

DES-7200

MPLS Command Reference Guide

Version 10.4(3)

D-Link[®]

DES-7200 CLI Reference Guide

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Preface


Version Description


This manual matches the firmware version 10.4(3).

Target Readers

This manual is intended for the following readers:

 Network engineers

 Technical salespersons

 Network administrators

Conventions in this Document

1. Universal Format Convention

Arial: Arial with the point size 10 is used for the body.

Note: A line is added respectively above and below the prompts such as caution and note to separate them from the body.

Format of information displayed on the terminal: Courier New, point size 8, indicating the screen output. User's entries among the information shall be indicated with bolded characters.

2. Command Line Format Convention

Arial is used as the font for the command line. The meanings of specific formats are described below:

Bold: Key words in the command line, which shall be entered exactly as they are displayed, shall be indicated with bolded characters.

Italic: Parameters in the command line, which must be replaced with actual values, shall be indicated with italic characters.

[]: The part enclosed with [] means optional in the command.

{ x | y | ... }: It means one shall be selected among two or more options.

[x | y | ...]: It means one or none shall be selected among two or more options.

//: Lines starting with an exclamation mark "://" are annotated.

3. Signs

Various striking identifiers are adopted in this manual to indicate the matters that special attention should be paid in the operation, as detailed below:



Caution

Warning, danger or alert in the operation.



Note

Descript, prompt, tip or any other necessary supplement or explanation for the operation.



Note

The port types mentioned in the examples of this manual may not be consistent with the actual ones. In real network environments, you need configure port types according to the support on various products.

The display information of some examples in this manual may include the information on other series products, like model and description. The details are subject to the used equipments.

1 MPLS Configuration Commands

1.1 Basic MPLS Configuration Commands

1.1.1 advertise-labels

Use this command to configure the policy for distributing a label to an IP route Forwarding Equivalence Class (FEC).

[no] advertise-labels [for host-routes | for bgp-routes [acl *acl_name*] | for default-route | for acl *prefix-access-list* [to *peer-access-list*]

	Parameter	Description
Parameter description	for host-routes	(Optional) Distribute labels to host routes (the subnet mask is 32-bit long) only.
	for bgp-routes [acl <i>acl_name</i>]	(Optional) Distribute labels to BGP routes only. You can distribute labels to only the BGP routes meeting conditions by using ACL keywords.
	for default-route	(Optional) Distribute non-3 labels to default routes.
	for acl <i>prefix-access-list</i>	(Optional) Specify the prefix of the routes to which labels are distributed.
	to <i>peer-access-list</i>	(Optional) Specify the neighbors to which label binding information is sent.

Default configuration

By default, labels are distributed to all LDP neighbors.

By default, labels are distributed to all IGP routes instead of BGP routes, for which FTN is not added either.

By default, implicit null label 3 is distributed to default routes.

**Command
mode****config-mpls-router mode****Usage
guidelines**

This command is effective to only the IP route FEC instead of other FECs such as PW FEC. Use the **advertise-labels for acl *fec_acl* to *peer_acl*** command to specify the FECs and LDP peers to which labels are distributed. For specified *fec_acl*, only one rule can be configured; for *peer_acl*, multiple rules can be configured. If this command is configured but no filtering rule is configured in the corresponding ACL, it is equivalent that this command is not configured, that is, FEC label mapping messages are sent normally. A label request received by an LDP session working in DOD mode cannot be replied with a label mapping message if the request cannot meet the label distribution policy as a result of the configured rule. Even if the rule is cancelled afterwards, the request that has been filtered cannot be distributed with a label mapping message. In this case, you can use the **clear mpls ldp neighbor** command to reset the LDP session to make it return to normal. You can use this command to configure a maximum of 64 rules.

Use the **advertise-labels for bgp-routes** command to distribute labels to BGP routes. You can use this command with the *acl* option to distribute labels to BGP routes meeting conditions or use this command without the *acl* option to distribute labels to all BGP routes. Use the **no advertise-labels for bgp-routes** command to disable the distribution of labels to BGP routes. Note that the distribution of labels to BGP routes is still controlled by the label distribution policy of LDP. Use the **advertise-labels for host-routes** command to distribute labels only to route prefixes with 32-bit masks (namely host routes).

Use the **advertise-labels for default-route** command to distribute labels to default routes, thus establishing an LSP for default routes.

Labels are distributed to all FECs by default. Therefore, you must use the `no advertise-labels` command to disable the distribution of labels to all FECs if you want to distribute labels to only the FECs meeting specified ACL rules. In this manner, labels are not distributed to those failing to meet ACL rules.



Caution

After the `no advertise-labels` command is configured, labels are distributed to only the FECs meeting `advertise-labels for acl prefix-access-list [to peer-access-list]` and instead of other FECs. If the preceding rule is not met, labels are not distributed to BGP routes and host routes even if the `advertise-labels for bgp-routes` command or `advertise-labels for host-routes` command is configured.

When the `advertise-labels for host-routes` command is configured, LDP distributes labels to only host routes and adds FTN for only host routes.

Example 1: The following command sets the LDP instance to distribute labels to the host route FEC only:

```
DES-7200(config)# mpls router ldp
DES-7200(config-mpls-router)# advertise-labels for host-routes
```

Example 2: The following command sets the LDP instance not to distribute any label to the LDP peer of the IP route FEC:

```
DES-7200(config)# mpls router ldp
DES-7200(config-mpls-router)# no advertise-labels
```

Examples

Example 3: The following command sets the LDP instance to distribute labels to all LDP peers of the FEC with 192.168.0.0/16 as the route prefix:

```
DES-7200(config)# ip access-list standard fec_acl
DES-7200(config-std-nacl)# permit 192.168.0.0 0.0.255.255
DES-7200(config-std-nacl)# exit
DES-7200(config)# mpls router ldp
DES-7200(config-mpls-router)# no advertise-labels
DES-7200(config-mpls-router)# advertise-labels for acl fec_acl
```

Example 4: The following command sets the LDP instance to distribute

labels to LDP peer 6.6.6.6 and LDP peer 7.7.7.7 of the FEC with 192.168.0.0/24 as the route prefix but to all LDP peers of other FECs:

```
DES-7200(config)#ip access-list standard fec_acl
DES-7200(config-std-nacl)#permit 192.168.0.0 0.0.0.255
DES-7200 (config)#ip access-list standard peer_acl
DES-7200 (config-std-nacl)#permit host 6.6.6.6
DES-7200 (config-std-nacl)#permit host 7.7.7.7
DES-7200(config)# mpls router ldp
DES-7200(config-mpls-router)# advertise-labels for acl fec_acl to
peer_acl
```

Related commands

Command	Description
-	-

Platform description

None

1.1.2 backoff

Use this command to configure the time for LDP exponential backoff. Use the **no** form of this command to restore the default value.

backoff initial-backoff maximum-backoff

no backoff

	Parameter	Description
Parameter description	<i>initial-backoff</i>	Indicate the initial time of exponential backoff in the unit of second, ranging from 5 to 2147483, 15 by default.
	<i>maximum-backoff</i>	Indicate the maximum time of backoff in the unit of second, ranging from 5 to 2147483, 120 by default.

Default configuration

By default, the initial time of exponential backoff is 15s and the maximum time is 120s.

Command mode**config-mpls-router mode****Usage guidelines**

When the LSR acts as the active side, the LDP session cannot be established if the parameters for negotiation are found inconsistent during the establishment of the LDP session. In this case, the LSR keeps attempting to re-establish an LDP session, which wastes system resources. The exponential backoff mechanism is just to prevent the active side from attempting to re-establish an LDP session constantly. The active side attempts to re-establish an LDP session only when the backoff time times out or the CSN of the Help message from the peer changes (which means changes in the configuration of the peer).

Examples

The following command can require the initial time of exponential backoff to be 20s and the maximum time to be 300s in this instance:

```
DES-7200(config)# mpls router ldp
```

```
DES-7200(config-mpls-router)# advertise-labels for bgp-routes
```

Related commands

Command	Description
show mpls ldp parameters	Show the configuration parameters of the LDP instance.

1.1.3 bfd bind backward-lsp-with-ip

Use this command to configure BFD to detect whether the LSP backward link uses an IP address. Use the **no** form of this command to disable this detection function.

bfd bind backward-lsp-with-ip peer-ip *ip-address* [vrf *vrf-name*] interface *interface-type interface-number* [source-ip *ip-address*] local-discriminator *discr-value* remote-discriminator *discr-value*

no bfd bind backward-lsp-with-ip peer-ip *ip-address* [vrf *vrf-name*]

Parameter description

Parameter	Description
peer-ip <i>ip-address</i>	Peer IP address bound by the BFD session

vrf <i>vrf-name</i>	VRF name bound by the BFD session
interface <i>interface-type</i> <i>interface-number</i>	Configure the interface type and interface number.
source-ip <i>ip-address</i>	Source IP address carried by the BDF session
local-discriminator <i>discr-value</i>	Configure the local identifier of the current BFD session, ranging from 1 to 8191.
remote-discriminator <i>discr-value</i>	Configure the remote identifier of the current BFD session, ranging from 1 to 8191.
no	Disable the function for BFD to detect whether the LSP backward link uses an IP address.

Default configuration

By default, this function is disabled.

Command mode

Global configuration mode

**Usage
guidelines**

Use this command to configure BFD to detect whether the LSP backward link uses an IP address as follows:

- If the LSP backward link uses an IP address, the forward LSP must be configured with a local identifier and a remote identifier, that is, manual configuration mode must be adopted.
- The peer IP address needs to be configured, and the source IP address is optional.
- In the case of having no specified source IP address, the source IP address in the BFD packet is not updated if the IP address of the outgoing interface is changed after the BFD session is configured successfully. In the case of having a specified source IP address, the source IP address in the BFD packet is not updated if the source IP address is changed after the BFD session is configured successfully. After the BFD session is established successfully, the identifier cannot be modified.
- The system regularly queries the BFD configuration items that sessions have been submitted but not been established and attempts to establish BFD sessions.
- The system has a limit on the number of BFD sessions. If the number of BFD sessions submitted and established by a user exceeds the upper limit allowed by the system, the system will generate log information to prompt the user.

Examples

In global configuration mode on the switch, the following command configures BFD to detect whether the LSP backward link uses an IP address. The source IP address is 20.20.20.20, and the destination IP address is 10.10.10.10. The outgoing interface is GigabitEthernet 0/2. The local identifier is 1, and the remote identifier is 2. The configuration is as follows:

```
DES-7200#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DES-7200(config)#interface gigabitEthernet 0/2
DES-7200(config-if-GigabitEthernet 0/2)#no switchport
DES-7200(config-if-GigabitEthernet 0/2)#bfd interval 100 min_rx 100
multiplier 3
DES-7200(config-if-GigabitEthernet 0/2)#exit
DES-7200(config)#bfd bind backward-lsp-with-ip peer-ip 10.10.10.10
interface gigabitEthernet 0/2 source-ip 20.20.20.20
local-discriminator 1 remote-discriminator 2
```

Related commands	Command	Description
	bfd	Configure the parameters of the LDP session.
Platform description	None	

1.1.4 bfd bind ldp-lsp

Use this command to configure BFD to detect LDP LSP. Use the **no** form of this command to disable this function.

bfd bind ldp-lsp peer-ip *ip-address* nexthop *ip-address* [interface *interface-type interface-number*] source-ip *ip-address* [local-discriminator *discr-value* remote-discriminator *discr-value*] [process-state]

no bfd bind ldp-lsp peer-ip *ip-address*

Parameter description	Parameter	Description
	peer-ip <i>ip-address</i>	Bind the sink IP address of the LDP LSP by the BFD session.
	nexthop <i>ip-address</i>	Specify the next-hop IP address of LDP LSP.
	interface <i>interface-type interface-number</i>	Configure the interface type and interface number.
	source-ip <i>ip-address</i>	Source IP address carried by the BFD packet
	local-discriminator <i>discr-value</i>	Configure the local identifier of the current BFD session, ranging from 1 to 8191.
	remote-discriminator <i>discr-value</i>	Configure the remote identifier of the current BFD session, ranging from 1 to 8191.
	process-state	Process the state of the current BFD session. For some applications requiring BFD to detect faults such as deployments based on the cooperation BFD and LSP, this parameter is mandatory.
no	Mean disabling this function.	

Default configuration	By default, this function is disabled.
Command mode	LDP configuration mode
Usage guidelines	<p>Use this command to configure BFD to detect an LDP LSP as follows:</p> <ul style="list-style-type: none">■ This command can only be executed on ingress nodes of an LSP.■ When BFD configuration has existed, the BFD configuration item cannot be established. After BFD is configured, a BFD session starts being established immediately if the LDP LSP exists. If the LDP LSP does not exist, a BFD session starts being established when the LDP LSP exists.■ When the LDP LSP is deleted, the BFD session bound to it is deleted. However, the system reserves the configuration item of this BFD session. When the LDP LSP exists, the system re-creates a BFD session.■ The local identifier and remote identifier can be configured in a BFD session. If the local identifier is not configured, the system elects the local identifier automatically. If the LSP backward link adopts an IP address, the forward LSP must be configured with the local identifier and remote identifier manually.■ When the address of the egress of the detected LSP is borrowed or lent, the egress must be specified. Otherwise, the egress does not need to be specified.■ After a BFD session is established successfully, the identifier cannot be modified.■ The system queries regularly BFD configuration items that sessions have been submitted but not been established and attempts to establish BFD sessions.■ The system has a limitation on the number of BFD sessions. If the number of requests for establishing BFD sessions submitted by a user exceeds the limitation, the system prompts the user through log information.

**Caution**

Only LDP LSP detection established by host routes is supported.

One LSP can be configured with only one BFD session.

Example 1: Autonegotiate an identifier.

In LDP configuration mode on the switch, configure BFD to detect LDP LSP. The source IP address is 20.20.20.20, the sink IP address is 10.10.10.10, and the next-hop address is 1.1.1.2. The configuration is as follows:

```
DES-7200#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DES-7200(config)#mpls ip
DES-7200(config)#interface gigabitEthernet 0/2
DES-7200(config-if-GigabitEthernet 0/2)#no switchport
DES-7200(config-if-GigabitEthernet 0/2)#mpls ip
DES-7200(config-if-GigabitEthernet 0/2)#label-switching
DES-7200(config-if-GigabitEthernet 0/2)#bfd interval 100 min_rx 100
multiplier 3
DES-7200(config-if-GigabitEthernet 0/2)#exit
DES-7200(config)#mpls router ldp
DES-7200(config-mpls-router)#ldp router-id interface loopback 0
force
DES-7200(config-mpls-router)#bfd bind ldp-lsp peer-ip 10.10.10.10
nexthop 1.1.1.2 source-ip 20.20.20.20
```

Examples**Example 2: Specify an identifier manually.**

In LDP configuration mode on the switch, configure BFD to detect LDP LSP. The source IP address is 20.20.20.20, the sink IP address is 10.10.10.10, and the next-hop address is 1.1.1.2. The local identifier is 1, and the remote identifier is 2. The BFD session status is processed. The configuration is as follows:

```
DES-7200#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DES-7200(config)#mpls ip
DES-7200(config)#interface gigabitEthernet 0/2
DES-7200(config-if-GigabitEthernet 0/2)#no switchport
```

```

DES-7200(config-if-GigabitEthernet 0/2)#mpls ip
DES-7200(config-if-GigabitEthernet 0/2)#label-switching
DES-7200(config-if-GigabitEthernet 0/2)#bfd interval 100 min_rx 100
multiplier 3
DES-7200(config-if-GigabitEthernet 0/2)#exit
DES-7200(config)#mpls router ldp
DES-7200(config-mpls-router)#ldp router-id interface loopback 0
force
DES-7200(config-mpls-router)#bfd bind ldp-lsp peer-ip 10.10.10.10
nexthop 1.1.1.2 source-ip 20.20.20.20 local-discriminator 1
remote-discriminator 2 process-state

```

**Related
commands**

Command	Description
bfd	Configure the parameters for the BFD session.

**Platform
description**

None

1.1.5 bfd bind static-lsp

Use this command to configure BFD to detect a static LSP. Use the **no** form of this command to disable this function.

bfd bind static-lsp peer-ip *ip-address* source-ip *ip-address* [local-discriminator *discr-value* remote-discriminator *discr-value*] [process-state]

no bfd bind static-lsp peer-ip *ip-address*

**Parameter
description**

Parameter	Description
peer-ip <i>ip-address</i>	Sink IP address of the static LSP bound by the BFD session
source-ip <i>ip-address</i>	Source IP address carried by the BDF packet
local-discriminator <i>discr-value</i>	Configure the local identifier of the current BFD session, ranging from 1 to 8191.
remote-discriminator <i>discr-value</i>	Configure the remote identifier of the current BFD session, ranging from 1 to 8191.

	process-state	Process the state of the current BFD session. For some applications requiring BFD to detect faults such as deloyments based on the cooperation BFD and LSP, this parameter is mandatory.
	no	Mean disabling this function.
Default configuration	By default, this function is disabled.	
Command mode	Global configuration mode	

Usage guidelines

Use this command to configure BFD to detect a static LSP as follows:

- This command can only be executed on ingress nodes of an LSP.
- When the BFD configuration has existed, the BFD configuration item cannot be established. After BFD is configured, a BFD session starts being established immediately if the static LSP exists. If the static LSP does not exist, a BFD session starts being established when the static LSP exists.
- When the static LSP is deleted, the BFD session bound to it is deleted. However, the system reserves the configuration item of this BFD session. When the static LSP exists, the system re-creates a BFD session.
- The local identifier and remote identifier can be configured in a BFD session. If the local identifier is not configured, the system elects the local identifier automatically. If the LSP backward link adopts an IP address, the forward LSP must be configured with the local identifier and remote identifier manually.
- When the address of the egress of the detected LSP is borrowed or lent, the egress must be specified. Otherwise, the egress does not need to be specified.
- After a BFD session is established successfully, the identifier cannot be modified.
- The system queries regularly BFD configuration items that sessions have been submitted but not been established and attempts to establish BFD sessions.
- The system has a limitation on the number of BFD sessions. If the number of requests for establishing BFD sessions submitted by a user exceeds the limitation, the system prompts the user through log information.



Caution

Only static LSP detection established by host routes is supported.

One LSP can be configured with only one BFD session.

Examples

Example 1: Autonegotiate an identifier.

In global configuration mode on the switch, configure BFD to detect static LSP. The source IP address is 20.20.20.20, the sink IP address is 10.10.10.10. The configuration is as follows:

```
DES-7200#configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```

DES-7200(config)#mpls ip
DES-7200(config)#interface GigabitEthernet 0/2
DES-7200(config-if-GigabitEthernet 0/2)#no switchport
DES-7200(config-if-GigabitEthernet 0/2)#label-switching
DES-7200(config-if-GigabitEthernet 0/2)#bfd interval 100 min_rx 100
multiplier 3
DES-7200(config-if-GigabitEthernet 0/2)#exit
DES-7200(config)#bfd bind static-lsp peer-ip 10.10.10.10 source-ip
20.20.20.20

```

Example 2: Specify an identifier manually.

In global configuration mode on the switch, configure BFD to detect static LSP. The source IP address is 20.20.20.20, the sink IP address is 10.10.10.10. The local identifier is 1, and the remote identifier is 2. The BFD session state is processed. The configuration is as follows:

```

DES-7200#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
DES-7200(config)#mpls ip
DES-7200(config)#interface GigabitEthernet 0/2
DES-7200(config-if-GigabitEthernet 0/2)#no switchport
DES-7200(config-if-GigabitEthernet 0/2)#label-switching
DES-7200(config-if-GigabitEthernet 0/2)#bfd interval 100 min_rx 100
multiplier 3
DES-7200(config-if-GigabitEthernet 0/2)#exit
DES-7200(config)#bfd bind static-lsp peer-ip 10.10.10.10 source-ip
20.20.20.20 local-discriminator 1 remote-discriminator 2
process-state

```

Related commands

Command	Description
bfd	Configure the parameters for the BFD session.

Platform description

None

1.1.6 clear mpls ldp neighbor

Use this command to forcibly disconnect an LDP session and re-establish an LDP session.

```
clear mpls ldp neighbor [all | vrf vrf-name] [* | ip-address]
```

	Parameter	Description
Parameter description	all	Forcibly disconnect LDP sessions under all virtual routing and forwarding instances (VRFs, including default global VRF) and re-establish sessions.
	vrf <i>vrf-name</i>	Forcibly disconnect LDP sessions under specified VRFs and re-establish sessions.
	*	Forcibly disconnect LDP sessions under specified VRFs or all VRFs and re-establish sessions.
	ip-address	Forcibly disconnect LDP sessions established between specified VRFs or all VRFs and specified LDP peers and re-establish sessions.
Default configuration	None	
Command mode	Privileged mode	
Usage guidelines		If no VRF is specified in this command, it indicates that LDP sessions under the default global VRF are forcibly reset.
Examples		<p>The following command forcibly resets all established LDP sessions under the default global VRF:</p> <pre>DES-7200# clear mpls ldp neighbor *</pre> <p>The following command forcibly resets the LDP sessions established between the default global VRF and the peer 10.10.10.10:</p> <pre>DES-7200# clear mpls ldp neighbor 10.10.10.10</pre> <p>The following command forcibly resets the LDP sessions established</p>

under all VRFs (including default global VRF):

```
DES-7200# clear mpls ldp neighbor all *
```

Related commands	Command	Description
	show mpls ldp neighbor	Show the state of the LDP session.
Platform description	None	

1.1.7 discovery targeted-Hello

Use this command to set the holdtime or interval for the extended peer Hello message. Use the **no** form of this command to restore the default value.

discovery targeted-Hello {holdtime/interval} *seconds*

no discovery targeted-Hello {holdtime/interval}

Parameter description	Parameter	Description
	holdtime	The holdtime of the Hello message for the extended mechanism.
	interval	The interval of the Hello message for the extended mechanism.
	<i>seconds</i>	Range within 1-65535

Default configuration	By default, the holdtime of the Hello message for the extended mechanism is 45s, and the interval of the Hello message is 5s, which is 1/9 of the holdtime.
------------------------------	---

Command mode	config-mpls-router mode
---------------------	--------------------------------

Usage guidelines

For the actual configuration, it is necessary to ensure the holdtime of the target Hello is larger than the interval value. Otherwise, LDP can not work normally according to the requirement. Note that this command is valid for the targeted Hello used by the extended discovery mechanism only.

Examples

```
DES-7200(config)# mpls route ldp
DES-7200(config-mpls-router)# discovery target-Hello holdtime 90
```

Related commands

Command	Description
show mpls ldp parameters	Show the LDP global configuration attribute

1.1.8 explicit-null

Use this command to configure the distribution of explicit null labels to direct routes or direct route prefixes meeting specified ACL rules, or the distribution of explicit null labels to only the neighbors meeting rules and of implicit null labels to other neighbors. Use the **no** form of this command to cancel relevant configurations.

explicit-null [for *prefix-acl*] [to *peer-acl*]

no explicit-null

Parameter description

Parameter	Description
for <i>prefix-acl</i>	(Optional) Specify the prefixes of direct routes whose implicit null labels are replaced with explicit null labels.
to <i>peer-acl</i>	(Optional) Specify the LDP peers whose implicit null labels can be replaced by explicit null labels.

Default configuration

By default, implicit null labels are distributed to direct routes for all peers.

Command mode**config-mpls-router mode****Usage guidelines**

1. When the LSP of the FEC to which a direct route corresponds serves as the bearer tunnel of an L2 VPN or an L3 VPN, an explicit null label cannot be distributed to the corresponding FEC of this direct route.

2. If a command to distribute explicit null labels is configured but no filtering rule is configured in the corresponding ACL, it is equivalent that the command is not configured, that is, implicit null labels are distributed to direct routes for all neighbors.

3. This command can be configured for global LDP instances only, and VRFs do not support this command.

Examples

If no parameter is specified, it indicates that explicit null labels are distributed to all direct routes by LDP:

```
DES-7200(config)# mpls router ldp
```

```
DES-7200(config-mpls-router)# explicit-null
```

The following command configures LDP to distribute explicit null labels to LDP peer 1.1.1.1 for direct routes with 192.168.0.0/16 as the prefix. Otherwise, the LDP distributes implicit null labels.

```
DES-7200(config)#ip access-list standard fec_acl
```

```
DES-7200(config-std-nacl)#permit 192.168.0.0 0.0.255.255
```

```
DES-7200(config-std-nacl)#exit
```

```
DES-7200(config)#ip access-list standard peer_acl
```

```
DES-7200(config-std-nacl)#permit host 1.1.1.1
```

```
DES-7200(config-std-nacl)#exit
```

```
DES-7200(config)# mpls router ldp
```

```
DES-7200(config-mpls-router)# explicit-null for fec_acl to peer_acl
```

Related commands

Command	Description
-	-

Platform description

None

1.1.9 graceful-restart

Use this command to enable the graceful restart (GR) capability of LDP. Use the **no** form of this command to disable the GR capability of LDP.

graceful-restart

no graceful-restart

Parameter description	Parameter	Description
	no	Disable the GR capability of LDP.

