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Chapter 1 Commands for MPLS

1.1 mpls egress-ttl

Command: mpls egress-ttl <0-255>
no mpls egress-ttl

Function: Set the TTL value of IP messages through the egress LSR of LSP; the no operation will cancel the configured value.

Parameters: <0-255>: the TTL value.

Default: None.

Command Mode: Global Mode

Usage Guide: The egress-ttl configuration of the LSR will be the TTL of all IP messages forwarded through this egress LSR.

Example: Set the egress TTL as 45.

Switch#config terminal

Switch(config)#mpls egress-ttl 45

Related Commands: mpls ingress-ttl

1.2 mpls enable

Command: mpls enable
no mpls enable

Function: Enable mpls protocol; the no command will disable the protocol.

Parameters: None.

Default: The mpls protocol is disabled by default.

Command Mode: Global Mode.

Usage Guide: Implementing this command will enable the mpls protocol.

Example:

Switch(config)#mpls enable

1.3 mpls ingress-ttl

Command: mpls ingress-ttl <0-255>
no mpls ingress-ttl

Function: Set the TTL value of IP messages through the ingress LSR of LSP; the no operation will cancel the configured value.

Parameters: <0-255>: the TTL value.

Default: None.

Command Mode: Global Mode

Usage Guide: The ingress-ttl configuration of the ingress LSR will be the TTL value in the top label of all MPLS messages entering this LSP through the LSP ingress router.

Example: Set the ingress TTL as 45.

Switch#config terminal

Switch(config)#mpls ingress-ttl 45

Related Commands: mpls egress-ttl

1.4 show mpls

Command: show mpls

Function: Display all label data.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display all label data.

Example: Display all label data.

Switch#show mpls

Minimum label configured: 16

Maximum label configured: 1048575

Per label-space information:

Label-space 0 is using minimum label: 16 and maximum label: 1048575

Custom ingress TTL configured: none

Custom egress TTL configured: none

Display	Explanation
Minimum label configured	The configured minimum label
Maximum label configured	The configured maximum label
Per label-space information	The space information of each label
Label-space 0 is using minimum label	The minimum label can be used by label-space 0.
Label-space 0 is using maximum label	The maximum label can be used by label-space 0.
Custom ingress TTL configured	The ingress TTL configured by users
Custom egress TTL configured	The egress TTL configured by users

1.5 show mpls enable

Command: show mpls enable

Function: Display whether the mpls is enabled.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display whether the mpls is enabled.

Example: Display whether the mpls is enabled.

```
Switch#show mpls enable
```

```
Switch#MPLS enable has been on
```

Related Commands: mpls enable

1.6 show mpls forwarding-table

Command: show mpls forwarding-table

Function: Display the information of all LSP created by the switch as an ingress router, and FTN (FEC to Next-Hop-Label-Forwarding-Entry) marked as selected.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display the information of all LSP created by the switch as an ingress router, and FTN marked as selected.

Example: Display the information of all LSP created by the switch as an ingress router.

```
Switch#show mpls forwarding-table
```

Codes: > - selected FTN, B - BGP FTN, C - CR-LDP FTN, K - CLI FTN,

L - LDP FTN, R - RSVP-TE FTN, S - SNMP FTN, U - unknown FTN

```
Code FEC          FTN-ID  Pri Nexthop      Out-Label  Out-Intf
L>  200.200.1.2/32  1      Yes 202.200.1.1   640       Vlan3
L>  202.200.1.0/24  2      Yes 0.0.0.0       3         Vlan3
L>  202.200.2.0/24  3      Yes 202.200.1.1   3         Vlan3
```

Display	Explanation
Code	Type
FEC	The FEC Address
FTN-ID	The FTN ID
Pri	The Primary lsp label
Nexthop	The next-hop address
Out-Label	The Out label
Out-Intf	The Out interface

1.7 show mpls ftn-table brief

Command: show mpls ftn-table brief

Function: Display brief information of public network FTN routers created by MPLS on the switch.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display brief information of public network FTN routers created by MPLS on the switch.

Example:

```
Switch#show mpls ftn-table brief
                        FTN Entry Brief Information
```

```
-----
FEC      Out-Label Out-intf  Next hop   Oper-code  Op-State  Vrf
100.1.1.0/24  3   Vlan10  0.0.0.0   Push      Up       0
```

1.8 show mpls ftn-table detail

Command: show mpls ftn-table detail

Function: Display detailed information of public network FTN router created by MPLS on the switch.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display detailed information of public network FTN routers created by MPLS on the switch.

Example:

```
Switch#show mpls ftn-table detail
```

```
-----
FTN ID      : 1
VrfIndex    : 0
Fec         : 100.1.1.0/24
Nexthop addr : 0.0.0.0
Owner       : LDP
Primary     : Yes
Row Status   : Active
Exp-bits    : 0X0
Incoming DSCP : none
Tunnel ID   : 0
Protected LSP id : 0
QoS Resource id : 0
In-Label    : 0
In-Interface : N/A
Out-Label   : 3
Out-Interface : Vlan10
Admin Status : Up
Oper Status  : Up
```

Oper Code : Push

Display	Explanation
FTN ID	The FEC ID
VrflIndex	The Vrf Index
Fec	The Fec Address
Nexthop addr	The next-hop address
Owner	The protocol creating the cross-link table
Primary	Whether it is primary or not.
Row Status	The Row status
Exp-bits	The experiment bits
Incoming DSCP	Differentiated Services CodePoint.
Tunnel ID	The Tunnel ID
Protected LSP id	The id of protected LSP
QoS Resource id	The ID of Qos Resource
in label	The in label
In-Interface	The in interface
Out-Label	The out label
Out-Interface	The out interface
Admin Status	The administration status
Oper Status	The operation status
Oper Code	The operation code

1.9 show mpls ilm-table

Command: show mpls ilm-table

Function: Display the information of ILM routers created by MPLS on the switch.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display the information of ILM routers created by MPLS.

Example:

```
Switch#show mpls ilm-table
```

```
In-Label Out-Label In-Intf Out-Intf Nexthop FEC
640 3 Vlan1 Vlan2 24.1.1.2 2.2.2.2/32
641 3 Vlan2 Vlan1 14.1.1.1 1.1.1.1/32
```

Display	Explanation
In-Label	The in label
Out-Label	The out label
In-Intf	The in interface

Out-Intf	The our interface
Nexthop	The next-hop address
FEC	The fec address

1.10 show mpls vrf-table

Command: show mpls vrf-table [vrf-name]

Function: Display the detailed information of all configured VRP ingresses.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display the detailed information of all configured VRP ingresses. If there is a specified VRF in the parameter, only details about this ingress will be displayed.

Example:

Switch#show mpls vrf-table

Output for VRF table with id: 1

```

-----
FTN ID      : 1
VrfIndex    : 1
Fec         : 10.1.1.0/24
Nexthop addr : 0.0.0.0
Owner       : BGP
Primary     : Yes
Row Status   : Active
Exp-bits    : 0X0
Incoming DSCP : none
Tunnel ID   : 0
Protected LSP id : 0
QoS Resource id : 0
In-Label    : 0
In-Interface : N/A
Out-Label   : 0
Out-Interface : Vlan20
Admin Status : Up
Oper Status  : Up
Oper Code   : Deliver to IP
    
```

Display	Explanation
FTN ID	The FEC ID

VrfIndex	The Vrf Index
Fec	The Fec address
Nexthop addr	The next-hop address
Owner	The protocol creating the cross-link table
Primary	Whether it is primary or not
Row Status	The row status
Exp-bits	The experiment bits
Incoming DSCP	Differentiated Services CodePoint.
Tunnel ID	The tunnel ID
Protected LSP id	The ID of protected LSP
QoS Resource id	The ID of Qos resource
in label	The in label
In-Interface	The in interface
Out-Label	The out label
Out-Interface	The out interface
Admin Status	The administration status
Oper Status	The operation status
Oper Code	The operation code

Chapter 2 LDP

2.1 advertisement-mode

Command: advertisement-mode {downstream-on-demand | downstream-unsolicited}

no advertisement-mode {downstream-on-demand | downstream-unsolicited}

Function: Configure the advertisement mode of labels; the no operation will cancel the configuration.

Parameters: None.

Default: Downstream-unsolicited mode

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: The LDP label advertisement mode determines how the LDP protocol handles the label advertisement. The protocol supports two modes: the first one is downstream-on-demand, which means, only when the upstream propose a label request, will the switch advertise a label to it; the other one is downstream-unsolicited, which means, the switch will allocate labels for all upstreams no matter they need one or not. It is recommended to use this mode together with the label retention modes and label control modes: the downstream-unsolicited mode corresponds with the liberal retention mode and the liberal mode, while the downstream-on-demand mode with the conservative retention mode and the ordered mode. It is better not to configure other attributes separately. If the interface is in the label advertisement mode, this command will have no effect.

Example: Configure the label advertisement mode as downstream-unsolicited.

```
Switch(config)#router ldp
```

```
Switch(config-router)#advertisement-mode downstream-on-demand
```

Related Commands: ldp advertisement-mode, label-retention-mode, ldp label-retention-mode

2.2 clear ldp adjacency

Command: clear ldp adjacency {<ip-addr>|*}

Function: Cancel the LDP adjacency.

Parameters: <ip-addr> is the adjacent IP address, * means to clear all adjacencies.

Default: None.

Command Mode: Admin Mode.

Usage Guide: Implementing this command will clear the adjacency between the switch and its neighbor. With all configurations staying the same, the switch will recreate an adjacency with the neighbor through negotiation.

Example: Clear the adjacency with the neighbor 10.10.10.1.

```
Switch#clear ldp adjacency 10.10.10.1
```

2.3 clear ldp session

Command: `clear ldp session {<ip-addr> | *}`

Function: Clear LDP sessions.

Parameters: <ip-addr> is the IP address of the neighbor, * means to clear all sessions.

Default: None.

Command Mode: Admin Mode

Usage Guide: Implementing this command will clear session procedures. With all configurations staying the same, the switch will restart the session again. Please pay attention to the relationship between session and adjacency: multiple adjacencies may be created in one session.

Example:

```
Switch#clear ldp session *
```

2.4 clear ldp statistics

Command: `clear ldp statistics`

Function: Clear the LDP statistics.

Parameters: None.

Default: None.

Command Mode: Admin Mode.

Usage Guide: Implementing this command will clear all statistics.

Example:

```
Switch#clear ldp statistics
```

2.5 control-mode

Command: `control-mode {ordered | independent}`
`no control-mode`

Function: Configure the LSP control mode; the no operation will cancel the configuration.

Parameters: None.

Default: The default mode is "independent".

Command Mode: LDP Protocol Configuration Mode

Usage Guide: LSP provides two different control modes: independent and ordered. The independent mode means that, there is no need to acquire a label map of the FEC from the downstream, which is required in the ordered mode when a LSR is advertising to the upstream a label map related with the specified FEC (unless this LSR is the egress

router of this FEC). Hop-by-hop route applications usually work in the independent LSP control mode, and choose DU mode as the label advertisement mode. The ordered mode should be used along with the DoD mode.

Example: Configure the LSPcontrol mode to ordered.

```
Switch(config)#router ldp
```

```
Switch(config-router)#control-mode ordered
```

Related Commands: advertisement-mode, ldp advertisement-mode

2.6 debug ldp all

Command: debug ldp all

no debug ldp all

Function: Display all debug information related with LDP; when it is disabled, all debug switches will be disabled too.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Example: Enable all debug switches.

```
Switch#debug ldp all
```

```
Switch#
```

2.7 debug ldp dsm

Command: debug ldp dsm

no debug ldp dsm

Function: Display debug information related with the LDP downstream state machine; the no operation will disable the debug information.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Implementing this command will display the debug information related with the LDP downstream state machine. With it is enabled, debug information will be displayed when any the LDP protocol change related with the downstream state machine happens.

Example: Enable the debug switch.

```
Switch#debug ldp dsm
```

```
Switch#
```

2.8 debug ldp error

Command: debug ldp error

no debug ldp error

Function: Display debug information of LDP errors; the no operation will disable the debug information.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: When there is any LDP error, corresponding debug information will be displayed with this command enabled.

