Configuring Static MPLS

This chapter contains information on how to configure static multiprotocol label switching (MPLS).

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Licensing Requirements

For a complete explanation of Cisco NX-OS licensing recommendations and how to obtain and apply licenses, see the *Cisco NX-OS Licensing Guide* and the *Cisco NX-OS Licensing Options Guide*.

About Static MPLS

Generally, label switching routers (LSRs) use a label distribution protocol to dynamically learn the labels that they should use to label-switch packets. Examples of such protocols include:

- Label Distribution Protocol (LDP), the Internet Engineering Task Force (IETF) standard that is used to bind labels to network addresses
- Resource Reservation Protocol (RSVP), which is used to distribute labels for traffic engineering (TE)
- Border Gateway Protocol (BGP), which is used to distribute labels for MPLS virtual private networks (VPNs)

To use a learned label to label-switch packets, an LSR installs the label into its Label Forwarding Information Base (LFIB).

The static MPLS feature enables you to statically configure the following:

- The binding between a label and an IPv4 or IPv6 prefix
- The action corresponding to the binding between a label and an IPv4 or IPv6 prefix (label swap or pop)
- The contents of an LFIB cross-connect entry

Label Swap and Pop

As a labeled packet traverses the MPLS domain, the outermost label of the label stack is examined at each hop. Depending on the contents of the label, a swap or pop (dispose) operation is performed on the label stack. Forwarding decisions are made by performing an MPLS table lookup for the label carried in the packet header. The packet header does not need to be reevaluated during packet transit through the network. Because the label has a fixed length and is unstructured, the MPLS forwarding table lookup process is both straightforward and fast.

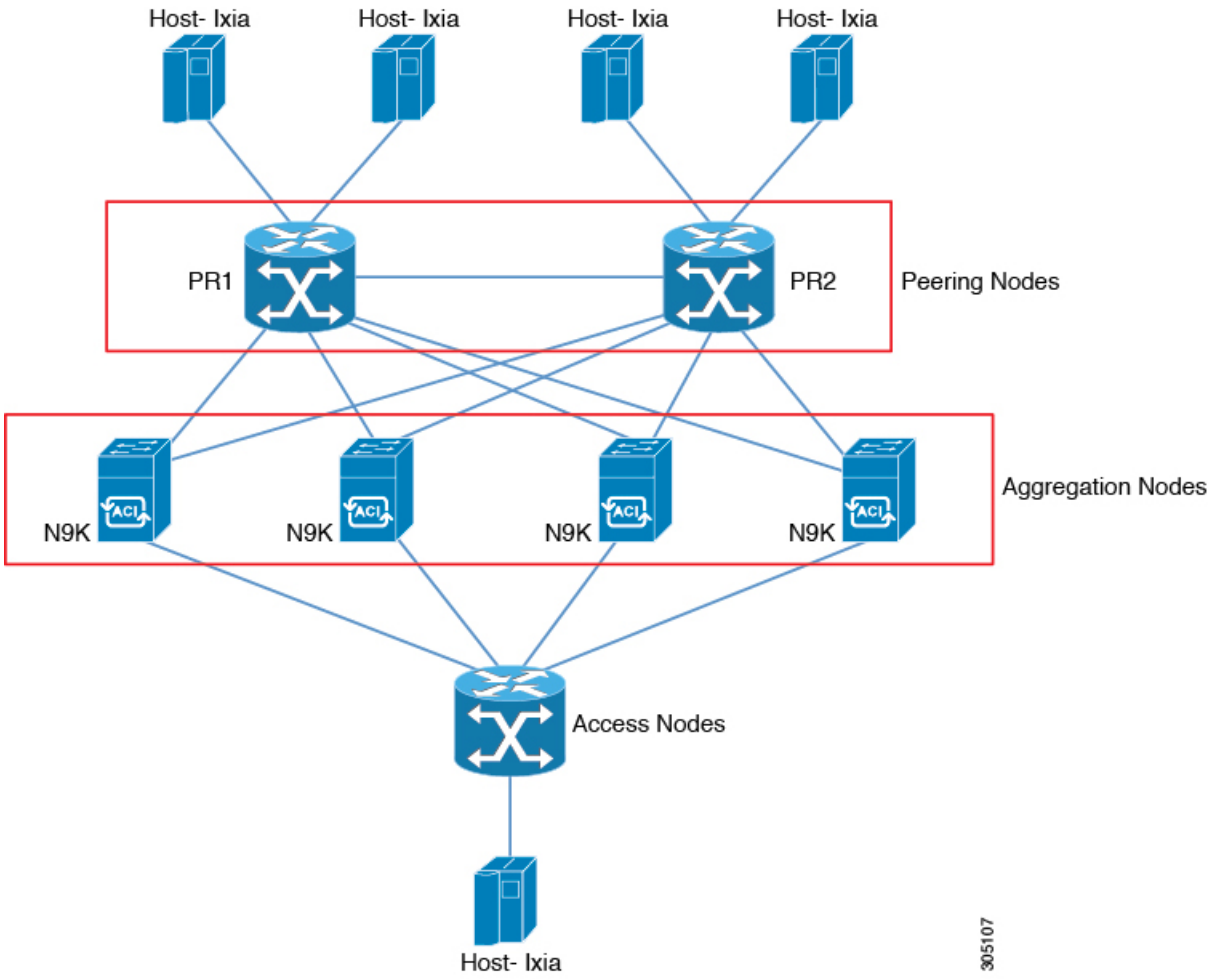
In a swap operation, the label is swapped with a new label, and the packet is forwarded to the next hop that is determined by the incoming label.