Default configuration

By default, the GR capability of LDP is disabled.

Command mode

config-mpls-router mode

Usage guidelines

Use this command to enable the GR capability of LDP as follows:

- If a dual-engine device is enabled with the GR capability of LDP, traffic can be forwarded uninterruptedly and MPLS forwarding state can be consistent before and after restart when the master management board of the device becomes faulty or master/slave switchover is performed manually.
- By default, the GR capability is disabled on either of devices acting as GR-Restarter and GR-Helper.



Note

The LDP session must be restarted to make the GR capability of LDP take effect.

Examples

The following command enables the GR capability of LDP:

```
DES-7200#configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
DES-7200(config)#mpls router ldp
DES-7200(config-mpls-router)#graceful-restart
```

**Related
commands**

Command	Description
show mpls ldp graceful-restart	Show the LDP GR session and its parameters.

**Platform
description**

None

1.1.10 graceful-restart timer neighbor-liveness

Use this command to configure the survival time for an LDP neighbor. Use the **no** form of this command to restore the default value.

graceful-restart timer neighbor-liveness *seconds*

no graceful-restart timer neighbor-liveness

**Parameter
description**

Parameter	Description
<i>seconds</i>	Configure the survival time for an LDP neighbor, ranging from 5s to 300s.
no	Restore the default value.

**Default
configuration**

By default, the survival time for an LDP neighbor is 120s.

**Command
mode**

config-mpls-router mode

Usage guidelines

Use this command to configure the survival time for an LDP neighbor as follows:

- The device uses this value only when it acts as a GR-Helper.
- When a device acts as a GR-Helper, it selects the smaller value of the configured neighbor-liveness time and the received reconnect time to enable the survival timer and keeps "old" entries before the survival timer times out.



The LDP session must be restarted to make the survival time for an LDP neighbor take effect.

Note**Examples**

The following command configures the survival time for an LDP neighbor as 200s:

```
DES-7200#configure terminal
```

Enter configuration commands, one per line. End with CNTL/Z.

```
DES-7200(config)#mpls router ldp
```

```
DES-7200(config-mpls-router)#graceful-restart
```

```
DES-7200(config-mpls-router)#graceful-restart timer  
neighbor-liveness 200
```

Related commands

Command	Description
<code>show mpls ldp graceful-restart</code>	Show the LDP GR session and its parameters.

Platform description

None


1.1.11 graceful-restart timer reconnect

Use this command to configure the LDP session reconnect time. Use the **no** form of this command to restore the default value.

graceful-restart timer reconnect *seconds*

no graceful-restart timer reconnect

Parameter	Parameter	Description
-----------	-----------	-------------

description	<i>seconds</i>	Configure the LDP session reconnect time, ranging from 30s to 600s.
	no	Restore the default value.
Default configuration	By default, the LDP session reconnect time is 300s.	
Command mode	config-mpls-router mode	
Usage guidelines	<p>Use this command to configure the LDP session reconnect time as follows:</p> <ul style="list-style-type: none"> ■ During GR, both of devices acting as GR-Restarter and GR-Helper use the LDP session reconnect time. ■ For the GR-Restarter, the LDP session reconnect time is used to keep "old" entries time. ■ The GR-Helper selects the smaller value of the configured neighbor-liveness time and the received reconnect time to enable the survival timer and keeps "old" entries before the survival timer times out. <hr/> <div style="display: flex; align-items: center;">  <div> <p>The LDP session must be restarted to make the LDP session reconnect time take effect.</p> <p>Note</p> </div> </div>	
Examples	<p>The following command configures the LDP neighbor reconnect time as 400s:</p> <pre>DES-7200#configure terminal DES-7200(config)#mpls router ldp DES-7200(config-mpls-router)#graceful-restart DES-7200(config-mpls-router)#graceful-restart timer reconnect 400</pre>	

Related commands	Command	Description
	<code>show mpls ldp graceful-restart</code>	Show the LDP GR session and its parameters.
Platform description	None	

1.1.12 graceful-restart timer recovery

Use this command to configure the LDP session recovery time. Use the **no** form of this command to restore the default value.


graceful-restart timer recovery *seconds*

no graceful-restart timer recovery

Parameter description	Parameter	Description
	<i>seconds</i>	Configure the LDP session recovery time, ranging from 15s to 600s.
	no	Restore the default value.

Default configuration	By default, the LDP session recovery time is 120s.
------------------------------	--

Command mode	config-mpls-router mode
---------------------	--------------------------------

<p>Usage guidelines</p>	<p>Use this command to configure the LDP session recovery time as follows:</p> <ul style="list-style-type: none"> ■ The device uses this value only when it acts as a GR-Helper. ■ When a device acts as a GR-Helper, it selects the smaller value of the configured recovery time and the received recovery time to enable the recovery timer and keeps "old" entries before the recovery timer times out. <hr/> <div style="display: flex; align-items: center;">  <p>The LDP session must be restarted to make the LDP session recovery time take effect.</p> </div> <p>Note</p>				
<p>Examples</p>	<p>The following command configures the LDP session recovery time as 200s:</p> <pre>DES-7200#configure terminal DES-7200(config)#mpls router ldp DES-7200(config-mpls-router)#graceful-restart DES-7200(config-mpls-router)#graceful-restart timer recovery 200</pre> <p>Enter configuration commands, one per line. End with CNTL/Z.</p>				
<p>Related commands</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #e0e0e0;"> <th style="text-align: left;">Command</th> <th style="text-align: left;">Description</th> </tr> </thead> <tbody> <tr> <td><code>show mpls ldp graceful-restart</code></td> <td>Show the LDP GR session and its parameters.</td> </tr> </tbody> </table>	Command	Description	<code>show mpls ldp graceful-restart</code>	Show the LDP GR session and its parameters.
Command	Description				
<code>show mpls ldp graceful-restart</code>	Show the LDP GR session and its parameters.				
<p>Platform description</p>	<p>None</p>				

1.1.13 label-merge

Use this command to enable global label merge. Use the **no** form of this command to disable this function.

[no] label-merge

<p>Default configuration</p>	<p>Enabled.</p>
-------------------------------------	-----------------

Command mode	<code>config-mpls-router</code> mode.						
Usage guidelines	In the DU advertise control mode, label merge cannot be disabled. This command configuration resets the LDP session.						
Examples	<pre>DES-7200(config)# mpls route ldp DES-7200(config-mpls-router)# label-merge</pre>						
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><code>show mpls ldp parameters</code></td> <td>Show the LDP global configuration attribute</td> </tr> <tr> <td><code>mpls ldp distribution-mode</code></td> <td>Configure the label distribution mode used for each interface.</td> </tr> </tbody> </table>	Command	Description	<code>show mpls ldp parameters</code>	Show the LDP global configuration attribute	<code>mpls ldp distribution-mode</code>	Configure the label distribution mode used for each interface.
Command	Description						
<code>show mpls ldp parameters</code>	Show the LDP global configuration attribute						
<code>mpls ldp distribution-mode</code>	Configure the label distribution mode used for each interface.						

1.1.14 label-retention-mode

Use this command to set the label retention mode. Use the **no** form of this command to restore the default value.

label-retention-mode {liberal | conservative}

[no] label-retention-mode

	Parameter	Description
Parameter description	liberal	Use the liberal label retention mode
	conservative	Use the conservative label retention mode

Default configuration	Use the liberal label retention mode
------------------------------	--------------------------------------

Command mode	config-mpls-router mode				
Usage guidelines	Use this command to reset and rebuild the LDP session.				
Examples	<pre>DES-7200(config)# mpls route ldp DES-7200(config-mpls-router)# label-retention-mode liberal</pre>				
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show mpls ldp parameters</td> <td>Show the LDP global configuration attribute</td> </tr> </tbody> </table>	Command	Description	show mpls ldp parameters	Show the LDP global configuration attribute
Command	Description				
show mpls ldp parameters	Show the LDP global configuration attribute				

1.1.15 label-switching

When the MPLS multi-service card is used to forward the MPLS service, use this command to enable the interface to process the MPLS label message.

[no] label-switching

Default configuration	For the equipment which uses the MPLS multi-service card to forward the MPLS service, its interface can not process the MPLS label message by default.
Command mode	Interface configuration mode.
Usage guidelines	This command is valid only for the equipment which uses the MPLS multi-service card(7200-ASE3) to forward the MPLS service.
Examples	<pre>DES-7200(config)# interface Gi4/1 DES-7200(config-if)# label-switching</pre>

Related commands	Command	Description
	show mpls label-pool	Show the usage of the label pool in each label space

1.1.16 ldp router-id

Use this command to set the router ID of the LDP. Use the **no** form of this command to restore the default value, which does not take effect immediately.

ldp router-id { *ip-address* | interface *interface-name* [**force**]}

no ldp router-id

Parameter description	Parameter	Description
	<i>ip-address</i>	Specify a static IP address as the router ID of LDP. It takes effect immediately after being configured.
	<i>interface-name</i> [force]	Configure the primary address of a specified interface as the router ID of LDP. If the force keyword is specified, the new router ID is forced to take effect immediately. Otherwise, the new router ID will not take effect immediately.

Default configuration	Use the system router ID as the LDP router ID.
------------------------------	--

Command mode	config-mpls-router mode
---------------------	--------------------------------

**Usage
guidelines**

If a static IP address is specified as the router ID of LDP and the address takes effect immediately after being configured, it indicates that the established session is disconnected and that a new router ID is used to re-establish a session.

If the IP address of a specified interface is specified as the router ID of LDP and the **force** keyword is not carried, the primary address of the currently configured interface is used as the new router ID only when the currently used router ID is unavailable. To use the address of an interface as the router ID, the following conditions must be met:

- (1) The VRF to which the interface belongs must be the same as that to which LDP belongs.
- (2) The interface must be in Up state.

Otherwise, the router ID cannot take effect even if the **force** keyword is specified. The router ID takes effect only when the preceding conditions are met (in the case that the **force** keyword is specified).

If a configured static IP address replaces a configured interface address to act as the router ID of LDP or vice versa, the router ID takes effect immediately. In this case, the LDP sessions established under the LDP instance are disconnected automatically and then re-established.

It is recommended to use an interface address as the router ID of LDP. The purpose of using a static address is mainly to be compatible with commands of earlier versions.

Examples

```
DES-7200(config)# mpls router ldp
```

```
DES-7200(config-mpls-router)# ldp router-id interface vlan 10 force
```

**Related
commands**

Command	Description
show mpls ldp parameter	Show all LDP configuration parameters under all or specified VRFs.

1.1.17 loop-detection

Use this command to enable loop detection. Use the **no** form of this command to disable loop detection.

[no]loop-detection

Default configuration	Disabled.								
Command mode	config-mpls-router mode								
Usage guidelines	Use this command to reset and rebuild the LDP session.								
Examples	<pre>DES-7200(config)# mpls router ldp DES-7200(config-mpls-router)# loop-detection</pre>								
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show mpls ldp parameters</td> <td>Show the LDP global configuration attribute</td> </tr> <tr> <td>mpls ldp max-path-vector</td> <td>Configure the maximum path vector allowed for LDP loop detection</td> </tr> <tr> <td>mpls ldp max-hop-count</td> <td>Configure the maximum hop count allowed for LDP loop detection</td> </tr> </tbody> </table>	Command	Description	show mpls ldp parameters	Show the LDP global configuration attribute	mpls ldp max-path-vector	Configure the maximum path vector allowed for LDP loop detection	mpls ldp max-hop-count	Configure the maximum hop count allowed for LDP loop detection
Command	Description								
show mpls ldp parameters	Show the LDP global configuration attribute								
mpls ldp max-path-vector	Configure the maximum path vector allowed for LDP loop detection								
mpls ldp max-hop-count	Configure the maximum hop count allowed for LDP loop detection								

1.1.18 lsp-control-mode

Use this command to set the LDP control mode globally. Use the **no** form of this command to restore the default value.

lsp-control-mode [**independent** | **ordered**]

no lsp-control-mode

Parameter description	Parameter	Description
	independent	Use the independent control mode
	ordered	Use the ordered control mode

Default configuration	Independent control mode				
Command mode	config-mpls-router mode				
Usage guidelines	Use this command to reset and rebuild the LDP session.				
Examples	<pre>DES-7200(config)# mpls router ldp DES-7200(config-mpls-router)# lsp-control-mode ordered</pre>				
Related commands	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #e0e0e0;"> <th style="padding: 5px;">Command</th> <th style="padding: 5px;">Description</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">show mpls ldp parameters</td> <td style="padding: 5px;">Show the LDP global configuration attribute</td> </tr> </tbody> </table>	Command	Description	show mpls ldp parameters	Show the LDP global configuration attribute
Command	Description				
show mpls ldp parameters	Show the LDP global configuration attribute				

1.1.19 mpls ip (Global configuration mode)

Use this command to enable the MPLS forward in the global configuration mode. Use the **no** form of this command to disable MPLS forward.

[no] mpls ip

Default configuration	The MPLS forward is not enabled.
Command mode	Global configuration mode.

Usage guidelines

To implement the mpls forward, it is necessary to enable the MPLS globally firstly.

This command is invalid for the mpls forward on the switch. After the mpls forward is disabled by the process forward, the switch can not send and receive the MPLS messages.

Examples

```
DES-7200(config)# mpls ip
```

Related commands

Command	Description
mpls ip	Enable the MPLS in the interface configuration mode.

1.1.20 mpls ip (Interface configuration mode)

Use this command to enable the MPLS forward and the LDP functions in the interface configuration mode. Use the no form of this command to disable the LDP function to terminate the MPLS forward.

[no] mpls ip**Default configuration**

Disabled.

Command mode

Interface configuration mode.

Usage guidelines

For the interface which doesn't use the MPLS multi-service card to forward the MPLS service, the MPLS forward function is disabled by default. Therefore, you must use this command to enable the MPLS forward function, and the LDP function on the interface is enabled automatically at the same time. If the LDP function is not enabled on this interface, it can not use the LDP to set up the LSP.

It only allows enable the MPLS function on the L3 interface.

Examples

```
DES-7200(config)# interface Gi4/1
```

```
DES-7200(config-if)# mpls ip
```

Related commands

Command	Description
mpls ldp Hello-interval	Configure the interval for sending Hello messages
mpls ldp Hello-holdtime	Configure the Hello packet holdtime

1.1.21 mpls ip fragment

Use this command to set the processing if it exceeds the MPLS MTU after the IP message is encapsulated with the MPLS label.

[no] mpls ip fragment**Default configuration**

After the entered IP packet is encapsulated with the MPLS label, if its size exceeds the defined size of the MPLS MTU, it will carry out the fragment to the original IP packet before the MPLS label is encapsulated to send.

Command mode

Global configuration mode.

Usage guidelines

This command is valid only for the process forward. Use the **no mpls ip fragment** command to disable the fragment function for process forward. Namely, it will be discarded directly if its size exceeds the defined size of the MPLS MTU after the entered IP packet is encapsulated with the MPLS label.

Examples

```
DES-7200(config)# no mpls ip fragment
```

Related

Command	Description
---------	-------------

	mpls ip	Enable MPLS globally.
--	----------------	-----------------------

1.1.22 mpls ip icmp-error pop

Use this command to set the processing mode for ICMP error packets during the forwarding of MPLS packets.

mpls ip icmp-error pop *labels*

no mpls ip icmp-error pop

	Parameter	Description
Parameter description	<i>labels</i>	Number of labels for packets to be processed

Default configuration	By default, the generated ICMP error packet continues to be forwarded along the original LSP after being labeled with the original tag.
------------------------------	---

Command mode	Global configuration mode
---------------------	---------------------------

Usage guidelines	By default, the generated ICMP error packet continues to be forwarded along the original LSP until to the LSP egress. At the egress, the packet is rerouted and forwarded according to the inner IP address after its label stack is removed. You can use this command to change this default action by configuring packets with different numbers of labels to be processed differently. When the number of labels of a forwarded packet is less than or equal to the configured value, the ICMP error packet directly uses the IP route forwarding table of the FEC to which the top label corresponds.
-------------------------	---

Examples	DES-7200(config)# mpls ip icmp-error pop 2
-----------------	---

	Command	Description
Related		

	mpls ip	Enable MPLS globally.
Platform description	None	

1.1.23 mpls ip ttl propagate

Use this command to enable or disable the IP TTL copy function of the MPLS.

mpls ip ttl propagate {public | vpn}

no mpls ip ttl propagate {public | vpn}

	Parameter	Description
Parameter description	public	Specify whether to enable TTL copy function or not for the sending messages.
	vpn	Specify whether to enable TTL copy function or not for the forwarding messages.
Default configuration	By default, it enables TTL copy function for both the sending and forwarding messages.	
Command mode	Global configuration mode	

Usage guidelines

The following are two modes of MPLS TTL:

- **TTL copy mode:** it is the default working mode. In this mode, the pushed label TTL is copied from the TTL of the existed header of the IP packet or the MPLS packet when Pushing the label. The TTL of the inner IP packet or the MPLS packet is copied from the TTL of the outer label when Popping the label.
- **TTL non-copy mode:** in this mode, set the value of pushed label TTL to 255 when Pushing the label and keep the value of the TTL of the inner IP packet or the MPLS packet when Popping the label.

Caution:

After the TTL copy is enabled, the TTL of the inner header is not copied but retained if it is smaller than the TTL of the outer header.

For the switch products, the TTL of the inner header is directly copied from the outer header during the PHP Pop operation, if TTL copy is enabled. The TTL of the packets forwarded, however, does not decrease by one. If TTL non-copy is enabled, the TTL of the inner header does not copy that from the outer header. Instead, the TTL of the inner header is retained. The TTL of packets forwarded also does not decrease by one.

Examples

The following example disables the TTL copy function of the forwarding message:

```
DES-7200(config)# mpls ip ttl propagate public
```

Related commands

Command	Description
mpls ip	Enable MPLS globally.

1.1.24 mpls ldp distribution-mode

Use this command to set the label distribution mode used by LDP on each interface. Use the **no** form of this command to restore the default value.

mpls ldp distribution-mode {dod | du}

no mpls ldp distribution-mode

Parameter description	Parameter	Description
	dod	Use the downstream on-demand distribution mode
	du	Use the downstream active distribution mode
Default configuration	Use the downstream active distribution mode.	
Command mode	Interface configuration mode.	
Usage guidelines	If the interconnected LDP sessions use different distribution modes, the du mode will be used forcibly for both of them. Use this command to reset and rebuild the LDP session.	
Examples	<pre>DES-7200(config)# interface vlan 10 DES-7200(config-if)# mpls ldp distribution-mode dod</pre>	
Related commands	Command	Description
	loop detection-mode	Configure loop detection

1.1.25 mpls ldp frr nexthop

Use this command to enable the LDP FRR function on an interface. Use the **no** form of this command to disable the LDP FRR function.

mpls ldp frr nexthop nexthop-address [**interface interface-type interface-number**] [**acl acl-name**] [**priority priority**]

no mpls ldp frr nexthop {* | *nexthop-address* [**interface interface-type interface-number**] [**acl acl-name**] [**priority priority**]}

	Parameter	Description
Parameter description	nexthop <i>nexthop-address</i>	Specify the next hop IP address of a backup port.
	interface <i>interface-type</i> <i>interface-number</i>	Configure the interface type and interface number.
	acl <i>acl-name</i>	The FEC that matches the IP prefix defined with the name of a specified ACL can generate a backup LSP.
	priority <i>priority</i>	Specify the priority of a backup LSP. The smaller the priority value, the higher the priority of a backup LSP. The priority value is an integer, ranging from 1 to 65535, 10 by default.
	nexthop *	Indicates all next hop IP addresses, namely all backup ports.
	no	Mean disabling the LDP RFF function.
Default configuration	By default, the LDP FRR function is disabled.	
Command mode	Interface configuration mode	
Usage guidelines	<p>This command is used to configure the LDP FRR function on an interface and generate a backup LSP by specifying a backup port:</p> <ul style="list-style-type: none"> ■ When the address of the backup port is borrowed or lent, the interface type and interface number must be specified. ■ To configure the LDP FRR function on an interface, the specified backup port must be under one VRF with the current interface, which cannot be specified as the backup port. ■ If the LDP FRR function is configured on an interface, the LDP FRR configuration on the interface is automatically deleted when 	

the backup port is deleted.

- Multiple backup ports can be configured on one interface and distinguished by priority. If the next hop IP address of a backup port is specified on an interface but the priority is not specified, the default priority is adopted. If the next hop IP addresses of backup ports are specified on one interface but priorities are not specified, the subsequent configuration overwrites the preceding configuration and default priorities are adopted, that is, only one backup port is configured on this interface.
- There can be a maximum of 10 backup ports with 10 different priorities on an interface, but only one backup port is elected as the effective one. If the effective backup port becomes faulty, the system re-elects another effective backup port from configured backup ports according to priorities.
- You can configure an ACL rule for the FEC of routes with the same next hop on one interface.
 - LDP FRR can only process standard ACLs, that is, ACLs created by using the **ip access-list standard** command.
 - If no ACL rule is specified, LDP FRR attempts to establish an LSP on the path specified by *nexthop-address* for all FECs passing an interface.
 - If an ACL rule is specified and there are both Permit items and Deny items in the ACL rule, a backup LSP can be established on the path specified by *nexthop-address* for only the LSP to which the FEC permitted by the interface corresponds.
 - The ACL rule name is specified when LDP FRR is configured. However, if the user does not create an ACL rule (that is, no ACL rule exists), the system performs Deny operations to all FECs passing an interface, that is, the system does not establish LSPs for all FECs passing an interface.

**Caution**

In configuring LDP FRR, you must configure the label to work in free retention mode.

**Note**

During LDP GR, the LDP FRR function cannot be enabled or disabled.

Examples

The following example enables the LDP FRR function on GE0/1 of the switch. The next hop IP address of the backup port is 5.5.51.

```
DES-7200#configure terminal

Enter configuration commands, one per line. End with CNTL/Z.

DES-7200(config)#mpls ip

DES-7200(config)#interface GigabitEthernet 0/1

DES-7200(config-if-GigabitEthernet 0/1)#label-switching

DES-7200(config-if-GigabitEthernet 0/1)#mpls ip

DES-7200(config-if-GigabitEthernet 0/1)#exit

DES-7200(config)#mpls router ldp

DES-7200(config-mpls-router)#exit

DES-7200(config)#interface gigabitEthernet 0/1

DES-7200(config-if-GigabitEthernet 0/1)#mpls ldp frr nexthop 5.5.5.1
```

Related commands

Command	Description
show mpls rib	View MPLS routing information.

Platform description

None

1.1.26 mpls ldp frr timer protect-time

Use this command to configure the time of the LDP FRR protection timer for controlling the time used for the slave link to switch as the master link, with second as the unit. Use the **no** form of this command to restore the default value.

mpls ldp frr timer protect-time {infinity | seconds}

no mpls ldp frr timer protect-time

Parameter description

Parameter	Description
infinity	When the LSP link returns to normal, its traffic will not be transferred to the master LSP link for ever.
seconds	Indicates the time of protection timer. The value is an integer, ranging from 0 to 65535s.

	no	Restore the default value of 10s.
Default configuration	By default, the time of protection timer is 10s. It indicates that, within this time, if the master LSP link recovers from the fault, the traffic is transferred to the master LSP link when the protection timer times out.	
Command mode	Interface configuration mode	
Usage guidelines	<p>If the time of the LDP FRR protection timer is configured, the system does not transfer the service traffic to the master link immediately after the master link recovers from the fault. Instead, the system transfers the service traffic to the master link after the LDP FRR protection timer times out, thus preventing switchover of traffic on the master/slave links caused by Up/Down oscillation.</p> <hr/> <p>1. In the following cases, Up/Down oscillation can be suppressed for the reason that the routing protocol is not aware of the change in the next hop immediately after link fault recovery.</p> <p>(1) The master LSP link uses BFD and OSPF but is not configured with cooperation between BFD and OSPF.</p> <p>(2) The master LSP link uses BFD and a protocol other than OSPF.</p> <p>2. In the following cases, Up/Down oscillation cannot be suppressed for the reason that the routing protocol is aware of the change in the next hop immediately after link fault recovery.</p> <p>(1) The master LSP link uses BFD and OSPF and is configured with cooperation between BFD and OSPF.</p> <p>(2) The master LSP link uses interface detection.</p>	
Examples	<p>The following example enables LDP on GE0/1 of the switch and configures backup LSP protection time for this interface:</p> <pre>DES-7200#configure terminal</pre>	



Caution

```

Enter configuration commands, one per line. End with CNTL/Z.

DES-7200(config)# mpls ip

DES-7200(config)#interface GigabitEthernet 0/1

DES-7200(config-if-GigabitEthernet 0/1)#label-switching

DES-7200(config-if-GigabitEthernet 0/1)#mpls ip

DES-7200(config-if-GigabitEthernet 0/1)#exit

DES-7200(config)# mpls router ldp

DES-7200(config-mpls-router)#exit

DES-7200(config)#interface gigabitEthernet 0/1

DES-7200(config-if-GigabitEthernet 0/1)#mpls ldp frr protect-time 15

```

Related commands	Command	Description
	mpls ldp frr nexthop	Enable the LDP FRR function on the interface.
Platform description	None	

1.1.27 mpls ldp hello-holdtime

Use this command to configure the holdtime in seconds for LDP Hello packets on each interface. Use the **no** form of this command to restore the default value.

mpls ldp hello-holdtime *seconds*

no mpls ldp hello-holdtime

Parameter description	Parameter	Description
	<i>seconds</i>	Holdtime of Hello messages, ranging from 1s to 65535s. Holdtime 65535 indicates that the Hello message will never time out.
Default configuration	15 seconds	

Command mode

Interface configuration mode.