Example: Enable the debug switch.

```
Switch# debug ldp error
```

```
Switch#
```

2.9 debug ldp events

Command: debug ldp events

no debug ldp events

Function: Display debug information of LDP events; the no operation will disable the debug information.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: With this command enabled, the corresponding debug information of LDP events will be displayed.

Example: Enable the debug switch.

```
Switch# debug ldp events
```

```
Switch#
```

2.10 debug ldp fsm

Command: debug ldp fsm

no debug ldp fsm

Function: Display debug information related with the LDP session finite state machine; the no operation will disable the debug information.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Enable (Disable) the debug information related with the LDP session finite state machine.

Example: Enable the debug switch.

```
Switch# debug ldp fsm
```

```
Switch#
```

2.11 debug ldp hexdump

Command: debug ldp hexdump
no debug ldp hexdump

Function: Display the debug information of LDP messages in hex; the no operation will disable the debug information.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Enable (Disable) the hex debug information of received and sent LDP message contents.

Example: Enable the debug switch
Switch#debug ldp hexdump
Switch#

2.12 debug ldp nsm

Command: debug ldp nsm
no debug ldp nsm

Function: Enable the debug information switch of the message communication between NSM and LDP; the no operation will disable the switch.

Parameters: None.

Default: No display of the debug information.

Command Mode: Admin Mode.

Usage Guide: Enable (Disable) the debug information of NSM, mainly including interface changes, route changes, entry distribution and etc.

Example: Enable the debug switch
Switch#debug ldp nsm

2.13 debug ldp packet

Command: debug ldp packet [receive|send|detail]
no debug ldp packet [receive|send|detail]

Function: Display the debug information of LDP messages; the no operation will disable the switch.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Enable (Disable) the debug information of LDP receiving and sending messages. All information about sending and receiving messages will be displayed with the switch enabled while no such information will be printed. receive|send|detail

separately means information of receiving/sending and detailed information.

Example: Enable the debug switch.

```
Switch#debug ldp packet receive
```

2.14 debug ldp timer

Command: `debug ldp timer`

`no debug ldp timer`

Function: Display the debug information of the LDP timer; the no operation will disable the switch.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: The debug information of the LDP timer will be displayed with this command enabled.

Example: Enable the debug switch.

```
Switch#debug ldp timer
```

2.15 debug ldp tsm

Command: `debug ldp tsm`

`no debug ldp tsm`

Function: Display the debug information of the LDP state machine.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Implementing this command will display the debug information of the LDP state machine.

Example: Enable the debug switch.

```
Switch#debug ldp tsm
```

2.16 debug ldp usm

Command: `debug ldp usm`

`no debug ldp usm`

Function: Display the debug information of the LDP upstream state machine.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Implementing this command will display the debug information of the LDP upstream state machine.

Example: Enable the debug switch.

```
Switch#debug ldp usm
```

2.17 ldp {enable|disable}

Command: ldp {enable|disable}

Function: Enable the LDP protocol on the interface.

Parameters: None.

Default: The LDP is disabled.

Command Mode: Interface Mode.

Usage Guide: The LDP protocol is a label switching protocol used when switching labels in the public network, which usually works in a BGP VPN environment. “router ldp” is used to globally enable the LDP protocol, however, in interfaces where the protocol is actually working, implementing “ldp enable” in the interface configuration mode is required, so does enabling Label-switching, which, in combination with this command, work as a whole to ensure the normal operation of the protocol.

Example:

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp enable
```

Related Commands: router ldp, label-switching

2.18 global-merge-capability

Command: global-merge-capability {merge-capable|non-merge-capable }

no global-merge-capability {merge-capable|non-merge-capable }

Function: Enable or disable globally the LDP label merging capability; the no operation will restore the default value.

Parameters: None.

Default: Enable the label merging capability globally.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: The LSP map multiple in-labels to the same FEC, corresponding with the same out-label and out-interface, in which case, when packets with different labels enter the LSR, the output packets will bear the same label. This procedure is called label merging. If the label-merging capability on the interface changes, the switch will reboot.

Example:

```
Switch(config)#router ldp
```

```
Switch(config-router)#global-merge-capability non-merge-capable
```

2.19 hello-interval

Command: hello-interval <hello-interval>

no hello-interval

Function: Set the global time interval between hello messages; the no operation will restore the default value.

Parameters: *<hello-interval>* is the time interval between hello messages, ranging from 1 to 65535 seconds.

Default: 5s.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: LDP discovers its neighbors and keeps the communication with them through multicast Hello. Implementing this command will set the time interval of sending hello messages. Please pay attention to the relationship between it and the hold-time. It is better to set a value no greater than 1/3 of the latter. When the interface is configured with Hello-interval, the global configuration will have no effect on it.

Example: Configure the hello-interval as 10:

```
Switch(config)#router ldp
```

```
Switch(config-router)#hello-interval 10
```

Related Commands: hold-time, ldp hello-interval, ldp hold-time

2.20 hold-time

Command: hold-time *<hold-time>*

no hold-time

Function: Configure the hold-time of LDP multicast peers, whose default value is 15 seconds; the no operation will restore the default value.

Parameters: *<hold-time>* is the hold-time of multicast peer, ranging from 1 to 65535 seconds

Default: 15s.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: LDP discovers its neighbors and keeps in communication with them through multicast Hello. Implementing this command will set the time interval of sending hello messages. Please pay attention to the relationship between it and the hello-interval. It is better to set a value at least three times as long as the latter. When the interface is configured with Hold-interval, the global configuration will have no effect on it.

Example: Configure the hold-time as 50:

```
Switch(config)#router ldp
```

```
Switch(config-router)#hold-time 50
```

Related Commands: hello-interval, ldp hold-time, ldp hello-interval

2.21 import-bgp-routes

Command: import-bgp-routes

no import-bgp-routes

Function: Configure to import BGP routes; the “no” operation will restore the default

configuration.

Parameters: None.

Default: LDP doesn't import BGP routes by default.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: In common cases, LDP finds routes in the route table of the system. But there are exceptions where it doesn't import default routes or BGP routes. Importing the default routes may cause disorder, so it is forbidden in any case. If the users can make sure the security, then they can import BGP routes through this command and allocate labels for them.

Example: Import BGP routes and set the import route labels.

```
Switch(config)#router ldp
```

```
Switch(config-router)#import-bgp-routes
```

2.22 keepalive-interval

Command: `keepalive-interval <interval>`
`no keepalive-interval`

Function: Configure the interval between LDP keep-alive messages, whose default value is 10 seconds; the no operation will restore the default value.

Parameters: <interval> is the interval between keep-alive messages, ranging from 1 to 65535 seconds.

Default: 10s.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: LDP will send keepalive messages to each other for keeping the communication, if there is no data after the creation of a TCP session. Implementing this command will set the interval of sending keepalive messages. Please make sure the value is big enough to prevent too many keepalive messages. When this value is configured on the interface, the global configuration command will lose effect.

Example: Configure the global keepalive-interval as 50s.

```
Switch(config)#router ldp
```

```
Switch(config-router)#keepalive-interval 50
```

Related Commands: `keepalive-timeout`, `ldp keepalive-interval`

2.23 keepalive-timeout

Command: `keepalive-timeout <time-val>`
`no keepalive-timeout`

Function: Configure the timeout value of LDP sessions, whose default value is 30 seconds; the no operation will restore the default value.

Parameters: <time-val> is the timeout value of LDP sessions, ranging from 1 to 65535 seconds.

Default: 30s.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: LDP will send keepalive messages to each other for keeping the communication, if there is no data after the creation of a TCP session. Without receiving a keepalive message within the timeout period set by this command, the connection will be treated as disconnected. Usually this value should be at least three times as long as the keepalive interval. When this value is configured on the interface, the global configuration command will lose effect.

Example: Configure the global timeout value.

```
Switch(config)#router ldp
```

```
Switch(config-router)#keepalive-timeout 50
```

Related Commands: `keepalive-interval`, `ldp keepalive-timeout`

2.24 label-retention-mode

Command: `label-retention-mode {conservative|liberal}`

no label-retention-mode {conservative|liberal}

Function: Set the label retention mode; the no operation will cancel the configuration.

Parameters: None.

Default: Liberal

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: The LDP label retention mode determines how the LDP protocol handles the label information. The protocol provides two modes: the first one is conservative, which means only allows the retention of label information useful for the switch and drops other information. The other one is liberal, which means to allow the retention of all label information. This mode works together with the label advertisement mode, with liberal working with the “downstream unsolicited” advertisement mode, and conservative with the “downstream-on-demand” mode. Please notice that the manually configured liberal mode and the default one are different. When the liberal mode is set manually, the conservative mode of the interface will be the same as the global one if there is no configuration; while in the default liberal mode, it will be adjusted according to the label advertisement mode of the interface. In common cases, it is not recommended to configure this attributes, for it is in accordance with the label advertisement mode, and will be changed automatically when the label advertisement mode changes. Configuring this attribute separately may cause unmatched attributes. If the label retention mode changes when the label retention modes of all sessions on the interface are already configured, the session will be reconnected.

Example: Set the global label retention mode as liberal.

```
Switch(config)#router ldp
```

```
Switch(config-router)#label-retention-mode liberal
```

Related Commands: `advertisement-mode`, `ldp advertisement-mode`

2.25 label-switching

Command: `label-switching`
`no label-switching`

Function: Enable the label-switching function; the no operation will disable the function.

Parameters: None.

Command Mode: Interface Configuration Mode

Default: The label-switching function is disabled.

Usage Guide: Implementing this command to enable the label-switching function. This is a necessity to ensure the normal operation of the LDP protocol.

Example: Enable the label-switching function of the interface vlan1:

```
Switch#config terminal
Switch(config)#interface vlan 1
Switch(Config-if-Vlan1)#label-switching
```

Related Commands: `enable-ldp`

2.26 ldp advertisement-mode

Command: `ldp advertisement-mode {downstream-on-demand | downstream-unsolicited}`

`no ldp advertisement-mode {downstream-on-demand | downstream-unsolicited}`

Function: Set the interface label advertisement mode; the no operation will cancel the configuration.

Command Mode: Interface Configuration Mode.

Usage Guide: Implementing this command will set the label advertisement mode as downstream-unsolicited or downstream-on-demand. Parameters different with the global configuration can be used when configuring the interface. By default, the value is the global default or the global configuration, unless the interface has its own settings. This mode works together with two other modes, and any change of it will affect the other two at the same time. If the parameter is downstream-unsolicited, the label retention mode will be Liberal and the LSP control mode will be Independent, if it is downstream-on-demand, the label retention mode will be Conservative and the LSP control mode will be Ordered. Parameters different with the global configuration can be used when configuring the interface with this command.

Example: Configure the label advertisement mode as downstream-unsolicited in the interface mode.

```
Switch(config)#int vlan 9
Switch(Config-if-Vlan9)#ldp advertisement-mode downstream-unsolicited
```

Related Commands: `label-retention-mode`, `ldp label-retention-mode`, `advertisement-mode`

2.27 ldp hello-interval

Commands: `ldp hello-interval <hello-interval>`
`no ldp hello-interval`

Function: Set the hello-interval of the interface; the no operation will cancel the configuration.

Parameters: *<hello-interval>* is the interval between multicast Hello messages, ranging from 1 to 65535 seconds.

Default: Using the global configuration.

Command Mode: Interface Configuration Mode

Usage Guide: Implementing this command will set the interval between multicast Hello messages. Parameters different with the global configuration can be used when configuring the interface with this command.

Example: Set the hello interval of the interface as 25s.

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp hello-interval 25
```

Related Commands: `ldp hold-time`, `hold-time`

2.28 ldp hold-time

Command: `ldp hold-time <hold-time>`
`no ldp hold-time`

Function: Set the neighbor hold-time of the interface; the no operation will restore the default value.

Parameters: *<hold-time>* is the neighbor hold time, ranging from 1 to 65535 seconds.

Default: Use the global configuration.

Command Mode: Interface Configuration Mode.

Usage Guide: LDP discovers its neighbors and keeps the communication with them through multicast Hello. Implementing this command will set neighbor hold-time when configuring the multicast. Please pay attention to the relationship between it and the hello-time, that is, it is better to set a value at least three times as long as the hello-time. When the interface is configured with Hold-interval, the global configuration will have no effect on it.

