

# 1 IP REF Commands

Command	Function
<a href="#">clear ip ref packet statistics</a>	Clear the packet statistics of IPv4 REF.
<a href="#">clear ipv6 ref packet statistics</a>	Clear the packet statistics of IPv6 REF.
<a href="#">hash-disturb</a>	Configure the hash disturbance factor of load balancing.
<a href="#">hash-symmetrical</a>	Enable the load balancing hash disturbance function and configure the hash synchronization factor of load balancing, also known as symmetrical hash.
<a href="#">ip ref algorithm mode</a>	Configure the ECMP hash algorithm mode.
<a href="#">ip ref check</a>	Configure illegitimate destination IP address check of IPv4 REF.
<a href="#">ip ref mgmt-forward</a>	Enable L3 forwarding on the management interface.
<a href="#">ip ref load-balance</a>	Configure the ECMP global load balancing algorithm.
<a href="#">ip ref load-sharing</a>	Configure the load balancing algorithm for IPv4 REF.
<a href="#">ip ref hash-elasticity enable</a>	Enable elastic hash of ECMP load balancing.
<a href="#">ip ref synchronize all</a>	Synchronize IPv4 routes between the hardware and software REF.
<a href="#">ip-ref-load-balance-profile</a>	Rename the enhanced profile and enter the enhanced profile configuration mode of REF load balancing.
<a href="#">ipv4 field</a>	Configure the load balancing mode for IPv4 packets in a specified enhanced profile.
<a href="#">ipv6 field</a>	Configure the load balancing mode for IPv6 packets in the specified enhanced profile.
<a href="#">ipv6 ref load-sharing</a>	Set the load balancing algorithm of IPv6 REF to load balancing based on the source and destination IP addresses.
<a href="#">ipv6 ref synchronize all</a>	Synchronize IPv6 routes between the hardware and

	software REF.
<a href="#"><b>show ip ref adjacency</b></a>	Display the adjacency table.
<a href="#"><b>show ip ref exact-route</b></a>	Display the exact forwarding path of an IP packet.
<a href="#"><b>show ip ref load-balance</b></a>	Display the configuration of the ECMP load balancing.
<a href="#"><b>show ip ref load-balance-profile</b></a>	Display the configuration of an enhanced profile.
<a href="#"><b>show ip ref packet statistics</b></a>	Display the packet statistics of IPv4 REF.
<a href="#"><b>show ip ref resolve-list</b></a>	Display the information actively resolved by IPv4 REF.
<a href="#"><b>show ip ref route</b></a>	Display all routing information of the current IPv4 REF.
<a href="#"><b>show ip ref route detail</b></a>	Display the detailed routing table of a specified IPv4 route prefix.
<a href="#"><b>show ipv6 ref adjacency</b></a>	Display the adjacency information of IPv6 REF.
<a href="#"><b>show ipv6 ref exact-route</b></a>	Display the actual forwarding path of an IPv6 packet.
<a href="#"><b>show ipv6 ref packet statistics</b></a>	Display the packet statistics of IPv6 REF.
<a href="#"><b>show ipv6 ref resolve-list</b></a>	Display the information actively resolved by IPv6 REF.
<a href="#"><b>show ipv6 ref route</b></a>	Display routing information of IPv6 REF.
<a href="#"><b>show ipv6 ref route detail</b></a>	Display the detailed routing table of a specified IPv6 route prefix.

## 1.1 clear ip ref packet statistics

### Function

Run the **clear ip ref packet statistics** command to clear the packet statistics of IPv4 REF.

### Syntax

```
clear ip ref packet statistics
```

### Parameter Description

N/A

### Command Modes

Privileged EXEC mode

### Default Level

14

### Usage Guidelines

N/A

### Examples

The following example clears packet statistics of IPv4 REF.

```
Hostname> enable
Hostname# clear ip ref packet statistics
```

### Notifications

N/A

### Platform Description

N/A

### Related Commands

N/A

## 1.2 clear ipv6 ref packet statistics

### Function

Run the **clear ipv6 ref packet statistics** command to clear the packet statistics of IPv6 REF.

### Syntax

```
clear ipv6 ref packet statistics
```

### Parameter Description

N/A

### Command Modes

Privileged EXEC mode

### Default Level

14

### Usage Guidelines

N/A

### Examples

The following example clears packet statistics of IPv6 REF.

```
Hostname> enable
Hostname# clear ipv6 ref packet statistics
```

### Notifications

N/A

### Platform Description

N/A

### Related Commands

N/A

## 1.3 hash-disturb

### Function

Run the **hash-disturb** command to configure the hash disturbance factor of load balancing.

Run the **no** form of this command to disable the load balancing hash disturbance function.

The hash disturbance function of load balancing is disabled by default.

### Syntax

**hash-disturb** *string*

**no hash-disturb**

### Parameter Description

*string*: Disturbance factor. It is a string of 1 to 16 characters.

### Command Modes

Enhanced profile configuration mode of REF load balancing

### Default Level

14

## Usage Guidelines

Hash disturbance refers that device traffic is balanced using the hash algorithm. For the same stream from two devices of the same type, the same path will be calculated by the load balancing algorithm. When the equal cost multiple path (ECMP) is deployed, the same stream from the two devices may be distributed to the same destination device. This is called hash polarization. The hash disturbance factor is used to affect the load balancing algorithm of the device. Different disturbance factors can be configured on different devices so that different paths are calculated for the same stream.

## Examples

The following example configures the hash disturbance factor in enhanced profile configuration mode of REF load balancing.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip-ref-load-balance-profile
Warning: The profile default has been created, and this command will rename it.
Continue? [Y/N]:Y
Hostname(ref-ip-config-load-balance-profile)# hash-disturb A
```

## Notifications

When the ECMP hash disturbance factor fails to be configured, the following notification will be displayed:

```
% Set ecmp hash-disturb failed.
```

## Platform Description

N/A

## Related Commands

- [show ip ref load-balance-profile](#)

# 1.4 hash-symmetrical

## Function

Run the **hash-symmetrical** command to enable the load balancing hash disturbance function and configure the hash synchronization factor of load balancing, also known as symmetrical hash.

Run the **no** form of this command to disable the load balancing hash disturbance function.

Hash synchronization is enabled by default.

Hash synchronization is disabled by default.

## Syntax

```
hash-symmetrical { ipv4 | ipv6 }
```

```
no hash-symmetrical { ipv4 | ipv6 }
```

## Parameter Description

**ipv4**: Enables/Disables load balancing hash synchronization for IPv4 packets.

**ipv6**: Enables/Disables load balancing hash synchronization for IPv6 packets.

## Command Modes

Enhanced profile configuration mode of REF load balancing

## Default Level

14

## Usage Guidelines

To ensure network security, a firewall cluster is deployed between the internal and external networks for traffic cleaning. This requires that both the uplink and downlink traffic of a session be transmitted to the same device in the firewall cluster for processing. The source and destination IP addresses contained in the uplink and downlink streams of a session are reversed. If a traditional hash algorithm is used, the uplink and downlink streams will be directed to different firewalls, while hash synchronization can ensure that the same path is calculated for the uplink and downlink streams.

When hash synchronization is enabled, the source and destination address-based load balancing modes in an enhanced profile need to be configured symmetrically. For example, if load balancing based on source IP addresses is configured, load balancing based on destination IP addresses needs to be configured at the same time.

## Examples

The following example enables load balancing hash synchronization for IPv6 packets in enhanced profile configuration mode of REF load balancing.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip-ref-load-balance-profile
Warning: The profile default has been created, and this command will rename it.
Continue? [Y/N]:Y
Hostname(ref-ip-config-load-balance-profile)# hash-symmetrical ipv6
```

