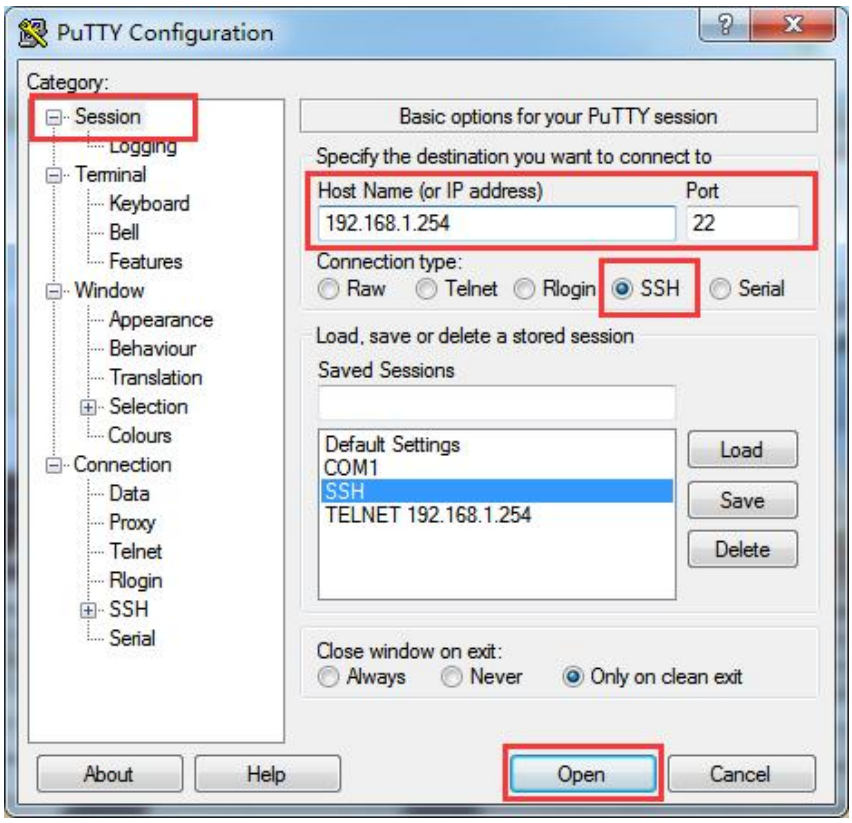
- Enable SSH;
- Configure SSH users, that is device users;
- Login the device

Operation Steps

Step 1 Using the Console port, enable SSH service using the "ssh-server enable" command.

```
switch> enable
switch# configure terminal
switch(config)# ssh-server enable
```

Step 2 Run the third-party PuTTY software on the PC host as an SSH client to establish a secure connection with the device, and fill in the following parameters:



1. Click “Session” in the “Category” column.

2. Select "SSH" in "Connection type";
3. Enter the IP address "192.168.1.254" of the device in the "Host Name (or IP address)" text box.
4. The default port number is 22.
5. (Optional) enter the session name in the "Saved Sessions", such as SSH; click "Save" to save the session;
6. Click ”Open” button to enter SHH configuration interface;
7. Enter the user account name of this device in the SSH client, such as the default user name and password is "admin123";

Notes:

With SSH enabled, all users on the device support SSH encrypted login.

8. SSH access to device succeed.

Step 3 End.

1.2.4 Login the Switch via WEB:

User can log into the switch through the WEB.

By default, the switch acts as an HTTP server function is enabled. Before logging into the WEB, user needs to ensure that the client has a browser and corresponding IP address to ensure normal communication between the client and the HTTP server.

WEB Log in Configuration

Operation	Command	Remark
Enter global mode	**configure terminal**	Required
Enable HTTP server	**http-server enable**	Optional
Disable HTTP server	**no http-server enable**	Optional

Configuration Environment Requirements

Client requirements: IE browser 8.0 above, some versions of 360 browser may have problems, other browsers have not found any problem at present.

Login WEB Management Platform

The user enter http://X.X.X.X directly in the browser (default switch management IP is 192.168.1.254), press Enter key to enter the switch login interface, enter user name

and password and click login to enter the main interface. The default user name and password of the device is “admin123”.

1.2.5 Manage the switch via Network Management Software

The switch supports login management via network management software. By default, SNMP function is enabled, and can use the default community name. This only shows that the switch can be managed by SNMP. Please refer to the SNMP user manual for more detailed configuration.

SNMP login configuration

Operation	Command	Remark
Enter global mode	**configure terminal**	Required
Enable SNMP server	**snmp-server**	Required
Disable SNMP server	**no snmp-server**	Optional

1.3 Command Line

1.3.1 Command Analysis

Command consists of two parts: command word and command parameter.
Commands are all lowercase, input is case-insensitive; command words come in many forms, including: capital letters, (), <>, *, etc.
For example: IP address A.B.C.D/M (secondary|), IP and address are command words, and A.B.C.D/M and (secondary|) are command parameters.

1.3.2 Command Line Mode

Here are four major command-line patterns:

- Exec Mode: also called "View Mode" , the basic mode of entering CLI. The prompt is ">", and user can only execute some simple commands, such as: show, enable, logout, etc. Login with priority of 0 (visiting user) is the Exec Mode. Other users log in in Privileged Exec Mode, and only the console login can upgrade the permissions through "enable". telnet, ssh and other login methods need to be configured with enable password to upgrade the permissions.

- Privileged Exec Mode: also known as "Enable Mode" with the prompt of "#", in Exec Mode, entered by executing enable command, or switched from other modes. Basic commands such as: debug, show, reboot, copy can be executed.
- Configure Mode: also known as "Configure Terminal", the prompt is "(config)#". User can execute the configure terminal to enter this mode in Privileged Exec mode, or switch to this mode from another mode, and all Configure Mode commands can be executed.
- Interface Mode: prompt is "(config-IFNAME)#". User can enter "Interface IFNAME" in ConfigurE Mode or switch to this Mode from another mode. Configuration command for the specified Interface can be executed.

1.3.3 Shortcut Key

Only the commonly used command parameters are covered here.

Shortcut Key	Description
?	Help command, enter"?" Command help is displayed.
Tab	Command completion, "Tab" can prompt or complete the remaining characters to be input when typing part of the command word.
Ctrl+D	To exit the current mode, can exit to the upper level mode in any mode, such as Interface Mode to Configure Mode.
Ctrl+C	End up command input or execution. Or directly return to "Enable Mode".
Ctrl+W	Delete an input command word or delete an input command parameter.
Ctrl+U	Deletes all characters from the current input command line.

Instance

"?" Help command. When using the command line, type“? ”command help is displayed. Cases are as follows:

1. Type only "? "in a configuration mode, a list of all commands in the current mode is displayed.

```
Switch#?
Exec commands:
  clear      Reset functions
  clock      Config clock time
  configure   Enter configuration mode
  copy      Copy file
```

```
  debug       Debugging functions (see also 'undebug')
  disable     Turn off privileged mode command
  enable      Turn on privileged mode command
  erase       erase file
  exit        End current mode and down to previous mode
  faults      Fault management command
  help        Description of the interactive help system
  logout      Exit from the EXEC
  loopback    config l2 interface loopback
  mstat       Show statistics after multiple multicast traceroutes
  mtrace      Trace multicast path from source to destination
  no          Negate a command or set its defaults
  ping        Send echo messages
  quit        Exit current mode and down to previous mode
  reboot      Halt and perform a cold restart
  rm          erase file
  show        Show running system information
  telnet      Open a telnet connection
  terminal    Set terminal line parameters
  traceroute  Trace route to destination
  undebug     Disable debugging functions (see also 'debug')
  write       Write running configuration to memory, file or
terminal
```

2. All commands matching the current command word are displayed when partial command words are entered.

```
Switch#c?
  clear      Reset functions
  clock      Config clock time
  configure  Enter configuration mode
  copy       Copy file
```

1.4 Common Command

1.4.1 Password Verification

The configuration process for enabling password verification:

```
Switch>enable
Switch#configure terminal
Switch(config)#username admin password admin
Switch(config)#line vty 0
Switch(config-line 0)#login local
```

Disable password verification:

```
Switch(config-line_0)#no login local
```

1.4.2 Customization display

Currently, there are four ways: exclude, include, grep and redirect:

- Exclude: only shows rows that do not contain the current string;
- Include: only displays the line that contains the current string;
- Grep: displays only the rows that conform to the current rule;
- Redirect: Redirect input to a system file.

Instance 1: show interface brief all

```
Switch#show interface brief all
Interface       IP-Address      Link    Protocol
lo              127.0.0.1       up      up
vlanif1         192.168.1.254   up      up

Interface       Link    Speed   Duplex  Type    PVID Description
ge1             down    auto    auto    access  1
ge2             down    auto    auto    access  1
ge3             down    auto    auto    access  1
ge4             down    auto    auto    access  1
ge5             down    auto    auto    access  1
ge6             down    auto    auto    access  1
ge7             down    auto    auto    access  1
ge8             down    auto    auto    access  1
ge9             down    auto    auto    access  1
ge10            down    auto    auto    access  1
ge11            down    auto    auto    access  1
ge12            down    auto    auto    access  1
ge13            down    auto    auto    access  1
ge14            down    auto    auto    access  1
ge15            down    auto    auto    access  1
ge16            down    auto    auto    access  1
ge17            down    auto    auto    access  1
ge18            down    auto    auto    access  1
ge19            down    auto    auto    access  1
ge20            down    auto    auto    access  1
ge21            down    auto    auto    access  1
ge22            up      100m(a) full(a) access  1
ge23            down    auto    auto    access  1
```

```
ge24            down     auto    auto    access  1
xe1             down     10g(a)  full(a) access  1
xe2             down     10g(a)  full(a) access  1
xe3             down     10g(a)  full(a) access  1
xe4             down     10g(a)  full(a) access  1
```

Instance 2: show interface brief all | exclude ge Does not show interfaces containing ge

```
Switch#show interface brief all | exclude ge
Interface       IP-Address      Link    Protocol
lo              127.0.0.1       up      up
vlanif1         192.168.1.254   up      up

Interface       Link    Speed   Duplex  Type    PVID Description
xe1             down    10g(a)  full(a) access  1
xe2             down    10g(a)  full(a) access  1
xe3             down    10g(a)  full(a) access  1
xe4             down    10g(a)  full(a) access  1
```

Instance 3: show interface brief all | include ge Only show interfaces containing ge

```
Switch#show interface brief all | include ge
ge1             down     auto    auto    access  1
ge2             down     auto    auto    access  1
ge3             down     auto    auto    access  1
ge4             down     auto    auto    access  1
ge5             down     auto    auto    access  1
ge6             down     auto    auto    access  1
ge7             down     auto    auto    access  1
ge8             down     auto    auto    access  1
ge9             down     auto    auto    access  1
ge10            down     auto    auto    access  1
ge11            down     auto    auto    access  1
ge12            down     auto    auto    access  1
ge13            down     auto    auto    access  1
ge14            down     auto    auto    access  1
ge15            down     auto    auto    access  1
ge16            down     auto    auto    access  1
ge17            down     auto    auto    access  1
ge18            down     auto    auto    access  1
ge19            down     auto    auto    access  1
ge20            down     auto    auto    access  1
ge21            down     auto    auto    access  1
ge22            up       100m(a) full(a) access  1
ge23            down     auto    auto    access  1
ge24            down     auto    auto    access  1
```

Instance 4: show interface brief all | grep ge*1 Show interfaces containing ge*1

```
Switch#show interface brief all | grep ge*1
ge1             down    auto    auto    access  1
ge10            down    auto    auto    access  1
ge11            down    auto    auto    access  1
ge12            down    auto    auto    access  1
ge13            down    auto    auto    access  1
ge14            down    auto    auto    access  1
ge15            down    auto    auto    access  1
ge16            down    auto    auto    access  1
ge17            down    auto    auto    access  1
ge18            down    auto    auto    access  1
ge19            down    auto    auto    access  1
```

Instance 5: show interface brief all | grep down Only show down interfaces

```
Switch#show interface brief all | grep down
ge1             down    auto    auto    access  1
ge2             down    auto    auto    access  1
ge3             down    auto    auto    access  1
ge4             down    auto    auto    access  1
ge5             down    auto    auto    access  1
ge6             down    auto    auto    access  1
ge7             down    auto    auto    access  1
ge8             down    auto    auto    access  1
ge9             down    auto    auto    access  1
ge10            down    auto    auto    access  1
ge11            down    auto    auto    access  1
ge12            down    auto    auto    access  1
ge13            down    auto    auto    access  1
ge14            down    auto    auto    access  1
ge15            down    auto    auto    access  1
ge16            down    auto    auto    access  1
ge17            down    auto    auto    access  1
ge18            down    auto    auto    access  1
ge19            down    auto    auto    access  1
ge20            down    auto    auto    access  1
ge21            down    auto    auto    access  1
ge23            down    auto    auto    access  1
ge24            down    auto    auto    access  1
xe1             down    10g(a)  full(a) access  1
xe2             down    10g(a)  full(a) access  1
xe3             down    10g(a)  full(a) access  1
xe4             down    10g(a)  full(a) access  1
```

1.4.3 Configuration Management

Command	Description
Switch#**show running-config**	Displays the configuration of the current system running
Switch#**show startup-config**	Displays the configuration of the system startup profile
Switch#**write**	Save command
Switch#**erase startup-config**	Restore factory settings
Switch#**copy tftp startup-config** 192.168.1.168 **Switch.conf**	Upload configuration file to switch
Switch#**copy flash startup-config** 192.168.1.168 **Switch.conf**	Download Configuration file from switch

Notes

If the configuration of the current system is inconsistent with the configuration of the system startup configuration file:

- After entering Configure Mode, the prompt is "*Switch";
- Performing a system reboot will prompt whether need to save a disk.

1.4.4 System Upgrade

Suppose the upgrade package is "packetapp.bin", the IP address of the TFTP server is "192.168.1.168", and the command to upgrade the switch system is:

```
Switch#copy tftp package 192.168.1.168 packetapp.bin
```

Notes

The system upgrade must restart the switch to take effect.

The command to restart the system is: Switch#reboot.

After executing the restart, the screen will display as follows:

```
*Switch#reboot
save running config? (y/n): y
Building configuration...
[OK]
reboot system? (y/n): y
```

1.4.5 Debug Mode

1. Enter the debugging state of function module.

```
*Switch#debug ospf packet /*Enable receiving packet debug of ospf*/
*Switch(config)#log stdout        /*Log output to serial port*/
```

2. Print message information:

```
Switch # debug PKT-filter tx/rx icmp    enable the information
printing of received icmp messages or sent icmp messages.
Switch # no debug PKT-filter tx/rx icmp    disable the information
printing of received icmp messages or sent icmp messages.
```

3. Check the detailed information such as the number of sending and receiving packets of various messages:

```
Switch#show pkt-filter
```

2 User Configuration

2.1 Add user

Command

```
username WORD
username WORD password (8|) LINE
username WORD privilege <0-15>
username WORD privilege <0-15> password (8|) LINE
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

WORD: a user name, length limited to 16 characters. And it cannot be numbers, characters other than ,! @ # ￥%.

(8|) : 8 means password encryption. This function will only take effect when global encryption is turned on.

LINE: password, limited to 8 characters. And it cannot be numbers, characters other than ,! @ # ￥%.

<0-15> a total of 16 user privilege priority, divided into four categories:

- 0: visit level; user can only view device version information and some simple configuration information.
- 1: view level; The configuration information of the device can be viewed, but the configuration of the device cannot be modified.
- 2: configuration level; User can view the configuration information of the device and configure some functional parameters of the device, but cannot manage the device.

- 3-15: management level; Have all permissions of the device, can download, upload, restart, modify the device information and other operations.

Description

username WORD: this command adds a user name that has no password and priority defaults to 1.

Username WORD password (8|) LINE: this command can add or change passwords to users that have already been created, or add users with passwords.

username WORD privilege <0-15> : this command has setting permission of the user and the default priority for all new users is 15.

Username WORD privilege <0-15> password (8|) LINE: this command can create a new user, specify priority, and specify password.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#username admin123 privilege 15 password admin123
```

2.2 Delete User

Command

```
no username WORD
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

WORD: a user name, length limited to 16 characters.

Description

Delete specify user

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#no username admin123
```

Notes

Deleted user names cannot be logged into the device, and when all user names have been

deleted, the device only can be logged in through the Console port.

2.3 View Current Online Users

Command

show users

show logined users

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show logined users: view current online users

show users: view current users with lower priority.

Instance

```
Switch> enable
Switch#show Logined users
Line     User     Type    Idle     Host(s)    Uptimes      Location
 0     admin123  console   0                  01:36:08     console
```

2.4 Console Login Management

The Console user interface is used to manage and monitor users logging in through the Console port. The device provides a RJ45 type Console port of RS-232 serial port. The terminal serial port of the user can connect directly with the device Console port to achieve local access to the device.

Command

line console <0-0>

View

Configure Mode

Default Level

2: Configuration level

Parameters

<0-0> : parameter "0", local Console configuration, supporting only one user.

Description

Line console <0-0>: enters the Console user interface configuration view. The Console user interface can configure connection timeout, password validation, priority, and history command buffer sizes.

Instance

```
*Switch#configure terminal
*Switch(config)#line console 0
*Switch(config-console_0)#
```

2.5 Virtual Terminal Login Management

The VTY (Virtual Type Terminal) user interface is used to manage and monitor users logging in through VTY. After the user establishes a Telnet or SSH connection with the device through the terminal, a VTY channel is established. Currently each device supports up to 16 simultaneous VTY users. There is no fixed relationship between user interface and user. The user interface is assigned differently when the same user logs in different ways. Different user interfaces may be assigned for different login times for the same user.

Command

line vty <0-15>

View

Configure Mode

Default Level

2: Configuration level

Parameters

<0-15> : VTY user channel 0-15, supports 16 VTY users to access the device simultaneously.

Description

Line vty <0-15> ： enters the VTY user interface configuration view. The VTY user interface can configure connection timeout, password validation, priority, and history command buffer sizes.

Instance

```
*Switch#configure terminal
```

```
*Switch(config)#line vty 0
*Switch(config-vty_0)#
```

2.6 Timeout Logout

Command

exec-timeout <0-35791> <10-2147483>

View

Console/ VTY user interface configuration mode

Default Level

2: Configuration level

Parameters

<0-35791> : timeout minutes range.

<10-2147483> : timeout seconds range.

Description

exec-timeout <0-35791> <10-2147483> : this command disconnects idle connections within a set time. If the connection is always idle during the set time, the system will automatically disconnect the connection. By default, the timeout of user interface disconnection is 10 minutes.

Instance

The system is configured with a 10-minute timeout by default. If the user is configured with password authentication, the user needs to enter the username and password again after the timeout to enter the system.

Configuration process for modifying the timeout logout:

```
Switch>enable
Switch#configure terminal
Switch(config)#line vty 0
Switch(config-vty_0)#exec-timeout 0 600
```

3 Port Configuration

3.1 Enter Port Configuration Mode

Command

```
interface IFNAME
interface ge <1-24>
interface loopback <0-1>
interface po <1-12>
interface range (ge | xe)
interface sa <1-12>
interface vlanif <1-4094>
interface xe <1-4>
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

IFNAME: port name

Ge: Gigabit port name.

loopback: loopback port name

po: dynamic aggregation group name.

Range: supports range type port input. For example, interface range ge 1-10 is denoted as going into Gigabit port 1-10. Only Gigabit ports and 10 Gigabit ports are currently supported.

sa: static aggregation group name

vlanif : layer 3 interface

xe: 10 Gigabit port.

Description

This command is the mode navigation command that goes from Configure Mode to interface configuration mode. The next step is to modify the configuration of the corresponding interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface range ge 1-10
Switch(config-ge1-10)#
Enter 10 ports from ge1 to ge10.
```

3.2 Port Rate Limit

Command

bandwidth <64-10000000>
no bandwidth

View

fe (100M Ethernet) port view
ge (Gigabit Ethernet) port view
xe (10 Gigabit Ethernet) port view
sa (static aggregation group) port view
po (dynamic aggregation group) port view

Default Level

2: Configuration level

Parameters

<64-10000000> : the unit is kbps. For different ports, there are some restrictions on the parameters. The allowed input range of normal Gigabit ports is 64-1000000, andthe allowed input range of 10 Gigabit ports is 64-10000000. If the input parameter is not in the specified range, the setting will not be successful and an error will be returned.

Description

bandwidth: this command does not actually affect the bandwidth of an interface, but simply allows the user to inform the system the bandwidth standard of that interface. By default, the bandwidth of an Ethernet interface is determined by the rate of the actual port connection, and can be manually configured if necessary. The bandwidth

is only a routing parameter and does not affect the real bandwidth of the interface of the physical link.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#bandwidth 128
```

3.3 Port Settings

3.3.1 Combo PortTransmission Media

Command

combo-port (auto | copper | fiber)

View

fe (100M Ethernet) port view

ge (Gigabit Ethernet) port view

Default Level

2: Configuration level

Parameters

auto：Automatically select media types

Copper：forced to select copper port.

fiber：forced to select fiber port.

Description

combo-port: used to select the media type of the port.

Note

Change the media type of the port, the properties of the port will be updated to the default values.

By default, the first eight ports (ge1-ge8) default to "auto" mode, and the fiber transmission medium is preferred. That is, if a port is connected to both fiber port and copper port, then the port type is fiber port. If a port is only connected a copper port, the port type is copper port.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#combo-port copper
```

3.3.2 Duplex Mode

Command

duplex (auto | full | half)

no duplex

View

fe (100M Ethernet) port view

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

Default Level

2: Configuration level

Parameters

Auto: full duplex and half duplex self-adaption.

Full: represents full duplex.

Half: represents half duplex.

Description

duplex (auto | full | half) : this command is used to set the duplex mode of the port. By default, duplex mode of all ports is auto.

When setting the normal port rate to Gigabit, the duplex mode of the port cannot be set to half-duplex. When setting 10 Gigabit fiber ports, the duplex mode of the port cannot be set to half duplex. Otherwise the setting will not take effect and an error will be returned.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#duplex full
```

3.3.3 Flow Control

Command

flowcontrol (both| receive | send)

flowcontrol send (on | off)

flowcontrol receive (on | off)

no flowcontrol

View

fe (100M Ethernet) port view

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

sa (static aggregation group) port view

po (dynamic aggregation group) port view

Default Level

2: Configuration level

Parameters

both: Data transmit and receive of the port are set to self-negotiate flow control.

receive (on | off) : only enable or disable flow control on data receiving of the ports.

send (on | off) : only enable or disable flow control on data transmission of the ports.

Description

flowcontrol: this command is used to enable or disable flow control of the ports.

By default, flow control on all ports default to disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#flowcontrol both
```

3.3.4 Max-Frame

Command

mtu <64-16360>

no mtu

View

fe (100M Ethernet) port view

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

sa (static aggregation group) port view

po (dynamic aggregation group) port view

vlanif (layer 3) port view

Default Level

2: Configuration level

Parameters

<64-16360> : the allowed setting range of mtu is 64-16360.

<128-1500> : the allowed setting range of mtu in a layer 3 interface is 128-1500.

Description

mtu: this command is used to set the maximum data frame length supported by the interface, that is, the maximum length of the data portion of the link.

By default, the maximum data frame length for all physical ports is set to 1518. The MTU for the virtual port, such as vlanif1, is set to 1500.

 Notes

when setting up virtual ports (such as vlanif1), the allowed maximum MTU value is 1500.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#mtu 1800
```

3.3.5 Interface Switch

Command

shutdown

no shutdown

View

fe (100M Ethernet) port view

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

sa (static aggregation group) port view

po (dynamic aggregation group) port view

vlanif (layer 3) port view

Default Level

2: Configuration level

Parameters

-

Description

shutdown: for interfaces (Ethernet ports, converged ports, and switched virtual interfaces), the command is primarily to close the corresponding interface, but other configurations of the interface still exist, just do not work. no shutdown is to open the port.

By default, the administrative state of the interface is UP.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface sa1
Switch(config-sa1)#shutdown
```

3.3.6 Rate

Command

```
speed (auto | 10m | 100m | 1g | 10g)
speed (auto | 1g | 10g)
speed (auto | 10m | 100m | 1g )
no speed
```

View

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

sa (static aggregation group) port view

po (dynamic aggregation group) port view

Default Level

2: Configuration level

Parameters

auto: Indicates that the rate of the interface is self-adaptive.

10M: set the interface rate to 10Mbps.

100M: set the interface rate to 100Mbps.

1G: set the interface rate to 1Gbps.

10G: set the interface rate to 10Gbps.

(auto|10m|100m|1g|10g): port rate configuration of dynamic and static aggregation groups.

(auto|1g|10g): 10 Gigabit port speed configuration

(Auto|10m|100m|1g): Gigabit port speed configuration.

Description

speed: this command is used to set the rate of the port.

By default, the rate of the interface is self-adaptive (auto). The port rate cannot be set to 1g or above when setting the normal port duplex mode to half. The port rate is set to a minimum of 1g, when setting a 10 Gigabit fiber port.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#speed 100m
```

3.4 Port Isolation

Command

port-isolate enable group <1-8>

no port-isolate enable

View

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

sa (static aggregation group) port view

po (dynamic aggregation group) port view

Default Level

2: Configuration level

Parameters

<1-8> : isolation group ID

Description

port-isolate: this command is used to add the current Ethernet ports to the isolation group.

no port-isolated: this command is used to remove the current Ethernet ports from the isolation group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#port-isolate enable group 1
Switch(config-ge8)#no port-isolate enable
```

3.5 Storm Suppression

Command

```
storm-control ( broadcast | dlf | multicast ) level LEVEL
no storm-control ( broadcast | dlf | multicast ) level
```

View

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

sa (static aggregation group) port view

po (dynamic aggregation group) port view

Default Level

2: Configuration level

Parameters

broadcast: sets the limit of broadcast message traffic of the port

dlf: Destination look-up fail, which is to set unicast storm suppression.

multicast: sets the limit of multicast message traffic of the port

LEVEL: the percentage of restricted storm suppression, ranging from 0.00 to 100.00 to two decimal places.

Description

storm-control: this command is used to set the limit on unicast/multicast/broadcast messages traffic of the port.

no storm-control: this command is used to unconfigure restricted port messages.

After setting the upper limit of port message traffic, the port regularly detects the received unicast/multicast/broadcast message flow. Once the data flow of a certain type of message is detected to reach the storm control of the port, it would be considered as storm, then the port can block the forwarding of such message.

By default, the percentage of storm suppression is 100.00%.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#storm-control broadcast level 20.02
Switch(config-ge8)#no storm-control broadcast level
```

3.6 MAC Address

3.6.1 Clear Dynamic MAC address

Command

clear mac-address-table dynamic (MAC | address MACADDR| interface IFNAME | vlan VID)

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

MAC: means clear of the specified dynamic MAC address, in the format HHHH.HHHH.HHHH.

address: means clear the specified dynamic MAC address.

interface: means to clear all dynamic addresses of a specified interface.

vlan: means to clear all dynamic addresses of the specified vlan, ranging from 1-4094;

Description

clear mac-address-table dynamic: this command is used to clear the specified dynamic MAC address, or to clear all dynamic MAC addresses on the specified interface or VLAN.

Instance

```
Switch> enable
*Switch#clear mac-address-table dynamic interface ge1
```

3.6.2MAC address learning

Command

mac-address-learning (disable | enable)

View

Configure Mode

Default Level

2: Configuration level

Parameters

disable: disable global MAC learning.

enable: enable global MAC learning.

Description

mac-address-learning: The function of this command is to disable the global MAC address learning ability, so that the global MAC address learning can not be carried out; Or enable the global MAC address learning ability, according to the port of the MAC address learning ability to take effect.

By default, the learning capability of the global MAC address is enabled.

When the MAC address learning ability is enabled, the MAC address learned by the port is a dynamic MAC address, and the aging time is determined by the user settings.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mac-address-learning disable
```

3.6.3MAC address aging-time

Command

mac-address-ageingtime (0 | <10-1000000>)

no mac-address-ageingtime

View

Configure Mode

Default Level

2: Configuration level

Parameters

ageing-time: set the aging time of the global MAC. The value range of dynamic address aging time is <10-1000000>, in seconds. 0 means to disable aging function.

Description

mac-address-table ageingtime: command is to set the dynamic aging time of the MAC address table. When the user enters the 0 parameter, it means to disable the aging time of MAC.

no mac-address-ageingtime: MAC address aging time is restored to the default value. By default, the aging time is set to 300 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mac-address-ageingtime 500
```

3.6.4 Static MAC Address Filtering

Command

```
mac-address-table static MAC ( discard | forward ) IFNAME vlan VLAN
no mac-address-table static address MAC ( vlan VLAN |  )
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

Discard: set a MAC address for the port .Discard the packet if the packet's source MAC address is the same as the set MAC address.

Forward: sets a MAC address of the port. Forward the packet if the source MAC address is consistent with the set MAC address.

Vlan: specifies the vlan corresponding to the table entry, with a range of <2-4094>. If there is no input, the default is vlan 1.

Description

mac-address-table static MAC forward IFNAME: this command is to set a static MAC address to the MAC table entry on the specified port. Static addresses, as opposed to dynamic ones, never aging and can only be manually configured and deleted. Static addresses will not lost even if the device is reset.

No static address is set by default.

Static addresses cannot be set to multicast addresses.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mac-address-table static 0.8.4 forward ge10 vlan
3
```

3.6.5 Multicast MAC Address Filtering

Command

```
mac-address-table multicast MAC ( discard | forward) IFNAMELIST
vlan <2-4094>
no mac-address-table multicast address MAC interface IFNAME vlan
<2-4094>
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

IFNAMELIST: multiple ports can be entered simultaneously. For example: ge1, ge2

Vlan: specifies the vlan corresponding to the table entry, with a range of <2-4094>. If there is no input, the default is vlan 1.

Description

mac-address-table static MAC forward IFNAMELIST: this command is to set a static Multicast MAC address to the MAC table entry on the specified port. Static addresses, as opposed to dynamic protocol learned, never aging and can only be manually configured and deleted. Static addresses will not lost even if the device is reset.

no mac-address-table multicast: is used to remove static multicast table entries configured with command. The three commands of interface, mac and vlan can be randomly combined. That is, through the port to batch delete, can also delete a specific MAC specific VLAN under the specific port.

No static address is set by default.


Notes

Currently only single port deletions are allowed when deleting configuration. Multiple port combination deletion is not allowed.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mac-address-table multicast 0100.5e00.0001
forward ge10,ge11,ge12 vlan 3
```

3.6.6 Display MAC Address Table

Command

```
show mac-address-table
show mac-address-table ( multicast | dynamic | static | )
```

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

multicast：displays the table entry of multicast MAC address.

Dynamic: displays dynamic MAC address table entries.

static: displays dynamic MAC address table entries.

Description

show mac-address-table: this command displays the MAC table of the device. Without parameters, all MAC addresses are displayed, including user-configured static MAC addresses, dynamic MAC addresses learned by protocol, and multicast MAC addresses. With the relevant parameters, the corresponding MAC address is displayed, when with multicast, dynamic and static multicast MAC addresses are displayed.

Instance

```
Switch> enable
Switch#show mac-address-table
```

3.7 Mirror Command

3.7.1 Port Mirror Configuration

Command

mirror session <1-4> (both | receive | transmit) destination IFNAME source IFNAMELIST

View

Configure Mode

Default Level

2: Configuration level

Parameters

session: mirror group number, value range: <1-4>.

TRAFFIC: messages direction of monitored port. That is to monitor the messages received or transmit.

- both: means both receiving and sending packets are monitored.
- transmit: stands for direction of transmit package.
- receive: stands for direction of receive package.

directions: means the destination port.

source: means the source port. Multiple ports can be input at the same time, separated by commas.

Description

Mirrors a message in the specified direction of the source port to the destination port.

Notes

- There is and can only be one destination port for mirroring, but multiple source ports can be configured simultaneously. And the destination port of one mirror group cannot be the source port for other mirror groups.
- The direction of the port mirroring cannot be covered, but only superimposed. When a certain direction is not needed, the group needs to be deleted and reconfigured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mirror session 1 both destination ge1 source ge2,ge3
```

3.7.2 Delete Port Mirror

Command

no mirror session <1-4> direction (both | receive | transmit) source IFNAME

View

Configure Mode

Default Level

2: Configuration level

Parameters

session: mirror group number, value range: <1-4>.

TRAFFIC: messages direction of monitored port. That is to monitor the messages received or transmit.

- both: means both receiving and sending packets are monitored.
- transmit: stands for direction of transmit package.
- receive: stands for direction of receive package.

source: means the source port. Multiple ports can be input at the same time, separated by commas.

Description

Delete Mirror Configuration The three parameters in this instruction are optional, that is, user can only type session, or session and direction when deleting, or directly type no mirror without any parameters. And parameter position arbitrary swap, will not affect the execution of instructions.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#no mirror session 1 source ge2
```

3.8 Link Aggregation Configuration

3.8.1 Dynamic Aggregation System Priority

Command

lacp system-priority <priority>

no lacp system-priority

View

Configure Mode

Default Level

2: Configuration level

Parameters

<priority> : dynamic aggregation system priority, range is 1-65535

Description

lacp system-priority: this command is used for dynamical aggregate system priorities.

By default, the system priority is 32768.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#lacp system-priority 1
```

3.8.2 Dynamic Aggregation Port Priority

Command

```
lacp prot-priority <priority>
no lacp prot-priority
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

<priority> : dynamic aggregation port priority, range is 1-65535.

Description

lacp port-priority: this command is used for dynamic aggregation port priorities.

By default, the port priority is 32768.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#lacp port-priority 1
```

3.8.3 Dynamic Aggregation Port Timeout

Command

lacp timeout (short | long)

View

Interface Mode

Default Level

2: Configuration level

Parameters

Short: short timeout 3 seconds, the time threshold of neighborhood information aging.

Long: long timeout 90 seconds, the time threshold of neighborhood information aging.

Description

lacp timeout: this command is used for dynamic aggregate port timeout.

By default, it is long timeout.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#lacp timeout short
```

3.8.4 Add Dynamic Aggregation Group

Command

channel-group <id> mode (active | passive)

no channel-group

View

Interface Mode

Default Level

2: Configuration level

Parameters

< id> : aggregation group number, the range is <1-12>.

Active: active mode, in which the switch actively initiates the aggregation negotiation process.

Passive: the mode in which the switch passively receives the aggregate negotiation process.

Description

channel-group: this command is used to add dynamic aggregation port members and configure the LACP mode for the ports.

When the first aggregation group member port is added, the corresponding aggregation group interface will be created. The interface name is Po + aggregation group number (the static aggregation group is sa+ aggregation group number). For example, a dynamic aggregation group interface named po100 with aggregation group number 100 is created by command channel-group 100 mode active.

When the last aggregation group member port is deleted, the corresponding aggregation group interface will be deleted.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#channel-group 1 mode active
```

3.8.5 Add static LACP

Command

```
static-channel-group <id>
no static-channel-group
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

< id> : aggregation group number, the range is <1-12>.

Description

static-channel-group: this command is used to add static aggregate port members.

When the first aggregation group member port is added, the corresponding aggregation group interface will be created. The interface name is sa + aggregation group number (the dynamic aggregation group is po+ aggregation group number). For example, a static aggregation group interface named sa9 with aggregation group number 9 is created by command static-channel-group 9.

When the last aggregation group member port is deleted, the corresponding aggregation group interface will be deleted.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#static-channel-group 2
```

3.8.6 Link Aggregation Load Balance Mode

Command

port-channel load-balance (dst-ip | dst-mac | dst-port | src-dst-ip | src-dst-mac | src-dst-port | src-ip | src-mac | src-port)
no port-channel load-balance

View

Aggregation group interface view

Default Level

2: Configuration level

Parameters

dst-ip: the load balance mode is based on destination IP.

src-ip: the load balance mode is based on source IP.

src-dst-ip: the load balance mode is based on source and destination IP.

dst- MAC: the load balance mode is based on destination MAC.

src- MAC: the load balance mode is based on source MAC.

src- dst- MAC: the load balance mode is based on source and destination IP.

dst- port: the load balance mode is based on destination port, do not support currently.

src- MAC: the load balance mode is based on source port, do not support currently.

src- dst- port: the load balance mode is based on source and destination port, do not support currently.

Description

port-channel load-balance: this command is used to configure the load balance mode of the aggregate group.

Instance

```
Switch> enable
Switch#configure terminal
```

```
Switch(config)#interface ge8
Switch(config-ge8)#static-channel-group 2
Switch(config)#interface sa2
Switch(config-sa2)#port-channel load-balance dst-port
Switch(config-sa2)#exit
Switch(config)#interface ge7
Switch(config-ge7)#channel-group 1 mode active
Switch(config)#interface po1
Switch(config-po1)#port-channel load-balance src-mac
```

3.8.7 Displays Dynamic Aggregation Group

Command

show etherchannel {[*<id>*] | [detail] | [load-balance] | [summary]}

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

<id>: LACP aggregation group number

Description

show etherchannel: this command is used for LACP aggregation group related information.

Instance

```
Switch#show etherchannel
% Lacp Aggregator: po1
% Member:
   ge7
```

3.8.8 Displays Static Aggregation Group

Command

show static-channel-group

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show static-channel-group: this command is used for static aggregation group information.

Instance

```
Switch#show static-channel-group
% Static Aggregator: sa1
% Member:         state
   ge8            unbndl
```

3.9 Port Statistics

Port message statistics can be seen through the show interface IFNAME command. The following is the analysis of this instruction.

3.9.1 Display Port

Command

show interface IFNAME

View

Configure Mode

Default Level

2: Configuration level

Parameters

IFNAME: port name

Description

The display mainly includes port name, port number, port medium, port property, port MAC address, MTU, bandwidth, configuration rate, duplex mode, running time and port message statistics. Here is an explanation of the key words that appear in the statistics:

- "Input" refers to the message statistics received by the port, i.e., "receive". "output" means the number of packets transmitted by the port, i.e., "transmit".

- "TYPE" refer to the classification of statistical message types.
  - "Total" represents the statistics of all types of messages in the corresponding direction (i.e. input or output), and the unit is bit.
  - "Unicast" represents the statistics of the packets of Unicast in the corresponding direction, and the unit is packets.
  - "Multicast" represents the statistics of the packets of packets in the corresponding direction, and the unit is packets.
  - "Broadcast" represents the statistics of the number of packets Broadcast in the corresponding direction, and the unit is packets.
  - "Dropped" represents the statistics of the packets lost in the corresponding direction, and the unit is packets.
  - "Error" represents the statistics of the number of packets of errors in the corresponding direction, with the unit of packets.
- "RATE" refers to the rate in the corresponding direction (it should be noted that this rate refers to the average rate in the corresponding type and direction in a specific period of time. Port statistics cannot be updated in real time, with an interval of about 24 seconds). In the "Total" type, the rate is expressed in parentheses as the ratio of message bytes to the "defined bandwidth" of the port, not the set bandwidth. The "defined bandwidth" here refers to the maximum bandwidth corresponding to the port, that is, the bandwidth ratio of the Gigabit port is calculated by Gigabit, and the 10 Gigabit port is calculated by 10 Gigabit, having nothing to do with the actual bandwidth set by the user.
- "PEAK" refers to the PEAK value, which is the maximum speed from the start to the execution of the command. The following brackets represent the time point at which the peak occurs.
- "TOTAL" refers to the total number of corresponding "TYPE". That is to say, the number (or digits) of corresponding type and direction messages obtained from startup to execution of command are counted. The following brackets represent the unit conversion result of the corresponding TOTAL (that is, when the TOTAL is 1024, the brackets show 1K).

In addition, all unit conversion in the command is carried out in the form of 1K = 1024.

Instance

```
Switch> enable
Switch#show interface ge1
```

4 VLAN Configuration

4.1 Enter VLAN Configuration Mode

Command

vlan database

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

The vlan database command is used to enter VLAN configuration mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan database
```

4.2 Add VLAN ID

Command

vlan <vlan-id> （name WORD | ）
vlan range VLANLIST
no vlan <vlan-id>

View

VLAN configuration view

Default Level

2: Configuration level

Parameters

<vlan-id> : vlan id value, range is 2-4094.

WORD: VLAN name.

range: set the static VLAN in batch.

VLANLIST: VLAN range to be set, user can input a single number, continuous range vlan or a combination of single and range, separated by commas, eg: 4, 10-20.

Description

vlan: this command is used to create a static VLAN and configure the VLAN name.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan database
Switch(config-vlan)#vlan 2
```

4.3 Port Type

Command

switchport mode (access| hybrid | trunk)

View

Interface Mode

Default Level

2: Configuration level

Parameters

Access: set the link type of the port to access type.

Hybrid: set the link type of the port to hybrid type.

trunk: set the link type of the port to trunk type.

Description

switchport mode: this command is used to configure the link type of the port.

By default, the link type of all ports are access.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
```

```
Switch(config-ge8)#switchport mode trunk
```

4.4 Port Default VLAN

Command

```
switchport (access| hybrid ) vlan <vlan-id>
no switchport (access| hybrid ) vlan
switchport trunk native vlan <vlan-id>
no switchport trunk native vlan
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

access vlan: set the default vlan for a port in access mode to <2-4094>.

hybrid vlan: sets the default vlan for a port in hybrid mode to <2-4094>.

<2-4094> : VID allowed setting range is 2-4094.

Native vlan: set the local VLAN and classify the unmarked traffic through the Layer 2 interface, that is, set the PVID of the port.

Description

switchport (access | hybrid) vlan: this command is to reset the default VLAN of the port. For example, enter the configuration mode of port ge1, the port ge1 is in hybrid mode, and enter “switchport hybrid vlan 3”. The default VLAN ID for port ge1 becomes 3.

switchport trunk native vlan: this command specifies a native VLAN for a trunk port. As a Trunk port, it must belong to a native VLAN. The native VLAN refers to UNTAG messages sent and received on the interface, which are all considered to belong to the VLAN. Obviously, the default VLAN ID of the interface (i.e., PVID in IEEE 802.1Q) is the VLAN ID of the native VLAN. At the same time, if native VLAN frames are sent in Trunk port, UNTAG must be adopted.

By default, the default VLAN ID of the port is 1.

 Notes

When setting the VLAN ID, the port mode parameter of the command must be consistent with the current mode of the setting port to ensure the setting takes effect, otherwise an error

will be returned.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#switchport access vlan 2
```

4.5 Classify VLAN Based on Port

Command

```
switchport hybrid allowed vlan add (tag| untag )<vlan-id>
switchport hybrid allowed vlan remove <vlan-id>
switchport hybrid allowed vlan (all | none)
switchport trunk allowed vlan (add |except | remove) <vlan-id>
switchport trunk allowed vlan (all | none)
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

<vlan-id> : VLAN ID, range is 1-4094.

Add: add the port to the VLAN.

All: add ports to all VLANS.

Except: adds a port to all VLANS except the one specified.

None: delete the port from all VLANS except PVID.

Remove: delete the port from the specified VLAN.

Tag: the port will add a VLAN tag when forwarding a VLAN message.

Untag: the port will remove the VLAN Tag when forwarding a VLAN message.

Description

switchport (hybrid | trunk) allowed vlan: this command is used to configure the port to be added to or removed from a specified VLAN.