Example: Set the neighbor hold-time as 220s:

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp hold-time 220
```

Related Commands: `ldp hello-interval`, `hello-interval`

2.29 ldp keepalive-interval

Command: `ldp keepalive-interval <interval-time>`

no ldp keepalive-interval

Function: Configure the interval between keep-alive messages; the no operation will restore the default value.

Parameters: *<interval-time>* is the interval between keep-alive messages, ranging from 1 to 65535 seconds.

Default: Use the global configuration.

Command Mode: Interface Configuration Mode

Usage Guide: LDP will send keepalive messages to each other for keeping the communication, if there is no data after the creation of a TCP session. Implementing this command will set the interval of sending keepalive messages. Please make sure the value is big enough to prevent too many keepalive messages. Parameters different with the global configuration can be used when configuring the interface.

Example: Configure the keepalive-interval of the interface as 33s.

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp keepalive-interval 33
```

Related Commands: **ldp keepalive-timeout**, **keepalive-timeout**

2.30 ldp keepalive-timeout

Command: **ldp keepalive-timeout <time-val>**

no ldp keepalive-timeout

Function: Configure the session timeout value of the interface; the no operation will restore the default value.

Parameters: *<time-val>* is the timeout value of sessions, ranging from 1 to 65535 seconds.

Default: 30s.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: LDP will send keepalive messages to each other for keeping the communication, if there is no data after the creation of a TCP session. Without receiving a keepalive message within the timeout period set by this command, the connection will be treated as disconnected. Usually this value should be at least three times as long as the keepalive interval. Parameters different with the label configuration can be used when configuring the interface.

Example: Configure the keepalive-interval of the interface as 200s.

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp keepalive-timeout 200
```

Related Commands: **ldp keepalive-interval**, **keepalive-interval**

2.31 ldp label-retention-mode

Command: **ldp label-retention-mode {conservative | liberal}**

no ldp label-retention-mode {conservative | liberal}

Function: Set the label retention mode; the no operation will restore the default value.

Parameters: None.

Default: Liberal

Command Mode: Interface Configuration Mode.

Usage Guide: Set the label retention mode as conservative or liberal. When the label retention mode is changed, all the sessions on the interface will be created. If the configuration of the interface is different with the global one, the latter will be ignored. Parameters different with the global configuration can be used when configuring the interface with this command.

Example: Set the label retention mode of the interface as conservative.

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp label-retention-mode conservative
```

Related Commands: advertisement-mode, ldp advertisement-mode

2.32 ldp multicast-hellos

Command: ldp multicast-hellos

no ldp multicast-hellos

Function: Configure the interface to discover LDP neighbors with multicast Hello messages; the no operation will cancel the configuration.

Parameters: None.

Default: Use the global configuration.

Command Mode: Interface Configuration Mode

Usage Guide: LDP can discover its neighbors through multicast Hello messages or specify one via the “targeted-peer” command. Implementing this command will enable the multicast hello based neighbor discovery. Implementing the no operation will stop receiving and sending multicast Hello messages, so that the only way to discover neighbors is “targeted-peer”. Parameters different with the global configuration can be used when configuring the interface with this command.

Example:

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp multicast-hellos
```

Related Commands: multicast-hellos

2.33 ldp targeted-peer-hello-interval

Command: ldp targeted-peer-hello-interval <hello-interval>

no ldp targeted-peer-hello-interval

Function: Set the interval of Hello to the specified target, the no operation will cancel the configuration and restore to the global one.

Parameters: <hello-interval> is the interval of Hello to the specified target, ranging from 1 to 65535 seconds.

Default: Use the global configuration

Command Mode: Interface Configuration Mode.

Usage Guide: LDP discovers its neighbors and keeps the communication with them by sending Hello to specified targets. Implementing this command will configure the interval of Hello to the specified target. Please pay attention to the relationship between it and the targeted-peer-hold-time. It is recommended to set a value no greater than 1/3 of the targeted-peer-hold-time. Parameters different with the global configuration can be used when configuring the interface with this command.

Example: Set the interval of Hello to the specified target as 225s.

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp targeted-peer-hello-interval 255
```

Related Commands: `ldp targeted-peer-hold-time`, `targeted-peer-hold-time`

2.34 ldp targeted-peer-hold-time

Command: `ldp targeted-peer-hold-time <hold-time>`
`no ldp targeted-peer-hold-time`

Function: Set the peer-hold-time of specified destination for the interface; the no operation will cancel the configuration can restore to the global one.

Parameters: `<hold-time>` is the peer-hold-time of the specified target, ranging from 1 to 65535 seconds.

Default: Use the global configuration.

Command Mode: Interface Configuration Mode.

Usage Guide: LDP keeps the communication with neighbors by sending Hello to specified targets. Implementing this command will configure the peer-hold-time of specified destination. Please pay attention to the relationship between it and the targeted-peer-hello-time. It is recommended to set a value at least 3 times as long as the targeted-peer-hello-time. Parameters different with the global configuration can be used when configuring the interface with this command.

Example:

```
Switch(config)#int vlan 9
```

```
Switch(Config-if-Vlan9)#ldp targeted-peer-hold-time 50
```

Related Commands: `ldp targeted-peer-hello-interval`, `targeted-peer-hello-interval`

2.35 loop-detection

Command: `loop-detection`
`no loop-detection`

Function: Enable the LDP loop detection; the no operation will cancel the configuration.

Parameters: None.

Default: The loop detection is disabled by default.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: LDP can be configured to enable the loop detection or not. If it is enabled, LDP provides two methods: the first is to check whether the HOP-COUNT exceeds the upper limit; the other is to check whether there is any repeated LSR-ID on the path vector.

Example:

```
Switch(config)#router ldp
Switch(config-router)#loop-detection
```

2.36 loop-detection-count

Command: loop-detection-count <count>

Function: Set the max number of hops allowed in the LDP loop detection; the no operation will restore to the default value.

Parameters: <count> is the allowed hop number, ranging from 1 to 255.

Default: 255.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: LDP can be configured to enable the loop detection or not. If it is enabled, implementing this command will set the allowed hop number. The configuration will only take effect with loop-detection enabled. The no operation will restore to the default value.

Example: Set the allowed hop number in the LDP loop detection as 200:

```
Switch(config)#router ldp
Switch(config-router)#loop-detection-count 200
```

Related Commands: loop-detection

2.37 multicast-hellos

Command: multicast-hellos
no multicast-hellos

Function: Configure the interface to discover LDP neighbors with multicast Hello messages or not; the no operation will stop receiving and sending multicast hellos.

Parameters: None.

Default: Enable the receiving and sending of multicast Hellos on the LDP interface.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: LDP can discover its neighbors through multicast Hello messages or specify one via the “targeted-peer” command. Implementing this command will enable the multicast hello based neighbor discovery. Implementing the no operation will stop sending multicast Hello messages, so that the only way to discover neighbors is “targeted-peer”. Configure to sending and receiving multicast hello messages globally, and enumerate all interfaces. If this attribute is already configured on the interface, the global configuration will be ignored, otherwise, the global one will take effect.

Example:

```
Switch(config)#router ldp
```

```
Switch(config-router)#multicast-hellos
```

2.38 propagate-release

Command: `propagate-release`

`no propagate-release`

Function: Configure to propagate the label release to neighbors; the no operation will do the opposite.

Parameters: None.

Default: Disabled.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: If the label is expired, the switch won't send it to the upstream, unless this command is enabled.

Example:

```
Switch(config)#router ldp
```

```
Switch(config-router)#propagate-release
```

2.39 request-retry

Command: `request-retry`

`no request-retry`

Function: Set LDP to retry 5 times after the request for a label is rejected; the no operation will cancel the configuration.

Parameters: None.

Default Settings: Don't retry.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: When LDP send a label request to the downstream, if the latter rejects it for some reasons, LDP will retry for 5 times with this attribute is configured, at an interval of request-retry-timeout.

Example:

```
Switch(config)#router ldp
```

```
Switch(config-router)#request-retry
```

Related Commands: `request-retry-timeout`

2.40 request-retry-timeout

Command: `request-retry-timeout <time-val>`

`no request-retry-timeout`

Function: Set the retry timeout interval after LDP's request for a label is rejected; the no operation will restore the default value.

Parameters: `<time-val>` is the timeout interval, ranging from 1 to 65535 seconds.

Default: 5s.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: When LDP send a label request to the downstream, if the latter rejects it for some reasons, LDP will retry for 5 times with this attribute is configured, at an interval of request-retry-timeout.

Example: Set the retry timeout interval as 10 seconds.

```
Switch(config)#router ldp
```

```
Switch(config-router)#request-retry-timeout 10
```

Related Commands: request-retry

2.41 router ldp

Command: router ldp

no router ldp

Function: Enable the LDP protocol; the no operation will disable it.

Parameters: None.

Default: LDP is disabled.

Command Mode: Global Mode.

Usage Guide: The LDP protocol is a label advertising protocol used when switching labels in the public network, which usually works in a BGP VPN environment. Implementing this command will globally enable the LDP protocol, however, in interfaces where the protocol is actually working, implementing “enable-ldp” in the interface configuration mode is required, so does enabling Label-switching, which, in combination with this command, work as a whole to ensure the normal operation of the protocol.

Example:

```
Switch(config)#router ldp
```

```
Switch(config-router)#
```

2.42 router-id

Command: router-id <ip-addr>

no router-id

Function: Set the router ID used by LDP; the no operation will cancel the configuration.

Parameters: <ip-addr> is the router ID, in dotted decimal format.

Default: The ID will be automatically obtained.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: The router ID exclusively identifies a LDP device in the network. Router-id is the value of router-id in Hello messages.

Example:

```
Switch(config)#router ldp
```

```
Switch(config-router)#router-id 10.10.10.10
```

2.43 show ldp

Command: show ldp

Function: Display some basic LDP attributes of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display the current configuration information of LDP.

Example:

```
Switch#show ldp
Router ID : 10.10.0.11
LDP Version : 1
Global Merge Capability : N/A
Label Advertisement Mode : Downstream Unsolicited
Label Retention Mode : Liberal
Label Control Mode : Independent
Loop Detection : Off
Loop Detection Count : 0
Request Retry : Off
Propagate Release : Disabled
Hello Interval : 5
Targeted Hello Interval : 15
Hold time : 15
Targeted Hold time : 45
Keepalive Interval : 10
Keepalive Timeout : 30
Request retry Timeout : 5
Multicast Hello : Enabled
Targeted Hello Accept : Disabled
Transport Interface : N/A
Import BGP routes : No
```

Display	Explanation
Router ID : 10.10.0.11	Router id is 10.10.0.11
LDP Version : 1	The LDP version is 1
Global Merge Capability : N/A	The global label merging capability is disabled
Label Advertisement Mode : Downstream Unsolicited	The label advertisement mode is downstream unsolicited
Label Retention Mode : Liberal	The label retention mode is Liberal
Label Control Mode : Independent	The label control mode is Independent

Loop Detection : Off	The loop detection is disabled
Loop Detection Count : 0	The loop detection count is 0
Request Retry : Off	The switch won't retry after a rejected label request.
Propagate Release : Disabled	The switch won't propagate the label release messages
Hello Interval : 5	The interval between Hello messages is 5s
Targeted Hello Interval : 15	The interval between Hello messages to a specified target is 15s
Hold time : 15	The hold time of adjacency is 15s
Targeted Hold time : 45	The hold time of adjacency with specified targets is 45s
Keepalive Interval : 10	The intervals between keepalive messages sent by the interface is 10s
Keepalive Timeout : 30	The keepalive timeout period is 30s
Request retry Timeout : 5	The retry timeout after the label request being rejected is 5s.
Multicast Hello : Enabled	Discover neighbors via multicast Hello messages
Targeted Hello Accept : Disabled	The switch won't accept Hello from specified targets.
Transport Interface : N/A	No transport interface
Import BGP routes : No	The switch won't import BGP routes

2.44 show ldp adjacency

Command: show ldp adjacency

Function: Display all adjacency information of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Implementing this command will display LDP adjacency information, for diagnosing and troubleshooting.