## Notifications

When load balancing hash synchronization fails to be configured for IPv4 packets, the following notification will be displayed:

```
% Set ecmp hash-symmetrical ipv4 failed.
```

When load balancing hash synchronization fails to be configured for IPv6 packets, the following notification will be displayed:

```
% Set ecmp hash-symmetrical ipv6 failed.
```

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [ip-ref-load-balance-profile](#)
- [show ip ref load-balance-profile](#)

## 1.5 ip ref algorithm mode

### Function

Run the **ip ref algorithm mode** command to configure the ECMP hash algorithm mode.

Run the **no** form of this command to remove this configuration.

### Syntax

**ip ref algorithm mode** *hash-number*

### Parameter Description

*hash-number*: Number of a hash algorithm mode. The value range is from 0 to 9, and the default value is **0**.

When the value is **0**, the hash algorithm mode is  $x8+x7+x2+x+1$ .

When the value is **1**, the hash algorithm mode is  $x8+x7+x6+x+1$ .

When the value is **2**, the hash algorithm mode is  $x8$ .

When the value is **3**, the hash algorithm mode is  $x10+x3+1$ .

When the value is **4**, the hash algorithm mode is  $x10+x7+1$ .

When the value is **5**, the hash algorithm mode is  $x16$ .

When the value is **6**, the hash algorithm mode is  $x16+x5+x3+x2+1$ .

When the value is **7**, the hash algorithm mode is  $x16+x5+x4+x3+1$ .

When the value is **8**, the hash algorithm mode is  $x16+x10+x5+x3+1$ .

When the value is **9**, the hash algorithm mode is  $x16+x9+x4+x2+1$ .

*hash-number*: Number of a hash algorithm mode. The value range is from 3 to 11, and the default value is **9**.

- When the value is **3**, the hash algorithm mode is 16 bit crc16 using bisync polynomial.
- When the value is **4**, the hash algorithm mode is upper 8 bits of crc16 and 8 bit xor1.
- When the value is **5**, the hash algorithm mode is upper 8 bits of crc16 and 8 bit xor2.
- When the value is **6**, the hash algorithm mode is upper 8 bits of crc16 and 8 bit xor4.
- When the value is **7**, the hash algorithm mode is upper 8 bits of crc16 and 8 bit xor8.
- When the value is **8**, the hash algorithm mode is xor16.
- When the value is **9**, the hash algorithm mode is 16 bit crc16 using the ccitt polynomial.
- When the value is **10**, the hash algorithm mode is 16 LSBs of computed crc32.
- When the value is **11**, the hash algorithm mode is 16 MSBs of computed crc32.

### Command Modes

Global configuration mode

### Default Level

14

### Usage Guidelines

This command is used to set an appropriate hash algorithm mode to adapt to different traffic models to achieve the optimal load balancing effect.

## Examples

The following example sets the number of the ECMP hash algorithm mode to 3.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip ref algorithm mode 3
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [show ip ref load-balance](#)

# 1.6 ip ref check

## Function

Run the **ip ref check** command to configure illegitimate destination IP address check of IPv4 REF.

Run the **no** form of this command to disable this feature.

IPv4 REF does not check illegitimate destination IP addresses by default.

## Syntax

```
ip ref check [ masklen mask-length ]
```

```
no ip ref check
```

## Parameter Description

**masklen** *mask-length*: Specifies the IP packet mask length for the illegitimate host address check. The value range is from 1 to 31, and the default value is **24**.

## Command Modes

Global configuration mode

## Default Level

14

## Usage Guidelines

REF can filter out illegitimate class E addresses (excluding 255.255.255.255), addresses with all zeros, and loopback interface addresses (excluding 127.0.0.1), and record the illegitimate destination IP addresses.



## Examples

The following example sets the mask length to 20 bits for the illegitimate destination IP address check of IPv4 REF.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip ref check masklen 20
```

## Notifications

N/A

## Related Commands

N/A

# 1.7 ip ref mgmt-forward

## Function

Run the **ip ref mgmt-forward** command to enable L3 forwarding on the management interface.

Run the **no** form of this command to disable this feature.

L3 forwarding is enabled on the management interface by default.

## Syntax

**ip ref mgmt-forward**

**no ip ref mgmt-forward**

## Parameter Description

N/A

## Command Modes

Global configuration mode

## Default Level

14

## Usage Guidelines

If the forwarding function of Orion Network Operating System is enabled, then L3 forwarding is enabled for both the management interface and other L3 interfaces. If the **no ip ref mgmt-forward** command is run, L3 forwarding can be disabled on the management interface separately without affecting other L3 interfaces. You can run the **ip ref mgmt-forward** command to enable L3 forwarding on the management interface.

If the forwarding function of NOS is disabled, regardless of whether **no ip ref mgmt-forward** is configured, L3 forwarding is disabled on the management interface and other L3 interfaces.

## Examples

The following example disables L3 forwarding on the management interface.

```
Hostname> enable
```

```
Hostname# configure terminal
Hostname(config)# no ip ref mgmt-forward
```

### Notifications

N/A

### Related Commands

N/A

## 1.8 ip ref load-balance

### Function

Run the **ip ref load-balance** command to configure the ECMP global load balancing algorithm.

Run the **no** form of this command to restore the default configuration.

The load is balanced according to an enhanced profile by default.

### Syntax

```
ip ref load-balance { enhanced profile profile-name | src-dst-ip | src-dst-ip-src-dst-l4port | src-ip }
no ip ref load-balance
```

### Parameter Description

**enhanced profile** *profile-name*: Performs load balancing based on the packet type field configured in the enhanced profile indicated by *profile-name*.

**src-dst-ip**: Performs load balancing based on the source and destination IP addresses of incoming packets. Packets with different source and destination IP addresses are evenly distributed among member links, while those with the same source and destination IP addresses are distributed to the same member link.

**src-dst-ip-src-dst-l4port**: Performs load balancing based on the source IP addresses, destination IP addresses, L4 source port numbers, and L4 destination port numbers of incoming packets.

**src-ip**: Performs load balancing based on the source IP address of incoming packets. Packets with different source IP addresses are evenly distributed among member links, while those with the same source IP address are distributed to the same member link.

### Command Modes

Global configuration mode

### Default Level

14

### Usage Guidelines

ECMP differentiates packet flows by using one or several load balancing algorithms based on packet characteristics, such as the source IP address, destination IP address, L4 source port number, and L4

destination port number. It also distributes the same packet flow to the same path for transmission, and different packet flows to equal-cost paths evenly.

For example, in source IP address-based load balancing mode, packets are distributed to different paths based on the source IP addresses of the packets. Packets with different source IP addresses are evenly distributed to equal-cost paths, and packets with the same source IP address are forwarded by the same path.

In an L3 network, you are advised to adopt load balancing based on the source and destination IP addresses of incoming packets.

## Examples

The following example configures the ECMP load balancing algorithm based on the source IP address.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip ref load-balance src-ip
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [show ip ref load-balance](#)

# 1.9 ip ref load-sharing

## Function

Run the **ip ref load-sharing** command to configure the load balancing algorithm for IPv4 REF.

Run the **no** form of this command to restore the default configuration.

The default load balancing algorithm of IPv4 REF is load balancing based on the destination IP addresses of packets.

## Syntax

