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# Static routing commands

## delete static-routes all

Use `delete static-routes all` to delete all static routes.

### Syntax

```
delete [ vpn-instance vpn-instance-name ] static-routes all
```

### Views

System view

### Predefined user roles

network-admin

### Parameters

**vpn-instance** *vpn-instance-name*: Specifies an MPLS L3VPN instance by its name, a case-sensitive string of 1 to 31 characters. If you do not specify a VPN instance, the command deletes all static routes for the public network.

### Usage guidelines

When you use this command, the system will prompt you to confirm the operation before deleting all the static routes.

To delete one static route, use the `undo ip route-static` command. To delete all static routes, including the default route, use the `delete static-routes all` command.

### Examples

```
# Delete all static routes.
```

```
<Sysname> system-view
```

```
[Sysname] delete static-routes all
```

```
This will erase all IPv4 static routes and their configurations, you must reconfigure all static routes.
```

```
Are you sure?[Y/N]:y
```

### Related commands

```
ip route-static
```

## display route-static nib

Use `display route-static nib` to display static route next hop information.

### Syntax

```
display route-static nib [ nib-id ] [ verbose ]
```

### Views

Any view

### Predefined user roles

network-admin

network-operator

## Parameters

*nib-id*: Specifies a NIB by its ID, a hexadecimal string of 1 to fffffff. If you do not specify this argument, the command displays all static route next hop information.

**verbose**: Displays detailed static route next hop information. If you do not specify this keyword, the command displays brief static route next hop information.

## Examples

# Displays brief static route next hop information.

```
<Sysname> display route-static nib
```

```
Total number of nexthop(s): 44
```

```
    NibID: 0x11000000      Sequence: 0
    Type: 0x21             Flushed: Yes
    UserKey0: 0x111        VrfNthp: 0
    UserKey1: 0x0          Nexthop: 0.0.0.0
    IFIndex: 0x111        LocalAddr: 0.0.0.0
    TopoNthp: 0           ExtType: 0x0
```

```
    NibID: 0x11000001      Sequence: 1
    Type: 0x41             Flushed: Yes
    UserKey0: 0x0          VrfNthp: 5
    UserKey1: 0x0          Nexthop: 2.2.2.2
    IFIndex: 0x0          LocalAddr: 0.0.0.0
    TopoNthp: 0           ExtType: 0x0
```

...

**Table 1 Command output**

Field	Description
NibID	ID of the NIB.
NibSeq	Sequence number of the NIB.
Type	Type of the NIB.
Flushed	Indicates whether the route with the NIB has been flushed to the FIB.
UserKey0	Reserved data 1.
UserKey1	Reserved data 2.
VrfNthp	Index of the VPN instance that the next hop belongs to. This field displays <b>0</b> if the next hop is on the IPv4 public network.
Nexthop	Next hop address.
IFIndex	Interface index
LocalAddr	Local interface address.
TopoNthp	This field is not supported in the current software version. Index of the topology that contains the next hop. This field displays <b>0</b> if the next hop is on the IPv4 public network.
ExtType	NIB extension type.

# Displays detailed static route next hop information.

```
<Sysname> display route-static nib verbose
```

```
Total number of nexthop(s): 44
```

```

      NibID: 0x11000000      Sequence: 0
      Type: 0x21             Flushed: Yes
UserKey0: 0x111             VrfNthp: 0
UserKey1: 0x0               Nexthop: 0.0.0.0
      IFIndex: 0x111        LocalAddr: 0.0.0.0
      TopoNthp: 0           ExtType: 0x0
      RefCnt: 2             FlushRefCnt: 0
      Flag: 0x2             Version: 1
1 nexthop(s):
PrefixIndex: 0              OrigNexthop: 0.0.0.0
RelyDepth: 0                RealNexthop: 0.0.0.0
Interface: NULL0            LocalAddr: 0.0.0.0
TunnelCnt: 0                Vrf: default-vrf
TunnelID: N/A               Topology: base
Weight: 1000000

      NibID: 0x11000001      Sequence: 1
      Type: 0x41             Flushed: Yes
UserKey0: 0x0               VrfNthp: 5
UserKey1: 0x0               Nexthop: 2.2.2.2
      IFIndex: 0x0          LocalAddr: 0.0.0.0
      TopoNthp: 0           ExtType: 0x0
      RefCnt: 1             FlushRefCnt: 0
      Flag: 0x12            Version: 1
2 nexthop(s):
PrefixIndex: 0              OrigNexthop: 2.2.2.2
RelyDepth: 7                RealNexthop: 8.8.8.8
Interface: Vlan11           LocalAddr: 12.12.12.12
TunnelCnt: 0                Vrf: default-vrf
TunnelID: N/A               Topology: base
Weight: 1000000
PrefixIndex: 0              OrigNexthop: 2.2.2.2
RelyDepth: 9                RealNexthop: 0.0.0.0
Interface: NULL0            LocalAddr: 0.0.0.0
TunnelCnt: 0                Vrf: default-vrf
TunnelID: N/A               Topology: base
Weight: 1000000
...