In a pop operation, the label is removed from the packet, which may reveal an inner label below. If the popped label was the last label on the label stack, the packet exits the MPLS domain. Typically, this process occurs at the egress LSR. A failure of the primary link in the aggregator reroutes the MPLS traffic to the backup link and results in a swap operation.

Static MPLS Topology

This diagram illustrates the static MPLS source routing topology. The access nodes perform the swap operation, and the aggregation nodes perform the pop operation for the primary path and the swap operation for the backup path.

Figure 1: Static MPLS Topology



Benefits of Static MPLS

- Static bindings between labels and IPv4 or IPv6 prefixes can be configured to support MPLS hop-by-hop forwarding through neighbor routers that do not implement LDP label distribution.
- Static cross-connects can be configured to support MPLS label switched path (LSP) midpoints when neighbor routers do not implement either LDP or RSVP label distribution but do implement an MPLS forwarding path.

High Availability for Static MPLS

Cisco Nexus 9500 Series switches support stateful switchovers (SSOs) for static MPLS. After an SSO, static MPLS returns to the state it was in previously.

Static MPLS supports zero traffic loss during SSO. MPLS static restarts are not supported.

Note The Cisco Nexus 9300 Series switches do not support SSO.

Prerequisites for Static MPLS

Static MPLS has the following prerequisites:

- For Cisco Nexus 9300 and 9500 Series switches and the Cisco Nexus 3164Q, 31128PQ, 3232C, and 3264Q switches, you must configure the ACL TCAM region size for MPLS, save the configuration, and reload the switch. (For more information, see the "Using Templates to Configure ACL TCAM Region Sizes" and "Configuring ACL TCAM Region Sizes" sections in the Cisco Nexus 9000 Series NX-OS Security Configuration Guide.) The Cisco Nexus 9200 Series switches do not require TCAM carving for static MPLS.

Note By default the mpls region size is zero. You need to configure this region to 256 in order to support static MPLS.