```
ip ref load-sharing { original | original-only }
```

```
no ip ref load-sharing { original | original-only }
```

## Parameter Description

**original**: Sets the load balancing algorithm of IPv4 REF to load balancing based on the source and destination IP addresses.

**original-only**: Sets the load balancing algorithm of IPv4 REF to load balancing based on the source IP address.

## Command Modes

Global configuration mode

## Default Level

14

## Usage Guidelines

REF is responsible for data forwarding and supports three load balancing algorithms, that is, load balancing based on the destination IP address, load balancing based on the source IP address, and load balancing based on the source and destination IP addresses. When IP packets are forwarded through multiple paths, if the load balancing based on the destination IP address is set, REF will match the destination IP addresses of the packets with one of the paths for forwarding.

## Examples

The following example sets the load balancing algorithm of IPv4 REF to load balancing based on the source and destination IP addresses.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip ref load-sharing original
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

N/A

## 1.10 ip ref hash-elasticity enable

### Function

Run the **ip ref hash-elasticity enable** command to enable elastic hash of ECMP load balancing.

Run the **no** form of this command to restore the default configuration.

Elastic hash of ECMP load balancing is disabled by default.

### Syntax

**ip ref hash-elasticity enable**

**no ip ref hash-elasticity enable**

### Parameter Description

N/A

## Command Modes

Global configuration mode

## Default Level

14

## Usage Guidelines

In normal cases, a load balancing cluster interworks with multiple top of rack (ToR) devices via the ECMP, and the ToR devices are required to distribute all packets of a session to the same scheduling server. However, when a server is faulty, all session streams will be reorganized and balanced according to the traditional load balancing mechanism of ToR devices. In this case, packets of the same session may be distributed to two servers. The elastic hash function ensures that, when one link is faulty, traffic on other links is not affected and only the traffic of the faulty link is distributed to other active links, without affecting the traffic of other links. In this way, traffic of a session will only be distributed to the same server.

## Examples

The following example enables the elastic hash of ECMP load balancing.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip ref hash-elasticity enable
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [show ip ref load-balance](#)

# 1.11 ip ref synchronize all

## Function

Run the **ip ref synchronize all** command to synchronize IPv4 routes between the hardware and software REF.

## Syntax

```
ip ref synchronize all
```

## Parameter Description

N/A

## Command Modes

Privileged EXEC mode

## Default Level

14

## Usage Guidelines

This command is used for routing recovery under faulty conditions. If the hardware fails to install routing entries because the number of existing routing entries exceeds the capacity of the routing table, or routing entries are discarded due to insufficient memory, you can use this command to restore the consistency of routing entries between the hardware and software REF after the number of existing entries is reduced to the normal range.

## Examples

The following example synchronizes IPv4 routes between the hardware and software REF.

```
Hostname> enable
Hostname# ip ref synchronize all
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

N/A

## 1.12 ip-ref-load-balance-profile

### Function

Run the **ip-ref-load-balance-profile** command to rename the enhanced profile and enter the enhanced profile configuration mode of REF load balancing.

Run the **default** form of this command to restore the name of the enhanced profile to **default** and enter the enhanced profile configuration mode of REF load balancing, or restore the default load balancing mode in the enhanced profile.

The default enhanced profile name is **default**.

### Syntax

```
ip-ref-load-balance-profile [ profile-name ]
```

```
default ip-ref-load-balance-profile [ profile-name ]
```

## Parameter Description

*profile-name*: Profile name. It is a string of 1 to 31 characters.

## Command Modes

Global configuration mode

## Default Level

14

## Usage Guidelines

The device has an enhanced profile named **default**, which cannot be deleted by default.

Run the **ip-ref-load-balance-profile** command (without parameters) to change the profile name to null and enter the enhanced profile configuration mode of REF load balancing.

Run the **ip-ref-load-balance-profile** *profile-name* command (with parameters) to change the profile name to *profile-name* and enter the enhanced profile configuration mode of REF load balancing.

Run the **default ip-ref-load-balance-profile** command (without parameters) to restore the name of the current profile to **default** and enter the enhanced profile configuration mode of REF load balancing.

Run the **default ip-ref-load-balance-profile** *profile-name* command (with parameters) to restore the default load balancing mode for all types of packets in the enhanced profile.

## Examples

The following example renames the enhanced profile **rpn**, and enters the enhanced profile configuration mode of REF load balancing.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip-ref-load-balance-profile rpn
Warning: The profile default has been used and this command will rename it.
Continue? [Y/N]:Y
Hostname(ref-ip-config-load-balance-profile)#
```

The following example restores the name of the enhanced profile to **default** and restores the default load balancing mode in the enhanced profile.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# default ip-ref-load-balance-profile
Warning: The profile default has been used and this command will rename it.
Continue? [Y/N]:Y
Hostname(ref-ip-config-load-balance-profile)# exit
Hostname(config)# default ip-ref-load-balance-profile default
Hostname(config)# show ip ref load-balance-profile
Load-balance-profile: default
Packet      Hash Field:
  IPV4: src-ip dst-ip l4-src-port l4-dst-port
  IPV6: src-ip dst-ip l4-src-port l4-dst-port
```

**Notifications**

N/A

**Common Errors**

N/A

**Platform Description**

N/A

**Related Commands**

- [ipv4 field](#)
- [ipv6 field](#)
- [hash-disturb](#)
- [hash-symmetrical](#)
- [show ip ref load-balance-profile](#)

## 1.13 ipv4 field

**Function**

Run the **ipv4 field** command to configure the load balancing mode for IPv4 packets in a specified enhanced profile.

Run the **no** form of this command to restore the default configuration.

The load is balanced based on the source IP addresses, destination IP addresses, L4 source port numbers, and L4 destination port numbers of packets by default.