Notes

- When adding hybrid or trunk ports to a VLAN, the port should be set to the appropriate type.

- Hybrid or trunk ports are untag in the VLAN to which PVID belongs, and trunk ports are tag in VLAN except PVID.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#switchport hybrid allowed vlan add tag 2
```

4.6 Display VLAN Information

Command

```
show vlan all
show vlan brief
show vlan <2-4094>
```

View

Privileged Exec Mode

Default Level

1: View level

Parameters

<2-4094>: VLAN ID range is 2-4094.

Description

```
show vlan all: displays all vlan information.
show vlan brief: displays vlan information of all Bridges.
show vlan <2-4094> : displays the specified vlan information.
```

Instance

```
Switch> enable
Switch# show vlan 2
```

4.7 Port Receive Frame Type

Command

```
switchport acceptable-frame-type (all | tagged | untagged)
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

All: there is no restriction on whether the received message with tag.

Tagged: only allow the port to receive tagged message, that is, stop the port to receive untagged message.

Untagged: only allow the port to receive untagged message, stop the port to receive tagged message.

Description

switchport accept-frame-type: this command is used to restrict whether the port is allowed to accept message with tags.

By default, the accepted frame type of the port is set to all, which means that the port does not by default restrict whether or not it can receive packets with tags. However, if the accepted frame type of the port is set to tagged, the port can only allow tagged message to pass, and other packets will be discarded.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#switchport acceptable-frame-type tagged
```

4.8 Port Entry Filtering

Command

switchport ingress-filter (enable | disable)

View

Interface Mode

Default Level

2: Configuration level

Parameters

Enable: only messages from the VLAN to which the port belongs are allowed to be received.

Disable: allows to receive messages from VLANs that do not belong to the port.

Description

The ingress filter function of the device defaults to enable, that is, any port only allows packets belonging to its VLAN to pass through. Other messsage will be discarded. However, when the ingress filter function of the port is set to disable, the port will allow to receive messages not belonging to the VLAN of the port and forward the message to the specified VLAN.

For example, set port entry filtering on port ge1 to disable. Port ge1 belongs to vlan10. The message is sent to ge2 belonging to vlan20. After ge1 receives the message, the port will receive the message and forward the message to the specified vlan. In other words, the message will be forwarded to ge2 belonging to vlan20 instead of discarding the message.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#switchport ingress-filter disable
```

4.9 VLAN Classifer Function

4.9.1 VLAN Classifier Function Introduction

The VLAN classifier is similar to PVID in that it assigns a default VLAN ID to packets entering the switch port. It provides MAC based, subnet based and protocol based allocation. If a packet matches all of the three, only one rule will take effect. The priority of the rules is: MAC-based, subnet-based, and protocol-based. For example, if MAC-based rules are matched first, neither subnet-based nor protocol-based VLAN allocation rules will take effect. If none of the three rules match, VLAN ID are assigned according to PVID rule.

4.9.2 Rule configuration.

4.9.2.1 Classify VLAN Based on Sub-network

Command

```
vlan classifier rule <1-256> ipv4 A.B.C.D/M vlan <1-4094>
```

View

Global Configuration

Default Level

2: Configuration level

Parameters

<1-256>: group number.

A.B.C.D/M: sub-network segment.

<1-4094>: represents the VLAN ID assigned by the matching rule.

Description

Configure subnet-based VLAN rules.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan classifier rule 1 ipv4 192.168.2.0/24 vlan 2
```

4.9.2.2 Classify VLAN Based on MAC Address

Command

```
vlan classifier rule <1-256> mac WORD vlan <1-4094>
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

<1-256>: group number.

MAC: MAC address.

<1-4094>: represents the VLAN ID assigned by the matching rule.

Description

Configure MAC-based VLAN rules.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan classifier rule 1 mac 0.0.2 vlan 3
```

4.9.2.3 Classify VLAN Based on Protocol

Command

vlan classifier rule <1-256> proto (ip|ipv6|ipx|x25|arp|rarp|atalkddp|atalkaarp|atmmulti|atmtransport|pppdiscovery|pppsession|xeroxpup|xeroxaddrtrans|g8bpqx25|ieeepup|ieeeaddrtrans|dec|decdnadumpload|decdnaremoteconsole|decdnarouting|declat|decdiagnostics|deccustom|decsyscomm|<0-65535>) encap (ethv2|snapllc|nosnapll) vlan <1-4094>

View

Configure Mode

Default Level

2: Configuration level

Parameters

<1-256>: group number.

proto：Ethernet protocol type; enter ip, ipv6, ipx, x25, arp, rarp, atalkddp, atalkaarp, atmmulti, atmtransport, pppdiscovery, pppsession, xeroxpup, xeroxaddrtrans, g8bpqx25, ieeepup, ieeeaddrtrans, dec, decdnadumpload, decdnaremoteconsole, decdnarouting, declat, decdiagnostics, deccustom, decsyscomm or enter protocol number <0-65535>

encap：Ethernet Encapsulation Type；ethv2，snapllc，nosnapll.

<1-4094> : represents the VLAN ID assigned by the matching rule.

Description

Configure protocol-based VLAN rules.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan classifier rule 1 proto ip encap ethv2 vlan 3
```

4.9.2.4 Delete VLAN Rule

Command

no vlan classifier rule <1-256>

View

Configure Mode

Default Level

2: Configuration level

Parameters

<1-256> : group number.

Description

Delete a rule.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#no vlan classifier rule 1
```

4.9.3 Group Configuration

Command

```
vlan classifier group <1-16> (add | delete) rule <1-256>
no vlan classifier group <1-16>
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

<1-16> : group number.

add: add a rule to a group.

delete: delete a rule from a group.

<1-256> : rule number;

Description

vlan classifier group: group configuration.

no vlan classifier group: delete group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan classifier group 1 add rule 2
Switch(config)#no vlan classifier group 2
```

4.9.4 Interface Configuration Command

Command

vlan classifier activate <1-16>

no vlan classifier activate <1-16>

View

Interface Mode

Default Level

2: Configuration level

Parameters

<1-16> : reference group number;

Description

vlan classifier activate: interface reference group.

no vlan classifier activate: delete interface reference group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#vlan classifier activate 1
Switch(config-ge1)#no  vlan classifier activate 2
```

5 Ring Configuration

Ring is made up of the company independent research and development, professional link redundancy backup for the needs of high reliability of industrial control network application and development of the design of Ethernet rapid spanning tree algorithm, its design concept is completely in accordance with international standards (STP and RSTP) implementation, and do the necessary for industrial control application optimization, with Ethernet link redundancy, fault fast automatic recovery ability, when a network interruption or network failure, Ring can ensure that the user network automatic recovery link communication within 20 ms.

5.1 Globle Ring Enablement

Command

```
[no ] ring
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

ring: this command is used to enable the global Ring function.

no ring: this command is used to disable the global Ring function and delete all Ring groups.

By default, the global Ring function is disabled.

Instance

```
Switch> enable
Switch# configure terminal
Switch(config)# ring
```

5.2 Create Ring NetworkGroup

Command

ring <group-id> id <ring-id> port1 <ifname> port2 <ifname> type 0 hello <hello-time> (master | slave)

ring <group-id> id <ring-id> port1 <ifname> port2 <ifname> type <type-id> hello <hello-time>

no ring <group-id>

View

Configure Mode

Default Level

2: Configuration level

Parameters

group-id : ring group ID, range is 1-4.

ring-id : ring loop ID, range is 0-255.

ifname: ring port name, the port can be a physical port or a static aggregation group, and the port cannot enable spanning tree or ERPS.

type-id: ring loop type, range 0-3, corresponding to Single Ring, Coupling Ring, Chain, Dual Homing.

hello-time: hello request packet sending period, range 0-300(*100ms), 0 means to do not send.

Master | slave: ring network master device selection, no master station if all are masters, only ring type is Single ring can be configured.

Description

ring <group-id> : this command is used to configure the ring group.

no ring <group-id> : this command is used to delete the ring group.

By default, no ring group is configured.

Ring Type Description

A Single ring is a basic ring networking structure in which all devices are connected in a ring. When the network is working normally, the algorithm running on the device will automatically block a link as a backup link to ensure the normal operation of the

network. When the network link failure occurs, the algorithm will automatically start the backup link and restore the data communication within 20ms.

Coupling Ring is a redundant structure introduced to connect two separate networks. The Coupling Ring provides additional security by enabling the coupling of two ports on different switches. For some systems, users can also create single rings for devices from different regions and also integrate multiple single rings through the Coupling Ring to create a larger redundant network.

Chain refers to connecting multiple switch devices in series and connecting both ends of the Chain to Ethernet network. Chain has strong channel selection ability. When the network is working properly, the algorithm automatically blocks one link in the Chain as a backup link, forcing all devices to access the Ethernet network from the unblocked end of the link. When Chain link failure occurs, the algorithm will automatically start the backup link within 20ms and quickly guide the device access the Ethernet network through the side that do not has a link failure.

Dual Homing is a special case of the Chain, in which users can host the same switch on two different networks or two different switching devices on the same network. The algorithm will automatically select one link for data communication according to the link condition. When the link in the communication state fails, the other link will start to work within 20ms.

Note:

1. RING loop ports can be normal physical ports or static aggregation groups.
2. The RING loop port cannot enable other layer 2 protocols (MSTP, ERPS, etc.) at the same time.

Instance

```
Switch> enable
Switch# configure terminal
Switch(config)# ring 1 id 1 port1 ge1 port2 ge3 type 1 hello 1
```

5.3 Display Ring Network Information

Command

show ring [<*group-id*>]

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

group-id : ring group ID, range is 1-4

Description

show ring: this command is used to show Ring information.

Instance

```
Switch(config)#interface ge3
Switch(config-ge3)#spanning-tree disable
*Switch(config-ge3)# exit
*Switch(config)#interface ge4
*Switch(config-ge4)#spanning-tree disable
*Switch(config-ge4)#exit
*Switch(config)#ring 1 id 1 port1 ge3 port2 ge4 type 0 hello 0 master
*Switch#show ring
ring global : Enable
ring list:
ring GROUP: 1
ring ID: 1
ring PORT1: ge3
ring PORT1 state: block
ring PORT2: ge4
ring PORT2 state: block
ring TYPE: Single
ring HELLOTIME: 0
ring : master
```

6 MSTP Configuration

6.1 Globle Spanning-tree Enablement

Command

spanning-tree (enable | disable)

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree enable: this command is used to enable the globle spanning tree protocol.

spanning-tree disable: this command is used to disable the spanning tree protocol.

By default, the global spanning tree protocol is enabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree disable
```

6.2 Enter MSTP Instance Configuration View

Command

spanning-tree mst configuration

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree mst configuration: this command is used to enter the MSTP instance configuration view.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree mst configuration
```

6.3 Create MSTP Instance

Command

```
instance < instance -id> vlan <vlan-id>
no instance < instance -id> [vlan <vlan-id>]
```

View

MST configuration view

Default Level

2: Configuration level

Parameters

<instance-id> : represents the number of MSTI in the range 0-16.

<vlan-id> : VLAN ID value, range is 1-4094.

Description

instance: This command is used to create MSTP instance.

no instance: this command is used to delete the MSTP instance.

instance instance_id vlan vlan_id: this command is used to configure the mapping between vlan and MSTP instances. If the Instance does not exist, it will be created first.

By default, all VLANS map to CIST (that is, MSTI 0).

 Notes

- Different MSTI cannot be mapped to the same VLAN. If a VLAN that has been mapped to one MSTI is remapped to another MSTI, the original mapping relationship will be canceled.
- When adding a VLAN mapping, it is recommended to configure the VLAN first.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree mst configuration
Switch(config-mst)#instance 1 vlan 2
```

6.4 MSTP Revision Level

Command

revision <level>

View

MST configuration view

Default Level

2: Configuration level

Parameters

<level> : revision level, range 0-255.

Description

revision: this command is used to configure the MSTP revision level for the MST domain.

By default, the MSTP revision level for the MSTP domain is 0.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree mst configuration
Switch(config-mst)#revision 1
```

6.5 MST Domain Name

Command

region <name>

no region <name>

View

MST configuration view

Default Level

2: Configuration level

Parameters

<name> : the domain name of the MST domain.

Description

region <name>: this command is used to configure the domain name for the MST domain.

By Default, the MST domain name is Default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree mst configuration
Switch(config-mst)#region test
```

6.6 Device Priority

Command

spanning-tree [instance <instance_id>] priority <priority>
no spanning-tree [instance <instance_id>] priority

View

Configure Mode

Default Level

2: Configuration level

Parameters

<priority> : device priority (multiple of 4094), <0-61440>

Description

spanning-tree priority: this command is used to configure the device priority of CIST.

no spanning-tree priority: this command is used to restore the device priority of CIST to the default value.

spanning-tree instance priority: this command is used to configure the device priority of the MSTI.

no spanning-tree instance priority: this command is used to restore the device priority of MSTI to the default value.

By default, the device priority is 32768.

CIST refers to spanning tree instance 0, and MSTI refers to creating spanning tree instance, with instance range 1-16.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree priority 4096
```

6.7 Spanning-tree Protocol Version

Command

```
spanning-tree force-version <version>
no spanning-tree force-version
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

<version> : spanning tree protocol version number, range is 0-3, 0 is STP compatibility mode, 2 is RSTP mode, 3 is MSTP mode, 1 is unsupported.

Description

spanning-tree force-version: this command is used to configure the version of the spanning tree protocol.

no spanning-tree force-version: this command restores the version of the spanning tree protocol to the MSTP protocol.

By default, the working mode of MSTP is MSTP mode.

MSTP and RSTP can recognize each other's protocol messages and are compatible with each other. STP cannot recognize MSTP messages, in order to realize mixed networking with STP equipment and complete compatibility with RSTP, there are three operating modes have been set: STP compatibility mode, RSTP mode and MSTP mode.

- In STP compatibility mode, each port of the device will send out STP BPDU messages.
- In the RSTP mode, each port of the device will send out RSTP BPDU messages.

When it is found to be connected with the device running STP, the port will automatically switch to the STP compatibility mode.

- In MSTP mode, each port of the device will send out MSTP BPDU messages. When it is found that it is connected with the device running STP, the port will automatically switch to STP compatibility mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree force-version 2
```

6.8 Spanning Tree Timer Parameter

Command

spanning-tree (hello-time | forward-time | max-age) <seconds>
no spanning-tree hello-time

View

Configure Mode

Default Level

2: Configuration level

Parameters

<seconds> : hello-time range <1-10>, forward-time range <4-30>, max-age range <6-40>, all in seconds

Description

spanning-tree hello-time: the command is used to configure the hello-time.

no spanning-tree hello-time: this command is used to restore the hello-time to default value.

By default, hello-time is 2 seconds, forward-time is 15 seconds, and max-age is 20 seconds.

The values of the three time parameters of the root bridge hello-time, forward-time and max-age should meet the following formula, otherwise will cause the network oscillation frequently:

2 ×（forward-time - 1）≥ max-age

max-age ≥ 2 ×（hello-time + 1）

Instance

```
Switch> enable
Switch#configure terminal
```

```
Switch(config)#spanning-tree hello-time 3
```

6.9 The Maximum Hop of Spanning-tree

Command

spanning-tree max-hops <hops>

no spanning-tree max-hops

View

Configure Mode

Default Level

2: Configuration level

Parameters

<hops> : the maximum hops of MST domain are in the range <1-40>.

Description

spanning-tree max-hops: this command is used to configure the maximum number of hops of the MST domain.

no-spanning -tree max-hops: this command restores max-hops as the default.

By default, the max-hops is 20.

Starting from the root bridge of spanning tree in MST domain, every time configuration message in domain (namely BPDU message) is forwarded by a device, the hop number is reduced by 1; Devices discard configuration messages with 0 hops received, preventing devices outside the maximum hops from participating in the spanning tree calculation, limiting the size of the MST domain.

If the current device becomes the root bridge of CIST in MST domain or the root bridge of MSTI, the maximum hop number of this device configuration will become the network diameter of this spanning tree, limiting the scale of this spanning tree in the current MST domain. Devices that do not generate root Bridges in the MST domain will use the maximum number of hops set by the root bridge.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree max-hops 24
```

6.10 The Rate that the Spanning Tree Sends a BPDU

Command

```
spanning-tree transmit-holdcount <count>
no spanning-tree transmit-holdcount
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

<count> : maximum number of message sent per second, range is <1-10>.

Description

spanning-tree transmit-holdcount: this command is used to configure the maximum rate of sending the BPDU of the port.

no spanning-tree transmit-holdcount: this command is used to restore the maximum rate of sending the BPDU of the port to default value.

By default, transmit-holdcount is 3.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree transmit-holdcount 10
```

6.11 Compatible with Cisco MSTP Mode

Command

```
spanning-tree cisco-interoperability (enable | disable)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree cisco-interoperability enable: this command is used to enable compatibility with the cisco MSTP pattern.

By default, cisco MSTP mode is not compatible.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree cisco-interoperability enable
```

6.12 Global Edge Port BPDU Filtering

Command

spanning-tree portfast bpdu-filter

no spanning-tree portfast bpdu-filter

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree portfast bpdu-filter: this command is used to enable the global portfast bpdu-filter function.

no-spanning -tree portfast bpdu-filter: this command disables the global portfast bpdu-filter function.

By default, global portfast bpdu-filter is disabled.

The portfast features (bpdu-filter and bpdu-guard) both need to be valid on the portfast port (see related command spanning-tree portfast). The portfast feature can be enabled in configure mode or under the port (see the relative commands under the port). There are only enable and disable two state in configure mode, while there are enable, disable and default three states under the port. When the portfast feature configured under the port is default, the actual running portfast feature under the port will be the same as the global portfast feature. When the portfast feature configured of the port is enable or disable, the actual running portfast feature of the port will be

consistent with the portfast feature configured on the port. Use the show spanning-tree interface command to view relative details.

By default, the global portfast bpdu-filter function is disabled.

The portfast function is mainly used to connect devices such as terminals or servers, which needs fast convergence ports, similar to edgeport. Portfast must be enabled if the port needs to use the portfast feature.

Bpdu-filter function is used for portfast port, after enabling it, the port will not send and receive bpdu messages.

bpdu-guard function is used for portfast port. Once enabled, when the port receives bpdu message, the port will change into error-disable state (shutdown), which can be restored by errdisable-timeout function.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree portfast bpdu-filter

*Switch#show spanning-tree interface ge6
% Default: Bridge up - Spanning Tree Enabled  - topology change
detected
% Default: CIST Root Path Cost 0 - CIST Root Port 0 -  CIST Bridge
Priority 32768
% Default: Forward Delay 15 - Hello Time 2 - Max Age 20 - Transmit
Hold Count 6 - Max-hops 20
% Default: CIST Root Id 800000b25f5f0003
% Default: CIST Reg Root Id 800000b25f5f0003
% Default: CIST Bridge Id 800000b25f5f0003
% 0: 1 topology change(s)  - last topology change Thu Jan  1 08:00:29
1970

% Default: portfast bpdu-filter disabled
% Default: portfast bpdu-guard enabled
% Default: portfast errdisable timeout enabled
% Default: portfast errdisable timeout interval 300 sec
%   ge6: Port Number 910 - Ifindex 5006 - Port Id 838e - Role Disabled
- State Discarding
%   ge6: Designated External Path Cost 0 -Internal Path Cost 0
%   ge6: Configured Path Cost 20000  - Add type Explicit ref count
1
%   ge6: Designated Port Id 0 - CIST Priority 128  -
%   ge6: Message Age 0 - Max Age 0
```

```
%   ge6: CIST Hello Time 0 - Forward Delay 0
%   ge6: CIST Forward Timer 0 - Msg Age Timer 0 - Hello Timer 0 -
topo change timer 0
%   ge6: forward-transitions 0
%   ge6: Version Multiple Spanning Tree Protocol - Received None
- Send MSTP
%   ge6: No portfast configured - Current  portfast off
%   ge6: portfast bpdu-guard  default  - Current portfast
bpdu-guard on
%   ge6: portfast bpdu-filter default  - Current portfast
bpdu-filter off
%   ge6: no root guard configured    - Current root guard off
%   ge6: Configured Link Type point-to-point - Current
point-to-point
%   ge6: No auto-edge configured - Current port Auto Edge off
```

6.13 Global Edge Port BPDU Protection

Command

spanning-tree portfast bpdu-guard
no spanning-tree portfast bpdu-guard

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree portfast bpdu-guard: this command is used to enable the global portfast bpdu-guard function.
no spanning-tree portfast bpdu-guard: this command is used to disable the global portfast bpdu-guard function.
By default, global portfast bpdu-guard is disabled.

The portfast features (bpdu-filter and bpdu-guard) both need to be valid on the portfast port (see related command spanning-tree portfast). The portfast feature can be enabled in configure mode or under the port (see the relative commands under the port). There are only enable and disable two state in configure mode, while there are

enable, disable and default three states under the port. When the portfast feature configured under the port is default, the actual running portfast feature under the port will be the same as the global portfast feature. When the portfast feature configured of the port is enable or disable, the actual running portfast feature of the port will be consistent with the portfast feature configured on the port. Use the show spanning-tree interface command to view relative details.

By default, the global portfast bpdu-filter function is disabled.

The portfast function is mainly used to connect devices such as terminals or servers, which needs fast convergence ports, similar to edgeport. Portfast must be enabled if the port needs to use the portfast feature.

Bpdu-filter function is used for portfast port, after enabling it, the port will not send and receive bpdu messages.

Bpdu-guard function is used for portfast port. Once enabled, when the port receives bpdu message, the port will change into error-disable state (shutdown), which can be restored by errdisable-timeout function.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree portfast bpdu-guard
```

6.14 Port error-disable Timeout Recovery

Command

spanning-tree errdisable-timeout (enable | disable)

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree errdisable-timeout enable: this command is used to configure the error-disable timeout recovery function of the port.

spanning-tree errdisable-timeout disable: this command is used to disable the error-disable timeout recovery function of the port.

By default, the port error-disable timeout recovery function is enabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree errdisable-timeout enable
```

6.15 Port error-disable Recovery Interval

Command

spanning-tree errdisable-timeout interval <seconds>

View

Configure Mode

Default Level

2: Configuration level

Parameters

<seconds>: the recover interval of error-disable, in the range <10-1000000>.

Description

spanning-tree errdisable-timeout interval: this command is used to configure the time interval for recovery after error-disable of the port .

no spanning-tree errdisable-timeout interval: The command to restore the port after error-disable is restored at the default interval. errdisable-timeout interval is 300 seconds by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#spanning-tree errdisable-timeout interval 400
```

6.16 Edge

Command

spanning-tree portfast
no spanning-tree portfast

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree portfast: this command is used to enable the portfast function of the port.

no spanning-tree portfast: this command is used to disable the portfast function.

By default, port portfast is disabled.

The portfast function is mainly used to connect terminals or servers and other devices, requiring fast convergence of the port. Portfast must be enabled if the port needs to use the portfast feature.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree portfast
```

6.17 BPDU Filter of Edge Port

Command

spanning-tree portfast bpdu-filter (enable | disable | default)

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree portfast bpdu-filter: this command is used to configure the mode of the portfast bpdu-filter feature under the port, enable, disable, default respectively.

By default, the port portfast bpdu-filter is in default.

The portfast features (bpdu-filter and bpdu-guard) both need to be valid on the portfast port (see related command spanning-tree portfast). The portfast feature can be enabled in configure mode or under the port (see the relative commands under the port). There are only enable and disable two state in configure mode, while there are

enable, disable and default three states under the port. When the portfast feature configured under the port is default, the actual running portfast feature under the port will be the same as the global portfast feature. When the portfast feature configured of the port is enable or disable, the actual running portfast feature of the port will be consistent with the portfast feature configured on the port. Use the show spanning-tree interface command to view relative details.

By default, the global portfast bpdu-filter function is disabled.

The portfast function is mainly used to connect devices such as terminals or servers, which needs fast convergence ports, similar to edgeport. Portfast must be enabled if the port needs to use the portfast feature.

Bpdu-filter function is used for portfast port, after enabling it, the port will not send and receive bpdu messages.

bpdu-guard function is used for portfast port. Once enabled, when the port receives bpdu message, the port will change into error-disable state (shutdown), which can be restored by errdisable-timeout function.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree portfast bpdu-filter enable
```

6.18 BPDU Filter of Edge Port

Command

spanning-tree portfast bpdu-guard (enable | disable | default)

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree portfast bpdu-guard: this command is used to configure the modes of the portfast bpdu-guard feature of the port, they are enable, disable, default.

By default, the port portfast bpdu-guard is in default.

The portfast features (bpdu-filter and bpdu-guard) both need to be valid on the portfast port (see related command spanning-tree portfast). The portfast feature can be enabled in configure mode or under the port (see the relative commands under the port). There are only enable and disable two state in configure mode, while there are enable, disable and default three states under the port. When the portfast feature configured under the port is default, the actual running portfast feature under the port will be the same as the global portfast feature. When the portfast feature configured of the port is enable or disable, the actual running portfast feature of the port will be consistent with the portfast feature configured on the port. Use the show spanning-tree interface command to view relative details.

By default, the global portfast bpdu-filter function is disabled.

The portfast function is mainly used to connect devices such as terminals or servers, which needs fast convergence ports, similar to edgeport. Portfast must be enabled if the port needs to use the portfast feature.

Bpdu-filter function is used for portfast port, after enabling it, the port will not send and receive bpdu messages.

bpdu-guard function is used for portfast port. Once enabled, when the port receives bpdu message, the port will change into error-disable state (shutdown), which can be restored by errdisable-timeout function.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree portfast bpdu-guard enable
```

6.19 Automatical Switching Edge Port

Command

```
spanning-tree autoedge
no spanning-tree autoedge
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree autoedge: this command is used to configure ports to automatically switch to edge ports.

no spanning-tree autoedge: this command conjures ports that cannot be automatically switched to non-edge ports.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree autoedge
```

6.20 Root Port Protection

Command

spanning-tree guard root

no spanning-tree guard root

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree guard root: this command is used to configure the root port protection function.

no spanning-tree guard root: this command concatenates the port to not enable root port protection.

By default, root port guard is not enabled.

guard root is a mandatory root protection that stops accidental (or illegal) switches becoming root Bridges in the network. when the guard root port (designated ports) is opened and receives better BPDU packets, the port will enter a Listening (STP) or discarding state (RSTP, MSTP).

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
```

```
Switch(config-ge8)#spanning-tree guard root
```

6.21 Port Spanning-tree Enablement

Command

spanning-tree (enable | disable)

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

spanning-tree enable: this command is used to enable the spanning tree function of the port.

spanning-tree disable: this command is used to disable the spanning tree function of the port.

By default, the port spanning tree function is enabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree enable
```

6.22 Port Hello-time

Command

spanning-tree hello-time <seconds>

no spanning-tree hello-time <seconds>

View

Interface Mode

Default Level

2: Configuration level

Parameters

<seconds> ： hello-time，range is 1-10.

Description

spanning-tree hello-time: this command is used to configure the hello-time of the port.

no spanning-tree hello-time: this command is used to restore the hello-time of the port to its default value.

By default, the hello-time of the port is 2.

It is better to use global configuration commands for hello-time.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree hello-time 3
```

6.23 Port Connection Type

Command

```
spanning-tree link-type (auto | point-to-point | shared)
no spanning-tree link-type
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

Auto: automatically determines the connection type, point-to-point or shared, based on duplex mode.

Point-to-point: specifies the port type as point-to-point.

Shared: specifies the port type as shared.

Description

spanning-tree link-type: this command is used to modify the link type of the port.

no spanning-tree link-type: this command is used to restore the link type of the port to the default value.

By default, the link type of the port is auto.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree link-type point-to-point
```

6.24 Port Priority

Command

spanning-tree [instance <instance_id>] priority <priority>
no spanning-tree instance <instance_id> priority

View

Interface Mode

Default Level

2: Configuration level

Parameters

<instance-id> : represents the number of MSTI in the range 0-16.

<priority> : port priority, the range is 0-240.

Description

spanning-tree priority: this command is used to configure the port priority.

no spanning-tree priority: this command is used to restore the port priority to the default.

By default, the port priority is 128.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree priority 32
```

6.25 Cost

Command

spanning-tree [instance <instance_id>] path-cost <cost>
no spanning-tree instance <instance_id> path-cost

View

Interface Mode

Default Level

2: Configuration level

Parameters

<instance-id> : represents the number of MSTI in the range 0-16.

<cost> : means the cost value of the port, ranging from 1-200000000.

Description

spanning-tree path-cost: this command is used to configure the port cost.

no spanning-tree path-cost: this command is used to restore the port cost as the default.

By default, the port cost is 20000000.

When the port cost is the default value, the actual cost of link up port is converted according to the port rate, the rate of 10M corresponds to the cost of 2000000, and 100M corresponds to the cost of 200000.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree path-cost 1000
```

6.26 Port Restricted Election

Command

```
spanning-tree [instance <instance_id>] restricted-role
no spanning-tree instance <instance_id> restricted-role
```

View

Interface Mode

Default Level

2: Configuration level

Parameters

<instance-id> : the number of MSTI in the range 0-16.

Description

spanning-tree restricted-role: the command is used to configure ports to restrict elections so that ports cannot be elected as root ports.

no spanning-tree restricted-role: the command is used to cancel port restricted elections.

By default, the port does not restrict elections.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
```

```
Switch(config-ge8)#spanning-tree restricted-role
```

6.27 Port Restriction TC

Command

spanning-tree [instance <instance_id>] restricted-tcn
no spanning-tree instance <instance_id> restricted-tcn

View

Interface Mode

Default Level

2: Configuration level

Parameters

<instance-id> : the number of MSTI in the range 0-16.

Description

spanning-tree restricted-tcn: the command is used to configure port restriction processing for receiving TC bits in BPDU message.

no spanning-tree restricted-tcn: the command is used to cancel the port restriction processing of the TC bit in the received BPDU message.

By default, no restriction on the port.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#spanning-tree restricted-tcn
```

6.28 Display Spanning-tree Detail Information

Command

show spanning-tree (*interface IFNAME* |)

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Interface IFNAME: displays state information of the specified port.

Description

show spanning-tree: this command is used to display the details of spanning-tree.

Instance

```
Switch#show spanning-tree
% Default: Bridge up - Spanning Tree Disabled
% Default: CIST Root Path Cost 0 - CIST Root Port 0 -  CIST Bridge
Priority 32768
% Default: Forward Delay 15 - Hello Time 2 - Max Age 20 - Transmit
Hold Count 6 - Max-hops 20
% Default: CIST Root Id 800000226f0100a3
% Default: CIST Reg Root Id 800000226f0100a3
% Default: CIST Bridge Id 800000226f0100a3
% 0: 0 topology change(s)  - last topology change Thu Jan  1 08:00:00
1970

% Default: portfast bpdu-filter disabled
% Default: portfast bpdu-guard disabled
% Default: portfast errdisable timeout disabled
% Default: portfast errdisable timeout interval 300 sec
%   ge1: Port Number 1 - Ifindex 5001 - Port Id 8001 - Role Disabled
- State Discarding
%   ge1: Link down - Spanning Tree Disabled
%   ge1: Designated External Path Cost 0 -Internal Path Cost 0
%   ge1: Configured Path Cost 20000000  - Add type Explicit ref count
1
%   ge1: Designated Port Id 0 - CIST Priority 128  -
%   ge1: Message Age 0 - Max Age 0
%   ge1: CIST Hello Time 0 - Forward Delay 0
%   ge1: CIST Forward Timer 0 - Msg Age Timer 0 - Hello Timer 0 -
topo change timer 0
%   ge1: forward-transitions 0
%   ge1: Version MSTP - Received None - Send MSTP
%   ge1: Auto edge - On
%   ge1: Portfast - Off
%   ge1: Edge port - False
%   ge1: Bpdu Guard  - Disabled (Config - default)
%   ge1: Bpdu filter - Disabled (Config - default)
%   ge1: Link Type - point-to-point (Config - auto)
%   ge1: Root Guard - Off
```

6.29 Display the Basic Information of the Spanning Tree

Command

show spanning-tree (*instance* <*instance-id*>|) brief

View

Privileged Exec Mode

Default Level

1: View level

Parameters

<instance-id> : the number of MSTI in the range 0-16.

Description

The show spanning-treebrief command is used to show information for spanning-tree.

Instance

```
Switch#show spanning-tree brief
MST  Port           Role        State
0    ge10           Designated   Forwarding
```

7 ERPS Configuration

7.1 Enter ERPS Instance Configuration View

Command

erps instance config

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

erps instance config: this command is used to enter the ERPS instance configuration view.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
```

7.2 Create ERPS Instance Name

Command

erps creat erps-name <*NAME*>

no erps creat erps-name <*NAME*>

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >: ERPS instance name

Description

erps creat erps-name: the command is used to create an ERPS instance and specify the instance name.

By default, no configuration.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
```

7.3 ConfigureERPS Instance ID

Command

erps <*NAME*> set instanceID <*instance*>

no erps <*NAME*> set instanceID

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name

< instance > : MSTP instance number, the range is 0-16

Description

erps set instanceID: the command is used to configure the ERPS protection instance (configured by the spanning tree).

By default, no configuration.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set instanceID 1
```

7.4 Specify the Ring Instance Corresponding to the ERPS Instance

Command

erps <NAME> set ring <NAME>

no erps <NAME> set ring

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name

< NAME > : ring instance name of ERPS

Description

erps set ring: this command is used to specify the ring instance corresponding to the ERPS instance (the ring instance is created and configured by the command in ring mode).

By default, no configuration.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set ring 1
```

7.5 Specify the Timer Instance Corresponding to the ERPS Instance

Command

erps <*NAME*> set timer <*NAME*>

no erps <*NAME*> set timer

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

< NAME > : timer instance name of ERPS.

Description

erps set ring: this command is used to specify the timer instance corresponding to the ERPS instance (the timer instance is created and configured by the command in ring mode).

By default, no configuration.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set timer 1
```

7.6 ERPS Instance Device Role

Command

erps <*NAME*> set role {rpl-owner|neighbor|interconnection|other}

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps set role: this command is used to specify the role of the ERPS instance in the ring network.

By default, it is other.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set role rpl-owner
```

7.7 ERPS Instance Ring Role

Command

erps <*NAME*> set ring-role { major-ring| sub-ring}

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps set ring-role: this command is used to specify the role of the ERPS instance in the ring network.

By default, it is a major-ring role.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set role-ring major-ring
```

7.8 Major Instance Name of ERPS Instance

Command

erps <*NAME*> set major-instance-name <*NAME*>

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS subinstance name.

< NAME >：ERPS major instance name.

Description

erps set majority-instance-name: this command is used to set the major instance of ERPS for the specified subinstance of ERPS, and is executed only if the specified instance of ERPS is a subring.

By default, no configuration.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set role-ring sub-ring
Switch(config-erps-instance)#erps 1 set major-instance-name 2
```

7.9 ERPS Instance Protocol Message Management VLAN

Command

erps <*NAME*> set raps-channel <*vlan*>

no erps <*NAME*> set raps-channel

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

< vlan > : VLAN of raps protocol message, the range is 1-4094.

Description

erps set raps-channel: this command is used to set the raps protocol message channel for the erps instance.

By default, it is 0 and invalid VLAN.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set raps-channel 10
```

7.10 ERPS InstanceVirtual Channel

Command

erps <*NAME*> set virtual-channel {enable|disable}

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps set ring-role: this command is used to set whether raps protocol massage are going through virtual channels (note: virtual channels are not currently supported). By default, it is default.

Instance

-

7.11 ERPS Instance Reverse Mode

Command

erps <*NAME*> set revertive {enable|disable}

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps set revertive: command is used to configure the work mode of ERPS instance, enable is revertive mode and disable is irreversible mode.

By default, it is enable, that is reversible mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 set revertive disable
```

7.12 ERPS Instance Force-switch or Manual-switch

Command

erps <*NAME*> command { force-Switch| manual-Switch}

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps command: this command is used to perform forced or manual switch commands of ERPS instance.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 command force-Switch
```

7.13 ERPS Instance Clear Command

Command

erps <*NAME*> command clear

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps command clear: this command is used to configure the ERPS instance to perform the clear command.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 command clear
```

7.14 ERPS Instance Enablement

Command

erps <*NAME*> {start|stop}

View

ERPS instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

Description

erps start|stop: this command is used to start or stop an ERPS instance.

By default, the ERPS instance is in the stop state.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps instance config
Switch(config-erps-instance)#erps creat erps-name 1
Switch(config-erps-instance)#erps 1 start
```

7.15 Enter Ring Instance Configuration View

Command

erps ring config

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

erps ring config: this command is used to enter the ERPS ring configuration view.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps ring config
```

7.16 Create Ring Instance Name

Command

ring creat ring-name <*NAME*> ring-id <*ring-id*>

no ring creat ring-name <*NAME*>

View

ERPS ring instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >: ERPS ring name.

< ring-id > : ERPS ring ID, the range is1-239.

Description

erps creat ring-name: this command is used to create the RING instance and specify the RING name and RING ID.

By default, no configuration.

RING ID will be the last byte of the MAC destination of the raps message.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps ring config
Switch(config-erps-ring)#ring creat ring-name 1 ring-id 1
```

7.17 Ring Instance Interface

Command

ring <*NAME*> set east-ifname <*if-name*> west-ifname <*if-name*>

View

ERPS ring instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

<if-name>: port name.

Description

ring set east-ifname: this command is used to configure the ring port for the specified ring instance.

By default, no configuration.

Note:

1. ERPS ring ports can be normal physical ports or static aggregation groups.

2. ERPS ring port cannot be opened at the same time with other layer 2 protocols (MSTP, SWRING, etc., when ERPS protection is not 0, it can be opened at the same time with MSTP).

Instance

```
Switch> enable
Switch#configure terminal
```

```
Switch(config)#erps ring config
Switch(config-erps-instance)#ring creat ring-name 1
Switch(config-erps-instance)#ring 1 set east-ifname ge1
west-ifname ge2
```

7.18 Ring Instance Network Level

Command

ring <*NAME*> set ring-level <*level*>

View

ERPS ring instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name.

<level> : ring grade, the range is 1-7.

Description

erps set ring-level: this command is used to configure the RING level for the specified RING instance.

By default, the RING level is 1.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps ring config
Switch(config-erps-ring)#ring creat ring-name 1
Switch(config-erps-ring)#ring 1 set ring-level 2
```

7.19 Enter Timer Instance Configuration View

Command

erps timer config

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

erps timer config: this command is used to enter the ERPS timer configuration view.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps timer config
```

7.20 Create Timer Instance Name

Command

timer creat timer-name <*NAME*>

no timer creat timer-name <*NAME*>

View

ERPS Timer Instance Configuration View

Default Level

2: Configuration level

Parameters

< NAME >：ERPS timer instance name.

Description

timer creat timer-name: this command is used to create a timer instance and specify the timer instance name.

By default, no configuration.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps timer config
Switch(config-erps-time)#timer creat timer-name 1
```

7.21 WTB Timer

Command

timer <*NAME*> set wtb <*interval*>

View

ERPS timer instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS timer instance name.

<interval> : WTB timer value, the range is 1-12min.

Description

timer set wtb: this command is used to create the timing cycle of the TIMER instance WTB timer.

By default, it is 5min.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps timer config
Switch(config-erps- time)#timer 1 set wtb 1
```

7.22 WTR Timer

Command

timer <*NAME*> set wtr <*interval*>

View

ERPS timer instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS timer instance name.

<interval> : WTR timer value, the range is 1-12min.

Description

timer set wtr: this command is used to create the timing cycle of the timer instance WTR timer.

By default, it is 5min.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#erps timer config
Switch(config-erps- time)#timer 1 set wtr 1
```

7.23 GuardTimer

Command

timer <*NAME*> set guard <*interval*>

View

ERPS timer instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS timer instance name.

<interval> : guard timer value, the range is 10-2000ms.

Description

timer set guard: this command is used to create the timing cycle of TIMER instance guard timer.

By default, it is 500ms.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps timer config
Switch(config-erps- time)#timer 1 set guard 1000
```

7.24 HoldTimer

Command

timer <*NAME*> set hold <*interval*>

View

ERPS timer instance configuration view

Default Level

2: Configuration level

Parameters

< NAME >：ERPS timer instance name.

<interval> : hold timer value, the range is 0-10s.

Description

timer set hold: this command is used to create the timing cycle of TIMER instance hold timer.

By default, it is 0.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#erps timer config
Switch(config-erps- time)#timer 1 set hold 1
```

7.25 Display ERPS Instance Information

Command

show {erps <*NAME*>| erps-all}

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

< NAME >：ERPS instance name

Description

show erps: this command is used to display the ERPS instance information.

Instance

```
Switch#show erps 1

---------------ERPS INSTANCE INFORMATION START-----------------
ERPS  Name:1                          ERPS Version:1
ERPS-STATE:ERPS_PROTECTION            Device  Role:NEIGHBOR
InstanceID:0                          Channel Mode:NON-VRITUAL
ERPS  revert  mode:REVERTIVE
Major InstanceName:NULL
R-APS Vlan Channel:10
Data  Vlan Channel:NULL
WTR    Timer State:Stop
WTB    Timer State:Stop
Guard  Timer State:Stop
```

```
Hold   Timer State:Stop
Hello  Timer State:Running
Instance Run State:Running
-----------------RING INSTANCE INFORMATION START---------------
Ring Name:1
East Port:ge2    Port Role:OTHER-PORT           Port State:BLOCK
West Port:ge1    Port Role:RPL-NEIGHBOR-PORT    Port State:BLOCK
Ring   ID:1      Ring Level:1                Ring Role:Major Ring
----------------RING INSTANCE INFORMATION END-------------------
----------------TIMER INSTANCE INFORMATION START----------------
Timer        Name:1
WTR    Timer Value:1 min
WTB    Timer Value:5 min
Guard  Timer Value:10 ms
Hold   Timer value:0 ms
Hello  Timer value:5 s
---------------TIMER INSTANCE INFORMATION END-----------------
----------------ERPS INSTANCE INFORMATION END-----------------
```

7.26 Display Ring Instance Information

Command

show erps {ring <*NAME*>| ring-all}

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

< NAME >: ERPS ring instance name.

Description

show erps ring: this command is used to display the ERPS ring instance information.

Instance

```
Switch#show erps ring 1
--------------RING INSTANCE INFORMATION START---------------
Ring Name:1
East Port:ge2     Port Role:OTHER-PORT           Port State:BLOCK
West Port:ge1     Port Role:RPL-NEIGHBOR-PORT    Port State:BLOCK
Ring   ID:1       Ring Level:1                Ring  Role:Major Ring
```

```
--------------RING INSTANCE INFORMATION END-----------------
```

7.27 Display Timer Instance Information

Command

show erps {timer <*NAME*>| timer-all}

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

< NAME >：ERPS timer instance name.

Description

show erps timer: this command is used to display the instance information of the ERPS timer.