Guidelines and Limitations for Static MPLS

Static MPLS has the following guidelines and limitations:

- Static MPLS is supported on Cisco Nexus 3100, 3200, 9200, 9300, 9300-EX, FX, FX2 and 9500 switches with the 9400, 9500, 9600, and 9700-EX line cards.
- Beginning with Cisco NX-OS Release 9.3(3), static MPLS is supported on Cisco Nexus 9364C-GX, Cisco Nexus 9316D-GX, and Cisco Nexus 93600CD-GX switches.
- Static MPLS, MPLS segment routing, and MPLS stripping cannot be enabled at the same time.
- Equal-cost multipath (ECMP) is not supported with Label pop.
- Label pop and swap operations are supported, but label push operations are not.
- MPLS packets are forwarded as long as the ingress label matches the configured label and the configured FEC (prefix) is in the routing table.
- The device generally performs as a label switching router (LSR). If you install the explicit null label as the out-label in the label FIB (LFIB) by an LSR before the packet is passed to an adjacent LER, the device performs as a label edge router (LER) for penultimate hop popping. Meaning that a label switching router (LSR) functions with one or more labels.

Note If you intentionally use implicit-null CLI on LSR, the output packet going to the LER, it contains an explicit-null and the inner label.

- Static MPLS supports up to 128 labels.

- The backup path is supported only for a single adjacency and not for ECMP.
- Cisco Nexus 9300 Series switches support backup path Fast Reroute (FRR) subsecond convergence whereas Cisco Nexus 9500 Series switches support a limited backup path FRR convergence.
- The output for most of the MPLS commands can be generated in XML or JSON. See Verifying the Static MPLS Configuration, on page 10 for an example.
- VRFs, vPCs, FEX, and VXLAN are not supported with static MPLS.
- When sub-interfaces are used to connect to the remote vpnv4 neighbors, the parent interface needs to enable "mpls ip forwarding" command.
- Command "mpls ip forwarding" cannot be configured under a sub-interface.
- Subinterfaces are not supported for static MPLS.
- The Forwarding Equivalence Class (FEC) must match routes in the routing table.
- Static MPLS is enabled and cannot be disabled on the X9536PQ, X9564PX, and X9564TX line cards and the M12PQ generic expansion module (GEM).
- When you configure Fast Reroute (backup), you can specify only the connected next hop (and not the recursive next hop) as the next-hop prefix in the backup configuration.
- When multiple FECs are sharing the backup (the same next-hop and interface), any change to the backup configuration requires a reconfiguration of all the other FECs that are sharing the backup configuration.
- When the backup path is active, the **show mpls switching labels** command will not show the out label/out interface/next hop and related statistics. You can use the **show forwarding mpls label** *label* **stats platform** command to check the statistics.
- If traffic ingresses or egresses on a non-default unit (where the default unit is unit0), the corresponding ULIB statistics will not be displayed in the output of the **show mpls switching labels** *low-label-value* [*high-label-value*] **detail** command. You can use the **show forwarding mpls label** *label* **stats platform** command to check the statistics.
- If the backup and primary paths are pointing to the same interface, the backup action swap takes precedence.
- Physical (Ethernet) and port channels are supported only for backup.
- The following guidelines and limitations apply to Cisco Nexus 9200 Series switches:
  - ECMP hashing is supported only on inner fields.
  - MTU checks are not supported for packets with an MPLS header.

Configuring Static MPLS

Enabling Static MPLS

You must install and enable the MPLS feature set and then enable the MPLS static feature before you can configure MPLS static labels.

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	[**no**] **install feature-set mpls** **Example:** `switch(config)# install feature-set mpls`	Installs the MPLS feature set. The **no** form of this command uninstalls the MPLS feature set.
Step 3	[**no**] **feature-set mpls** **Example:** `switch(config)# feature-set mpls`	Enables the MPLS feature set. The **no** form of this command disables the MPLS feature set.
Step 4	[**no**] **feature mpls static** **Example:** `switch(config)# feature mpls static`	Enables the static MPLS feature. The **no** form of this command disables the static MPLS feature.

Step 5	(Optional) **show feature-set**
	Example:
	`switch(config)# show feature-set`
	`Feature Set Name ID State`
	
	`-------------------- -------- --------`
	`mpls 4 enabled`
		Displays the status of the MPLS feature set.