**Syntax**

```
ipv4 field [ dst-ip ] [ l4-dst-port ] [ l4-src-port ] [ protocol ] [ src-ip ] [ src-port ]
```

```
no ipv4 field
```

**Parameter Description**

**dst-ip**: Performs load balancing based on the destination IP addresses of incoming IPv4 packets.

**l4-dst-port**: Performs load balancing based on the L4 destination port numbers of incoming IPv4 packets.

**l4-src-port**: Performs load balancing based on the L4 source port numbers of incoming IPv4 packets.

**protocol**: Performs load balancing based on the protocol types of incoming IPv4 packets.

**src-ip**: Performs load balancing based on the source IP addresses of incoming IPv4 packets.

**src-port**: Performs load balancing based on the source port numbers of incoming IPv4 packets.

**Command Modes**

Enhanced profile configuration mode of REF load balancing

**Default Level**

14



## Usage Guidelines

ECMP differentiates packet flows by using one or several load balancing modes based on packet characteristics, such as the source IP address, destination IP address, L4 source port number, and L4 destination port number. It also distributes the same packet flow to the same path for transmission, and different packet flows to equal-cost paths evenly.

Run the **default ip-ref-load-balance-profile** *profile-name* command (with parameters) to restore the default load balancing mode for all types of packets in the enhanced profile.

## Examples

The following example sets the load balancing mode for IPv4 packets to load balancing based on source IP addresses of incoming IPv4 packets in the enhanced profile named rpn.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip-ref-load-balance-profile rpn
Warning: The profile default has been created, and this command will rename it.
Continue? [Y/N]:Y
Hostname(ref-ip-config-load-balance-profile)# ipv4 field src-ip
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [ip-ref-load-balance-profile](#)
- [show ip ref load-balance-profile](#)

## 1.14 ipv6 field

### Function

Run the **ipv6 field** command to configure the load balancing mode for IPv6 packets in the specified enhanced profile.

Run the **no** form of this command to restore the default configuration.

The load is balanced based on the source IP addresses, destination IP addresses, L4 source port numbers, and L4 destination port numbers of packets by default.

### Syntax

```
ipv6 field [ dst-ip ] [ l4-dst-port ] [ l4-src-port ] [ protocol ] [ src-ip ] [ src-port ]
```

```
no ipv6 field
```

## Parameter Description

**dst-ip**: Performs load balancing based on the destination IP addresses of incoming IPv6 packets.

**l4-dst-port**: Performs load balancing based on the L4 destination port numbers of incoming IPv6 packets.

**l4-src-port**: Performs load balancing based on the L4 source port numbers of incoming IPv6 packets.

**protocol**: Performs load balancing based on the protocol types of incoming IPv6 packets.

**src-ip**: Performs load balancing based on the source IP addresses of incoming IPv6 packets.

**src-port**: Performs load balancing based on the source port numbers of incoming IPv6 packets.

## Command Modes

Enhanced profile configuration mode of REF load balancing

## Default Level

14

## Usage Guidelines

ECMP differentiates packet flows by using one or several load balancing modes based on packet characteristics, such as the source IP address, destination IP address, L4 source port number, and L4 destination port number. It also distributes the same packet flow to the same path for transmission, and different packet flows to equal-cost paths evenly.

Run the **default ip-ref-load-balance-profile** *profile-name* command (with parameters) to restore the default load balancing mode for all types of packets in the enhanced profile.

## Examples

The following example sets the load balancing mode for IPv6 packets to load balancing based on source IP addresses of incoming IPv6 packets in the enhanced profile named rpn.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ip-ref-load-balance-profile rpn
Warning: The profile default has been created, and this command will rename it.
Continue? [Y/N]:Y
Hostname(ref-ip-config-load-balance-profile)# ipv6 field src-ip
```

## Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [ip-ref-load-balance-profile](#)

- [show ip ref load-balance-profile](#)

## 1.15 ipv6 ref load-sharing

### Function

Run the **ipv6 ref load-sharing** command to set the load balancing algorithm of IPv6 REF to load balancing based on the source and destination IP addresses.

Run the **no** form of this command to restore the default configuration.

The default load balancing algorithm of IPv6 REF is load balancing based on the destination IPv6 address.

### Syntax

```
ipv6 ref load-sharing { original | original-only }
```

```
no ipv6 ref load-sharing { original | original-only }
```

### Parameter Description

**original**: Sets the load balancing algorithm of IPv6 REF to load balancing based on the source and destination IP addresses.

**original-only**: Sets the load balancing algorithm of IPv6 REF to load balancing based on the source IP address.

### Command Modes

Global configuration mode

### Default Level

14

### Usage Guidelines

REF is responsible for data forwarding and supports three load balancing algorithms, that is, load balancing based on the destination IP address, load balancing based on the source IP address, and load balancing based on the source and destination IP addresses. When IP packets are forwarded through multiple paths, if the load balancing based on the destination IP address is set, REF will match the destination IP addresses of the packets with one of the paths for forwarding.

### Examples

The following example sets the load balancing algorithm of IPv6 REF to load balancing based on the source and destination IP addresses.

```
Hostname> enable
Hostname# configure terminal
Hostname(config)# ipv6 ref load-sharing original
```

### Notifications

N/A

### Common Errors

N/A

**Platform Description**

N/A

**Related Commands**

N/A

## 1.16 ipv6 ref synchronize all

**Function**

Run the **ipv6 ref synchronize all** command to synchronize IPv6 routes between the hardware and software REF.

**Syntax**

```
ipv6 ref synchronize all
```

**Parameter Description**

N/A

**Command Modes**

Privileged EXEC mode

**Default Level**

14

**Usage Guidelines**

This command is used for routing recovery under faulty conditions. If the hardware fails to install routing entries because the number of existing routing entries exceeds the capacity of the routing table, or routing entries are discarded due to insufficient memory, you can use this command to restore the consistency of routing entries between the hardware and software REF after the number of existing entries is reduced to the normal range.

**Examples**

The following example synchronizes the IPv6 routes between the hardware and software REF.

```
Hostname> enable
Hostname# ipv6 ref synchronize all
```

**Notifications**

N/A

**Common Errors**

N/A

**Platform Description**

N/A

**Related Commands**

N/A

**1.17 show ip ref adjacency****Function**

Run the **show ip ref adjacency** command to display the adjacency table.

**Syntax**

```
show ip ref adjacency [ glean | local | ip-address | interface interface-type interface-number | discard | statistics ]
```

**Parameter Description**

**glean**: Indicates glean adjacent nodes.

**local**: Indicates local adjacent nodes.

*ip-address*: Adjacency next-hop IP address.

**interface** *interface-type interface-number*: Specifies the interface type and interface number.

**discard**: Displays the adjacent nodes that are discarded.

**statistics**: Displays statistics.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

This command displays the current adjacency table of IPv4 REF. You can specify parameters to check the glean adjacencies, local adjacencies, adjacency of a specified IP address, adjacencies associated with a specified interface, and all adjacent nodes.

**Examples**

The following example displays information about all the current adjacent nodes.