Usage guidelines

This command is valid only for the LDP Link Hello packets for the basic discovery mechanism and may lead to a change in the interval for sending Hello messages. Use the **discovery targeted-Hello** command to set the Hello interval for the extended discovery mechanism.

Examples

The following command configures the Link Hello holdtime of LDP on an interface as 30s:

```
DES-7200(config)# interface vlan 10
```

```
DES-7200(config-if)# mpls ldp Hello-holdtime 30
```

Related commands

Command	Description
mpls ldp Hello-interval	Configure the interval for sending Hello messages.
discovery targeted-Hello	Configure the interval and timeout time of sending Hello messages for the extended discovery mechanism.

1.1.28 mpls ldp hello-interval

Use this command to configure the holdtime in seconds for LDP Hello packets on each interface. Use the **no** form of this command to restore the default value.

mpls ldp Hello-interval *seconds*

no mpls ldp Hello-interval

Parameter description

Parameter	Description
<i>seconds</i>	Interval for sending Hello messages, ranging from 1s to 65535s.

Default configuration	5 seconds				
Command mode	Interface configuration mode.				
Usage guidelines	<p>The interval for sending Link Hello packets on an interface may not be consistent with that configured by this command.</p> <ol style="list-style-type: none"> (1) By default, if the minimum holdtime among all holdtimes negotiated with neighbors on an interface is less than 15s, the actually used interval for sending Hello packets is 1/3 of the minimum holdtime and 1s minimum. (2) By default, if the minimum holdtime among all holdtimes negotiated with neighbors of an interface is greater than or equal to 15s, the actually used interval for sending Hello packets is 5s. (3) If the configured interval is greater than 1/3 of the minimum value among all holdtimes negotiated with neighbors of an interface, the actually used interval for sending Hello packets is 1/3 of the minimum holdtime and 1s minimum. (4) If the configured interval is less than 1/3 of the minimum value among all holdtimes negotiated with neighbors of an interface, the configured interval for sending Hello packets is used. <p>In the actual configuration, this value must be less than the value of Hello-holdtime. This command is valid only for the LDP Link Hello packets for the basic discovery mechanism. Use the discovery targeted-Hello command to set the Hello holdtime for the extended discovery mechanism.</p>				
Examples	<p>The following command configures the interval for sending Hello packets as 10s:</p> <pre>DES-7200(config)# interface vlan 10 DES-7200(config-if)# mpls ldp Hello-interval 10</pre>				
Related	<table border="1"> <thead> <tr> <th data-bbox="655 1951 922 2020">Command</th> <th data-bbox="922 1951 1513 2020">Description</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	Command	Description		
Command	Description				

mpls ldp hello-holdtime	Configure the Hello packet holdtime in seconds.
discovery targeted-hello	Configure the interval and timeout time of sending Hello messages for the extended discovery mechanism.

1.1.29 mpls ldp keepalive-holdtime

Use this command to configure the holdtime for keepalive packets on each interface. Use the **no** form of this command to restore the default value.

mpls ldp keepalive-holdtime *seconds*

no mpls ldp keepalive-holdtime

Parameter description	Parameter	Description
	<i>seconds</i>	Holdtime of keepalive packets, ranging from 15s to 65535s

Default configuration

45 seconds

Command mode

Interface configuration mode.

Usage guidelines

This command is valid for the LDP sessions to be created instead of created LDP sessions. This command has no influence on the LDP session set up by the extended discovery mechanism. Use the **targeted-session holdtime** command to modify the Keepalive Holdtime of the LDP session set up by the extended discovery mechanism.

Examples

The following command configures the holdtime of the Keepalive packet of LDP on an interface as 90s:

```
DES-7200(config)# interface vlan 10
DES-7200(config-if)# mpls ldp keepalive-holdtime 90
```


Related commands	Command	Description
	targeted-session holdtime	

1.1.30 mpls ldp max-hop-count

Use this command to configure the maximum hop count allowed for loop detection on each interface. Use the **no** form of this command to restore the default value.

mpls ldp max-hop-count *number*

no mpls ldp max-hop-count

Parameter description	Parameter	Description
	<i>number</i>	Maximum hop count allowed for loop detection, ranging from 1 to 255

Default configuration	The default value is 254.
------------------------------	---------------------------

Command mode	Interface configuration mode.
---------------------	-------------------------------

Usage guidelines	The value configured by this command is valid only after loop detection is configured. If the hop count value in the label mapping message or the label request message of LDP is greater than the configured value, it is deemed that a loop occurs. This command is invalid for the label mapping message and label request message received previously, but valid for those received later.
-------------------------	--

Examples	<p>The following command configures the LDP hop count of the interface as 30:</p> <pre>DES-7200(config)# interface vlan 10</pre>
-----------------	---

```
DES-7200(config-if)# mpls ldp max-hop-count 30
```

Related commands	Command	Description
	loop-detection	Configure LDP loop detection

1.1.31 mpls ldp max-label-requests

Use this command to configure the maximum label requests allowed on each interface. Use the **no** form of this command to restore the default value.

mpls ldp max-label-requests *times*

no mpls ldp max-label-requests

Parameter description	Parameter	Description
	<i>times</i>	Maximum request times, ranging from 0 to 255

Default configuration	There is no limit by default, indicating that label requests are retransmitted until a label mapping message is received.
------------------------------	---

Command mode	Interface configuration mode.
---------------------	-------------------------------

Usage guidelines	This command is invalid for the label request times in the created LDP session on the interface, and valid for newly-created LDP sessions. The value 0 means that the label request will not be retransmitted.
-------------------------	--

Examples	<p>The following command configures the maximum number of label requests of LDP allowed on an interface as 5:</p> <pre>DES-7200(config)# interface vlan 10</pre> <pre>DES-7200(config-if)# mpls ldp max-label-requests 5</pre>
-----------------	--

Related commands	Command	Description
	<code>mpls ldp distribution-mode</code>	

1.1.32 mpls ldp max-path-vector

Use this command to configure the maximum path vector value allowed for loop detection on each interface. Use the **no** form of this command to restore the default value.

mpls ldp max-path-vector *number*

no mpls ldp max-path-vector

Parameter description	Parameter	Description
	<i>number</i>	Maximum path vector value, ranging from 0 to 255.

Default configuration	The default value is 254.
-----------------------	---------------------------

Command mode	Interface configuration mode.
--------------	-------------------------------

Usage guidelines	The configured path vector value takes effect only after the LDP instance enables loop detection. If the number of LDR IDs contained in the path vector list of the label mapping message or the label request message of LDP is greater than the configured maximum path sector value, it is deemed that a loop occurs. This command is invalid for the created LDP sessions, but influences the LDP sessions to be created.
------------------	---

Examples	<p>The following command configures the maximum path vector value of LDP on an interface as 10:</p> <pre>DES-7200(config)# interface vlan 10 DES-7200(config-if)# mpls ldp max-path-vector 10</pre>
----------	---

Related commands	Command	Description
	loop-detection	Set LDP loop detection.

1.1.33 mpls ldp max-pdu

Use this command to configure the maximum PDU value. Use the **no** form of this command to restore the default value.

mpls ldp max-pdu *max-pdu*

no mpls ldp max-pdu

Parameter description	Parameter	Description
	<i>max-pdu</i>	The maximum PDU value in exchanging the LDP messages, in bytes, ranging from 256 to 4096

Default configuration	The default value is 4096.
------------------------------	----------------------------

Command mode	Interface configuration mode.
---------------------	-------------------------------

Usage guidelines	This command does not influence the created LDP session on the interface.
-------------------------	---

Examples	<p>The following command configures the maximum length of LDP messages as 256:</p> <pre>DES-7200(config)# interface vlan 10 DES-7200(config-if)# mpls ldp max-pdu 256</pre>
-----------------	---

1.1.34 mpls ldp transport-address

Use this command to set the transport address used by basic LDP sessions. Use the **no** form of this command to restore the default value.

mpls ldp transport-address {interface | ip-address}

no mpls ldp transport-address

	Parameter	Description
Parameter description	interface	The LDP session uses the main address of an interface itself.
	<i>ip-address</i>	The LDP session uses an IP address specified by this parameter.

Default configuration

Use the LSR ID of LDP as the transport address.

Command mode

Interface configuration mode.

Usage guidelines

This command is ineffective to LDP sessions created by the extended discovery mechanism, and it is effective only to LDP sessions created by the basic discovery mechanism. When this interface transport address is configured, this command is ineffective to the LDP sessions that have been created by basic discovery mechanism, and effective to newly created sessions.

Examples

The following example configures basic LDP sessions to use the main address of an interface as the transport address:

```
DES-7200(config)# interface vlan 10
```

```
DES-7200(config-if)#mpls ldp transport-address interface
```

Related commands	Command	Description
	show mpls ldp parameters	Show the LDP parameters under all or specified VRFs.
	transport-address	Globally configure the transport address used by basic LDP sessions.
Platform description	None	

1.1.35 mpls mtu

Use this command to configure the mtu value when the MPLS messages are forwarded.

mpls mtu *mtu*

no mpls mtu

Parameter description	Parameter	Description
	<i>mtu</i>	The length of label packets supported by the interface, in bytes, ranging from 64 to 1500

Default configuration	The MPLS mtu value equals to the interface mtu.
------------------------------	---

Command mode	Interface configuration mode.
---------------------	-------------------------------

Usage guidelines

By default, the mtu of the transmittable MPLS label packet on an interface is equal to default the interface mtu. The MPLS mtu determines whether to fragment the MPLS packet during the message sending. The length of the MPLS mtu includes the total length of the MPLS encapsulating and encapsulated (IP) layers. The MPLS mtu on the interface must not exceed the actual transmission capability of the interface.

This command is valid for process forwarding and router fast forwarding only instead of switches adopting ASIC forwarding. The switch forwards the packets according to the actually configured mtu on the interface and discards the packets that exceed the configured mtu. Use the **mtu** command in interface configuration mode to adjust the mtu on the interface.

In actual forwarding, you should try to prevent forwarding performance from degrading due to fragmenting by adjusting the mtu value.

Examples

```
DES-7200(config)# interface Gi4/1
DES-7200(config-if)# mpls mtu 1510
```

Related commands

Command	Description
mpls ip	Enable the MPLS globally.

1.1.36 mpls router ldp

Use this command to enable LDP, use the **no** form of this command to disable LDP.

[no] mpls router ldp [vrf-name]

Default configuration

Disabled

Command mode

Global configuration mode.

Usage guidelines

The number of LDP instances is limited by the number of VRFs on a device. Each VRF can start one LDP instance. If no VRF is enabled, LDP of the global VRF is enabled or disabled by default.

Examples

The following command is used to enable LDP of the global VRF and enter LDP configuration mode:

```
DES-7200(config)# mpls router ldp
```

```
DES-7200(config-mpls-router)# ldp router-id interface vlan 10 force
```

The following command is used to enable LDP of vjna and enter LDP configuration mode:

```
DES-7200(config)# mpls router ldp vjna
```

```
DES-7200(config-mpls-router)# ldp router-id interface vlan 10 force
```

1.1.37 mpls static ftn

Use this command to allow you to add one FTN entry to the global FTN table. Use the **no** form of this command to delete the specified FTN entry from the FTN table.

mpls static ftn *ip-address/mask* **out-label** *label* **nexthop** *interface-name* *nexthop-ip*

no mpls static ftn *ip-address/mask*

Parameter description

Parameter	Description
<i>ip-address/mask</i>	Corresponding FEC, namely the destination address.
out-label <i>label</i>	Corresponding outgoing label of this FEC.
nexthop <i>interface-name</i> <i>nexthop-ip</i>	The next hop of this FEC, including the egress and the IP address of the next hop.

Command mode

Global configuration mode.

Usage guidelines

This command allows you to add an FTN entry to the global FTN table. After the router with MPLS enabled receives an IP packet, it looks up for the next hop in the FTN table according to the destination address of the IP packet by maximum match. If the next hop is found, it performs label forwarding to the IP packet. For the FTN whose destination address and mask are both 0, it is valid only when this default route exists in the IP route forwarding table.

Examples

```
DES-7200(config)# mpls static ftn 192.168.0.0/16 out-label 100
nexthop gi4/1 10.10.10.1
```

Related commands

Command	Description
show mpls forwarding-table	Show the overview information of the global FTN table

1.1.38 mpls static l3vpn-ftn

Use this command to add the FTN of one L3 VPN. Use the **no** form of this command to delete this FTN.

mpls static l3vpn-ftn *vrf-name ip-address/mask out-label label remote-pe ip-addr*

mpls static l3vpn-ftn *vrf-name ip-address/mask local-forward nexthop interface-name nexthop-ip*

no mpls static l3vpn-ftn *vrf ip-address/mask*

Parameter description

Parameter	Description
<i>vrf-name</i>	Specify the name of the VRF whose FTN table to which the FTN entry is to be added
<i>ip-address/mask</i>	Fec, namely the destination network.
out-label <i>label</i>	It indicates that the corresponding private network FTN should reach to other PE forwarding through the LSP tunnel. At the same time, it will be specified with the private network label used for the forward.
remote-pe <i>ip-addr</i>	The address of the egress PE.

	local-forward nexthop <i>interface-name</i> <i>nexthop-ip</i>	<p>It indicates that the corresponding private network FTN will be forwarded to the next hop by this PE directly. At the same time, it will specify the egress of the next hop and the IP address.</p>				
Command mode	<p>Global configuration mode.</p>					
Usage guidelines	<p>This command allows you to add an FTN entry to the FTN table specified by the vrf-name. After the router with MPLS enabled receives an IP packet, it looks up for the next hop in the FTN table according to the destination address of the IP packet according to maximum match. If the next hop is found, it performs label forwarding to the IP packet. For the FTN whose destination and mask is 0, it is valid only when this route exists in the IP route forwarding table.</p>					
Examples	<pre>DES-7200 (config)# mpls static l3vpn-ftn 192.168.0.0/16 out-label 100 remote-pe 10.10.10.1</pre>					
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show mpls forwarding-table</td> <td>Show the overview information of the global FTN table</td> </tr> </tbody> </table>		Command	Description	show mpls forwarding-table	Show the overview information of the global FTN table
Command	Description					
show mpls forwarding-table	Show the overview information of the global FTN table					

1.1.39 mpls static l2vc-ftn

Use this command to configure one static VC FTN item. Use the **no** form of this command to delete the configured FTN item.

mpls static l2vc-ftn *vc-id* *vc-peer-ip* **out-label** *label*

no mpls static l2vc-ftn *vc_id* *vc_peer_ip*

Parameter description	Parameter	Description
	<i>vc-id</i>	The id of the VC instance.

	<i>vc-peer-ip</i>	The IP address at another PE of Vc.
	out-label <i>label</i>	Used for the private network egress label when this VC FTN is forwarded.
Command mode	Global configuration mode.	
Usage guidelines	This command is used to create one ftn item for the vc instance. After the frame is received from the AC binding with this VC, it will be stamped with the private network label for the data frame according to the content of this ftn item, and find the LSP that reaches the peer PE according to the vc peer ip, and then forward the frame.	
Examples	DES-7200(config)# mpls static l2vc-ftn 1 10.10.10.1 out-label 21	
Related commands	show mpls l2vc ftn-table	Show the ftn table item of all VC instances.
	show mpls forwarding-table	Show the forwarding table item of the MPLS.

1.1.40 mpls static ilm in-label

Use this command to add one ILM table item to the ILM table. Use the **no** form of this command to delete the configured ILM item.

mpls static ilm in-label *in-label* **forward-action swap-label** *label* **nexthop** *interface-name* **nexthop-ip fec** *ip-address/mask*

mpls static ilm in-label *in-label* **forward-action pop-l3vpn-nexthop** *vrf-name* **nexthop** *interface-name* **nexthop-ip fec** *ip-address/mask*

mpls static ilm in-label *in-label* **forward-action pop-l2vc-destport** *vc-id* *vc-peer-addr*

no mpls static ilm in-label *in-label*

Parameter	Description
<i>in-label</i>	The ingress label value of this ILM table item.
forward-action	Specify the forward behavior of this ILM table item. swap-label: apply to the ILM table item of the public network, to indicate the label switching and forwarding. pop-l3vpn-nexthop: apply to the ILM table item of the L3 VPN, to indicate the pop-up label, and forward it to the next hop of the specified VRF. pop-l2vc-destport: apply to the ILM table item of the L2 VPN, to indicate the pop-up label, and forward the message from the specified interface.
<i>label</i>	For the swap-label forward behavior, it will specify the egress label value of the switched label value.
<i>vrf-name</i>	For the pop-l3vpn-nexthop forward behavior, it will specify the VPN of the specified ILM, namely VRF.
<i>Interface-name</i>	For the pop-l2vc-destport forward behavior, it will specify the forwarded egress.
nexthop <i>interface-name</i> <i>nexthop-ip</i>	Specify the next hop, including the egress and the IP address of the next hop.
fec	Indicate this ILM is created for which FEC.
<i>ip-address/mask</i>	Correspond to the fec format of the global or I3vpn application, to indicate one destination network.
<i>vc-id</i>	Correspond to the fec format of the I2vpn application, to indicate the VC instance.
<i>vc-peer-addr</i>	Address of the VC peer.

Parameter
description

Command mode

Global configuration mode.

Usage guidelines

This command allows you to add an ILM entry to the ILM table. After the router with MPLS enabled receives an IP packet with label, it looks up for the next hop in the ILM table according to the label of the IP packet according to maximum match. If the next hop is found, it swaps, pops up the label of the IP packet or performs VPN forwarding after pop-up.

Examples

```
DES-7200 (config)# mpls static ilm in-label 20 forward-action
swap-label 30 nexthop gi4/2 10.10.10.1 fec 172.16.0.0/26
```

Related commands

Command	Description
show mpls forwarding-table	Show the information of the MPLS forwarding table.

1.1.41 neighbor labels accept

Use this command to configure the LSR to filter label mapping messages for the LDP peer according to a specified ACL rule. Use the **no** form of this command to delete the corresponding rule.

neighbor *ip-address* labels accept *acl-name*

no neighbor *ip-address* labels accept

Parameter description

Parameter	Description
<i>ip-address</i>	Router ID of the peer LSR
<i>acl-name</i>	Name of the specified ACL rule

Default configuration

No filtering rule is configured by default.

Command mode

config-mpls-router mode.

Usage guidelines

This command is effective to only the IP route FEC instead of other FECs such as PW FEC. If this command is used to configure a filtering rule for incoming label mapping messages, label mapping messages of the FEC from a specified neighbor meeting the ACL rule can be received and those of other FECs from this neighbor are discarded. However, label mapping messages sent by other neighbors are not affected and are still received. If this command is configured for a neighbor but no filtering rule is configured for the corresponding ACL, label mapping messages of all FECs sent by this neighbor are discarded. When the rule is cancelled by using the **no** form of this command, label mapping messages that have been filtered are not affected (that is, messages that have been discarded cannot be recovered) and only label mapping messages received thereafter are affected. In this case, the **clear mpls ldp neighbor** command needs to be used to reset the LDP session. Only one rule can be configured for one neighbor. 从次配置的话，后面的配置将覆盖前面的。Each LDP instance can be used to configure filtering rules for a maximum of 64 neighbors.

Examples

In the following example, only label mapping messages of the FEC with 192.168.0.0/16 as the route prefix and sent from the neighbor 10.10.10.1 are received, and those of other FECs sent from this neighbor are not received.

```
DES-7200(config) #ip access-list standard fec_acl
DES-7200(config-std-nacl)#permit 192.168.0.0 0.0.255.255
DES-7200(config-std-nacl)# exit
DES-7200(config)# mpls router ldp
DES-7200(config-mpls-router)# neighbor 10.10.10.1 labels accept
fec_acl
```

Related commands

Command	Description
clear mpls ldp neighbor	Forcibly disconnect the LDP session.

	show mpls ldp neighbor	Show the LDP session state.
Platform description	None	

1.1.42 neighbor password

Use this command to enable MD5 authentication of LDP. Use the **no** form of this command to disable MD5 authentication of LDP.

neighbor *ip-address* password [0 | 7] *pwd-string*

no neighbor *ip-address* password

	Parameter	Description
Parameter description	<i>ip-address</i>	Transport address of the peer LSR
	[0 7]	(Optional) 0 means typing a key in plain text and 7 means typing a key in encrypted text. A key is typed in plain text by default.
	<i>pwd-string</i>	Password string, which is case-sensitive. If the password string is entered in plain text, it is a string of 1 to 25 characters; if the password string is entered in encrypted text, it is a string of 1 to 52 characters.

Default configuration	MD5 authentication of LDP is disabled by default.
Command mode	config-mpls-router mode.

**Usage
guidelines**

A key can be typed in either plain text or encrypted text. In the former case, if the **service password-encryption** command is used to enable the encryption service in global configuration mode, the key is saved in encrypted text when the current configuration is saved or viewed.

To enable LDP authentication function, the keys configured on both ends of the LDP peer need to be the same. The change to the key will cause disconnection of established LDP sessions and re-attempt to establish them.

If a router is configured with a key but the LDP peer on the other end is not configured with a key, the following will be prompted when the two ends attempt to establish a session:

```
%TCP-6-BADAUTH: No MD5 digest from 10.40.10.10(20836) to
10.10.10.10(646)
```

If the keys configured on both ends are not the same, the following will be prompted when the two ends attempt to establish a session:

```
%TCP-6-BADAUTH: MD5 digest failed for (10.20.10.10,
55998)->(10.10.10.10, 646)
```

Examples

The following example configures MD5 authentication to be adopted for sessions with 10.10.10.1, with the plain text key being 123456:

```
DES-7200(config)# mpls router ldp
DES-7200(config-mpls-router)# neighbor 10.10.10.1 password 123456
```

**Related
commands**

Command	Description
show mpls ldp discovery	Show the information about neighbors discovered by LDP.
show mpls ldp neighbor	Show the LDP session state.
neighbor ip-address	Create an LDP extended peer.

**Platform
description**

None

1.1.43 neighbor

Use this command to create an ldp extended peer. Use the **no** form of this command to delete the ldp extended peer.

[no] neighbor *ip-address*

Parameter description	Parameter	Description
	<i>ip-address</i>	The Router ID of the peer LSR.

Default configuration	There is no LDP extended peer by default.
------------------------------	---

Command mode	config-mpls-router mode.
---------------------	---------------------------------

Usage guidelines	To set up an extended LDP session, the both ends of the LSR of the session to be built must be configured. It fails to set up the extended LDP session if the extended peer is configured at only one end.
-------------------------	--

Examples	<p>The following command configures 10.10.10.1 as an extended peer of the LSR:</p> <pre>DES-7200(config)# mpls router ldp DES-7200(config-mpls-router)# neighbor 10.10.10.1</pre>
-----------------	---

Related commands	Command	Description
	show mpls ldp discovery	Show the information of neighbors discovered by the LDP.
	show mpls ldp neighbor	Show the LDP session state.