Instance

```
Switch#show erps timer 1
------------TIMER INSTANCE INFORMATION START------------
Timer        Name:1
WTR    Timer Value:1 min
WTB    Timer Value:5 min
Guard  Timer Value:10 ms
Hold   Timer value:0 ms
Hello  Timer value:5 s
------------TIMER INSTANCE INFORMATION END-------------
```

8 Remote Loop Detection Configuration

GSTP means the remote loop detection function. Switch connect iwth the client, if the client network has a loop, it will affect the entire network. The GSTP is designed to solve this problem. After the switch port enabled the remote loop detection function, it will periodically broadcast and send detection messages. When the switch port enabled the remote loop detection function, it will periodically broadcast the detection message. If the client network has a loop, the switch will receive detection message sent by itself. The switch will regard client network has loop network and set the ports that connect with client port to discarding or shutdown according to processing strategy.

8.1 Enable Configuration

Command

```
loop-detect enable
no loop-detect enable
```

View

Configure Mode

Default Level

2. Configuration level

Parameters

-

Description

loop-detect enable: this command is used to enable loop-detect function.
no loop-detect enable: this command is used to disable loop-detect function.

Instance

```
Switch#configure terminal
Switch(config)#loop-detect enable
```

8.2 Port Loopback Detection

Command

loop-detect force up
loop-detect protect vlan <1-4094>
loop-detect resume time <300-600>
loop-detect tx-interval time <10-300>

View

Interface Mode

Default Level

2. Configuration level

Parameters

<1-4094> : VLAN ID and the range is 1-4094.

<300-600>: the recovery time of the port, ranging from 300-600 seconds.

<10-300> : probe packet detection interval, the range is 10-300 seconds.

Description

Loop-detect force up: force open the port closed by the protocol (this command does not save).
Loop-detect protect vlan <1-4094> : specify protection VLAN and enable port check.
loop-detect resume time <300-600>: Recovery port time.
loop-detect tx-interval time <10-300>: The time interval between sending probe packets.

Instance

```
Switch>enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#loop-detect protect vlan 1
```

9 IGMP Configuration

9.1 IGMP Enablement

Command

ip igmp

no ip igmp

View

Vlan-if Ethernet port configuration mode

Default Level

2: Configuration level

Parameters

-

Description

Ip igmp: this command is used to enable IGMP on the interface.

no ip igmp: this command is used to disable IGMP on the interface.

By default, IGMP on the interface is disabled.

Only when IGMP is enabled on the interface can the configuration of other IGMP features on that interface take effect.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp
```

9.2 IGMP Version

Command

```
ip igmp version VERSION-NUMBER
no ip igmp version
```

View

Vlan-if Ethernet port configuration mode

Default Level

2: Configuration level

Parameters

version-number: means the version number of IGMP, with a value range of 1-3.

Description

ip igmp version: this command is used to configure the version of IGMP on the interface.

no ip igmp version: this command is used to restore the IGMP to the default value. By default, the version of IGMP is IGMPv3.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp version 2
```

9.3 The Times the IGMP Query Started

Command

```
ip igmp startup-query-count <2-10>
no ip igmp startup-query-count
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<2-10> : specifies the number of times IGMP queries are started, with a value range of 2-10.

Description

ip igmp startup-query-count: this command is used to configure the times that the IGMP queries is started on the interface.

no ip igmp startup-query-count: this command is used to restore to the default value. By default, the number of starts of an IGMP querier is equal to the robustness of the IGMP querier.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp startup-query-count 5
```

9.4 Start Query Interval of IGMP Querier

Command

ip igmp startup-query-interval <1-18000>

no ip igmp startup-query-interval

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<1-18000> : specifies the start query interval of the IGMP query, ranging from 1-18000 in seconds.

Description

ip igmp startup-query-interval: this command is used to configure the start query interval of the IGMP querier on the interface.

no ip igmp startup-query-interval: this command is used to restore to the default value. By default, the IGMP query starts at a query interval 1/4 of the time it takes to send IGMP universal group query messages. The interval of sending IGMP universal group query packet is 125 seconds, then the interval of launching IGMP querier is 125÷4=31 (seconds).

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
```

```
Switch(config-vlanif1)#ip igmp startup-query-interval 20
```

9.5 The Robustness Factor of IGMP Querier

Command

```
ip igmp robustness-variable <2-7>
no ip igmp robustness-variable
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<2-7>: specifies the robustness of the IGMP query, ranging from 2 to 7. This coefficient is used to specify the default number of times the IGMP query sends the universal group query message at startup and the number of times the IGMP query sends the specific group query message after receiving the outgoing group message.

Description

ip igmp robustness-variable: this command is used to configure the robustness coefficient of the igmp query on the interface.

no ip igmp robustness-variable: this command is used to restore to the default value. By default, the robustness factor of IGMP querier is 2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp robustness-variable 3
```

9.6 IGMP Universal Group Query Message Time Interval

Command

```
ip igmp query-interval <1-1800>
no ip igmp query-interval
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<1-1800>: specifies the time interval for sending IGMP universal group query packet, ranging from 1 to 18000 in seconds.

Description

ip igmp query-interval: this command is used to configure the interval at which the igmp universal group query message is sent on the interface.

no ip igmp query-interval: this command is used to restore to the default value.

By default, the interval between sending IGMP universal group query packets is 125 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp query-interval 240
```

9.7 IGMP Lifetime of Other Queries

Command

```
ip igmp querier-timeout <60-300>
no ip igmp querier-timeout
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<60-300>: specifies the duration of IGMP other querier, ranging from 60 to 300 seconds.

Description

ip igmp querier-timeout: this command is used to configure the duration of other igmp queries on the interface.

no ip igmp querier-timeout: this command is used to restore to the default value.

By default, the existence time of IGMP other queries = the interval between sending IGMP universal group query packets × the robustness coefficient of IGMP query + the maximum response time of IGMP universal group query ÷2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp querier-timeout 180
```

9.8 Maximum Response Time of IGMP Universal Group Query Message

Command

```
ip igmp query-max-response-time <1-240>
no ip igmp query-max-response-time
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<1-240>: specifies the maximum response time of IGMP universal group query message, ranging from 1 to 240 in seconds.

Description

ip igmp query-max-response-time: this command is used to configure the maximum response time for IGMP universal group queries on the interface.

No ip igmp query-max-response-time: this command is used to restore the default. By default, the maximum response time for IGMP universal group query message is 10 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp query-max-response-time 20
```

9.9 The Number of IGMP Query Packets in a Particular Group

Command

```
ip igmp last-member-query-count <2-7>
no ip igmp last-member-query-count
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<2-7>: specifies the number of sending query message a particular group of IGMP, with a value range of 2-7.

Description

ip igmp last-member-query-count: this command is used to configure the number of sending query message of IGMP specific groups on the interface.

no ip igmp last-member-query-count: command is used to restore to the default value. By default, the number of sending IGMP specific group query message is 2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp last-member-query-count 3
```

9.10 Time Interval of IGMP Group Query Message

Command

```
ip igmp last-member-query-interval <1000-25500>
no ip igmp last-member-query-interval
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

<1000-25500>: specifies the time interval for sending IGMP specific group query message, ranging from 1000 to 25500 in milliseconds.

Description

ip igmp last-member-query-interval: the command is used to configure the interval at which the IGMP specific group query message is sent on the interface.

no ip igmp last-member-query-interval: the command is used to restore to the default value.

By default, the interval between sending IGMP specific group query message is 1000 milliseconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp last-member-query-interval 2000
```

9.11 IGMP Message with RA Option

Command

```
ip igmp ra-option
no ip igmp ra-option
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip igmp ra-option: the command is used to configure the dropping of igmp packets on the interface without the Router-Alert option.

no ip igmp ra-option: this command is used to restore the default value.

By default, the device does not check the Router-Alert option, which means that all received IGMP packets are sent to the upper protocol for processing, whether they carry the Router-Alert option.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp ra-option
```

9.12 Fast Aging ACL Group

Command

ip igmp immediate-leave group-list <ACL-NUMBER | ACL-NAME**>**

no ip igmp immediate-leave

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

acl-number: standard acl number, ranging from 1-99 or 1300-1999.

acl-name: extended acl name.

Description

ip igmp immediate-leave group-list: the command is used to configure the acl group address range of fast leave. The acl action must be permit.

no ip igmp immediate-leave: the command is used to restore to the default value. By default, when the interface is working on version 2 and version 3, upon receiving the igmp leave message, a group-specific query message is sent to determine whether to age the multicast member table entry. Once this capability is configured, the multicast member table entry can be aged immediately if the group address specified by the acl is within the group address specified by the acl.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 1300 permit 225.1.1.0 0.0.0.255
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp immediate-leave group-list 1300
```

9.13 Illegal Multicast Group

Command

```
ip igmp access-group <ACL-NUMBER | ACL-NAME>
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

acl-number: standard acl number, the value range is 1 ~ -99.

acl-name: extended acl name.

Description

Ip igmp access-group: this command is used to configure an invalid multicast group range. The action of the acl must be deny, and if the action is permit, mismatched multicast groups are considered legitimate.

no ip igmp access-group: the command is used to remove illegal multicast group range restrictions.

By default, there are no restrictions on the range of multicast groups that an interface can learn from.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 1300 deny 225.1.1.0 0.0.0.255
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp access-group 1300
```

9.14 Multicast Group Number Limit

Command

```
ip igmp limit VALUE [except <ACL-NUMBER | ACL-NAME > ]
no ip igmp limit
```

View

Configure Mode

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

Value: the maximum number of multicast groups allowed to be added by the global or interface, ranging from 1 to 1024.

acl-number: standard acl number, the value range is 1-99.

acl-name: extended acl name.

Description

ip igmp limit: this command is used to configure the maximum number of multicast groups that are allowed to be added to the global or interface.

no ip igmp limit: this command is used to restore to the default value. In the process of working, the device first determines whether it exceeds the global limit, then determines whether it exceeds the interface limit, or ignores the new multicast group learning.

An acl of type permit can be referenced by the except parameter, indicating that there are no restrictions on the number of multicast groups within the range specified by the acl.

By default, there is no limit to the number of multicast groups that can be added to a global or interface.

 Notes

When the configured limit value is less than the number of established multicast groups on the global or current interface, the system will not automatically delete the additional multicast groups.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip igmp limit 1000
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp limit 100
```

9.15 IGMP Message Source Address and Receive Interface Subnet Restrictions

Command

ip igmp offlink

no ip igmp offlink

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip igmp offlink: this command is used to remove the restriction that the source address of an igmp message must be in the same subnet as the receiving interface, except for querying message and leaving message.

no ip igmp offlink: this command is used to restore to the default value.

By default, the source address of an igmp message must be on the same subnet as the receiving interface. Once the restriction is removed, the source address of the message will be considered valid as long as it passes RPF check.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp offlink
```

9.16 Static Multicast

Command

ip igmp static-group <group-address> [source <source-address> | ssm-map]

no ip igmp static-group <group-address> [source <source-address> | ssm-map]

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

Group-address: specify the address of the multicast group, ranging from 224.0.1.0 to 239.255.255.255.

Source-address: specifies the address of the multicast source.

Ssm-map: obtain the address of multicast source by ssm-mapping function

Description

ip igmp static-group: this command is used to configure the interface to statically join a multicast group or multicast source group.

no ip igmp static-group: this command is used to restore to the default value. By default, the interface does not statically add any multicast groups or multicast source groups.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp static 225.1.1.1 source
192.168.1.10
```

9.17 Global IGMP SSM Mapping Enablement

Command

```
ip igmp ssm-map enable
no ip igmp ssm-map enable
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

ip igmp ssm-map enable: this command is used to enable the IGMP SSM Mapping function globally.

no IP igmp ssm-map enable: this command is used to disable the global IGMP SSM Mapping function.

By default, the IGMP SSM Mapping function is disabled.

Because IGMPv1/IGMPv2 cannot specify multicast source in the report message, it is necessary to have compatibility with IGMP SSM Mapping technology. This feature provides SSM services for the interface that receives vesion1 and version2 igmp report packets, with the source address specified by the ip igmp ssm-map static command.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip igmp ssm-map enable
```

9.18 IGMP SSM-Map Static Multicast

Command

ip igmp ssm-map static <ACL-NUMBER | ACL-NAME> <SOURCE-ADDRESS>
no ip igmp ssm-map static <ACL-NUMBER | ACL-NAME> <SOURCE-ADDRESS>

View

Configure Mode

Default Level

2: Configuration level

Parameters

acl-number: standard acl number, ranging from 1 ~ 99 or 1300 ~ 1999.

acl-name: extended acl name.

Source-address: the static mapping source address for SSM mapping.

Description

Ip igmp ssm-map static: this command is used to configure the IGMP SSM Mapping rule.

no ip igmp ssm-map: this command is used to delete the IGMP SSM Mapping rule.

IGMP SSM Mapping rules are not configured by default.

Because IGMPv1/IGMPv2 cannot specify multicast source in the report message, it is necessary to have compatibility with IGMP SSM Mapping technology. This feature needs to work with ip igmp ssm-map enable.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#access-list 1300 deny 225.1.1.0 0.0.0.255
Switch(config)#ip igmp ssm-map enable
Switch(config)#ip igmp ssm-map static 1300 192.168.1.10
```

9.19 Display IGMP Multicast Information

Command

```
show ip igmp groups [<IFNAME> | <GROUP-ADDRESS> | detail ]
```

View

Privileged Exec Mode

Default Level

1: View level

Parameters

ifname：vlanif interface.

group-address：ipv4 multicast address.

detail: outputs the details of the multicast group

Description

View the operation of the specified parameter or all the multicast groups.

Instance

```
Switch#show ip igmp groups detail
IGMP Connected Group Membership, Total is 1
Interface:     vlanif1
Group:       255.1.1.1
Uptime:      01:09:31
Group mode:   Exclude (Expires: 00:03:56)
Last reporter:   192.168.1.11
Source list is empty
```

9.20 Display IGMP Interface Information

Command

```
show ip igmp inteface <IFNAME>
```

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Ifname：vlanif interface

Description

View the configuration and operation of the interface with the specified parameters or all igmp enabled.

Instance

```
Switch#show ip igmp interface vlanif1
Interface vlanif1 (Index 3)
 IGMP Enabled, Active, Querier, Configured for version 2
 L3 mcast is not enabled on this interface
 Internet address is 192.168.1.254
 IGMP interface has 1 group-record states
 IGMP activity: 54 joins, 0 leaves
 IGMP query interval is 125 seconds
 IGMP Startup query interval is 31 seconds
 IGMP Startup query count is 2
 IGMP querier timeout is 255 seconds
 IGMP max query response time is 10 seconds
 Last member query response interval is 1000 milliseconds
 Group Membership interval is 260 seconds
 IGMP Last member query count is 2
 L2 mcast is not enabled on this interface
 IGMP Snooping is globally disabled
 IGMP Snooping is not enabled on this interface
 IGMP Snooping fast-leave is not enabled
 IGMP Snooping querier is not enabled
 IGMP Snooping report suppression is enabled
```

10 IGMP Snooping Configuration

10.1 IGMP SnoopingEnablement

Command

```
ip igmp snooping
no ip igmp snooping
```

View

Configure Mode

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip igmp snooping: this command is used to enable IGMP snooping on global or VLAN interfaces.

no ip igmp snooping: this command is used to disable igmp snooping on the global or VLAN interface.

IGMP snooping is disabled by default on the global or VLAN interfaces.

 Notes

Only when IGMP snooping is enabled on the global and VLAN interfaces can the configuration of the other IGMP snooping properties on that interface take effect.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip igmp snooping
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp snooping
```

10.2 IGMP SnoopingQuerier Enablement

Command

```
ip igmp snooping querier
no ip igmp snooping querier
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip igmp snooping querier: this command is used to enable IGMP Snooping querier.

no ip igmp snooping querier: this command is used to disable IGMP Snooping querier.

By default, the IGMP Snooping querier is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp snooping querier
```

10.3 IGMP Snooping Port Fast-leave Enablement

Command

```
ip igmp snooping fast-leave
no ip igmp snooping fast-leave
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip igmp-snooping fast-leave: this command is used to enable the fast leave function on all ports of the VLAN interface. Port fast leave means that when the switch receives the IGMP leaving a multicast group message sent by the host from a port, the port is directly deleted from the list of outgoing ports of the corresponding forwarding item.

no ip igmp-snooping fast-leave: this command is used to disable the fast leave function on all ports of the VLAN interface.

By default, the fast leave function of the port is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp snooping fast-leave
```

10.4 IGMP SnoopingPort Suppression Enablement

Command

```
ip igmp snooping report-suppresstion
no ip igmp snooping report-suppresstion
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip igmp snooping report-suppresstion: this command is used to enable port reporting suppression on all ports of the VLAN interface. When the port is in IGMPv1 or IGMPv2, when receiving the leave message, if the port report suppression function is enabled, the report message will not be sent.

no ip igmp-snooping report-suppresstion command：this command is used to disable port reporting suppression on all ports of the VLAN interface.

By default, port report suppression is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip igmp snooping report-suppresstion
```

10.5 Display the IGMP Snooping Multicast Group Routing Interface

Command

show ip igmp snooping mrouter inteface <IFNAME>

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Ifname：vlanif interface

Description

View the multicast group routing port of the specified interface

Instance

```
Switch#show ip igmp snooping mrouter interface vlanif1
VLAN     interface
1         ge2
```

10.6 Display IGMP SnoopingMulticast Statistics

Command

show ip igmp snooping statistics inteface <IFNAME>

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Ifname：vlanif interface

Description

View the multicast group statistics of the specified interface

Instance

-

11 GMRP and MMRP Configuration

As a carrier of an Attribute Registration Protocol, GARP (Generic Attribute Registration Protocol) can be used to propagate attributes. Application entities that follow the GARP protocol are called GARP applications,
GMRP(GARP Multicast Registration Protocol) is one of the applications of the generic property Registration Protocol (GARP) to provide a limited Multicast diffusion capability similar to IGMP probe technology.
As the carrier of an attribute registration protocol, MRP (Multiple Register Protocol) can be used to propagate attribute messages. The application entity following MRP Protocol is called MRP application. MVRP (Multiple VLAN Register Protocol) is one of the applications of MRP. MRP, MVRP and MMRP are the upgraded versions of GARP (Generic Attribute Registration Protocol), GVRP (GARP VLAN Registration Protocol) and GMRP(GARP Multicast Registration Protocol) respectively, which improve the efficiency of Attribute declaration. Used to replace GARP, GVRP, GMRP protocol. MVRP is used to publish and learn VLAN configuration information between devices, so that devices can automatically synchronize VLAN configuration and reduce the configuration work of network administrators. After the network topology changes, MVRP reissues and learns the VLAN according to the new topology, so as to update the network topology synchronously in real time.

11.1 GlobalGMRP or MMRP Enablement

Command

```
(gmrp | mmrp) (enable | disable)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

(gmrp | mmrp) enable: this command is used to enable the global GMRP (MMRP) function.

(gmrp | mmrp) disable: this command is used to disable the global GMRP（MMRP） function.

By default, the global GMRP（MMRP） is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gmrp enable
```

11.2 Port GMRP or MMRP Enablement

Command

(gmrp | mmrp) (enable | disable)

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

port (gmrp | mmrp) enable: this command is used to enable the GMRP (MMRP) function of the port.

port (gmrp | mmrp) disable: this command is used to disable the GMRP（MMRP） function of the port.

By default, the GMRP（MMRP）function of the port is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gmrp enable
```

```
Switch(config)#interface ge5
Switch(config-ge5)#gmrp enable
```

11.3 GMRP or MMRP Registration Mode

Command

(gmrp | mmrp) registration (fixed| forbidden | normal | restricted)

View

Interface Mode

Default Level

2: Configuration level

Parameters

fixed：Fixed mode.

forbidden：Forbidden mode.

normal: Normal mode, allowing registering and deregistering multicast dynamically.

restricted：Restricted mode.

Description

(gmrp | mmrp) registration: this command is used for GMRP port registration mode. By default, the GMRP port registration mode is normal.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gmrp enable
Switch(config)#interface ge5
Switch(config-ge5)#gmrp registration normal
```

11.4 GMRP or MMRP Timer

Command

(gmrp | mmrp) timer (join| leave| leaveall) <TIMER_VALUE>

View

Interface Mode

Default Level

2: Configuration level

Parameters

leaveall | join | leave: represent leave All, join and leave three timers respectively. After GARP is started on each port and LeaveAll timer is started at the same time, the port will send LeaveAll messages to the outer loop to cause the other ports to re-register all their property information. GARP port can send out each Join packet twice to ensure the reliable transmission of message, and the time interval between the two times is controlled by Join timer. The GARP port that receives the Leave packet enable the Leave timer, and if the Join packet is not received before the timer timeout, the corresponding attribute information will be logged out.
<TIMER_VALUE> : timer value, leave All defaults to 1000; The default value for join is 20; The default value for leave is 60. Unit: centiseconds.

Description

(gmrp | mmrp) timer: this command is used to configure leave All, join, and leave timers of the GARP ports.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gmrp enable
Switch(config)#interface ge5
Switch(config-ge5)#gmrp timer leave 100
```

11.5 Display GMRP or MMRP Configuration Information

Command

show (gmrp | mmrp) configuration

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show gmrp | mmrp configuration: this command is used to display GMP| MMRP configuration information.

Instance

```
*Switch#show gmrp configuration
```

11.6 Display GMRP or MMRP State Machine Information

Command

```
show (gmrp | mmrp) machine
```

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show gmrp | mmrp machine command: this command is used to display GMRP| MMRP state machine information.

Instance

```
Switch> enable
Switch#show gmrp machine
```

11.7 Display GMRP or MMRP Message Statistics

Command

```
show (gmrp | mmrp) statistics vlanid [<VLANID>]
```

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

vlanid：VLAN ID.

Description

show gmrp | mmrp statistics: this command is used to display GMRP| MMRP message statistics.

Instance

```
Switch> enable
Switch#show gmrp statistics vlanid 3
```

11.8 Display GMRP or MMRP Timer Information

Command

show (gmrp | mmrp) timer <IFNAME>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname：port name.

Description

show gmrp | mmrp timer: this command is used to display the GMRP| MMRP port timer information.

Instance

```
Switch> enable
Switch#show gmrp timer ge2
```

12 GVRP and MVRP Configuration

As a carrier of an Attribute Registration Protocol, GARP (Generic Attribute Registration Protocol) can be used to propagate attributes. Application entities that follow the GARP protocol are called GARP applications,GVRP (GARP VLAN Registration Protocol) is one of the applications of the common property Registration Protocol (GARP) for VLAN properties login and logout.

As the carrier of an attribute registration protocol, MRP (Multiple Register Protocol) can be used to propagate attribute messages. The application entity following MRP Protocol is called MRP application. MVRP (Multiple VLAN Register Protocol) is one of the applications of MRP. MRP, MVRP and MMRP are the upgraded versions of GARP (Generic Attribute Registration Protocol), GVRP (GARP VLAN Registration Protocol) and GMRP(GARP Multicast Registration Protocol) respectively, which improve the efficiency of Attribute declaration. Used to replace GARP, GVRP, GMRP protocol. MVRP is used to publish and learn VLAN configuration information between devices, so that devices can automatically synchronize VLAN configuration and reduce the configuration work of network administrators. After the network topology changes, MVRP reissues and learns the VLAN according to the new topology, so as to update the network topology synchronously in real time.

12.1 Globle GVRP or MVRP Enablement

Command

```
(gvrp | mvrp) (enable | disable)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

(gvrp | mvrp) enable: this command is used to enable the global GVRP (MVRP) function.

(gvrp | mvrp) disable: this command is used to disable the global GVRP (MVRP) function.

By default, the global GVRP (MVRP) function is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gvrp enable
```

12.2 GVRP or MVRP Dynamic VLAN Enablement

Command

(gvrp | mvrp) dynamic-vlan-creation (enable | disable)

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

(gvrp | mvrp) dynamic-vlan-creation enable: this command is used to enable the dynamic creation of VLAN functions.

(gvrp | mvrp) dynamic-vlan-creation disable: this command is used to disable the dynamic creation of VLAN functions.

By default, the dynamic creation VLAN feature is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gvrp enable
Switch(config)#gvrp dynamic-vlan-creation enable
```

12.3 Port GVRP or MVRP Enablement

Command

(gvrp | mvrp) (enable | disable)

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

port (gvrp | mvrp) enable: this command is used to enable port GVRP (MVRP) function.

port (gvrp | mvrp) disable: this command is used to disable the GVRP（MVRP）function.

By default, the GVRP（MVRP）function of the port is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gvrp enable
Switch(config)#gvrp dynamic-vlan-creation enable
Switch(config)#interface ge5
Switch(config-ge5)#gvrp enable
```

12.4 GVRP or MVRP Registration Mode

Command

(gvrp | mvrp) registration (fixed| forbidden | normal)

View

Interface Mode

Default Level

2: Configuration level

Parameters

fixed: Fixed mode, no dynamic VLAN registration on the port, only static VLAN declaration messages are sent.

forbidden: Forbidden mode, does not allow dynamic VLAN to register on the port, simultaneously deletes all VLANs except VLAN 1 on the port, only sends VLAN 1 declaration message.

Normal: normal mode, which allows dynamic VLANs to be registered on the port and simultaneously sends both static and dynamic VLAN declaration messages.

Description

(gvrp | mvrp) registration: this command is used for the GVRP port registration mode. By default, the GVRP port registration mode is normal.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gvrp enable
Switch(config)#interface ge5
Switch(config-ge5)#gvrp registration normal
```

12.5 GVRP or MVRP Timer

Command

(gvrp | mvrp) timer (join| leave| leaveall) <TIMER_VALUE>

View

Interface Mode

Default Level

2: Configuration level

Parameters

leaveall | join | leave: represent leave All, join and leave three timers respectively. After GARP is started on each port and LeaveAll timer is started at the same time, the port will send LeaveAll messages to the outer loop to cause the other ports to re-register all their property information. GARP port can send out each Join packet twice to ensure the reliable transmission of message, and the time interval between the two times is controlled by Join timer. The GARP port that receives the Leave packet enable the Leave timer, and if the Join packet is not received before the timer timeout, the corresponding attribute information will be logged out.

<TIMER_VALUE> : timer value, leave All defaults to 1000; The default value for join is 20; The default value for leave is 60. Unit: centiseconds.

Description

(gvrp | mvrp) timer: this command is used to configure leave All, join, and leave timers of the GARP ports.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#gvrp enable
Switch(config)#interface ge5
Switch(config-ge5)#gvrp timer join 10
```

12.6 Display Dynamic VLAN Information

Command

```
show vlan dynamic
```

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show vlan dynamic: this command is used to display dynamic vlan information.

Instance

```
Switch> enable
Switch#show vlan dynamic
```

12.7 Display GVRP or MVRP Configuration Information

Command

```
show (gvrp | mvrp) configuration
```

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show gvrp | mvrp configuration: this command is used to display GVRP| MVRP configuration information.

Instance

```
Switch> enable
Switch#show gvrp configuration
```

12.8 Display GVRP or MVRP State Machine Information

Command

show (gvrp | mvrp) machine

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show gvrp | mvrp machine: this command is used to display GVRP| MVRP state machine information.

Instance

```
Switch> enable
Switch#show mvrp machine
```

12.9 Display GVRP or MVRP Message Statistics

Command

show (gvrp | mvrp) statistics [<IFNAME>]

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname：port name.

Description

show gvrp | mvrp statistics: this command is used to display GVRP| MVRP message statistics.

Instance

```
Switch> enable
Switch#show mvrp statistics
```

12.10 Display GVRP or MVRP Timer Information

Command

show (gvrp | mvrp) timer <IFNAME>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname：port name.

Description

show gvrp | mvrp timer: this command is used to display timer information of GVRP| MVRP port .

Instance

```
Switch> enable
Switch#show mvrp time ge1
```

13 PIM-DM Configuration

13.1 PIM-DM Enablement

Command

ip pim dense-mode

no ip pim dense-mode

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip pim dense-mode: this command is used to enable the PIM-DM.

no ip pim dense-mode: this command is used to disable the PIM-DM.

By default, the PIM-DM is disabled.

Notes

- this command will only take effect when IP multicast routing is enabled globally.
- For relative configuration, refer to the command ip multicast-routing.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim dense-mode
```

13.2 PIM-DM DR Priority

Command

```
ip pim dense-mode dr-priority PRIORITY
no ip pim dense-mode dr-priority
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

PRIORITY: specify the priority of the election DR, and the value range is 0 ~ 4294967294. The higher the value, the higher the priority.

Description

ip pim dense-mode dr-priority: this command is used to configure the priority of the election DR on the interface.

no ip pim dense-mode dr-priority: this command is used to restore to the default value. By default, the priority of election DR is 1.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim dense-mode dr-priority 10
```

13.3 PIM-DM GenID Information

Command

```
ip pim dense-mode exclude-genid
no ip pim dense-mode exclude-genid
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip pim dense-mode exclude-genid: this command is used to configure the interface to send hello message without genID information.

The no ip pim dense-mode exclude-genid: this command is used to restore to the default value.

By default, the hello message sent from the interface is with GenID information.

GenID is a random value at the initial creation of the interface to identify unique interface information. With this information, device can detect whether the neighbor device has been restarted.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim dense-mode exclude-genid
```

13.4 PIM-DM Neighbor Reachable State Time

Command

ip pim dense-mode hello-holdtime TIME

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

TIME: specifies the time to maintain the reachable state of PIM neighbors, and the value range is 1 ~ 65535, in seconds. If specify 65535 seconds, the PIM neighbors are always reachable.

Description

ip pim dense-mode hello-holdtime: this command is used to configure the time on the interface to maintain the reachable state of the pim neighbors.

no ip pim dense-mode hello-holdtime: this command is used to restore to the default value.

By default, the PIM neighborhood reachable time is 105 seconds.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim dense-mode hello-holdtime 150
```

13.5 Time Interval of PIM-DM Hello Message

Command

```
ip pim dense-mode hello-interval INTERVAL
no ip pim dense-mode hello-interval
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

INTERVAL: specifies the time interval for sending Hello message, ranging from 1 to 65535 in seconds.

Description

ip pim dense-mode hello-interval: this command is used to configure the time interval between Hello messages on the interface.

no ip pim dense-mode hello-interval: this command is used to restore to the default value.

By default, the interval for sending Hello message is 30 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim dense-mode hello-interval 60
```

13.6 PIM-DM Neighbor Filter

Command

```
ip pim dense-mode neighbor-filter <ACL-NUMBER | ACL-NAME>
no ip pim dense-mode neighbor-filter
```

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

ACL-NUMBER: standard acl number, the value range is 1-99.

ACL-NAME: extended acl name.

Description

ip pim dense-mode neighbor-filter: this command is used to configure the illegal neighbor source address range, acl action must be deny, if the action is permit, it will not match even considered to be a legitimate neighbor.

no ip pim dense-mode neighbor-filter: this command used to cancel the configuration of the illegal neighbor source address range.

By default, there are no restrictions on the neighbor source addresses that an interface can learn from.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 20 deny 192.168.1.0 0.0.0.255
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim dense-mode neighbor-filter 20
```

13.7 IPM-DM SRM Message Enablement

Command

```
ip pim dense-mode state-refresh
no ip pim dense-mode state-refresh
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

ip pim dense-mode state-refresh: this command is used for global configuration to enable the sending of SRM messages.

no ip pim dense-mode state-refresh: this command is used to cancel the restore configuration.

By default, enable sending SRM messages globally.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#no ip pim dense-mode state-refresh
```

13.8 Time Interval of Sending PIM-DM SRM Message

Command

```
ip pim dense-mode state-refresh origination-interval < VALUE >
no ip pim dense-mode state-refresh origination-interval
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

VALUE: time interval to send SRM, ranging from 1 to -100, in seconds.

Description

ip pim dense-mode state-refresh origination-interval: this command is used to set the time interval between sending SRM messages globally.

no ip pim dense-mode state-refresh origination-interval: this command is used to restore to the default value.

By default, the interval for sending SRM message is 60 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim dense-mode state-refresh
origination-interval 30
```

13.9 Time Interval for PIM-DM to Receive SRM message

Command

ip pim dense-mode state-refresh rate limit-interval < VALUE >
no ip pim dense-mode state-refresh limit-interval

View

Configure Mode

Default Level

2: Configuration level

Parameters

VALUE: time interval to receive SRM message, ranging from 1 to 100, the unit is in seconds/piece.

Description

ip pim dense-mode state-refresh rate limit-interval: this command is used to set the time interval for receiving SRM messages globally.

no ip pim dense-mode state-refresh rate limit-interval: this command is used to restore to the default value.

By default, the interval for receiving SRM message is 30 seconds/piece.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim dense-mode state-refresh rate
limit-interval 60
```

13.10 Display PIM-DM Interface Information

Command

show ip pim dense-mode interfce [<IFNAME**> | detail]**

View

Privileged Exec Mode

Default Level

1: View level

Parameters

ifname: specify vlanif interface.

Detail: specify to view details.

Description

This command is used to view PIM information on the interface.

Instance

```
Switch#show ip pim dense-mode interface
Address         Interface VIFindex  Ver/    Nbr    DR    DR
                                    Mode   Count  Prior
10.3.101.252     vlanif10  0        v2/S   1      1
10.3.101.253
11.1.1.2         vlanif11  2        v2/S   1      1     11.1.1.3
172.24.0.2       vlanif50  3        v2/S   1      1     172.24.0.3

Switch#show ip pim dense-mode interface detail
vlanif10 (vif 0):
  Address 10.3.101.252, DR 10.3.101.253
  Hello period 30 seconds, Next Hello in 2 seconds
  Triggered Hello period 5 seconds
  Neighbors:
   10.3.101.253

vlanif11 (vif 2):
  Address 11.1.1.2, DR 11.1.1.3
  Hello period 30 seconds, Next Hello in 2 seconds
  Triggered Hello period 5 seconds
  Secondary addresses:
   11.1.1.1
  Neighbors:
   11.1.1.3

vlanif50 (vif 3):
  Address 172.24.0.2, DR 172.24.0.3
  Hello period 30 seconds, Next Hello in 3 seconds
  Triggered Hello period 5 seconds
  Neighbors:
   172.24.0.3
```

13.11 View the Local Multicast Group Members of PIM-DM

Command

show ip pim dense-mode local-members [<IFNAME>]

View

Privileged Exec Mode

Default Level

1: View level

Parameters

IFNAME：specify vlanif interface

Description

View the local multicast group members of PIM-DM of the current device.

Instance

```
Switch#show ip pim dense-mode local-members vlanif10
PIM Local membership information
vlanif10:
  (*, 225.2.2.2) : Include
```

13.12 Displays the PIM-DM Multicast Routing Table Entry

Command

show ip pim dense-mode mroute [detail]

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Detail: specify to view details.

Description

View the current PIM-DM multicast routing table entry.

Instance

-

13.13 Display PIM-DM Neighbor Information

Command

show ip pim dense-mode neighbor [detail]

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Detail: specify to view details.

Description

View the currently learning PIM-DM neighborhood running status.

Instance

```
Switch#show ip pim dense-mode neighbor
Neighbor        Interface         Uptime/Expires    Ver   DR
Address                                           Priority/Mode
10.3.101.253     vlanif10          01:53:56/00:01:17  v2    1 /
DR
11.1.1.3         vlanif11          01:53:57/00:01:18  v2    1 / DR
172.24.0.3       vlanif50          01:53:56/00:01:17  v2    1 / DR
```

13.14 Displays PIM-DM Next Hop Information

Command

show ip pim dense-mode nexhop

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

View the next hop information used by the PIM-DM module in the current device.

Instance

```
Switch#show ip pim dense-mode nexthop
Flags: N = New, R = RP, S = Source, U = Unreachable
Destination  Type  Nexthop   Nexthop      Nexthop  Nexthop Metric
Pref  Refcnt
               Num    Addr         Ifindex    Name
_____________________________________________________________________
_____________
10.3.101.111  ..S.  1        0.0.0.0        4              0
0     2
```

14 PIM-SM Configuration

14.1 PIM-SM Enablement

Command

ip pim sparse-mode

no ip pim sparse-mode

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip pim sparse-mode: this command is used to enable the PIM-SM.

no ip pim sparse-mode: this command is used to disable the PIM-SM.

By default, the PIM-SM is disabled.

Notes

- This command will only take effect when IP multicast routing is enabled globally.
- For relative configuration, refer to the command ip multicast-routing.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim sparse-mode
```

14.2 PIM-SM DR Priority

Command

ip pim sparse-mode dr-priority PRIORITY

no ip pim sparse-mode dr-priority

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

PRIORITY: specify the priority of the election DR, and the value range is 0 ~ 4294967294. The higher the value, the higher the priority.

Description

ip pim sparse-mode dr-priority: this command is used to configure the priority of the election DR on the interface.

no ip pim sparse-mode dr-priority: this command is used to restore to the default value.

By default, the priority of election DR is 1.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim sparse-mode dr-priority 10
```

14.3 PIM-SM GenID Information

Command

ip pim sparse-mode exclude-genid

no ip pim sparse-mode exclude-genid

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

ip pim sparse-mode exclude-genid: this command is used to configure the interface to send hello message without GenID information.

no ip pim sparse-mode dr-priority: this command is used to restore to the default value.

By default, the hello message sent from the interface is with GenID information.

GenID is a random value at the initial creation of the interface to identify unique interface information. With this information, device can detect whether the neighbor device has been restarted.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim sparse-mode exclude-genid
```

14.4 PIM-SM Neighbor Reachable State Time

Command

ip pim sparse-mode hello-holdtime TIME

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

TIME: specifies the time to maintain the reachable state of PIM neighbors, and the value range is 1 ~ 65535, in seconds. If specify 65535 seconds, the PIM neighbors are always reachable.

Description

ip pim sparse-mode hello-holdtime: this command is used to configure the time on the interface to maintain the reachable state of the pim neighbors.

no ip pim sparse-mode hello-holdtime: this command is used to restore to the default value.

By default, the PIM neighborhood reachable time is 105 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim sparse-mode hello-holdtime 150
```

14.5 Time Interval of PIM-SM Hello Message

Command

ip pim sparse-mode hello-interval INTERVAL
no ip pim sparse-mode hello-interval

View

VLAN-IF Interface Configuration View

Default Level

2: Configuration level

Parameters

INTERVAL: specifies the time interval for sending Hello message, ranging from 1 to 65535 in seconds.

Description

ip pim sparse-mode hello-interval: this command is used to configure the time interval between sending hello messages on the interface.

no ip pim sparse-mode hello-interval: this command is used to restore to the default value.

By default, the interval for sending Hello message is 30 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim sparse-mode hello-interval 60
```

14.6 PIM-SM Neighbor Filter

Command

ip pim sparse-mode neighbor-filter <ACL-NUMBER | ACL-NAME**>**
no ip pim sparse-mode neighbor-filter

View

Vlan-if Ethernet port configuration mode

Default Level

2: Configuration level

Parameters

ACL-NUMBER: standard acl number, the value range is 1-99.

ACL-NAME: extended acl name.

Description

ip pim sparse-mode neighbor-filter: this command is used to configure the illegal neighbor source address range, acl action must be deny, if the action is permit, it will be considered to be a legitimate neighbor even it doesn't match.

no ip pim sparse-mode neighbor-filter: this command is used to cancel the configuration of the illegal neighbor source address range.

By default, there are no restrictions on the neighbor source addresses that an interface can learn from.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 20 deny 192.168.1.0 0.0.0.255
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim sparse-mode neighbor-filter 20
```

14.7 PIM-SM Illegal Registration Message Restriction

Command

```
ip pim accept-register list <ACL-NUMBER | ACL-NAME>
no ip pim accept-register
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

ACL-NUMBER: standard acl number, ranging from 1 ~ 99 and 2000 ~ 2699.

ACL-NAME: extended acl name.

Description

ip pim accept-register: this command is used to configure the source address range of illegal registration packets. The action of acl must be deny, and the register-stop packet will be sent immediately after matching. If it is any other action type, it is considered to be the legitimate source address.

no IP pim accept-register: this command is used to cancel the configuration of the source address range of an invalid registration message.

By default, there is no restriction on the source address of registered message that the interface can learn from.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 20 deny 192.168.1.0 0.0.0.255
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip pim accept-register 20
```

14.8 PIM C-BSR

Command

ip pim bsr-candidate <IFNAME> **[hash-mask-lengh** <HASH-LEN> **| priority** <PRI> **]**

no ip pim bsr-candidate <IFNAME> **[hash-mask-lengh** <HASH-LEN> **| priority** <PRI> **]**

View

Configure Mode

Default Level

2: Configuration level

Parameters

IFNAME：specify C- BSR vlanif interface.

HASH-LEN: specifies the length of the hash mask, with a value range of 0 ~ 32.

PRI: specifies the priority of C-BSR, with values ranging from 0 to 255. The higher the value, the higher the priority.

Description

ip pim bsr-candiat: this command is used to configure an interface as C-BSR.

no ip pim bsr-candiat: this command is used to cancel the relevant configuration of C-BSR.

By default, C-BSR is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim bsr-candidate vlanif1 hash-mask-length 20
priority 20
```

14.9 PIM Registered Message Validation and Compatibility with Cisco Standard

Command

```
ip pim cisco-register-checksum [ group-list <ACL-NUMBER |
ACL-NAME> ]
no ip pim cisco-register-checksum [ group-list <ACL-NUMBER |
ACL-NAME> ]
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

ACL-NUMBER: standard acl number, ranging from 1 ~ 99 and 1300 ~ 1999.

ACL-NAME: extended acl name.

Description

ip pim cisco-register-checksum: this command is used to configure and calculate the verification and compatibility of registered packet with CISCO standard, that is, including the whole PIM mesage, the ACL can be applied to specify the group address range, the action of ACL must be pemit, if no ACL is specified, it means that all multicast groups need to be compatible with CISCO standard.

no ip pim cisco-register-checksum: this command is used to cancel the configure the calculation of the check and compatibility of registered packets with the CISCO standard.

By default, calculating the checksum of registered packets only includes 8 bytes of PIM headers.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim cisco-register-checksum
```

14.10 PIM C-RP Compatibility with Cisco Standard

Command

```
ip pim crp-cisco-prefix
no ip pim crp-cisco-prefix
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

ip pim crp-cisco-prefix: this command is used to keep BSR communication with the CISCO device when as C-RP.

no ip pim crp-cisco-prefix: this command is used to restore the default configuration. By default, this function is not enabled.

If the BSR of CISCO equipment is not compatible with Prefix Count when it equals to 0 in some versions, after this feature is enabled, if CRP uses the default Group Range, the Prefix Count in CRP-Adv message should be set to 1, and the Group Range use 224.0.0.0/4.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim crp-cisco-prefix
```

14.11 PIM BSR C-RP Priority Ignorance

Command

```
ip pim ignore-rp-set-priority
no ip pim ignore-rp-set-priority
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

ip pim ignore-rp-set-priority: this command is used to select RP for BSR to ignore the priority of CRP.

no ip pim ignore-rp-set-priority: this command is used to restore to the default configuration.