Example:

```
Switch#show ldp adjacency
```

```
IP Address  Interface Name  Holdtime  LDP ID
192.168.3.5  vlan1           15       10.10.0.18:0
192.168.4.5  vlan2           15       10.10.0.18:0
```

Display	Explanation
IP Address	The IP address of the neighbor
Interface Name	The interface name of the connection with the neighbor

Holdtime	The holdtime of the adjacency
LDP ID	(LSR-ID : Label Space) The LDP ID

2.45 show ldp downstream

Command: show ldp downstream

Function: Display all downstream information of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode

Usage Guide: Implementing this command will display the information of downstreams maintained by the current protocol.

Example:

```
Switch#show ldp downstream
```

```
Session peer 192.168.11.50:
```

```
Downstream state: Established Label: impl-null RequestID: 0 Peer: 192.168.11.50 Attr:
```

```
Downstream state: Established Label: impl-null RequestID: 0 Peer: 192.168.11.50 Attr:
```

```
Downstream state: Established Label: impl-null RequestID: 0 Peer: 192.168.11.50 Attr:
```

```
Downstream state: Established Label: 20 RequestID: 0 Peer: 192.168.11.50 Attr:
```

2.46 show ldp fec

Command: show ldp fec

Function: Display information about all FECs (Forwarding Equivalence Class) of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information about all FECs (Forwarding Equivalence Class) of this LSR.

Example:

```
Switch#show ldp fec
```

```
LSR codes : E/N - LSR is egress/non-egress for this FEC,
```

```
    L - LSR received a label for this FEC,
```

```
    > - LSR will use this route for the FEC
```

Code	FEC	Session	Out Label	NextHop Addr
E >	3.3.3.1/32	Non-Existent	None	Connected
E >	4.4.4.1/32	Non-Existent	None	80.80.90.2
E >	80.80.90.0/24	Non-Existent	None	Connected
E >	80.90.70.0/24	Non-Existent	None	80.80.90.2
E >	80.90.70.10/32	Non-Existent	None	Connected
E >	80.90.70.78/32	Non-Existent	None	Connected

2.47 show ldp interface

Command: show ldp interface [vlan <1-4094> | IFNAME]

Function: Display LDP information about all or specified interfaces of this LSR.

Parameters: <1-4094> VLAN ID;

IFNAME: the interface name.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display the LDP information of the interface; user-provided parameters can specify some particular interfaces; no parameter means to display information of all interfaces.

Examples:

```
Switch#show ldp interface
```

```
Interface LDP Identifier Label-switching Merge Capability
vlan0 10.10.0.11:0 Disabled N/A
vlan1 10.10.0.11:0 Enabled Merge capable
vlan2 10.10.0.11:0 Enabled Merge capable
```

2.48 show ldp lsp

Command: show ldp lsp

Function: Display the label switching path of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display the label switching path of the switch.

Example:

```
Switch#show ldp lsp
```

```
FEC IPV4:10.1.1.0/24 -> 0.0.0.0
```

```
Downstream state: Established Label: none RequestID: 0 Peer: EGRESS Attr: None
```

```
Upstream state: Established Label: impl-null RequestID: 0 Peer: 15.1.1.70 Attr: None
```

```
Upstream state: Established Label: impl-null RequestID: 0 Peer: 20.1.1.1 Attr: None
```

```
Downstream state: Established Label: impl-null RequestID: 0 Peer: 15.1.1.70 Attr: None
```

```
FEC IPV4:11.1.1.0/24 -> 0.0.0.0
```

```
Downstream state: Established Label: impl-null RequestID: 0 Peer: 15.1.1.70 Attr: None
```

```
Downstream state: Established Label: none RequestID: 0 Peer: EGRESS Attr: None
```

```
Upstream state: Established Label: impl-null RequestID: 0 Peer: 15.1.1.70 Attr: None
```

```
Downstream state: Established Label: impl-null RequestID: 0 Peer: 20.1.1.1 Attr: Hop
Count: 1
```

2.49 show ldp session

Command: show ldp session [*<ip-addr>*]

Function: Display information about specified or all LDP sessions of this LSR.

Parameters: *<ip-addr>*: the IP address of the neighbor to display, in dotted decimal format.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information about current LDP sessions of this switch.

Example:

```
Switch#show ldp session
Peer IP Address IF Name   My Role   State      KeepAlive
192.168.11.50  vlan1     Passive   OPERATIONAL 30
192.168.13.60  vlan2     Passive   OPERATIONAL 30
```

2.50 show ldp statistics

Command: show ldp statistics

Function: Display the LDP statistics of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display the current LDP statistics of this switch.

Example:

```
Switch#show ldp statistics
PacketType      Sent   Received
Notification    18     22
Hello           102589 103935
Initialization   37     37
Keepalive       45216  45224
Address          44     40
Address Withdraw  3      1
Label Mapping    97     152
Label Request    0      0
Label Withdraw   3      38
Label Release    42     3
Request About    0      0
```

Display	Explanation
PacketType	The packet types will be listed as below:
Total	Sent
	The total number of this type of packets that have been sent.

	Received	The total number of this type of packets that have been received.
--	----------	---

2.51 show ldp targeted-peers

Command: show ldp targeted-peers

Function: Display the information of LDP targeted peers in the configuration of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display the currently configured LDP neighbor information.

Example:

```
Switch#show ldp targeted-peers
IP Address      Interface
10.1.1.66      Vlan2
```

2.52 show ldp upstream

Command: show ldp upstream

Function: Display information of all upstreams of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information of all LDP upstreams maintained by the switch.

Example:

```
Switch#show ldp upstream
Session peer 192.168.11.50:
Upstream state: Established Label: impl-null RequestID: 0 Peer: 192.168.11.50 Attr:
Upstream state: Established Label: impl-null RequestID: 0 Peer: 192.168.11.50 Attr:
```

2.53 show mpls ldp discovery

Command: show mpls ldp discovery interface [vlan <1-4094> | IFNAME]

Function: Display all interfaces and label-switching information of this LSR.

Parameters: <1-4094>: VLAN ID.

IFNAME: The interface name

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display all or specified interfaces and label-switching information.

Example:

```
Switch#show mpls ldp discovery
```

Interface	LDP Identifier	Label-switching	Merge Capability
Vlan1	10.10.0.11:0	Enabled	Merge capable
Vlan2	10.10.0.11:0	Enabled	Merge capable
Loopback1	0.0.0.0:0	Disabled	N/A

2.54 show mpls ldp fec

Command: show mpls ldp fec

Function: Display information about all FECs of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information about currently maintained FECs.

Example:

Switch#show mpls ldp fec

LSR codes : E/N - LSR is egress/non-egress for this FEC,

L - LSR received a label for this FEC,

> - LSR will use this route for the FEC

Code	FEC	Session	Out Label	NextHop Addr
E >	10.1.1.0/24	non-existent	none	15.1.1.68
NL	10.1.1.0/24	10.1.1.66	impl-null	15.1.1.68
E >	11.1.1.0/24	non-existent	none	15.1.1.68
E >	15.1.1.0/24	non-existent	none	connected
NL>	15.1.1.0/24	10.1.1.66	impl-null	connected
E >	20.1.1.0/24	non-existent	none	15.1.1.68
NL	30.1.1.0/24	10.1.1.66	impl-null	invalid
E >	100.1.1.0/24	non-existent	none	connected
NL	100.1.1.0/24	10.1.1.66	impl-null	connected

2.55 show mpls ldp neighbor

Command: show mpls ldp neighbor

Function: Display information about all neighbors of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information of LDP neighbors, which is useful for troubleshooting.

Example:

Switch#show mpls ldp neighbor

IP Address	Interface Name	Holdtime	LDP ID
192.168.3.5	vlan1	15	10.10.0.18:0
192.168.4.5	vlan2	15	10.10.0.18:0

2.56 show mpls ldp parameter

Command: show mpls ldp parameter

Function: Display basic LDP attributes of this LSR.

Parameters: None.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information of current LDP configurations.

Example:

```
Switch#show mpls ldp parameter
```

```
Router ID : 10.10.0.11
```

```
LDP Version : 1
```

```
Global Merge Capability : N/A
```

```
Label Advertisement Mode : Downstream Unsolicited
```

```
Label Retention Mode : Liberal
```

```
Label Control Mode : Independent
```

```
Loop Detection : Off
```

```
Loop Detection Count : 0
```

```
Request Retry : Off
```

```
Propagate Release : Disabled
```

```
Hello Interval : 5
```

```
Targeted Hello Interval : 15
```

```
Hold time : 15
```

```
Targeted Hold time : 45
```

```
Keepalive Interval : 10
```

```
Keepalive Timeout : 30
```

```
Request retry Timeout : 5
```

```
Targeted Hello Receipt : Disabled
```

```
Transport Address : N/A
```

```
Transport Interface : N/A
```

```
Import BGP routes : No
```

Display	Explanation
Router ID : 10.10.0.11	Router id 为 10.10.0.11 Router ID is 10.10.0.11
LDP Version : 1	The LDP version is 1
Global Merge Capability : N/A	The global label merging capability is disabled
Label Advertisement Mode : Downstream Unsolicited	The label advertisement mode is Downstream Unsolicited
Label Retention Mode : Liberal	The label retention mode is Liberal
Label Control Mode : Independent	The label control mode is Independent
Loop Detection : Off	The loop detection is disabled

Loop Detection Count : 0	The loop detection count is 0.
Request Retry : Off	Don't retry when the request is rejected
Propagate Release : Disabled	Don't propagate the label release message
Hello Interval : 5	The interval between Hello messages is 5s
Targeted Hello Interval : 15	The interval between Hello messages to the specified target is 15s
Hold time : 15	The adjacency hold time is 15s
Targeted Hold time : 45	The hold time of adjacency with the specified target is 45s
Keepalive Interval : 10	The interval between keepalive messages is 10s
Keepalive Timeout : 30	The keepalive timeout of is 30s
Request retry Timeout : 5	The retry timeout after the request is rejected is 5s.
Targeted Hello Receipt : Disabled	Forbidden the receipt of Hello messages from the specified target.
Transport Address : N/A	No configuration of the Transport address
Transport Interface : N/A	No configuration of the Transport Interface
Import BGP routes : No	Don't import BGP routes.

2.57 show mpls ldp session

Command: show mpls ldp session [*<ip-addr>*]

Function: Display all or specified LDP sessions of this LSR.

Parameters: <ip-addr> is the IP address of the neighbors to be displayed, in dotted decimal format.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information about current LDP sessions of this switch.

Example:

```
Switch#show mpls ldp session
```

```
Peer IP Address IF Name My Role State KeepAlive
192.168.11.50 vlan1 Passive OPERATIONAL 30
192.168.13.60 vlan2 Passive OPERATIONAL 30
```

2.58 targeted-hello-accept

Command: targeted-hello-accept [*filter <1-99>*]

no targeted-hello-accept

Function: Configure the LDP to receive Hello messages from the specified target, applied in the extended mode.

Parameters: <1-99>: the access list ID that will be used.

Default: Don't accept target-Hello messages.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: By implementing this command, users can specify targets, from which the LDP will accept Hello messages, via access list commands.

Example:

```
Switch(config)#router ldp
Switch(config-router)#targeted-hello-accept filter 1
```

2.59 targeted-peer

Command: `targeted-peer <ip-addr>`
`no targeted-peer <ip-addr>`

Function: Configure the LDP neighbor of the specified target; the no operation will delete the configuration.

Parameters: <ip-addr> is the IP address of the neighbor, in dotted decimal format.

Default: No targeted-peer.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: LDP can discover a neighbor via multicast Hello messages or manual configurations. This command enables the latter method by adding a targeted-peer and establishing the adjacency with it. The no operation will delete the configuration. Configuring a targeted-peer neighbor means to establish an extended session.

Example: Configure the LDP neighbor of the specified target is 10.10.10.10

```
Switch(config)#router ldp
Switch(config-router)#targeted-peer 10.10.10.10
```

2.60 targeted-peer-hello-interval

Command: `targeted-peer-hello-interval <hello-interval>`
`no targeted-peer-hello-interval`

Function: Configure the global interval between Hello messages to the specified target; the no operation will restore the default value.