1.1.44 ping mpls

Use this command to detect the connectivity of an MPLS LSP.

ping mpls ipv4 *ip-address/mask* [**repeat** *repeat*] [**ttl** *time-to-live*] [**timeout** *timeout*] [**size** *size*] [**interval** *mseconds*] [**source** *ip-address*] [**destination** *ip-address*] [**force-explicit-null**] [**pad** *pattern*] [**reply mode** {*ipv4* | *router-alert*}] [**dsmap**] [**flags fec**] [**verbose**]

Parameter description	Parameter	Description
	<i>ip-address/mask</i>	IPv4 address and subnet mask length of the destination FEC to be tested
	repeat <i>repeat</i>	(Optional) Number of times to resend an Echo Request packet, ranging from 1 to 2147483647, 5 by default
	ttl <i>time-to-live</i>	(Optional) Specify the initial MPLS TTL value for sending packets, ranging from 1 to 255, 255 by default.
	timeout <i>timeout</i>	(Optional) Specify the timeout time for packets, ranging from 0 to 3600, 2 by default.
	size <i>size</i>	(Optional) Specify the size of packets, ranging from 84 to 18024, 84 by default.
	interval <i>mseconds</i>	(Optional) Specify the minimum interval time (in milliseconds) between two consecutive Echo Request packets sent, ranging from 0 to 3600000, 0 by default
	source <i>ip-address</i>	(Optional) Source address. It is the destination address when the peer sends an Echo Reply packet.
	destination <i>ip-address</i>	(Optional) Specified 127/8 segment address. It is used to fill the IP header, 127.0.0.1 by default.
	force-explicit-null	(Optional) Whether to forcibly add an explicit null label to the MPLS label. By default, it is not added.
	pad <i>pattern</i>	(Optional) Pad pattern of packets, 0xABCD by default

reply mode {ipv4 router-alert}	(Optional) Specify the reply mode of the Echo Request packet: ipv4 : reply with an IPv4 UDP packet (default) router-alert : reply with an IPv4 UDP packet with the Router Alert option
dsmap	(Optional) Require returning downstream information.
flags fec	(Optional) Set forcible FEC stack check.
verbose	(Optional) Show detailed information about Echo Reply packets. By default, the information is not shown.

Default configuration

See the preceding parameter description.

Command mode

Privileged mode

Usage guidelines

You can change some default parameter values by specifying optional parameters. In addition to the directly typed command, interactive typing mode is provided. You can enter the interactive typing mode by pressing **Enter** after typing the **ping mpls** command.

Examples

Example 1: To detect the connectivity from the local device to the LSP of 10.10.10.10/32, type the following command:

```
DES-7200# ping mpls ipv4 10.10.10.10/32 verbose
Sending 5, 84-byte MPLS Echoes to 10.10.10.10/32,
    timeout is 2 seconds, send interval is 0 msec:
    < press Ctrl+C to break >
Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
'L'-labeled output interface, 'B'-unlabeled output interface,
'D'-DS Map mismatch, 'F'-no FEC mapping, 'f'-FEC mismatch,
```

```
'M'-malformed request,'m'-unsupported tlvs,'N'-no label entry,
'P'-no rx intf label prot,'p'-premature termination of LSP,
'R'-transit router,'I'-unknown upstream index,
'X'-unknown return code,'x'-return code 0
```

Type escape sequence to abort.

```
! size 84, reply addr 192.168.201.208, return code 3
! size 84, reply addr 192.168.201.208, return code 3
! size 84, reply addr 192.168.201.208, return code 3
! size 84, reply addr 192.168.201.208, return code 3
! size 84, reply addr 192.168.201.208, return code 3
```

Success rate is 100 percent(5/5),round-trip min/avg/max=20/36/60 ms

Example 2: To return downstream information, use the dsmap parameter and ttl parameter together (because if the egress LSR is reached, downstream information is not returned):

```
DES-7200# ping mpls ipv4 10.40.10.10/32 dsmap ttl 1
```

```
Sending 5, 84-byte MPLS Echoes to 10.4(2)0.10.10/32,
```

```
timeout is 2 seconds, send interval is 0 msec:
```

```
< press Ctrl+C to break >
```

```
Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
'L'-labeled output interface,'B'-unlabeled output interface,
'D'-DS Map mismatch,'F'-no FEC mapping,'f'-FEC mismatch,
'M'-malformed request,'m'-unsupported tlvs,'N'-no label entry,
'P'-no rx intf label prot,'p'-premature termination of LSP,
'R'-transit router,'I'-unknown upstream index,
'X'-unknown return code,'x'-return code 0
```

Type escape sequence to abort.

```
L
```

```
Echo Reply received from 192.168.201.208
```

```
DSMAP 0,DS Router Addr 192.168.198.2,DS Intf Addr 192.168.198.2
```

```
Depth Limit 0, MRU 1508 [Labels: implicit-null Exp: 0]
```

```
L
```

```
Echo Reply received from 192.168.201.208
```

```
DSMAP 0,DS Router Addr 192.168.198.2,DS Intf Addr 192.168.198.2
```

```
Depth Limit 0, MRU 1508 [Labels: implicit-null Exp: 0]
```

```
L
```

```

Echo Reply received from 192.168.201.208

  DSMAP 0,DS Router Addr 192.168.198.2,DS Intf Addr 192.168.198.2

  Depth Limit 0, MRU 1508 [Labels: implicit-null Exp: 0]

L

Echo Reply received from 192.168.201.208

  DSMAP 0,DS Router Addr 192.168.198.2,DS Intf Addr 192.168.198.2

  Depth Limit 0, MRU 1508 [Labels: implicit-null Exp: 0]

L

Echo Reply received from 192.168.201.208

  DSMAP 0,DS Router Addr 192.168.198.2,DS Intf Addr 192.168.198.2

  Depth Limit 0, MRU 1508 [Labels: implicit-null Exp: 0]

Success rate is 0 percent (0/5)

```

Field	Description
!	A correct Reply packet is received, indicating that the LSP is connected.
Q	The Request packet is not sent, indicating that there is no LSP corresponding to the destination FEC on the local device.
.	The time to receive a Reply packet times out, indicating that no Reply packet is received within a specified period of time.
L	There is an outgoing label corresponding to the FEC on the router that returns a Reply packet, indicating that the router that returns a Reply packet is an intermediate router of the LSP.
B	There is no outgoing label corresponding to the FEC on the router that returns a Reply packet, indicating that the LSP is interrupted.
D	Validation information carried in Downstream Mapping TLV does not match the information on the router that returns a Reply packet.
F	There is no FEC mapping carried in the corresponding TargetFec on the router that returns a Reply packet.

f	The label of the current label stack in the router that returns a Reply packet is inconsistent with the label of FEC mapping carried in TargetFec.
M	The format of the Request packet received by the router that returns a Reply packet is incorrect.
m	The Request packet received by the router that returns a Reply packet has TLVs that are not supported.
N	The router that returns a Reply packet does not have an instance corresponding to the incoming label, indicating that the labels are not synchronous.
P	The protocol for transmitting packets in the router that returns a Reply packet is inconsistent with that recorded in TargetFec stack.
p	Premature termination of packet transmission
R	Return the reserved value.
I	Upstream interface index unknown
X	Unknown return value
x	The return value is 0.

Related commands	Command	Description
	traceroute mpls	View the LSRs that the MPLS LSP passes.
Platform description	None	

1.1.45 propagate-release

Use this command to enable label release. Use the **no** form of this command to disable this function with no label release messages transmitted.

[no] propagate-release

Default configuration	Disabled				
Command mode	config-mpls-router mode.				
Usage guidelines	This command execution does not influence the label release messages previously received from the LDP instance, only the ones received later.				
Examples	The following command enables label release of the LDP instance: <pre>DES-7200(config)# mpls router ldp</pre> <pre>DES-7200(config-mpls-router)# propagate-release</pre>				
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show mpls ldp parameters</td> <td>Show the LDP configuration parameters under all or specified VRFs.</td> </tr> </tbody> </table>	Command	Description	show mpls ldp parameters	Show the LDP configuration parameters under all or specified VRFs.
Command	Description				
show mpls ldp parameters	Show the LDP configuration parameters under all or specified VRFs.				

1.1.46 snmp-server enable traps mpls

Use this command to enable Trap transmission of MPLS. Use the **no** form of this command to disable Trap transmission of MPLS.

snmp-server enable traps mpls {xc|ldp|vpn}

snmp-server enable traps mpls xc [xc-up] [xc-down]

snmp-server enable traps mpls ldp [pv-limit][session-down][session-up]

snmp-server enable traps mpls l3vpn [max-threshold] [mid-threshold][max-thresh-cleared][vrf-up][vrf-down]

no snmp-server enable traps mpls xc [xc-up] [xc-down]

no snmp-server enable traps mpls ldp [pv-limit][session-down][session-up]

no snmp-server enable traps mpls l3vpn [max-threshold] [mid-threshold][max-thresh-cleared][vrf-up][vrf-down]

Parameter description	Parameter	Description
	xc	Trap transmission switch for MPLS route

	change
ldp	Trap transmission switch for LDP
l3vpn	Trap transmission switch for L3 VPN
xc-up	Trap transmission switch for MPLS route change XC Up
xc-down	Trap transmission switch for MPLS route change XC Down
pv-limit	Trap transmission switch for mismatch of path vectors
session-down	Trap transmission switch for LDP sessions disconnected
session-up	Trap transmission switch for LDP sessions created
max-threshold	Trap transmission switch for VRF maximum route threshold
mid-threshold	Trap transmission switch for VRF middle route threshold
max-thresh-cleared	Trap transmission switch for cleared VRF maximum route threshold
vrf-up	Trap transmission switch for VRF Up
vrf-down	Trap transmission switch for VRF Down

Default configuration

By default, traps of MPLS are sent.

Command mode

Global configuration mode

There are two types of XC traps:

1. XC Up trap, indicating that an effective ILM or FTN entry is generated
2. XC Down trap, indicating that an ILM or FTN entry is deleted

The user can enable the preceding two trap switches at the same time by using the **snmp-server enables mpls xc** command at the same time or either of them by using the **snmp server enables mpls xc [xc-up] [xc-down]** command.

There are three types of LDP traps:

1. LDP session Up trap, which is sent when an LDP session is established
2. LDP session Down trap, which is sent when an LDP session is disconnected
3. When initialization messages (INIT) are exchanged after an LDP session is established, a trap is sent if the value of the path vector list length used in loop detection does not match that advertised by the neighbor.

**Usage
guidelines**

The user can enable the preceding three trap switches at the same time by using the **snmp-server enables mpls ldp** command or any of them by using the **snmp server enables mpls ldp [pv-limit] [sesseion-up] [session-down]** command.

There are the following types of L3 VPN traps:

1. Trap identifying VRF Up or Down: When an VRF instance has an associated interface Up, the VRF instance is considered to be in Up state. In this case, a VRF Up trap needs to be sent. When an VRF instance has all its associated interfaces Down or has no associated interface, a VRF Down trap needs to be sent.
2. Trap of VRF route pre-alert: When the number of VRF routes exceeds the middle route capacity threshold, a VRF MidThreshExceed trap is sent. When the number of VRF routes exceeds the maximum route capacity threshold, a VRF MaxThreshExceed trap is sent. In this case, a VRF MaxThreshCleared trap needs to be sent after the number of VRF routes becomes below the maximum route capacity threshold, indicating that the number of VRF routes returns to normal.

The user can enable all trap switches for L3 VPN at the same time by using the **snmp-server enables mpls l3vpn** command or any of them by using the **snmp server enables mpls l3vpn**

[max-threshold] [mid-threshold][max-thresh-cleared] [vrf-up] [vrf-down] command.

After MPLS Trap Transmission is enabled, to capture a trap on a host, you must use the **snmp-server host** command to specify the host to receive the trap.

Examples

The following command configures Trap Transmission of LDP to be enabled:

```
DES-7200(config)#snmp-server host 192.168.10.1
```

```
DES-7200(config)#snmp-server enable traps mpls ldp
```

Related commands

Command	Description
snmp-server host	Set a host for receiving traps.

Platform description

None

1.1.47 target-session holdtime

Use this command to set the keepalive holdtime for the extended mechanism. Use the **no** form of this command to restore the default value.

target-session holdtime *seconds*

Parameter description

Parameter	Description
<i>seconds</i>	Set the holdtime, with the value range <15-65535>.

Default configuration

By default, the holdtime of the LDP session built in the extended discovery mechanism is 180s. The sending interval of the keepalive message is 60s, which is 1/3 of the session holdtime.

Command mode	config-mpls-router mode.				
Usage guidelines	Note that this command is valid for the LDP session only built in the extended discovery mechanism, not for the LDP session already set up.				
Examples	<p>The following command configures the keepalive holdtime for LDP sessions established by the extended mechanism:</p> <pre>DES-7200(config)#mpls router ldp</pre> <pre>DES-7200(config-mpls-router)# target-session holdtime 90</pre>				
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show mpls ldp parameters</td> <td>Show the LDP global configuration parameters under all or specified.</td> </tr> </tbody> </table>	Command	Description	show mpls ldp parameters	Show the LDP global configuration parameters under all or specified.
Command	Description				
show mpls ldp parameters	Show the LDP global configuration parameters under all or specified.				

1.1.48 traceroute mpls

Use this command to detect an MPLS LSP hop by hop and trace the LSRs that the LSP passes.

traceroute mpls ipv4 *ip-address/mask* [**timeout** *timeout*] [**ttl** *time-to-live*] [**source** *ip-address*] [**destination** *ip-address*] [**force-explicit-null**] [**reply mode** {**ipv4** | **router-alert**}] [**flags fec**] [**verbose**]

Parameter description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>ip-address/mask</i></td> <td>IPv4 address and subnet mask length of the destination FEC to be tested</td> </tr> <tr> <td>timeout <i>timeout</i></td> <td>(Optional) Specify the timeout time for packets, ranging from 0 to 3600, 2 by default</td> </tr> <tr> <td>ttl <i>time-to-live</i></td> <td>(Optional) Specify the TTL value for sending packets, ranging from 1 to 255, 30 by default</td> </tr> <tr> <td>source <i>ip-address</i></td> <td>(Optional) Source address. It is the destination address when the peer sends an Echo Reply packet.</td> </tr> </tbody> </table>	Parameter	Description	<i>ip-address/mask</i>	IPv4 address and subnet mask length of the destination FEC to be tested	timeout <i>timeout</i>	(Optional) Specify the timeout time for packets, ranging from 0 to 3600, 2 by default	ttl <i>time-to-live</i>	(Optional) Specify the TTL value for sending packets, ranging from 1 to 255, 30 by default	source <i>ip-address</i>	(Optional) Source address. It is the destination address when the peer sends an Echo Reply packet.
Parameter	Description										
<i>ip-address/mask</i>	IPv4 address and subnet mask length of the destination FEC to be tested										
timeout <i>timeout</i>	(Optional) Specify the timeout time for packets, ranging from 0 to 3600, 2 by default										
ttl <i>time-to-live</i>	(Optional) Specify the TTL value for sending packets, ranging from 1 to 255, 30 by default										
source <i>ip-address</i>	(Optional) Source address. It is the destination address when the peer sends an Echo Reply packet.										

destination <i>ip-address</i>	(Optional) Specified 127/8 segment address. It is used to fill the IP header, 127.0.0.1 by default.
force-explicit-null	(Optional) Whether to forcibly add an explicit null label to the MPLS label. By default, it is not added.
reply mode {ipv4 router-alert}	(Optional) Specify the reply mode of the Echo Request packet: ipv4 : reply with an IPv4 UDP packet (default) router-alert : reply with an IPv4 UDP packet with the Router Alert option
flags fec	(Optional) Set forcible FEC stack check.
verbose	(Optional) Show detailed information about Echo Reply packets. By default, the information is not shown.

Default configuration

See the preceding parameter description.

Command mode

Privileged mode

Usage guidelines

You can change some default parameter values by specifying optional parameters. In addition to the directly typed command, interactive typing mode is provided. You can enter the interactive typing mode by pressing **Enter** after typing the **traceroute mpls** command.

Examples

To view the LSRs that the LSP of the FEC corresponding to 10.10.10.10/32 passes, type the following command:

```
DES-7200# traceroute mpls ipv4 10.10.10.10/32
```

```
Tracing MPLS Label Switched Path to 10.10.10.10/32, timeout is 2 seconds
```

```

    < press Ctrl+C to break >
Codes: '!' - success, 'Q' - request not sent, '.' - timeout,
'L' - labeled output interface, 'B' - unlabeled output interface,
'D' - DS Map mismatch, 'F' - no FEC mapping, 'f' - FEC mismatch,
'M' - malformed request, 'm' - unsupported tlvs, 'N' - no label entry,
'P' - no rx intf label prot, 'p' - premature termination of LSP,
'R' - transit router, 'I' - unknown upstream index,
'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.

 0 10.3.0.8 MRU 1500 [Labels: 17 Exp: 0]
L 1 10.3.0.1 MRU 1504 [Labels: implicit-null Exp: 0] 624 ms
! 2 10.2.0.1 708 ms

```

See the **ping mpls** command for descriptions of return values.

Related commands	Command	Description
	ping mpls	Detect the connectivity of an MPLS LSP.
Platform description	None	

1.1.49 transport-address

Use this command to configure globally the transport address used by basic LDP sessions. Use the **no** form of this command to delete the configuration.

transport-address {*interface* | *ip-address* | *interface-name*}

no transport-address

Parameter description	Parameter	Description
	interface	The primary IP address of an interface is used as the transport address for basic LDP sessions created on each interface.
	<i>ip-address</i>	The specified IP address is used as the

		transport address for all basic LDP sessions.				
	<i>Interface-name</i>	The primary IP address of the specified interface is used as the transport address for all basic LDP sessions.				
Default configuration		Use the LSR ID of LDP as the transport address.				
Command mode		config-mpls-router mode.				
Usage guidelines		This command is ineffective to LDP sessions created by the extended discovery mechanism, and it is effective only to LDP sessions created by the basic discovery mechanism. LDP sessions created by the extended discovery mechanism always use the LSR ID of LDP as the transport address. If both an interface transport address and a global transport address are configured, the interface transport address have priority over the global transport address to take effect.				
Examples		<p>The following example configures the primary IP address of each interface as the transport address:</p> <pre>DES-7200(config)# mpls router ldp</pre> <pre>DES-7200(config-mpls-router)# transport-address interface</pre>				
Related commands		<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>mpls ldp transport-address</td> <td>Configure the transport address used by basic LDP sessions created on an interface.</td> </tr> </tbody> </table>	Command	Description	mpls ldp transport-address	Configure the transport address used by basic LDP sessions created on an interface.
Command	Description					
mpls ldp transport-address	Configure the transport address used by basic LDP sessions created on an interface.					
Platform description		None				

1.2 Showing Commands

1.2.1 show ip ref mpls forwarding-table

Use this command to show MPLS express forwarding information.

show ip ref mpls forwarding-table [**vrf** *vrf-name*] {**ftn** [*ip-address/mask*] | **ilm** [*label*]} [**frr**] [**detail**]

	Parameter	Description
Parameter description	vrf <i>vrf-name</i>	Show the specified VRF entry information.
	ftn [<i>ip-address/mask</i>]	Show FTN entry information.
	ilm [<i>label</i>]	Show ILM entry information.
	frr	Show FRR entry information when and only when there are active/standby FTN/ILM entries.
	detail	Show detailed information about FTN/ILM entries.
Default configuration	None	
Command mode	Privileged mode	
Usage guidelines	<p>Use this command to show MPLS express forwarding information as follows:</p> <ul style="list-style-type: none"> ■ If this command does not specify a VRF, it indicates that FTN/ILM entry information of all VRFs is displayed. 	
Examples	Example 1: To show FTN entry information of all VRFs, use the	

following command:

```
DES-7200#show ip ref mpls forwarding-table ftn
Label Operation Code:
PH--PUSH label
IP--IP lookup forward
FEC      VRF  Out Label  OP  Out IF  Adj  Nexthop
1.1.1.1/32  0   1024   PH  2      7   20.0.0.6
2.2.2.2/32  0   1026   PH  4      3   21.1.1.1
```

FEC: In the case of FTN for IP routes, the IP address and mask are displayed for the FEC field; in the case of FTN for L3 VPN, "--" is displayed for the FEC field.

VRF: Indicates the VRF to which the FTN belongs.

Out Label: Indicates an outgoing label.

OP: Indicates an operation behavior that a packet hits the forwarding entry. This behavior includes the following:

Field	Description
PH	Indicates that an IP packet needs to be added with labels (perhaps one to three labels) and then forwarded to the next hop after hitting the entry. If imp-null is displayed for an outgoing label, the imp-null label is not added in the actual forwarding process.
IP	Indicates an IP packet needs to be forwarded across VRFs after hitting the entry. This type of entry is the forwarding entry across VRFs of one VPN.

Out IF: Indicates the outgoing interface for packet forwarding, using the interface index number.

Adj: Indicates adjacency identifier.

Nexthop: Indicates the next hop for packet forwarding. "--" is displayed for a forwarding entry with an ineffective next hop address.

Example 2: To show FRR information for FTN entries under all VRFs, use the following command:

```
DES-7200#show ip ref mpls forwarding-table ftn frr
Label Operation Code:
PH--PUSH label
IP--IP lookup forward
Status codes: m - main entry, b - backup entry, * - active
```



```

      FEC      VRF    Out Label  OP  Out IF  Adj   Nexthop
m*1.1.1.1/32  0      1024     PH  2      7     20.0.0.6
b 1.1.1.1/32  0      1025     PH  3      2     20.0.1.6

```

Example 3: To show ILM entry information of all VRFs, use the following command:

```
DES-7200#show ip ref mpls forwarding-table ilm
```

Label Operation Code:

PP--POP label

SW--SWAP label

SP--SWAP topmost label and push new label

PN--POP label and forward to nexthop

PI--POP label and do ip lookup forward

PC--POP label and continue lookup(IP or Label)

DP--DROP packet

PM--POP label and do MAC lookup forward

PV--POP label and output to VC attach interface

```

In Label    Out Label  OP  VRF    Out IF  Adj   Nexthop
1024        1028     SW  0      2      7     20.0.0.6
1025        1029     SW  0      3      2     20.0.1.6

```

In Label: Indicates an incoming label.

Out Label: Indicates an outgoing label.

OP: Indicates an operation behavior that a packet hits the forwarding entry. This behavior includes the following:

Field	Description
PP	Indicates that an MPLS packet needs to remove the label and be forwarded to the next hop directly after hitting the entry, that is, perform forwarding of the last but one hop.
SW	Indicates that an MPLS packet needs to exchange labels and be forwarded to the next hop directly after hitting the entry.
SP	Indicates that an MPLS packet needs to exchange top labels, added with a label, and be forwarded to the next hop after hitting the entry. Exchanged labels are displayed for the outgoing label field, and one to two labels may be added.

PN	Indicates that an MPLS packet needs to remove the label and be forwarded to the next hop directly after hitting the entry.
PI	Indicates that an MPLS packet needs to remove all labels and be forwarded according to the destination IP address after hitting the entry.
PC	Indicates that an MPLS packet removes the top label and is forwarded according to the query result in the label forwarding table after hitting the entry. In the case of an IP packet, it is forwarded according to the destination IP address.
PM	Indicates that an MPLS packet needs to remove the label and is forwarded according to the destination MAC of the inner packet (VPLS application) after hitting the entry.
PV	Indicates that an MPLS packet needs to remove the label and is forwarded from a specified egress (VPWS application) after hitting the entry.
DP	Indicates that a packet is discarded after hitting the entry.

VRF: Indicates the VRF to which the ILM belongs.

Out IF: Indicates the outgoing interface for packet forwarding, using the interface index number.

Adj: Indicates adjacency identifier.

Nexthop: Indicates the next hop for packet forwarding. "--" is displayed for a forwarding entry with an ineffective next hop address.

Example 4: To show FRR information for ILM entries under all VRFs, use the following command:

```
DES-7200#show ip ref mpls forwarding-table ilm frr
```

```
Label Operation Code:
```

```
PP--POP label
```

```
SW--SWAP label
```

```
SP--SWAP topmost label and push new label
```

```
PN--POP label and forward to nexthop
```

```
PI--POP label and do ip lookup forward
```

```
PC--POP label and continue lookup(IP or Label)
```

```

DP--DROP packet

Status codes: m - main entry, b - backup entry, * - active

  In Label    Out Label  OP  VRF    Out IF  Adj    Nexthop
m*1024       1028      SW  0      2      7      20.0.0.6
b 1024       1029      SW  0      3      2      20.0.1.6

```

**Related
commands**

Command	Description
-	-

**Platform
description**

None

1.2.2 show mpls forwarding-table

Use this command to show the MPLS forwarding table.

show mpls forwarding-table [*ip-address/mask*] [**label** *label*] [**interface** *interface-name*] [**next-hop** *ip-address*] [**ftn** [**ip** | **vc**]] [**ilm** [**ip** | **vc**]] [{**vrf** *vrf-name* | **global**}] [**ftn** | **ilm**]] [**detail** | **summary**]

**Parameter
description**

Parameter	Description
<i>ip-address/mask</i>	Show ILM and FTN entries of a specified FEC.
label <i>label</i>	Show the ILM entry of a specified label.
interface <i>interface-name</i>	Show the MPLS forwarding entry (ILM and FTN) of a specified egress.
next-hop <i>ip-address</i>	Show the MPLS forwarding entry (ILM and FTN) of a specified next-hop address.
ftn	Show an FEC mapping entry.
ilm	Show a label forwarding entry.
ip	Show the MPLS forwarding entry of an IP application (including unicast route and L3 VPN).

vc	Show the MPLS forwarding entry added by the vc.
vrf <i>vrf-name</i>	Show the MPLS forwarding entry related to a VRF.
detail	Show the detailed information about the MPLS forwarding entry.
global	Show global non-VRF MPLS forwarding entries, excluding FTN and ILM entries of VC.
summary	Show the statistics information of MPLS process forwarding.