```

**Table 2 Command output**

Field	Description
x nexthop(s)	Number of next hops.
PrefixIndex	Prefix index of the next hop for an ECMP route.

Field	Description
OrigNexthop	Original next hop.
RelyDepth	Recursion depth.
RealNexthop	Real next hop.
Interface	Output interface.
localAddr	Local interface address.
TunnelCnt	Number of tunnels after route recursion.
Vrf	VPN instance name. For the IPv4 public network, this field displays <b>default-vrf</b> .
TunnelID	ID of the tunnel after route recursion.
Topology	This field is not supported in the current software version. Topology name. The topology name for the IPv4 public network is <b>base</b> .
Weight	ECMP route weight. This field displays 0 for non-ECMP routes.
RefCnt	Reference count of the next hop.
FlushRefCnt	Reference count of the next hop that is flushed to the FIB.
Flag	Flag of the next hop.
Version	Version of the next hop.
ExtType	NIB extension type.

## display route-static routing-table

Use `display route-static routing-table` to display static routing table information.

### Syntax

```
display route-static routing-table [ vpn-instance vpn-instance-name ]
[ ip-address { mask-length | mask } ]
```

### Views

Any view

### Predefined user roles

network-admin

network-operator

### Parameters

**vpn-instance** *vpn-instance-name*: Specifies an MPLS L3VPN instance by its name, a case-sensitive string of 1 to 31 characters. If you do not specify a VPN instance, the command displays static routing table information for the public network.

*ip-address*: Specifies the destination IP address in dotted decimal notation. If you do not specify this argument, the command displays all static routing table information.

*mask-length*: Specifies the mask length, an integer in the range of 0 to 32.

*mask*: Specifies the subnet mask in dotted decimal notation.

## Examples

```
# Display static routing table information.
<Sysname> display route-static routing-table
Total number of routes: 24

Status: * - valid

*Destination: 0.0.0.0/0
  NibID: 0x1100000a      NextHop: 2.2.2.10
  MainNibID: N/A        BkNextHop: N/A
  BkNibID: N/A          Interface: Vlan-interface11
  TableID: 0x2          BkInterface: Vlan-interface12
  Flag: 0x82d01         BfdSrcIp: N/A
  DbIndex: 0xd          BfdIfIndex: 0x0
  Type: Normal          BfdVrfIndex: 0
  TrackIndex: 0xffffffff Label: NULL
  Preference: 60        vrfIndexDst: 0
  BfdMode: N/A          vrfIndexNH: 0
  Permanent: 0          Tag: 0

Destination: 0.0.0.0/0
  NibID: 0x1100000b      NextHop: 2.2.2.11
  MainNibID: N/A        BkNextHop: N/A
  BkNibID: N/A          Interface: Vlan-interface13
  TableID: 0x2          BkInterface: Vlan-interface14
  Flag: 0x82d01         BfdSrcIp: N/A
  DbIndex: 0xd          BfdIfIndex: 0x0
  Type: Normal          BfdVrfIndex: 0
  TrackIndex: 0xffffffff Label: NULL
  Preference: 60        vrfIndexDst: 0
  BfdMode: N/A          vrfIndexNH: 0
  Permanent: 0          Tag: 0

...
```

**Table 3 Command output**

Field	Description
destination	Destination address/prefix.
NibID	ID of the NIB.
MainNibID	ID of the primary next hop for static route FRR.
BkNibID	ID of the backup next hop for static route FRR.
NextHop	Next hop address.
BkNextHop	Backup next hop address.
Interface	Output interface of the route.
BkInterface	Backup output interface.
TableID	ID of the table to which the route belongs.