Parameters: <hello-interval> is the interval between Hello messages to the specified target, ranging from 1 to 65535 seconds.

Default: 15s.

Command Mode: LDP Protocol Configuration Mode

Usage Guide: LDP discovers a neighbor and stays in communication with it via sending Hello messages to the specified target. Implementing this command will configure the interval between those Hello messages. Please pay attention to the relationship between it and the targeted-peer-hold-time. It is recommended to configure a value no greater than 1/3 of the latter. When a specified interface has its own configuration, this command will lose effect on it.

Example: Configure the Hello interval as 50s.

```
Switch(config)#router ldp
```

```
Switch(config-router)#targeted-peer-hello-interval 50
```

Related Commands: `targeted-peer-hold-time`, `ldp targeted-peer-hold-time`, `ldp targeted-peer-hello-interval`

2.61 targeted-peer-hold-time

Command: `targeted-peer-hold-time <hold-time>`
`no targeted-peer-hold-time`

Function: Configure the global hold-time of the specified target; the no operation will restore the default value.

Parameters: `<hold-time>` is the hold-time of the specified target, ranging from 1 to 65535 seconds.

Default: 45s.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: LDP discovers a neighbor and stays in communication with it via sending Hello messages to the specified target. Implementing this command will configure the hold-time of neighbors discovered by the specified target. Please pay attention to the relationship between it and the `targeted-peer-hello-interval`. It is recommended to configure a value at least three times as long as the latter. When a specified interface has its own configuration, this command will lose effect on it.

Example: Configure the neighbor hold-time as 50s.

```
Switch(config)#router ldp
```

```
Switch(config-router)#targeted-peer-hold-time 50
```

Related Commands: `targeted-peer-hello-interval`, `ldp targeted-peer-hold-time`, `ldp targeted-peer-hello-interval`

2.62 transport-address

Command: `transport-address <ip-addr>`
`no transport-address`

Function: Configure the IP address used by LDP to establish TCP connections; the no operation will cancel the configuration.

Parameters: `<ip-addr>` is the IP address, in dotted decimal format. This address should be one of a loopback interface.

Default: The address is automatically obtained.

Command Mode: LDP Protocol Configuration Mode.

Usage Guide: After the discovery of a neighbor via multicast or targeted Hello messages, LDP doesn't use the interface address sending the messages as the source address when establishing TCP connections, instead it uses the `transport-address` in the Hello messages to guarantee the uniqueness of the connection. Usually, LDP chooses

an interface address as transport-address. Implementing this command will configure this address. The no operation will cancel the configuration, and regain an interface address as transport-address automatically.

Example: Configure 10.10.10.10 as the source address of TCP connections.

```
Switch(config)#router ldp
```

```
Switch(config-router)#transport-address 10.10.10.10
```

Chapter 3 MPLS VPN

3.1 address-family ipv4

Command: `address-family ipv4 [unicast | vrf <vrf-name>] multicast`
`no address-family ipv4 vrf <vrf-name>`

Function: Configure the BGP VPN address family; the no operation will cancel the configuration. Before entering the BGP-VPN view, this VRF should be created and configured with rd.

Parameters: **unicast:** unicast address family factor
<vrf-name> : the VPN route/forwarding instance name

Default: No BGP VPN address family.

Command Mode: BGP Route Configuration Mode.

Example:

```
Switch(config)#router bgp 100
Switch(config-router)#address-family ipv4 vrf VRF-A
Switch(config-router-af)#
```

3.2 address-family vpnv4

Command: `address-family vpnv4 [unicast]`

Function: Configure the BGP VPNv4 address family in non-default mode.

Parameters: **unicast:** the unicast address family factor.

Default: No BGP VPNv4 address family.

Command Mode: BGP Route Configuration Mode.

Example:

```
Switch(config)#router bgp 100
Switch(config-router)#address-family vpnv4 unicast
Switch(config-router-af)#
```

3.3 aggregate-address

Command: `aggregate-address <ip-address/M> [summary-only] [as-set]`
`no aggregate-address <ip-address/M> [summary-only] [as-set]`

Function: By aggregating addresses, users can decrease the route message propagation; the no operation will cancel the configuration.

Parameters: **<ip-address/M>**: IP address, MASK length
[summary-only]: Only send the summary and ignore the route.
[as-set]: Display each AS of the path once in the list form.

Default: No aggregate configuration.

Command Mode: BGP Route Configuration Mode, VRF Address Family Configuration Mode.

Usage Guide: By aggregating addresses, users can decrease the route message propagation. The summary-only option means only to send the summary and ignore the route, and the as-set option will display the AS of every route covered by the aggregate for once without repetition.

Example:

```
Switch(config-router)#aggregate-address 100.1.0.0/16 summary-only
```

```
Switch(config-router)#aggregate-address 100.2.0.0/16 summary-only as-set
```

```
Switch(config-router)#aggregate-address 100.3.0.0/16 as-set
```

Related Commands: `bgp aggregate-nexthop-check`, `no bgp aggregate-nexthop-check`

3.4 clear ip bgp

Command: `clear ip bgp * [vrf <vrf-name>] [in | out | soft [in | out]]`

Function: Reboot the corresponding bgp process of vrf-name, and the connections between all peers of the process.

Parameters: `<vrf-name>`: the configured VPN instance name, whose length ranges from 1 to 64 characters.

in: soft reboot and configure the inbound update;

out: soft reboot and configure the outbound update;

soft: soft reboot

Default: No configuration.

Command Mode: Admin Mode

Usage Guide: Implementing the “clear ip bgp *” command will restart the BGP process; configuring the “in” parameter will send route request message to neighbors; configuring the “out” parameter will send its route to neighbors; configuring the “soft” parameter won’t restart the BGP process.

Example:

```
Switch#clear ip bgp * vrf VRF-A
```

```
Switch#
```

3.5 debug bgp mpls

Command: `debug bgp mpls`

`no debug bgp mpls`

Function: Display the information about processing VRF FTN, the global FTN, and global ILM entries while the bgp vpn is running; the no operation will disable the display.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Usage Guide: Enable the debug information to check the information about processing VRF FTN, the global FTN, and global ILM entries while the bgp vpn is running.

Example:

```
Switch#debug bgp mpls
Switch#
```

3.6 debug bgp update

Command: debug bgp update
no debug bgp update

Function: Display the route update information received by bgp vpn while it is running; the no command will disable the information.

Parameters: None.

Default: No display of debug information.

Command Mode: Admin Mode.

Example:

```
Switch#debug bgp update
Switch#
```

3.7 description

Command: description <text>
no description

Function: Configure the description of VRF to record information like the relationship between the VNP instance and a VPN; the no operation will disable the description.

Parameters: <text>: the descriptive text, whose length ranges from 1 to 256 characters.

Default: No configuration.

Command Mode: VRF Configuration Mode.

Usage Guide: Following “description” is user’s description of VRF, which will be displayed below the corresponding VRF to provide instructions.

Example: Configure the VRF description as “associate with VRF-B VRF-C”.

```
Switch(config)#ip vrf VRF-A
Switch(config-vrf)#description associate with VRF-B VRF-C
```

3.8 import map

Command: import map <route-map-name>
no import map

Function: Apply import-route-map policy to the specified VPN instance.

Parameters: <route-map-name>: the route-map policy name.

Default: No configuration.

Command Mode: VRF Configuration Mode.

Usage Guide: When a more accurate method of importing VPN instance routes than the extended-community attribute is required, the import-route policy is an option. By default, the imported routes will be filtered according to their VPN-target extended-community attribute. The import-route policy may decline the routes chosen from the communities in the import list.

Example: Apply the map-a route-map to the VRF instance VRF-A.

```
Switch(config)#ip vrf VRF-A
Switch(config-vrf)#import map map-a
Switch(config-vrf)#
```

3.9 ip route

Command: `ip route <Destination_prefix> <Destination_prefix_mask> {vlan <Vlan_ID>|IFNAME} <nexthop_address> <1~255>`

`no ip route <Destination_prefix> <Destination_prefix_mask> {vlan <Vlan_ID>|IFNAME} <nexthop_address> <1~255>`

Function: Configure a static route directing to the VPN site in the global route table, whose output interface is the one bound to VRF; the no operation will delete the configured static route.

Parameters: `<Destination_prefix>` is the destination prefix of the route ;

`<Destination_prefix_mask>` is the destination prefix mask of the route ;

`<Vlan_ID>` is the VLAN ID of the output interface; IFNAME is the interface name ;

`<nexthop_addresses>` is the next-hop address of the route ;

`<1~255>` is the administrative distance of the route.

Default: No static route.

Command Mode: Global Mode.

Usage Guide: This command is usually used to configure the route for the Internet to access the VPN on PE, where the VPN can access the Internet.

Example: Configure a static route, in which the destination IP is 20.20.20.0, the mask length is 24, the port is vlan 9 and the next-hop address is 20.20.20.23.

```
Switch(config)#ip route 20.20.20.0 255.255.255.0 vlan 9 20.20.20.23
Switch(config)#
```

3.10 ip route vrf

Command: `ip route vrf <vrf-name>{<ip-prefix> <mask>|<ip-prefix/prefix-length>} {<gateway-address>|null0} [<1-255>]`

`no ip route vrf <vrf-name>{<ip-prefix> <mask>|<ip-prefix/prefix-length>} {<gateway-address>|null0} [<1-255>]`

Function: Specify static routes for the specified VRF. Before doing this, a successful

VPN forwarding instance is required. The no operation will delete the configured static routes.

Parameters: **<vrf-name>**: The specified VRF name
<ip-prefix>: the destination IP address
<mask>: mask, in dotted decimal format
<prefix-length>: the length of the prefix
<gateway-address>: the next-hop address
null0: the black hole route;
<1-255>: Administrative distance.

Example:

```
Switch(config)#ip route vrf VRF-A 10.1.1.10 255.255.255.0 10.1.1.1
Switch(config)#
```

3.11 ip vrf

Command: **ip vrf <vrf-name>**
no ip vrf <vrf-name>

Function: Configure a VPN instance with the specified name; the no operation will cancel the instance.

Parameters: **<vrf-name>** the configured VPN instance name, whose length is 1 to 64.

Default: No configuration.

Command Mode: Global Mode.

Usage Guide: Configure a VPN instance with the specified name. There is no default VPN instance on PE, which allows multiple VPN instances. The VPN instance name is case sensitive. Please notice that only after configuring RD will the VPN instance take effect.

Example:

```
Switch(config)#ip vrf VRF-A
Switch(config-vrf)#
```

3.12 ip vrf forwarding vrfName

Command: **ip vrf forwarding <vrfName> [fallback global]**
no ip vrf forwarding <vrfName> [fallback global]

Function: Bind interfaces to the specified VRF. With configuring the fallback global option of the interface, the interface, being the IP message input interface, will try a second lookup in the global route table if the lookup fails in the route table of the bound VRF.

Parameters: **<vrfName>** is the VRF name, a string shorter than 32 characters.

fallback global: Look up the global route table. With configuring the fallback global option of the interface, the interface, will try a second lookup in the global route table if the lookup fails in the route table of the bound VRF.

Command Mode: Interface Configuration Mode.

Usage Guide: Implementing the command if the interface needs to access the Internet. Each interface can only be bound to one VRF, while the latter can be bounded with multiple interfaces. The IGP supporting VPN will record the binding relationship between interfaces and VRF by adding a route received from the bound interface to the route table of the bound VRF. By default, the interface is bound to no VRF, and is a public network interface.

Example:

```
Switch(config)#int vlan 9
Switch(Config-if-Vlan9)#ip vrf forwarding vpn1 fallback global
```

3.13 mpls proxy loopback-group

Command: `mpls proxy loopback-group <1-max_agg_num>`
`no mpls proxy loopback-group`

Function: Make the boardcard to implement MPLS function through MPLS proxy.

Parameter: `<1-max_agg_num>` is loopback group ID, ranging from 1 to 128.

Default: Do not enable MPLS proxy.

Command Mode: Interface Mode

Usage Guide: When the port of VLAN on the boardcard which does not support MPLS, the interface bind VRF or configure the label exchange, to implement MPLS function, it must configure a loopback group, at least one port (Note: the added port must be not used by vlan1) of the boardcard which support MPLS is added to loopback group, configure MPLS proxy on the interface.