By default, this function is not enabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim ignore-rp-set-priority
```

14.12 Time Interval for PIM to Send Joined/Pruned Message

Command

ip pim jp-timer VALUE

View

Configure Mode

Default Level

2: Configuration level

Parameters

VALUE: specifies the time interval for sending the join/pruning message, ranging from 1 to 65535 in seconds.

Description

Ip pim jp-timer: this command is used to globally configure the time interval for sending join/pruning messages.

no Ip pim jp-timer: this command is used to restore to the default value.

By default, the join/pruning message is sent at an interval of 60 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim jp-timer 120
```

14.13 The Rate for the PIM Receive and Process Multicast Service Message

Command

```
ip pim register-rate-limit VALUE
no ip pim register-rate-limit
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

VALUE: the rate at which multicast messages are received and processed and the unit is in piece/second.

Description

Ip pim regime-rate-limit: this command is used to globally configure the rate at which multicast messages are received and processed.

no ip pim register-rate-limit: this command is used to restore to the default value.

By default, the rate at which multicast messages are received and processed is not limited.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim register-rate-limit 1
```

14.14 The PIM Checks the Accessibility of the RP

Command

```
ip pim register-rp-reachability
no ip pim register-rp-reachability
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

ip pim register-rp-reachability: this command is used to global configure whether the reachability of RP needs to be checked when sending registration packet. If it is not reachable, it means that registration cannot be carried out, and CouldRegister is False.

no ip pim register-rp-reachability: this command is used to restore to the default value. By default, DR need not to check the accessibility of the RP when sending registration messages.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim register-rp-reachability
```

14.15 The VLAN Interface or Source IP Address of a PIM that Sends a Registered Message

Command

```
ip pim register-source < IFNAME | IP-ADDRESS >
no ip pim register-source
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

IFNAME: vlanif interface for sending registration messages.

IP-ADDRESS: the source IP address used to send the registration message, it must be the IP of the interface.

Description

ip pim register-source: this command is used to globally configure the VLAN interface or source IP address for sending registration messages.

no ip pim register-source: this command is used to restore to the default values.

By default, the source address of the registered message is the primary IP address of the outgoing interface to the RP in the routing table.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim register-cource 192.168.1.100
```

14.16 PIM Registration Suppression Time

Command

```
ip pim register-suppression VALUE
no ip pim register-suppression
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

VALUE: the time interval after receiving the registration stop message to send the registered message again, the VALUE range is 1 ~ 65535, in seconds.

Description

IP pim register-suppression: this command is used to configure the registration suppression time.

no ip pim register-suppression: this command is used to restore to the default value.

By default, the registration suppression time is 60 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim register-suppression 120
```

14.17 PIM Static PR

Command

ip pim rp-address <RP-ADDRESS> [ACL-NUMBER | ACL-NAME]

no ip pim rp-address <RP-ADDRESS> [ACL-NUMBER | ACL-NAME]

View

Configure Mode

Default Level

2: Configuration level

Parameters

RP-ADDRESS: specifies the IP address of the static RP. The address must be a valid unicast IP address and cannot be configured as 127.0.0.0/8 network segment address.

ACL-NUMBER: standard acl number, ranging from 1 ~ 99 and 1300 ~ 1999.

ACL-NAME: extended acl name.

Description

ip pim rp-address: the command is used to configure the static RP.

no ip pim rp-address: the command is used to delete static RP.

By default, no static RP is configured.

 Notes

- When the ACL rule referenced by a static RP changes, the RP needs to be re-elected for all the multicast groups.
- Repeat this command to configure multiple static RPS. However, if the static RP address or ACL rule specified at configuration time is the same, the new configuration overrides the old configuration; If there are multiple static RPS serving the same multicast group, select the static RP with the largest IP address to serve that group.
- Dynamic RP has higher priority than static RP.
- If there is no ACL parameter, the configured static RP will serve all the multicast groups (224.0.0.0/4).

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim rp-address 192.168.1.100
```

14.18 PIM C-RP

Command

ip pim rp-candidate <IFNAME> **[priority** <PRI> **| interval** <INTERVAL> **| group-list** <ACL>**]**

no ip pim rp-candidate <IFNAME> **[priority** <PRI> **| interval** <INTERVAL> **| group-list** <ACL>**]**

View

Configure Mode

Default Level

2: Configuration level

Parameters

IFNAME: specify C-RP vlanif interface.

INTERVAL: the sending interval of CRP-Adv message, ranging from 0 to 16383 in seconds.

PRI: specifies the priority of C-BSR, with values ranging from 0 to 255. The smaller the value, the higher the priority.

Description

ip pim rp-candidate: the command is used to configure an interface as C-RP.

no ip pim rp-candidate: the command is used to cancel the relevant configuration of C-RP.

By default C-RP is not configured.

Notes

- An interface that acts as C-RP must enable the PIM-SM.
- If C-RP is not specified the scope of the multicast group it serves, the C-RP will serve all the multicast groups.
- If the router wants to be C-RP for multiple groups, it needs to represent multiple group scopes with multiple rules when configuring the ACL corresponding to group-policy.
- If executing this command on the same interface for multiple times, the latest configuration would override the old one.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 20 deny 225.1.1.0 0.0.0.255
```

```
Switch(config)#ip pim rp-candidate vlanif1 priority 20 group-list
1 interval 30
```

14.19 PIM KAT Timer Aging Time

Command

```
ip pim rp-register-kat VALUE
no ip pim rp-register-kat
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

VALUE: aging time of KAT timer after receiving the registered message, ranging from 1 to 65535 in seconds.

Description

ip pim rp-register-kat: the command is used to globally configure the aging time of KAT timer after receiving the registered message.

The no ip pim rp-register-kat: the command is used to restore the mode configuration. By default, after receiving the registration message, the KAT timer's aging time is set to 3 times of the register-suppression time.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim rp-register-kat 120
```

14.20 PIM SPT Switch

Command

```
ip pim spt-threshold [ group-list <ACL-NUMBER | ACL-NAME> ]
no ip pimspt-threshold [ group-list <ACL-NUMBER | ACL-NAME> ]
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

ACL-NUMBER: standard acl number, ranging from 1 ~ 99 and 1300 ~ 1999.

ACL-NAME: extended acl name.

Description

ip pim spt-threshold: this command is used for global configuration whether STP switch can be performed, can be applied ACL to specify the group address range, ACL action must be permit, if do not specify ACL, it means that all multicast groups need to perform SPT switch.

no ip pim spt-threshold: this command is used to cancel the recovery configuration. By default, STP switching is not performed.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip pim spt-threshold
```

14.21 Display BRS Running Information of PIM-SM

Command

show ip pim sparse-mode bsr-router

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

View the BRS running information of the PIM-SM of the current device.

Instance

```
Switch#show ip pim sparse-mode bsr-router
PIMv2 Bootstrap information
  BSR address: 172.24.0.10
  Uptime:    00:01:39, BSR Priority: 0, Hash mask length: 30
  Expires:    00:01:31
  Role: Candidate BSR
  State: Candidate BSR
```

```
  Candidate RP: 172.24.0.3(vlanif50)
    Advertisement interval 60 seconds
    Next Cand_RP_advertisement in 00:00:28
```

14.22 Display PIM-SM Interface Information

Command

show ip pim sparse-mode interfce [detail]

View

Any

Default Level

1: View level

Parameters

Interface: specify vlanif interface.

Detail: specify to view details.

Description

The command is used to view PIM information on the interface.

Instance

```
Switch#show ip pim sparse-mode interface
Address         Interface VIFindex  Ver/    Nbr    DR    DR
                                    Mode   Count  Prior
10.3.101.252     vlanif10  0        v2/S   1      1
10.3.101.253
11.1.1.2         vlanif11  2        v2/S   1      1     11.1.1.3
172.24.0.2       vlanif50  3        v2/S   1      1     172.24.0.3

Switch#show ip pim sparse-mode interface detail
vlanif10 (vif 0):
  Address 10.3.101.252, DR 10.3.101.253
  Hello period 30 seconds, Next Hello in 2 seconds
  Triggered Hello period 5 seconds
  Neighbors:
   10.3.101.253

vlanif11 (vif 2):
  Address 11.1.1.2, DR 11.1.1.3
  Hello period 30 seconds, Next Hello in 2 seconds
  Triggered Hello period 5 seconds
```

```
  Secondary addresses:
   11.1.1.1
  Neighbors:
   11.1.1.3

vlanif50 (vif 3):
  Address 172.24.0.2, DR 172.24.0.3
  Hello period 30 seconds, Next Hello in 3 seconds
  Triggered Hello period 5 seconds
  Neighbors:
   172.24.0.3
```

14.23 View The Local Multicast Group Members of PIM-SM

Command

show ip pim sparse-mode local-members [<IFNAME>]

View

Privileged Exec Mode

Default Level

1: View level

Parameters

IFNAME：specify vlanif interface.

Description

View the local multicast group members of PIM-SM of the current device.

Instance

```
Switch#show ip pim sparse-mode local-members vlanif10
PIM Local membership information
vlanif10:
  (*, 225.2.2.2) : Include
```

14.24 Displays the PIM-SM Multicast Routing Table Entry

Command

show ip pim sparse-mode mroute [GROUP-ADDRESS **|** SOURCE-ADDRESS**]**
[detail]

View

Privileged Exec Mode

Default Level

1: View level

Parameters

GROUP-ADDRESS: specify multicast group address

SOURCE-ADDRESS: specify the source address of the multicast

Detail: specify to view details.

Description

View the current PIM-SM multicast routing table entry.

Instance

```
Switch#show ip pim sparse-mode mroute
IP Multicast Routing Table

(*,*,RP) Entries: 0
(*,G) Entries: 0
(S,G) Entries: 1
(S,G,rpt) Entries: 1
FCR Entries: 0

(10.3.101.111, 239.255.255.250)
RPF nbr: 0.0.0.0
RPF idx: None
SPT bit: 1
Upstream State: NOT JOINED
 Local    ..............................
 Joined   ..............................
 Asserted ..............................
 Outgoing ..............................

(10.3.101.111, 239.255.255.250, rpt)
```

```
RP: 0.0.0.0
RPF nbr: 0.0.0.0
RPF idx: None
Upstream State: RPT NOT JOINED
 Local    ..............................
 Pruned   ..............................
 Outgoing ..............................

*DUT4#show ip pim sparse-mode mroute detail
IP Multicast Routing Table

(*,*,RP) Entries: 0
(*,G) Entries: 0
(S,G) Entries: 1
(S,G,rpt) Entries: 1
FCR Entries: 0

(10.3.101.111, 239.255.255.250) Uptime: 00:09:05 Flags: 0x03
  RPF nbr: None, RPF idx: None
  Upstream:
   State: NOT JOINED, SPT Bit: on, JT: off, KAT Expiry: 85 secs
  Downstream:

(10.3.101.111, 239.255.255.250, rpt) Uptime: 00:09:05
  RP: 0.0.0.0, RPF nbr: None, RPF idx: None
  Upstream:
   State: RPT NOT JOINED, OT: off
   Macro state:
  Downstream:
```

14.25 Display PIM-SM Neighbor Information

Command

show ip pim sparse-mode neighbor [<IFNAME> | detail]

View

Privileged Exec Mode

Default Level

1: View level

Parameters

IFNAME：specify vlanif interface

Detail: specify to view details.

Description

View the currently learning PIM-SM neighborhood running status.

Instance

```
Switch#show ip pim sparse-mode neighbor
Neighbor        Interface         Uptime/Expires    Ver   DR
Address                                             Priority/Mode
10.3.101.253     vlanif10          01:53:56/00:01:17  v2    1 /
DR
11.1.1.3         vlanif11          01:53:57/00:01:18  v2    1 / DR
172.24.0.3       vlanif50          01:53:56/00:01:17  v2    1 / DR
```

14.26 Display PIM-SM Next Hop Information

Command

show ip pim sparse-mode nexhop

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

View the next hop information used by the PIM-SM module in the current device.

Instance

```
Switch#show ip pim sparse-mode nexthop
Flags: N = New, R = RP, S = Source, U = Unreachable
Destination  Type  Nexthop   Nexthop      Nexthop  Nexthop Metric
Pref  Refcnt
               Num     Addr         Ifindex    Name
_____________________________________________________________________
_____________
10.3.101.111  ..S.  1        0.0.0.0        4              0
0     2
172.24.0.10   .R..  1        0.0.0.0        6              0
0     1
```

14.27 Display PIM-SM Information

Command

show ip pim sparse-mode rp mapping

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

View RP-Set information of the PIM-SM of the current device.

Instance

```
Switch#show ip pim sparse-mode rp mapping
PIM Group-to-RP Mappings
Group(s): 224.0.0.0/4
  RP: 172.24.0.10
    Info source: 172.24.0.10, via bootstrap, priority 192
        Uptime: 00:08:35, expires: 00:01:55
  RP: 172.24.0.3
    Info source: 172.24.0.10, via bootstrap, priority 192
        Uptime: 00:08:35, expires: 00:01:55
  RP: 172.24.0.2
    Info source: 172.24.0.10, via bootstrap, priority 192
        Uptime: 00:08:35, expires: 00:01:55
Group(s): 224.0.0.0/4, Static
    RP: 172.24.0.10
        Uptime: 02:28:07
```

14.28 Display the RP Address of the PIM-SM Multicast Group

Command

show ip pim sparse-mode rp-hash <GROUP-ADDRESS>

View

Privileged Exec Mode

Default Level

1: View level

Parameters

GROUP-ADDRESS: specify multicast group address.

Description

View the RP address of the specified multicast group address.

Instance

```
Switch#show ip pim sparse-mode rp-hash 226.1.1.1
   RP: 172.24.0.2
   Info source: 172.24.0.10, via bootstrap
```

15 VRRP Configuration

15.1 Create VRRP Group and Enter VRRP Configuration View

Command

router vrrp VITUAL-ROUTER-ID
no router rip VITUAL-ROUTER-ID

View

Configure Mode

Default Level

2: Configuration level

Parameters

vitual-router-id: VRRP backup group number, the value range is 1~255.

Description

router vrrp: this command is used to create a VRRP backup group session and enter session configuration mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
```

15.2 VRRP Interface Enablement

Command

network interface <IFNAME>

no network interface <IFNAME>

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

IFNAME: interface name, only vlanif interface is supported.

Description

network interface: this command is used to enable VRRP on the specified network segment interface.

By default, VRRP function on the interface is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch (config)#router vrrp 1
Switch (config- router)#network interface vlanif1
```

15.3 VRRP Virtual IP Address

Command

virtual-ip <A.B.C.D >

no virtual-ip <A.B.C.D >

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

A.B.C.D: VRRP group virtual address.

Description

virtual-ip: this command is used for the virtual IP address of the VRRP group, which should be on the same subnet with the primary address of the interface specified by the network command.

Instance

```
Switch> enable
Switch#configure terminal
```

```
Switch(config)#router vrrp 1
Switch(config- router)#virtual-ip 192.168.1.10
```

15.4 Preemption Mode Enablement

Command

preempt-mode （true | false）

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

True: enable preemption mode.

False: disable preemption mode.

Description

preempt-mode: this command is used to set the switch in the backup group to work in preemption mode. By default, the preempt-delay-time is 0 second and can be set by the preempt-delay-time command.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#preempt-mode true
```

15.5 Preemption Delay Time

Command

preempt-delay-time DELAY-VALUE

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

DELAY-VALUE: preempt delay time, the value range is 0~255, the unit is seconds, the default value is 0 seconds.

Description

preempt-delay-time: this command is used to set the preemption delay for the VRRP backup group. In order to avoid frequent master/backup state transitions of the backup group members and make backup router have enough time to collect the necessary information (such as routing information), when backup router receives notification message with lower priority than the local priority, instead of immediately preempting to become Master, it will wait for a certain time - after the preemption delay time, VRRP notification message will be sent out to replace the original Master router.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#preempt-delay-time 5
```

15.6 Priority of VRRP Device

Command

```
priority PRIORITY-VALUE
no priority
```

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

PRIORITY-VALUE: the value of priority, ranging from 1 to 254. The larger the value, the higher the priority.

Description

priority: this command is used to set the priority of the router in the backup group.

no priority: this command is used to restore to the default value.

By default, the router has a priority of 100 in the backup group.

 Notes

- Priority determines the router's status in the backup group, and the higher the priority, the more likely it is to become a Master router. Priority 0 is reserved by the system for special use and 255 is reserved by the system for IP address owners.

- If the router is the owner of the IP address, its priority is always 255, indicating that it is a Master router as long as it is working properly.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#priority 150
```

15.7 VRRP Notification Message Interval

Command

advertisement-interval ADVER-INTERVAL

no advertisement-interval

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

ADVER-INTERVAL: the interval between the Master router in the backup group sending VRRP notification messages, with a value range of 1~10 in seconds.

Description

advertisement-interval: this command is used to set the time interval between VRRP notification messages sent by the Master router in the backup group.

no advertisement-interval: this command is used to restore to the default value.

By default, the Master router in the backup group sends VRRP notification messages every second.

Notes

Routers within the same backup group are configured at the same time interval.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#advertisement-interval 5
```

15.8 VRRP Message Authentication Mode

Command

authentication-mode （md5 | text）
no authentication-mode

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

Text: means authentication method is simple character authentication.

md5: md5 algorithm for authentication, not currently supported.

Description

authentication-mode: this command is used to configure how the backup group sends and receives VRRP messages.

no authentication-mode: this command is used to restore to the default value.

By default, authentication is not performed.

Notes

Different backup groups on an interface can set different authentication mode and authentication word; Members joining the same backup group need to set the same authentication mode and authentication word.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#authentication-mode text
```

15.9 Authentication Word of VRRP Message

Command

authentication-string KEY
no authentication-string

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

KEY: authentication word, case sensitive

Description

authentication-string: this command is used to configure how the backup group sends and receives authentication word of VRRP messages.

no authentication-string: this command is used to restore to the default value.

By default, authentication is not performed.

 Notes

Different backup groups on an interface can set different authentication mode and authentication word; Members joining the same backup group need to set the same authentication mode and authentication word.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#authentication-string vrrpkey
```

15.10 Configure the Monitoring Specified Interface

Command

circuit-failover IFNAME PRIORITY-DELTA

no circuit-failover

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

IFNAME: interface name, physical ports and vlanif interfaces is supported.

PRIORITY -DELTA: amount of priority reduction, ranging from 1 to 253.

Description

circuit-failover: this command is used to configure to monitor the specified interface.
no circuit-failover: this command is used to cancel the monitor of the specified interface.
By default, no monitored interface is specified.
When the interface connecting the router to the uplink fails, the backup group cannot perceive the uplink failure. If the router is in the Master state at this time, the host in the LAN cannot access the external network. This problem can be solved by monitoring the function of the specified interface. When the interface connected to the upline is in the Down state, the router actively lowers its priority, making the priority of other routers in the backup group higher than that of this router, so that the router with the highest priority becomes Master and undertakes the forwarding task.


Notes
When the status of the monitored interface changes from Down to Up, the priority level of the corresponding router will be automatically restored.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#circuit-failover ge2 10
```

15.11 Track ipdt Session

Command

tracek ipdt session SESSION-ID **(increased | reduced)** PRIORITY-DELTA
no track ipdt session SESSION-ID

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

SESSION-ID: ipdt session ID, ranging from 1 to 8.

Increased: upgrade priority, usually used for backup devices.

Reduced: reduce priority, usually used for master devices.

PRIORITY-DELTA: amount of priority upgrade or reduction, ranging from 1 to 253.

Description

track ipdt session: this command is used to set up sessions to track ipdt.

No track ipdt session: this command is used to cancel sessions to track ipdt.

By default, no traced ipdt session is specified.

Similar to circuit-failover, the VRRP backup group tracks an ipdt session, and with the up or down of the ipdt session, the priority is increased or decreased accordingly.

Usually reduced is set on the master device and increased is set on the backup device.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#track ipdt session 1 increased 20
```

15.12 Enable VRRP Backup Group

Command

enable

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

-

Description

enable: this command is used to enable the VRRP backup group, which is not enabled by default.

Notes

- When modifying any configuration of the backup group, enable must be turned off first.
- The backup group must be configured with the virtual-ip and network interface commands to enable successfully.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#enable
```

15.13 Disable VRRP Backup Group

Command

disable

View

VRRP backup group session view

Default Level

2: Configuration level

Parameters

-

Description

disable : this command is used to disable the enabled VRRP backup group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router vrrp 1
Switch(config- router)#disable
```

15.14 Display VRRP Backup Group Information

Command

show vrrp [VIRTUAL-ROUTER-ID **]**

View

Privileged Exec Mode

Default Level

1: View level

Parameters

VITUAL-ROUTER-ID: backup group, the value range is 1~8.

Description

View the current configuration and operation of the specified VRRP backup group or all VRRP backup groups.

Instance

```
Switch> enable
Switch#show vrrp
VrId <10>
 State is Master
 Send Adv after 1 seconds
 Virtual IP is 11.1.1.1 (Not IP owner)
 Interface is vlanif11
 Priority is 151
 Advertisement interval is 1 sec
 Preempt mode is TRUE
 Preempt delay time is 30 sec
```

16 RIP Configuration

16.1 Enter RIP View

Command

router rip
no router rip

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

router rip: this command is used to start the RIP process and enter RIP process mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
```

16.2 RIP Interface Enablement

Command

network <A.B.C.D/M >
no network <A.B.C.D/M >

View

RIP View

Default Level

2: Configuration level

Parameters

A.B.C.D/M: network address and mask

Description

network: this command is used to enable RIP on the specified network segment interface.

RIP function on the interface is disabled by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch (config)#router rip
Switch (config- router)#network 10.11.20.0/24
```

16.3 Configure IP Address of RIP Neighbor in NBMA Network

Command

```
neighbor <A.B.C.D >
no neighbor <A.B.C.D >
```

View

RIP View

Default Level

2: Configuration level

Parameters

A.B.C.D: neighbor interface address.

Description

neighbor: this command is used to configure the IP address of the RIP neighbor in the NBMA (non-broadcast multi-access) network and to send the update message to the opposite end as unicast rather than as normal multicast or broadcast.

no neighbor: this command is used to cancel the specified neighbor IP address.

By default, RIP does not send update message to any specified address.

Notes

This command is not recommended when a RIP neighbor is directly connected to the current device, as it may cause the opposite side to receive both multicast (or broadcast) and unicast message with the same routing information.

Instance

```
Switch>enable
Switch#configure terminal
Switch(config)#router rip
Switch(config-router)#neighbor 10.11.20.1
```

16.4 Add Static RIP Route

Command

```
route <A.B.C.D /M >
no route <A.B.C.D /M>
```

View

RIP View

Default Level

2: Configuration level

Parameters

A.B.C.D /M:IP address and prefix.

Description

route: this command is used to add a static RIP route. This command is primarily for debugging purposes. The route configured by this command does not appear in the core routing table, but the route exists in the RIP routing database.

Instance

```
Switch>enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#route 10.11.20.1/16
```

16.5 Add default Routing to RIP Routing Database

Command

default-information originate

no default-information originate

View

RIP View

Default Level

2: Configuration level

Parameters

-

Description

default-information originate: this command inserts the default route with a destination address of 0.0.0.0 into the RIP routing database and notifies the route like any other route.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#default-information originate
```

16.6 Default Route Metric

Command

default-metric <METRIC>

no default-metric

View

RIP View

Default Level

2: Configuration level

Parameters

<METRIC> : sets the default metric when routing is introduced. <value> values range from 0 -16.

Description

default-metric: the command is used to set the default routing weight used to introduce routes from other routing protocols into the RIP route. When redistribute command is used to introduce a route for another protocol, if no specific route weight is specified, the default route weight specified by default-metric is introduced.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config-router)#default-metric 10
```

16.7 RIP Route Management Distance

Command

```
distance <NUMBER> [ <A.B.C.D/M> ] [ <ACCESS-LIST-NAME | ACCESS-LIST-NUMBER > ]
no distance <NUMBER> [ <A.B.C.D/M> ] [ <ACCESS-LIST-NAME | ACCESS-LIST-NUMBER > ]
```

View

RIP View

Default Level

2: Configuration level

Parameters

<NUMBER> : specifies the value of the distance, ranging from 1 to 255.

<A.B.C.D/ MB > : specifies the network prefix and prefix length.

<ACCESS-LIST-NAME|ACCESS-LIST-NUMBER>: specifies the access list number or name that applied.

Description

distance: this command is used to set the RIP routing management distance.

no distance: this command restores the default value.

Administrative distance is used to select routes when there are routes from two different routing protocols reach the same destination. The smaller the management distance value of the routing protocol, the more reliable the routing obtained by the protocol.

By default, RIP administrative distance is 120.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#distance 8 10.0.0.0/8 mylist
```

16.8 Access List Route Filtering

Command

```
distribute-list ( <ACCESS-LIST-NUMBER | ACCESS-LIST-NAME> |
prefix <PREFIX-LIST-NAME> ) ( in | out ) [ <IFNAME> ]
no distribute-list ( <ACCESS-LIST-NUMBER | ACCESS-LIST-NAME> |
prefix <PREFIX-LIST-NAME> ) ( in | out ) [ <IFNAME> ]
```

View

RIP View

Default Level

2: Configuration level

Parameters

< ACCESS-LIST-NUMBER |ACCESS-LIST-NAME> : the number or name of the access list to be applied.

<PREFIX-LIST-NAME> : the name of the list of prefixes to be applied.

<IFNAME>: specifies the interface name to which routing filtering is applied.

Description

distribute-list: the command is used to filter routing update message sent and received using an access list or prefix list. The no operation of this command is used to disable route filtering.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#distribute-list prefix myfilter in vlan 1
```

16.9 Other Routing Protocols Route Import

Command

```
redistribute { connected | static | ospf | bgp} [metric <VALUE> ]
```

[route-map <WORD>**]**

no redistribute { connected| static| ospf|bgp} [metric <VALUE>**]**

[route-map <WORD>**]**

View

RIP View

Default Level

2: Configuration level

Parameters

connected：connected route

static: static route;

ospf：OSPF route.

bgp：BGP route.

<VALUE> : the measure assigned to the introduced route, with a value range of 0-16.

<WORD>：a pointer to the route map used to introduce routes.

Description

redistribute: the command introduces routes learned from other routing protocols into BGP.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#redistribute bgp metric 12
```

16.10 Block RIP Broadcast

Command

passive-interface <IFNAME>

no passive-interface <IFNAME>

View

RIP View

Default Level

2: Configuration level

Parameters

<IFNAME>: interface name.

Description

passive-interface: the command is used to block RIP broadcast on the specified interface, so RIP packets can only be sent to the interface configured with neighbor. The no operation of this command is to disable this function.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#passive-interface vlanif2
```

16.11 Time of RIP Timer

Command

timers basic <UPDATE> <INVALID> <GARBAGE>

no timers basic

View

RIP View

Default Level

2: Configuration level

Parameters

<UPDATE> : time interval for sending update message, the unit is second, value range: 5-2147483647.

<INVALID> : the time period in which RIP route is declared invalid, the unit is second, and the value range is 5-2147483647.

<GARBAGE> : the time period that can still exist in the routing table after declaring a route invalid, the unit is second,the value range is 5-2147483647.

Description

timers basic: the command sets the RIP timer update, timeout, and garbage collection time. The no operation of this command is to restore to the default values of the parameters.

By default, <update> defaults to 30; Invalid > defaults to 180; <garbage> defaults to 120. The system broadcasts RIP update message every 30 seconds. When the update message of a route cannot be received after 180 seconds, the route is considered invalid. But the route can also exist in the routing table for 120 seconds, after which the routing table can delete it.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#timers basic 20 80 60
```

16.12 RIP version

Command

```
version {1 | 2}
no version
```

View

RIP View

Default Level

2: Configuration level

Parameters

1 is rip version 1; 2 is rip version 2.

Description

Version 1: indicates that each interface only sends/receives RIP-I datagrams.

Version 2: indicates that each interface sends/receives RIP-II datagrams only.

By default, sending RIP-II as well as receiving RIP-II packets.

By default RIP version is 2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#version 1
```

16.13 Maximum number of RIP route

Command

```
maximum-prefix <maximum-prefix>[<threshold>]
no maximum-prefixd
```

View

RIP View

Default Level

2: Configuration level

Parameters

<maximum-prefix> : the maximum number of RIP routes allowed, with a value range of 1-500;

<threshold> : when the percentage of the maximum number of routes exceeds, a warning will be generated by <threshold>. The value range is 1-100, and the default value is 75.

Description

maximum-prefix: the command is used to configure the maximum number of RIP routes in the routing table, and the no command removes the restriction on the number of routes.

The maximum number of RIP routes only limits the routes learned through RIP, excluding connected and introduced routes and RIP static routes configured with the route command. The comparison is based on the number of routes marked R in the show IP route database command. And also is based on the RIP route number shown by the show IP route statistics command.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#maximum-prefix 150
```

16.14 RIP Routing Measures Offset

Command

```
offset-list <ACCESS-LIST-NUMBER | ACCESS-LIST-NAME> {in | out}
<METRIC > [<IFNAME>]
no offset-list <ACCESS-LIST-NUMBER | ACCESS-LIST-NAME> {in | out}
<METRIC > [<IFNAME>]
```

View

RIP View

Default Level

2: Configuration level

Parameters

< access-list-number |access-list-name> : the number or name of the access list to be applied.

<metric> : the additional offset, and the value range is 0-16.

<ifname> : the specific interface name.

Description

offset-list: this command is used to configure the metric of the route learned through RIP plus an offset.

By default, RIP message is not validated.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router rip
Switch(config- router)#offset-list 1 in 5 vlanif1
```

16.15 RIP Route UDP to Receive Cache Size

Command

```
recv-buffer-size <SIZE>
no recv-buffer-size
```

View

RIP View

Default Level

2: Configuration level

Parameters

<SIZE> : buffer size in bytes, value range 8192-2147483647.

Description

recv-buffer-size: UDP receive buffer size of the command RIP; No operation restores to system defaults.

By default, it is 8192 bytes.

Instance

```
#Configure vlanif1 to use plaintext authentication mode
Switch> enable
Switch#configure terminal
Switch(config)#router rip
```

```
Switch(config- router)#recv-buffer-size 10240
```

16.16 RIP Message Authentication Mode

Command

```
ip rip authentication mode {text|md5}
no ip rip authentication mode [text|md5]
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

Text: means text authentication.

Md5: means md5 authentication.

Description

ip rip authentication mode: the command sets the used type of authentication; the no operation of this command is to restore the default authentication type, that is text authentication.

By default, the relative interfaces do not configure passwords and keys.

RIP-I does not support authentication, and RIP-II supports two types of authentication: text authentication (that is, Simple authentication) and datagram authentication (that is, MD5 authentication). This command needs to be used in combination with ip rip authentication key-chain or ip rip authentication string.Configuration alone does not perform authentication processing.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip authentication mode md5
```

16.17 RIP Message Authentication Key Chain

Command

```
ip rip authentication key-chain <name-of-chain>
no ip rip authentication key-chain [<name-of-chain>]
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<name-of-chain> : the name of the key chain used, the string can contain spaces, the input ends with enter key, and the string length should not exceed 256.

Description

ip rip authentication key-chain: the command is used to enable RIPV2 authentication on an interface and to configure the used key chain. The no operation of this command is used to cancel authentication.

If authentication mode is configured only and the key chain or password used by the interface is not configured, authentication will not work at all. If mode is not set before this command is configured, it will be set to plaintext authentication. The no operation of this command will cancel authentication,it does not mean that mode will be set to the non-authenticated type, but authentication will not be processed when sending or receiving packets. The ip rip authentication key-chain my key command can be entered, which means the key chain name is my key, a total of 6 characters

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip authentication key-chain my key
```

16.18 RIP Message Authentication Password

Command

```
ip rip authentication string <TEXT>
no ip rip authentication string
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<text> : the password used for authentication, with a length of 1-16 characters. Password can include space and end it with enter key.

Description

ip rip authentication string: the command is used to set the password used for RIP authentication. The no operation of this command is used to cancel authentication. The ip rip authentication key chain command cannot be configured if this command is configured. Key id value is required when using MD5 authentication. If this command is used to configure the command, the key id value is equivalent to 1. If mode is not set before this command is configured, it will be set to plaintext authentication. The no operation of this command will cancel authentication,it does not mean that mode will be set to the non-authenticated type, but authentication will not be processed when sending or receiving packets. The ip rip authentication string aaa aaa command can be entered, which means the key is aaa aaa, a total of 7 characters.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip authentication string guest
```

16.19 Receive RIP Message enablement

Command

```
ip rip receive-packet
no ip rip receive-packet
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

-

Description

ip rip receive-packet: this command is used to set whether the interface can receive RIP packets; The no operation of this command means cannot receive RIP message. By default, the interface can receive RIP message.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip receive-packet
```

16.20 Accept Message of Specified RIP Version

Command

```
ip rip receive version { 1 | 2 | 1 2 }
no ip rip receive version [ 1 | 2 | 1 2]
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

1 and 2 represent RIP version 1 and RIP version 2, respectively. 1 and 2 represent RIP version 1 and 2.

Description

ip rip receive-packet: the command is used to set the version information of the RIP packet received by the interface. RIP version 2 is received by default; The no operation of this command restores to the value set by the version command.
By default, the RIP message version received by the interface is 2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip receive version 1 2
```

16.21 Send RIP Message Enablement

Command

```
ip rip send-packet
no ip rip send-packet
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

-

Description

ip rip send-packet: the command is used to set whether the interface can send RIP message; The no operation of this command means that RIP message cannot be sent.

By default, the interface can send RIP message.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip send -packet
```

16.22 Send the Message of the Specified RIP Version

Command

```
ip rip send version { 1 | 2 | 1 2 }
no ip rip send version [ 1 | 2 | 1 2 ]
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

1 and 2 represent RIP version 1 and RIP version 2, respectively, 1 and 2 represent RIP versions 1 and 2.

Description

ip rip send-packet: the command is used to set the version information of the RIP packet sent by the interface. RIP version 2 is sent by default; The no operation of this command restores to the value set by the version command.

By default, the version that the interface sends RIP message is 2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip send version 1 2
```

16.23 RIP Horizontal Split Enablement

Command

```
ip rip split-horizon [ poisoned ]
no ip rip split-horizon
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

[poisoned] : it means the configuration with reverse poison horizontal segmentation.

Description

ip rip split-horizon: the command is used to enable horizontal split. The no operation of this command disables horizontal split.

By default, enable horizontal segmentation with reverse poisoning.

Horizontal segmentation is used to prevent Routing Loops, which prevent the interface of the device from broadcasting routes learned from itself. In general, horizontal segmentation is necessary to prevent routing loops, so it is not recommended to disable it. When it is necessary to disable horizontal segmentation for special reasons, such as ensuring proper execution of the protocol, be sure to confirm whether it is necessary.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip rip split-horizon poisoned
```

16.24 Display Routing Information learned by RIP

Command

show ip rip

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show ip rip: the command is used to display the routing information learned by rip protocol.

Note:

The show ip route rip command is used to display the route information that learned by rip protocol and show in the routing table.

Instance

```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#router rip
SwitchA(config-router)#network 192.168.1.0/24
SwitchA(config-router)#network 192.168.2.0/24

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
```

```
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config- vlanif2)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#network 192.168.2.0/24
SwitchB(config-router)#end
Switch#show ip rip

Codes: R - RIP, Rc - RIP connected, Rs - RIP static, K - Kernel,
      C - Connected, S - Static, O - OSPF, I - IS-IS, B - BGP

Network          Next Hop        Metric From           If     Time
R  192.168.1.0/24    192.168.2.2          2 192.168.2.2
vlanif2 02:41
Rc 192.168.2.0/24                       1              vlanif2

Switch#show ip route rip
R      192.168.1.0/24 [120/2] via 192.168.2.2, vlanif2, 00:00:32
```

16.25 Display the Routing Information in the RIP Routing information Base

Command

show ip rip database

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show ip rip database: the command is used to display routing information in the rip routing information database.

Instance

```
SwitchA> enable
```

```
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#router rip
SwitchA(config-router)#network 192.168.1.0/24
SwitchA(config-router)#network 192.168.2.0/24

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config- vlanif2)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#network 192.168.2.0/24
SwitchB(config-router)#end
Switch#show ip rip database

Codes: R - RIP, Rc - RIP connected, Rs - RIP static, K - Kernel,
       C - Connected, S - Static, O - OSPF, I - IS-IS, B - BGP

Network      Next Hop      Metric From       If              Time
R  192.168.1.0/24   192.168.2.2   2  192.168.2.2  vlanif2   02:57
Rc 192.168.2.0/24                      1              vlanif2
```

16.26 Display RIP Interface Information

Command

show ip rip interface <IFNAME>

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show ip rip interface: the command is used to display rip interface information.

Instance

```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#router rip
SwitchA(config-router)#network 192.168.1.0/24
SwitchA(config-router)#network 192.168.2.0/24

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config- vlanif2)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#network 192.168.2.0/24
SwitchB(config-router)#end
Switch#show ip rip interface vlanif2
vlanif2 is up, line protocol is up
```

```
Routing Protocol: RIP
  Receive RIP packets
  Send RIP packets
  Passive interface: Disabled
  Split horizon: Enabled
  IP interface address:
    192.168.2.1/24
```

17 OSPF Configuration

17.1 Enter OSPF Router Configuration View

Command

router ospf [<PROCESS-ID>]

no router ospf [<PROCESS-ID>]

View

Configure Mode

Default Level

2: Configuration level

Parameters

process-id: range 1-65535, default to process 1.

Description

router ospf [PROCESS-ID]: the command is used to start the OSPF process and enter OSPF process mode.

Instance

```
# configuration starts and enters the OSPF process 1
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
```

17.2 OSPF Route ID

Command

router-id ***<A.B.C.D>***

no router-id [***<A.B.C.D>***]

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D：router ID.

Description

router-id [< A.B.C.D>] : the command is used to configure the OSPF router ID of the device.

The same configuration command router-id <A.B.C.D> is available in configuration mode with a lower priority

Instance

```
# Configure device router ID to 1.1.1.1
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#router-id 1.1.1.1
```

17.3 OSPF Area and Enablement

Command

```
network (A.B.C.D/M | A.B.C.D) area (A.B.C.D | <0-4294967295>)
no network (A.B.C.D/M | A.B.C.D) area (A.B.C.D|<0-4294967295>)
```

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D/M | A.B.C.D: network address and mask.

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

Description

network: the command is used to configure the OSPF region the various network interfaces of the device belong to and enable OSPF functions.

By default, the interface does not belong to any region and OSPF function is disabled.

Instance

```
# specifies that the primary IP address of the interface running the OSPF protocol is on the network segment 10.11.20.0/24, and the OSPF region ID of the interface is 1
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config-router)#network 10.11.20.0 0.0.0.255 area 1
Or Switch(config-router)#network 10.11.20.0/24 area 1
```

17.4 Configure and Publish a Host Route

Command

host (A.B.C.D) **area** (A.B.C.D | <0-4294967295>) **[cost** <COST>**]**
no host (A.B.C.D) **area** (A.B.C.D | <0-4294967295>) **[cost** <COST>**]**

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: host address.

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

<cost> : host routing cost value, integer in range 0~65535, default value is 0.

Description

host: the command is used to configure and publish a host route.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#host 172.16.10.100 area 1
```

17.5 Configure Neighbor Interface Address in the NBMA Network

Command

neighbor <A.B.C.D> **[priority** <PRIORITY-ID>**] [poll-interval** <SECONDS>**] [cost** <METRIC>**]**

no neighbor <A.B.C.D> **[priority** <PRIORITY-ID>**] [poll-interval** <SECONDS>**] [cost** <METRIC>**]**

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: neighbor interface address.

priority-id: priority of neighbors in NBMA network, invalid in P2MP network, default value is 0, value range is <0-255>.

seconds: interval of HELLO package before establishing neighborhood relationship, value range is <1-65535>.

metric: neighborhood link cost, value range is <1-65535>.

Description

neighbor: the command is used to configure neighbors in the NBMA network.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#neighbor 10.11.20.1
```

17.6 Create Virtual Connection

Command

area (*A.B.C.D*|*<0-4294967295>*) virtual-link A.B.C.D

no area (*A.B.C.D*|*<0-4294967295>*) virtual-link A.B.C.D

Command options are numerous and not enumerated

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

A.B.C.D: virtual link neighbor router ID, IP address format.

Hello-interval seconds: the time interval for the interface to send hello message, ranging from 1 to 65535 in seconds. The default value is 10 seconds. This value must equal the value of hello seconds on its connected virtual connection router.

retransmit-interval seconds: the time interval for retransmission of LSA packets of the interface, ranging from 1 to 65535 in seconds. The default value is 5 seconds.

transmit-delay seconds: the time interval for transmitting LSA packets, ranging from 1 to 65535 in seconds. The default value is 1 second.

Dead-interval seconds: dead interval seconds, ranging from 1 to 65535 in seconds, with a default value of 40 seconds. This value must equal the dead-interval seconds value of its virtual connected router and be at least 4 times the hello seconds value.

Authentication: plaintext authentication mode.

Message-digest: MD5 authentication mode, it is optional, if unselected it will be simple authentication mode (password in plaintext).

Null: null is unauthenticated.

Authenticate-key: plaintext authentication password.

Message-digest-key: MD5 key with range 1-255.

Description

virtual-link: this command is used to create and configure a virtual connection.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 1 virtual-link 1.1.1.1
```

17.7 Routing Within the Aggregation Area

Command

```
area (A.B.C.D|<0-4294967295>) range (A.B.C.D/M) [advertise |
not-advertise]
```

no area (A.B.C.D|<0-4294967295>) range (A.B.C.D/M) [advertise | not-advertise]

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

A.B.C.D/M: aggregate address and mask.

advertise | not-advertise: whether to publish the aggregation route or not. This aggregation route is published if the parameter advertise or not-advertise is not specified.

Description

area range: the command is used to aggregate the routers of an area. If the network addresses in the region are configured in a discontinuous manner, configuring this command on ABR notifies a summary route that contains all the individual networks in the region that belong to a particular range.

By default this function is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 1 range 10.11.20.0/24
```

17.8 Type-3 LSA Filter

Command

area (A.B.C.D|<0-4294967295>) filter-list (access|prefix) <name> (in|out)

no area area (A.B.C.D|<0-4294967295>) filter-list (access|prefix) <name> (in|out)

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

Access：specifies to use access-list.

Prefix: specifies to use prefix-list; <name> the name of the filter, the length is 1-256.

In: from other areas to this area.

Out: from this area to other areas.

Description

area filter-list: the command is used to configure the filtering of Type-3 LSA in and out of the area.

By default this function is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 1 deny 172.22.0.0 0.0.0.255
Switch(config)#access-list 1 permit any-
Switch(config)#router ospf
Switch(config- router)#area 1 filter-list access 1 in
```

17.9 Stub Area

Command

```
area (A.B.C.D|<0-4294967295>) stub [no-summary]
no area (A.B.C.D|<0-4294967295>) stub [no-summary]
```

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

No-summary: this parameter is only used for the ABR of the Stub region. After configuration, the ABR only publishes a type-3 LSA for the default route to the Stub region, and does not generate any other type-3 LSAs (this region is also known as the Total ly Stub region).

Description

area stub: the command is used to configure a region as a Stub region.

By default, no region is set to Stub region.

If user want to configure a zone as a Stub zone, all routers in the zone must configure this property. For configuration, refer to the command default-cost.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 1 stub
```

17.10 NSSA Area

Command

area (*A.B.C.D|<0-4294967295>*) nssa
[default-information-originate | translator-role | no-summary | no-redistribution]
no area (*A.B.C.D|<0-4294967295>*) nssa
[default-information-originate | translator-role | no-summary | no-redistribution]

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

Default-information-spanish [metric <0-16777214>] [metric <1-2>] : generates LSA of type-7 metric <0-16777214> specifies the metric value, and metric-type <1-2> specifies the metric type of external-LSA, 2 is the default value.

translator-role {candidate|never|always} : specify LSA transformation behavior of router:

Candidate means that if the router is elected as translator, NSSA-LSA can be converted to Type-5 LSA, which is candidate by default.