Field	Description
Flag	Flag of the route.
DbIndex	Index of the database to which the route belongs.
Type	Route type: <ul style="list-style-type: none"> <li>• Normal.</li> <li>• DHCP.</li> <li>• NAT.</li> <li>• IPsec.</li> </ul>
BfdSrcIp	Source IP address of the indirect BFD session.
BfdIfIndex	Index of the interface where BFD is enabled.
BfdVrfIndex	Index of the VPN instance where BFD is enabled. This field displays <b>0</b> if BFD is enabled for the IPv4 public network.
BfdMode	BFD session mode: <ul style="list-style-type: none"> <li>• <b>N/A</b>—No BFD session is configured.</li> <li>• <b>Ctrl</b>—Control packet mode</li> <li>• <b>Echo</b>—Echo packet mode.</li> </ul>
TrackIndex	NQA Track index.
vrfIndexDst	Index of VPN instance that the destination belongs to. For the IPv4 public network, this field displays <b>0</b> .
vrfIndexNH	Index of the VPN instance that the next hop belongs to. For the IPv4 public network, this field displays <b>0</b> .
Permanent	Permanent static route flag. 1 indicates a permanent static route.

## ip route-static

Use **ip route-static** to configure a static route.

Use **undo ip route-static** to delete a static route.

### Syntax

```
ip route-static { dest-address { mask-length | mask } | group group-name }
{ interface-type interface-number [ next-hop-address ] [ backup-interface
interface-type interface-number [ backup-nexthop backup-nexthop-address ]
[ permanent ] | bfd { control-packet | echo-packet } | permanent | track
track-entry-number ] | next-hop-address [ recursive-lookup host-route ]
[ bfd control-packet bfd-source ip-address | permanent | track
track-entry-number ] | vpn-instance d-vpn-instance-name next-hop-address
[ recursive-lookup host-route ] [ bfd control-packet bfd-source ip-address
| permanent | track track-entry-number ] } [ preference preference ] [ tag
tag-value ] [ description text ]
```

```
undo ip route-static { dest-address { mask-length | mask } | group
group-name } [ interface-type interface-number [ next-hop-address ] |
next-hop-address | vpn-instance d-vpn-instance-name next-hop-address ]
[ preference preference ]
```

```
ip route-static vpn-instance s-vpn-instance-name { dest-address
{ mask-length | mask } | group group-name } { interface-type
interface-number [ next-hop-address ] [ backup-interface interface-type
interface-number [ backup-nexthop backup-nexthop-address ] [ permanent ] |
```

```

bfd { control-packet | echo-packet } | permanent | track track-entry-number ]
| next-hop-address [ recursive-lookup host-route ] [ public ] [ bfd
control-packet bfd-source ip-address | permanent | track
track-entry-number ] | vpn-instance d-vpn-instance-name next-hop-address
[ recursive-lookup host-route ] [ bfd control-packet bfd-source ip-address
| permanent | track track-entry-number ] } [ preference preference ] [ tag
tag-value ] [ description text ]

```

```

undo ip route-static vpn-instance s-vpn-instance-name { dest-address
{ mask-length | mask } | group group-name } [ interface-type
interface-number [ next-hop-address ] | next-hop-address [ public ] |
vpn-instance d-vpn-instance-name next-hop-address ] [ preference
preference ]

```

## Default

No static route is configured.

## Views

System view

## Predefined user roles

network-admin

## Parameters

**vpn-instance** *s-vpn-instance-name*: Specifies a source MPLS L3VPN instance by its name, a case-sensitive string of 1 to 31 characters. Each VPN instance has its own routing table, and the configured static route is installed in the routing tables of the specified VPN instances.

*dest-address*: Specifies the destination IP address of the static route, in dotted decimal notation.

*mask-length*: Specifies the mask length, an integer in the range of 0 to 32.

*mask*: Specifies the subnet mask in dotted decimal notation.

**group** *group-name*: Specifies a static route group by its name, a case-sensitive string of 1 to 31 characters.

**vpn-instance** *d-vpn-instance-name*: Specifies a destination MPLS L3VPN instance by its name, a case-sensitive string of 1 to 31 characters. If a destination VPN instance is specified, packets will search for the output interface in the destination VPN instance based on the configured next hop address.

*interface-type interface-number*: Specifies an output interface by its type and number. For more information, see *Layer 3—IP Routing Configuration Guide*.

*next-hop-address*: Specifies the IP address of the next hop, in dotted decimal notation. For more information, see *Layer 3—IP Routing Configuration Guide*.

**recursive-lookup host-route**: Specifies only host routes for static route recursion.

**backup-interface** *interface-type interface-number*: Specifies a backup output interface by its type and number. If the backup output interface is an NBMA interface or broadcast interface and not a P2P interface, you must specify the backup next hop address.

**backup-nexthop** *backup-nexthop-address*: Specifies a backup next hop address.

**bfd**: Enables BFD to detect reachability of the static route's next hop. When the next hop is unreachable, the system immediately switches to the backup route.