Default configuration

No parameter is carried, indicating that all MPLS forwarding entries are displayed.

Command mode

Privileged mode

Usage guidelines

Use the **show mpls forwarding-table** command to show information about all MPLS forwarding entries (including ILM and FTN entries).

Use the **show mpls forwarding-table *ip-address/mask*** command to show information about specified MPLS forwarding entries (including ILM and FTN entries).

Use the **show mpls forwarding-table label *label*** command to show the ILM forwarding entries of a specified label.

Use the **show mpls forwarding-table interface *interface-name*** command to show the MPLS forwarding entries of a specified egress (including FTN and ILM entries).

Use the **show mpls forwarding-table next-hop *ip-address*** command to show the MPLS forwarding entries of a specified next hop (including FTN and ILM entries).

Use the **show mpls forwarding-table detail** command to show detailed information about all MPLS forwarding entries (including

ILM and FTN entries).

Use the **show mpls forwarding-table vrf** command to show all MPLS forwarding entries (including ILM and FTN entries) which belong to a VRF.

Use the **show mpls forwarding-table vrf *vrf-name* ftn** command to show information about all FTN entries which belong to a VRF.

Use the **show mpls forwarding-table vrf *vrf-name* ilm** command to show information about all ILM entries which belong to a VRF.

Use the **show mpls forwarding-table ftn ip** command to show FTN entries of unicast routes and L3 VPN application.

Use the **show mpls forwarding-table ilm ip** command to show ILM entries of unicast routes and L3 VPN application.

Use the **show mpls forwarding-table ftn** command to show all FTN entries.

Use the **show mpls forwarding-table ilm** command to show all ILM entries.

Use the **show mpls forwarding-table ftn vc** command to show all FTN entries of L2 VPN.

Use the **show mpls forwarding-table ilm vc** command to show all ILM entries of L2 VPN.

Use the **show mpls forwarding-table ftn detail** command to show detailed information about all FTN entries.

Use the **show mpls forwarding-table ilm detail** command to show detailed information about all ILM entries.

Examples

Example 1: To show all MPLS forwarding entries, to use the following command:

```
DES-7200#show mpls forwarding-table

Label Operation Code:

PH--PUSH label

PP--POP label

SW--SWAP label

SP--SWAP topmost label and push new label

DP--DROP packet

PC--POP label and continue lookup by IP or Label

PI--POP label and do ip lookup forward
```

```

PN--POP label and forward to nexthop

PM--POP label and do MAC lookup forward

PV--POP label and output to VC attach interface

IP--IP lookup forward

Local Outgoing OP FEC          Outgoing      Nexthop
laebl label                    interface

--      1025      PH 119.1.1.0/24(V) Gi3/19      10.0.10.1
--      1026      PH 120.1.1.0/24      Gi3/18      10.0.2.1
--      imp-null  PH 130.1.1.0/24      Gi3/18      10.0.2.1
1025  1027      SP 100.1.1.0/24      V18         192.1.2.1
1026  1028      SW 120.1.2.0/24      Gi3/19      10.0.2.1
1027  imp-null  PP 121.1.1.0/24      Fa3/1       11.0.0.1
--      --          IP 167.168.195.0/24 Fa3/2       120.1.1.1
1028  --          PC 167.168.196.0/24 --           --
1029  --          PN 167.168.197.0/24(V) V14         1.0.0.1
1030  --          PI VRF(vpna)          --           --
1031  --          PV VC(20,1.1.1.1)  V15         --
--      1029      PH VC(20,1.1.1.1)  V110        192.1.2.1
1032  --          PI 192.1.1.0/24(V) V1101       172.2.1.2
1033  1030      SW 193.1.1.0/24(V)  V1102       10.2.1.2

```

Local label: It is the label distributed by this forwarding equivalence class device to other devices, namely the incoming label of an ILM entry. If there is no incoming label for an FTN entry, "--" is displayed.

Outgoing label: It is the outgoing label of an ILM or FTN label. "--" indicates that an ILM or FTN label has no outgoing label. If impl-null is shown, it indicates an implicit null label 3 and that this label is not carried in the forwarding of packets.

OP: Indicates an operation behavior that a packet hits the incoming label and outgoing label of a forwarding entry (ILM or FTN), and the behavior includes the following:

Field	Description
-------	-------------

PH	Indicates that an IP packet needs to be added with labels (perhaps one to three labels) and then forwarded to the next hop after hitting the entry. Use the show mpls forwarding-table detail command to view the labels and the number of labels added. If imp-null is displayed for an outgoing label, the imp-null label is not added in the actual forwarding process.
PP	Indicates that an MPLS packet needs to remove the label and be forwarded to the next hop directly after hitting the entry, that is, perform forwarding of the last but one hop.
SW	Indicates that an MPLS packet needs to exchange labels and be forwarded to the next hop directly after hitting the entry.
SP	Indicates that an MPLS packet needs to exchange top labels, added with a label, and be forwarded to the next hop after hitting the entry. Exchanged labels are displayed for the outgoing label field. Use the show mpls forwarding-table detail command to the labels added and the number of labels. One to two labels may be added.
PN	Indicates that an MPLS packet needs to remove the label and be forwarded to the next hop directly after hitting the entry.
PI	Indicates that an MPLS packet needs to remove all labels and be forwarded according to the destination IP address after hitting the entry.
PC	Indicates that an MPLS packet removes the top label and is forwarded according to the query result in the label forwarding table after hitting the entry. In the case of an IP packet, it is forwarded according to the destination IP address.
PM	Indicates that an MPLS packet needs to remove the label and is forwarded

	according to the destination MAC of the inner packet (VPLS application) after hitting the entry.
PV	Indicates that an MPLS packet needs to remove the label and is forwarded from a specified egress (VPWS application) after hitting the entry.
IP	Indicates an MPLS packet needs to be forwarded across VRFs after hitting the entry. This type of entry is the forwarding entry across VRFs of one VPN.
DP	Indicates that a packet is discarded after hitting the entry.

FEC: It has two meanings.

1. In the case of an FTN entry ("--" is displayed if it has no incoming label), the IP address and mask are displayed for the FEC field if the FTN is for IP route. If (V) is carried behind, it indicates that the FTN belongs to a VRF. In the case of a VC FTN, VC ID and VC peer IP are displayed for the FEC field.

2. For an ILM entry (it has an incoming label), if the label is for IP route, the IP address and mask are displayed for the FEC field. If (V) is carried behind, it indicates that the ILM belongs to a VRF. If the label is for a VRF of an L3 VPN (that is, each VRF of a VPN is allocated with a label), the VRF name is displayed for the FEC field, such as VRF (vpna) in the preceding example. If the label is for VC, VC ID and VC peer IP are displayed for the FEC field, such as VC (20,1.1.1.1) in the preceding example.

Outgoing interface: Indicates the outgoing interface for packet forwarding and uses the abbreviated name of the interface.

Nexthop: Indicates the next hop for packet forwarding. "--" is displayed for a forwarding entry with an ineffective next hop address.

Example 2: The following command shows statistics information of the process forwarding module:

```
DES-7200# show mpls forwarding-table summary
```

```
MPLS forwarding is ON
```

```
Enable count:1
```

```
ILM entrys:14
```

```
ILM changes:14
```



```
ILM failed changes :0

IP FTN entrys:0

IP FTN changes:4

IP FTN failed changes:0

L2 FTN entrys:0

L2 FTN changes:0

L2 FTN failed changes:0

In label packets:0

Out label packets:0

Send label packets:0

In ip packets:0

Out ip packets:0

Out ip stack packets:0

Forwarding packets:0

Fragment packets:0

Fragment error packets:0

Label error packets:0

Label failed packets:0

Ttl over packets:0

Buffer failed packets:0

Ip don't fragment packets:0

Other failed packets:0
```

Example 3: The following command shows FRR information of the process forwarding module:

```
DES-7200#show mpls forwarding-table frr

Label Operation Code:

PH--PUSH label

PP--POP label
```

```

SW--SWAP label

SP--SWAP topmost label and push new label

DP--DROP packet

PC--POP label and continue lookup by IP or Label

PI--POP label and do ip lookup forward

PN--POP label and forward to nexthop

PM--POP label and do MAC lookup forward

PV--POP label and output to VC attach interface

IP--IP lookup forward

Status codes: m - main entry, b - backup entry, * - active.

   Local  Outgoing  OP  FEC                Outgoing  Nexthop
   Label  label                interface
m*  --    1026          PH  120.1.1.0/24      Gi3/18    10.0.2.1
b   --    1027          PH  120.1.1.0/24      Gi3/19    10.0.3.1
m*  1028  1029          SW  120.1.2.0/24      Gi3/18    10.0.2.1
b   1028  1030          SW  120.1.2.0/24      Gi3/29    10.0.3.1

```

1.2.3 show mpls label-pool

Use this command to show the usage of the label pool in various label spaces. You can show the data of all the label spaces, or that of a specific label space by specifying a label space number.

show mpls label-pool [*label_space*]

Parameter description	Parameter	Description
	<i>label_space</i>	Specify the label space whose label pool is to be shown.

Default configuration	None
-----------------------	------

Command mode	Privileged mode				
Usage guidelines	This command allows you to show the usage of the label pools of all label spaces or a specific label space, including label pool size, maximum/minimum label value, and allocation of each label pool. At present, only the global label space is supported.				
Examples	<pre>DES-7200# show mpls label-pool label space: 0 label pool bucket size 512 min label 16, max label 1048575 label block used 2, free 2046 status codes: (s) - stale CLI: 0 , 1 (Include label [16,1023], reserved) LDP: 3 , 4 (s)</pre>				
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>label-switching</td> <td>Enable label switching.</td> </tr> </tbody> </table>	Command	Description	label-switching	Enable label switching.
Command	Description				
label-switching	Enable label switching.				

1.2.4 show mpls ldp bindings

Use this command to show the LDP label binding information, which can be filtered according to VRF, FEC prefix, label value, remote binding, or local binding.

show mpls ldp bindings [**all** | **vrf** *vrf-name*] [*ip-address* | *mask* | **label** *label*] [**remote** | **local**]

Parameter description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>all</td> <td>Show label binding information under all VRFs.</td> </tr> <tr> <td>vrf <i>vrf-name</i></td> <td>Show label binding information under specified VRFs.</td> </tr> <tr> <td><i>ip-address</i> <i>mask</i></td> <td>Show label binding information of specified FECs.</td> </tr> </tbody> </table>	Parameter	Description	all	Show label binding information under all VRFs.	vrf <i>vrf-name</i>	Show label binding information under specified VRFs.	<i>ip-address</i> <i>mask</i>	Show label binding information of specified FECs.
Parameter	Description								
all	Show label binding information under all VRFs.								
vrf <i>vrf-name</i>	Show label binding information under specified VRFs.								
<i>ip-address</i> <i>mask</i>	Show label binding information of specified FECs.								

label <i>label</i>	Show label binding information of specified label values, ranging from 0 to 1048575.
remote	Show remote label binding information received from the LDP peer.
local	Show label binding information sent locally.

Default configuration

No parameter is carried, indicating that all label binding information under the global VRF is shown.

Command mode

Privileged mode

Usage guidelines

This command shows the FEC and label binding information. This command allows you to view the working status of the LDP, whether the LDP has normally bound a label to an FEC, the specific label value of bound to an FEC, and whether the binding is local binding or remote binding. If no VRF is specified, it indicates that label binding information under the global VRF is displayed.

Examples

The following command shows label database information under the global VRF:

```
DES-7200# show mpls ldp bindings
```

```
Default VRF:
```

```
lib entry: 2.2.2.2/32
```

```
local binding: to lsr:10.20.10.10:0,label: imp-null
```

```
remote binding: from lsr:10.20.10.10:0,label: 16 (not in FIB)
```

```
lib entry: 10.20.10.10/32
```

```
local binding: to lsr: 10.20.10.10:0, label: 1027
```

```
remote binding: from lsr: 10.20.10.10:0, label: imp-null
```

Field	Description
local binding	Label binding information distributed by an LSR

		for an FEC. not in FIB indicates that the information is not added to the FIB.
	remote binding	Remote label binding information received from the LDP peer. not in FIB indicates that the information is not added to the FIB.

Related commands	Command	Description
	show mpls ldp neighbor	

1.2.5 show mpls ldp discovery

Use this command to show the neighbor information discovered by LDP under all or specified VRFs.

show mpls ldp discovery [**all** | **vrf** *vrf-name*] [**detail**]

Parameter description	Parameter	Description
	all	Show the neighbor information discovered by LDP under all VRFs.
	vrf <i>vrf-name</i>	Show the neighbor information discovered by LDP under specified VRFs.
	detail	Show detailed information about neighbors discovered by LDP.

Default configuration

None

Command mode

Privileged mode

**Usage
guidelines**

This command allows you to show the interfaces on which LDP neighbors have been discovered, the LDP neighbors discovered, the Hello packet source address of the LDP neighbor, and Hello keepalive time. Specifying no VRF indicates that neighbor information discovered by LDP under the global VRF is displayed.

The following command shows neighbor information discovered by LDP under the global VRF:

```
DES-7200# show mpls ldp discovery
Default VRF:
Local LDP Identifier:
    8.8.8.8:0
Discovery Sources:
Interfaces:
    GigabitEthernet 2/1 (ldp): xmit/recv
        LDP Ident: 10.30.10.10:0
    GigabitEthernet 2/2 (ldp): xmit
Targeted Hellos:
    8.8.8.8 -> 10.5.0.1 (ldp): active, xmit
    8.8.8.8 -> 10.30.10.10 (ldp): active/passive, xmit
    2.2.2.2 -> 10.30.10.10 (ldp): passive, xmit/recv
        LDP Ident: 10.30.10.10:0
```

Examples

Field	Description
Local LDP Identifier	Indicates the LDP identifier for the local router.
Interfaces	Indicates the interface information lists discovered by the active LDP.
xmit	Indicates that Hello packets were sent on an interface.
recv	Indicates that Hello packets are received on an interface.
Targeted Hellos	Indicates the sending path list of all targeted Hello messages.
active	Indicates the local LSR actively sends targeted Hello messages.

	passive	Indicates the neighbor LSR actively sends targeted Hello messages. The local LSR is configured to respond to the targeted Hello message sent by the neighbor LSR.
--	---------	---

	Command	Description
Related commands	show mpls ldp interface	Show the LDP-enabled interface information.
	neighbor ip-address	Create an LDP extended peer.

1.2.6 show mpls ldp graceful-restart

Use this command to show the LDP GR session and its parameters.

show mpls ldp graceful-restart [**all** | **vrf** *vrf-name*]

	Parameter	Description
Parameter description	all	Show LDP GR sessions and session parameters of all VRFs (including VRF).
	vrf <i>vrf-name</i>	Show LDP GR sessions and session parameters of specified VRFs.

Default configuration	None
-----------------------	------

Command mode	Privileged mode
--------------	-----------------

**Usage
guidelines**

Use this command to show the LDP GR session and session parameter as follows:

- If there is no parameter in this command, it indicates that the LDP GR sessions and session parameters of the global VRF are displayed.

The following command shows the LDP GR sessions and session parameters:

```
DES-7200# show mpls ldp graceful-restart
Default VRF:
  LDP Graceful Restart is enabled
  Neighbor Liveness Timer: 120 seconds
  Max Recovery Time: 120 seconds
  Forwarding State Holding Time: 300 seconds
  Down Neighbor Database (1 records):
    Peer LDP Ident: 20.20.20.20:0; Local LDP Ident: 10.10.10.10:0
    Status: recovering (86 seconds left)
    Address list contains 3 addresses:
      192.168.202.3  20.20.20.20  192.168.201.37
Graceful Restart-enabled Sessions:
  Peer LDP Ident: 20.20.20.20:0, State: estab
```

Examples

Field	Description
Default VRF	Global VRF information
LDP Graceful Restart is enabled	The GR capability of LDP is enabled for a VRF.
Neighbor Liveness Timer	Survival time of the neighbor timer in the unit of second
Max Recovery Time	Maximum recovery time in the unit of second
Forwarding State Holding Time	Forwarding state holding time (reconnect time) in the unit of second
Down Neighbor Database	Down database information of an LDP neighbor
Graceful Restart-enabled Sessions	Enable LDP session information of LDP GR.
Peer LDP Ident	Peer LDP ID
State	LDP session state of an LDP

		neighbor
Related commands	Command	Description
	graceful-restart	Enable the GR capability of LDP.
	graceful-restart timer reconnect <i>seconds</i>	Configure the reconnect time of an LDP session.
	graceful-restart timer neighbor-liveness <i>seconds</i>	Configure the survival time of an LDP neighbor.
	graceful-restart timer recovery <i>seconds</i>	Configure the recovery time of an LDP session.

1.2.7 show mpls ldp interface

Use this command to show information about interfaces enabled with LDP under all or specific VRFs.

show mpls ldp interface [**all** | **vrf** *vrf-name* | *interface-name*]

		Parameter	Description
Parameter description	all		Show information about interfaces enabled with LDP under all VRFs.
	vrf <i>vrf-name</i>		Show information about interfaces enabled with LDP under specified VRFs.
	<i>interface-name</i>		Show information about specified interfaces.
Default configuration		None	

Command mode	Privileged mode																		
Usage guidelines	Use this command to show the device's interfaces on which LDP is enabled and Up/Down state of them. If no VRF is specified, it indicates that interface information under the global VRF is displayed.																		
Examples	<p>The following command shows information about the interfaces enabled with LDP under the global VRF:</p> <pre>DES-7200# show mpls ldp interface</pre> <p>Default VRF:</p> <table border="1"> <thead> <tr> <th>Interface</th> <th>Operational</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>GigabitEthernet 2/1</td> <td>Yes</td> <td>UP</td> </tr> <tr> <td>GigabitEthernet 2/2</td> <td>No</td> <td>DOWN</td> </tr> <tr> <td>GigabitEthernet 2/3</td> <td>Yes</td> <td>UP</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Field</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Operational</td> <td>Indicates whether an interface is enabled with LDP.</td> </tr> <tr> <td>Status</td> <td>Indicates interface status.</td> </tr> </tbody> </table>	Interface	Operational	Status	GigabitEthernet 2/1	Yes	UP	GigabitEthernet 2/2	No	DOWN	GigabitEthernet 2/3	Yes	UP	Field	Description	Operational	Indicates whether an interface is enabled with LDP.	Status	Indicates interface status.
Interface	Operational	Status																	
GigabitEthernet 2/1	Yes	UP																	
GigabitEthernet 2/2	No	DOWN																	
GigabitEthernet 2/3	Yes	UP																	
Field	Description																		
Operational	Indicates whether an interface is enabled with LDP.																		
Status	Indicates interface status.																		

1.2.8 show mpls ldp neighbor

Use this command to show LDP neighbor information under all or specified VRFs.

show mpls ldp neighbor [**all** | **vrf** *vrf-name*] [*ip-address*] [**detail**]

Parameter description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>all</td> <td>Show LDP session information under all VRFs.</td> </tr> <tr> <td>vrf <i>vrf-name</i></td> <td>Show LDP session information under specified VRFs.</td> </tr> <tr> <td><i>ip-address</i></td> <td>Show LDP session information of specified LDP peers under specified or all VRFs.</td> </tr> <tr> <td>detail</td> <td>Show detailed LDP session information.</td> </tr> </tbody> </table>	Parameter	Description	all	Show LDP session information under all VRFs.	vrf <i>vrf-name</i>	Show LDP session information under specified VRFs.	<i>ip-address</i>	Show LDP session information of specified LDP peers under specified or all VRFs.	detail	Show detailed LDP session information.
Parameter	Description										
all	Show LDP session information under all VRFs.										
vrf <i>vrf-name</i>	Show LDP session information under specified VRFs.										
<i>ip-address</i>	Show LDP session information of specified LDP peers under specified or all VRFs.										
detail	Show detailed LDP session information.										

Default configuration

None

Command mode

Privileged mode

Usage guidelines

Use this command to show all LDP neighbors, such as the TCP connection port between the local LDP and peer LDP, LDP status, received/sent message counts.

Examples

The following command shows LDP neighbor information under the global VRF:

```
DES-7200# show mpls ldp neighbor
```

```
Default VRF:
```

```
Peer LDP Ident: 10.20.10.10:0; Local LDP Ident: 8.8.8.8:0
```

```
TCP connection: 10.20.10.10.62488 - 8.8.8.8.646
```

```
State: OPERATIONAL; Msgs sent/rcv: 42/45; UNSOLICITED
```

```
Up time: 00:33:49
```

```
Graceful Restart enabled; Peer reconnect time (msecs): 300000
```

```
Down Neighbor Information:
```

```
Status: recovering (115 seconds left)
```

```
LDP discovery sources:
```

```
Link Peer on GigabitEthernet 2/1,Src IP addr:192.168.201.220
```

```
Targeted Hello 8.8.8.8 -> 10.20.10.10
```

```
Addresses bound to peer LDP Ident:
```

```
10.20.10.10 192.168.201.220 192.168.198.1 10.5.0.1
```

Field	Description
Peer LDP Ident	Peer LDP identifier of an LDP session
Local LDP Identifier	LDP identifier of the local router
TCP connection	TCP connection that supports the LDP session
State	LDP session state

Msgs sent/recv	Count of LDP messages which are sent to and received from the session peer
UNSOLICITED&ONDEMAND	Label distribution mode
Up time	Time when an LDP session is established
Graceful Restart enabled	Indicates that Graceful Restart is enabled.
Peer reconnect time (msecs)	Reconnect time of the peer LDP session
Down Neighbor Information	Neighbor Down information
Status	Indicates that the neighbor is recovering (with 115 seconds to go).

	Command	Description
Related commands	show mpls ldp discovery	Show the neighbor information discovered by LDP.

1.2.9 show mpls ldp parameters

Use this command to show the LDP configuration parameters under all or specified VRFs.

show mpls ldp parameter [**all** | **vrf** *vrf-name*]

	Parameter	Description
Parameter description	all	Show LDP configuration parameters under all VRFs.
	vrf <i>vrf-name</i>	Show LDP configuration parameters under specified VRFs.

Default configuration	None
------------------------------	------

Command mode

Privileged mode

Usage guidelines

Use this command to show various attribute information of LDP, including the LSR ID, transport address, loop detection mechanism, label distribution and control mode, label retention mode, interval and holdtime of the Hello packet for the extended mechanism as well as the interval and holdtime of the Keepalive packet. If no VRF is specified, it indicates that configuration parameters of LDP under the global VRF are displayed.

Examples

The following command shows the configuration parameters of LDP under the global VRF:

```
DES-7200# show mpls ldp parameters
```

```
Default VRF:
```

```
Protocol version: 1
```

```
Ldp Router ID: 1.1.1.1
```

```
Control Mode: INDEPENDENT
```

```
Propagate Release: FALSE
```

```
Label Merge: TRUE
```

```
Label Retention Mode: LIBERAL
```

```
Loop Detection Mode: off
```

```
Targeted Session Keepalive HoldTime/Interval: 180/60 sec
```

```
Targeted Hello HoldTime/Interval: 45/5 sec
```

```
LDP initial/maximum backoff: 15/120 sec
```

Related commands

Command	Description
ldp router-id	Configure the LDP router ID.
ldp-control-mode	Configure the LDP control mode.
ldp-label-retention-mode	Configure the label retention mode.
propagate-release	Configure the label propagate release switch.
label-merge	Configure the label merge switch.

loop-detection-mode	Configure loop detection.
----------------------------	---------------------------

1.2.10 show mpls rib

Use this command to show MPLS RIB information.

show mpls rib [*all* | *vrf vrf-name*]

	Parameter	Description
Parameter description	all	Show MPLS routing information under all VRFs.
	vrf vrf-name	Show MPLS routing information under specified VRFs.