Never means that the router never converts NSSA-LSA to Type 5 LSA.

Always means that the router always converts NSSA-LSA to Type 5 LSA.

No-summary: this parameter is only used for the ABR of the NSSA region. After configuration, NSSA ABR only publishes a default route to the region through the Summary-LSA of Type-3, and no other Summary-LSAs (this region is also called Totally NSSA region) to the region.

Summary-LSA publishes a default route to the region and no other Summary-LSAs (this region is also known as the Totally NSSA region) is published to the region.

No-redistribution: means do not distribute EXTERNAL - LSA to NSSA.

Description

area nssa: the command is used to configure a region as a nssa region.

By default, no region is set to nssa region.

If user want to configure a zone as a NSSA zone, all routers in the zone must configure this command. For configuration, refer to the command default-cost.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 1 nssa
```

17.11 Area Shortcut Mode

Command

area (A.B.C.D|<0-4294967295>) shortcut {default|enable|disable}

no area (A.B.C.D|<0-4294967295>) shortcut {default|enable|disable}

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

Default: set the default shortcut behavior of the area.

Enable: forced to shourcut when through the area.

Disable: not to shourcut when through the area.

Default: the default configuration is set to default.

Description

area shortcut: the command is used to configure shortcut mode of a region. Whether the region boundary router is connected to a backbone router or not, enabling region shortcut allows traffic to pass through non-backbone regions with lower magnitude.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 1 shortcut enable
```

17.12 Default Costs for Introduced Default Routes

Command

```
area (A.B.C.D|<0-4294967295>) default-cost <cost>
no area (A.B.C.D|<0-4294967295>) default-cost
```

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

<cost>:value range is 0-16777215. Default value is 1.

Description

area default-cost: this command used to configure stub/nssa zone to introduce the default cost of default routing.

This command only applies to an ABR router connected to a stub region or NSSA region.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 1 default-cost 20
```

17.13 Configure Aggregation of External Routes and Notify or Suppress

Command

```
summary-address <A.B.C.D/M> [{not-advertise|tag<tag-value>}]
no summary-address <A.B.C.D/M> [{not-advertise|tag<tag-value>}]
```

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D/M: aggregate address and mask.

Not-advertised: control the external routing.

Tag <tag-value> : the tag number of the external route, the value range is 0~4294967295, the default is 0.

Description

summary-address: this command is used to introduce OSPF from other routing protocols,demanding that each route be notified separately in an external LSA. Using this command, only one summary route can be notified for introduced routes that are covered by specific network addresses and masks, which can greatly reduce the size of the link-state database.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#summary-address 10.11.0.0/16
```

17.14 Link Cost Bandwidth Reference Value

Command

```
auto-cost reference-bandwidth <bandwidth>
no auto-cost reference-bandwidth
```

View

OSPF View

Default Level

2: Configuration level

Parameters

< bandwidth > : the reference bandwidth value in megabits per second, ranging from 1~4294967.

Description

reference-bandwidth: this command is used to configure the bandwidth reference values by which link cost is calculated.

By default, link cost is calculated based on a bandwidth reference value of 100Mbps.

If the link cost value configuration is not displayed, OSPF calculates the cost based on link bandwidth (cost = bandwidth reference value ÷ bandwidth, the maximum cost is 65535 when the calculated cost value is greater than 65535).

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#auto-cost reference-bandwidth 50
```

17.15 Opaque LSA Publishing and Receiving Capabilities

Command

```
capability opaque
no capability opaque
```

View

OSPF View

Default Level

2: Configuration level

Parameters

-

Description

capability opaque: the command is used to enable OSPF opaque LSA to publish and receive Type9, Type10, and Type11 opaque LSA.

The no capability opaque: this command is used to restore the default value.

By default,Opaque LSA publish receiving capability of OSPF is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#capability opaque
```

17.16 Compatibility with RFC1583

Command

```
compatible rfc1583
no compatible rfc1583
```

View

OSPF View

Default Level

2: Configuration level

Parameters

-

Description

compatible rfc1583: the command is used to enable the compatibility of RFC 1583 with external routing rules.

no compatible rfc1583: the command is used to disable the compatibility of RFC 1583 with external routing rules.

By default, enable the compatibility of RFC 1583 with external routing rules.

When multiple AS-External-LSA publish routes to the same destination address, the priority rules defined by RFC 1583 and RFC 2328 differ in how to select the optimal route. When RFC 2328 is compatible with RFC 1583, the regional routing in the

backbone area is optimized. When RFC 2328 is incompatible with RFC 1583, intra-region routing in non-backbone area is preferred to minimize the burden of backbone area.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#compatible rfc1583
```

17.17 Introduce Default Route

Command

default-information originate [always | metric | metric-type | route-map]
no default-information originate [always | metric | metric-type | route-map]

View

OSPF View

Default Level

2: Configuration level

Parameters

Always: notify default routing whether or not there is one in the software.

metric = metric <value> : sets the metric used to create the default route, and <value> ranges from 0 to 16777214. The default metric is 10.

Metric -type = metric-type {1|2} :sets the OSPF external link type of the default route.

- 1: Set the external type 1 metric of OSPF.
- 2: Set the external type 2 metric of OSPF.

route-map = route-map <WORD> : <WORD> specifies the policy name of the applied routing. Only if the default route exists in the routing table of the current router and the route matches the routing policy specified by route-map can a Type-5 LSA describing the default route be published, and the specified routing policy will affect the value in the Type-5 LSA. If the always parameter is specified at the same time, as long as a route matches the specified routing policy, a Type-5 LSA describing the default route will be published regardless of whether there is a default route in the routing table of the current router, and the specified routing policy will affect the value in the Type-5 LSA.

Description

default-information originate: the command is used to introduce the default route into the OSPF routing area.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#default-information originate always
```

17.18 OSPF Routing Default Metric

Command

```
default-metric < metric >
no default-metric
```

View

OSPF View

Default Level

2: Configuration level

Parameters

<metric> : sets the default metric when routing is introduced. <value> ranging from 0 to 16777214.

Description

default-metric: sets the default metric for the OSPF routing protocol, and the no command restore to the default values. When metric are incompatible due to default,routing introductions still can continue. If the metric cannot be converted, the default metric provides an alternative option that enables the routing introduction to proceed. This command causes the current routing protocols to use the same metric for all introduced routes. This command should be used in combination with the command redistribute.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#default-metric 100
```

17.19 OSPF Route Management Distance

Command

```
distance { <value> | ospf }
no default { < value > | ospf }
```

View

OSPF View

Default Level

2: Configuration level

Parameters

< value > : OSPF route management distance value, value range 1~255.

ospf { external | inter-area | intra-area }:

- external <exernal distance> sets the management distance value of the routes learned from other routing fields, <exernal distance> management distance value, and its value range is 1~255.
- inter-area <inter-distance> sets the value of route management distance from one area to another. <inter-distance> management distance value, which ranges from 1 to 255.
- intra-area <intra-distance> sets the managed distance value of all routes in an area <intra-distance> management distance value, which ranges from 1 to 255.

Description

distance: the command is used to set the OSPF route management distance based on the route type configuration, and the no command restores the default value.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#distance ospf inter-area 20 intra-area 10
external 40
```

17.20 Ingress Route Information Filter

Command

```
distribute-list <access-list-name> in
no distribute-list <access-list-name> in
```

View

OSPF View

Default Level

2: Configuration level

Parameters

<access-list-name> : specifies the name of the access-list used.

Description

distribute-list in: the command is used to filter routing information in the incoming direction, and can not filter the LSA.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config-router)#distribute-list 10 in
```

17.21 Egress Route Information Filter

Command

distribute-list <access-list-name> out {kernel |connected| static| rip| isis| bgp}
distribute-list <access-list-name> out {kernel |connected| static| rip| isis| bgp}

View

OSPF View

Default Level

2: Configuration level

Parameters

<access-list-name> : specifies the name of the access-list used.

out: routing updates sent by filter.

kernel: kernel route.

connected：connected route

static: static route;

rip：RIP route.

isis：ISIS route.

bgp：BGP route.

Description

distribution-list out: The command is used to filter outgoing routes when routes from other routing protocols are introduced into the OSPF routing table, and this command is used only by ASBR.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 11 permit 172.10.0.0 0.0.255.255
Switch(config)#router ospf
Switch(config-router)#distribute-list 1 out bgp
Switch(config-router)#redistribute bgp
```

17.22 Introduce Additional Routing Information

Command

```
redistribute {connected|static|rip|bgp} [metric<value>]
[metric-type {1|2}] [route-map<word>] [tag<tag-value>]
no redistribute {connected|static|rip|bgp} [metric<value>]
[metric-type {1|2}] [route-map<word>] [tag<tag-value>]
```

View

OSPF View

Default Level

2: Configuration level

Parameters

connected：connected route

static: static route;

rip：RIP route.

bgp：BGP route.

metric: <value> the metric assigned to the introduced route, with a value range of 0-16777214.

metric -type: {1|2} the introduced metric type of the external route and can only be 1 or 2, default value is 2.

Route-map: <word> points to the route map used to introduce the route.

Tag: <tag-value> the tag number of the external route, the value range is 0~4294967295, the default value is 0.

Description

1. redistribute: the command is used only by ASBR to introduce routes from other routing protocols into the OSPF routing table.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#redistribute bgp metric 12
```

17.23 Interface Hello Message Control

Command

```
passive-interface<ifname> [<ip-address>]
no passive-interface<ifname> [<ip-address>]
```

View

OSPF View

Default Level

2: Configuration level

Parameters

<Ifname>: interface name.

<Ip-address>: interface IP address.

Description

passion-interface: the command is used to configure not to send hello messages on a specific interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config-router)#passive-interface vlanif2
```

17.24 SPF Timer

Command

```
timers spf <spf-delay> <spf-holdtime>
no timers spf
```

View

OSPF View

Default Level

2: Configuration level

Parameters

<spf-delay> : The default value is 5 seconds.

<spf-holdtime> : The default value is 10 seconds.

Description

timbers spf: the command is used to configure the delay time between receiving a topological change and SPF computation, and the hold time between two discrete SPF computations.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#timers spf 6 12
```

17.25 The Maximum Number of LSA

Command

overflow database <maxdbsize > [{hard|soft}]

no overflow database

View

OSPF View

Default Level

2: Configuration level

Parameters

< maxdbsize > : maximum number of LSA, ranging from 0 to 4294967294.

Soft: soft limit,a warning will be sent when crossing a line.

Hard: hard limit,the ospf instance will be close directly when crossing the line.

By default, it is processed as hard.

Description

overflow database: the command is used to configure the maximum number of LSA.

No operation does not limit the maximum number.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#overflow database 10000
```

17.26 Maximum Concurrent Number of Current DD Packet

Command

max-concurrent-dd <value>
no max-concurrent-dd

View

OSPF View

Default Level

2: Configuration level

Parameters

<value> : the value range is <1-65535>, the upper limit of the process of maximum concurrent dd packet.

Description

max-concurrent-dd: the command is used to configure the OSPF course to process the maximum number of concurrent dd currently, and the no command restores the default value.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#max-concurrent-dd 25
```

17.27 Regional OSPF Message Validation

Command

area (*A.B.C.D*|*<0-4294967295>*) authentication [message-digest]
no area (*A.B.C.D*|*<0-4294967295>*) authentication

View

OSPF View

Default Level

2: Configuration level

Parameters

A.B.C.D: area identification, IP address format.

<0-4294967295> : area identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

Message-digest: MD5 authentication mode, it is optional, if unselected it will be simple authentication mode (password in plaintext).

Description

area-id authentication: the command is used to configure the OSPF zone to authenticate OSPF messages and the authentication mode.

no area-id authentication: the command is used to cancel the configured authentication mode for this area.

By default, regions do not authenticate OSPF packets

Instance

```
#Configure OSPF zone 0 to use MD5 authentication mode
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config- router)#area 0 authentication message-digest
Switch(config- router)#no area 0 authentication
```

17.28 OSPF ABR Type

Command

ospf abr-type (cisco | ibm | shortcut | standard)

no ospf abr-type

View

OSPF View

Default Level

2: Configuration level

Parameters

Cisco: using the cisco (RFC3509) ABR implementation, the router connects multiple active areas, one of which is the backbone area.

ibm: using the ibm (RFC3509) ABR implementation, the router connects multiple active areas and backbone areas, backbone areas should not be the active areas.

Shortcut: using standard (draft-ietf-ospf-shortcut-abr-02) specify a shortcut-ABR.

Standard: using the standard (RFC2328) ABR implementation, the router connects multiple active areas.

Description

ospf abr-type: The command is used to configure the ABR type of the OSPF region. Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router ospf
Switch(config-router)# ospf abr-type standard
```

17.29 Interface OSPF Message Validation

Command

```
ip ospf authentication [message-digest]
ip ospf authentication null
no ip ospf authentication
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

Message-digest: MD5 authentication mode, optional, unselected simple authentication mode (password in plaintext).

Null: null is unauthenticated.

Description

ip ospf [A.B.C.D] authentication [message-digest]: the command is used to configure the interface to authenticate ospf messages and the authentication mode.

ip ospf [A.B.C.D] authentication null and no ip ospf authentication: the commands are used to cancel the authentication mode configured by the associated interface.

By default, relative interface do not authenticate OSPF packets

Instance

```
#Configure vlanif1 to use plaintext authentication mode
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf authentication
Switch(config- vlanif1)#no ip ospf authentication
```

Note:

- The authentication mode of the interface has a higher priority than the authentication mode of the region. When the authentication mode is not configured in the interface and the regional configuration is simple plaintext password authentication, the password needs to be set using ip ospf authentication-key command in the interface mode. If it is MD5 authentication, user need to configure the MD5 key using ip ospf message-digest-key in interface mode. When the authentication mode of an interface is configured, the authentication of the region in which the interface is located cannot affect the authentication behavior of the interface.
- Priority: ip ospf authentication is higher than area <area-id> authentication.
- Ip ospf authentication [message-digest] and other commands of the layer 2 interface are invalid.

17.30 Interface OSPF Message Authentication Key

Command

```
ip ospf authentication-key <line>
no ip ospf authentication-key
ip ospf authentication message-digest-key <key-id> md5 <line>
no ip ospf message-digest-key <key-id>
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

Line: plaintext authentication password.

key-id：MD5 key, the range is 1-255.

Description

ip ospf authentication-key <line> : the command is used to configure the password of OSPF message plaintext encryption authentication of relevant interface, the no operation of this command is used to restore the default value.

ip ospf message-digest-key <key-id> md5<line>: the command is used to configure the key value and password of the relevant interface for md5 encryption verification of ospf message, and restore the default value through the no operation of this command.

By default, the relative interfaces do not configure passwords and keys.

Instance

```
# Configure vlanif1 to use MD5 authenticated key values and passwords.
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip ospf message-digest-key 2 md5 yourpassword
Switch(config- vlanif1)#no ip ospf message-digest-key 2
```

Note:

Use MD5 encryption authentication to achieve security between OSPF routers on the network. This command must configure the same key id and key between neighbors, otherwise an adjacency relationship cannot be established. The subsequent configuration of this command covers the previous configuration to prevent the system from continuing to communicate using the previous key id.

17.31 Interface OSPF Cost

Command

ip ospf cost <*cost*>

no ip ospf cost

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<cost>:value range is 1-65535.

Description

ip ospf cost: the command is used to configure the cost required to run the ospf protocol on the interface. The no operation of this command is to restore the default value.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf cost 20
```

17.32 Interface LSA Database Filter

Command

```
ip ospf database-filter all out
no ip ospf database-filter
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

-

Description

Ip ospf database-filter all out: the command is used to configure to enable the LSA database filter switch on a specific interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf database-filter all out
```

17.33 Interface OSPF Neighbor Failure Time

Command

```
ip ospf dead-interval <time>
no ip ospf dead-interval
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<time>: OSPF neighbor failure time, in seconds, value range 1 ~ 65535

Description

Ip ospf dead-interval: the command is used to configure the OSPF neighbor failure time.

By default, the failure time of OSPF neighbors of P2P and Broadcast interfaces is 40 seconds. The failure time of OSPF neighbors of P2MP and NBMA interfaces is 120 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf dead-interval 60
```

17.34 Time Interval of Sending Hello Message

Command

```
ip ospf hello-interval <time>
no ip ospf hello-interval
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<time> : the time interval for the interface to send Hello message, in seconds, with a value range of 1 ~ 65535.

Description

ip ospf hello-interval: the command is used to configure the time interval for the interface to send the Hello message.

By default, the time interval for P2P and Broadcast type interfaces to send Hello message is 10 seconds. The time interval for P2MP and NBMA type interface to send Hello message is 30 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf hello-interval 20
```

17.35 Interface Retransmission LSA Interval

Command

```
ip ospf retransmit-interval <time>
no ip ospf retransmit -interval
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<time> : the time interval for the interface to retransmit LSA, in seconds, with a value range of 1 ~ 65535.

Description

ip ospf retransmit-interval command is used to configure the time interval for the interface to retransmit LSA.

By default, the time interval for interface to retransmit LSA is 5 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip ospf retransmit-interval 10
```

17.36 Interface to LSA Transmission Delay Time

Command

```
ip ospf transmit-delay <time>
no ip ospf transmit-delay
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<time> : transmission delay time of LSA of the interface, in seconds, with a value range of 1 ~ 65535.

Description

ip ospf retransmit-delay: the command is used to configure the transmission delay of LSA of the interface.

By default, the transmission delay for interface to retransmit LSA is 1 second.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip ospf transmit-delay 2
```

17.37 Disable the OSPF Function of the Interface

Command

ip ospf disable all

no ip ospf disable all

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

-

Description

ip ospf disable all: disable OSPF function on the interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf disable all
```

17.38 Interface OSPF MTU Value

Command

ip ospf mtu <mtu>

no ip ospf mtu

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

< mtu>: interface mtu value, ranging from 576 to 65535.

Description

ip ospf mtu: the command is used to configure the mtu value of the interface as the basis for the OSPF grouping. The interface values configured by this command are used only by the ospf protocol and are not updated to the kernel.

By default, the interface mtu value obtained from the kernel is used.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf mtu 1480
```

17.39 Interface DD Exchanges Ignore MTU

Command

ip ospf <ip-address> mtu-ignore

no ip ospf <ip-address> mtu-ignore

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<ip-address>: interface IP address format.

Description

ip ospf mtu-ignore: the command does not check the mtu size when configuring the DD switching for the interface. By default check is necessary.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip ospf mtu-ignore
```

17.40 Interface OSPF Network Type

Command

ip ospf network
{broadcast|non-broadcast|point-to-point|point-to-multipoint}
no ip ospf network

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

broadcast: set OSPF network type to broadcast.

non-broadcast: set OSPF network type to NBMA.

point-to-point: set OSPF network type to point-to-point.

point-to-multipoint: set OSPF network type to point-to-multipoint.

Description

ip ospf network: the command is used for the OSPF network type of the interface. By default, the OSPF network type of the interface is the broadcast type.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip ospf network non-broadcast
```

17.41 The DR Priority of the Interface

Command

```
ip ospf priority <priority>
no ip ospf priority
```

View

Layer 3 Interface View

Default Level

2: Configuration level

Parameters

<priority> : DR priority of the interface, ranging from 0 to 255.

Description

ip ospf priority: the command is used to configure the DR priority of the interface.

By default, the DR priority of the interface is 1.

The DR priority determines the qualification of the interface for election of DR/BDR. The higher the value, the higher the priority. High priority will be taken into account when voting rights conflict. If a device has a priority of 0, it will not be elected as DR or BDR.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ip ospf priority 2
```

17.42 Display OSPF Route Information

Command

```
show ip ospf route
```

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show ip ospf route: the command is used to display the routing information learned by ospf protocol.

Note: The show ip route ospf command is used to display the route information shown in the routing table that learned by ospf protocol.

Instance

```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#router ospf
SwitchA(config-router)#network 192.168.1.0/24 area 0
SwitchA(config-router)#network 192.168.2.0/24 area 0

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config- vlanif2)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#network 192.168.2.0/24 area 0
SwitchB(config-router)#end
Switch#show ip ospf route
O  192.168.1.0/24 [2] via 192.168.2.2, vlanif2, Area 0.0.0.0
C  192.168.2.0/24 [1] is directly connected, vlanif2, Area 0.0.0.0

Switch#show ip route  ospf
O      192.168.1.0/24 [110/2] via 192.168.2.2, vlanif2, 00:26:23
```

17.43 Display OSPF Database Information

Command

show ip ospf database

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show ip ospf database: the command is used to display the routing status database information of the ospf protocol.

Instance

```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#router ospf
SwitchA(config-router)#network 192.168.1.0/24 area 0
SwitchA(config-router)#network 192.168.2.0/24 area 0

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
```

```
SwitchB(config- vlanif2)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#network 192.168.2.0/24 area 0
SwitchB(config-router)#end
SwitchB#show ip ospf database

            Router Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum  Link count
192.168.2.1     192.168.2.1     570  0x80000003 0xe0bd 1
192.168.2.2     192.168.2.2     552  0x80000005 0xf825 2

            Net Link States (Area 0.0.0.0)

Link ID         ADV Router      Age  Seq#       CkSum
192.168.2.2     192.168.2.2     571  0x80000001 0x881d
```

17.44 Display OSPF Neighbor Information

Command

show ip ospf neighbor

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

show ip ospf neighbor: the command is used to display neighbor information of the ospf protocol.

Instance

```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config-vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
```

```
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config)#router ospf
SwitchA(config-router)#network 192.168.1.0/24 area 0
SwitchA(config-router)#network 192.168.2.0/24 area 0

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config-vlanif2)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#network 192.168.2.0/24 area 0
SwitchB(config-router)#end
SwitchB#show ip ospf neighbor

OSPF process 0:
Neighbor ID     Pri   State           Dead Time   Address
Interface
192.168.2.2      1   Full/DR         00:00:37    192.168.2.2
vlanif2
```

18 BGP Configuration

18.1 Enter BGP Route Configuration View

Command

router bgp < AS-NUMBER >

no router bgp < AS-NUMBER >

View

Configure Mode

Default Level

2: Configuration level

Parameters

As-number: autonomous system number and the range is 1-4294967295.

Description

router bgp: the command is used to start the BGP process and enter BGP process mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
```

18.2 Enter the IPv4 or IPv6 Address Family

Command

address-family { ipv4 | ipv6}

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

address-family: the command is used to enter the ipv4/ ipv6 address family to configure BGP configuration mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router)#address-family ipv4
Switch(config-router-af) #
```

18.3 BGP Route Aggregation Address

Command

```
aggregate-address <A.B.C.D/M > [as-set] [summary-only]
no aggregate-address <A.B.C.D/M > [as-set] [summary-only]
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

A.B.C.D/M: network address and mask.

as-set: generates a route with AS collection segments.

Summary-only: only the aggregated routes are announced, all routes are announced by default.

Description

aggregate-address: the command is used to create an aggregate route in the BGP routing table.

By default, routing aggregation is not performed.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #aggregate-address 10.0.0.0 255.0.0.0
as-set
```

18.4 BGP Always Comparison MED Value

Command

bgp always-compare-med

no bgp always-compare-med

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp always-compare-med: the command is used to set the BGP always compare MED.

By default, MED is only compared when AS is the same.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp always-compare-med
```

18.5 The BGP optimal Path Ignore the AS-Path Length

Command

bgp bestpath as-path ignore

no bgp bestpath as-path ignore

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp bestpath as-path ignore: the command is used to configure to ignore the as-path length.

By default, the as-path length is considered when selecting the optimal path.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp bestpath as-path ignore
```

18.6 Comparison of AS-Path Length of BGP Optimum Path

Command

```
bgp bestpath compare-confed-aspath
no bgp bestpath compare-confed-aspath
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp bestpath compare-confed-aspath: the command is used to allow the same external routing to compare the aspath path length of the federation, the smaller the aspath length within the federation, the higher the path priority.

By default, the optimal path is chosen not by comparing ASPATHS from EBGP peer routes within the same federation, routing is optimized according to other conditions.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp bestpath compare-confed-aspath
```

18.7 BGP Optimum Path Routing ID Comparison

Command

```
bgp bestpath compare-routerid
no bgp bestpath compare-routerid
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp bestpath compare-routerid: the command is used for router ID that allows the same external routing comparison path, the smaller the router ID, the higher the path priority.

By default, when selecting the optimal path, two paths with the same path attributes will be received by different EBGP peers, The first one is not the one with the highest priority.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp bestpath compare-routerid
```

18.8 MED Property of BGP Optimum Path

Command

```
bgp bestpath med {[confed] [missing-as-worst]}
no bgp bestpath med {[confed] [missing-as-worst]}
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

Confed: compare MED in alliance path.

missing-as-worst: consider that the value of MED is the greatest when it is missing.

Description

bgp bestpath med confed: the command is used to compare the properties of med in the alliance path and to consider its value to be the maximum when the med is missing.

By default, the MED value of the path of the peers is not compared when selecting the optimal path.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp bestpath med confed
```

18.9 BGP Route Reflection

Command

```
bgp client-to-client reflection
no bgp client-to-client reflection
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp client-to-client reflection: the command is used to configure whether to process route reflection.

By default, route reflection is performed when the client is configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp client-to-client reflection
```

18.10 Configure the Group Identifier for the Routing Reflector

Command

```
bgp cluster-id {(A.B.C.D) | <0-4294967295>}
no bgp cluster-id
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

A.B.C.D: group identification, IP address format.

<0-4294967295> : group identification, decimal integer, value range is 0 ~ 4294967295, the system will process it into IP address format.

Description

bgp cluster-id: the command is used to configure the group identification of the route reflector.

By default, the identification is router-id of the router reflector.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp cluster-id 1.1.1.1
```

18.11 Configure the Identifier for the AS Alliance

Command

```
bgp confederation identifier <number>
no bgp confederation identifier [<number>]
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

Number: confederation identifier

Description

bgp confederation identifier: the command is used to configure the identifier for the AS confederation.

By default confederation identifier is not configured.

Confederation is another way to reduce the number of IBGP peer connections in autonomous systems. An autonomous system is divided into multiple sub-autonomous systems, and these sub-autonomous systems are formed into a confederation by setting a unified federation ID(i.e., confederation AS number). For the outside of the confederation, the whole confederation is still regarded as an AS, and only the AS number of the confederation is visible to the external. Within the confederation, full IBGP peer-to-peer connections are still established between BGP speakers within the sub-autonomous systems and EBGP connections between BGP speakers in the sub-autonomous systems. Although EBGP links have been established between BGP speakers in sub-autonomous systems, information exchange remains the same for next hop, MED, local priority, etc.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp confederation identifier 65000
```

18.12 Configure the Member AS for the AS Alliance

Command

```
bgp confederation peers <as-number> [<as-number>]
no bgp confederation peers <as-number> [<as-number>]
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

as-number: AS, a member of the confederation. range :1-65535.

Description

bgp confederation peers: the command is used to configure the identifier for the AS confederation.

By default confederation member is not configured.

Confederation is a way to reduce the number of IBGP peer connections in autonomous systems. An autonomous system is divided into multiple sub-autonomous systems, and these sub-autonomous systems are formed into a confederation by setting a unified federation ID(i.e., confederation AS number). For the outside of the confederation, the whole confederation is still regarded as an AS, and there are other AS numbers of the confederation are visible to the external. Within the confederation, full IBGP peer-to-peer connections are still established between BGP speakers within the sub-autonomous systems and EBGP connections between BGP speakers in the sub-autonomous systems. Although EBGP links have been established between BGP speakers in sub-autonomous systems, information exchange remains the same for next hop, MED, local priority, etc. This command specifies AS, a member of the alliance.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp confederation peers 100 110
```

18.13 EBGP Route Suppression

Command

```
bgp dampening {[<half-life>] [<reusing> <suppressing> <duration>]
| [route-map <WORD>] }
no bgp dampening {[<half-life>] [<reusing> <suppressing>
<duration>] | [route-map [<WORD>]] }
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

Half-life: Specifies how long to interval the penalty value is halved in minutes, ranging from 1 to 45 minutes, default is 15 minutes.

Reusing: do not dampen the routing when the penalty value drops to this value, ranging from 1-20000, default to 750.

Suppressing: dampen the routing when the penalty value reaches the value,the range is 1-20000, the default value is 2000.

duration: the maximum duration of routing suppression, beyond which the routing suppression is automatically unmounted, is in minutes, ranging from 1 to 255, default is 60 minutes.

WORD: the name of oute-map, which applies routing attenuation to specific routes via route-map.

Route attenuation is applied to all routes by default.

Description

bgp dampening: the command is used to suppress unstable EBGP route and is invalid to the IBGP routing.

By default confederation member is not configured.

BGP uses the concept of penalty values to describe the stability of the route. The higher the penalty value, the more unstable the route. The penalty value is increased by 1000 per routing concussion (when withdraw message is received). When the penalty value increases to a certain level, it will not increase again. This value is called the penalty upper limit. The value depends on the duration value configured by the user, and the calculation formula is: Penalty upper limit = 2 ^ (duration / half-life) * reusing. At the same time, the upper limit of penalty value cannot be greater than 20000, so duration, half-life and reusing values should be adjusted according to the network conditions during configuration. These parameters roughly satisfy the following requires: 1) half-time and duration : half-time ≤ duration; 2) reusing, suppressing and penalty uper limit: reusing ≤ suppressing ≤ penalty uper limit. The user can also specify other half - life value, the value of duration is (half - life * 4), and reusing and suppressing values are 750 and 2000 respectively. EBGP routes with penalty value exceeds suppressing value will be suppressed, suppressed routing in BGP routing in the process of the election will not be used, also won't notice to other BGP peers. If the suppressed route continues concussion, the penalty will continue to rise to the penalty upper limit. For every half-life time a suppressed route

passes, the penalty is reduced by half. When the penalty value is reduced to the reusing value, the route that was updated at the last update will re-participate in the BGP routing election. When the penalty value is reduced to 0, the route that is withdraw message at the last update will be deleted from the BGP routing table.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp dampening 30 1200 10000 120
```

18.14 Set the BGP Address Family to IPv4 Unicast by Default

Command

bgp default ipv4-unicast
no bgp default ipv4-unicast

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp default ipv4-unicast: the command is used to set the address family to a unicast address that defaults to ipv4.

By default, IPv4 unicast is used for neighbor relationship build.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp default ipv4-unicast
```

18.15 The Default Local Priority Value for BGP

Command

bgp default local-preference *<0-4294967295>*

no bgp default local-preference [*<0-4294967295>*]

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

<0-4294967295>: default local priority.

Description

bgp default local-preference: the command is used to set the default local-preference property value.

By default, the local priority value is 100.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp default local-preference 200
```

18.16 Compare MED Values of the Same AS Counterparts

Command

bgp deterministic-med

no bgp deterministic-med

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp deterministic-med: the command is used to set path precedence for comparing med values from peers of the same AS.

By default, comparisons are made in path receive order, the most recently received path being compared first.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp deterministic-med
```

18.17 Force the AS-Path of the First Location to be the EBGP Route

Command

bgp enforce-first-as

no bgp enforce-first-as

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp enforce-first-as: the command is used to set up that when BGP receives an external route, the forced route's as-path must contain the neighbor's as number in the position of the first as or break the peer's connection.

By default it is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp enforce-first-as
```

18.18 Reset the Direct Connection EBGP Fault Interface

Command

bgp fast-external-failover

no bgp fast-external-failover

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp fast-external-failover: the command is used to set up a BGP session connection to be quickly closed when the network interface used by the directly connected EBGP peer to establish the connection fails.

By default this function is configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp fast-external-failover
```

18.19 Record BGP Status Change Information

Command

bgp log-neighbor-changes

no bgp log-neighbor-changes

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

bgp log-neighbor-changesr: the command is used to enable the state message of the BGP to be recorded when the debug is not turned on.

By default this function is configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp log-neighbor-changes
```

18.20 BGP Route ID

Command

```
bgp router-id <A.B.C.D >
no bgp router-id [<A.B.C.D >]
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

A.B.C.D: router ID

Description

bgp router-id: the command is used to set the ID of the router.

By default, the router ID is automatically obtained.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp router-id 1.1.1.1
```

18.21 BGP Next Hop Detection Interval

Command

```
bgp scan-time <interval>
no bgp scan-time [<interval>]
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

interval: the interval between checks.

Description

bgp scan-time: the command is used to set the time interval between which BGP periodically checks whether the next hop of the route is valid.

By default, the interval is 60.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #bgp scan-time 45
```

18.22 Specifies the Management Distance for the Routing Prefix

Command

```
distance <distance> <A.B.C.D/M>
no distance <distance> <A.B.C.D/M>
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

distance: management distance, the range is 1-255.

A.B.C.D/M: route prefix.

Description

distance: the command is used to set the administrative distance for the specified route prefix.

By default it is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #distance 100 10.12.1.0/24
```

18.23 Managed Distances for Internal/External/Local BGP Routes

Command

```
distance bgp <EXTERNAL> <INTERNAL> <LOCAL>
no distance bgp <EXTERNAL> <INTERNAL> <LOCAL>
```

View

BGP Configuration View

Default Level

2: Configuration level

Parameters

External: BGP external (EBGP) management distance, the range is 1-255.

Internal: BGP internal (IBGP) management distance, the range is 1-255.

local: local management distance, the range is 1-255.

Description

distance bgp: the command is used to set different management distances for different types of BGP routes.

By default, EBGP management distance is 20, IBGP management distance is 200, and local route management distance is 200.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #distance bgp 30 180 180
```

18.24 Exit the BGP IPv4 or IPv6 Address Family

Command

```
exit-address-family
```

View

IPv4 or IPv6 Address Family of BGP Configuration View

Default Level

2: Configuration level

Parameters

-

Description

The exit-address-family: the command is used to exit the BGP IPv4 or IPv6 address family configuration view.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router) #address-family ipv4
Switch(config-router-af)#exit-address-family
```

18.25 Network Segment Routing Notification BGP Routing Table

Command

network {<A.B.C.D > |<A.B.C.D/M >} [route-map <*map-name*>] [backdoor]
no network {<A.B.C.D > |<A.B.C.D/M >} [route-map <*map-name*>] [backdoor]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D/M: network address and mask.

Map-name: the name of the route-map. Route map name should be no more than 32 characters.

backdoor: this route is backdoor route. Enables router to select the route learned from IGP first instead of the route learned from IBGP neighbors.

Description

network: the command is used to notify segment route to the BGP route table.

By default, BGP does not notify any network segment route.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#network 10.11.20.0/24
```

18.26 Route Synchronization Notify Network Information

Command

```
network synchronization
no network synchronization
```

View

BGP configuration view,the IPv4 or IPv6 address family configuration view of the BGP

Default Level

2: Configuration level

Parameters

-

Description

network synchronization: the command is used to configure the synchronize of BGP and the local route before announcing the network information configured by the network.

By default, BGP directly announces the network route, regardless of whether it is synchronized with the local route.

It is not recommended to turn off the switch, which may cause a routing black hole.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#network synchronization

Switch > enable
```

```
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config)#address-family ipv4
Switch(config- router r-af)#network synchronization
```

18.27 Configure BGP Peers/Peer Groups

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} remote-as < AS-number >
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} remote-as < AS-number >

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

As-number: BGP peer (group) autonomous system number and the range is 1-65535.

Description

neighbor remote-as: the command is used to configure the BGP peer/peer group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
```

18.28 Activate the Specified Peer/Peer Group

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} activate
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} activate

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group

Description

neighbor activate: the command is used to activate the specified peer/peer group.

By default, it is active.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 activate
```

18.29 The Time Interval between Sending BGP Routing Update Packets

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} advertisement-interval < seconds >

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} advertisement-interval < seconds >

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

seconds: the time interval in which routing updates are sent. Range: 0-600 seconds.

Description

neighbor advertisement-interval: the command is used to set the time interval between sending BGP routing updates.

By default, the same routing update message is sent to an internal peer group at a 5-second interval and to an external peer group at a 30-second interval.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 advertisement-interval 10
```

18.30 The Number of Occurrences of the Same AS in the Neighbor Route AS List

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} allowas-in [< numbers >]
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} allowas-in [< numbers>]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Numbers: the times an AS number is allowed to repeat. range :1-10.

Description

neighbor allowas-in: the command is used to specify the number of times the same AS is allowed in the neighbor's routing AS list.

By default, AS is not allowed to be repeated on the same route. When repetition is configured to allow , the default repeat times allowed without the <1-10> parameter is 3.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 allowas-in 10
```

18.31 The Time Interval Between Sending the Local Originating BGP Route

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} as-origination-interval <seconds >

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} as-origination-interval <seconds >

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group

seconds: the time interval between sending local originating BGP routes. Range: 1-600 seconds.

Description

The neighbor as-origination interval command is used to configure the time interval between notifying a specified peer of a local originating BGP route.

By default, the time interval for sending a local originating BGP route is 15 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 as-origination-interval 100
```

18.32 The Routing Properties Associated with the Transport Neighbors Remain Unchanged

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} attribute-unchanged [as-path] [med] [next-hop]

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} attribute-unchanged [as-path] [med] [next-hop]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group

as-path: as-path property.

med: med property.

next-hop ： next-hop property

Description

The neighbor attribute-unchanged command is used to configure that the related routing property will not be changed when passed to the specified neighbor.

Instance

```
Switch> enable
Switch#configure terminal
Switc (config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 attribute-unchanged
```

18.33 Dynamic Updates and Routing Refreshes with Neighbors

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} capability {dynamic |route-refresh}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} capability {dynamic |route-refresh}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group

Dynamic: dynamic update capability negotiation.

route-refresh: route refresh capability negotiation.

Description

neighbor capability: The command is used to configure dynamic update and routing refresh capability negotiation with neighbors. Through this configuration, negotiate the capability supported by both parties in the OPEN message. If the capability is supported by the end, a response will be given; otherwise, NOTIFICATION will be sent, and the initiator will send OPEN without the capability to re-establish the connection. Dynamic capability means that a connection does not have to be restarted when the supported address family negotiation changes. Routing refresh is to issue a routing refresh request when some properties can be configured for soft reset and the other party can resend the existing route to the originating end. With the routing refresh property configured, user can use the clear ip bgp * soft in command to refresh when changing policy without rebuilding the connection.

By default: configure routing refresh capability instead of dynamic update capability.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
```

```
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 capability dynamic
```

18.34 Egress Route Filter with Neighbor

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} capability orf prefix-list {<both>|<send>|<receive>}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} capability orf prefix-list {<both>|<send>|<receive>}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address

X:X::X:X: IPv6 peer interface address

WORD: name of the peer group

both: receives and sends the prefix-list filter rule

send: sends the prefix-list filter rule

receove: receives the prefix-list filter rule

Description

neighbor capability orf prefix-list: the command is used to configure the outlet with the neighbor to be negotiated by the filter function. Through this configuration, negotiate the capability supported by both parties in the OPEN message. If the capability is supported by the end, a response will be given; otherwise, NOTIFICATION will be sent, and the initiator will send OPEN without the capability to re-establish the connection. After this capability is configured, the party that has the prefix-list filter rule configured sends its own filter rule to the peer when the connection is established, and the peer applies its own rule to avoid sending the route that will be filtered on the other side.

By default ORF function is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
```

```
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 capability orf
prefix-list both
```

18.35 TCP Connection Collision Detection with Neighbor

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} collide-established

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} collide-established

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group

Description

neighbor collide-established: the command is used to enable conflict detection and resolution in the event of a TCP connection conflict.

By default, it is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 collide-established
```

18.36 Send a Default Route to a Peer/Peer Group

Command

neighbor {*<A.B.C.D >* | *<X:X::X:X>* | *<WORD>*} default-originate [route-map *<WORD>*]

no neighbor {*<A.B.C.D >* | *<X:X::X:X>* | *<WORD>*} default-originate [route-map *<WORD>*]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

WORD: the name of the route map.

Description

neighbor default-originate: the command is used to send the default route to the peer/peer group.

By default: no default route is sent to peer/peer groups.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 default-originate
```

18.37 Peer/Peer Group Description Information

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} description <LINE>
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} description [< LINE >]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

LINE: description information for peers.

Description

neighbor description: the command is used to configure description information for peer/peer groups.

By default: peer/peer group does not have description information.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 description test
```

18.38 Filtering Strategy Based on ACL

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} distribute-list {<access-list-number> | <WORD>} {in | out}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} distribute-list {<access-list-number> | <WORD>} {in | out}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

access-list-number: ACL number.

WORD: ACL name.

Description

neighbor distribution-list: the command is used to set up acl-based filtering policies for peer and peer groups.

By default: no ACL based filtering policy is set for peer/peer groups.

Whether for the input (in) or output rules (out), at any time, the command and neighbor prefix-list can not coexist, only one command is effective.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 distribute-list 1 in
```

18.39 No Capacity Negotiation when Establishing a Connection

Command

```
neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>}
dont-capability-negotiate
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>}
dont-capability-negotiate
```

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address

X:X::X:X: IPv6 peer interface address

WORD: name of the peer group

Description

neighbor dont-capability-negotiate: the command is used to configure that do not carry out the ability negotiation when a connection is established.

By default, ability negotiation is carried out.

By default, capability negotiation occurs when the connection is established with the other side, so this configuration allows users to establish a connection without capability negotiation when knowing that the other side is an older version of BGP that does not support capability negotiation.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1
dont-capability-negotiate
```

18.40 Allows Non-directly Connected Neighbors to Establish EBGP Sessions

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} ebgp-multihop [<count>]

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} ebgp-multihop [<count>]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Count: number of hops allowed, range 1-255.

Description

neighbor ebgp-multihop: the command is used to configure to allow EBGP sessions to be established with neighbors on non-directly connected networks.

By default: EBGP sessions are not allowed with neighbors on indirectly connected networks.

Set the parameter count to configure the maximum router hops for EBGP sessions at the same time, and 255 hops without the parameter count.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 ebgp-multihop
```

18.41 Force Direct Contact with Neighbors for Multiple Hop

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} enforce-multihop

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} enforce-multihop

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor enforce-multihop: the command is used to configure the connection to the neighbor to multihop.

By default, it is not configured.

Direct connection routing cannot be forced to be multi-hop, but with this configuration, the system can be forced to treat the connection as a multi-hop connection. That is to say, the checks that were originally made only for IBGP and EBGP of non-directly connected routes,all are checked after this property is set. At the ingress, there is no direct connection check for the next jump in case of forced multi-jump.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 enforce-multihop
```

18.42 AS-Path Access List Filtering

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} filter-list <WORD> {in | out}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} filter-list <WORD> {in | out}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group

WORD: as-path list name.

Description

neighbor filter-list: the command is used to configure access list control for AS-PATH when routing information is sent and received with a specified BGP peer (group).

By default, it is not configured.