Example 1: Configure mpls proxy on the interface which bind VRF.

```
Switch(config)#loopback-group 10
Switch(config)#interface e 1/0/1
Switch(config-if-ethernet1/0/1)#loopback 10
Switch(config)#int vlan 9
Switch(Config-if-Vlan9)#ip vrf forwarding vpn1
Switch(Config-if-Vlan9)#mpls proxy loopback-group 10
```

Example 2: Configure mpls proxy on the interface which enable the label exchange.

```
Switch(config)#loopback-group 10
Switch(config)#interface e 1/0/1
Switch(config-if-ethernet1/0/1)#loopback 10
Switch(config)#int vlan 9
Switch(Config-if-Vlan9)#ldp enable
Switch(Config-if-Vlan9)#label-switching
Switch(Config-if-Vlan9)#mpls proxy loopback-group 10
```

3.14 neighbor remote-as

Command: neighbor <ip-address> remote-as <as-num>
no neighbor <ip-address> remote-as <as-num>

Function: Add a new BGP neighbor; the no operation will delete it.

Parameters: <ip-address>: specify the BGP neighbor address. BGP neighbor address should be Loopback port IP for neighbor switch.

<as-num>: specify the AS number of the BGP neighbor.

Default: No BGP neighbor.

Command Mode: VRF Address Family Configuration Mode.

Usage Guide: Implementing this command will add a new neighbor for the switch.

Example:

```
Switch(config)#router bgp 100
Switch(config-router)#address-family ipv4 vrf VRF-A
Switch(config-router-af)#neighbor 3.0.0.1 remote-as 65001
Switch(config-router-af)#
```

3.15 neighbor as-override

Command: neighbor {<ip-address> | <TAG>} as-override
no neighbor {<ip-address> | <TAG>} as-override

Function: Override the AS path (the previous AS number). Before implementing this command, users should create a neighbor first. The no operation will delete the configuration.

Parameters: <ip-address>: specify the BGP neighbor address;

<TAG>: Specify the BGP neighbor group number.

Default: Not configured.

Command Mode: VRF Address Family Configuration Mode.

Usage Guide: After this command being implemented, the route from the neighbor will override the existing AS number.

Example:

```
Switch(config)#router bgp 100
Switch(config-router)#address-family ipv4 vrf VRF-A
Switch(config-router-af)#neighbor 3.0.0.1 remote-as 65001
Switch(config-router-af)#neighbor 3.0.0.1 as-override
Switch(config-router-af)#
```

3.16 neighbor soo

Command: neighbor <ip-addr> soo <soo-val>
no neighbor <ip-addr> soo <soo-val>

Function: Configure the site-of-origin from the neighbor route; the no operation will delete the configuration.

Parameters: *<ip-addr>* the neighbor's ip address, in dotted-decimal format.

<soo-val> is the site-of-origin, in the same form as RD.

Default: Not configured.

Command Mode: VRF Address Family Configuration Mode.

Usage Guide: If the customer AS is connected with multiple ISP devices, configuring this attribute can prevent the customer route from returning to the customer after passing the P area. This configuration will propagate once set. The route with the SOO attribute won't propagate to the neighbor already configured with this attribute.

Example:

```
Switch(config)#router bgp 100
Switch(config-router)#address-family ipv4 vrf test
Switch(config-router-af)#neighbor 11.1.1.64 remote 200
Switch(config-router-af)#neighbor 11.1.1.64 soo 100:10
```

After configuring this attribute, the switch won't propagate the remote route with the 100:10 rt attribute to 11.1.1.64. (To be clear, the soo attribute will be checked together with other rt attributes, that is to say, the neighbor will be treated as the original neighbor no matter it is or not, once the rt is configured with the same attributes. In fact, soo is usually configured separately with a value different with rt/rd, and is unique in the reachable area to describe the origin accurately).

3.17 rd

Command: `rd <ASN:nn_or_IP-address:nn>`

Function: Configure the RD (Route Distinguish) of VRF.

Parameters: `ASN:nn_or_IP-address:nn` : The IP address format of the switch ID. ASN is AS ID, ranging from 1 to 4294967295, it can be shown in decimal notation (such as 6553700) or delimiter method (such as 100.100); IP-address is IP address that the length is 4 bytes; nn is arbitrary number that the length is 2 bytes.

Default: Not configured.

Command Mode: VRF Configuration Mode.

Usage Guide: RD can uniquely identify the VPN route. VPN instances realize address space independence via RD, and thus realize the address overlap between different VPNs. Usually the configuration includes the AS number and an arbitrary number. RD can't be deleted directly.

Example:

```
Switch(config)#ip vrf VRF-A
Switch(config-vrf)#rd 300:3
Switch(config-vrf)#
```

3.18 route-target

Command: route-target {import | export | both} <rt-value>

no route-target {import | export | both} <rt-value>

Function: Configure the Route-Target of the specified VRF 的 Route-Target; The no operation will delete the configuration.

Parameters: **import:** Means to filter the import route, which means to judge whether the VPN route can be added into the VRF;

export: Means to use the route of this VRF as the Route-Target that will be added to when the VPNv4 route sends out messages, in order to filter the interface import;

both: Means the import and the export use the same Route-Target;

<rt-value>: Is the the route target value, the format is ASN:nn_or_IP-address:nn. ASN is AS ID, ranging from 1 to 4294967295, it can be shown in decimal notation (such as 6553700) or delimiter method (such as 100.100); IP-address is IP address that the length is 4 bytes; nn is arbitrary number that the length is 2 bytes.

Default: Not configured.

Command Mode: VRF Configuration Mode.

Usage Guide: A RT is a BGP extended community, for filtering the VPN routes and controlling the VNP membership of directly connected site and route policies. For the configured import rule, enumerate all routes received by the bgp process and add routes matching the condition (the export route-target overlaps with the import route-target of this VRF) to the bgp process of this VRF and advertise the route update messages to the bgp private network neighbors of this VRF. For the configured export rule, enumerate all bgp routes stored in the bgp process related with this VRF, add an export-target to these routes and advertise the route update messages to the bgp public network neighbors. If there is an import route-target of some other VRF matches the export route-target, copy the routes to the matching VRF and advertise the route update messages to the bgp private network neighbors of it.

Example:

```
Switch(config)#ip vrf VRF-A
Switch(config-vrf)#route-target both 100:1
Switch(config-vrf)#
```

3.19 show ip bgp vpnv4

Command: show ip bgp vpnv4 {all|rd <rd-val>|vrf <vrf-name>}

Function: Implementing this command will display all VRF of this switch or route information of the specified VRF.

Parameters: **all:** all VPNv4 peers.

rd-val: the route distinguisher, usually in a format of numbers (AS number of IP address), such as 100:10.

<vrf-name> the configured VPN instance name, whose length is 1 to 64.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information of a specified RD or VRF.

Example:

```
Switch#show ip bgp vpn4 all
Network Next Hop Metric LocPrf Weight Path
Route Distinguisher: 100:10 (Default for VRF test)
*> 11.1.1.0/24 11.1.1.64 0 0 200 ?
*> 20.1.1.0/24 11.1.1.64 0 0 200 ?
```

3.20 show ip route vrf

Command: show ip route vrf **<vrf-name>** [bgp|database]

Function: Display information of the specified route protocol.

Parameters: **<vrf-name>**: the VRF name created with the “if vrf<vrf-name>” command.

bgp: the route imported via bgp;

database: the IP route table database.

Default: None.

Command Mode: Admin and Config mode.

Usage Guide: Display information of the specified route protocol.

Example:

```
Switch#show ip route vrf vrf-a bgp
Network Next Hop Metric LocPrf Weight Path
Route Distinguisher: 100:10 (Default for VRF test)
*> 11.1.1.0/24 11.1.1.64 0 0 200 ?
*> 20.1.1.0/24 11.1.1.64 0 0 200 ?
```

3.21 show ip vrf

Command: show ip vrf [**<vrf-name>**]

Function: Implementing this command will display the RIP instance information related with this VPN route/forwarding instance and the fallback global option of the interfaces bound with the VRF.

Parameters: **<vrf-name>** specifies the name of the VPN route/forwarding instance.

Default: No display by default.

Command Mode: Admin and Config mode.

Usage Guide: This command also exists in other route protocols. Implementing this command will also display the information of other related route protocol processes.

Example: Display the information of the RIP instances related with the IPI vrf route/forwarding instance.

```
Switch#show ip vrf IPI
```

```
VRF IPI, FIB ID 1
Router ID: 11.1.1.1 (automatic)
Interfaces:
Vlan1
!
VRF IPI; (id=1); RIP enabled Interfaces:
Ethernet1/8
```

Name	Interfaces
IPI	Vlan1

Name	Default RD	Interfaces
IPI		Vlan1

Chapter 4 VPLS

4.1 clear mac-address-table

Command: clear mac-address-table [vfi <vfi-name>]

Function: Clear MAC address table of forwarding in VPLS instances, if there is parameter input, clear the specified MAC address table, or clear all MAC address tables.

Parameter: vfi <vfi-name> : It is the name of VPLS instance, it is a character string with the length from 1 to 32.

Default: None

Command Mode: Admin mode

Usage Guide: Use this command to clear all MAC (clear all MAC addresses including VFI and non-VFI addresses when no VFI is specified), or clear MAC in the specified VFI.

Example:

```
Switch#clear mac-address-table vfi v1
```

4.2 debug vpls packet

Command: debug vpls packet [send | receive | detail]
no debug vpls packet

Function: Enable the debugging of receiving and sending packets for VPLS, no command disables the debugging.

Parameter: send : send packet's information

receive : receive packet's information

detail : detail information for receiving and sending packets

Default: Do not display the debugging.

Command Mode: Admin mode

Usage Guide: Use this command to check the relevant packets of VPLS forwarded by software platform, including the packets of VPWS and VPLS and layer 2, layer 3 packets processed by VPLS and VPWS.

Example:

```
Switch#debug vpls packet send
```

4.3 description

Command: description <text>
no description

Function: Add descriptive information for VPLS instance, no command deletes the information.

Parameter: <text> : Descriptive information for VFI, it is a character string with the length from 1 to 128, do not distinguish capital letter and small letter.

Default: No descriptive information

Command Mode: VFI configuration mode

Usage Guide: Configure this command to add descriptive information for VPLS instance in VFI.

Example:

```
Switch(config)#vfi v1 100
```

```
Switch(config-vfi)#description vpn1
```

4.4 encapsulation

Command: encapsulation {ethernet | vlan}

Function: Set encapsulation type for VPLS instance. By default, it is in VLAN mode, and in Tagged mode for PW. As long as there is VFI, this command can be used to specify and modify encapsulation type as long as VFI exists.

Parameter: ethernet : Specify encapsulation type for VPLS instance to be in Ethernet mode and in Raw mode for PW.

vlan : Specify encapsulation type for VPLS instance to be in VLAN mode and in Tagged mode for PW.

Default: Encapsulation type for VPLS instance to be in VLAN, while in Tagged mode for PW.

Command Mode: VFI configuration mode

Usage Guide: Use this command to modify VFI encapsulation mode. Notice: it can not be modified after PW is established.

Example:

```
Switch(config)#vfi v1 100
```

```
Switch(config-vfi)#encapsulation ethernet
```

4.5 I2-vc

Command: I2-vc <ip-address> pw-id <pw-id> [group <group-id>] [pw-class <class-name>]

no I2-vc <ip-address> pw-id <pw-id>

Function: Configure peer PE for VPWS, no command deletes it.

Parameter: <ip-address> : Specify neighbor address of the peer PE in VPWS, the address usually is the router-id of the peer PE or an address of loopback interface.

<pw-id> : Specify PW ID of the peer PE, range from 1 to 4294967295. A PW of two PEs must be same.

<group-id> : Group ID of neighbor in VPWS, range from 1 to 4294967295.

<class-name> : Specify PE template name used by VPWS neighbor, it is a character string with the length from 1 to 32, do not distinguish capital letter and small

letter.

Default: group_id is 0 by default. Do not specify PW-class, the default trans_mode is in tag mode.

Command Mode: Global mode

Usage Guide: Create a VPWS with this command, it needs to specify the address of the peer and the relevant pw-id.