Default configuration	None
------------------------------	------

Command mode	Privileged mode
---------------------	-----------------

Usage guidelines	Use this command to show MPLS routing information as follows:
	<ul style="list-style-type: none"> ■ If no parameter is specified in this command, it indicates that MPLS routing information under the global VRF is displayed.

Examples	The following command shows MPLS routing information under the global VRF:
	<pre>DES-7200#show mpls rib Status codes: m - main entry, b - backup entry, * - active, s - stale. Default VRF: LSP Information Total STATIC LSP 0 LDP LSP 3</pre>

```

RSVP LSP          0

BGP LSP           0

L3VPN LSP         0

```

```
LDP LSP:
```

```

-----
FEC                In/Out Label    In/Out IF        Nexthop
-----
119.1.1.0/24      -/1025             -/Gi3/19         10.0.10.1
m* 120.1.1.0/24   -/1026             -/Gi3/18         10.0.2.1
b 120.1.1.0/24    -/1031             -/Gi3/19         10.0.10.1
m* 120.1.2.0/24   1027/1032          Gi3/10/Gi3/18   10.0.2.1
b 120.1.2.0/24   1027/1033          Gi3/10/Gi3/19   10.0.10.1
-----

```

Field	Description
LSP Information	<ul style="list-style-type: none"> ● STATIC LSP: This type of LSP is configured manually. ● LDP LSP: This type of LSP is established through LDP. ● RSVP LSP: This type of LSP is an MPLS TE tunnel established through RSVP-TE. ● BGP LSP: This type of LSP is established through BGP for IPv4 private network BGP routes or IPv4 public network BGP routes. ● L3VPN LSP: This type of LSP is established through BGP for received VPNv4 routes.
Total	Show the total amount of LSP information related to a VRF.
FEC	Its value is usually the destination address of an LSP.
In/Out Label	Value of the incoming/outgoing label
In/Out IF	Name of the incoming/outgoing interface
Nexthop	Next hop

Related commands	Command	Description
	-	-
Platform description	None	

1.2.11 show mpls summary

Use this command to show MPLS global configuration information.

show mpls summary

Parameter description	Parameter	Description
	-	-

Default configuration	None
------------------------------	------

Command mode	Privileged mode
---------------------	-----------------

Usage guidelines	This command allows you to view the basic information about MPLS, including maximum/minimum available labels, information about each label space, label space used by each interface, and total number of interfaces with MPLS enabled.
-------------------------	---

Examples	<pre>DES-7200# show mpls summary Per label-space information://Show information about each label space, with only label space 0 supported at present. Label-space 0 is using minimum label:16 and maximum label:1048575//Label scope allowed by this label space Label-switching Interface://Display the interface enabled with label switching</pre>
-----------------	---


```
Interface          Label space
GigabitEthernet 4/1  0
GigabitEthernet 4/2  0
Total number of mpls interface is 2
```

**Related
commands**

Command	Description
label-switching	Enable label switching.

2

BGP/MPLS L3 VPN Configuration Commands

2.1 Configuration Related Commandss

2.1.1 address-family(VRF)

Use this command to configure the IPv4 or IPv6 address family for the multi-protocol VRF.

address-family {ipv4 | ipv6}

Parameter description	Parameter	Description
	-	-
Default configuration		No IPv4 or IPv6 address family is configured for the multi-protocol VRF.
Command mode		VRF configuration mode
Usage guidelines		Configuring the IPv4 address family for the multi-protocol VRF is equivalent to enabling the IPv4 protocol. Configuring the IPv6 address family for the multi-protocol VRF is equivalent to enabling the IPv6 protocol.
Examples		Define the multi-protocol VRF vrf1, and configure the IPv4 address family. <pre>DES-7200(config)#vrf definition vrf1 DES-7200(config-vrf)#address-family ipv4 DES-7200(config-vrf-af)#</pre>

Related commands	Command	Description
	exit-address-family	Exit the configuration mode for the VRF address family.
	vrf definition	Define the multi-protocol VRF.

2.1.2 address-family ipv4 vrf (BGP)

Use this command to enter or exit from the VRF address family mode, and set the interaction of a vrf route.

[no] address-family ipv4 vrf *vrf-name*

Parameter description	Parameter	Description
	<i>vrf-name</i>	VRF name.

Default configuration	By default, no VRF address family is defined.
------------------------------	---

Command mode	Router configuration mode.
---------------------	----------------------------

Usage guidelines	This command allows you to enable (or disable) the routing information exchange between the PE and CE. Use command exit-address-family to return to the BGP configuration mode.
-------------------------	--

Examples	<pre>DES-7200(config)# router bgp 100 DES-7200(config-router)# address-family ipv4 vrf vrf1</pre>
-----------------	---

Related commands	Command	Description
	neighbor activate	Activate an address family.

	exit-address-family	Exit from this mode.
--	----------------------------	----------------------

2.1.3 address-family vpnv4 (BGP)

Use this command to enter or exit from the VPN address family mode and enable VPN routing information interaction between the PEs.

[no] address-family vpnv4 [unicast]

Parameter description	Parameter	Description
	unicast	Specify the unicast address prefix

Default configuration	By default, no vpn address family is defined.
------------------------------	---

Command mode	Router mode
---------------------	-------------

Usage guidelines	Use this command to enable the VPN routing information interaction between PEs and enter the address-family VPN mode. Use command exit-address-family to exit from the address-family VPN configuration mode.
-------------------------	--

Examples	<pre>DES-7200(config)# router bgp 100 DES-7200 (config-router)# address-family vpnv4</pre>
-----------------	--

Related commands	Command	Description
	neighbor activate	Activate an address family
	exit-address-family	Exit from this mode.

2.1.4 alloc-label

Use this command to allocate label per VPN.

[no] alloc-label {per-vrf | per-route}

	Parameter	Description
Parameter description	per-vrf	Allocate a label per VPN.
	per-route	Allocate a label per VPN route.

Default configuration	By default, a label is allocated per VRF.
------------------------------	---

Command mode	VRF configuration mode
---------------------	------------------------

Usage guidelines	RFC4364 outlines two label assignment methods for L3VPN: per route and per VRF. The former method rapidly forwards packets to the next hop by label by searching the ILM table, but it requires a large ILM table. For the latter method, all routes of a VRF share the label that significantly reduces the size of the ILM table, but its forwarding efficiency is lower for it searches the ILM table two times. First it searches the VRF of a packet from the ILM table, then forwards the packet according to the destination IP address of the routing table of the VRF.
-------------------------	---

Examples	To configure label assignment per route for VPNA, use the following command: <pre>DES-7200(config)# ip vrf VPNA DES-7200(config-vrf)# alloc-label per-route</pre>
-----------------	--

2.1.5 area sham-link

Use this command to configure a sham link, and the **no** command is used to delete the corresponding sham link.

area *area-id* **sham-link** *source-address destination-address* [**cost** *number*] [**dead-interval** *seconds*] [**hello-interval** *seconds*] [**retransmit-interval** *seconds*] [**transmit-delay** *seconds*] [**authentication** [**message-digest** | **null**]] [[**authentication-key** *key*] | [**message-digest-key** *key-id md5 key*]]

no area *area-id* **sham-link** *source-address destination-address* [**cost**] [**dead-interval**] [**hello-interval**] [**retransmit-interval**] [**transmit-delay**] [**authentication**] [[**authentication-key**] | [**message-digest-key** *key-id*]]

Parameter description	Parameter	Description
	<i>area-id</i>	It indicates the OSPF area ID of the sham link that can be a decimal integer ranging from 0 to 4294967295 or an IP address.
	<i>source-address</i>	Sham link source address
	<i>destination-address</i>	Sham link destination address
	cost <i>number</i>	(Optional) It indicates the COST value for OSPF to send packets on the sham link. It ranges from 0 to 65535 with the default value of 1.
	dead-interval <i>seconds</i>	(Optional) It indicates the time interval when the neighbor of the sham link dies. It ranges from 0 to 2147483647 with the default value of 40s.
	hello-interval <i>seconds</i>	(Optional) It indicates the time interval for sending the Hello packet on the sham link. It ranges from 1 to 65535 with the default value of 10s.
	retransmit-interval <i>seconds</i>	(Optional) It indicates the retransmission time interval for sending packets on the sham link. It ranges from 0 to 65535 with the default value of 5s.
	transmit-delay <i>seconds</i>	(Optional) It indicates the delay for transmitting the LSU packet on the sham link. It ranges from 0 to 65535 with the default value of 1s.
	authentication-key <i>key</i>	(Optional) It defines the key for OSPF plain text authentication. The keys for plain text authentication between neighbors must be consistent. The service password-encryption command can make the key to be displayed in an encrypted way.

message-digest-key <i>key-id md5 key</i>	(Optional) It defines the key identifier and key for OSPF MD5 authentication. The key identifier and key for MD5 authentication between neighbors must be consistent. The service password-encryption command can make the key to be displayed in an encrypted way.
authentication	Set the authentication type: plain text authentication.
message-digest	Set the authentication type to MD5 authentication.
null	Set authentication not to be carried out.

Default configuration

By default, authentication is not carried out.

Command mode

OSPF Router mode

Usage guidelines

This command is valid only to the OSPF instance that associates the VRF.

To configure a sham link, configure the two PEs that set up the sham link. If you configure only one PE, the sham link cannot be set up.

The two PEs that establish the sham link must meet the following configuration requirements:

- The sham link area-id of two PEs must be the same.
- The source address of the sham link configured on one PE must be equal to the destination address of the sham link configured on the other PE.
- The source address of the sham link configured on the PE must be a 32-bit loopback address, and this address must be bound to the corresponding VRF instance.

As the OSPF route announced through the sham link lacks a VPN tag, this route cannot be used for forwarding, and the actual forwarding still needs to use the BGP VPNv4 route. Therefore, during the actual configuration, the route announced through the sham link must announce the VPNv4 route to the related BGP neighbor through the MP-BGP protocol.

**Caution**

The source address for setting up a sham link must participate in the BGP VPNv4 route announcement, but cannot participate in the calculation of the VRF OSPF instance.

Examples

A sham link is configured for an OSPF instance. The sham link belongs to the area 0, the source address is 1.1.1.1, the destination address is 2.2.2.2, and the COST value for transmitting packets on the sham link by the OSPF protocol is 10.

```
DES-7200(config)# router ospf 10 vrf vpn1
```

```
DES-7200(config-router)# area 0 sham-link 1.1.1.1 2.2.2.2 cost 10
```

Related commands

Command	Description
show ip ospf sham-links	Show all sham-link information of the OSPF instance.

Platform description

None

2.1.6 bgp default route-target filter

Use this command to enter the automatic router-target filtering of BGP. Use the **no** form of this command to disable this function.

bgp default route-target filter

no bgp default route-target filter

Default configuration

Enabled

Command mode

BGP configuration mode

Usage guidelines

By default, a PE will refuse the VPN route from other PE or ASBR which is not imported by any VRF on it. Using the **no** form of this command allows a PE to receive all VPN routes from other PEs or ASBR, no matter whether the VRFs on it imports the VPN routes or not.

This command is used for inter-domain VPN OptionB solution. Since no VRF is configured on an ASBR, but the ASBR needs to save VPN routes and advertise them to other PE (or ASBR), you need to run the **no bgp default route-target filter** command.

**Caution**

After the BGP peers are established and VPN routes are distributed, changing this configuration takes no effect for received or refused VPN routes. So it is recommended to use the **clear ip bgp** command to reset the sessions with the BGP peers, exchange VPN routes and determine whether to receive VPN routes.

For example, you run the **bgp default route-target filter** command to automatically filter route-target attribute. After the BGP peers are established and VPN routes are distributed, you need to disable this function. Hence, run the **no bgp default route-target filter** command and then the **clear ip bgp** command to reset the sessions with the BGP peers.

Examples

```
DES-7200(config)# router bgp 100
```

```
DES-7200 (config-router)# no bgy default route-target filter
```

2.1.7 capability vrf-lite

Use this command to control the loop inspection of the OSPF instance, and the no command enables loop inspection.

capability vrf-lite

no capability vrf-lite

Parameter description	Parameter	Description
	-	-

Default

By default, the OSPF instance associated with the VRF supports loop

configuration	inspection.
----------------------	-------------

Command mode	OSPF Router mode
---------------------	------------------

This command is valid only for the OSPF instance associated with the VRF. By default, the OSPF instance associated with the VRF supports loop inspection and the PE-CE OSPF feature (the so-called PE-CE OSPF feature is to convert different OSPF LSAs to CE based on the BGP extension attribute). Configuring the **capability vrf-lite** command will disable the function above. Loop inspection of the OSPF instance is to prevent the possible loop during transmission through the VPN route. The OSPF instance associated with the VRF will deal with the received LSAs according to the following rules:

LSA Type	Implementation Process
Types 3, 5, 7 LSA	Inspect the DN bit. If the received LSA has a DN bit, the LSA will not participate in the OSPF calculation.
Types 5, 7 LSA	Inspect the VPN domain-tag. If the VPN domain-tag of the received LSA and the VPN domain-tag of the local OSPF instance are the same, the LSA will not participate in the OSPF calculation.

Usage guidelines

After receiving the LSA packet, the OSPF protocol will not inspect the DN bit and the VPN domain-tag in the LSA packet, and let the LSA participate in the OSPF calculation. Disabling the PE-CE OSPF feature (for the introduction to “PE-CE OSPF Feature”, please see the *MPLS Configuration Guide*) means that different OSPF LSAs are not converted based on the BGP attribute.

By default, the OSPF instance associated with the VRF supports loop inspection.

The purpose of loop inspection is expected to disable the loop inspection of the VRF OSPF instance in some scenarios. For example, assume that a VPN user uses an MCE device exchange VPN routes with a PE. If the OSPF protocol runs for VPN route exchange between the MCE and PE and the MCE and VPN site exchange VPN routes through the EBGP, the OSPF and BGP in the MCE should be set to redistribute each other. To enable the BGP to completely redistribute OSPF routes, it is required to disable loop inspection of the VRF OSPF instance in the MCE by using the **capability vrf-lite** command.

Examples	<p>Disable loop inspection of the OSPF instance.</p> <pre>DES-7200(config)# router ospf 10 vrf vpn1 DES-7200(config-router)# capability vrf-lite</pre>
-----------------	--

Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>domain-tag</td> <td>Configure domain-tag information of the OSPF instance.</td> </tr> </tbody> </table>	Command	Description	domain-tag	Configure domain-tag information of the OSPF instance.
Command	Description				
domain-tag	Configure domain-tag information of the OSPF instance.				

Platform description	None
-----------------------------	------

2.1.8 clear ip bgp vrf

Use this command to reset the sessions of all members in VRF.

clear ip bgp vrf *vrf-name* [*] *address* [[**soft**][**in**|**out**]]

Parameter description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>vrf-name</i></td> <td>VRF name.</td> </tr> <tr> <td>*</td> <td>Reset all BGP sessions in VRF.</td> </tr> <tr> <td><i>address</i></td> <td>Reset the BGP sessions of the specified peer in VRF.</td> </tr> <tr> <td>ipv4 unicast</td> <td>IPv4 unicast session.</td> </tr> <tr> <td>in</td> <td>Reset the actively-connected session built by the peer.</td> </tr> <tr> <td>out</td> <td>Reset the actively-connected session built by the local BGP speaker.</td> </tr> <tr> <td>soft</td> <td>Reset the route information sent to or received from the specified peer by command.</td> </tr> <tr> <td>soft in</td> <td>Reset the received route information by command.</td> </tr> </tbody> </table>	Parameter	Description	<i>vrf-name</i>	VRF name.	*	Reset all BGP sessions in VRF.	<i>address</i>	Reset the BGP sessions of the specified peer in VRF.	ipv4 unicast	IPv4 unicast session.	in	Reset the actively-connected session built by the peer.	out	Reset the actively-connected session built by the local BGP speaker.	soft	Reset the route information sent to or received from the specified peer by command.	soft in	Reset the received route information by command.
Parameter	Description																		
<i>vrf-name</i>	VRF name.																		
*	Reset all BGP sessions in VRF.																		
<i>address</i>	Reset the BGP sessions of the specified peer in VRF.																		
ipv4 unicast	IPv4 unicast session.																		
in	Reset the actively-connected session built by the peer.																		
out	Reset the actively-connected session built by the local BGP speaker.																		
soft	Reset the route information sent to or received from the specified peer by command.																		
soft in	Reset the received route information by command.																		

	soft out	Reset the distributed route information by command.
Default configuration	N/A.	
Command mode	Privileged EXEC mode	
Usage guidelines	Use this command to reset the BGP sessions of all members in VRF.	
Examples	DES-7200(config)# <code>clear ip bgp vrf my-vrf in</code>	

2.1.9 description

Use this command to set the VRF descriptor.

description *string*

	Parameter	Description
Parameter description	<i>string</i>	Character string containing a maximum of 244 characters
Default configuration	None	
Command mode	VRF configuration mode	
Usage guidelines	None	

Examples	<p>Example 1: Define a single-protocol IPv4 VRF vrf1 and set the descriptor to vpn-a.</p> <pre>DES-7200(config)#ip vrf definition vrf1 DES-7200(config-vrf)#description vpn-a</pre>
	<p>Example 2: Define a multi-protocol VRF vrf2 and set the descriptor to vpn-b.</p> <pre>DES-7200(config)#vrf definition vrf1 DES-7200(config-vrf)#description vpn-b</pre>

Related commands	Command	Description
	ip vrf	Define a single-protocol IPv4 VRF.
	vrf definition	Define a multi-protocol VRF.

2.1.10 exit-address-family (BGP)

Use this command to exit the VRF family address configuration or VPN family address configuration mode.

exit-address-family

Parameter description	Parameter	Description
	-	-

Default configuration	None
------------------------------	------

Command mode	Specific address family configuration mode
---------------------	--

Usage guidelines	None
-------------------------	------

Examples	DES-7200(config)# router bgp 100
	DES-7200(config-router)# address-family vpnv4 unicast
	DES-7200(config-router-af)# exit-address-family

Related	Command	Description

commands	-	-
Platform description	None	
Command history	Version No.	Description
	-	-

2.1.11 exit-address-family(VRF)

Use this command to exit the VRF address family configuration mode.

exit-address-family

Parameter description	Parameter	Description
	-	-

Default configuration	None
------------------------------	------

Command mode	VRF address family configuration mode
---------------------	---------------------------------------

Usage guidelines	None
-------------------------	------

Examples	Create a multi-protocol VRF vrf1 and configure an IPv4 address family.
	<pre>DES-7200(config)#vrf definition vrf1 DES-7200(config-vrf)#address-family ipv4 DES-7200(config-vrf-af)# exit-address-family DES-7200(config-vrf)#</pre>

Related commands	Command	Description
	address-family	Configure an IPv4 or IPv6 address family for a multi-protocol VRF.

	vrf definition	Define a multi-protocol VRF.
--	-----------------------	------------------------------

2.1.12 domain-id

Use this command to configure the domain ID of the OSPF instance. The no command is used to cancel the domain ID of the OSPF instance.

domain-id {*ip-address* [*secondary*] | null | type {0005|0105|0205|8005} value *hex-value* [*secondary*]}

no domain-id [*ip-address* [*secondary*] | null | type {0005|0105|0205|8005} value *hex-value* [*secondary*]]

	Parameter	Description
Parameter description	<i>ip-address</i>	Set the domain ID to the IP address.
	secondary	The configured domain ID serves as the secondary identifier.
	null	The OSPF instance has no domain ID.
	type {0005 0105 0205 8005}	Set the domain ID type of the OSPF instance. It has the following four values: 0x0005, 0x0105, 0x0205, 0x8005, and the default type is 0x0005.
	value <i>hex-value</i>	Set the domain ID of the OSPF instance which is a hexadecimal numeral containing six bytes.
	secondary	The configured domain ID serves as the secondary identifier.

Default configuration

By default, the domain-id value of the OSPF instance is NULL, and the type is 0005.

Command mode

OSPF Router mode

Usage guidelines

This command is valid only for the OSPF instance associated with the VRF. Assume that the OSPF instance is configured with a domain ID. When an OSPF route changes into a VPN route after redistributed to BGP, the domain ID is also redistributed to the BGP, and is finally announced to other PEs as a part of the extended community attribute of the VPN route.

The OSPF instance can be configured with multiple domain IDs by using the **domain-id secondary** command, but there is only one primary domain ID, and others are secondary domain IDs. When the conversion from the OSPF

route to the VPN route is announced, the related extended community attribute also carries the primary domain ID information only.

Generally, the OSPF protocol runs between PE and CE to exchange VPN routes. After receiving the VPN route and redistributing it to the OSPF instance, PE announces this to the VPN site as type 5 LSA. However, for different sites that belong to one OSPF domain, the route should be announced as type 3 LSA. Therefore, after the same domain ID is configured for the related VRF OSPF instance on the PE, the route inside the domain can be announced as type 3 LSA.

In one PE, domain IDs of different VRF OSPF instances do not affect each other. They can be the same or different. The VRF OSPF instances that belong to one VPN should be configured with the same domain ID to ensure correct route announcement.

Examples

Configure the domain ID of the VRF OSPF instance.

```
DES-7200(config)# router ospf 10 vrf vpn1
DES-7200(config-router)# domain-id type 0005 value 000000000001
```

Related commands

Command	Description
show ip ospf	Show the summary information of the OSPF instance.

2.1.13 domain-tag

Use this command to configure the VPN domain-tag of the OSPF instance associated with the VRF. The **no** command restores the default value of the VPN domain-tag of the OSPF instance.

domain-tag *tag*

no domain-tag

Parameter description

Parameter	Description
<i>tag</i>	The domain-tag value of the OSPF instance, ranging from 1 to 4294967295

Default configuration

The default value of the VRF OSPF instance is the AS number of the local BGP protocol.

Command mode	OSPF Router mode				
Usage guidelines	<p>This command is valid only for the OSPF instance associated with the VRF, and only for the BGP redistributed route.</p> <p>If a VPN site connects multiple PEs, the VPN site learns the VPN route through MP-BGP from PEs. If the VPN route is announced to the VPN site through type 5 or type 7 LSA which may be learned by other PE routers connected to the VPN site and advertised, a loop may come into being. To prevent such a loop, configure the same VPN domain-tag for the VRF OSPF instances connected to the same VPN site on a PE. When the VRF OSPF instance sends type 5 or type 7 LSA to the VPN site, the LSA is attached with the VPN domain-tag information. When other PE sites receive type 5 or type 7 LSA, if the VPN domain-tag in the LSA is identical to the VPN domain-tag of the local OSPF instance, the LSA does not participate in OSPF calculation.</p> <p>Generally, the OSPF instances that belong to the same VPN should be configured with the same tag value.</p> <p>The VPN domain-tag contains four bytes in the OSPF packet. If this command is not configured for the VRF OSPF instance, by default, when the OSPF instance announces type 5 or type 7 LSA, the former two bytes of the VPN domain-tag are set to 0xD000, and the latter two bytes are set to the AS number of the local BGP. For example, if the AS number of the local BGP is 1, the hexadecimal value of the VPN domain-tag is 0xD0000001.</p>				
Examples	<p>Set the domain-tag value of the OSPF instance to 10.</p> <pre>DES-7200(config)# router ospf 10 vrf vpn1 DES-7200(config-router)# domain-tag 10</pre>				
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>capability vrf-lite</td> <td>Enable/Disable loop inspection.</td> </tr> </tbody> </table>	Command	Description	capability vrf-lite	Enable/Disable loop inspection.
Command	Description				
capability vrf-lite	Enable/Disable loop inspection.				

2.1.14 export map

Use this command to define the policy rule of exporting extended community attribute from local VRF to remote VPN route.

[no] export map *routemap-name*

Parameter description	Parameter	Description
	<i>route-map-name</i>	Associated route map policy rule.
Default configuration	By default, no policy rule of extended community attribute is exported.	
Command mode	VPN configuration mode	
Usage guidelines	This command allows you to more precisely control the extended group attribute of an exported route. You are allowed to add or modify the extended community attribute defined by the route-target export command. The route map associated by this command supports two rules only: match IP address and set extcommunity.	
Examples	<p>To configure the extended group attribute associated with rma on VPNA, use the following command:</p> <pre>DES-7200(config)# ip vrf VPNA DES-7200(config-vrf)# export map <i>rma</i></pre>	
Related commands	Command	Description
	route-target	Define the import and export RT policy of VRF.