After the IP AS-PAT H access list is first configured and applied to the specified neighbor, user can control to send/receive route with the specified AS number in the AS list to that neighbor . Accept and reject depend on settings of the access list , while issue and receive are set by this command.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ip as-path access-list test deny 100
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 filter-list test out
```

18.43 Configure the Interface to the BGP Peer/Peer Group

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} interface <WORD>

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} interface <WORD>

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

WORD: interface name.

Description

neighbor interface: the command is used to configure the interface connected to the BGP peer (group).

By default, it is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 interface vlanif2
```

18.44 Number of Received Peer Prefixes

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} maximum-prefix <limit> [threshold] [warning-only]

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} maximum-prefix <limit> [threshold] [warning-only]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

limit: the upper limit of the number of items allowed to receive routing information, ranging from 1-4294967295.

threshold: specifies a value that starts generation of warnings and a maximum number of percentages, ranging from 1 to 100, and defaults to 75.

Warning-only: when routing information reaches the limit, the BGP connection is terminated and a log message is generated.

Description

neighbor maximum-prefix: the command is used to configure the limit on the number of prefixes received from the specified BGP peer.

By default, it is not limited.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 maximum-prefix 100
```

18.45 Force Next-hop Addresses as Neighbors

Command

```
neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} next-hop-self
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} next-hop-self
```

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor next-hop-self: the command is used to configure a route that requires the neighbor to make the next hop to the local route.

By default, it is not configured.

In the EBGP environment, the next hop automatically points to the source neighbor, but in the IBGP environment, if the same network segment is routed, the original next hop remains unchanged. But if it is not a broadcast network, there will be a problem,

so this command can be used to force to use itself as neighbor's next hop as long as it is in IBGP.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 next-hop-self
```

18.46 Ignore the Results of Peer Capacity Negotiation

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} override-capability
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} override-capability

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor override-capability: the command is used to configure the result of ignoring the BGP peer (group) capability negotiation.

By default, it is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 override-capability
```

18.47 The Peer Connection is Passive

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} passive

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} passive

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor passive: the command is used to configure the connection to the BGP peer (group) to be passive and not to actively send the connection request.

By default: initiate the connection.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 passive
```

18.48 Create a BGP Peer Group

Command

neighbor <WORD> peer-group

no neighbor <WORD> peer-group

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

WORD: name of the peer group

Description

neighbor <WORD>peer-group: the command is used to create the BGP peer group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor test peer-group
```

18.49 Add a Peer Group Member

Command

```
neighbor {<A.B.C.D > | <X:X::X:X>} peer-group <WORD>
no neighbor {<A.B.C.D > | <X:X::X:X> } peer-group <WORD>
```

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address

X:X::X:X: IPv6 peer interface address

WORD: name of the peer group

Description

neighbor {< A.B.C.D> | <X:X: X:X>} peer group <WORD> : the command is used to add a specified BGP peer to a peer group.

By default，it have not joined the peer group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor test peer-group
Switch(config- router)#neighbor 1.1.1.1 peer-group test
```

18.50 TCP Port Number for Communicating with Neighbors

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} port < number >

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} port < number >

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

number: TCP port number, the range is 0-65535.

Description

neighbor passive: The command is used to configure the TCP port number to communicate with the neighbor.

By default, the port number is 179.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router)#neighbor 1.1.1.1 remote-as 200
Switch(config-router)#neighbor 1.1.1.1 port 1022
```

18.51 Routing Filtering Strategy based on IP Prefix List

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} prefix-list < WORD > {in | out}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} prefix-list < WORD > {in | out}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

WORD: IP prefix list name.

Description

neighbor prefix-list: the command is used to set a routing filter policy based on the IP prefix list for peer/peer groups.

By default, no route filtering strategy based on IP prefix list.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 prefix-list test
```

18.52 BGP Update Message Removes Private AS

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} remove-private-AS

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} remove-private-AS

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor remote-private-AS: the command is used to configure sending BGP update messages without carrying a private autonomous system number.

By default, BGP update messages are sent with a private autonomous system number.

Private AS numbers range from 64512 to 65535.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 remove-private-AS
```

18.53 Route Mapping Strategy

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} route-map < WORD > {in | out}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} route-map < WORD > {in | out}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

WORD: IP prefix list name.

Description

neighbor route-map: the command is used to configure the route mapping policy to be applied when sending or receiving routes from a neighbor.

Default: no filtering policy based on routing map .

Instance

```
Switch> enable
Switch#configure terminal
```

```
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 route-map test
```

18.54 Route Reflection

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} route-reflector-client

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} route-reflector-client

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor route-reflector-client: the command is used to configure native as the route reflector and peer/peer groups as the route reflector client.

By default: route reflector and its clients are not configured.

Route reflection is used to reduce the number of peers when the IBGP router inside the AS is larger, and its clients only exchange information with the route reflector, which handles the exchange of information between clients and with other IBGP and EBGP routers. This command configure itself as a route reflector and the specified peer (group) as its client. Note: this configuration can only be conducted within AS.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 route-reflector-client
Switch(config- router)#neighbor 3.3.3.3 remote-as 200
Switch(config- router)#neighbor 3.3.3.3 route-reflector-client
```

18.55 Router Server

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} route-server-client

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} route-server-client

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor route-server-client: the command is used to configure the native as the routing server and the peer/peer group as the routing server client.

By default: no routing server and its clients are configured.

Routing service is used to reduce the number of peers between AS routers in EBGP environment. When the clients exchange information through the routing server, the server transparently transmits the routing message to other clients.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 route-server-client
Switch(config- router)#neighbor 3.3.3.3 remote-as 300
Switch(config- router)#neighbor 3.3.3.3 route-server-client
```

18.56 Community Property Transfer

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} send-community [both | extended | standard]

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} send-community [both | extended | standard]

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

both: both standard and extended groups are transmitted

extended: only extended groups are transmitted.

Standard: only standard groups are transmitted.

Description

neighbor send-community: the command is used to specify the transmission of group attributes to the specified BGP neighbor.

By default: group attributes is sent.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 send-community
```

18.57 Disable BGP Connection

Command

```
neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} shutdown
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} shutdown
```

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor shutdown: the command is used to close a BGP connection with a specified BGP peer.

By default: the connection is not closed.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 shutdown
```

18.58 Store BGP Original Routing Information

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} soft-reconfiguration inbound

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} soft-reconfiguration inbound

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor soft-reconfiguration: the command is used to allow the storage of original routing information from BGP peers.

By default: storage is not allowed.

When configured to allow the storage of original routing information from BGP peers, the system will first store the original routing information in the cache and apply it to the end immediately after restart, thus reducing the consumption of exchange with other routers. This command makes sense when the routing refresh capability is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router)#neighbor 1.1.1.1 remote-as 200
Switch(config-router)#neighbor 1.1.1.1 soft-reconfiguration
inbound
```

18.59 Strict Ability Matching Connection

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} strict-capability-match
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>}
strict-capability-match

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor strict-capability-match: the command is used to configure a capability match that is strictly required when establishing a connection.

By default，strict capability matching is not configured.

This command is only valid for BGP multi-protocol. After the use of this command, the neighbor can only be established when the BGP multi-protocol capabilities of both parties match. Otherwise, it cannot be established. Whether or not other abilities are matched does not affect the establishment of neighbors.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 strict-capability-match
```

18.60 BGP Session Timer with the Specified Peer

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} timers { <keepalive> <holdtime> | connect < connect -time>}

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} timers { <keepalive> <holdtime> | connect < connect -time>}

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

keepalive: the time interval between sending KEEPALIVE messages to a specified BGP peer, range: 0-65535 seconds.

holdtime: specifies the interval between BGP peer sending KEEPALIVE messages, range: 0-65535 seconds.

connect-time: time interval for initiating a reconnection to a specified BGP peer, range: 1-65535 seconds.

Description

neighbor timers: the command is used to configure the alive time interval and hold times of BGP sessions established with a specified peer/peer group, as well as the reconnection interval.

By default, keepalive time is 60s, holdtime is 240s and connect-time is 120s.

It is recommended that keepalive value should not be greater than one third of holdtime.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config-router)#neighbor 1.1.1.1 remote-as 200
Switch(config-router)#neighbor 1.1.1.1 timers 50 150
```

18.61 Unsuppress the Routing Map

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} unsuppress-map <WORD>

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} unsuppress-map <WORD>

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

WORD: the name of the route-map.

Description

neighbor unsuppress-map: the command is used to configure or cancel unsuppress of cases that match the specified routing map.

By default, it is not configured.

This function is mainly for specific routes that are aggregated and summary-only suppressed. Routes that meet the routing mapping conditions are not suppressed in this case and are still issued separately.

Instance

```
Switch> enable
Switch#configure terminal
Switch#access-list 3 permit 100.1.3.0
Switch(config)#route-map test permit 10
Switch (config-route-map)#match ip address 3
Switch (config-route-map)#exit
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 unsuppress-map test
```

18.62 Specify the BGP Connection Interface

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} update-source < WORD >

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} update-source < WORD >

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

WORD: interface name or address.

Description

neighbor update-source: the command is used to set up the network interface to be used when establishing a BGP connection in a specified IBGP peer.

By default: use the best local interface as the output interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 update-source vlanif1
```

18.63 Configure the BGP Version of the Peer

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} version

no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} version

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Description

neighbor version: the command is used to configure the BGP version number of the peer, currently only version 4 available.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 version 4
```

18.64 Configure the Weight Value of the Peer

Command

neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} weight <value>
no neighbor {<A.B.C.D > | <X:X::X:X> | <WORD>} weight <value>

View

BGP configuration view,IPv4 or IPv6 address family of BGP configuration view

Default Level

2: Configuration level

Parameters

A.B.C.D: IPv4 peer interface address.

X:X::X:X: IPv6 peer interface address.

WORD: name of the peer group.

Value: neighbor's weight. value range is 0-65535.

Description

neighbor weight: the command is used to configure the weights of the peer.

By default: routes from other routers have a default weight of 0. The weight of the local static configuration defaults to 32768.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#neighbor 1.1.1.1 remote-as 200
Switch(config- router)#neighbor 1.1.1.1 weight 40
```

18.65 Introduce Additional Routing Information to the BGP

Command

redistribute { connected| static| ospf |rip} [route-map<word>]

no redistribute { connected| static| ospf| rip} [route-map<word>]

View

BGP View

Default Level

2: Configuration level

Parameters

connected：connected route

static: static route;

ospf：OSPF route.

rip：RIP route.

<word>：a pointer to the route map used to introduce routes.

Description

redistribute: the command introduces routes learned from other routing protocols into BGP.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#redistribute ospf
```

18.66 BGP Connection Survival Interval and Holdtime

Command

timers bgp <keepalive> <holdtime>

no timers basic

View

BGP View

Default Level

2: Configuration level

Parameters

keepalive: keepalive interval, the range is 0-65535 seconds.

holdtime: the range is 0-65535 seconds.

Description

timers bgp: the command is used to configure the intervals of the BGP connection alive time and hold time.

By default, BGP connections have a survival interval of 60 seconds and a retention time of 180 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#router bgp 100
Switch(config- router)#timers bgp 80 200
```

18.67 Display BGP Route Information

Command

show ip bgp [<A.B.C.D >] [<A.B.C.D/M >]

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: IP address.

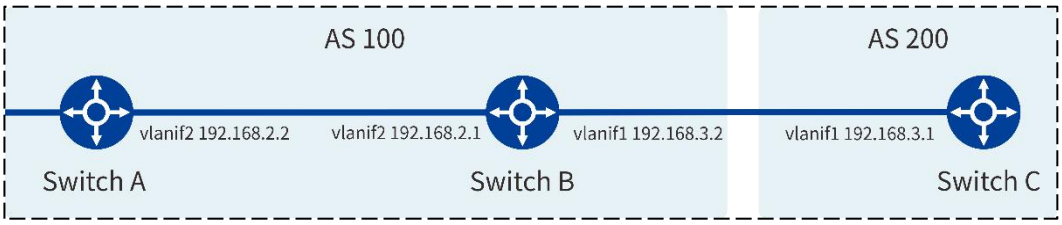
A.B.C.D/M: IP address and mask.

Description

show ip bgp: command is used to display routing information maintained by BGP.

Instance

Networking: As shown in the figure below, device A is connected to device B through VLANIF2, and device B is connected to device C through VLANIF1. Device C displays routing information maintained by BGP via command.




```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#ip interface loopback 0
SwitchA(config)#interface loopback0
SwitchA(config- loopback0)#ip address 2.2.2.2/32
SwitchA(config- loopback0)#exit
SwitchA(config)#router ospf
SwitchA(config-router)#router-id 2.2.2.2
SwitchA(config-router)#network 192.168.1.0/24 area 0
SwitchA(config-router)#network 192.168.2.0/24 area 0
SwitchA(config-router)#network 2.2.2.2/32 area 0
SwitchA(config-router)#exit
SwitchA(config)#router bgp 100
SwitchA(config-router)#bgp router-id 2.2.2.2
SwitchA(config-router)#network 192.168.1.0/24
SwitchA(config-router)#network 192.168.2.0/24
SwitchA(config-router)#neighbor 1.1.1.1 remote-as 100

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#interface vlanif1
SwitchB(config- vlanif1)#ip address 192.168.3.2/24
SwitchB(config- vlanif1)#exit
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
```

```
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config-vlanif2)#exit
SwitchB(config)#ip interface loopback 0
SwitchB(config)#interface loopback0
SwitchB(config-loopback0)#ip address 1.1.1.1/32
SwitchB(config-loopback0)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#router-id 1.1.1.1
SwitchB(config-router)#network 1.1.1.1/32 area 0
SwitchB(config-router)#network 192.168.2.0/24 area 0
SwitchB(config-router)#network 192.168.3.0/24 area 0
SwitchB(config-router)#exit
SwitchB(config)#router bgp 100
SwitchB(config-router)#bgp router-id 1.1.1.1
SwitchB(config-router)#network 192.168.1.0/24
SwitchB(config-router)#network 192.168.2.0/24
SwitchB(config-router)#neighbor 2.2.2.2 remote-as 100
SwitchB(config-router)#neighbor 3.3.3.3 remote-as 200

SwitchC> enable
SwitchC#configure terminal
SwitchC(config)#interface vlanif1
SwitchC(config- vlanif1)#ip address 192.168.3.1/24
SwitchC(config- vlanif1)#exit
SwitchC(config)#ip interface loopback 0
SwitchC(config)#interface loopback0
SwitchC(config- loopback0)#ip address 3.3.3.3/32
SwitchC(config- loopback0)#exit
SwitchC(config)#router ospf
SwitchC(config-router)#router-id 3.3.3.3
SwitchC(config-router)#network 192.168.3.0/24 area 0
SwitchC(config-router)#network 3.3.3.3/32 area 0
SwitchC(config- router)#exit
SwitchC(config)#router bgp 200
SwitchC(config-router)#bgp router-id 3.3.3.3
SwitchC(config-router)#network 192.168.3.0/24
SwitchC(config-router)#neighbor 1.1.1.1 remote-as 100
SwitchC(config-router)#end
SwitchC#show ip bgp
BGP table version is 1, local router ID is 3.3.3.3
Status codes: s suppressed, d damped, h history, * valid, > best,
i - internal,            S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete
```

```
   Network          Next Hop            Metric LocPrf Weight Path
*> 192.168.3.0      0.0.0.0                  100  32768 i

Total number of prefixes 1
```

18.68 Display BGP IPv4 Unicast Route Information

Command

show ip bgp ipv4 unicast [<A.B.C.D >] [<A.B.C.D/M >]

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: IP address.

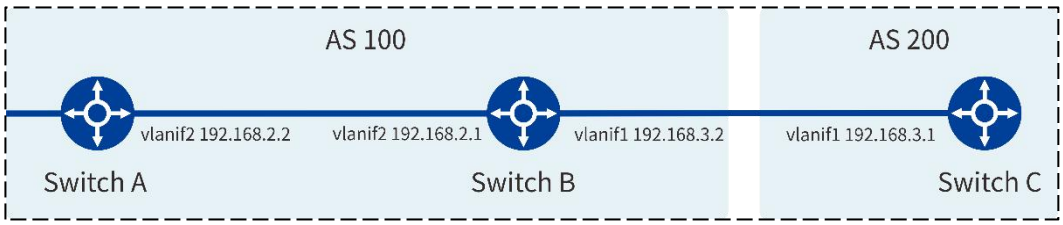
A.B.C.D/M: IP address and mask.

Description

show ip bgp: the command is used to display ipv4 unicast routing information maintained by BGP.

Instance

Networking: device A is connected to device B via VLANIF2, and device B is connected to device C via VLANIF1 as shown in the figure below. Device C displays the IPv4 unicast routing information maintained by BGP via command.




```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
```

```
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#ip interface loopback 0
SwitchA(config)#interface loopback0
SwitchA(config- loopback0)#ip address 2.2.2.2/32
SwitchA(config- loopback0)#exit
SwitchA(config)#router ospf
SwitchA(config-router)#router-id 2.2.2.2
SwitchA(config-router)#network 192.168.1.0/24 area 0
SwitchA(config-router)#network 192.168.2.0/24 area 0
SwitchA(config-router)#network 2.2.2.2/32 area 0
SwitchA(config-router)#exit
SwitchA(config)#router bgp 100
SwitchA(config-router)#bgp router-id 2.2.2.2
SwitchA(config-router)#network 192.168.1.0/24
SwitchA(config-router)#network 192.168.2.0/24
SwitchA(config-router)#neighbor 1.1.1.1 remote-as 100

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#interface vlanif1
SwitchB(config- vlanif1)#ip address 192.168.3.2/24
SwitchB(config- vlanif1)#exit
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config-vlanif2)#exit
SwitchB(config)#ip interface loopback 0
SwitchB(config)#interface loopback0
SwitchB(config- loopback0)#ip address 1.1.1.1/32
SwitchB(config- loopback0)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#router-id 1.1.1.1
SwitchB(config-router)#network 1.1.1.1/32 area 0
SwitchB(config-router)#network 192.168.2.0/24 area 0
SwitchB(config-router)#network 192.168.3.0/24 area 0
SwitchB(config-router)#exit
SwitchB(config)#router bgp 100
SwitchB(config-router)#bgp router-id 1.1.1.1
```

```
SwitchB(config-router)#network 192.168.1.0/24
SwitchB(config-router)#network 192.168.2.0/24
SwitchB(config-router)#neighbor 2.2.2.2 remote-as 100
SwitchB(config-router)#neighbor 3.3.3.3 remote-as 200

SwitchC> enable
SwitchC#configure terminal
SwitchC(config)#interface vlanif1
SwitchC(config- vlanif1)#ip address 192.168.3.1/24
SwitchC(config- vlanif1)#exit
SwitchC(config)#ip interface loopback 0
SwitchC(config)#interface loopback0
SwitchC(config- loopback0)#ip address 3.3.3.3/32
SwitchC(config- loopback0)#exit
SwitchC(config)#router ospf
SwitchC(config-router)#router-id 3.3.3.3
SwitchC(config-router)#network 192.168.3.0/24 area 0
SwitchC(config-router)#network 3.3.3.3/32 area 0
SwitchC(config- router)#exit
SwitchC(config)#router bgp 200
SwitchC(config-router)#bgp router-id 3.3.3.3
SwitchC(config-router)#network 192.168.3.0/24
SwitchC(config-router)#neighbor 1.1.1.1 remote-as 100
SwitchC(config-router)#end
SwitchC#show ip bgp ipv4 unicast
BGP table version is 1, local router ID is 3.3.3.3
Status codes: s suppressed, d damped, h history, * valid, > best,
i - internal,            S Stale
Origin codes: i - IGP, e - EGP, ? - incomplete

   Network          Next Hop            Metric LocPrf Weight Path
*> 192.168.3.0      0.0.0.0                  100  32768 i

Total number of prefixes 1
```

18.69 Display BGP Summary Information

Command

show ip bgp summary

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: IP address.

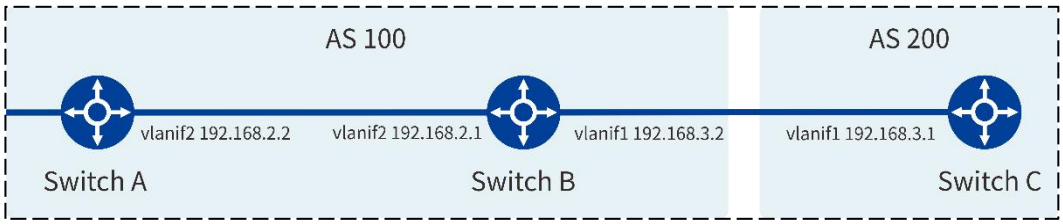
A.B.C.D/M: IP address and mask.

Description

show ip bgp summary: The command is used to display BGP summary information.

Instance

Networking: device A is connected to device B via VLANIF2, and device B is connected to device C via VLANIF1 as shown in the figure below. Device C displays BGP summary information via command.




```
SwitchA> enable
SwitchA#configure terminal
SwitchA(config)#interface vlanif1
SwitchA(config- vlanif1)#ip address 192.168.1.1/24
SwitchA(config- vlanif1)#exit
SwitchA(config)#vlan database
SwitchA(config-vlan)#vlan 2
SwitchA(config-vlan)#exit
SwitchA(config)#ip interface vlan 2
SwitchA(config)#interface vlanif2
SwitchA(config- vlanif2)#ip address 192.168.2.2/24
SwitchA(config- vlanif2)#exit
SwitchA(config)#ip interface loopback 0
SwitchA(config)#interface loopback0
SwitchA(config- loopback0)#ip address 2.2.2.2/32
SwitchA(config- loopback0)#exit
SwitchA(config)#router ospf
SwitchA(config-router)#router-id 2.2.2.2
SwitchA(config-router)#network 192.168.1.0/24 area 0
SwitchA(config-router)#network 192.168.2.0/24 area 0
SwitchA(config-router)#network 2.2.2.2/32 area 0
SwitchA(config-router)#exit
SwitchA(config)#router bgp 100
```

```
SwitchA(config-router)#bgp router-id 2.2.2.2
SwitchA(config-router)#network 192.168.1.0/24
SwitchA(config-router)#network 192.168.2.0/24
SwitchA(config-router)#neighbor 1.1.1.1 remote-as 100

SwitchB> enable
SwitchB#configure terminal
SwitchB(config)#interface vlanif1
SwitchB(config- vlanif1)#ip address 192.168.3.2/24
SwitchB(config- vlanif1)#exit
SwitchB(config)#vlan database
SwitchB(config-vlan)#vlan 2
SwitchB(config-vlan)#exit
SwitchB(config)#ip interface vlan 2
SwitchB(config)#interface vlanif2
SwitchB(config- vlanif2)#ip address 192.168.2.1/24
SwitchB(config-vlanif2)#exit
SwitchB(config)#ip interface loopback 0
SwitchB(config)#interface loopback0
SwitchB(config- loopback0)#ip address 1.1.1.1/32
SwitchB(config- loopback0)#exit
SwitchB(config)#router ospf
SwitchB(config-router)#router-id 1.1.1.1
SwitchB(config-router)#network 1.1.1.1/32 area 0
SwitchB(config-router)#network 192.168.2.0/24 area 0
SwitchB(config-router)#network 192.168.3.0/24 area 0
SwitchB(config-router)#exit
SwitchB(config)#router bgp 100
SwitchB(config-router)#bgp router-id 1.1.1.1
SwitchB(config-router)#network 192.168.1.0/24
SwitchB(config-router)#network 192.168.2.0/24
SwitchB(config-router)#neighbor 2.2.2.2 remote-as 100
SwitchB(config-router)#neighbor 3.3.3.3 remote-as 200

SwitchC> enable
SwitchC#configure terminal
SwitchC(config)#interface vlanif1
SwitchC(config- vlanif1)#ip address 192.168.3.1/24
SwitchC(config- vlanif1)#exit
SwitchC(config)#ip interface loopback 0
SwitchC(config)#interface loopback0
SwitchC(config- loopback0)#ip address 3.3.3.3/32
SwitchC(config- loopback0)#exit
```

```
SwitchC(config)#router ospf
SwitchC(config-router)#router-id 3.3.3.3
SwitchC(config-router)#network 192.168.3.0/24 area 0
SwitchC(config-router)#network 3.3.3.3/32 area 0
SwitchC(config- router)#exit
SwitchC(config)#router bgp 200
SwitchC(config-router)#bgp router-id 3.3.3.3
SwitchC(config-router)#network 192.168.3.0/24
SwitchC(config-router)#neighbor 1.1.1.1 remote-as 100
SwitchC(config-router)#end
SwitchC#show ip bgp summary
BGP router identifier 3.3.3.3, local AS number 200
BGP table version is 1
1 BGP AS-PATH entries
0 BGP community entries

Neighbor   V    AS MsgRcvd MsgSent   TblVer  InQ OutQ Up/Down
State/PfxRcd
1.1.1.1    4   100      0    53      0    0    0    never
Active

Total number of neighbors 1
```

19 IPv6 Configuration

19.1 Create Layer 3 Interface

Command

ip interface vlan <VLAN-ID>

View

Configure Mode

Parameters

<vlan-id> : create a layer 3 vlan interface, the range is 2-4094.

Description

ip interface vlan: the command is used to create the specified layer 3 vlan interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#vlan database
Switch(config-vlan)#vlan 2
Switch(config-vlan)#exit
Switch(config)#ip interface vlan 2
```

19.2 IPV6 address:

Command

ipv6 address (X:X::X:X/M | prefix X:X::X:X eui-64)

View

Layer 3 Interface View

Parameters

X:X::X:X/M：X:X::X:X is IPv6 address, M is mask length

prefix X:X::X:X eui-64: use the EUI-64 format to form an IPv6 address.

Description

ipv6 address: The command is used to configure the ipv6 address of the interface.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ipv6 address 3ffe:506::1/48  //ordinary
ipv6 address
Switch(config-vlanif1)#ipv6 address prefix 3ffe:501:ffff:100::
eui-64 //eui-64 //eui-64 format ipv6 address
```

19.3 Static IPv6Route

Command

ipv6 route X:X::X:X/M X:X::X:X INTERFACE

no ipv6 route X:X::X:X/M X:X::X:X INTERFACE

View

Configure Mode

Parameters

X:X::X:X/M: specify the static route destination network segment

X:X::X:X: specify ipv6 address of static routing next hop

INTERFACE: outgoing interface for specifying static routing

Description

ipv6 route: command is used to add static ipv6 routing.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ipv6 route ::/0 fe80::200:ff:fe00:a0a0 vlanif2
```

19.4 Configure RA message related parameters

Operation	Command	Description
Enter Privileged	enable	-

Operation	Command	Description
Exec Mode		
Enter Configure Mode	configure terminal	-
Enter Interface View	interface IFNAME	-
Cancel the restrain in RA messages	no ipv6 nd suppress-ra	Publish RA messages are restrained by default
Configure the maximum time interval for RA message publishing	ipv6 nd ra-interval <4-1800>	By default, the maximum time interval of RA message publishing is 600 seconds, and the minimum time interval is 198 seconds when RA messages are periodically published. The time interval between two consecutive times is a random value between the maximum time interval and the minimum time interval as the time interval for periodically publishing RA messages Configure that the minimum interval should be less than or equal to 0.75 times of the maximum interval
Configure the minimum time interval for RA message publishing	ipv6 nd minimum-ra-interval <3-1350>	
Configure the hop limit	ipv6 nd current-hoplimit <0-255>	The default router is limited to 64 hops
Configure prefix information of RA messages	ipv6 nd prefix {X:X::X:X/M | no-autoconf |offlink | preferred-lifetime <0-4294967295> | valid-lifetime <-4294967295>}	The prefix information in the RA message is not configured by default. In this case, the IPv6 address of the interface

Operation	Command	Description
		sending the RA message will be used as the prefix information in the RA message. Its effective life span is 2592000 seconds (30 days), and the preferred life span is 604800 (7 days).
Configure that the MTU option is not carried in the RA message	no ipv6 nd link-mtu	By default, the MTU option is carried in the RA message
Sets the managed address configuration flag bit to 1	ipv6 nd managed-config-flag	The default managed address flag bit is 0, meaning that the host gets IPv6 addresses through stateless automatic configuration
Set the other configuration flag bit to 1	ipv6 nd other-config-flag	The default other configuration flag bit is 0, which means that the host gets additional information through stateless automatic configuration
Set the router lifetime in the RA message	ipv6 nd ra-lifetime <0-9000>	By default, the lifetime of the router in the RA message is 1800 seconds
Configure the neighbor request message retransmission interval	ipv6 nd retransmission-time <1000-3600000>	The default interface sends NS messages at 1000ms intervals; The value of the Retrans Timer field in the RA message published by the interface is 0, which means the host is not

Operation	Command	Description
		specified
Configure the time to keep neighbors reachable	ipv6 nd reachable-time <0-3600000>	The default interface remains accessible for 30000 ms. The value of the Retrans Timer field in the RA message published by the interface is 0, which means the host is not specified

19.5 Enable IPv6Multicast Function

Command

ipv6 mif

no ipv6 mif

View

Interface Mode

Parameters

-

Description

The ipv6 mif: command is used to enable ipv6 multicast function of the interface

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config- vlanif1)#ipv6 mif
```

19.6 Static IPv6Multicast Route

Command

ipv6 mroute source X:X::X:X group X:X::X:X in-interface IFNAME out-interface IFNAME

no ipv6 mroute source X:X::X:X group X:X::X:X in-interface IFNAME out-interface IFNAME

View

Configure Mode

Parameters

X:X::X:X: source IPv6 address or multicast IPv6 address.

IFNAME: ingress or egress interface

Description

ipv6 mroute: the command is used to add static ipv6 multicast routing

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ipv6 mroute source
3ffe:501:ffff:100:200:ff:fe00:0100 group ff1e::1:2 in-interface
vlanif2 out-interface vlanif3
```

19.7 The Maximum Transmission Unit

Command

mtu <MTU-VALUE>

View

Layer 3 Interface View

Parameters

MTU-VALUE:configure the maximum transmission unit of message, the range is 128-1500, the unit is byte.

Description

mtu: command is used to configure the maximum transmission unit of a layer 3 interface message.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#mtu 1400
```

19.8 Ping IPv6Address

Command

ping ipv6 WORD {count <1-4294967295> | size <1-8100> | interface IFNAME | quiet | }

View

Privileged Exec Mode

Parameters

WORD: specifies the destination ipv6 address of the ping message.

count <1-4294967295> : specifies the number of ping message.

size <1-8100> : specifies the size of the contents to be filled in the ping message.

interface IFNAME: specify the egress interface of ping message.

quiet: does not display the details of the ping process, only the result of the ping.

Description

ping ipv6: command is used to detect whether a specified ipv6 address is reachable and to test whether an ipv6 network connection has break down.

Instance

```
Switch> enable
Switch#ping ipv6 fe80::0200:00ff:fe00:0100 size 2 count 1 interface vlanif2
```

20 DHCP Configuration

20.1 Global DHCP Service Enablement

Command

ip dhcp service

no ip dhcp service

View

Configure Mode

Default Level

2: Configuration level

Parameters

No.

Description

ip dhcp service: command is used to globally enable the dhcp server service.

Instance

```
#Configure to enabled DHCP server service globally
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
```

20.2 Enable Interface DHCP Relay

Command

ip dhcp relay enable

no ip dhcp relay enable

View

Layer 3 Interface Configuration View

Default Level

2: Configuration level

Parameters

No.

Description

ip dhcp relay enable: the command is used to enable the dhcp relay function of the interface.

no ip dhcp relay enable: the command is used to disable the dhcp relay function of the interface.

Instance

```
# Enable dhcp relay on vlanif1
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip dhcp relay enable

# disable DHCP relay on vlanif1
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#no ip dhcp relay enable
```

20.3 InterfaceDHCP Relay Address

Command

ip dhcp relay-to ***<A.B.C.D>***

no ip dhcp relay-to **[***<A.B.C.D>***]**

View

Layer 3 Interface Configuration View

Default Level

2: Configuration level

Parameters

A.B.C.D: dhcp server IP address.

Description

This command is in the Interface view and only configure the corresponding Interface relay and dhcp server IP addresses.

ip dhcp relay-to <A.B.C.D>: the command is used to set the dhcp server ip address required by the relay. This command can be executed repeatedly to configure multiple server IP addresses, which up to 9 relay servers can be configured.

no ip dhcp relay-to [<A.B.C.D>]: used to delete a relay server ip address, the function is opposite to ip dhcp relay-to <A.B.C.D>; With no parameter, the command deletes all relay server ip addresses of the corresponding interface.

Instance

```
Configure the dhcp relay server IP address for vlanif 1,the
parameter IP address is 192.168.1.1
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip dhcp relay enable
Switch(config-vlanif1)#ip dhcp relay-to 192.168.1.1

# Remove the DHCP relay server address with IP of 192.168.1.1 under
vlanif 1
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#no ip dhcp relay-to 192.168.1.1

# Remove all the dhcp relay server address under vlanif 1
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#no ip dhcp relay-to
```

20.4 DHCP Option82 Enablement

Command

ip dhcp option

no ip dhcp option

View

Layer 3 Interface Configuration View

Default Level

2: Configuration level

Parameters

-

Description

Ip dhcp option: enable the option 82 function of dhcp relay, and enable the ralay message sent by the relay process to carry option 82.

no ip dhcp option: disable option 82 function of dhcp relay.

Instance

```
For vlanif1 interface, enable option 82 function of dhcp relay
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip dhcp relay enable
Switch(config-vlanif1)#ip dhcp option
For vlanif1 interface, enable option 82 function of dhcp relay
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#no ip dhcp option
```

20.5 Treatment Strategy of DHCP Option82

Command

ip dhcp relay-information policy （append | discard | replace | untouched ）

no ip dhcp relay-information policy

View

Layer 3 Interface Configuration View

Default Level

2: Configuration level

Parameters

append: configure the option check policy as Append.

discard: configure the option check policy as Discard.

replace: configure the option check policy as Replace.

untouched: configure the option check policy as Untouched.

Description

ip dhcp relay-information policy <append | discard | replace | untouched >: set an option processing policy of dhcp relay, the relay process will process the received dhcp message with option 82 according to the policy.

no ip dhcp relay - information policy: disable the option processing strategy of dhcp relay, strategy will restore to the default strategy, namely only forward received dhcp message with the option 82 (Untouched).

Instance

```
# configure option 82 with the policy replace for vlanif1 port.
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip dhcp relay enable
Switch(config-vlanif1)#ip dhcp option
Switch(config-vlanif1)#ip dhcp relay-to 192.168.1.1
Switch(config-vlanif1)#ip dhcp relay-information policy replace

#Disable option 82 policy on port vlanif1.
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#no ip dhcp relay-information policy
```

20.6 Relay Identity of DHCP Option82

Command

ip dhcp relay-information circuitid (basic | string OPTION**)**

View

Interface Mode

Default Level

2: Configuration level

Parameters

Basic: configure sub option circuited is the base (default) configuration.

String: configure sub option circuited as the string given by option.

Description

ip dhcp relay-information circuitid (basic | string OPTION): Set the value of option82 suboption circuitid of DHCP relay.

Instance

```
#Configure the value of suboption circuited of option 82 is the string "vlan2:ge10” for vlanif1 port.
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip dhcp relay enable
Switch(config-vlanif1)#ip dhcp option
Switch(config-vlanif1)#ip dhcp relay-information circuitid string vlan2:ge10
```

20.7 Remote Identity of DHCP Option82

Command

ip dhcp relay-information remoteid (basic | string OPTION)

View

Layer 3 Interface Configuration View

Default Level

2: Configuration level

Parameters

Basic: configure sub option remoteid is the base (default) configuration.

String: configure sub option remoteid as the string given by option.

Description

ip dhcp relay-information remoteid (basic | string OPTION): Set the value of option82 suboption remoteid of DHCP relay.

Instance

```
Configure the value of sub option circuited of option 82 is the string "00:11:22:33:44:55” for vlanif1 port.
Switch> enable
Switch#configure terminal
Switch(config)#interface vlanif1
Switch(config-vlanif1)#ip dhcp relay enable
Switch(config-vlanif1)#ip dhcp option
Switch(config-vlanif1)#ip dhcp relay-information remoteid string 00:11:22:33:44:55
```

20.8 Create DHCP Address Pool

Command

ip dhcp pool <WORD>

no ip dhcp pool <WORD>

View

Configure Mode

Default Level

2: Configuration level

Parameters

WORD: the name of dhcp address pool

Description

ip dhcp pool: the command is used to create the dhcp address pool.

no ip dhcp pool: the command is used to delete the dhcp address pool.

Instance

```
#Create a dhcp address pool named "test" :
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#

#Delete a dhcp address pool named "test" :
Switch> enable
Switch#configure terminal
Switch(config)#no ip dhcp pool test
```

20.9 DHCP Address Pool Subnet Segment

Command

network (<A.B.C.D A.B.C.D>/<A.B.C.D/M>)

no network

View

DHCP Configuration View

Default Level

2: Configuration level

Parameters

A.B.C.D: IP address & mask, used to represent subnet segments.

A.B.C.D/M: IP address and mask,used to represent subnet segments.

Description

Network:: configure the subnet segment of DHCP pool , among which the parameters give the specific subnet segment value.

no network: deletes the subnet segment configuration of a specified DHCP pool.

Instance

```
#Configure network for address pool "test”
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#network 192.168.1.1 255.255.255.0
Switch(dhcp-config)#network 192.168.1.1/24

#Delete network configuration of address pool "test”
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#no network
```

20.10 Default Route of DHCP Address Pool

Command

default-router A.B.C.D

no default-router

View

dhcp View

Default Level

2: Configuration level

Parameters

A.B.C.D: The default routing address used by dhcp.

Description

default-router: configure the default routing IP address of DHCP pool.

no default-router: delete the default routing configuration of DHCP pool.

Instance

```
#Configure the default route to 192.168.1.1 of dhcp pool test
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#network 192.168.1.1 255.255.255.0
Switch(dhcp-config)#default-router 192.168.1.1

#delete the default routing configuration of dhcp pool test
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#no default-router 192.168.1.1
```

20.11 DHCP Address Pool

Command

range <A.B.C.D A.B.C.D>
no range (<A.B.C.D A.B.C.D>|)

View

dhcp View

Default Level

2: Configuration level

Parameters

A.B.C.D: The lowest and highest addresses of dhcp pool.

Description

range: configure the address range of DHCP pool, that is, the addresses that belong to the range can be allocated effectively by DHCP.

no range: delete the address range of DHCP pool. If no range parameters are given, delete all range configurations.

Instance

```
Configuration the address range of dhcp pool test to: 192.168.1.10
192.168.1.20
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
```

```
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#network 192.168.1.1 255.255.255.0
Switch(dhcp-config)#range  192.168.1.10 192.168.1.20

Delete the address range of dhcp pool test: 192.168.1.10
192.168.1.20
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#no range 192.168.1.10 192.168.1.20

Delete all the address range of dhcp pool test:
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#no range
```

20.12 The Lease Time of DHCP Address Pool

Command

lease-time <0-30> <0-24> <0-60>

no lease-time

View

dhcp View

Default Level

2: Configuration level

Parameters

<0-30> : days.

<0-24> : hours.

<0-60> : minutes.

Description

lease -time: configure the address lease duration of dhcp pool. When the IP address obtained by the dhcp client is about to reach the lease duration, it is necessary to renew the lease. Otherwise, the IP address will be invalid, and the dhcp client needs to re-request the IP address.

no lease-time: delete the address lease duration configuration of dhcp pool and restore the lease duration to the default value.

Instance

```
# set the lease-time of dhcp pool test to 30 minutes.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#network 192.168.1.1 255.255.255.0
Switch(dhcp-config)#lease-time 0 0 30

# set the lease-time of dhcp pool test.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#no lease-time
```

20.13 The Threshold of DHCP Address Pool

Command

threshold <1-254>

no threshold

View

dhcp View

Default Level

2: Configuration level

Parameters

<1-254> : threshold value.

Description

threshold: threshold value to configure dhcp pool.

no threshold: Delete the threshold value of DHCP pool (that is, restore to the default value).

Instance

```
# set the threshold of dhcp pool test to 8.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
```

```
Switch(dhcp-config)#network 192.168.1.1 255.255.255.0
Switch(dhcp-config)#threshold 8

# set the threshold of dhcp pool test.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp pool test
Switch(dhcp-config)#no threshold
```

20.14 DNS Server Address

Command

ip dhcp dns-server <A.B.C.D> [<A.B.C.D>] [<A.B.C.D>]

no ip dhcp dns-server

View

Configure Mode

Default Level

2: Configuration level

Parameters

< A.B.C.D>: dns server ip address.

Description

ip dhcp dns-server: configure dns servers for all dhcp pools, up to three different dns servers can be configured (this configuration is global).

no ip dhcp dns-server: delete all dns server configurations.

Instance

```
# set the DNS -serve of DHCP pool to 114.114.114.114 8.8.8.8.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp dns-server 114.114.114.114 8.8.8.8

Remove all dns-serve configurations.
Switch> enable
Switch#configure terminal
Switch(config)#no ip dhcp dns-server
```

20.15 Log Server Address

Command

ip dhcp log-server <A.B.C.D> [<A.B.C.D>] [<A.B.C.D>]

no ip dhcp log-server

View

Configure Mode

Default Level

2: Configuration level

Parameters

< A.B.C.D>: log server ip address.

Description

ip dhcp log-server: configure log servers for all dhcp pools, up to three different log servers can be configured (this configuration is global).

no ip dhcp log-server: delete all log server configurations.

Instance

```
# set the log-server of dhcp pool to 192.168.1.1 192.168.1.2
192.168.1.3.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp dns-server 192.168.1.1 192.168.1.2
192.168.1.3

#Remove all log-server configurations.
Switch> enable
Switch#configure terminal
Switch(config)#no ip dhcp log-server
```

20.16 WINS Server Address

Command

ip dhcp wins-server <A.B.C.D> [<A.B.C.D>] [<A.B.C.D>]

no ip dhcp wins-server

View

Configure Mode

Default Level

2: Configuration level

Parameters

< A.B.C.D>: wins server ip address.

Description

ip dhcp wins-server: configure wins servers for all dhcp pools, up to three different wins servers can be configured (this configuration is global).

no ip dhcp win-server: delete all winserver configurations.

Instance

```
# configure the wins-server of dhcp pool to be 192.168.1.1
192.168.1.2 192.168.1.3.
Switch> enable
Switch#configure terminal
Switch(config)#ip dhcp service
Switch(config)#ip dhcp wins-server 192.168.1.1 192.168.1.2
192.168.1.3

#Delete all wins-server configurations.
Switch> enable
Switch#configure terminal
Switch(config)#no ip dhcp wins-server
```

20.17 Display DHCP Information

Command

```
show ip dhcp global
show ip dhcp lease ((interface [IFNAME]) | (summary [IFNAME]))
show ip dhcp pool [WORD]
show ip dhcp relay [IFNAME]
show ip dhcp statistics [IFNAME]
show ip dhcp status
```

View

Privileged Exec Mode

Default Level

1: View level

Parameters

[IFNAME]: interface name.

[WORD]: address pool identification.

Description

show ip dhcp global: view DHCP global information.
show ip dhcp lease: view DHCP lease information.
show ip dhcp pool: view DHCP address pool information.
show ip dhcp relay: view DHCP relay information.
show ip dhcp statistics: view DHCP statistics information.
show ip dhcp status: view DHCP status information.

Instance

```
Switch#show ip dhcp status
Interface       IP Address      DHCP Status
-----------------------------------------------
vlanif1         192.168.1.254   DHCP Relay
-----------------------------------------------
```

21 SNMP Configuration

21.1 SNMP Enablement

Command

snmp-server enable traps

no snmp-server enable traps

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

snmp-server enable traps: command is used to enable SNMP server.

no snmp-server enable: command is used to disable SNMP server.

By default, SNMP function is enabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#snmp-server enable traps
Switch(config)#no snmp-server enable traps
```

21.2 SNMP View

Command

snmp-server view VIEWNAME OID (included | excluded)

no snmp-server view VIEWNAME OID

View

Configure Mode

Default Level

2: Configuration level

Parameters

VIEWNAME: VIEWNAME, ranging from 1 to 32 bytes.