```

Hostname> enable
Hostname# show ip ref adjacency
id state      type      rfct chg  ip                interface          linklayer(header
data)
1  unresolved  mcast    1     0    224.0.0.0
9  resolved   forward  1     0    192.168.50.78    GigabitEthernet 0/0  00 25 64 C5
9D 6A 00 D0 F8 98 76 54 08 00
7  resolved   forward  1     0    192.168.50.200   GigabitEthernet 0/0  00 04 5F 87
69 66 00 D0 F8 98 76 54 08 00
6  unresolved  glean    1     0    0.0.0.0          GigabitEthernet 0/0
4  unresolved  local    3     0    0.0.0.0          Local 1

```

**Table 1-1** Output Fields of the show ip ref adjacency Command

Field	Description
id	Adjacency ID.
state	Adjacency status. <ul style="list-style-type: none"> <li>● <b>unresolved</b>: Indicates unresolved.</li> <li>● <b>resolved</b>: Indicates resolved.</li> </ul>
type	Adjacency type. <ul style="list-style-type: none"> <li>● <b>local</b>: Indicates a local adjacency.</li> <li>● <b>forward</b>: Indicates a forwarding adjacency.</li> <li>● <b>discard</b>: Indicates a discarded adjacency.</li> <li>● <b>glean</b>: Indicates a glean adjacency.</li> <li>● <b>mcast</b>: Indicates a multicast adjacency.</li> </ul>
rfct	Number of times that an adjacency is referenced.
chg	Whether an adjacency is in the change chain.
ip	IP address of an adjacency.
interface	Outbound interface.
linklayer(header data)	L2 header.

**Notifications**

N/A

**Platform Description**

N/A

## 1.18 show ip ref exact-route

**Function**

Run the **show ip ref exact-route** command to display the exact forwarding path of an IP packet.

**Syntax**

```
show ip ref exact-route [ vrf vrf-name ] source-ip-address destination-ip-address
```

**Parameter Description**

**vrf vrf-name**: Indicates the name of a VRF instance.

*source-ip-address*: Source IP address of a packet.

*destination-ip-address*: Destination IP address of a packet.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

This command displays the forwarding path of a packet whose source and destination IP addresses are specified.

**Examples**

The following example displays the exact forwarding path of a packet with the source IP address 192.168.217.74 and destination IP address 192.168.13.1.

```

Hostname> enable
Hostname# show ip ref exact-route 192.168.217.74 192.168.13.1
192.168.217.74 --> 192.168.13.1 (vrf global):
id state      type      rfct chg ip                interface          linklayer(header
data)
9  resolved forward 1        0  192.168.17.1 GigabitEthernet 0/0 00 25 64 C5 9D 6A
00 D0 F8 98 76 54 08 00

```

**Table 1-1 Output Fields of the show ip ref exact-route Command**

Field	Description
id	Adjacency ID.
state	Adjacency status. <ul style="list-style-type: none"> <li>● <b>unresolved</b>: Indicates unresolved.</li> <li>● <b>resolved</b>: Indicates resolved.</li> </ul>
type	Adjacency type. <ul style="list-style-type: none"> <li>● <b>local</b>: Indicates a local adjacency.</li> <li>● <b>forward</b>: Indicates a forwarding adjacency.</li> <li>● <b>discard</b>: Indicates a discarded adjacency.</li> <li>● <b>glean</b>: Indicates a glean adjacency.</li> <li>● <b>mcast</b>: Indicates a multicast adjacency.</li> </ul>
rfct	Number of times that an adjacency is referenced.
chg	Whether an adjacency is in the change chain.
ip	IP address of an adjacency.
interface	Outbound interface.
linklayer(header data)	L2 header.

**Notifications**

N/A

**Platform Description**

N/A

**1.19 show ip ref load-balance****Function**

Run the **show ip ref load-balance** command to display the configuration of the ECMP load balancing.

**Syntax**

```
show ip ref load-balance
```

**Parameter Description**

N/A

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

N/A

**Examples**

The following example displays the configuration of the ECMP load balancing.

```

Hostname> enable
Hostname# show ip ref load-balance
  load-balance           : enhanced profile.
  hash-elasticity       : disable.

```

**Table 1-1 Output Fields of the show ip ref load-balance Command**

Field	Description
load-balance	Type of the configured ECMP load balancing algorithm.
hash-elasticity	<ul style="list-style-type: none"> <li>● <b>enable</b>: Indicates that elastic hash is supported.</li> <li>● <b>disable</b>: Indicates that elastic hash is not supported.</li> </ul>

**Notifications**

N/A

**Platform Description**

N/A



## 1.20 show ip ref load-balance-profile

### Function

Run the **show ip ref load-balance-profile** command to display the configuration of an enhanced profile.

### Syntax

```
show ip ref load-balance-profile [ profile-name ]
```

### Parameter Description

*profile-name*: Profile name.

### Command Modes

All modes except the user EXEC mode

### Default Level

14

### Usage Guidelines

If *profile-name* is not specified, information about all enhanced profiles will be displayed.

### Examples

The following example displays the enhanced load balancing configuration of the enhanced profile named rpn.

```

Hostname> enable
Hostname# show ip ref load-balance-profile rpn
Load-balance-profile: rpn
Packet      Hash Field:
  IPV4: src-ip dst-ip l4-src-port l4-dst-port
  IPV6: src-ip dst-ip l4-src-port l4-dst-port

```

**Table 1-1**Output Fields of the show ip ref load-balance-profile Command

Field	Description
Load-balance-profile	Name of an enhanced profile.
Packet	Packet type. <ul style="list-style-type: none"> <li>● <b>IPv4</b>: Indicates the load balancing configuration for IPv4 packets in an enhanced profile.</li> <li>● <b>IPv6</b>: Indicates the load balancing configuration for IPv6 packets in an enhanced profile.</li> </ul>
Hash Field	Load balancing mode.

### Notifications

N/A

## Common Errors

N/A

## Platform Description

N/A

## Related Commands

- [ip-ref-load-balance-profile](#)
- [ipv4 field](#)
- [ipv6 field](#)
- [hash-disturb](#)
- [hash-symmetrical](#)

# 1.21 show ip ref packet statistics

## Function

Run the **show ip ref packet statistics** command to display the packet statistics of IPv4 REF.

## Syntax

```
show ip ref packet statistics
```

## Parameter Description

N/A

## Command Modes

All modes except the user EXEC mode

## Default Level

14

## Usage Guidelines

N/A

## Examples

The following example displays packet statistics of IPv4 REF.

```
Hostname> enable
Hostname# show ip ref packet statistic
IPv4 REF Packet Statistics:
  Flags forward      : 0
  Ip head option    : 68
  Lookup FIB fail   : 0
  Deny forward     : 0
  Invalid adj id    : 0
  Glean adj         : 0
  TTL expiration    : 0
```