2.1.15 exit address-family

Use this command to exit the VRF address family configuration or vpn address family configuration mode.

exit address-family

Command mode Specific address family configuration mode

Examples

```
DES-7200(config)# router bgp 100
DES-7200(config-router)# address-family vpnv4 unicast
DES-7200(config-router-af)# exit address-family
```

2.1.16 extcommunity-type

Use this command to configure router-id or route-type of the OSPF instance associated with the VRF. The **no** command restores the default value.

extcommunity-type {router-id {0107|8001} | route-type {0306|8000}}

no extcommunity-type {router-id | route-type }

	Parameter	Description
Parameter description	router-id {0107 8001}	Set the router-id type of the OSPF instance. The value can be 0107 or 8001.
	route-type {0306 8000}	Set the route-type type of the OSPF instance. The value can be 0306 or 8000.

Default configuration By default, the router-id type is 0107, and the route-type type is 0306.

Command mode OSPF Router mode

Usage guidelines

The command is valid only for the OSPF instance associated with the VRF, and not valid for the global VRF instance.

When the OSPF route of VRF forms the VPN route, the extended community attribute of the VPN route also carries the router-id information of the OSPF instance. The type field value of the extended community attribute can be set to 0x0107 or 0x8001 by running the **extcommunity-type router-id** command.

When the OSPF route of VRF forms the VPN route, the extended community attribute of the VPN route can also carry the router-type information of the OSPF instance. The type field value of the extended community attribute can be set to 0x0306 or 0x8000 by running the

extcommunity-type router-type command.

Examples

Set router-id of the OSPF instance to 8001.

```
DES-7200(config)# router ospf 10 vrf vpn1
```

```
DES-7200(config-router)# extcommunity-type router-id 8001
```

Related commands

Command	Description
-	-

2.1.17 import map

Use this command to define the policy rule of importing remote VPN routes to local VRF.

[no] import map *routemap-name*

Parameter description

Parameter	Description
<i>routemap-name</i>	Associated route map policy rule.

Default configuration

By default, no import policy rule is defined.

Command mode

VPN configuration mode

Usage guidelines

This command allows you to more precisely control the import of remote VPN route to local VRF . The rule defined by the **import map** command takes effect after the import of extended community attribute defined in the VRF. Namely, the rule defined by this command filters the received remote VPN routes only when they match the extended community attribute defined by the **route-target import** command in the VRF. The route map associated by this command supports two rules only: match IP address and match extcommunity.

Examples

To configure the extended group attribute associated with rma on VPNA, use the following command:

```
DES-7200(config)# ip vrf VPNA
DES-7200(config-vrf)# import map rma
```

Related commands

Command	Description
route-target	Define the import and export RT policy of VRF.

2.1.18 ip extcommunity-list

Use this command to define the extended community list referred in the route map, which is used to filter VPN routes in BGP/MPLS VPN applications. Use the **no** form to delete the extended community list.

```
ip extcommunity-list {expanded-list | expanded list-name } {permit | deny} [regular-expression]
```

```
ip extcommunity-list {standard-list | standard list-name } {permit | deny} [rt value] [soo value]
```

```
no ip extcommunity-list {expanded-list | expanded list-name | standard-list | standard list-name }
```

Use the following command to define the extended community list created by name. Use the **no** form to delete the extended community list.

```
ip extcommunity-list {expanded-list | expanded list-name | standard-list | standard list-name }
```

```
no ip extcommunity-list {expanded-list | expanded list-name | standard-list | standard list-name}
```

The command in the expanded ip extcommunity-list configuration includes:

```
[no] [sequence-number]deny regular-expression
```

```
[no] [sequence-number] permit regular-expression
```

```
exit
```

The command in the standard ip extcommunity-list configuration includes:

```
[no] [sequence-number] deny {[rt value] [soo value]}
```

```
[no] [sequence-number] permit {[rt value] [soo value]}
```

```
exit
```

Parameter	Description	
<i>expanded-list</i>	Value range (100-199), which is used to identify extended extcommunity list. One extcommunity list can contain multiple rules.	
<i>standard-list</i>	Value range (1-99), which is used to identify standard extcommunity list. One extcommunity list can contain multiple rules.	
expanded <i>list-name</i>	Name of extended extcommunity list less than 32 characters. This parameter allows you to enter the extended community list configuration mode.	
standard <i>list-name</i>	Name of standard extcommunity list less than 32 characters. This parameter allows you to enter the standard community list configuration mode.	
Parameter description	permit	Define an extcommunity permit rule.
	deny	Define an extcommunity deny rule.
	<i>regular-expression</i>	(optional) Define the template to match extcommunity.
	<i>sequence-number</i>	(Optional) Sequence number of a rule in the range 1 to 2147483647. Without specification, by default when a rule is added, its sequence number automatically increases by 10 starting with 10.
	rt	(Optional) Set RT, which can be used only for standard extcommunity configuration.
	soo	(Optional) Set SOO, which can be used only for standard extcommunity configuration.
	<i>value</i>	RT or SOO value
	Default configuration	By default, no extended community is defined.

Command mode

Global configuration mode and ip extcommunity-list configuration mode

Usage guidelines

The **ip extcommunity-list** command is used to create an extcommunity list including multiple extcommunity values, which is mainly applied for the match extcommunity rule of route map to match the extended community of BGP routes for route filtering.

For definition of extended extcommunity, the principle of regular-expression is as follows:

Symbol	Description
.	Match any single character.
*	Match zero or any sequence in the character string.
+	Match one or any sequence in the character string.
?	Match zero or one symbol in the character string.
^	Match the starting of the character string.
\$	Match the ending of the character string.
-	Match the comma, bracket, starting and ending of the character string, and space.
[]	Match the single character in a certain range.

Examples

Define ip extcommunity-list.

```
DES-7200(config)# ip extcommunity-list 1 permit rt 100: 1
```

```
DES-7200(config)# ip extcommunity-list standard aaa permit rt
100: 2
```

```
DES-7200(config)# ip extcommunity-list expanded ext1 permit 200:
[0~9][0~9]
```

Use ip extcommunity.

```
DES-7200(config)# route-map rt_in_filter
```

```
DES-7200(config-route-map)# match extcommunity 1
```

```

DES-7200(config-route-map)# match extcommunity ext1

DES-7200(config)# router bgp 100

DES-7200(config-router)# address-family vpn

DES-7200(config-router-af)#neighbor 3.3.3.3 send-community extended

DES-7200(config-router-af)#neighbor 3.3.3.3 route-map rt_in_filter in

```

**Related
commands**

Command	Description
match extcommunity	Match extcommunity.

2.1.19 ip route static inter-vrf

Use this command to enable or disable the static inter-vrf route.

[no] ip route static inter-vrf
**Default
configuration**

Enable the static inter-vrf route by default.

**Command
mode**

Global configuration mode

**Usage
guidelines**

If users configure the **no ip route static inter-vrf**, the inter-vrf route of static configuration will not be valid. If the active static inter-vrf route is existed, when you configure it again, it will print similar information as follow, to prompt to delete the static inter-vrf route.

```
*Aug 7 10:58:34: %NSM-6-ROUTESACROSSVRF: Un-installing route [x.x.x.x/8] from global routing table with outgoing interface x/x.
```

Examples

```
DES-7200(config)# no ip route static inter-vrf
```

2.1.20 ip route vrf

Use this command to create a static routing table entry for the VFR. Use the **no** form of this command to delete the entry.

[no] ip route vrf *vrf-name ip-addr mask interface next-hop-address* [**global**]

	Parameter	Description
Parameter description	<i>vrf-name</i>	VRF name.
	<i>ip-addr</i>	Prefix of the destination address of the route
	<i>mask</i>	Mask of the prefix of the destination address
	<i>interface</i>	Egress of the destination address.
	<i>next-hop</i>	Next hop of the destination address
	global	Indicate the next hop is of the global VRF.

Default configuration

There is no static route by default.

Command mode

Global configuration mode

Usage guidelines

The outgoing interface can be specified to bind to the interface of other vrf, to configure the static inter-VRF route. If the global parameter is configured, it is considered as the route of the global VRF. However, if the interface and global parameter are configured at the same time, and the interface is not within the global vrf, it will take the vrf where the interface locates as the standard.

Note: Configure the global to cross the global inter-vrf. It is not limited by the **no ip route static inter-vrf** command.

Examples

```
DES-7200(config)# ip route vrf vrf1 10.10.10.0 255.255.255.0 gi3/1
192.168.18.1
```

2.1.21 ip vrf

Use this command to create a VRF. Use the **no** form of this command to delete a VRF.

[no] ip vrf *vrf_name*

Parameter description	Parameter	Description
	<i>vrf_name</i>	VRF name.

Default configuration	By default, no vrf is defined.
------------------------------	--------------------------------

Command mode	Global configuration mode
---------------------	---------------------------

Examples	DES-7200(config)# ip vrf vrf1
-----------------	--------------------------------------

	Command	Description
Related commands	ip vrf forwarding	Bind the VRF with an interface
	show ip vrf	Show VRF configurations.
	rd	Configure the RD for the VRF
	route-target	Configure the RT attribute for the VRF.

2.1.22 ip vrf forwarding

Use this command to bind the VRF with an interface. Use the **no** form of this command to remove the binding.

[no] ip vrf forwarding *vrf-name*

Parameter	Parameter	Description
-----------	-----------	-------------

description	<i>vrf-name</i>	VRF name.
Default configuration	By default, the VRF is not binding with any interface.	
Command mode	Interface configuration mode	
Examples	<pre>DES-7200(config)# int eth1 DES-7200(config-if)# ip vrf forwarding vrf1</pre>	
Related commands	Command	Description
	ip vrf	Create a VRF instance
	show ip vrf	Show the VRF configurations

2.1.23 match extcommunit

Use this command to define the rule of matching the extended community of BGP in the route map configuration mode. Use the no form to remove the setting.

match **extcommunity** {*standard-list-number*|*standard-list-name*
|*expanded-list-num*|*expanded-list-name*}

no **match** **extcommunity** {*standard-list-number*|*standard-list-name*
expanded-list-num|*expanded-list-name*}

Parameter description	Parameter	Description
	<i>expanded-list-num</i>	In the range 100 to 199, which is used to identify extended extcommunity list. One extcommunity list can contain more than one rule.

<i>expanded-list-nam</i>	Name of extended extcommunity list. One extcommunity list can contain more than one rule.
<i>standard-list-num</i>	In the range 1 to 99, which is used to identify standard extcommunity list. One extcommunity list can contain more than one rule.
<i>standard-list-nam</i>	Name of standard extcommunity list. One extcommunity list can contain more than one rule.

Default configuration

By default, no match rule is defined.

Command mode

Route map configuration mode

Usage guidelines

Two kinds of route maps have the rule of matching extended community:

1. Route map associated by the **import map** command, which uses RT to filter the routes imported into the VRF.
2. Route map associated by the **neighbor route-map in** and **neighbor route-map out** commands configured in the VPNv4 address family configuration mode, which uses RT to filter VPNv4 routes from/to BGP peers.

Examples

Define two extended communities.

```
DES-7200(config)# ip extcommunity-list 1 permit rt 100:1
```

```
DES-7200(config)# ip extcommunity-list 1 permit rt 100:2
```

Define match rule in the route map.

```
DES-7200(config)# route-map rt
```

```
DES-7200(config-route-map)# match extcommunity 1
```

Use the route map.

```
DES-7200(config)# router bgp 100

DES-7200(config-router)# address-family vpnv4

DES-7200(config-router-af)# neighbor 3.3.3.3 route-map rt in
```

Related commands

Command	Description
ip extcommunity-list	Create extended community list.
show ip extcommunity-list	Show extended community list.

2.1.24 match mpls-label

Use this command to receive the routes matching label from the BGP peer. Use the no form to remove the setting.

match mpls-label

no match mpls-label

Default configuration

By default, no match rule is defined in the associated route map policy.

Command mode

Route map configuration mode

Usage guidelines

This command applies to only the route map associated by the **neighbor route-map in** command, which is used to only filter the inbound routes received from the BGP peer. If the rule defined in the route map has not this command, the routes are permitted as long as they match other rules, no matter whether they are tagged or not.

Note that this command takes effect for tagged IPv4 routes, not VPNv4 routes.

Examples

Create a route map and receive the routes matching the following conditions:

- 1 The route prefix matches the rule defined ACL 1.
- 2 The route has MPLS label.

```

DES-7200(config)# route-map infiltrer permit 10

DES-7200(config-route-map)# match ip address acl1

DES-7200(config-route-map)# match mpls-label

DES-7200(config-route-map)# exit

DES-7200(config)# router bgp 1

DES-7200(config-router)# neighbor 1.1.1.1 route-map infiltrer in

```

Related commands

Command	Description
neighbor send-label	Exchange the routes of MPLS label between the BGP peers.
neighbor route-map out	Control the routes to the BGP peer.
neighbor route-map in	Control the routes received from the BGP peer.
set mpls-label	Assign MPLS label to permitted routes.

2.1.25 maximum routes

Use this command to limit the maximum routes within the vrf. Use the **no** form of this command to cancel this limit.

maximum routes *limit* {*warn-threshold* | **warning-only**}

no maximum routes

Parameter description

Parameter	Description
<i>limit</i>	Limit the routes. The routes which exceed the limits will not be written into the core route table, ranging from 1 to 4294967295.
<i>warn-threshold</i>	Print the warning threshold, It will print the warning after the percent is reached, ranging from 1 to 100.
warning-only	After the configured limit is reached, it only prints the warning. But it is still allowed to add to the core route table.

Default configuration

There is no limit for the configuration by default.

Command mode

VRF configuration mode

Usage guidelines

Use this command to limit the allowed routes within the VRF. If it only hopes to get the warning, use the warning-only parameter.

Examples

```
DES-7200(config)# ip vrf vrf1
DES-7200(config-vrf)# rd 200:1
DES-7200(config-vrf)# maximum routes 1000 warning-only
```

2.1.26 neighbor activate

Use this command to activates the neighboring or peer group under current address mode. Use the **no** form of this command to restore the default value.

neighbor {*peer-address* | *peer-group-name*} **activate**

no neighbor {*peer-address* | *peer-group-name*} **activate**

	Parameter	Description
Parameter description	<i>peer-address</i>	Specify the address of the peer. This address can be the IPv4 or IPv6 address.
	<i>peer-group-name</i>	Specify the name of the peer group. The peer group name doesn't exceed 32 characters.

Default configuration

It is enabled under the address family IPv4.

Command mode

The BGP configuration mode, the IPv4 address family configuration mode of BGP, the IPv6 address family configuration mode of BGP, the IPv4 VRF configuration mode of BGP and the VPNv4 address family configuration mode of BGP.

Usage guidelines

For the address family of ipv4, this function is enabled by default. For other address family type, you need to configure this command for route information exchange.

Examples

```
DES-7200(config)# router bgp 60
DES-7200(config-router)# neighbor 10.0.0.1 remote-as 100
DES-7200(config-router)# address-family vpnv4
DES-7200(config-router-af)# neighbor 10.0.0.1 activate
```

Related commands

Command	Description
router bgp	Open the BGP protocol.
neighbor remote-as	Configure the peer of BGP

2.1.27 neighbor allowas-in

When you configure the PE, you can use this command to allow the PE to receive the messages with AS numbers duplicated with this PE. Use the **no** form of this command to restore the default value.

neighbor {*peer-address* | *peer-group-name*} **allowas-in** *number*

no neighbor {[*peer-address* | *peer-group-name*] **allowas-in**

Parameter description

Parameter	Description
<i>peer-address</i>	Specify the address of the peer.
<i>peer-group-name</i>	Specify the name of the peer group. The name of the peer group doesn't exceed 32 characters.
<i>number</i>	The repeated times of the allowed AS

	number. The default value is 3. The range is within [1, 10].						
Default configuration	By default, the allowas-in function is not enabled						
Command mode	BGP VPN address-family configuration mode, IPv4VRF address family configuration mode of BGP						
Usage guidelines	The typical application is in the spoke-hub model. Configure this command on the PE so that the PE can receive and send the advertised address prefix. Configure two VRFs on the PE. Set one of them to receive the route information of all PEs, and notify it to the CE; the other vrf receives the route information advertised by the CE and advertises them to all the PEs. You can make settings at both the IBGP peer and EBGP peer.						
Examples	<pre>DES-7200(config)# router bgp 60 DES-7200(config-router)# neighbor 10.0.0.1 remote-as 100 DES-7200(config-router)# address-family ipv4 vrf vpn1 DES-7200(config-router-af)# neighbor 10.0.0.1 allowas-in</pre>						
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>router bgp</td> <td>Open the BGP protocol.</td> </tr> <tr> <td>neighbor remote-as</td> <td>Configure the peer of the BGP.</td> </tr> </tbody> </table>	Command	Description	router bgp	Open the BGP protocol.	neighbor remote-as	Configure the peer of the BGP.
Command	Description						
router bgp	Open the BGP protocol.						
neighbor remote-as	Configure the peer of the BGP.						

2.1.28 neighbor as-override

Use this command to configure the PE to cover the AS number of a site. Use the **no** form of this command to restore the default value.

neighbor {peer-address | peer-group-name} **as-override**

no neighbor {peer-address | peer-group-name} **as-override**

	Parameter	Description
Parameter description	<i>peer-address</i>	Specify the address of the peer.
	<i>peer-group-name</i>	Specify the name of the peer group. The name of the peer group doesn't exceed 32 characters.

Default configuration

By default, the as-override function is not enabled.

Command mode

IPv4VRF address family configuration mode of BGP

Usage guidelines

Normally, the BGP protocol will not receive the route information with the same AS number as the AS. You can use this command to cover the AS number so that the BGP protocol can receive the route information from the same AS number.

In the VPN, the most typical application lies in that the two CE ends have the same AS number. Normally, these two CEs cannot receive the other from the other party. After the above command is configured on the PE, you can let the PE cover the AS number of the CE so that the CE from the other end can receive the route information.

Only set this function for the EBGP peer.

Examples

```
DES-7200(config)# router bgp 60
DES-7200(config-router)# neighbor 10.0.0.1 remote-as 100
DES-7200(config-router)# address-family ipv4 vrf vpn
DES-7200(config-router-af)# neighbor 10.0.0.1 as-override
```

Related commands

Command	Description
router bgp	Enable BGP protocol

	neighbor remote-as	Configure the peer of BGP
--	---------------------------	---------------------------

2.1.29 neighbor description

Use this command to set the descriptive language for specified peer (group). Use the **no** form of this command to cancel this configuration.

neighbor {*peer-address* | *peer-group-name*} **description text**

no neighbor {*peer-address* | *peer-group-name*} **description**

	Parameter	Description
Parameter description	<i>peer-address</i>	Specify the address of the peer.
	<i>peer-group-name</i>	Specify the name of the peer group. The name of the peer group doesn't exceed 32 characters.
	<i>text</i>	Use to describe the text of this peer (group). Range: up to 80 characters.

Default configuration	Disabled.
------------------------------	-----------

Command mode	BGP configuration mode, IPv4VRF address family configuration mode of BGP
---------------------	--

Usage guidelines	Use this command to add the descriptive character for the peer (group).It can help us remember the characteristics and features of this peer (group) better.
-------------------------	--

Examples	<pre>DES-7200(config)# router bgp 60 DES-7200(config-router)# neighbor 10.1.1.1 remote-as 80 DES-7200(config-router)# neighbor 10.1.1.1 description xyz.com</pre>
-----------------	---

	Command	Description
Related commands	router bgp	Enable BGP protocol
	neighbor remote-as	Configure the peer (group) of BGP.

2.1.30 neighbor next-hop-self

Use this command to modify the next hop as itself when sending routes to the peer. Use the **no** form of this command to cancel this configuration.

neighbor {*peer-address* | *peer-group-name*} **next-hop-self**

no neighbor {*peer-address* | *peer-group-name*} **next-hop-self**

	Parameter	Description
Parameter description	<i>peer-address</i>	Specify the address of the peer.
	<i>peer-group-name</i>	Specify the name of the peer group less than 32 characters.
	next-hop-self	Modify the next hop as itself when sending routes to the peer

Default configuration	By default, the next hop is not modified when sending routes to the peer.
-----------------------	---

Command mode	BGP configuration mode, IPv4 and VPNv4 address family configuration modes of BGP
--------------	--

Usage guidelines	In the inter-domain VPN OptionB solution, use this command in the BGP VPN address configuration mode to modify the next hop.
------------------	--

Examples	DES-7200(config)# router bgp 60
----------	--

```
DES-7200(config-router)# address-family vpnv4
DES-7200(config-router-af)# neighbor 10.1.1.1 next-hop-self
```

	Command	Description
Related commands	router bgp	Enable BGP protocol.
	neighbor remote-as	Configure the peer (group) of BGP.

2.1.31 neighbor next-hop-unchanged

Use this command to maintain the next hop when sending routes to the peer. Use the **no** form of this command to cancel this configuration.

neighbor {*peer-address* | *peer-group-name*} **next-hop-unchanged**

no neighbor {*peer-address* | *peer-group-name*} **next-hop-unchanged**

	Parameter	Description
Parameter description	<i>peer-address</i>	Specify the address of the peer.
	<i>peer-group-name</i>	Specify the name of the peer group less than 32 characters.
	next-hop-unchanged	Maintain the next hop when sending routes to the peer

Default configuration	By default, the next hop is not modified when sending routes to the peer.
-----------------------	---

Command mode	BGP configuration mode, IPv4 and VPNv4 address family configuration modes of BGP
--------------	--

Usage guidelines

In the inter-domain VPN OptionC (Multihop MP-EBGP) solution, you can set one route reflector in each AS to reduce the connections of PEs of inter-domain VPN. The route reflectors in different ASs set up Multihop MP-EBGP connections to exchange VPN routes. By default, the next hop is changed as itself when the route reflector sends routes to the EBGP peer. Consequently, when PEs in other ASs receive VPN routes, they consider the next hop of VPN routes to be the route reflector. In this way, all inter-domain VPN traffic passes through the route reflector. This is not the optimal forwarding path and imposes higher demand on the forwarding of RR. To avoid this circumstance, when the route reflector establishes inter-domain Multihop MP-EBGP connection, run the **neighbor next-hop-unchanged** command in the VPNv4 address family mode to maintain the next hop of VPNv4 routes.

Examples

```
DES-7200(config)# router bgp 60
DES-7200(config-router)# address-family vpnv4
DES-7200(config-router-af)# neighbor 10.1.1.1 next-hop-unchanged
```

Related commands

Command	Description
router bgp	Enable BGP protocol.
neighbor remote-as	Configure the peer (group) of BGP.

2.1.32 neighbor remote-as

Use this command to configure the peer (group) of BGP. Use the **no** form of this command to delete the configured peer (group).

neighbor {*peer-address* | *peer-group-name*} **remote-as** *as-number*

no neighbor {*peer-address* | *peer-group-name*} **remote-as**

Parameter description

Parameter	Description
<i>peer-address</i>	Specify the address of the peer, which may be the IPv4 or IPv6 address.
<i>peer-group-name</i>	Specify the name of the peer group. The name of the peer group doesn't exceed 32 characters.

	<i>as-number</i>	AS number of the BGP peer (group). The range is from 1 to 65535.				
Default configuration	No BGP peer is configured.					
Command mode	BGP configuration mode, IPv4 address family configuration mode of BGP, IPv6 address family configuration mode of BGP and IPv4 VRF configuration mode of BGP					
Usage guidelines	If you specify the BGP peer group, all members of the peer group will inherit the setting of this command.					
Examples	<pre>DES-7200(config)# router bgp 65000 DES-7200(config-router)# neighbor 10.0.0.1 remote-as 80</pre>					
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>router bgp</td> <td>Enable BGP protocol</td> </tr> </tbody> </table>	Command	Description	router bgp	Enable BGP protocol	
Command	Description					
router bgp	Enable BGP protocol					

2.1.33 neighbor send-label

Use this command to exchange the IPV routes of MPLS label with the peer (group). Use the **no** form of this command to disable this function.

neighbor {*peer-address* | *peer-group-name*} **send-label**

no neighbor {*peer-address* | *peer-group-name*} **send-label**

Parameter description	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td><i>peer-address</i></td> <td>Specify the address of the peer.</td> </tr> </tbody> </table>	Parameter	Description	<i>peer-address</i>	Specify the address of the peer.
Parameter	Description				
<i>peer-address</i>	Specify the address of the peer.				

<i>peer-group-name</i>	Specify the name of the peer group of less than 32 characters.
send-label	Send IPv4 routes of MPLS label to the BGP peer (group).

Default configuration

No routes of MPLS label is sent to the BGP peer.

Command mode

BGP configuration mode, IPv4 address family configuration mode of BGP

**Usage
guidelines****Caution**

This command must be configured on the local router and the adjacent router. If the BGP session is set up, this configuration takes effect after the BGP session resets.