Step 6	(Optional) **show feature | inc mpls_static**
	Example:
	`switch(config)# show feature | inc mpls_static`
	`mpls_static 1 enabled`
		Displays the status of static MPLS.

Reserving Labels for Static Assignment

You can reserve the labels that are to be statically assigned so that they are not dynamically assigned.

Before you begin

Ensure that the static MPLS feature is enabled.

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	[**no**] **mpls label range** *min-value max-value* [**static** *min-static-value max-static-value*] **Example:** `switch(config)# mpls label range 17 99 static 100 10000`	Reserves a range of labels for static label assignment. The range for the minimum and maximum values is from 16 to 471804.
Step 3	(Optional) **show mpls label range** **Example:** `switch(config)# show mpls label range`	Displays the label range that is configured for static MPLS.
Step 4	(Optional) **copy running-config startup-config** **Example:** `switch(config)# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Configuring Static Label and Prefix Binding Using the Swap and Pop Operations

In a top-of-rack configuration, the outer label is swapped to the specified new label. The packet is forwarded to the next-hop address, which is auto-resolved by the new label.

In an aggregator configuration, the outer label is popped, and the packet with the remaining label is forwarded to the next-hop address. Pop operations are performed in the primary path, and swap operations are performed in the backup path.

Before you begin

Ensure that the static MPLS feature is enabled.

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	**interface** *type slot/port* **Example:**	Enters the interface configuration mode for the specified interface.

	Command or Action	Purpose
	`switch(config)# interface ethernet 2/2` `switch(config-if)#`	
Step 3	[**no**] **mpls ip forwarding** **Example:** `switch(config-if)# mpls ip forwarding`	Enables MPLS on the specified interface. The **no** form of this command disables MPLS on the specified interface.

Step 4	**mpls static configuration**
	Example:
	`switch(config-if)# mpls static configuration`
	`switch(config-mpls-static)#`
		Enters MPLS static global configuration mode.

Step 5	**address-family** {**ipv4** | **ipv6**} **unicast**
	Example:
	`switch(config-mpls-static)# address-family ipv4 unicast`
	`switch(config-mpls-static-af)#`
		Enters global address family configuration mode for the specified IPv4 or IPv6 address family.

Step 6	**local-label** *local-label-value* **prefix** *destination-prefix destination-prefix-mask*
	Example:
	`switch(config-mpls-static-af)# local-label 2000 prefix 1.255.200.0 255.255.255.25`
	`switch(config-mpls-static-af-lbl)#`
		Specifies static binding of incoming labels to IPv4 or IPv6 prefixes. The *local-label-value* is the range of the static MPLS label defined in the **mpls label range** command.

Step 7	**next-hop** {**auto-resolve** | *destination-ip-next-hop* **out-label implicit-null** | **backup** *local-egress-interface destination-ip-next-hop* **out-label** *output-label-value*} **Example:** `switch(config-mpls-static-af-lbl)# next-hop auto-resolve`	Specifies the next hop. These options are available: • **next-hop auto-resolve**—Use this option for label swap operations. • **next-hop** *destination-ip-next-hop* **out-label implicit-null**—Use this option for the primary path in label pop operations. • **next-hop backup** *local-egress-interface destination-ip-next-hop* **out-label** *output-label-value*—Use this option for the backup path in label pop operations.
Step 8	(Optional) **copy running-config startup-config** **Example:** `switch(config-mpls-static-af-lbl)# copy running-config startup-config`	Copies the running configuration to the startup configuration.

Configuring Segment Routing Adjacency Statistics

By default, the statistics collection mode accumulates the number of packets that egress out of a given adjacency. Beginning Cisco NX-OS Release 9.3(1), you can configure the statistics collection mode to accumulate the number of bytes for an adjacency.

This mode is available when you enable the MPLS segment routing feature, however you must configure the collection mode to accumulate bytes.