OID: OID MIB subtree of MIB object subtree, variable OID only allows digital input (such as 1.3.6.1).

Included: means that this MIB view includes the MIB subtree.

excluded: means that this MIB view excludes the MIB subtree.

Description

snmp-server view: command is used to create or update information about the MIB view to restrict the MIB objects that can be accessed by the NMS.

no snmp-server view: The command is used to cancel the current Settings.

The MIB is a collection of managed objects, and the MIB view is a subset of the MIB, and the user can bind the community name/user name to the MIB view to restrict the MIB objects that can be accessed by the NMS. The user can configure the MIB object to excluded or included within the view. Excluded means that the current view does not include all the modes of the MIB subtree; Included means that the current view includes all nodes of the MIB subtree.

By default, the view name is system. The OID included is 1.3.6.1.

SNMP community name or group name configuration needs to determine the MIB view permissions of the community name or group, related configuration can refer to the command snmp-server community, snmp-server group.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#snmp-server view viewname 1.3.6.1.5 included
Switch(config)#no snmp-server view viewname 1.3.6.1.5
```

21.3 SNMP Community Name

Command

snmp-server community NAME {view VIEWNAME| } (ro | rw)

no snmp-server community {COMMUNITYNAME | }

View

Configure Mode

Default Level

2: Configuration level

Parameters

NAME: community name, ranging from 1 to 32 bytes.

View: MIB view name, this parameter is optional, if not entered, by default it is the default view.

Ro: read only means read-only access to MIB objects. Communities with read-only access can only view device information.

Rw: read and write indicates read and write access to MIB objects, and communities with read and write permissions can configure devices.

Description

snmp-server community: command is used to set the community name, SNMP v1/v2c version uses the group name to restrict access rights. This command can be used to configure the group name, read or write view rights and access control policies. **no snmp-server community**: command is used to cancel group access name settings.

Normally, "public" is used as the name of the read permission group. For security reasons, it is recommended that network administrators configure other community names.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#snmp-server community communityname view viewname
rw
Switch(config)#no snmp-server community communityname
```

21.4 SNMP Group

Command

```
snmp-server group NAME v3 (auth | noauth | priv ) { notify | read
| write } VIEWNAME
no snmp-server group NAME v3 (auth | noauth | priv )
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

NAME: group name, ranging from 1 to 32 bytes.

v3: SNMP v3 version.

Auth: indicates that the message is authenticated but not encrypted.

Noauth: indicates that the message is neither authenticated nor encrypted.

Priv: indicates that the message is authenticated and encrypted.

VIEWNAME: view name, ranging from 1 to 32 bytes. By default, the Trap message view is not configured, meaning that the Agent does not send Traps to the NMS.

Read: specifies the read view of the group.

write: specifies the write and read view of the group.

VIEWNAME: view name

Description

snmp-server group: command is used to configure a new SNMP group and set the secure mode and corresponding SNMP view of the SNMP group.

no snmp-server group: The command is used to remove a specified SNMP group.

For SNMP v3, the group name and the security mode (authentication or not, encryption or not) together determine a group, with the same group name but different security mode are two different groups.

This system defaults to snmp v2, so there is no default configuration for group. If the view name for read is not specified in the command, it defaults to the default view.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#snmp-server group groupname v3 priv read viewname
write viewname
Switch(config)#no snmp-server group groupname v3 priv
```

21.5 SNMP User

Command

```
snmp-server user USERNAME GROUPNAME
snmp-server user USERNAME GROUPNAME v3
snmp-server user USERNAME GROUPNAME v3 auth md5 MD5
snmp-server user USERNAME GROUPNAME v3 auth md5 MD5 priv ( aes |
des) pasword
```

no snmp-server user USERNAME GROUPNAME v3

View

Configure Mode

Default Level

2: Configuration level

Parameters

USERNAME: user name, ranging from 1 to 32 bytes.

GROUPNAME: group name

v3: specifies that it is SNMP v3 version user, and defaults to v1 version user.

Auth: indicates that security mode requires authentication. If do not enter this parameter, the default is no authentication, no encryption mode.

md5: specifies the authentication protocol as the HMAC MD5 algorithm.

MD5: authentication password, string, value range of plaintext is 1 ~ 64 characters. If MD5 algorithm is adopted in ciphertext form, the authentication key is 32-bit hexadecimal number. If SHA algorithm is used, the authentication key is a 40-bit hexadecimal number.

priv: indicates that security mode requires authentication.

aes: the encryption algorithm is specified as AES (Advanced Encryption Standard), which has higher security than DES.

des: the encryption algorithm is specified as DES (Data Encryption Standard).

password: encrypted password, string, value range of plaintext is 1 ~ 64 characters. If MD5 algorithm is adopted in ciphertext form, the authentication key is 32-bit hexadecimal number. If SHA algorithm is used, the authentication key is a 40-bit hexadecimal number.

Description

snmp-server user: The command is used to add a new user to an SNMP group.

no snmp-server user: command is used to delete a user of an SNMP group.

This command applies to SNMP v3 version. If the Agent interact with the message of NMS using SNMP v3 version, then SNMP v3 users need to be created. For the configured user to take effect, a group must be created first. Authentication and encryption are configured when the group is created, and the specific algorithm and password for authentication and encryption are configured when the user is created.

 Notes

This command is used several times to configure the same user (that is, the user name is the

same, no other parameters are required), and the configuration results are subject to the last configuration.

Instance

```
Switch> en
Switch#configure terminal
Switch(config)#snmp-server user admin groupname v3
Switch(config)#no snmp-server user username groupname v3
```

21.6 SNMP Trap Destination

Command

snmp-server host IP traps (version (1 | 2c)) NAME
no snmp-server host IP traps NAME

View

Configure Mode

Default Level

2: Configuration level

Parameters

traps: specify the host to be Trap host.

IP: the IPV4 address of a host that accepts Traps.

1: represents SNMP v1 version.

2c: represents SNMP v2c version.

NAME: when there is a parameter version, NAME represents SNMPv1/v2c community. When there is no version parameter, NAME represents SNMPv3 user name.

Description

snmp-server host: command is used to set the destination host to receive SNMP Trap messages.

no snmp-server host: command is used to cancel the current configurations.

Depending on network management needs, users can configure multiple destination hosts to receive Trap messages through this command.

If a device is needed to send Trap messages, the snmp -server host command should be used in conjunction with the snmp -server enable trap command (the default is to send all traps).

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#snmp-server host 192.168.5.123 traps version 2c
communityname
Switch(config)#no snmp-server host 192.168.5.123 traps name
```

22 LLDP Configuration

22.1 LLDP enablement

Command

lldp enable

no lldp enable

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

lldp enable: command is used to enable the LLDP function.

no lldp enable: The command is used to turn off the LLDP function.

By default, global LLDP function is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#lldp enable
```

22.2 LLDP Port Operating Mode

Command

lldp admin-status (*tx-enable* | *rx-enable* | *txrx-enable* | *disable*)

no lldp admin-status disable

View

Interface Mode

Default Level

2: Configuration level

Parameters

tx-enable: working mode is Tx, only sending and not receiving LLDP message.

rx-enable: working mode Rx, only receiving and not sending LLDP message.

txrx-enable: working mode is TxRx, both sending and receiving LLDP message.

disable: working mode Disable, neither receiving nor sending LLDP message.

Description

lldp admin-status: command is used to configure the lldp working mode of the port.

no lldp admin-status disable: command is used to restore the default working mode of the port.

By default, the working mode of LLDP works in TxRx when global LLDP is enabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#lldp admin-status tx-enable
```

22.3 Time Interval of Sending LLDP Message

Command

lldp timer <INTERVAL>

no lldp timer

View

Configure Mode

Default Level

2: Configuration level

Parameters

Interval: the time interval between ports to send LLDP message, ranging from 5-300 in seconds.

Description

lldp timer: command is used to set the time interval for sending LLDP message.

no lldp timer: command is used to restore the default packet time interval for LLDP.

By default, the interval between LLDP message is 30 seconds

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#lldp timer 50
```

22.4 LLDP Interface Management Address

Command

lldp management-address A.B.C.D

no lldp management-address

View

Interface Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: administrative address published in LLDP message.

Description

lldp management-address: command is used to configure the management address published in the LLDP message.

no lldp management-address: command is used to restore the default management address published in the LLDP message.

The management address released by the port in the LLDP message defaults to the main IP address of the smallest VLAN of the VLANs this port is in. If the VLAN is not configured with a main IP address, it will be 0.0.0.0.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#lldp management-address 2.2.2.2
```

22.5 Encapsulation Format of LLDP Message

Command

lldp frame-format (snap | ethernet2)

View

Interface Mode

Default Level

2: Configuration level

Parameters

snap: encapsulation format of LLDP message is snap.

ethernet2: encapsulation format of LLDP message is ethernet2

Description

lldp frame-format: command is used to configure the encapsulation format of LLDP message.

By default, the encapsulation format of LLDP message is ethernet2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#lldp frame-format snap
```

22.6 Display LLDP neighbor information

Command

show lldp neighbor-information (*brief* |)

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Brief:displays a summary of the neighbor device, or neighbor information of all ports without this parameter.

Description

show lldp neighbor-information: command is used to display information about the neighbor device.

Instance

```
Switch> enable
Switch#show lldp neighbor-information
LLDP neighbor information of port ge2
----------------------------------------
Neighbor index                      : 1
Update time                         : 1hours 57minutes 40seconds
Ageing time                         : 114seconds
Chassis ID type                     : MAC Address
Chassis ID                          : 0022.6f55.5556
Port ID type                        : Interface Name
Port ID                          : ge10
Time to live                        : 120 seconds
Port description                    : ge10
System name                      : SW5
System capabilities supported          : Bridge/Switch,Router
System capabilities enabled            : Bridge/Switch,Router
Management address subtype          : IPv4
Management address               : 192.168.1.254
Interface number subtype            : System Port Number
Interface number                    : 5010
Object ID                           : Standard LLDP MIB
MAC/PHY Configuration/Status        :
   Auto-Negotiation supported       : Yes
   Auto-Negotiation enabled         : Yes
   Operational MAU type             : 1000BASE-T full duplex mode
Link Aggregation                    :
   Link aggregation supported       : Yes
   Link aggregation enabled         : No
   Aggregated port ID               : 0
Maximum Frame Size                  : 1518
Port VLAN ID                        : 1
----------------------------------------

LLDP Neighbors Number               : 1

Switch#show lldp neighbor-information brief
```

```
Local Intf     Neighbor System Name     Neighbor Port ID
Ageing-time(s)
ge2            SW5                  ge10            91

LLDP Neighbors Number              : 1
```

22.7 Display LLDP Statistics Information

Command

show lldp statistics (interface IFNAME **|)**

View

Privileged Exec Mode

Default Level

1: View level

Parameters

interface IFNAME: displays statistics information of the specified port.

Description

show lldp statistics: command is used to display statistics for all ports, or for the specified port.

Instance

```
Switch> enable
Switch#show lldp statistics
Global LLDP traffic statistics:
       Total frames out: 268
       Total ages out: 0
       Total frames discarded: 0
       Total frames received in error: 0
       Total frames received in: 260
       Total frames TLVs discarded: 0
       Total frames TLVs unrecognized: 0

Switch#show lldp statistics ge2
Interface ge2 LLDP traffic statistics:
       Total frames out: 269
       Total ages out: 0
       Total frames discarded: 0
       Total frames received in error: 0
       Total frames received in: 260
```

```
Total frames TLVs discarded: 0
Total frames TLVs unrecognized: 0
```

22.8 Display LLDP Local Information

Command

show lldp local-information (interface IFNAME **|)**

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Interface IFNAME: displays local information of the specified port.

Description

show lldp local-information: command is used to display all LLDP local information, or LLDP local information of the specified port.

Instance

```
Switch> enable
Switch#show lldp local-information
*Switch#show lldp local-information
LLDP local-information of port ge2:
       Chassis ID subtype : MAC address
       Chassis ID        : 0022.6f01.cca3
       Port ID subtype   : Interface name
       Port ID          : ge2
       Port description  : ge2

       Management address type         : IPv4
       Management address             : 192.168.1.254
       Management address interface type : ifIndex
       Management address interface ID   : 5002
       Management address OID          : 0

       Port VLAN ID(PVID) : 1

       Port and protocol VLAN ID(PPVID) : 0
       Port and protocol VLAN supported : not supported
       Port and protocol VLAN enabled   : no enabled
```

```
VLAN name of VLAN 1 : default

Link aggregation supported : supported
Link aggregation enabled   : not enabled
Aggregated port ID         : 0

Auto-negotiation supported     : supported
Auto-negotiation enabled       : enabled
PMD auto-negotiation advertised :
    10BASE-T half duplex mode
    10BASE-T full duplex mode
    100BASE-TX half duplex mode
    100BASE-TX full duplex mode
    1000BASE-T half duplex mode
    1000BASE-T full duplex mode
Operational MAU type           : speed(1000)/duplex(full)
```

22.9 Display LLDP Status Information

Command

show lldp status (interface IFNAME **|)**

View

Privileged Exec Mode

Default Level

1: View level

Parameters

Interface IFNAME: displays state information of the specified port.

Description

show lldp status: command is used to display global LLDP status information, or LLDP status information on the specified port.

Instance

```
Switch> enable
Switch#show lldp status
LLDP running-information
       System running status          : Running
       System description             : Switch
       Transmit interval              : 30 s
```

```
        Hold multiplier              : 4
        Reinit delay                 : 2 s
        Transmit delay               : 2 s
        Notification enable          : Enable
        Notification Interval        : 5 s

Switch#show lldp status interface ge2
Interface[ge2] lldp status
        Port status of LLDP          :  Enable
        Admin status                 :  Rx_Tx
        Trap flag                    :  No
        Number of neighbors          :  1
        Number of sent optional TLV  :  9
```

23 QOS Configuration

23.1 Configure Global QOS Enable/Disable

Command

mls qos enable
no mls qos

View

Configure Mode

Default Level

2: Configuration level

Parameters

On is enable, disable is no

Description

For configuring global QOS on and off, the MLS QOS switch must be on for all qos configurations.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos enable
Switch(config)#no mls qos
```

23.2 Configure the queue bitmap

Command

mls qos cos-map <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>
no mls qos cos-map

show mls qos cos-map

View

Configure Mode

Default Level

2: Configuration level

Parameters

Parameter 1: select a queue for COS 0 message;

Parameter 2: select a queue for COS 1 message;

Parameter 3: select a queue for COS 2 message;

Parameter 4: select a queue for COS 3 message;

Parameter 5: select a queue for COS 4 message;

Parameter 6: select a queue for COS 5 message;

Parameter 7: select a queue for COS 6 message;

Parameter 8: select a queue for COS 7 message;

Description

Configure the queue value for each COS. No is to deleted and show is to view configuration.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos enable
Switch(config)#mls qos cos-map 1 2 3 4 5 6 7 0
Switch(config)#show mls qos cos-map
Switch(config)#no mls qos cos-map
```

23.3 Configure queue mode

Command

mls qos scheduler (sp|wrr <1-10> <1-10> <1-10> <1-10> <1-10> <1-10> <1-10> <1-10> <1-10>)

no mls qos scheduler

show mls qos scheduler

View

Configure Mode

Default Level

2: Configuration level

Parameters

sp: represents strict priority; WRR means to configure each queue with a weight according to weight priority <1-10>.

no: means delete. The default mode is simple polling mode.

Show: to view the configuration.

Description

SP: Strict Priority, the SP schedule sends packets in the higher-priority queue in Strict Priority order from highest to lowest, and then sends packets in the lower-priority queue when the higher-priority queue is empty. Queue 7 has the highest priority and queue 0 has the lowest priority.

WRR, weighted scheduling based on message, can configure how many messages are scheduled per queue as possible and then transfer to the next queue.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos enable
Switch(config)#mls qos sschedule sp // configured to SP mode
Switch(config)#show mls qos sschedule
Switch(config)#mls qos sschedule wrr 1 2 3 4 5 6 7 0 // the
configuration effect is: each queue takes away the message with
the corresponding weight ratio
Switch(config)#no mls qos schedule // restore default configuration
SRR
```

23.4 Configure DSCP -COS bitmap

Command

```
mls qos map dscp-cos NAME (<0-63>|<0-63> <0-63>|<0-63> <0-63>
<0-63>|<0-63> <0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63>
<0-63>|<0-63> <0-63> <0-63> <0-63> <0-63> <0-63>|<0-63> <0-63>
<0-63> <0-63> <0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63>
<0-63> <0-63> <0-63> <0-63>) to <0-7>
no mls qos map dscp-cos (NAME|all)
show mls qos dscp-cos (NAME|all)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

NAME: create a name for the dscp-cos map.

<0-63> to <0-7>: transfer each DSCP value to the corresponding COS queue.

No means to delete.

Show: means to view the configuration.

Description

The default dscp-cos map is 0-7 to cos 0 8-15 to cos 1 16-23 to cos 2 24-31 to cos 3 32-39 to cos 4 40-47 to cos 5 48-55 to cos 6 56-63 to cos 7.

The configuration is only issued when it is referenced. No means to delete NAME, specifying which one to delete.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos enable
Switch(config)# mls qos dscp-cos dscp1 10 46 56 6// means that the message DSCP value is 10 46 56 and so on will be transfered to queue 6
Switch(config)#show  mls qos dscp-cos dscp1
Switch(config)#no mls qos map dscp-cos dscp1// specify to delete dscp1
```

23.5 Configure DSCP -DSCP bitmap

Command

```
mls qos map dscp-mutation NAME (<0-63>|<0-63> <0-63>|<0-63> <0-63>
<0-63>|<0-63> <0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63>
<0-63>|<0-63> <0-63> <0-63> <0-63> <0-63> <0-63>|<0-63> <0-63>
<0-63> <0-63> <0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63>
<0-63> <0-63> <0-63> <0-63>) to <0-63>
no mls qos map dscp-mutation （NAME |all)
show mls qos map dscp-mutation(NAME|all)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

By default, it is dscp-mutation map 0-63 to dscp 0-63

No means to delete, name is to specify which MAP to delete, all means to delete all.

Show means to view, NAME means to specify which MAP to view, all means to view all.

Description

When different DSCP values received, some changes can be made to the DSCP and then transfer to different queues.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos map dscp-mutation dscp2  2 61
Switch(config)#show mls qos map dscp-mutation dscp2
Switch(config)#no mls qos map dscp-mutation dscp2
```

23.6 Create a CLASS-MAP

Command

```
class-map NAME
no class-map NAME
show class-map(NAME|)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

No means to delete.

Show: means to view the specified class-map or all class-maps including the information configured therein.

Description

Class map: Class map is a definition of a Class map that groups different types of data flows.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#class-map ac
Switch(config)#show class-map
Switch(config)#no class-map ac
```

23.7 Create a POLICY-MAP

Command

```
policy-map NAME
no policy-map NAME
show policy-map (NAME|)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

No means to delete.

show: means to view the information specified or all included in it.

Description

policy map: It is a definition of a policy map that matches a class map to determine the bandwidth and/or priority of a class of data flows.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#policy-map ad
Switch(config)#show policy-map (ad)
Switch(config)#no policy-map ad
```

23.8 Configure the CLASS-MAP Property

Command

```
match ip-dscp (<0-63>|<0-63> <0-63>|<0-63> <0-63> <0-63>|<0-63>
<0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63> <0-63>|<0-63>
<0-63> <0-63> <0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63>
```

```
<0-63> <0-63> <0-63>|<0-63> <0-63> <0-63> <0-63> <0-63> <0-63>
<0-63> <0-63>)
no match ip-dscp

match ip-precedence (<0-7>|<0-7> <0-7>|<0-7> <0-7> <0-7>|<0-7>
<0-7> <0-7> <0-7>|<0-7> <0-7> <0-7> <0-7> <0-7>|<0-7> <0-7> <0-7>
<0-7> <0-7> <0-7>|<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>|<0-7>
<0-7> <0-7> <0-7> <0-7> <0-7> <0-7> <0-7>)
no match ip-precedence <0-7>

match layer4 (source-port|destination-port) <1-65535>
no match layer4 (source-port|destination-port) <1-65535>

match vlan <1-4094>
match vlan-range <1-4094> to <1-4094>
no match vlan
```

View

CLASS-MAP Configuration View

Default Level

2: Configuration level

Parameters

The ip - dscp ip - precedence command is used to configure fields layer4 of dscp precedence, matching L4 port protocol number, vlan < 1-4094 > message forwarded to the new vlan.

Description

-

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#class-map ac
*Switch(config-cmap)#match layer4 destination-port 80
*Switch(config-cmap)#do show class-map
   CLASS-MAP-NAME: ac
     Match Destination Port: 80
 *Switch(config-cmap)#no match layer4 destination-port 80
```

23.9 Configure the POLICY-MAP property

Command

class NAME

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

Enter config-pmap-c mode.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos enable
*Switch(config)#policy-map ac
*Switch(config-pmap)#class aa
*Switch(config-pmap-c)#
```

23.10 Configure the POLICY-MAP-C Property

Command

set cos （<0-7>|cos-inner）
no set cos

set ip-dscp <0-63>
no set ip-dscp

set ip-predence <0-7>
no set ip-predence

police <64-1000000> <0-64000> exceed-action drop
no police <64-1000000> <0-64000> exceed-action drop

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

COS sets the priority, cos-inner copies the vlanID of the ingress to the priority, and no means restore to the default value.

The ip-dscp ip-predence command is to set the priority.

police <64-1000000> <0-64000> exceed-action drop performs the discard action when the rate within this range and the rate should be a multiple of 64.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mls qos enable
*Switch(config)#policy-map ad
*Switch(config-pmap)#class ac
*Switch(config-pmap-c)#police 2000 2000 exceed-action drop
*Switch(config-pmap-c)#do show policy-map
  POLICY-MAP-NAME: ad
    State: detached
    CLASS-MAP-NAME: ac
      Police: average rate (2000 kbps)
             burst size (2000 bytes)
             exceed-action (drop)
             excess burst size (2000 bytes)
             flow control mode (none)
```

23.11 Configure QOS Interface Mode

Command

```
service-policy input NAME
no service-policy input NAME

mls qos trust dscp
no mls qos trust dscp

mls qos cos <0-7>
no mls qos cos
```

```
mls qos dscp-cos NAME
no mls qos dscp-cos NAME

mls qos dscp-mutation NAME
no mls qos dscp-mutation NAME

wrr-queue bandwidth <1-65535> <1-65535> <1-65535> <1-65535>
<1-65535> <1-65535> <1-65535> <1-65535>
no  wrr-queue bandwidth <0-7>
```

View

Ethernet port configuration view

Default Level

2: Configuration level

Parameters

Name

Description

service-policy input NAME: means to install the contents of the policy-map into the specified interface.

No means cancel the installation.

mls qos trust dscp: Indicates that the packet received at the specified port is queued according to the DSCP value, and the default mode is COS. No means restore to default value.

mls qos dscp-cos NAME: Installs the dscp-cos map of the specified name on the specified port. No means to delete.

mls qos dscp-mutation NAME: Install a dscp-mutation map with the specified name on the specified port. No means to delete.

mls qos cos <0-7>: Configure the default priority of the specified port. No means to restore the default value, which is 0-7 to 0-7

wrr-queue bandwidth <1-65535> <1-65535> <1-65535> <1-65535> <1-65535> <1-65535> <1-65535> <1-65535>: limit the speed of one or more queues on a specified port, enter a multiple of 64. No means contact speed limit.

Instance

```
Switch> enable
Switch#configure terminal
*Switch(config)#interface ge1
*Switch(config-ge1)#service-policy input ad
```

```
*Switch(config-ge1)#do show policy-map
  POLICY-MAP-NAME: ad
    State: attached
    CLASS-MAP-NAME: ac
      Police: average rate (2000 kbps)
             burst size (2000 bytes)
             exceed-action (drop)
             excess burst size (2000 bytes)
             flow control mode (none)

*Switch(config-ge1)#do show mls qos interface ge1
  INPUT-POLICY-MAP-NAME: ad
    CLASS-MAP-NAME: ac
      Police: average rate (2000 kbps)
             burst size (2000 bytes)
             exceed-action (drop)
             excess burst size (2000 bytes)
             flow control mode (none)
  Trust Mode: Ports default priority
  Port Default Prioiry: 0
  VLAN Priority Overide: Not Configured
  Egress Traffic Shaping: Not Configured
View all information on configuring MLS qos within a port.
```

24 ACL Configuration

24.1 Configure IPV4 standard ACL based on IP addresses

Command

```
access-list (<1-99>|<1300-1999>) (deny|permit) A.B.C.D A.B.C.D
access-list (<1-99>|<1300-1999>) (deny|permit) A.B.C.D
access-list (<1-99>|<1300-1999>) (deny|permit) host A.B.C.D
access-list (<1-99>|<1300-1999>) (deny|permit) any
no access-list (<1-99>|<1300-1999>) (deny|permit) A.B.C.D A.B.C.D
no access-list (<1-99>|<1300-1999>) (deny|permit) A.B.C.D
no access-list (<1-99>|<1300-1999>) (deny|permit) host A.B.C.D
no access-list (<1-99>|<1300-1999>) (deny|permit) any
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<1-99>|<1300-1999>) : represents the scope of the standard ACL.

(deny|permit) : ACL action, deny, permit.

A.B.C.D A.B.C.D: represents the source IP address and mask. The mask adopts the anti-code mechanism, such as 192.168.1.1 0.0.0.0 means only match 192.168.1.1 source IP message.

host A.B.C.D: indicates that the source IP address is A.B.C.D 0.0.0.0.

any: indicates that the source IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

Description

Access-list: command is used to create a standard filter rule group. A group can support up to 32 rules. No is to delete a rule group. When the message matches the corresponding rule, the action will be executed. For example, the configuration rule is as follows: access-list 1 deny 192.168.1.1 0.0.0.0.When the message from 192.168.1.1 is received, the action performed is discarded. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 1 deny 192.168.1.1 0.0.0.0
```

24.2 Configure IPV4 Extended ACL based on IP addresses

Command

```
access-list (<100-199>|<2000-2699>) (deny|permit) ip A.B.C.D
A.B.C.D A.B.C.D A.B.C.D
access-list (<100-199>|<2000-2699>) (deny|permit) ip A.B.C.D
A.B.C.D any
access-list (<100-199>|<2000-2699>) (deny|permit) ip any A.B.C.D
A.B.C.D
access-list (<100-199>|<2000-2699>) (deny|permit) ip any any
access-list (<100-199>|<2000-2699>) (deny|permit) ip A.B.C.D
A.B.C.D host A.B.C.D
access-list (<100-199>|<2000-2699>) (deny|permit) ip host
A.B.C.D A.B.C.D A.B.C.D
access-list (<100-199>|<2000-2699>) (deny|permit) ip host A.B.C.D
host A.B.C.D
access-list (<100-199>|<2000-2699>) (deny|permit) ip any host
A.B.C.D
access-list (<100-199>|<2000-2699>) (deny|permit) ip host A.B.C.D
any
no access-list (<100-199>|<2000-2699>) (deny|permit) ip A.B.C.D
A.B.C.D A.B.C.D A.B.C.D
no access-list (<100-199>|<2000-2699>) (deny|permit) ip A.B.C.D
A.B.C.D any
```

no access-list (<100-199>|<2000-2699>) (deny|permit) ip any A.B.C.D A.B.C.D
no access-list (<100-199>|<2000-2699>) (deny|permit) ip any any
no access-list (<100-199>|<2000-2699>) (deny|permit) ip A.B.C.D A.B.C.D host A.B.C.D
no access-list (<100-199>|<2000-2699>) (deny|permit) ip host A.B.C.D A.B.C.D A.B.C.D
no access-list (<100-199>|<2000-2699>) (deny|permit) ip host A.B.C.D host A.B.C.D
no access-list (<100-199>|<2000-2699>) (deny|permit) ip any host A.B.C.D
no access-list (<100-199>|<2000-2699>) (deny|permit) ip host A.B.C.D any

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<100-199>|<2000-2699>) : indicates extending the scope of the ACL.

(deny|permit) : ACL action, deny, permit.

A.B.C.D A.B.C.D: represents the source IP address and mask. The mask adopts the anti-code mechanism. For example: 192.168.1.1 0.0.0.0 represents messages that only matches 192.168.1.1 source IP.

host A.B.C.D: represents the source/destination IP address.

any: indicates that the source /destination IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

No means to delete the corresponding rule.

Description

Access-list: command is used to create a standard filter rule group. A group can support up to 32 rules. No is to delete a rule group. When the message matches the corresponding rule, the action will be executed. For example, the configuration rule is as follows: access-list 101 deny 192.168.1.1 0.0.0.0 192.168.2.1 0.0.0.0 When the message from 192.168.1.1 to 192.168.2.1 is received, the action performed is discarded. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#access-list 101 deny 192.168.1.1 0.0.0.0
192.168.2.1 0.0.0.0
```

24.3 Configure other IPV4 protocols based on IP addresses to extend ACL

Command

```
access-list (<100-199>|<2000-2699>) (deny|permit)
(<0-255>|ahp|eigrp|esp|gre|ipinip|ospf|pcp|pim ) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) ((A.B.C.D A.B.C.D)|(any)|(host
A.B.C.D))
no access-list (<100-199>|<2000-2699>) (deny|permit)
(<0-255>|ahp|eigrp|esp|gre|ipinip|ospf|pcp|pim ) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) ((A.B.C.D A.B.C.D)|(any)|(host
A.B.C.D))
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<100-199>|<2000-2699>) : indicates extending the scope of the ACL.

(deny|permit) : ACL action, deny, permit.

(<0-255>| ahp | eigrp | esp | gre | ipinip | ospf | PCP |pim) : configure IP protocol type:

- <0-255>：An IP protocol number
- Ahp：Authentication Header Protocol
- Eigrp：EIGRP routing protocol
- Esp：Encapsulation Security Payload
- Gre：General Routing Encapsulation
- Ipinip：iP in IP tunneling
- Ospf：OSPF routing protocol
- Pcp：Payload Compression Protocol
- Pim：Protocol Independent Multicast

((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) : configure the source IP address.

((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) : configure the destination IP address.

No means to delete.

Description

Since the message has a corresponding protocol port number, it can be configured to filter based on the protocol port number. For example, the configuration rules are as follows: access-list 101 deny ahp 192.168.1.1 0.0.0.0 192.168.2.1 0.0.0.0.When the ahp message from 192.168.1.1 to 192.168.2.1 is received, the action performed is discarded. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 101 deny ahp 192.168.1.1 0.0.0.0
192.168.2.1 0.0.0.0
```

24.4 Configure IPV4 ICMP Extend ACL Based on IP Addresses

Command

```
access-list (<100-199> | <2000-2699>) (deny | permit) (icmp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) ((A.B.C.D A.B.C.D)
| (any) | (host A.B.C.D))
(<0-255>|echo|echo-reply|redirect|ttl-exceeded|unreachable|)
no access-list (<100-199> | <2000-2699>) (deny | permit) (icmp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) ((A.B.C.D A.B.C.D)
| (any) | (host A.B.C.D))
(<0-255>|echo|echo-reply|redirect|ttl-exceeded|unreachable|)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<100-199>|<2000-2699>) : indicates extending the scope of the ACL.

(deny|permit) : ACL action, deny, permit.

Icmp: filter Icmp protocol message.

A.B.C.D A.B.C.D: represents the source/destination IP address and mask, and the mask adopts the anti-code mechanism. For example, 192.168.1.1 0.0.0.0 means that only matches the message with 192.168.1.1 source/destination IP.

host A.B.C.D: represents the source/destination IP address.

any: indicates that the source /destination IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

(< 0-255 > | echo | echo - reply | redirect | ttl - exceeded | | unreachable |) : corresponding icmp message type, echo (ping), echo reply, All redirects, TTL exceeded, All unreachables.

No means to delete.

Description

Configure extended ACL icmp protocol based on IPV4. For example, the configuration rule is as follows: access-list 103 deny icmp 192.168.1.1 0.0.0.0 192.168.2.1 0.0.0.0 echo. Therefore, when receiving echo message from icmp 192.168.1.1 to icmp 192.168.2.1, the action executed is discarded. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> en
Switch#configure terminal
Switch(config)#access-list 103 deny icmp 192.168.1.1 0.0.0.0
192.168.2.1 0.0.0.0 echo
```

24.5 Configure IPV4 ICMP Extend ACL Based on IP Addresses

Command

```
access-list (<100-199>|<2000-2699>) (deny|permit) (igmp)
((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) (<0-255>|query|reportv1|reportv2|
leave|reportv3|)
no access-list (<100-199>|<2000-2699>) (deny|permit) (igmp)
((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) (<0-255>|query|reportv1|reportv2|
leave|reportv3|)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<100-199>|<2000-2699>) : indicates extending the scope of the ACL.

(deny|permit) : ACL action, deny, permit.

Igmp: filter Igmp protocol message.

A.B.C.D A.B.C.D: represents the source/destination IP address and mask, and the mask adopts the anti-code mechanism. For example, 192.168.1.1 0.0.0.0 means that only matches the message with 192.168.1.1 source/destination IP.

host A.B.C.D: represents the source/destination IP address.

any: indicates that the source /destination IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

(<0-255>|query|reportv1|reportv2|leave|reportv3|)：corresponding to different igmp message types, IGMP Membership Query, IGMPv1 Membership Report, IGMPv2 Membership Report, IGMPv2 Leave Group, IGMPv3 Membership Report.

no: means to delete.

Description

Configure extended ACL igmp protocol based on IPV4, destination address should be configured as multicast address, otherwise the corresponding rule cannot be matched. For example, the configuration rule is as follows: access-list 103 deny igmp 192.168.1.1 0.0.0.0 224.1.2.3 0.0.0.0 leave. Therefore, when the leave message from 192.168.1.1 to igmp of group 224.1.2.3 is received, the action executed is discarded. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> en
Switch#configure terminal
Switch(config)#access-list 103 deny igmp 192.168.1.1 0.0.0.0
224.1.2.3 0.0.0.0 leave
```

24.6 Configure IPV4 based on IP addresses TCP extend ACL

Command

```
access-list (<100-199> | <2000-2699>) (deny | permit) (tcp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)) | ) ((A.B.C.D
A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
```

```
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)) | )
(fin|syn|rst|psh|ack|urg| )

access-list (<100-199> | <2000-2699>) (deny | permit) (tcp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))) ((A.B.C.D
A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)) | )
(fin|syn|rst|psh|ack|urg| )

access-list (<100-199> | <2000-2699>) (deny | permit) (tcp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)) | ) ((A.B.C.D
A.B.C.D) | (any) | (host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)))
(fin|syn|rst|psh|ack|urg| )

access-list (<100-199> | <2000-2699>) (deny | permit) (tcp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))) ((A.B.C.D
A.B.C.D) | (any) | (host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)))
(fin|syn|rst|psh|ack|urg| )

no access-list (<100-199>|<2000-2699>) (deny|permit) (tcp)
((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) (((eq|lt|gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))|) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) (((eq|lt|gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))|)
(fin|syn|rst|psh|ack|urg|)

no access-list (<100-199>|<2000-2699>) (deny|permit) (tcp)
((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)) (ftp|ftp-data
|pop3|smtp|telnet|www|<1-65535>))) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) (((eq|lt|gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))|)
(fin|syn|rst|psh|ack|urg|)
```

```
no access-list (<100-199>|<2000-2699>) (deny|permit) (tcp)
((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) (((eq|lt|gt)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))|)  ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)))
(fin|syn|rst|psh|ack|urg|)

no access-list (<100-199>|<2000-2699>) (deny|permit) (tcp)
((A.B.C.D A.B.C.D)|(any)|(host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>)) (ftp|ftp-data
|pop3|smtp|telnet|www|<1-65535>))) ((A.B.C.D
A.B.C.D)|(any)|(host A.B.C.D)) (((range)
(ftp|ftp-data|pop3|smtp|telnet|www|<1-65535>))(ftp|ftp-data|po
p3|smtp|telnet|www|<1-65535>))) (fin|syn|rst|psh|ack|urg|)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<100-199>|<2000-2699>) : indicates extending the scope of the ACL.

(deny|permit)：ACL actions, deny, permit.

Tcp: filter tcp protocol message.

A.B.C.D: represents the source/destination IP address and mask, and the mask adopts the anti-code mechanism. For example, 192.168.1.1 0.0.0.0 means that only matches the message with 192.168.1.1 source/destination IP.

host A.B.C.D: represents the source/destination IP address.

any: indicates that the source /destination IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

(eq|lt|gt)：

- Match only packets on a given port number
- Match only packets with a lower port number
- Match only packets with a greater port number。

((ftp |ftp-data|pop3| SMTP | Telnet | WWW |<1-65535>))|) : corresponding to different TCP message types:

- File Transfer Protocol (21)，
- FTP data connections (20)，
- Post Office Protocol v3 (110)，
- Simple Mail Transport Protocol (25)，

- Telnet (23),
- World Wide Web (HTTP, 80),
- Port number(1-65535)。
- (fin|syn|rst|psh|ack|urg|):
- Match on the FIN bit,
- Match on the Syn bit,
- Match on the Rst bit,
- Match on the Psh bit,
- Match on the Ack bit,
- Match on the Urg bit.

No means to delete.