**control-packet**: Specifies the BFD control mode.

**bfd-source** *ip-address*: Specifies the source IP address of BFD packets. As a best practice, specify the loopback interface address.

**echo-packet**: Specifies the BFD echo mode.

**permanent**: Specifies the route as a permanent static route. If the output interface is down, the permanent static route is still active.

**track** *track-entry-number*: Associates the static route with a track entry specified by its number in the range of 1 to 1024. For more information about Track, see *High Availability Configuration Guide*.

**public**: Indicates that the specified next hop address is on the public network.

**preference** *preference*: Specifies a preference for the static route, in the range of 1 to 255. The default is 60.

**tag** *tag-value*: Sets a tag value for marking the static route, in the range of 1 to 4294967295. The default is 0. Tags of routes are used for route control in routing policies. For more information about routing policies, see *Layer 3—IP Routing Configuration Guide*.

**description** *text*: Configures a description of 1 to 60 characters for the static route. The description can include special characters, such as the space, except the question mark (?).

## Usage guidelines

If the destination IP address and the mask are both 0.0.0.0 (or 0), the configured route is a default route. The default route is used for forwarding a packet matching no entry in the routing table.

Implement different routing policies to configure different route preferences. For example, to enable load sharing for multiple routes to the same destination, assign the same preference to the routes. To enable the routes to back up one another, assign different preferences to them.

Follow these guidelines when you specify the output interface or the next hop address of the static route:

- If the output interface is a Null 0 interface, no next hop address is required.
- If the output interface is a point-to-point interface, you can specify only the output interface. You do not need to change the configuration of the route even if the peer address is changed.
- NBMA or P2MP interfaces need IP address-to-link layer address mappings for successful packet delivery. As a best practice, specify the next hop address for the route at the same time if the output interface is an NBMA or P2MP interface.
- If the output interface is a broadcast interface, the device uses the next hop IP address to obtain the MAC address of the next hop. Therefore, you must specify both the output interface and next hop IP address, except for certain cases.

Follow these guidelines when you configure a static route:

- Enabling BFD for a flapping route could worsen the route flapping situation. Therefore, use it with caution. For more information about BFD, see *High Availability Configuration Guide*.
- For static routing-Track-NQA collaboration, you must configure the same VPN instance ID for the next hop to be detected and the NQA operation.
- If a static route needs route recursion, the associated track entry must monitor the next hop of the related route instead of that of the recursive static route. Otherwise, a valid route might be mistakenly considered invalid.
- Do not specify the **permanent** keyword together with the **bfd** or **track** keyword.
- To specify the **recursive-lookup host-route** keyword, you must enable ARP direct route advertisement to advertise 32-bit host routes on the output interface corresponding to the next hop. To enable ARP direct route advertisement, use the **arp route-direct advertise** command.

If you specify a static route group, all prefixes in the static route group will be assigned the next hop and output interface specified by using this command.

## Examples

```
# Configure a static route, whose destination address is 1.1.1.1/24, next hop address is 2.2.2.2, tag value is 45, and description information is for internet.
```

```
<Sysname> system-view
[Sysname] ip route-static 1.1.1.1 24 2.2.2.2 tag 45 description for internet
```

## Related commands

```
arp route-direct advertise (Layer 3—IP Services Command Reference)
```

```
display ip routing-table protocol
```

```
ip route-static-group
```

```
prefix
```

## ip route-static arp-request

Use `ip route-static arp-request` to enable periodic sending of ARP requests to the next hops of static routes.

Use `undo ip route-static arp-request` to disable periodic sending of ARP requests to the next hops of static routes.

### Syntax

```
ip route-static arp-request [ interval interval ]
```

```
undo ip route-static arp-request
```

### Default

Periodic sending of ARP requests to the next hops of static routes is disabled.

### Views

System view

### Predefined user roles

network-admin

### Parameters

*interval*: Specifies an ARP request sending interval in the range of 1 to 300 seconds. The default value is 5.

### Usage guidelines

When the following conditions exist, a recursive static route becomes inactive:

- The static route uses a host route to reach its direct next hop.
- The host route is obtained either by specifying the `recursive-lookup host-route` keyword in the `ip route-static` command or by routing policy-based recursive lookup.
- The host route is unavailable because the direct next hop cannot send gratuitous ARP messages and consequently no ARP entry exists for that host route on the device.

To resolve this issue, you can use this command to enable the device to periodically send ARP requests to the direct next hop. When the device receives an ARP response from the direct next hop, it stops sending ARP requests and activates the recursive static route.