Procedure

	Command or Action	Purpose

Step 1	**configure terminal**
	Example:
	`switch# configure terminal`
	`switch(config)#`
		Enters global configuration mode.

Step 2	[**no**] **install feature-set mpls** **Example:** `switch(config)# install feature-set mpls`	Installs the MPLS feature set. The **no** form of this command uninstalls the MPLS feature set.
Step 3	[**no**] **feature-set mpls** **Example:** `switch(config)# feature-set mpls`	Enables the MPLS feature set. The **no** form of this command disables the MPLS feature set.
Step 4	[**no**] **feature mpls segment-routing** **Example:** `switch(config)# feature mpls segment-routing`	Enables the MPLS segment routing feature. The **no** form of this command disables the MPLS segment routing feature.
Step 5	[**no**] **hardware profile mpls adjacency-stats bytes** **Example:** `switch(config)# hardware profile mpls adjacency-stats bytes`	Configures the statistics collection mode for the output statistics to accumulate the count of bytes for a given adjacency. The **no** form of this command resets the collection mode to accumulate the packet count.

Step 6	(Optional) **show running-config | grep adjacency stats**
	Example:
	`witch(config)# show running-config | grep adjacency-stats`
	`hardware profile mpls adjacency-stats bytes`
	`switch(config)#`
		Displays the knob configuration.

Step 7	(Optional) **show feature-set**
	Example:
	`switch(config)# show feature-set`
	`Feature Set Name ID State`
		Displays the status of the MPLS feature set.

	Command or Action	Purpose
	`--------------------  --------  --------` `mpls                  4         enabled`	

Step 8	(Optional) **show feature | grep segment-routing**
	Example:
	`switch(config)# show feature | grep segment-routing`
	`segment-routing        1        enabled`
		Displays the status of MPLS segment routing.

Step 9	**show forwarding mpls** [**label** *label*] **stats**
	Example:
	`switch(config)# show forwarding mpls label 22 stats`
	
	`slot 1`
	`=======`
	
	`------+-------+------------+----------+--------+-----`
	`Local  |Prefix  |FEC  |Next-Hop  |Interface  |Out`
	`Label  |Table Id  |(Prefix/Tunnel id)  |  |  |Label`
	`------+-------+------------+----------+--------+-----`
	`22  |0x1  |182.1.1.7/32  |30.1.8.1  |Po11  |0  SWAP`
	
	`Input Pkts : 488482 Input Bytes : 250102784`
	`SWAP Output Pkts: 0 SWAP Output Bytes: 84215808`
	`TUNNEL Output Pkts: 0 TUNNEL Output Bytes: 0`
	`switch(config)#`
		Displays the adjacency statistics.

Verifying the Static MPLS Configuration

To display the static MPLS configuration, perform one of the following tasks:

Command	Purpose
show feature | inc mpls_static	Displays the status of static MPLS.
show feature-set	Displays the status of the MPLS feature set.
show ip route	Displays routes from the unicast Routing Information Base (RIB).
show mpls label range	Displays the label range that is configured for static MPLS.

Command	Purpose
show mpls static binding {**all** | **ipv4** | **ipv6**}	Displays the configured static prefix or label bindings.
show mpls switching [**detail**]	Displays MPLS switching information.
show mpls switching label [**detail**]	Displays the MPLS switching label information.
show forwarding mpls [**label** *label*] **stats**	Displays the adjacency statistics based on the label enabled.
show forwarding adjacency mpls stats	Displays the adjacency statistics

This example shows sample output for the **show mpls static binding all** command:

```
1.255.200.0/32: (vrf: default) Incoming label: 2000
  Outgoing labels:
      1.21.1.1 implicit-null
      backup 1.24.1.1 2001

2000:1:255:201::1/128: (vrf: default) Incoming label: 3000
  Outgoing labels:
      2000:1111:2121:1111:1111:1111:1111:1 implicit-null
      backup 2000:1:24:1::1 3001
```