Example:

```
Switch(config)#l2-vc 192.168.0.1 pw-id 1 pw-class c1
```

4.6 mac-address-table limit

Command: `mac-address-table limit vfi <vfi-name> limit <num>`
`no mac-address-table limit vfi <vfi-name>`

Function: Specify the total limit of MAC addresses in VPLS instance. If it exceeds the threshold, the system will not learn MAC addresses, it will broadcast packets among VPLS instance. No command restores the default value.

Parameter: <num>: the number threshold of MAC addresses.

Default: Do not limit the MAC address number in VPLS instances.

Command Mode: System mode

Usage Guide: Use this command to limit the total of MAC address in VFI. If it exceeds the threshold, the system will not learn MAC addresses and the new MAC will not be forwarded.

Example:

```
Switch(config)#vfi v1 100
```

```
Switch(config-vfi)#mac-address-table limit 100
```

```
Switch(config-vfi)#no mac-address-table limit
```

4.7 mac-address-table static address

Command: `mac-address-table static address <FF-FF-FF-FF-FF-FF> vfi <vfi-name>`
`{interface [ethernet | port-channel] <IFNAME> [svid <1-4094>] | peer <peer-address>}`

`no mac-address-table {static | dynamic} [address <FF-FF-FF-FF-FF-FF-FF>] vfi <vfi-name> [interface [ethernet | port-channel] <IFNAME> | peer <peer-address>]`

Function: Configure static MAC addresses in VPLS instance. We can set them to local MAC addresses or remote MAC addresses. No command deletes them.

Parameter: static : specify static MAC addresses, It allows users to configure static VFI MAC addresses so far

<FF-FF-FF-FF-FF-FF> : static MAC addresses

vfi : specify VPLS instance

<vfi-name> : specify name of VPLS, it is a character string with the length from 1 to 32

<IFNAME> : specify interfaces of static MAC addresses, it is a character string with the length from 1 to 32

peer : specify remote station of static MAC

<peer-address> : specify IP address of remote station corresponded with static MAC

Default: No static MAC address.

Command Mode: VFI configuration mode

Usage Guide: Use this command to add/delete static MAC on VFI, the method for processing MAC is same as non-VFI.

Example: Configure static MAC address for local station.

```
Switch(config)#mac-address-table static address 00-00-00-00-00-01 vfi v1 interface
Ethernet1/0/1 svid 200
```

4.8 mtu

Command: mtu <mtu>

no mtu

Function: Specify MTU (maximum transmission unit) in VPLS instance, no command restores the default values.

Parameter: <mtu> : Specify MTU (maximum transmission unit) in VPLS instance. Its range from 576 to 16383.

Default: The default value is 1500.

Command Mode: VFI configuration mode

Usage Guide: Set MTU value forwarded by VPLS, the default value is 1500, its value is related with the actual application. Usually, MTU is not modified, only the small packets can pass, but the big packets can not pass, it will be modified.

Example:

```
Switch(config)#vfi v1 100
Switch(config-vfi)#mtu 1600
```

4.9 peer

Command: peer <ip-address> [pw-id <pw-id>] [no-split-horizon] [pw-class <class-name>]

no peer <ip-address>

Function: Configure the peer PE included in VPLS instance. By default, enable level division. A neighbor without the ability of the level division is considered to correspond with spoke-vc, else correspond with mesh-vc. No command deletes a specified neighbor.

Parameter: <ip-address> : Specify neighbor address of the peer PE in VPLS, usually it is the address of the router-id of the peer PE or an address of loopback interface.

pw-id <pw-id> : Specify PW ID of the peer PE, its range from 1 to 4294967295. A PW of two PEs must be same.

no-split-horizon : disable level division. For mesh neighbor, it must enable level division.

`pw-class <class-name>` : Specify PW template name used by VPLS neighbor, it is a character string with the length from 1 to 32, do not distinguish capital letter and small letter

Default: No PW-class is specified, pw-id is vpls-id, and level division is enabled. Please note that it must enable level division to avoid loopback for the neighbor of mesh.

Command Mode: VFI configuration mode

Example:

```
Switch(config)#vfi v1 100
Switch(config-vfi)#peer 192.168.0.1 pw-class pw1
```

4.10 pw-class

Command: `pw-class <class-name>`

`no pw-class <class-name>`

Function: pw-class is used to create a PW template and enter template view. No command deletes an existing PW template.

Parameter: `<pw-class-name>` : PW template name, it is a character string with the length from 1 to 32, do not distinguish capital letter and small letter

Default: No PE template.

Command Mode: Global mode

Usage Guide: Use this command to create PW template, it can set PW encapsulation mode.

Example:

```
Switch(config)#pw-class pw1
Switch(config-class)#
```

4.11 show mpls l2-vc

Command: `show mpls l2-vc [<vc-id>]`

Function: Display summary information of VC.

Parameter: `<vc-id>` : ID for virtual circuit, its range form 1 to 4294967295

Default: None.

Command Mode: Any modes

Usage Guide: Display the relevant information for VPWS.

Example:

```
Switch#show mpls l2-vc
```

VC ID	State	Type	In Label	Out Label	Endpoint
10	UP	VLAN	645	650	2.2.2.2
14	UP	VLAN	645	650	2.2.2.2

4.12 show pw-class

Command: show pw-class [<class-name>]

Function: Display PW class.

Parameter: <class-name> : name of PW class, it is a character string with the length from 1 to 32.

Default: None

Command Mode: Any modes

Usage Guide: Display pw-class information.

Example:

```
Switch#show mpls l2-vc
```

```
PW-Class Name : class1 , encapsulated mode : VLAN
```

4.13 show vpls

Command: show vpls [<vfi-name> | detail]

Function: Show VPLS instance. If there is no specified vfi-name, it will show all information for VPLS instances. If there is a detail parameter, it will show the detail information for VPLS instance, or it will show summary information for VPLS instance.

Parameter: <vfi-name> : name of VPLS instance, it is a character string with the length from 1 to 32.

detail: show the detail information.

Default: None.

Command Mode: Any modes

Usage Guide: Show VPLS information.

Example:

```
Switch#show vpls
```

Name	VPLS-ID	Type	MTU	Peers	State
govern	100	Ethernet	1500	2	Active

4.14 show vpls fib

Command: show vpls fib [<vfi-name>]

Function: Show forwarding table of VPLS instance.

Parameter: <vfi-name> : name of VPLS instance, it is a character string with the length from 1 to 32.

Default: None.

Command Mode: Any modes

Usage Guide: Show VPLS forwarding instances.

Example:

```
<Sysname> show vpls fib vfi vpna
```

```
VfiName Pwld Inlabel OutLabel NextHop
vpna 1 103 102 6.1.1.1
```

Table 4-1 information description table

Display	Description
VfiName	Name of VPLS instance
Pwld	ID in PW of VPLS instance
Inlabel	Inlabel value of VPLS instance
OutLabel	OutLabel value of VPLS instance
NextHop	Nexthop address of VPLS instance

4.15 show vfi mac-address-table

Command: show mac-addresses-table [vfi <vfi-name>]

Function: Display MAC address table in VPLS instance. If there is parameter input, it will display the specified MAC address table, or it will display all MAC address tables.

Parameter: vfi : specify VPLS instance

<vfi-name> : name of VPLS instance, it is a character string with the length from 1 to 32.

Default: None.

Command Mode: Any modes

Usage Guide: Display MAC address learnt from VPLS.

Example:

```
switch# show mac-address-table vfi aaa
```

```
Vfi      MAC Address      Type      Creator      Ports
----      -
aaa      00-01-02-03-04-05 Dynamic    ethernet1/0/1
```

Table 4-2 description information

Vfi	Name of VPLS instance
MAC Address	MAC address
Type	Type of MAC address, Static or Dynamic
Creator	Creator of MAC address
Ports	Port name, it will be N/A if it is null.

4.16 show mac-address-table count

Command: show mac-addresses-table count [vfi <vfi-name>]

Function: Display total of MAC address table in VPLS instance. If there is parameter input, it will display total of MAC address table in VPLS instance, or it will display all MAC address tables.

Parameter: vfi : specify VPLS instance

<vfi-name> : name of VPLS instance, it is a character string with the length from 1 to 32.

Default: None.

Command Mode: Any modes

Usage Guide: Display the statistic MAC addresses learnt from VFI.

Example:

```
switch# show mac-address-table count
Vfi      MAC count
-----  -
vpna    100
vpnb    90
```

4.17 show vpls peer

Command: show vpls peer [<vfi-name>] {mesh | spoke}

Function: Display PW summary in VPLS instance. If there is no vfi-name parameter input, it will display all information of mesh or spoke neighbor in VPLS instance.

Parameter: <vfi-name> : name of VPLS instance, it is a character string with the length from 1 to 32.

mesh: display mesh neighbor

spoke : display spoke neighbor

Default: None.

Command Mode: Any modes

Usage Guide: Display the relevant peer of the specified type for VPLS.

Example:

```
switch#show vpls peer aaa mesh
PW-ID  Peer Addr In-Intf  In-Label  Out-Intf  Out-Label Lkps/St
-----  -
100    2.2.2.2 N/A      650       N/A 651      1/UP
```

Table 4-3 description information

PW-ID	ID of PW
Peer Addr	Address of peer
In-Intf	Name of InInterface, if it is null, display N/A
In-Label	ID of In-Label, if it is null, display none
Out-Intf	Name of Out-Interface, if it is null, display N/A
Out-Label	ID of Out-Label, if it is null, display none
Lkps	Values are 0, 1, 2; 1 stands for PUSH_FOR_VC, 2 stands for PUSH_AND_LOOKUP_FOR_VC
St	State of PW, UP or DOWN

4.18 transport-mode

Command: `transport-mode {ethernet | vlan}`
`no transport-mode`

Function: Configure packet encapsulation mode of PW template, no command restores the default value.

Parameter: ethernet : packets in PW is in ethernet mode without vlan tag.
vlan : packets in PW is in VLAN-tagged mode, drop non-VLAN-tagged packets/

Default: PW transmission mode is VLAN.

Command Mode: PW template configuration mode

Usage Guide: Use this command to create PW template which can set PW encapsulation mode currently. When it conflicts with encapsulation mode of VFI, PW encapsulation mode is preferential.

Example:

```
Switch(config)#pw-class pw1
Switch(config-class)#
```

4.19 vfi

Command: `vfi <vfi-name> <vfi-id>`
`no vfi <vfi-name> <vfi-id>`

Function: Create a VPLS instance, at the same time, it must specify the global and unique VFI-NAME and VFI-ID. vfi-name and vfi-id should be one-to-one correspondence. A vfi-name or vfi-id can uniquely identify a VPLS instance. No command deletes the VPLS instance.

Parameter: <vfi-name> : name of VFI, it is unique in global mode, it is a character string with the length from 1 to 32.

<vfi-id> : VFI ID, its range from 1 to 4294967295.

Default: No VPLS instance.

Command Mode: Global mode

Usage Guide: Use this command to create a VFI and enter VFI view to configure the relevant VFI command.

Example:

```
Switch(config)#vfi v1 1
Switch(config-vfi)#
```

4.20 vfi vfi-name

Command: `vfi <vfi-name>`

Function: Enter VFI mode. When the relevant VPLS instance exists, enter VFI mode.

Parameter: <vfi-name> : name of VFI, it is unique in global mode, it is a character string

with the length from 1 to 32.

Default: No VPLS instance.

Command Mode: Global mode

Usage Guide: Use this command to enter the relevant VFI view.

Example:

```
Switch(config)#vfi v1
```

```
Switch(config-vfi)#
```

4.21 xconnect l2-vc

Command: `xconnect l2-vc pw-id <pw-id> [mode {ethernet | vlan [svid <svid>]]]`
`no xconnect l2-vc pw-id <pw-id>`

Function: Bind port and the specified PW and configure access mode of AC. If access mode is VLAN, it specifies svid additionally. This command binds port and PW directly to establish point-to-point connection, it is used to support VPWS. No command deletes the binding.

Parameter: ethernet : access mode is ethernet

vlan : access mode is VLAN-tagged

<pw-id>: PW ID, its range from 1 to 4294967295

<svid> : service-vlan-id, its range from 1 to 4094

Default: Do not bind port to any PW, access mode is VLAN.