To enable distribution of labels for IPv4 routes on the IBGP session, use the **neighbor {peer-address|peer-group_name} update-source loopback id** command to set the loopback address as source address of the BGP session. If you use the IP address of the direct interface as the source address, the LDP will distribute label-3 to its upstream devices for the connected PE device considers the direct route to be egress. In this way, the LSP tunnel is terminated on the PE device, not the PE. Consequently, to use the loopback address (generally 32-bit mask) to identify the PE itself, ensure that the egress of LSP is the PE. For direct EBGP session, you do not need to bind the loopback address. Instead, you can use the IP address of direct interface as the source address of EBGP session. For the single-hop direct EBGP session which enables BGP route (IPv4 route or VPN route) to carry with label, MP-BGP automatically generates a host route of 32-bit mask to the egress (namely EBGP neighbor address) to prevent LSP from being terminated in advance for the host address is aggregated by the direct route. At this time, the LDP will not send label-3 to its upstream through the host route of EBGP neighbor address for it does not consider itself to be the egress.

When you use BGP as the label distribution protocol, run the label-switching command on the interface on which MPLS message is forwarded to enable the label forwarding capability.

Examples

Send IPv4 route of MPLS label to 10.10.10.1.

```
DES-7200(config)# router bgp 65000
```

```
DES-7200(config-router)# neighbor 10.0.0.1 remote-as 65501
```

```
DES-7200(config-router)# neighbor 10.0.0.1 update-source loopback 0
```

```
DES-7200(config-router)# neighbor 10.0.0.1 send-label
```

Related**Command****Description**

neighbor route-map in	Set the policy of receiving routes from the peer.
neighbor route-map out	Set the policy of sending routes to the peer.
label-switching	Enable the label forwarding capability on the interface.
match mpls-label	Match the MPLS label defined in the route map.
set mpls-label	Distribute the MPLS label to the routes matching the route map.

2.1.34 neighbor shutdown

Use this command to disable the BGP connection established for specified BGP peer. Use the **no** form of this command to restart the BGP peer (group).

neighbor {*peer-address* | *peer-group-name*} **shutdown**

no neighbor {*peer-address* | *peer-group-name*} **shutdown**

	Parameter	Description
Parameter description	<i>peer-address</i>	Specify the address of the peer, which can be the IPv4 or IPv6 address.
	<i>peer-group-name</i>	Specify the name of the peer group. The name of the peer group doesn't exceed 32 characters.

Default configuration	Disabled.
Command mode	BGP configuration mode, IPv4 address family configuration mode of BGP, IPv6 address family configuration mode of BGP and IPv4 VRF configuration mode of BGP

Usage guidelines

Use this command to disable the valid connection established for specified peer (group), and delete all associated route information. However, this command still remains the configuration information of this specified peer (group).

If you specify the BGP peer group, all members of the peer group will inherit the setting of this command. However, if you set this command for some member of the peer, it will cover the peer group-based setting.

Examples

```
DES-7200(config)# router bgp 60
```

```
DES-7200(config-router)# neighbor 10.0.0.1 shutdown
```

Related commands

Command	Description
router bgp	Enable BGP protocol
neighbor remote-as	Configure the peer of BGP
show ip bgp summary	Show the connection status of BGP

2.1.35 neighbor soo

Use this command to configure the neighbor source site attribute value. Use the **no** form of this command to cancel the neighbor source site attribute value.

neighbor {*peer-address* | *peer-group-name*} **soo** **soo-value**

no neighbor {*peer-address* | *peer-group-name*} **soo**

Parameter description

Parameter	Description
<i>peer-address</i>	Specify the address of the peer.
<i>peer-group-name</i>	Specify the name of the peer group. The name of the peer group doesn't exceed 32 characters.
<i>soo-value</i>	Value of soo. soo-value can have two different kinds of parameters: (1)soo-value= as-num:nn

		<p>an-num is the public autonomous area system number, and nn is specified by the user</p> <p>(2)soo-value = ip-addr:nn</p> <p>The ip-addr address must be a global IP address, and nn is specified by the user</p>
--	--	---

Default configuration	By default, the soo function is not enabled.
------------------------------	--

Command mode	BGP IPv4 address family configuration mode
---------------------	--

Usage guidelines	In the CE model, this command prevents the route information from the CE to the PE to return to the CE end.
-------------------------	---

Examples	<pre>DES-7200(config)# router bgp 65000 DES-7200(config-router)# address-family ipv4 vrf vpn1 DES-7200(config-router-af)# neighbor 10.0.0.1 remote-as 100 DES-7200(config-router-af)# neighbor 10.0.0.1 soo 100:100</pre>
-----------------	---

Related commands	Command	Description
	router bgp	Enable BGP protocol

2.1.36 rd

Use this command to define the RD value of the VRF

rd *rd-value*

Parameter description	Parameter	Description
	<i>rd_value</i>	The RD value.

Default configuration

By default, no RD value is configured. The default RD value is 0:0.

Command mode

VRF configuration mode.

Usage guidelines

If you have defined a VRF and configured the RD value for it, you cannot modify the RD value. If it is absolutely necessary to modify the RD value, the only way is to first delete the VRF and then configure the RD value for it. One VRF can have only one RD value, and you cannot define multiple RD values for it.

Examples

```
DES-7200(config)# ip vrf vrf1
DES-7200 (config-vrf)# rd 100:1
```

Related commands

Command	Description
ip vrf	Create a VRF instance
show ip vrf	Show the VRF configuration

2.1.37 recursive-route lookup lsp

Use this command to enable the capability of resolving the next hop of the BGP route to the LSP tunnel, and the no command disables this capability.

recursive-route lookup lsp**no recursive-route lookup lsp****Parameter description**

Parameter	Description
-	-

Default configuration

Disable the capability of resolving the next hop of the BGP route to the

	LSP tunnel.				
Command mode	Global configuration mode				
Usage guidelines	By default, the next hop of the BGP route without a tag is not resolved to the LSP tunnel. In a CSC application scenario, for the model where level 2 carriers provide Internet services based on the IP core, the next hop of the BGP route must be resolved to the LSP tunnel in the CSC CE by running this command.				
Examples	<p>Enable the capability of resolving next hop of the BGP route to the LSP tunnel.</p> <pre>DES-7200(config)# recursive-route lookup lsp</pre>				
Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>-</td> </tr> </tbody> </table>	Command	Description	-	-
Command	Description				
-	-				
Platform description	None				

2.1.38 redistribute

The route redistributed command can be used to carry out the redistribution between the route information of other route protocol and BGP, and the no form of this command can be used to delete this function and its parameter configuration.

redistribute *protocol-type* [**route-map** *map-tag*] [**metric** *metric-value*]

no redistribute *protocol-type* [**route-map** *map-tag*] [**metric** *metric-value*]

Parameter description	Parameter	Description
	<i>protocol-type</i>	Type of source protocol for the redistributed route. There are connected, static and rip protocol at present.

	route-map <i>map-tag</i>	The name of the associate route-map . No associate with route-map by default.
	metric <i>metric-value</i>	The default metric value of the configured redistribution route. This value is not set by default.

Default configuration

Disabled

Command mode

BGP configuration mode, IPv4 address family configuration mode of BGP, IPv6 address family configuration mode of BGP and IPv4 VRF configuration mode of BGP

Usage guidelines

When a switch supports multiple routing protocols, the coordination between these protocols becomes an important task. The switch may run multiple routing protocols at the same time. The switches can run the protocols at the same time, so it should redistribute the protocols. This is applicable to all IP routing protocols.

Description: When the no command is configured, if the parameters are configured and there are corresponding parameter configurations, it will cancel the configuration of corresponding parameters. If there is no parameter, this configuration of redistribute will be canceled.

Caution: for the metric value of the route, it will apply the route-map to process according to original value. If it is processed in the route-map, it will use the value after the route-map process. If this value is not set in the route-map, but the metric option is configured, it will use the metric configuration value. If there is not any value, it will use the redistributed value.

Examples

```
DES-7200(config-router)# redistribute static route-map static-rmap
DES-7200(config-router)# no redistribute static
route-map static-rmap
DES-7200(config-router)# no redistribute static
```

Related commands	Command	Description
	show ip protocols	Show the protocol configuration.

2.1.39 redistribute OSPF

The route redistributed command can carry out the redistribution between the route information of the OSPF route protocol and BGP, and the no form of this command can be used to delete this function and its parameter configuration.

redistribute ospf *process-id* [**route-map** *map-tag*] [**metric** *metric-value*] [**match internal external** [1|2] **nssa-external** [1|2]]

no redistribute ospf *process-id* [**route-map** *map-tag*] [**metric**] [**match {internal|external** [1|2]|**nssa-external** [1|2]]

Parameter description	Parameter	Description
	<i>process-id</i>	Process ID of the redistributed OSPF protocol.
	route-map <i>map-tag</i>	The name of the associate route-map . No associated with route-map by default.
	metric <i>metric-value</i>	Configured default metric value of the redistributed route. This value is not set by default.
	match	Used to set the matched subtype of the OSPF route.
	internal	Internal subtype of route for OSPF, the default configuration of match item for the redistributed ospf route.
	external [1 2]	External type of route for OSPF, can describe the type 1 or type 2 in detail. If not specified, it includes the type 1 and type 2.
	nssa-external [1 2]	nssa-external type of route for OSPF, can describe the type 1 or type 2 in detail. If not specified, it includes the type 1 and type 2.

Default configuration

Disable the redistributed OSPF route.

Command mode

BGP configuration mode, IPv4 address family configuration mode of BGP, IPv6 address family configuration mode of BGP and IPv4 VRF configuration mode of BGP

When a switch supports multiple routing protocols, the coordination between these protocols becomes an important task. The switch may run multiple routing protocols at the same time. The switches can run the protocols at the same time, so it should redistribute the protocols.

**Note**

When the no command is configured, if the parameters are configured and there are corresponding parameter configurations, it will cancel the configuration of corresponding parameters. If there is no parameter, this configuration of redistribute will be canceled. When all of the route subtypes are deleted, it is the default route type.

Usage guidelines**Caution**

The filtration rule of the OSPF route is to carry out the filtration of the OSPF route type according to the configured match option, and then carry out the filtration of the route-map rule. For the metric value of the route, it will carry out the route-map process according to the redistributed metric value. If it is processed in the route-map, it will use the value after the route-map process. If it is not processed in the route-map, but the metric option is configured, it will use the metric configuration value. If there is no any value, it will use the redistributed value directly.

Examples

```
DES-7200(config-router)# redistribute ospf 2 route-map static-rmap
DES-7200(config-router)# no redistribute ospf 4 match external route-map
ospf-rmap
DES-7200(config-router)# no redistribute ospf 78
```

Related commands	Command	Description
	<code>show ip protocols</code>	Show the protocol configuration.

2.1.40 route-target

Use this command to define or cancel the RT attribute of a VRF.

[no] route-target {import | export | both} *rt-value*

Parameter description	Parameter	Description
	<code>import</code>	Set the import value for the VRF
	<code>export</code>	set the export value for the VRF
	<code>both</code>	Set the import and export value for the VRF

Default configuration	By default, no Route-Target is defined.
-----------------------	---

Command mode	VRF configuration mode
--------------	------------------------

Usage guidelines	In one VRF, you can configure multiple import and export route-target attribute values.
------------------	---

Examples	<pre>DES-7200(config)# ip vrf vrf1 DES-7200(config-vrf)# route-target import 100:1 DES-7200(config-vrf)# route-target export 100:2 DES-7200(config-vrf)# route-target both 100:4</pre>
----------	--

Related	Command	Description
---------	---------	-------------

	ip vrf	Create a VRF instance
--	---------------	-----------------------

2.1.41 set extcommunit

Use this command to set the extended community in the route map configuration mode. Use the **no** form to remove the setting.

```
set extcommunity {rt extended-community-value [additive] | soo extended-community-value}
```

```
no set extcommunity {rt | soo}
```

	Parameter	Description
Parameter description	rt	Set RT value.
	soo	Set SOO value.
	additive	(Optional) Add new RT attribute to the RT list, not replacing any existing RT attributes.
	<i>extended-community-value</i>	Extended community value. You can set multiple RT values separate by space, but only one for SOO.

Default configuration	By default, this rule is not defined in associated route map policy. Without additive, this command will replace all RT lists.
------------------------------	--

Command mode	Route map configuratin mode
---------------------	-----------------------------

Usage guidelines	<p>This command applies to the following circumstances:</p> <ol style="list-style-type: none"> 1. Route map associated by the export map command, which controls the extended community of VPN routes based on policy. 2. Route map associated by the neighbor route-map out commands configured in the VPNv4 address family configuration mode, which modifies received and sent VPNv4 routes. <p>Without additive, the set extcommunity rt command replaces the original RT value with the set one. With additive, the command adds the new set RT value.</p> <p>Without SOO attribute in the extended community attribute list of BGP route, the set extcommunity soo command adds the SOO attributes. With SOO attribute, the command replace the original SOO value with the set one.</p>
-------------------------	--

Examples	<pre>DES-7200(config)# route-map set-rt DES-7200(config-route-map)# set extcommunity rt 100:1 200:1 DES-7200(config-route-map)# exit DES-7200(config)# ip vrf vrf1 DES-7200(config-vrf)# export map set-rt</pre>
-----------------	--

Related commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>match extcommunity</td> <td>Match the extended community attribute.</td> </tr> </tbody> </table>	Command	Description	match extcommunity	Match the extended community attribute.
Command	Description				
match extcommunity	Match the extended community attribute.				

2.1.42 set mpls-label

Use this command to distribute MPLS label to the routes matching the route map. Use the **no** form to remove the setting.

set mpls-label

no set mpls-label

Default configuration	By default, the IPv4 routes are sent to the BGPpeer without MPLS label.
------------------------------	---

Command mode	Route map configuratin mode
---------------------	-----------------------------

**Usage
guidelines**

This command applies to only the route map associated by the **neighbor route-map out** command, which is used to only filter the outbound routes sent to the BGP peer.

This command takes effect in the route map only after using the **neighbor send-label** command to enable exchange of the routes of MPLS label between the BGP peers. Otherwise, the command distributes the routes matching the route map without label. On the other hand, if you use the **neighbor send-label** command to enable exchange of the routes of MPLS label between the BGP peers, but does not configure the **set mpls-label** command on the associated route map, only the IPv4 routes matching the route map are distributed without MPLS label.

Examples

Create a route map, distribute MPLS label to the route of 1.1.1.1/32 prefix, distribute general IPv4 route update without MPLS label to the route of 1.1.1.2/32 prefix, but distribute no route update to the routes that do not match ACL1 and ACL2.

```
DES-7200 (config)# ip access-list standard acl1
DES-7200 (config-std-nacl) # permit host 1.1.1.1
DES-7200 (config-std-nacl) # exit
DES-7200 (config)# ip access-list standard acl2
DES-7200 (config-std-nacl) # permit host 1.1.1.2
DES-7200 (config-std-nacl) # exit
DES-7200 (config)# route-map out-as permit 10
DES-7200 (config-route-map)# match ip address acl1
DES-7200 (config-route-map)# set mpls-label
DES-7200 (config-std-nacl) # exit
DES-7200 (config)# route-map out-as permit 20
DES-7200 (config-route-map)# match ip address acl
```

**Related
commands**

Command	Description
neighbor send-label	Exchange the routes of MPLS label between the BGP peers.
neighbor route-map out	Control the routes to the BGP peer.
match mpls-label	Receive only the routes of MPLS label from the BGP peer.

show ip bgp labels	Show the routes of MPLS label that the BGP learns and sends.
---------------------------	--

2.2 Showing Commands

2.2.1 show bgp ipv4 unicast labels

Use this command to show the routes of MPLS labels that the BGP learns and sends.

show bgp ipv4 unicast labels

Default configuration	N/A.
------------------------------	------

Command mode	Privileged mode.
---------------------	------------------

Usage guidelines	This command shows IPv4 routes of MPLS label. To show the VPNv4 routes of MPLS label, run the show bgp vpnv4 unicast command.
-------------------------	--

```
DES-7200 #show bgp ipv4 unicast labels
Network          Next Hop        In Label/Out Label
1.1.1.1/32       192.167.1.1    17/18
1.1.1.2/32       192.167.1.1    noLabel/19
```

Examples

Field	Description
Network	Route prefix
NextHop	Next hop of the route
In label	The label that the local router assigns (if available)
Out label	The label learned from the next hop router of the route (if existent)

	Command	Description
Related commands	neighbor send-label	Exchange the routes of MPLS label between the BGP peers.
	show bgp vpnv4 unicast	Show the label information of VPN routes.

2.2.2 show bgp vpnv4 unicast

Use this command to show the VPN route information.

show bgp vpnv4 unicast all [*network* | **neighbor** [*peer-address*] | **summary** | **label**]

show bgp vpnv4 unicast vrf *vrf_name* [*network* | **summary** | **label**]

show bgp vpnv4 unicast rd *rd_value* [*network* | **neighbor** [*peer-address*] | **summary** | **label**]

	Parameter	Description
Parameter description	<i>network</i>	Show the prefix of the specified destination network.
	neighbor [<i>peer-address</i>]	Show the neighbor information of the specified VPN.
	summary	Show the state of the BGP peer.
	label	Show the label information of the route.
	all	Show the VPN route information of all VRFs.
	<i>vrf_name</i>	Show the VPN route information of the specified VRF.
	<i>rd_value</i>	Show the VPN route information of the specified RD value.

Default configuration	N/A.
-----------------------	------

Command mode

Privileged mode.

Usage guidelines

This command allows you to show the VPN route information. For the BGP/MPLS VPN application environment, the routes of BGP VRF instances are elected and imported by MP-BGP. Hence, this command shows only elected routes. The detailed MP-BGP route information should be viewed in the **show bgp vpnv4 unicast all** command.

```
DES-7200# show bgp vpnv4 unicast all
```

Network	Nexthop	Metric	Localprf	Path
Route Distinguisher : 100:2				
*>i 192.168.0.1/32	192.168.0.2	0	100	10 ?
*>i 192.168.1.0/32	192.168.0.2	0	100	?
Route Distinguisher : 100:30				
*>i 192.168.0.1/32	192.168.0.2	0	100	10 ?
*> 192.168.4.0	192.168.4.1	0		20 ?
* 192.168.4.0	0.0.0.0	0	32768	?

Examples

*****: This route is valid.

s: This route is suppressed by the aggregate route.

S: This route is an old entry.

>: This route is optimized.

i: This route is learned from IBGP.

Nexthop: The next-hop route information.

Metric: The metric value of this route.

Localprf: The local priority attribute of this route.

Path: The AS-path included in this route.

i: The ORIGIN attribute of this route is IGP.

e: The ORIGIN attribute of this route is EGP.

?: The ORIGIN attribute of this route is the one other than IGP and EGP.


```

DES-7200# show bgp vpv4 unicast vrf vpnl summary

BGP router identifier 192.168.0.4 , local AS num 100

BGP VRF vrfl Route Distinguisher : 100 : 30

BGP table version is 1

3 BGP AS-PATH entries

0 BGP community entries

Neibhbor  V  AS  MsgRcvd Msgsend  TblVer  IntQ

OutQ  Up/Down  State/PfxRcd

192.168.4.1 4  20   15     16     1     0   0

00:10:36 3

Total number of neighbors 1

```

Field	Description
<i>num</i> BGP AS-PATH entries	Number of BGP AS-Path entries
<i>num</i> BGP community entries	Number of BGP community entries
V	BGP version
AS	AS number of the BGP peer
MsgRcvd	Total BGP messages received from the BGP peer
Msgsend	Total BGP messages sent to the BGP peer
TblVer	Routing table version of the BGP VPN address family. The routing table will be updated once after sending all the VPN routes to the BGP peer.
Up/Down	Duration of the BGP peer or "never", indicating that the BGP peer is not set up
State/PfxRcd	Number of VPN routes received from the BGP peer or the state of the BGP peer

2.2.3 show ip extcommunity-list

Use this command to show the configuration of the extended community list.

show ip extcommunity-list [*extcommunity-list-num*] *extcommunity-list-name*]

	Parameter	Description
Parameter description	<i>extcommunity-list-num</i>	Identifies standard or extended extcommunity list in the range of 1 to 199.
	<i>extcommunity-list-name</i>	Name of standard or extended extcommunity list

Command mode	Privileged mode
---------------------	-----------------

Examples

```
DES-7200 # show ip extcommunity-list

Standard extended community-list 1

    10 permit RT:1:200

    20 permit RT:1:100

Standard extended community-list 2

    10 permit RT:1:200

Expanded extended community-list rt_filter

    13 permit 1:100
```

	Command	Description
Related commands	ip extcommunity-list	Create the extended community list.
	match extcommunity	Match the extended community list.
	set extcommunity	Set the extended community list.

2.2.4 show ip ospf sham-links

Use this command to display the OSPF sham-link information.

show ip ospf [*process-id*] **sham-links** [*area area-id*]

	Parameter	Description
Parameter description	process-id	OSPF process-id
	area <i>area-id</i>	The OSPF area-id of the sham-link can be a decimal integer ranging from 0 to 4294967295 or an IP address.

Default configuration	No
------------------------------	----

Command mode	Privileged user mode
---------------------	----------------------

Usage guidelines	This command is used to display the sham-link information of the OSPF instance.
-------------------------	---

Examples	<pre>DES-7200#show ip ospf sham-links Sham Link SLINK1 to address 8.8.8.8 is up Area 0.0.0.0 source address 7.7.7.7, Cost: 10 Output interface is GigabitEthernet 0/8 Nexthop address 192.168.1.2 Transmit Delay is 1 sec, State Point-To-Point, Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5 Hello due in 00:00:07 Adjacency state Full</pre>
-----------------	--

	Command	Description
Related commands	-	-

2.2.5 show ip route vrf

Use this command to show the routing table entry of the VRF

show ip route vrf *vrf-name* [*ip-address mask* | **bgp** | **connected** | **isis** | **ospf** | **rip** | **static**]

	Parameter	Description
Parameter description	<i>vrf-name</i>	VRF name
	<i>ip-address mask</i>	Show the entry of the prefix of the specified route.
	bgp	Show the route entry generated from BGP.
	connected	Show the entry of directly-connected route.
	isis	Show the route entry generated from ISIS.
	ospf	Show the route entry generated from OSPF.
	rip	Show the route entry generated from RIP.
	static	Show the static route entry.

Command mode

Privileged mode

Examples

```
DES-7200# show ip route vrf vrf1
Codes: C - connected, S - static, R - RIP, B - BGP
O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2 ,
ia - IS-IS inter area
* - candidate default
B 192.168.0.1/32 , [200/0] via 192.168.0.2, 01:02:33
```

```
B 192.168.0.3/32 , [200/0] via 192.168.4.1 , 01:02:33
C 192.168.4.0/24 is directly connected ,eth1
```

Related commands	Command	Description
	<code>show ip vrf</code>	

2.2.6 show ip vrf

Use this command to show the configured VRF information.

`show ip vrf [vrf-name]`

Parameter description	Parameter	Description
	<i>vrf-name</i>	VRF name.

Command mode	Privileged mode
--------------	-----------------

Usage guidelines	When the inputted parameter carries the VRF name, the command shows the VRF information. If no VRF name is specified, it shows the information of all VRFs.
------------------	---

Examples	<pre>DES-7200# show ip vrf vrf1 VRF pe1; default RD : 100:2 Interfaces: Eth0 Export VPN route-target communities: RT :100:30 No import VPN route-target community No import route-map</pre>
----------	---

Related	Command	Description
---------	---------	-------------

commands	ip vrf	Create a VRF instance
	rd	Configure the RD value
	route-target	Configure the RT value
	ip vrf forwarding	Bind the VRF with an interface

2.2.7 show vrf

Use this command to view the brief information of a VRF, which can be a single-protocol IPv4 VRF or a multi-protocol VRF:

show vrf [brief] [vrf-name]

Use this command to view the brief information of a VRF configured with an IPv4 address family, which can be a single-protocol IPv4 VRF:

show vrf ipv4 [vrf-name]

Use this command to view the brief information of a VRF configured with an IPv6 address family:

show vrf ipv6 [vrf-name]

Use this command to view the detailed information of a VRF, which can be a single-protocol IPv4 VRF or a multi-protocol VRF:

show vrf detail [vrf-name]

Parameter	Parameter	Description
description	<i>vrf-name</i>	VRF name

Default configuration	None
------------------------------	------

Command mode	Privileged user mode
---------------------	----------------------

Usage guidelines	None
-------------------------	------

Show the brief information of all VRFs.

```
DES-7200#show vrf
```

Name	Default RD	Protocols	Interfaces
aaa	<not set>	ipv4	
aab	<not set>		
bbb	<not set>	ipv6	
ccc	<not set>	ipv4,ipv6	VI1

Command	Description
ip vrf	Define a single-protocol IPv4 VRF
vrf definition	Define a multi-protocol VRF