This command applies only to a recursive static route that meets the following requirements:

- The static route has no output interface specified.
- The static route fails the next-hop recursion.

## Examples

```
# Enable sending of ARP requests to the next hops of static routes and set the sending interval to 10 seconds.
<Sysname> system-view
[Sysname] ip route-static arp-request interval 10
```

## Related commands

```
ip route-static
protocol nexthop recursive-lookup
```

## ip route-static default-preference

Use `ip route-static default-preference` to configure a default preference for static routes.

Use `undo ip route-static default-preference` to restore the default.

## Syntax

```
ip route-static default-preference default-preference
undo ip route-static default-preference
```

## Default

The default preference of static routes is 60.

## Views

System view

## Predefined user roles

network-admin

## Parameters

*default-preference*: Specifies a default preference for static routes, in the range of 1 to 255.

## Usage guidelines

If no preference is specified for a static route, the default preference applies.

When the default preference is reconfigured, it applies only to newly added static routes.

## Examples

```
# Set a default preference of 120 for static routes.
<Sysname> system-view
[Sysname] ip route-static default-preference 120
```

## Related commands

```
display ip routing-table protocol
```

## ip route-static fast-reroute auto

Use `ip route-static fast-reroute auto` to configure static route FRR to automatically select a backup next hop.

Use `undo ip route-static fast-reroute auto` to disable static route FRR from automatically selecting a backup next hop.

## Syntax

```
ip route-static fast-reroute auto
undo ip route-static fast-reroute auto
```

## Default

Static route FRR is disabled from automatically selecting a backup next hop.

## Views

System view

## Predefined user roles

network-admin

## Examples

```
# Configure static route FRR to automatically select a backup next hop.
<Sysname> system-view
[Sysname] ip route-static fast-reroute auto
```

# ip route-static primary-path-detect bfd echo

Use `ip route-static primary-path-detect bfd echo` to enable BFD echo packet mode for static route FRR.

Use `undo ip route-static primary-path-detect bfd` to disable BFD echo packet mode for static route FRR.

## Syntax

```
ip route-static primary-path-detect bfd echo
undo ip route-static primary-path-detect bfd
```

## Default

BFD echo packet mode for static route FRR is disabled.

## Views

System view

## Predefined user roles

network-admin

## Usage guidelines

This command enables static route FRR to use BFD echo packet mode for fast failure detection on the primary link.

## Examples

```
# Enable BFD echo packet mode for static route FRR.
<Sysname> system-view
[Sysname] ip route-static 1.1.1.1 32 vlan-interface 10 2.2.2.2 backup-interface
vlan-interface 11 backup-nexthop 3.3.3.3
[Sysname] ip route-static primary-path-detect bfd echo
```

# ip route-static-group

Use `ip route-static-group` to create a static route group and enter its view, or enter the view of an existing static route group.

Use `undo ip route-static-group` to delete a static route group.

### Syntax

```
ip route-static-group group-name  
undo ip route-static-group group-name
```

### Default

No static route groups exist.

### Views

System view

### Predefined user roles

network-admin

### Parameters

*group-name*: Specifies the static route group name, a case-sensitive string of 1 to 31 characters.

### Examples

```
# Create static route group test and enter its view.  
<Sysname> system-view  
[Sysname] ip route-static-group test  
[Sysname-route-static-group-test]
```

### Related commands

```
ip route-static  
prefix
```

## prefix

Use `prefix` to add a static route prefix to a static route group.

Use `undo prefix` to delete a static route prefix from a static route group.

### Syntax

```
prefix dest-address { mask-length | mask }  
undo prefix dest-address { mask-length | mask }
```

### Default

No static route prefix is added to a static route group.

### Views

Static route group view

### Predefined user roles

network-admin

### Parameters

*dest-address*: Specifies the destination IP address of the static route, in dotted decimal notation.

*mask-length*: Specifies the mask length, an integer in the range of 0 to 32.

*mask*: Specifies the subnet mask in dotted decimal notation.

## Usage guidelines

Execute this command repeatedly to add multiple static route prefixes to a static route group.

After you add static route prefixes to a static route group, you can specify that group in the **ip route-static group** command to configure static routes with the prefixes. To configure more static routes, you only need to add new static route prefixes to the group.

## Examples

# Add static route prefix 1.1.1.1/32 to static route group **test**.

```
<Sysname> system-view
```

```
[Sysname] ip route-static-group test
```

```
[Sysname-route-static-group-test] prefix 1.1.1.1 32
```

## Related commands

**ip route-static**

**ip route-static-group**