```

Don't fragment      : 0
Ip redirect         : 0
Redirect p2p        : 0
Forward adj         : 0
Vxlan adj           : 0
Local adj           : 43026
Mcast reserved     : 180
Punt adj            : 0
Cached reserve      : 0
Cached drop         : 0
Cached lost         : 0
Null interface      : 0
Total packets       : 45547
redirect drop       : 0

```

**Table 1-1**Output Fields of the show ip ref packet statistics Command

Field	Description
IPv4 REF Packet Statistics	Packet statistics of IPv4 REF.
Flags forward	Number of routed packets.
Ip head option	Number of IP packets with options.
Lookup FIB fail	Number of packets with failed REF routing.
Deny forward	Number of packets that are discarded due to no IP routing.
Invalid adj id	Invalid adjacency index.
Glean adj	Number of packets that match glean adjacencies.
TTL expiration	Number of packets with TTL timeout.
Don't fragment	Number of packets that are discarded because they cannot be fragmented.
Ip redirect	Number of packets that are redirected.
Redirect p2p	Number of packets that are redirected in a point-to-point way.
Forward adj	Number of packets that match forwarding adjacencies.
Vxlan adj	Number of packets that match VXLAN adjacencies.
Local adj	Number of packets that match local adjacencies.
Mcast reserved	Number of packets that are sent by the multicast service to the process.
Punt adj	Number of packets that match Punt adjacencies.
Cached reserve	Number of packets that are sent to the process after cached.
Cached drop	Number of packets that are discarded after cached.

Field	Description
Cached lost	Number of packets that are cached.
Null interface	Number of packets that hit the NULL 0 egress.
Total packets	Total number of packets that are sent to the REF module.
redirect drop	Number of packets that are discarded due to reverse path limited (RPL).

**Notifications**

N/A

**Platform Description**

N/A

**Related Commands**

N/A

## 1.22 show ip ref resolve-list

**Function**

Run the **show ip ref resolve-list** command to display the information actively resolved by IPv4 REF.

**Syntax**

```
show ip ref resolve-list
```

**Parameter Description**

N/A

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

N/A

**Examples**

The following example displays the information actively resolved by IPv4 REF.

```

Hostname> enable
Hostname# show ip ref resolve-list
IP           State   Flags  Interface
1.1.1.1     unres   1      GigabitEthernet 0/0

```

**Table 1-1 Output Fields of the show ip ref resolve-list Command**

Field	Description
IP	IP address.
State	<ul style="list-style-type: none"> <li>● <b>unres</b>: Indicates unresolved.</li> <li>● <b>res</b>: Indicates resolved.</li> </ul>
Flags	<ul style="list-style-type: none"> <li>● <b>0</b>: Indicates unrelated to adjacencies.</li> <li>● <b>1</b>: Indicates related to adjacencies.</li> </ul>
Interface	Interface name

**Notifications**

N/A

**Platform Description**

N/A

**Related Commands**

N/A

## 1.23 show ip ref route

**Function**

Run the **show ip ref route** command to display all routing information of the current IPv4 REF.

**Syntax**

```
show ip ref route [ vrf vrf-name ] [ default | ipv4-address mask | statistics ]
```

**Parameter Description**

**vrf** *vrf-name*: Displays routing information of a specified VRF instance.

**default**: Specifies the default route.

*ipv4-address*: Destination IP address of a specified route.

*mask*: Mask of a specified route.

**statistics**: Displays statistics.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

This command is used to display the routing information of the current IPv4 REF. You can specify parameters so that information about the default route, the route of a specified IP/mask, or all routes is displayed.

## Examples

The following example displays all routing information of the current IPv4 REF.

```

Hostname> enable
Hostname# show ip ref route
Codes: * - default route
       # - zero route
ip/mask          weight  path-id    next-hop      interface
255.255.255.255/32 1      4          0.0.0.0       Local 1
224.0.0.0/24     1      4          0.0.0.0       Local 1
192.168.50.0/24  1      6          0.0.0.0       GigabitEthernet 0/0
192.168.50.200/32 1      7          192.168.50.200 GigabitEthernet 0/0
192.168.50.122/32 1      4          0.0.0.0       Local 1
192.168.50.78/32  1      9          192.168.50.78 GigabitEthernet 0/0

```

**Table 1-1** Output Fields of the show ip ref route Command

Field	Description
ip/mask	Destination IP address and mask length.
path-id	Adjacency index ID.
weight	Weight value of a route.
next_hop	Next hop
interface	Outbound interface.

## Notifications

N/A

## Platform Description

N/A

## Related Commands

N/A

## 1.24 show ip ref route detail

### Function

Run the **show ip ref route detail** command to display the detailed routing table of a specified IPv4 route prefix.

### Syntax

```
show ip ref route detail ip-address [ vrf vrf-name ]
```

**Parameter Description**

*ip-address*: IP address.

*vrf vrf-name*: Indicates the name of a VRF instance.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

This command is used to display the detailed routing table of a specified route prefix.

**Examples**

The following example displays the detailed routing table of the IPv4 route prefix 100.0.0.0.

```

Hostname> enable
Hostname# show ip ref route detail 100.0.0.0
IPv4 100.000.000.000/8 vrf:0
===== SSC INFO =====
      ifx nh_ip          pri w mac          cmd   vid  l2_ifx sub_port
main_vid rt_type  rt_own
[ 0] 28  054.000.000.002 0   1 0000.0011.1111 forward 0 0    0    0
local_adj comm
[ 1] 29  055.000.000.002 0   1 0000.0000.0055 forward 0 0    0    0
local_adj comm
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSC END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
===== SSD INFO =====
***** LC slot 1/5 ROUTE INFO *****
prefix_type nh_id  ecmp_gid owner  ecmp_ready  nhblk_id nh_id nhblk_ready
lpm          9    1      comm  1          9     9     1
      ifx ip          intf_id phyid   vlan  cmd   flow_id mac
adj_id in_adj_id nhitem_id nh_status
[ 0] 28  054.000.000.002 1      0x7001f04 4094 forward 0      0000.0011.1111 0
0      0      1
[ 1] 29  055.000.000.002 2      0x7001f05 4093 forward 0      0000.0000.0055 0
0      0      1
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSD END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
===== SSA INFO =====
***** LC slot 1/5 ROUTE INFO *****
[unit:0] hw_type:lpm ecmpgid:1 nh_id:9 flowid:4 hit:[2048]0
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSA END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
    
```

**Table 1-1 Output Fields of the show ip ref route detail Command**

Field	Description
ifx	Interface ID.
nh_ip	IP address of the next hop.
pri	Priority of the next hop.
w	Weight value of the next hop.
mac	MAC address of the next hop.
cmd	Adjacency forwarding action.
vid	VLAN ID.
l2_ifx	Physical port number.
sub_port	VXLAN subinterface.
main_vid	Primary VLAN ID.
rt_type	Route type.
rt_own	Network, to which a route belongs.
prefix_type	Prefix type.
nh_id	Resource IP address of the next hop.
ecmp_gid	Resource ID of an ECMP group.
ecmp_ready	Resource readiness identifier of an ECMP group.
nhblk_id	Next-hop block ID.
nhblk_ready	Next-hop resource readiness identifier.
intf_id	RIF resource ID.
phyid	Physical port ID.
vlan	Actual VLAN.
flow_id	Flow classification ID.
adj_id	Adjacency resource ID.
in_adj_id	ID of the resource, to which the inner adjacency belongs.
nhitem_id	ID of the resource, to which the next-hop member belongs.
nh_status	Action flag of the next hop. <ul style="list-style-type: none"> <li>● <b>forward</b>: Indicates packet forwarding.</li> <li>● <b>drop</b>: Indicates discarding.</li> </ul>
unit	ID of the installed chip.



Field	Description
hit	Flow hit identifier.

## Notifications

When a route does not exist, or the search times out or fails, the following notification will be displayed:

```
% ROUTE INFO NOT FOUND, FOR NO ROUTE HITTED OR LOOK UP TIME OUT
```

## Platform Description

N/A

## Related Commands

N/A

# 1.25 show ipv6 ref adjacency

## Function

Run the **show ipv6 ref adjacency** command to display the adjacency information of IPv6 REF.

## Syntax

```
show ipv6 ref adjacency [ glean | local | ipv6-address | interface interface-type interface-number | discard | statistics ]
```

## Parameter Description

**glean**: Displays glean adjacent nodes.

**local**: Displays local adjacent nodes.

*ipv6-address*: IPv6 address. After this parameter is configured, adjacency information of a specified address (x:x:x:x::x) will be displayed.

**interface** *interface-type interface-number*: Specifies the interface type and interface number.

**discard**: Displays the adjacent nodes that are discarded.

**statistics**: Displays the statistics on all types of adjacencies.

## Command Modes

All modes except the user EXEC mode

## Default Level

14

## Usage Guidelines

This command displays the current adjacency table of IPv6 REF. You can specify parameters to check glean adjacencies, local adjacencies, adjacency of a specified IP address, adjacencies associated with a specified interface, and all adjacent nodes.

## Examples

The following example displays adjacencies of IPv6 REF.

```

Hostname> enable
Hostname# show ipv6 ref adjacency
id      state      type      rfct chg ip      interface      linklayer(header
data)
1       unresolved glean    1      0   ::   GigabitEthernet 0/0
2       unresolved local    2      0   ::1  Local 1

```

**Table 1-1** Output Fields of the show ipv6 ref adjacency Command

Field	Description
id	ID of an adjacent node.
state	State of an adjacent node.
type	Type of an adjacent node. <ul style="list-style-type: none"> <li>● <b>local</b>: Indicates a local adjacency.</li> <li>● <b>forward</b>: Indicates a forwarding adjacency.</li> <li>● <b>discard</b>: Indicates a discarded adjacency.</li> <li>● <b>glean</b>: Indicates a glean adjacency.</li> <li>● <b>mcast</b>: Indicates a multicast adjacency.</li> </ul>
rfct	Number of times that the route of an adjacent node is referenced.
chg	<ul style="list-style-type: none"> <li>● <b>0</b>: Indicates that an adjacent node is not in the adjacency change chain.</li> <li>● <b>1</b>: Indicates that an adjacent node is in the adjacency change chain.</li> </ul>
ip	IPv6 address of an adjacency.
interface	Physical port associated with an adjacent node.
linklayer(header data)	L2 header filling information.

### Note

For a distributed device, the **id** column contains two fields: **gid** and **lid**, of which **gid** indicates the global adjacent node ID and **lid** indicates the local adjacent node ID.

## Notifications

N/A

## Platform Description

N/A

**Related Commands**

N/A

**1.26 show ipv6 ref exact-route****Function**

Run the **show ipv6 ref exact-route** command to display the actual forwarding path of an IPv6 packet.

**Syntax**

```
show ipv6 ref exact-route [ vrf vrf-name ] source-ipv6-address destination-ipv6-address
```

**Parameter Description**

**vrf vrf-name**: Indicates the name of a VRF instance.

*source-ipv6-address*: Source IPv6 address.

*destination-ipv6-address*: Destination IPv6 address.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

N/A

**Examples**

The following example displays the actual forwarding path of a packet with the source address 2001:db8:1::1 and the destination address 3001:db8:2::2.

```

Hostname> enable
Hostname# show ipv6 ref exact-route 2001:db8:1::1 3001:db8:2::2
2001:db8:1::1 --> 3001:db8:2::2 (vrf global):
ID state      type      rfct chg ip interface          linklayer(header data)
3  unresolve  glean    1    0   :: GigabitEthernet 0/0

```

**Table 1-1 Output Fields of the show ipv6 ref exact-route Command**

Field	Description
id	ID of an adjacent node.
state	State of an adjacent node.

Field	Description
type	Type of an adjacent node. <ul style="list-style-type: none"> <li>● <b>local</b>: Indicates a local adjacency.</li> <li>● <b>forward</b>: Indicates a forwarding adjacency.</li> <li>● <b>discard</b>: Indicates a discarded adjacency.</li> <li>● <b>glean</b>: Indicates a glean adjacency.</li> <li>● <b>mcast</b>: Indicates a multicast adjacency.</li> </ul>
rfct	Number of times that the route of an adjacent node is referenced.
chg	<ul style="list-style-type: none"> <li>● <b>0</b>: Indicates that an adjacent node is not in the adjacency change chain.</li> <li>● <b>1</b>: Indicates that an adjacent node is in the adjacency change chain.</li> </ul>
ip	IPv6 address of an adjacency.
interface	Physical port associated with an adjacent node.
linklayer(header data)	L2 header filling information.

---

**Note**

For a distributed device, the **id** column contains two fields: **gid** and **lid**, of which **gid** indicates the global adjacent node ID and **lid** indicates the local adjacent node ID.

---

### Notifications

N/A

### Platform Description

N/A

### Related Commands

N/A

## 1.27 show ipv6 ref packet statistics

### Function

Run the **show ipv6 ref packet statistics** command to display the packet statistics of IPv6 REF.

### Syntax

```
show ipv6 ref packet statistics
```

### Parameter Description

N/A

### Command Modes

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

N/A

**Examples**

The following example displays packet statistics of IPv6 REF.

```

Hostname> enable
Hostname# show ipv6 ref packet statistics
IPv6 REF Packet Statistics:
  Flags forward      : 0
  Payload big       : 0
  Dstaddr multi     : 18558
  Param err        : 0
  Lookup fib fail   : 0
  Null Dstintf     : 0
  No ipv6 pkt      : 0
  Deny forward     : 0
  TTL expire       : 0
  Packet too big    : 0
  Address bscope   : 0
  Redirect packet   : 0
  Glean adj        : 0
  Forward adj      : 0
  Local adj        : 649
  Vxlan adj        : 0
  Punt adj         : 0
  Mcast adj        : 0
  Discard adj      : 0
  Cached drop      : 0
  Cached lost      : 0
  Cached rsvd     : 0
  Current cache pkt: 0
  Total packets    : 19207

```

**Table 1-1 Output Fields of the show ipv6 ref packet statistics Command**

Field	Description
IPv6 REF Packet Statistics	Statistics on packets of IPv6 REF.
Flags forward	Number of routed packets.
Payload big	Number of packets with the actual length smaller than the maximum packet length under load balancing.

Field	Description
Dstaddr multi	Number of packets with the destination addresses being multicast addresses.
Param err	Number of packets with illegitimate parameters (for example, VRF).
Lookup fib fail	Number of packets with failed REF routing.
Null Dstintf	Number of packets with the destination egress being null.
No ipv6 pkt	Number of non-IPv6 packets.
Deny forward	Number of packets that are denied for forwarding.
TTL expire	Number of packets with abnormal TTL.
Packet too big	Number of packets that are discarded due to too large size.
Address bscope	Number of packets beyond the scope of source address.
Redirect packet	Number of packets that are redirected.
Glean adj	Number of packets that match glean adjacencies.
Forward adj	Number of packets that match forwarding adjacencies.
Local adj	Number of packets that match local adjacencies.
Vxlan adj	Number of packets that match VXLAN adjacencies.
Punt adj	Number of packets that match Punt adjacencies.
Mcast adj	Number of packets that match multicast adjacencies.
Discard adj	Number of packets that match discarded adjacencies.
Cached drop	Number of packets that are discarded after cached.
Cached lost	Number of packets that are cached.
Cached rsvd	Number of packets that are sent to the process after cached.
Current cache pkt	Number of packets that are being cached.
Total packets	Total number of packets

**Notifications**

N/A

**Platform Description**

N/A

**Related Commands**

N/A

## 1.28 show ipv6 ref resolve-list

### Function

Run the **show ipv6 ref resolve-list** command to display the information actively resolved by IPv6 REF.

### Syntax