Description

Configure extended ACL igmp protocol based on IPV4, destination address should be configured as multicast address, otherwise the corresponding rule cannot be matched. For example, the configuration rule is as follows: access-list 101 deny tcp host 192.168.1.1 eq ftp host 192.168.2.1 eq pop3 fin, then when receiving the tcp message from 192.168.1.1 to 192.168.2.1, the action executed is discard. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list 101 deny tcp host 192.168.1.1 eq ftp
host 192.168.2.1 eq pop3 fin
Switch(config)#access-list 102 deny tcp host 192.168.1.1 range ftp
ftp host 192.168.2.1 range  pop3 pop3 fin
```

24.7 Configure IPV4 based on IP addresses UDP extend ACL

Command

```
access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | ) ((A.B.C.D A.B.C.D) | (any)
| (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | )
```

```
  access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((range)
(<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp)) ((A.B.C.D A.B.C.D) | (any)
| (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | )

access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | ) ((A.B.C.D A.B.C.D)|(any)
| (host A.B.C.D)) (((range) (<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp))

access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((range)
(<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp)) ((A.B.C.D A.B.C.D) | (any)
| (host A.B.C.D)) (((range) (<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp))

no access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | ) ((A.B.C.D A.B.C.D) | (any)
| (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp))| )

no access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D))  (((range)
(<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp))  ((A.B.C.D A.B.C.D) | (any)
| (host A.B.C.D)) (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | )

no access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (host A.B.C.D))  (((eq | lt | gt)
(<1-65535>|rip|snmp|snmp-trap|tftp)) | ) ((A.B.C.D A.B.C.D) | (any)
| (host A.B.C.D)) (((range) (<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp))

 no access-list (<100-199> | <2000-2699>) (deny | permit) (udp)
((A.B.C.D A.B.C.D) | (any) | (hostA.B.C.D)) ( ((range)
(<1-65535>|rip|snmp|snmp-trap|tftp)
(<1-65535>|rip|snmp|snmp-trap|tftp)) ((A.B.C.D A.B.C.D) | (any)
```

| (host A.B.C.D)) (((range) (<1-65535>|rip|snmp|snmp-trap|tftp) (<1-65535>|rip|snmp|snmp-trap|tftp))

View

Configure Mode

Default Level

2: Configuration level

Parameters

(<100-199>|<2000-2699>) : indicates extending the scope of the ACL.

(deny|permit) : ACL action, deny, permit.

udp: filter udp protocol message.

A.B.C.D A.B.C.D: represents the source/destination IP address and mask, and the mask adopts the anti-code mechanism. For example, 192.168.1.1 0.0.0.0 means that only matches the message with 192.168.1.1 source/destination IP.

host A.B.C.D: represents the source/destination IP address.

any: indicates that the source /destination IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

((eq|lt|gt)：

- Match only packets on a given port number，
- Match only packets with a lower port number，
- Match only packets with a greater port number。

(<1-65535>|rip|snmp|snmp-trap|tftp)：corresponding to different tcp message types:

- Port number(1-65535) (21)，
- Routing Information Protocol (router, in.routed, 520)，
- Simple Network Management Protocol (161)，
- SNMP Traps (162)，
- Trivial File Transfer Protocol (69).W

Description

Configure extended ACL igmp protocol based on IPV4, destination address should be configured as multicast address, otherwise the corresponding rule cannot be matched. For example, the configuration rule is as follows: access-list 101 deny udp host 192.168.1.1 eq tftp host 192.168.2.1 eq tftp, then when receiving the tcp tftp message from 192.168.1.1 to 192.168.2.1, the action executed is discarded. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
Switch#configure terminal
```

```
Switch(config)#access-list 101 deny tcp host 192.168.1.1 eq tftp
host 192.168.2.1 eq tftp
Switch(config)#access-list 102 deny tcp host 192.168.1.1 range tftp
tftp host 192.168.2.1 range 10 30
```

24.8 Configure character type ACL based on IPV4 addresses

Command

```
access-list swos WORD (deny|permit)
(ip|gre|igmp|pim|rsvp|ospf|vrrp|ipcom|any|<0-255>)
(A.B.C.D/M|A.B.C.D A.B.C.D|any) (A.B.C.D/M|A.B.C.D A.B.C.D|any)
((label(1-65535)|precedence<0-7>) | tos (0-255) | range <0-255>
<0-255> | pkt-size ((lt|gt)<0-65535> | range <0-65535> <0-65535>)
| fragments | log | interface (in|out) IFNAME)

access-list swos WORD (deny|permit) (icmp)(A.B.C.D/M|A.B.C.D
A.B.C.D|any) (A.B.C.D/M|A.B.C.D A.B.C.D|any) ((icmp-type
ICMP-TYPE|label(1-65535)|precedence<0-7>)|tos (0-255) |range
<0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

access-list swos WORD (deny|permit)(udp)(A.B.C.D/M|A.B.C.D
A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range <0-65535> <0-65535>)
 (A.B.C.D/M|A.B.C.D A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range
<0-65535> <0-65535>)((label(1-65535)|precedence<0-7>)|tos (0-255)
|range <0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

access-list swos WORD (deny|permit)(tcp)(A.B.C.D/M|A.B.C.D
A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range <0-65535> <0-65535>)
 (A.B.C.D/M|A.B.C.D A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range
<0-65535> <0-65535>)((label(1-65535)|precedence<0-7>)|tos (0-255)
|range <0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no access-list swos WORD (deny|permit)(udp)(A.B.C.D/M|A.B.C.D
A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range <0-65535> <0-65535>)
 (A.B.C.D/M|A.B.C.D A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range
<0-65535> <0-65535>)((label(1-65535)|precedence<0-7>)|tos (0-255)
```

```
|range <0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no access-list swos WORD (deny|permit) (icmp)(A.B.C.D/M|A.B.C.D
A.B.C.D|any) (A.B.C.D/M|A.B.C.D A.B.C.D|any) ((icmp-type
ICMP-TYPE|label(1-65535)|precedence<0-7>)|tos (0-255) |range
<0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no access-list swos WORD (deny|permit)( tcp)(A.B.C.D/M|A.B.C.D
A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range <0-65535> <0-65535>)
 (A.B.C.D/M|A.B.C.D A.B.C.D|any) ((eq|lt|gt|ne) <0-65535> | range
<0-65535> <0-65535>)((label(1-65535)|precedence<0-7>)|tos (0-255)
|range <0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no access-list swos WORD (deny|permit)
(ip|gre|igmp|pim|rsvp|ospf|vrrp|ipcom|any|<0-255>)
(A.B.C.D/M|A.B.C.D A.B.C.D|any) (A.B.C.D/M|A.B.C.D A.B.C.D|any)
((label(1-65535)|precedence<0-7>)|tos (0-255) |range <0-255>
<0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

Swos WORD: configure a character ACL.

(deny|permit) : ACL action, deny, permit.

(ip|gre|igmp|pim|rsvp|ospf|vrrp|ipcom|any|<0-255>):

A.B.C.D A.B.C.D: represents the source IP address and mask. The mask adopts the anti-code mechanism, such as 192.168.1.1 0.0.0.0 means only match 192.168.1.1 source IP message.

host A.B.C.D: indicates that the source IP address is A.B.C.D 0.0.0.0.

any: indicates that the source IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

Label: configure priority.

Precedence: configure priority.

Tos: configure priority.

Pkt-size: configure message length

Interface[IFNAME] : install port number.

Description

The access-list command is used to create a standard filter rule group. A group can support up to 32 rules. No is to delete a rule group. When the message matches the corresponding rule, the action will be executed. For example, the configuration rule is as follows: access-list swos AA deny ip 192.168.1.1 0.0.0.0 192.168.2.1 0.0.0.0.When the message from 192.168.1.1 is received and sent to 192.168.2.1, the action performed is discard. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#access-list swos AA deny ip 192.168.1.1 0.0.0.0
192.168.2.1 0.0.0.0
```

24.9 Configure character type ACL based on IPV6 addresses

Command

```
ipv6 access-list swos WORD (deny|permit)
(ip|gre|igmp|pim|rsvp|ospf|vrrp|ipcom|any|<0-255>)
( X:X::X:X/M|X:X::X:X |any) (X:X::X:X/M|X:X::X:X |any)
((label(1-65535)|precedence<0-7>) | tos (0-255) |range <0-255>
<0-255> | pkt-size ((lt|gt) <0-65535> | range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

ipv6 access-list swos WORD (deny|permit) (icmp)
(X:X::X:X/M|X:X::X:X |any) (X:X::X:X/M|X:X::X:X |any) ((icmp-type
ICMP-TYPE|label(1-65535)|precedence<0-7>)|tos (0-255) |range
<0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

ipv6 access-list swos WORD (deny|permit) (udp)
(X:X::X:X/M|X:X::X:X |any) ((eq|lt|gt|ne) <0-65535> | range
<0-65535> <0-65535>)(X:X::X:X/M|X:X::X:X |any) ((eq|lt|gt|ne)
<0-65535> | range <0-65535> <0-65535>)
((label(1-65535)|precedence<0-7>) | tos (0-255) |range <0-255>
```

```
<0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

       ipv6 access-list swos WORD (deny|permit) (tcp)
(X:X::X:X/M|X:X::X:X |any) ((eq|lt|gt|ne) <0-65535> | range
<0-65535> <0-65535>)(X:X::X:X/M|X:X::X:X |any) ((eq|lt|gt|ne)
<0-65535> | range <0-65535>
<0-65535>)((label(1-65535)|precedence<0-7>) | tos (0-255) |range
<0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no ipv6 access-list swos WORD
(deny|permit)(udp)(X:X::X:X/M|X:X::X:X |any) ((eq|lt|gt|ne)
<0-65535> | range <0-65535> <0-65535>)(X:X::X:X/M|X:X::X:X |any)
((eq|lt|gt|ne) <0-65535> | range <0-65535>
<0-65535>)((label(1-65535)|precedence<0-7>)|tos (0-255) |range
<0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no ipv6 access-list swos WORD (deny|permit)
(icmp)(X:X::X:X/M|X:X::X:X |any) (X:X::X:X/M|X:X::X:X |any)
((icmp-type ICMP-TYPE|label(1-65535)|precedence<0-7>)|tos (0-255)
|range <0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no ipv6 access-list swos WORD
(deny|permit)( tcp)(X:X::X:X/M|X:X::X:X |any) ((eq|lt|gt|ne)
<0-65535> | range <0-65535> <0-65535>)(X:X::X:X/M|X:X::X:X |any)
((eq|lt|gt|ne) <0-65535> | range <0-65535>
<0-65535>)((label(1-65535)|precedence<0-7>)|tos (0-255) |range
<0-255> <0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)

no ipv6 access-list swos WORD (deny|permit)
(ip|gre|igmp|pim|rsvp|ospf|vrrp|ipcom|any|<0-255>)( X:X::X:X/M|
X:X::X:X |any) (X:X::X:X/M|X:X::X:X |any)
((label(1-65535)|precedence<0-7>)|tos (0-255) |range <0-255>
<0-255>|pkt-size ((lt|gt)<0-65535>|range <0-65535>
<0-65535>)|fragments|log|interface (in|out) IFNAME)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

Swos WORD: configure a character ACL.

(deny|permit) : ACL action, deny, permit.

(ip|gre|igmp|pim|rsvp|ospf|vrrp|ipcom|any|<0-255>)：

X:X::X:X/M|X:X::X:X |any：Represents the source IP address and mask, and the mask adopts the anti-code mechanism, such as: fe80::01 :: represents only messages matching fe80::01 source IP.

any: indicates that the source IP address is 0.0.0.0 255.255.255.255, which means all IP addresses.

Label: configure priority.

Precedence: configure priority.

Tos: configure priority.

Pkt-size: configure message length

Interface[IFNAME] : install port number.

Description

The access-list command is used to create a standard filter rule group. A group can support up to 32 rules. No is to delete a rule group. When the message matches the corresponding rule, the action will be executed. For example, the configuration rule is as follows: Ipv6 access-list swos qwer deny any fe80::01 :: fe80::02 :: then when receiving the message from fe80::01 ::, to fe80::02 ::, the action executed is discard. These rules only take effect when activated on a port using the ip-access-group command. And has the "first activation first effect" feature.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#ipv6 access-list swos qwer deny any fe80::01 ::
fe80::02 ::
```

24.10 View All Configured ACL

Command

```
show access-list
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

-

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#show access-list
```

24.11 Configure time-range

Command

time-range NAME

View

Configure Mode

Default Level

2: Configuration level

Parameters

Name.

Description

Time-range means to configure a period of time during which the action of the ACL is executed, and when the time is up, the action of the ACL is not executed, which acts as a timing function. Support 20 groups of time-range, each group supports two types of time absolute (absolute time) and inquire (cycle time), and each group supports the creation of up to 16 time rules. Absolute time means to select a period of time, cycle time means to select a period of time, the weekly cycle time is divided into day, workday, non-work, supporting the configuration of time as well.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#time-range ac     // create a time-range called ac
```

```
Switch(config-time-range)#absolute start 12:00 1971-12-14 end
14:00 1971-12-15  // configure a period of time from 12:00
1971-12-14 to 14:00 1971-12-15.
Switch(config-time-range)#periodic  09:00 to 12:00 daily  //
configure a weekly cycle time from 09:00 to 12:00 every morning
*Switch#show time-range   // view the current configuration of
time-range
Current time: 10:52 1970-01-01
time-range ac (inactive)
 periodic 09:00 to 12:00 daily
 absolute start 12:00 1971-12-14 end 14:00 1971-12-15
Switch(config-time-range)#no periodic  09:00 to 12:00 // delete
the sub-items of configuration cycle time within the time-range
Switch(config-time-range)#no absolute start 12:00 1971-12-14 end
14:00 1971-12-15   //Delete the configuration absolute time
subitem in the time-range
Switch(config)#no time-range ac   //delete time-range ac
```

24.12 Time-range binds to the ACL

Command

access-list (<1-99>|<100-199>|<1300-1999>|<2000-2699>)
time-range WORD

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

Bind a time-range to an ACL and perform the ACL action within the setting time. An ACL can only bind one time-range, and one time-range can bind multiple ACL. When deleted, if the time-range is referenced, the time-range is not allowed to be deleted and its subitems are allowed to be modified.

Instance

```
Switch(config)#access-list 10 time-range ad  // bind the standard
ACL numbered 10 to time-range ad.
```

```
Switch(config)#no access-list 10 time-range ad  // unbind the
standard ACL numbered 10 to time-range ad.
```

24.13 Activate ACL

Command

ip-access-group (<1-199>|<1300-2699>) in

View

Interface Mode

Default Level

2: Configuration level

Parameters

(<1-199>|<1300-2699>) in: ACL rule group ID, in represents the ingress direction.

Description

ACLS configured with time-range also need to be activated, meeting the rule of first activation first effect.

A port can only activate one IP address ACL and one MAC address ACL.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge8
Switch(config-ge8)#ip-access-group 1 in
```

24.14 Configure ACL based on MAC address

Command

mac access-list <2000-2699> (deny|permit) MAC MASK MAC MASK (<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) MAC MASK MAC MASK (<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) MAC MASK host MAC (<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) MAC MASK host MAC (<1-65535>|NUM|)

```
mac access-list <2000-2699> (deny|permit) MAC MASK any
(<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) MAC MASK any
(<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) any host MAC
(<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) any host MAC
(<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) any MAC MASK
(<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) any MAC MASK
<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) host MAC MAC MASK
(<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) host MAC MAC MASK
(<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) host MAC any
(<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) host MAC any
(<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) host MAC host MAC
(<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) host MAC host MAC
(<1-65535>|NUM|)

mac access-list <2000-2699> (deny|permit) any any (<1-65535>|NUM|)
no mac access-list <2000-2699> (deny|permit) any any
(<1-65535>|NUM|)
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

<2000-2699>: standard MAC ACL label range

MAC MASK MAC MASK: source MAC + MASK destination MAC+ MASK.

(<1-65535>|NUM|): Ethernet type. Hexadecimal/hexadecimal input.

Description

Configure an ACL based on MAC address to perform the configured action when the message matches the rule issued.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#mac access-list 2001 deny any any 0x8100  //
Configure a message ACL that dismisses a MAC address of type 0x8100
Ethernet Switch(config)#no mac access-list 2001 deny any any 0x8100
//// delete a message ACL that discards a MAC address of Ethernet
type 0x8100
```

24.15 View All Configured MAC ACL

Command

show mac access-list

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

-

Instance

```
Switch> enable
Switch# show mac access-list
```

24.16 Time-range and MAC ACL binding

Command

mac access-list <2000-2699> time-range WORD

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

Bind a time-range to an ACL and perform the MAC ACL action within the setting time. An MAC ACL can only bind one time-range, and one time-range can bind multiple MAC ACL. When deleted, if the time-range is referenced, the time-range is not allowed to be deleted and its subitems are allowed to be modified.

Instance

```
Switch(config)#mac access-list 2001 time-range ad   // bind the standard MAC ACL numbered 2001 to time-range ad.
Switch(config)#no mac access-list 2001 time-range ad  // unbind the standard MAC ACL numbered 2001 to time-range AD.
```

24.17 Activate MAC ACL

Command

mac-access-group <2000-2699> in

View

Interface Mode

Default Level

2: Configuration level

Parameters

<2000-2699>: MAC ACL rule group ID

in: indicates the direction of ingress.

Description

ACLS configured with time-range also need to be activated, meeting the rule of first activation first effect.

A port can only activate one IP address ACL and one MAC address ACL.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#mac-access-group 2001 in
```

24.18 View all Activated ACL

Command

show access-group

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

View the currently activated ACL port .

Instance

```
Switch> enable
Switch#show access-group
```

25 802.1X Authentication Configuration

25.1 Global802.1X Authentication Enablement

Command

[no] dot1x system-auth-ctrl

View

Configure Mode

Default Level

2: Configuration level

Parameters

-

Description

dot1x system-auth-ctrl: command is used to enable global dot1x authentication function.

no dot1x system-auth-ctrl: command is used to disable global dot1x authentication function.

By default, global dotlx authentication function is disabled.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#dot1x system-auth-ctrl
```

25.2 802.1X authentication port authorization mode

Command

dot1x port-control (auto | force-authorized | force-unauthorized)

no dot1x port-control

View

Interface Mode

Default Level

2: Configuration level

Parameters

auto: set port to enable 802.1x authentication mode and it is unauthorized mode by default.

force-authorized: set the port to forced authorized mode.

force-unauthorized: set the port to unauthorized forced mode

Description

dot1x port-control: command is used to set the access control mode of 802.1x on the specified port.

no dot1x port-control: the command is used to delete port 802.1x authentication function.

The port is not configured with 802.1x authentication by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x port-control auto
```

25.3 802.1X Authentication Port Controlled Direction

Command

dot1x port-control dir (both | in)

View

Interface Mode

Default Level

2: Configuration level

Parameters

both: the controlled direction is bi-directional

in: the controlled direction is ingress.

Description

dot1x port-control dir: command is used to configure port controlled directions.

By default, the controlled direction of the port is ingress.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x port-control dir both
```

25.4 802.1X Authentication EAPOL Protocol Version

Command

dot1x protocol-version (1| 2)

no dot1x protocol-version

View

Interface Mode

Default Level

2: Configuration level

Parameters

1: Configure EAPOL to 1

2: Configure EAPOL to 2

Description

dot1x protocol-version: command is used for the EAPOL protocol version of dot1x.

no dot1x protocol-version: command is used for the default EAPOL protocol version of dot1x.

By default, the EAPOL protocol message version is 2.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x protocol-version 2
```

25.5 802.1X Authentication Port Silent Time

Command

dot1x quiet-period <1-65535>

no dot1x quiet-period

View

Interface Mode

Default Level

2: Configuration level

Parameters

1-65535: the silent time of the port, ranging from 1-65535 seconds, defaults to 60 seconds

Description

dot1x quiet-period: Command for the dot1x port's silence time.

no dot1x quiet-period: command is used for the default quiet time of the dot1x port.

By default, the silence time of the dot1x port is 60 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x quiet-period 120
```

25.6 802.1x Authorization Port Reauthentication Interval

Command

dot1x timeout re-authperiod <1-4294967295>

no dot1x timeout re-authperiod

View

Interface Mode

Default Level

2: Configuration level

Parameters

1-4294967295: re-authentication interval for port, the range is 1-4294967295 seconds, the default value is 3600 seconds.

Description

dot1x timeout re-authperiod: command is used for re-authentication intervals on the dot1x port.

no dot1x timeout re-authperiod: command is used for the default re-authentication interval of dot1x port.

By default, the re-authentication interval on dot1x port is 3600 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x timeout re-authperiod 1200
```

25.7 802.1X Authorization Server Timeout Time

Command

dot1x timeout server-timeout <1-65535>

no dot1x timeout server-timeout

View

Interface Mode

Default Level

2: Configuration level

Parameters

1-65535: the server timeout of the port, ranging from 1- -65535 seconds, defaults to 30 seconds.

Description

dot1x timeout server-timeout: The command is used for the server timeout on the dot1x port.

no dot1x timeout server-timeout: command is for the default server timeout of the dot1x port.

By default, the server timeout on dot1x port is 30 seconds.

Instance

```
Switch> enable
```

```
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x timeout server-timeout 60
```

25.8 802.1X Authorization Client Timeout Time

Command

dot1x timeout supp-timeout <*1-65535*>

no dot1x timeout supp-timeout

View

Interface Mode

Default Level

2: Configuration level

Parameters

1-65535: the client timeout of the port, ranging from 1- -65535 seconds, defaults to 30 seconds

Description

dot1x timeout supp-timeout: command is used for the client timeout on the dot1x port.

no dot1x timeout supp-timeout: command is for the default clinet timeout of the dot1x port.

By default, the client timeout on dot1x port is 30 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x timeout supp-timeout 60
```

25.9 802.1X Authorization Message Retransmission Interval

Command

dot1x timeout tx-period <*1-65535*>

no dot1x timeout tx-period

View

Interface Mode

Default Level

2: Configuration level

Parameters

1-65535: the retransmission interval of the port, the range is 1-65535 seconds, the default is 30 seconds

Description

dot1x timeout tx-period: command is used for retransmission intervals on the dot1x port.

no dot1x timeout tx-period: command is used for the default retransmission interval of the dot1x port.

By default, the retransmission interval on dot1x port is 30 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x timeout tx-period 60
```

25.10 802.1X Authorization Message Retransmission Interval

Command

dot1x reauthMax *<1-10>*

no dot1x reauthMax

View

Interface Mode

Default Level

2: Configuration level

Parameters

1-65535: the number of retransmission of request/id message of the port, ranging from 1 to 10 seconds, it is 3 times by default

Description

dot1x reauthMax: command is used for the times of retransmissions of the dot1x port.

no dot1x reauthMax: command is uded for the default times of retransmissions

By default, the times of retransmissions on dot1x port is 3.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x reauthMax 4
```

25.11 802.1x authorization port reauthentication mode

Command

dot1x reauthentication

no dot1x reauthentication

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

dot1x reauthentication: command is used to enable re-authentication on the dot1x port.

no dot1x reauthentication: command is used to disable the re-authentication feature on the dot1x port.

By default, the re-authentication interval on dot1x port is 3600 seconds.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x reauthentication
```

25.12 802.1X Authentication Port Initialization

Command

dot1x initialize

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

dot1x initialize: command is used to initialize and unauthorize the dot1x port and attempt to re-authenticate on the dot1x port.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x initialize
```

25.13 802.1X Authorization Key Encryption Function

Command

dot1x keytxenabled (enable | disable)

View

Interface Mode

Default Level

2: Configuration level

Parameters

-

Description

dot1x keytxenabled enable: command is used to enable key encryption on the dot1x port (when clients interact with EPAOL messages).

dot1x keytxenabled disable: command is used to disable key encryption on the dot1x port.

Key encryption on the dot1x port is disabled by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#dot1x keytxenabled enable
```

25.14 Display 802.1X Authentication Global Information

Command

show dot1x

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show dot1x: command is used to display dot1x global information and radius client information.

Instance

```
Switch> enable
Switch#show dot1x
802.1X Port-Based Authentication Enabled
  RADIUS client address: not configured
```

25.15 Display 802.1X Authentication Detailed Information

Command

show dot1x all

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show dot1x all: command is used to display dot1x global information and radius client information, as well as port information.

Instance

```
Switch> enable
Switch#show dot1x all
802.1X Port-Based Authentication Enabled
  RADIUS client address: not configured
802.1X info for interface ge4
  portEnabled: true - portControl: Auto
  portStatus: Unauthorized - currentId: 90
  reAuthenticate: disabled
  reAuthPeriod: 3600
  abort:F fail:F start:F timeout:F success:F
  PAE: state: Connecting - portMode: Auto
  PAE: reAuthCount: 1 - rxRespId: 0
  PAE: quietPeriod: 60 - reauthMax: 2 - txPeriod: 30
  BE: state: Idle - reqCount: 0 - idFromServer: 0
  BE: suppTimeout: 30 - serverTimeout: 30
  CD: adminControlledDirections: in - operControlledDirections: in
  CD: bridgeDetected: false
  KR: rxKey: false
  KT: keyAvailable: false - keyTxEnabled: false
```

25.16 Display 802.1X Authentication Port Information

Command

show dot1x interface <IFNAME>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname:specifies the port name

Description

show dot1x interface: command is used to display dot1x information for the specified port.

Instance

```
Switch> enable
Switch#show dot1x interface ge4
802.1X info for interface ge4
  portEnabled: true - portControl: Auto
  portStatus: Unauthorized - currentId: 92
  reAuthenticate: disabled
  reAuthPeriod: 3600
  abort:F fail:F start:F timeout:F success:F
  PAE: state: Connecting - portMode: Auto
  PAE: reAuthCount: 1 - rxRespId: 0
  PAE: quietPeriod: 60 - reauthMax: 2 - txPeriod: 30
  BE: state: Idle - reqCount: 0 - idFromServer: 0
  BE: suppTimeout: 30 - serverTimeout: 30
  CD: adminControlledDirections: in - operControlledDirections: in
  CD: bridgeDetected: false
  KR: rxKey: false
  KT: keyAvailable: false - keyTxEnabled: false
```

25.17 Display 802.1X Authentication Port Diagnosis Information

Command

show dot1x diagnostics interface <IFNAME>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname:specifies the port name

Description

show dot1x diagnostics interface: command is used to display dot1x diagnostics information for the specified port.

Instance

```
Switch> enable
Switch#show dot1x diagnostics interface ge4
802.1X Diagnostics for interface ge4
 authEnterConnecting: 707
 authEaplogoffWhileConnecting: 355
 authEnterAuthenticating: 0
 authSuccessWhileAuthenticating: 0
 authTimeoutWhileAuthenticating: 0
 authFailWhileAuthenticating: 0
 authEapstartWhileAuthenticating: 0
 authEaplogoggWhileAuthenticating: 0
 authReauthsWhileAuthenticated: 0
 authEapstartWhileAuthenticated: 0
 authEaplogoffWhileAuthenticated: 0
 BackendResponses: 0
 BackendAccessChallenges: 0
 BackendOtherrequestToSupplicant: 0
 BackendAuthSuccess: 0
 BackendAuthFails: 0
```

25.18 Display 802.1X Authentication Port Session Information

Command

show dot1x sessionstatistics interface <IFNAME>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname:specifies the port name

Description

show dot1x sessionstatistics interface: command is used to display dot1x sessionstatistics information for the specified port.

Instance

```
Switch> enable
Switch#show dot1x sessionstatistics interface ge4
802.1X session statistics for interface ge4
session authentication method: Local server
session time: 0 secs
session user name:
 session terminate cause: Port failure
```

25.19 Display 802.1X Authentication Port Message Statistics

Command

show dot1x statistics interface <IFNAME>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

Ifname:specifies the port name

Description

show dot1x statistics interface: command is used to display dot1x message for the specified port.

Instance

```
Switch> enable
Switch#show dot1x statistics interface ge4
802.1X statistics for interface ge4
  EAPOL Frames Rx: 0 - EAPOL Frames Tx: 0
  EAPOL Start Frames Rx: 0 - EAPOL Logoff Frames Rx: 0
  EAP Rsp/Id Frames Rx: 0 - EAP Response Frames Rx: 0
  EAP Req/Id Frames Tx: 719 - EAP Request Frames Tx: 0
  Invalid EAPOL Frames Rx: 0 - EAP Length Error Frames Rx: 0
```

EAPOL Last Frame Version Rx: 0 - EAPOL Last Frame Src: 0000.0000.0000

25.20 RADIUS Server Regeneration Interval

Command

radius-server deadtime <0-1440>

no radius-server deadtime

View

Configure Mode

Default Level

2: Configuration level

Parameters

0-1440: regeneration interval of RADIUS, ranging from 0-1440 minutes, defaults to 0

Description

radius-server deadtime: command is used to configure the interval between the radius unreachable is restored to reachable.

no radius-server deadtime: command is used to delete the interval.

By default, the regeneration interval is 0.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#radius-server deadtime 5
```

25.21 RADIUS Server

Command

radius-server host <HOSTNAME> **{key** STRING **| auth-port** PORTNO **| timeout** SEC **| retransmit** RETRIES**}**

no radius-server host <HOSTNAME> **(auth-port** PORTNO **|)**

View

Configure Mode

Default Level

2: Configuration level

Parameters

hostname: IP address or host name of RADIUS server

STRING: Shared key with RADIUS server

PORTNO: UDP port of RADIUS authentication, the value range is 0-65535

SEC: timeout interval of RADIUS server, value range is 1-1000, the default value is 5 seconds

RETRIES: the number of times the RADIUS server retransmits over the timeout，the value range is 1-100, which is 3 times by default

Description

radius-server host: command is used to configure the RADIUS server.

no radius-server host: command is used to configure the RADIUS server.

By default, theRADIUS server is not configured.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#radius-server host 192.168.1.100 key 123456
auth-port 1812
```

26 Alarm Configuration

26.1 Enable Port Alarm

Command

system alarm enable

View

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

Default Level

2: Configuration level

Parameters

-

Description

Enabling port up/down the alarm light on the panel will be lit immediately when the port down occurs. When the port up occurs, the alarm light on the panel will be turned off. By default, it is turned off. However, the warning light will also be turned on when the power alarm is enabled, so it is recommended not to turn them on at the same.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge 1
Switch(config-ge1)#system alarm enable
```

26.2 Disable Port Alarm

Command

system alarm disable

View

ge (Gigabit Ethernet) port view

xe (10 Gigabit Ethernet) port view

Default Level

2: Configuration level

Parameters

-

Description

Enabling port up/down the alarm light on the panel will be lit immediately when the port down occurs. When the port up occurs, the alarm light on the panel will be turned off. By default, it is turned off. However, the warning light will also be turned on when the power alarm is enabled, so it is recommended not to turn them on at the same.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge 1
Switch(config-ge1)#system alarm disable
```

26.3 Enable Power Alarm

Command

power <1-2> **alarm enable**

View

Configure Mode

Default Level

2: Configuration level

Parameters

<1-2>: means power supply 1, 2

Description

Enabling power<1-2>alarm, light on the panel will be lit immediately when the port is down. When power is specified to up, the alarm light on the panel will be turned off. By default, it is turned off. However, the warning light will also be turned on when the port alarm is enabled, so it is recommended not to turn them on at the same.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#power 1 alarm enable
```

26.4 Power off Warning

Command

power <1-2> **alarm disable**

View

Configure Mode

Default Level

2: Configuration level

Parameters

<1-2>: means power supply 1, 2

Description

Enabling power<1-2>alarm, light on the panel will be lit immediately when the port is down. When power is specified to up, the alarm light on the panel will be turned off. By default, it is turned off. However, the warning light will also be turned on when the port alarm is enabled, so it is recommended not to turn them on at the same.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#power 1 alarm disable
```

27 RMON Configuration

27.1 RMON Alarm Group

Command

```
rmon alarm <Index> <alarm-variable> interval <Seconds> {absolute
| delta} rising-threshold <RISING_THRES> event <event_Index>
falling-threshold <FALL_THRES> event <event_Index> ( owner
<name>|)
no rmon alarm <Index>
```

View

Configure Mode

Default Level

2: Configuration level

Parameters

Index: warning group index, the range is 1-65535.

alarm-variable: the format is etherStatsEntry.n.n

Seconds: sampling time interval ranging from 1-4294967295

Delta: sampling type is variable value (the current sample value of the selected variable relative to the last sample value)

absolute: the sampling type is absolute.

rising-threshold RISING_THRES: upper threshold, the value range is 0 ~ 2147483647.

event_Index: index of event groups corresponding to the upper threshold, the range is 1-65535.

falling -threshold FALL_THRES: lower threshold, the value range is 0 ~ 2147483647.

event_Index: index of event groups corresponding to the lower threshold, the range is 1-65535.

name: character string, creator of the row.

Description

rmon alarm: command is used to configure alarm group.

no rmon alarm: command is used to delete alarm group.

By default alarm group is not configured.

The alarm variable format support string format (not OID format), formats are etherStatsEntry. integer. instance or etherStatsString.instance, integer the range is 1-21, corresponding to the etherStatsString below respectively.

etherStatsString supports the following:

"etherStatsIndex"

"etherStatsDataSource"

"etherStatsDropEvents"

"etherStatsOctets"

"etherStatsPkts"

"etherStatsBroadcastPkts"

"etherStatsMulticastPkts"

"etherStatsCRCAlignErrors"

"etherStatsUndersizePkts"

"etherStatsOversizePkts"

"etherStatsFragments"

"etherStatsJabbers"

"etherStatsCollisions"

"etherStatsPkts64Octets"

"etherStatsPkts65to127Octets"

"etherStatsPkts128to255Octets"

"etherStatsPkts256to511Octets"

"etherStatsPkts512to1023Octets"

"etherStatsPkts1024to1518Octets"

"etherStatsOwner"

"etherStatsStatus"

Instance is an interface index.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#rmon alarm 1 etherStatsIndex.1 interval 20 delta
rising-threshold 200 event 1 falling-threshold 20 event 1
```

27.2 RMON Statistical Group

Command

rmon collection stats <INDEX>

no rmon collection stats <INDEX>

View

Interface Mode

Default Level

2: Configuration level

Parameters

INDEX:statistics group Index, the range is 1-65535.

Description

rmon collection stats: command is used to configure the port statistics group.

no rmon collection stats: command is used to cancel the port statistics group.

The port is not configured with statistics group by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#rmon collection stats 1
```

27.3 RMON History Group

Command

rmon collection history <INDEX> **{buckets** <NUMBER> **| interval** <SECONDS> **| owner** <NAME> **| }**

no rmon collection history <INDEX>

View

Interface Mode

Default Level

2: Configuration level

Parameters

INDEX: statistics group index, the range is 1-65535.

NUMBER: set the historical table capacity corresponding to the history group, ranging from 1-65535.

SECONDS: set the historical group statistical cycle value in the range of 1-3600 Seconds.

NAME: creator of the row

Description

rmon collection history: command is used to configure the port history group.

no rmon collection stats: command is used to delete the port statistics group.

The port is not configured with history group by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#interface ge1
Switch(config-ge1)#rmon collection history 1 buckets 10 interval 60
```

27.4 RMON Event Group

Command

rmon event <INDEX> **{description** <STRING> **| log | trap** <COMMUNITY>**}** **(owner** <NAME> **|)**

no rmon event <INDEX>

View

Interface Mode

Default Level

2: Configuration level

Parameters

INDEX：event group index, the range is 1-65535.

Log: log events. When events are triggered, the system logs them.

STRING: event description.

COMMUNITY: Trap event. When the event is triggered, the system will send it with community as the group name.

NAME: creator of the row

Description

rmon event: command is used to configure the event group.

no rmon event: command is used to cancel the event group.

The port is not configured with event group by default.

Instance

```
Switch> enable
Switch#configure terminal
Switch(config)#rmon event 2 log
```

27.5 Display RMON Alarm Group Information

Command

show rmon alarm

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show rmon alarm: command is used to display alarm group information.

Instance

```
Switch> enable
Switch#show rmon alarm
 alarm Index = 1
alarm status = VALID
       alarm Interval = 20
       alarm Type is Delta
       alarm Value  = 0
       alarm Rising Threshold = 200
       alarm Rising Event = 1
       alarm Falling Threshold = 20
       alarm Falling Event = 1
       alarm Owner is RMON_SNMP

 alarm Index = 2
alarm status = VALID
       alarm Interval = 20
       alarm Type is Delta
       alarm Value  = 0
       alarm Rising Threshold = 200
       alarm Rising Event = 1
```

```
alarm Falling Threshold = 20
alarm Falling Event = 1
alarm Owner is RMON_SNMP
```

27.6 Display RMON Statistics Information

Command

show rmon statistics

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show rmon statistics: command is used to display statistics group information.

Instance

```
Switch> enable
Switch#show rmon statistics
    rmon collection index 1
    stats->ifindex = 5002
    input packets 00, bytes 00, dropped 00, multicast packets 00
    output packets 00, bytes 3406566434058944, multicast packets
00 broadcast packets 00
```

27.7 Display RMON History Group Information

Command

show rmon history

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show rmon history: command is used to display history group information.

Instance

```
Switch> enable
Switch#show rmon history
       history index = 1
       data source ifindex = 5002
       buckets requested = 50
       buckets granted = 50
       Interval = 1800
       Owner RMON_SNMP
```

27.8 Display RMON Event Group Information

Command

show rmon event

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show rmon event: command is used to display event group information.

Instance

```
Switch> enable
Switch#show rmon event
 event Index = 1
      Description RMON_SNMP
       Event type Log
      Last Time Sent = 07:43:20
      Owner  RMON_SNMP
```

28 Log Configuration

28.1 Log File Size Limit

Command

log file size <10-10000>

no log file size

View

Configure Mode

Default Level

2: Configuration level

Parameters

<10-10000>：log file size, the unit is KB.

Description

log file size: the command is used to set the maximum size of logfile in KB.

no log file size: the command is used to delete the setting of logfile size and restore it to the default size, namely 2M.

Instance

```
Configure the logfile size to 5M
Switch> enable
Switch#configure terminal
Switch(config)#log file size 5000

Delete settings of logfile size
Switch> enable
Switch#configure terminal
Switch(config)#no log file size
```

28.2 Log stdout Display

Command

log stdout

no log stdout

View

Configure Mode

Default Level

2: Configuration level

Parameters

No.

Description

log stdout: the command is used to open the switch and display the log information in stdout.

no log stdout: the command is used to close the switch and not to display the log information in stdout.

Instance

```
Configure to open the log information  displayed in stdout
Switch> enable
Switch#configure terminal
Switch(config)#log stdout

close the log information displayed in stdout
Switch> enable
Switch#configure terminal
Switch(config)#no log stdout
```

28.3 LogInformation Highest Display Level

Command

Log trap (alerts | critical | debugging | emergencies | errors | informational | notifications | warnings)

no log trap

View

Configure Mode

Default Level

2: Configuration level

Parameters

No.

Description

log trap: the command sets the maximum display level of log information.

no log trap: the command is used to remove the settings for the highest display level of log information and restore it to the default level, which is the "debug" level.

Instance

```
# set the log information for the highest level "informational"
Switch> enable
Switch#configure terminal
Switch(config)#log trap informational

Delete the highest level Settings for log information
Switch> enable
Switch#configure terminal
Switch(config)#no log trap
```

28.4 Log Level Record Display

Command

log record-priority
no log record-priority

View

Configure Mode

Default Level

2: Configuration level

Parameters

No.

Description

log record-priority: the command is used to open the level of log information, that is, to display the information according to the level of log information.

no log record-priority: the command is used to close the level of log information, and all log information is unified as debug level.

Instance

```
Configure to open log information record-priority
Switch> enable
Switch#configure terminal
Switch(config)#log record-priority

Close log information record-priority
Switch> enable
Switch#configure terminal
Switch(config)#no log record-priority
```

28.5 Syslog Server Download Log

Command

log syslog server <A.B.C.D> [<PORT>]
no log syslog server

View

Configure Mode

Default Level

2: Configuration level

Parameters

A.B.C.D：syslog server IP address
PORT: The port used by the syslog server.

Description

log syslog server: the command is used to set the IP address of the remote syslog server. After executing the command, the log information of the system will be sent to the syslog server with the specified IP address for processing remotely. The parameter A.B.C.D specifies the IP address used by the syslog server, and the parameter PORT specifies the port used by the syslog server.
no log syslog server: the command is used to delete the configuration of the remote syslog server. After executing the command, the system will no longer send log information to any remote syslog server, but only save the log information locally.

Instance

```
# configuration sends log information to syslog server 192.168.1.1
on port 8848
Switch> enable
Switch#configure terminal
Switch(config)#log syslog server 192.168.1.1 8848

#Disable the log sending function to the remote syslog server
Switch> enable
Switch#configure terminal
Switch(config)#no log syslog
```

29 NTP Configuration

29.1 NTP server

Command

ntp server <A.B.C.D>
no ntp server <A.B.C.D | **all**>

View

Configure Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: ntp server IP address.

Description

ntp server <A.B.C.D>: used to configure the IP address of ntp server and start the ntp service. The default ntp service is not enabled. Only one ntp server is currently supported.

no ntp server <A.B.C.D/all> : delete the configured ntp server IP address and disable the ntp service. A.B.C.D is the address of the NTP server that need to be deleted. Since the system currently supports at most one ntp server IP configuration, the two forms of this command achieve the same effect: delete all ntp server IP addresses and disable the ntp service.

Instance

```
# Enable ntp service and configure ntp server ip to 192.168.1.1
Switch> enable
Switch#configure terminal
Switch(config)#ntp server 192.168.1.1
```

Delete all configured ntp server IP and disable the ntp service (1)

```
Switch> enable
Switch#configure terminal
Switch(config)#no ntp server 192.168.1.1
```

Delete all configured ntp server IP and disable the ntp service (2)

```
Switch> enable
Switch#configure terminal
Switch(config)#no ntp server all
```

30 Network Diagnose Configuration

30.1 Ping Test

Command

ping WORD
ping ip WORD
ping ipv6 WORD
ping

View

Privileged Exec Mode

Default Level

1: View level

Parameters

WORD: the connected destination IP address that needs to be checked.

Ipv6: supported ipv6.

Description

-

Instance

```
Switch> enable
Switch#ping 192.168.1.188
PING 192.168.1.188 (192.168.1.188): 56 data bytes
64 bytes from 192.168.1.188: seq=0 ttl=128 time=1.493 ms
64 bytes from 192.168.1.188: seq=1 ttl=128 time=13.077 ms

--- 192.168.1.188 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 1.493/7.285/13.077 ms
```

```
*Switch#ping ipv6 fe80::01 (Ipv6 address needs to be configured
to fe80::02/64)
Output Interface: vlanif1
PING fe80::01 (fe80::1): 56 data bytes
64 bytes from fe80::1: seq=0 ttl=128 time=0.536 ms
64 bytes from fe80::1: seq=1 ttl=128 time=0.483 ms

--- fe80::01 ping statistics ---
2 packets transmitted, 2 packets received, 0% packet loss
round-trip min/avg/max = 0.483/0.509/0.536 ms
```

30.2 TracerouteTest

Command

traceroute ip WORD
traceroute ipv6 WORD

View

Privileged Exec Mode

Default Level

1: View level

Parameters

WORD：the connected destination IP address that needs to be checked.

Ipv6: supported ipv6.

Description

-

Instance

```
Switch> enable
Switch#traceroute ip 192.168.1.254
traceroute to 192.168.1.254 (192.168.1.254), 30 hops max, 38 byte
packets
 1  192.168.1.254 (192.168.1.254)  0.036 ms  0.033 ms  0.013 ms

*Switch#traceroute ipv6 fe80::01 (Ipv6 address needs to be
configured to fe80::02/64 )
Output Interface: vlanif1
traceroute to fe80::01 (fe80::1), 30 hops max, 16 byte packets
 1  fe80::1 (fe80::1)  1.144 ms  0.440 ms  0.346 ms
```

30.3 Port Loopback

Command

```
loopback IFNAME internal mac
loopback IFNAME internal phy
no loopback IFNAME internal
```

View

Privileged Exec Mode

Default Level

1: View level

Parameters

IFNAME: Specify the name of test port.

Internal: represents an internal ring test.

mac/phy: the loop need to test is in the MAC layer or phy layer

Description

When the port loopback test is enabled, the port link light will be on, no execution will cancel the test, and the port link light will be off.

Instance

```
Switch> enable
Switch#loopback ge1 internal mac
Switch#no loopback ge1 internal
```

31 System Management

31.1 Device Information Display

31.1.1 Display System Version

Command

show version

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

-

Description

show version: the command displays the current system version information.

Instance

```
# Display System Current Version Information
Switch> enable
Switch#show version
```

31.1.2 Display Product Information

Command

show product-info [<NAME>]

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

NAME: product information name, no parameters by default.

Description

show product-info [<NAME>]: the command is used to display the product information value of the given name, and all product information will be displayed when no parameters are provided.

Instance

```
# Display Product Information:
Switch> enable
Switch(config)#show product-info
```

31.2 System Software Upgrade

Command

copy tftp package <A.B.C.D> <WORD>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D:tftp server ip address.

WORD: the name of the upgrade file

Description

copy tftp package: the command is used to upgrade the system software, in which the parameter A.B.C.D is the IP address of the tftp server, and WORD is the file name of “xxx.bin” for upgrade.

When files are uploaded and downloaded, the tftpd32 software can be used as the tftp server on the PC. When a file is transferred, make sure the TFTP server is open and the file path is correct.

Instance

```
# Upgrade system WWW and product information
Switch> enable
Switch#copy tftp package 192.168.1.1 packetweb.bin

# Upgrade System Software
Switch> enable
Switch#copy tftp package 192.168.1.1 packetapp.bin
```

31.3 Configuration File Import and Export

31.3.1 Import Configuration File

Command

copy tftp startup-config <A.B.C.D> <WORD>

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: tftp server ip address

WORD: the name of the upgraded configuration file

Description

copy tftp startup-config: the command is used to upgrade the system configuration file, in which the parameter A.B.C.D is the IP address of the tftp server, and WORD is the name of the configuration file used for the upgrade.

Instance

```
# Upgrade System Configuration File
Switch> enable
Switch#copy tftp startup-config 192.168.1.1 SWOS.conf
```

31.3.2 Configure File Export

Command

copy flash startup-config <A.B.C.D> (WORD|)

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D： tftp server ip address.

WORD：The name of the upgraded configuration file.

Description

copy tftp startup-config: the command is used to download starp-config files to the tftp server, in which the parameter A.B.C.D is the IP address of the tftp server, and WORD is the file name used when saving to the tftp server.

Instance

```
# upload startup-config to tftp server "192.168.1.1" and name it
"SWOS.conf”
Switch> enable
Switch#copy flash startup-config 192.168.1.1 SWOS.conf
```

31.4 Log File Export

Command

copy flash logfile <A.B.C.D> (WORD|)

View

Privileged Exec Mode

Default Level

2: Configuration level

Parameters

A.B.C.D: tftp server ip address.

WORD: the name of the upgraded configuration file.

Description

copy flash logfile: the command is used to download logfile to the tftp server, in which the parameter A.B.C.D is the IP address of the tftp server, and WORD is the file name used when saving to the tftp server.

Instance

```
# download logfile to tftp server "192.168.1.1" and name it
"message.log”
Switch> enable
Switch#copy flash logfile 192.168.1.1 message.log
```

31.5 Save Configuration

Command

copy running-config startup-config
write
do write

View

Privileged Exec Mode

Any

Default Level

2: Configuration level

Parameters

No.

Description

copy running-config startup-config: the command is used to cover the startup-config file with running-config, that is, to save running-config. Running-config is the configuration file that is currently running, and startup-config is the configuration file that is currently saved. copy running-config startup-config is to execute a "write" and save the configuration file.

do write: command can perform the save configuration in any mode (except Privileged Exec Mode).

Instance

```
# Save running-config
Switch> enable
Switch#copy running-config startup-config
#or
Switch> enable
*Switch#configure terminal
Switch(config)#do write
Building Configuration...
```

```
[OK]
```

31.6 Reboot the Device.

Command

reboot

View

Privileged Exec Mode

Default Level

1: View level

Parameters

-

Description

Reboot the device

Instance

```
Switch> enable
Switch#reboot
reboot system? (y/n): y
```

31.7 Restore Factory Settings

Command

erase startup-config
rm startup-config

View

Privileged Exec Mode

Default Level

1: Configuration level

Parameters

-

Description

Delete current configuration file.

Instance

```
Switch> enable
```

```
Switch#erase startup-config
erase startup-config ? (y/n): y
Switch#reboot
```