Command Mode: Global mode

Usage Guide: Use this command to bind port to the specified PW, it is used in VPWS.

Example:

```
Switch(config)#interface Ethernet 1/0/1
```

```
Switch(config-if-ethernet1/0/1)#xconnect l2-vc pw-id 1 mode vlan svid 200
```

4.22 xconnect vfi

Command: `xconnect vfi <vfi-id> [mode {ethernet | vlan [svid <svid>]]]`
`no xconnect vfi <vfi-id>`

Function: Bind a port to a VPLS instance and configure AC access mode, no command deletes the binding.

Parameter: <vfi-id>: ID for VPLS instance, its range from 1 to 4294967295

svid: service-vlan-id is outer label, it is used to specify outer VLAN matched with packets

ethernet : access mode is ethernet

vlan : access mode is VLAN-tagged

<svid> : service-vlan-id, its range from 1 to 4094

Default: Do not bind port to any VFI, access mode is VLAN and the default Svid is 0.

Command Mode: Port mode

Usage Guide: Use this command to bind port to the specified VFI, it is used in VPLS.

Example:

```
Switch(config)#interface Ethernet 1/0/1
```

```
Switch(config-if-ethernet1/0/1)#xconnect vfi v100 mode vlan svid 200
```

Chapter 5 MAC-in-MAC

5.1 clear mac-address-table

Command: clear mac-address-table vfi <vfi-name>

Function: Clear MAC address table for forwarding in VFI.

Parameter: vfi-name : Name of MIM instance, it is a character string with the length between 1 and 32.

Default: None

Command Mode: Admin mode

Usage Guide: Use this command to clear MACs of the specified VFI on BEB.

Example: Clear MACs of vfi v1.

Switch#clear mac-address-table vfi v1

5.2 debug mim event

Command: debug mim event

no debug mim event

Function: Enable/disable the debugging for MIM event.

Parameter: None.

Default: Do not show the debugging.

Command Mode: Admin mode

Usage Guide: Enable/disable the debugging for MIM event.

Example: Enable the debugging for MIM event.

Switch#debug mim event

5.3 debug mim packet

Command: debug mim packet [send | receive | detail]

no debug mim packet

Function: Enable the debugging for receiving and sending MIM packets, no command disables the debugging.

Parameter: send : send packet's information

receive : receive packet's information

detail : detail information of receiving and sending packets

Default: Do not show the debugging.

Command Mode: Admin mode

Usage Guide: Use this command on BEB to check the relevant MAC-in-MAC packets processed by software platform.

Example: Enable the debugging for sending MIM packets.

```
Switch#debug vpls packet send
```

5.4 description

Command: `description <text>`

`no description`

Function: Add the descriptive information for MAC-in-MAC instance, no command deletes the information.

Parameter: `<text>` : Descriptive information for VFI, it is a character string with the length between 1 and 128, do not distinguish capital letter and small letter.

Default: No descriptive information

Command Mode: VFI configuration mode

Usage Guide: Configure this command to add the descriptive information for MAC-in-MAC instance in VFI.

Example: Configure the descriptive information as vpn1 in vfi v1.

```
Switch(config)#vfi v1 100 mim 17
```

```
Switch(config-vfi)#description vpn1
```

5.5 mac-address-table limit

Command: `mac-address-table vfi <vfi-name> limit <num>`

`no mac-address-table vfi <vfi-name> limit`

Function: Specify the number of MAC addresses in VFI. If it exceeds the threshold, the system will not learn MAC addresses any more, it will broadcast packets in VFI. No command restores the default value.

Parameter: `<num>`: the threshold of MAC number.

Default: Do not limit the MAC address number in MAC-in-MAC instance.

Command Mode: Global mode

Usage Guide: Use this command to limit the total of MAC address in VFI. If it exceeds the upper limit, the system will not learn the new MAC addresses any more.

Example: Configure 100 MAC addresses learnt in vfi a at most.

```
Switch(config)#mac-address-table vfi a limit 100
```

5.6 mac-address-table static address

Command: `mac-address-table static address <FF-FF-FF-FF-FF-FF> vfi <vfi-name> {interface [ethernet | port-channel] <IFNAME> [svid <1-4094>] | bvlan <1-4094> bmac <FF-FF-FF-FF-FF-FF>}`

`no mac-address-table static address <FF-FF-FF-FF-FF-FF> vfi <vfi-name> {interface [ethernet | port-channel] <IFNAME> [svid <1-4094>] | bvlan <1-`

4094> bmac <FF-FF-FF-FF-FF-FF>}

Function: Configure the remote static MAC addresses for MIM instance. We can set them to local MAC addresses or remote MAC addresses. No command deletes them.

Parameter: FF-FF-FF-FF-FF-FF : static MAC address

vfi-name : specify name of MIM instance

IFNAME : specify interfaces of the local static MAC address, it is a character string with the length between 1 and 32

bvlan : specify bvlan id that the remote static MAC address belongs to

bmac : specify bmac address of the remote static MAC

Default: No static MAC address in MIM instance.

Command Mode: Global mode

Usage Guide: Use this command to configure the static MAC address for MIM instance.

Note: The used B-MAC must be the static virtual port.

Example: Add the remote static MAC address as 0-00-00-00-00-01 in vfi1, specify the corresponding bvlan as 1, bmac as 00-00-00-02-03-05.

```
switch(config)#mac-address-table static address 00-00-00-00-00-01 vfi 1 bvlan 1 bmac 00-00-00-02-03-05
```

5.7 mim address destination default

Command: mim address destination default <mac-addr>

no mim address destination default <mac-addr>

Function: Specify the remote destination B-DA, no command restores the default value.

Parameter: mac-addr: specify the remote destination B-DA which is the unknown multicast address only.

Default: 01:1E:83:xx:xx:xx, xx:xx:xx is the hexadecimal number of isid.

Command Mode: VFI mode

Usage Guide: Specify the default destination B-DA for MIM instance.

Example: Configure the default destination B-DA as 01-01-01-00-00-11 for vfi a.

```
switch(config)#vfi a
```

```
switch(config-vfi)#mim address destination default 01-01-01-00-00-11
```

5.8 mim bmac

Command: mim bmac <FF-FF-FF-FF-FF-FF> bvlan <vlan-id>

no mim bmac <FF-FF-FF-FF-FF-FF> bvlan <vlan-id>

Function: Specify a static B-MAC for MIM instance, no command cancels the operation.

Parameter: FF-FF-FF-FF-FF-FF: unicast bmac address

vfi-id: BVLAN ID

Default: No static b-mac.

Command Mode: Port mode

Usage Guide: Specify a static B-MAC for MIM instance. Usually, the static b-mac is

configured on uplink port, if the static b-mac is configured on downlink port that will result in the abnormality communication.

Example: Configure the static bmac as 00-00-00-00-00-01, bvlan as 1 on port 1/0/1.

```
switch(config)#interface ethernet 1/0/1
```

```
switch(config-if-ethernet1/0/1)#mim bmac 00-00-00-00-00-01 bvlan 1
```

5.9 mim bvlan

Command: `mim bvlan <vlan-id>`

`no mim bvlan <vlan-id>`

Function: Specify a BVLAN for VFI instance, no command restores the default BVLAN.

Parameter: vfi-id : BVLAN ID, its range from 1 to 4094. There is only one B-VALN (it should be a static VLAN) in a MIM instance.

Default: vlan1.

Command Mode: VFI mode

Usage Guide: There is only one B-VALN (it should be a static VLAN) in a MIM instance.

Example: Configure BVLAN as 2 for vfi v1.

```
Switch(config)#vfi v1
```

```
Switch(config-vfi)#mim bvlan 2
```

5.10 mim uplink

Command: `mim uplink vfi <vfi-id>`

`no mim uplink vfi <vfi-id>`

Function: Specify a port to be the uplink port of MAC-in-MAC instance, no command cancels the operation.

Parameter: <vfi-id> : specify VFI ID of MIM instance, its range from 1 to 4294967295.

Default: Do not specify the port to be the uplink port of MIM instance.

Command Mode: Port mode

Usage Guide: None.

Example: Configure port 1/0/1 to be the uplink port of vfi 1.

```
switch(config)#interface ethernet 1/0/1
```

```
switch(config-if-ethernet1/0/1)#mim uplink vfi 1
```

5.11 show mim

Command: `show mim [<vfi-name>]`

Function: Show MIM instance. If vfi-name is not specified, it will show the summary information for all MIM instances. If vfi-name is specified, it will show the detail information for a MIM instance.

Parameter: vfi-name : name of MIM instance, it is a character string with the length

between 1 and 32.

Default: None.

Command Mode: Any modes

Usage Guide: With this command, show MIM instance.

Example: Show MIM instance.

```
switch(config)#show mim
```

```
vfi name: a
```

```
vfi-id:1, vpnid:1, bvlan: 2, default b-mac: 01-1e-83-00-00-11, mtu: 1500, i-sid: 17, default-  
vpindex:3
```

5.12 show vfi mac-address-table

Command: `show vfi mac-addresses-table [vfi <vfi-name>]`

Function: Show the MAC address table for VFI instance. If the parameter is input, it will show the MAC address table of the specified VFI, or it will show C-MAC address tables for all VFI instances.

Parameter: vfi : specify MIM instance

vfi-name : name of MIM, it is a character string with the length between 1 and 32.

Default: None.

Command Mode: Any modes

Usage Guide: With this command, show MAC address table in VFI.

Example: Check MAC address table in VFI.

```
switch(config)#show vfi mac-address-table
```

```
Read mac address table....
```

vfi	Mac Address	Type	Creator	Ports
a	00-00-3e-4e-df-b4	DYNAMIC	Hardware	Ethernet1/0/1

5.13 show vfi mac-address-table count

Command: `show vfi mac-addresses-table count [vfi <vfi-name>]`

Function: Show the number of MAC address table in VFI instance. If the parameter is input, it will show the number of MAC address table in the specified VFI instance, or it will show the number of C-MAC address tables for all VFI instances.

Parameter: vfi : specify VFI instance

vfi-name : name of VFI, it is a character string with the length between 1 and 32.

Default: None.

Command Mode: Any modes

Usage Guide: Show the number of MAC address table in VFI.

Example: Check the number of MAC address table in VFI.

```
switch#show vfi mac-address-table count
vfi          Mac count
-----
a            10
```

5.14 vfi

Command: `vfi <vfi-name> <vfi-id> mim <i-sid>`
`no vfi <vfi-name>`

Function: Create a MIM instance and enter VFI mode, at the same time, we must specify the unique MIM instance name, VFI-ID and ISID in global mode. No command deletes the corresponding VFI.

Parameter: vfi-name : name of VFI, it is unique in global mode, it is a character string with the length between 1 and 32.

vfi-id : specify VFI ID for MIM instance, its range from 1 to 4294967295.

i-sid: specify I-SID for VFI which support MIM function, its range from 17 to 16777214, thereinto, the value from 1 to 16, and 16777215 are saved for the future extension.

Default: No MAC-in-MAC instance.

Command Mode: Global mode

Usage Guide: None.

Example: Create vfi v1, set vfi id as 100, isid as 200.

```
switch(config)# vfi v1 100 mim 200
```

5.15 xconnect vfi

Command: `xconnect vfi <vfi-id> [mode {ethernet | vlan [svid <svid>]]]`
`no xconnect vfi <vfi-id> [mode {ethernet | vlan [svid <svid>]]]`

Function: Bind a downlink port with a MIM instance and enter the access mode. No command deletes the MIM instance bound by the port.

Parameter: vfi-id: ID of MIM instance.

ethernet : access mode with ethernet

vlan : access mode with vlan-tagged

svid : the specified svid ID, its range from 1 to 4094

Default: Do not bind the port to any VFI, access mode is ethernet mode.

Command Mode: Port mode

Usage Guide: Use this command to bind the port to the specified VFI.

Example: Bind port 1/0/1 with VLAN access mode to vfi 100, specify svid as 200.

```
Switch(config)#interface Ethernet 1/0/1
```

```
Switch(config-if-ethernet1/0/1)#xconnect vfi 100 mode vlan svid 200
```