```
show ipv6 ref resolve-list
```

### Parameter Description

N/A

### Command Modes

All modes except the user EXEC mode

### Default Level

14

### Usage Guidelines

N/A

### Examples

The following example displays the information actively resolved by IPv6 REF.

```

Hostname> enable
Hostname# show ipv6 ref resolve-list
IP                State      Flags  Interface
1000::1           unres     1      GigabitEthernet 0/0

```

**Table 1-1** Output Fields of the show ipv6 ref resolve-list Command

Field	Description
IP	IPv6 address of an interface.
State	<ul style="list-style-type: none"> <li>● <b>unres</b>: Indicates unresolved.</li> <li>● <b>res</b>: Indicates resolved.</li> </ul>
Flags	<ul style="list-style-type: none"> <li>● <b>0</b>: Indicates unrelated to adjacencies.</li> <li>● <b>1</b>: Indicates related to adjacencies.</li> </ul>
Interface	Interface name

### Notifications

N/A

### Platform Description

N/A

**Related Commands**

N/A

**1.29 show ipv6 ref route****Function**

Run the **show ipv6 ref route** command to display routing information of IPv6 REF.

**Syntax**

```
show ipv6 ref route [ vrf vrf-name ] [ default | statistics | ipv6-address/prefix-length ]
```

**Parameter Description**

**vrf** *vrf-name*: Indicates the name of a VRF instance.

**default**: Displays the information of the default route.

**statistics**: Displays the route statistics.

*ipv6-address/prefix-length*: Prefix. After this parameter is configured, the routing information of a specified prefix (X:X:X:X::X/<0-128>) is displayed.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

This command is used to display routing information of IPv6 REF. When no VRF parameter is specified, the global routing table is queried; when the VRF parameter is specified, the related VRF routing table is queried.

You can specify parameters to check information about the default route, the route with a specified prefix, or the statistics on all routes.

**Examples**

The following example displays routing information of IPv6 REF.

```

Hostname> enable
Hostname# show ipv6 ref route
Codes: * - default route
  prefix/len                weight path_id  next_hop interface
  2001:da8:ffe:2::/64        1       3       ::      GigabitEthernet 0/0
  2001:da8:ffe:2::3/128      1       2       :::1    Local 1
  fe80::/10                  1       6       ::      Null 0
  fe80::21a:a9ff:fe3b:fa41/128 1       2       :::1    Local 1

```



**Table 1-1 Output Fields of the show ipv6 ref route Command**

Field	Description
prefix/len	IPv6 prefix and prefix length.
weight	Weight value of a route.
path_id	Adjacency index ID.
next_hop	Next-hop address
interface	Name of the interface associated with an adjacent node.

**Notifications**

N/A

**Platform Description**

N/A

**Related Commands**

N/A

## 1.30 show ipv6 ref route detail

**Function**

Run the **show ipv6 ref route detail** command to display the detailed routing table of a specified IPv6 route prefix.

**Syntax**

```
show ipv6 ref route detail ipv6-address [ vrf vrf-name ]
```

**Parameter Description**

*ipv6-address*: IPv6 address.

**vrf** *vrf-name*: Indicates the name of a VRF instance.

**Command Modes**

All modes except the user EXEC mode

**Default Level**

14

**Usage Guidelines**

This command is used to display the detailed routing table of a specified route prefix.

**Examples**

The following example displays the detailed routing table of the IPv6 route prefix 120::.

```

Hostname> enable
Hostname# show ipv6 ref route detail 120::
IPv6 120::/32 vrf:0
===== SSC INFO =====
      ifx nh_ip  pri w   mac          cmd          vid  l2_ifx sub_port
main_vid rt_type  rt_own
[ 0] 244 38:::2  0   1   0000.6638.3838  forward      0    0    0    0
local_adj comm
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSC END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
===== SSD INFO =====
***** LC slot 1/3 ROUTE INFO *****
prefix_type nh_id  ecmp_gid owner  ecmp_ready  nhblk_id nh_id nhblk_ready
lpm          11    0        comm   1          0      11    1
      ifx ip    intf_id phyid    vlan cmd    flow_id mac          adj_id
in_adj_id nhtem_id nh_status
[ 0] 244 38:::2 5          0x7001d30 4094 forward  0          0000.6638.3838  0    0
0
1
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSD END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
===== SSA INFO =====
***** LC slot 1/3 ROUTE INFO *****
[unit:0] hw_type:lpm ecmpgid:0 nh_id:11 flowid:4 hit:[17]0
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSA END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^ SSA END ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^

```

**Table 1-1**Output Fields of the show ipv6 ref route detail Command

Field	Description
ifx	Interface ID.
nh_ip	IP address of the next hop.
pri	Priority of the next hop.
w	Weight value of the next hop.
mac	MAC address of the next hop.
cmd	Adjacency forwarding action.
vid	VLAN ID.
l2_ifx	Physical port number.
sub_port	VXLAN subinterface.
main_vid	Primary VLAN ID.
rt_type	Route type.
rt_own	Network, to which a route belongs.

Field	Description
prefix_type	Prefix type.
nh_id	Resource IP address of the next hop.
ecmp_gid	Resource ID of an ECMP group.
ecmp_ready	Resource readiness identifier of an ECMP group.
nhblk_id	Next-hop block ID.
nhblk_ready	Next-hop resource readiness identifier.
intf_id	RIF resource ID.
phyid	Physical port ID.
vlan	Actual VLAN.
flow_id	Flow classification ID.
adj_id	Adjacency resource ID.
in_adj_id	ID of the resource, to which the inner adjacency belongs.
nhitem_id	ID of the resource, to which the next-hop member belongs.
nh_status	Action flag of the next hop. <ul style="list-style-type: none"> <li>● <b>forward</b>: Indicates packet forwarding.</li> <li>● <b>drop</b>: Indicates discarding.</li> </ul>
unit	ID of the installed chip.
hit	Flow hit identifier.

## Notifications

When a route does not exist, or the search times out or fails, the following notification will be displayed:

```
% ROUTE INFO NOT FOUND, FOR NO ROUTE HITTED OR LOOK UP TIME OUT
```

## Platform Description

N/A

## Related Commands

N/A