This example shows sample output for the **show mpls switching detail** command:

```
VRF default

IPv4 FEC
 In-Label                      : 2000
 Out-Label stack               : Pop Label
 FEC                           : 1.255.200.0/32
 Out interface                 : Po21
 Next hop                      : 1.21.1.1
 Input traffic statistics      : 0 packets, 0 bytes
 Output statistics per label   : 0 packets, 0 bytes
IPv6 FEC
 In-Label                      : 3000
 Out-Label stack               : Pop Label
 FEC                           : 2000:1:255:201::1/128
 Out interface                 : port-channel21
 Next hop                      : 2000:1111:2121:1111:1111:1111:1111:1
 Input traffic statistics      : 0 packets, 0 bytes
 Output statistics per label   : 0 packets, 0 bytes
```

This example shows normal, XML, and JSON sample output for the **show mpls switching** command when the switch is configured with a static IPv4 prefix:

```
switch# show run mpls static | sec 'ipv4 unicast'
address-family ipv4 unicast
local-label 100 prefix 192.168.0.1 255.255.255.255 next-hop auto-resolve out-label 200

switch# show mpls switching
Legend:
(P)=Protected, (F)=FRR active, (*)=more labels in stack.
IPV4:
In-Label   Out-Label  FEC name           Out-Interface      Next-Hop

VRF default
100        200        192.168.0.1/32     Eth1/23            1.12.23.2
```

```
switch# show mpls switching | xml
<?xml version="1.0" encoding="ISO-8859-1"?> <nf:rpc-reply
xmlns:nf="urn:ietf:params:xml:ns:netconf:base:1.0"
xmlns="http://w
ww.cisco.com/nxos:1.0:ulib">
 <nf:data>
  <show>
   <mpls>
    <switching>
     <__XML__OPT_Cmd_ulib_show_switching_cmd_labels>
      <__XML__OPT_Cmd_ulib_show_switching_cmd_detail>
       <__XML__OPT_Cmd_ulib_show_switching_cmd_vrf>
        <__XML__OPT_Cmd_ulib_show_switching_cmd___readonly__>
         <__readonly__>
          <TABLE_vrf>
           <ROW_vrf>
            <vrf_name>default</vrf_name>
            <TABLE_inlabel>
             <ROW_inlabel>
              <in_label>100</in_label>
              <out_label_stack>200</out_label_stack>
              <ipv4_prefix>192.168.0.1/32</ipv4_prefix>
              <out_interface>Eth1/23</out_interface>
              <ipv4_next_hop>1.12.23.2</ipv4_next_hop>
              <nhlfe_p2p_flag> </nhlfe_p2p_flag>
             </ROW_inlabel>
            </TABLE_inlabel>
           </ROW_vrf>
          </TABLE_vrf>
         </__readonly__>
        </__XML__OPT_Cmd_ulib_show_switching_cmd___readonly__>
       </__XML__OPT_Cmd_ulib_show_switching_cmd_vrf>
      </__XML__OPT_Cmd_ulib_show_switching_cmd_detail>
     </__XML__OPT_Cmd_ulib_show_switching_cmd_labels>
    </switching>
   </mpls>
  </show>
 </nf:data>
</nf:rpc-reply>
]]>]]>


switch# show mpls switching | json
{"TABLE_vrf": {"ROW_vrf": {"vrf_name": "default", "TABLE_inlabel":
{"ROW_inlabel
": {"in_label": "100", "out_label_stack": "200", "ipv4_prefix":
"192.168.0.1/32"
, "out_interface": "Eth1/23", "ipv4_next_hop": "1.12.23.2",
"nhlfe_p2p_flag": nu
ll}}}}}
```

Displaying Static MPLS Statistics

To monitor static MPLS statistics, perform one of the following tasks:

Command	Purpose
show forwarding [**ipv6**] **adjacency mpls stats**	Displays MPLS IPv4 or IPv6 adjacency statistics.
show forwarding mpls drop-stats	Displays the MPLS forwarding packet drop statistics.
show forwarding mpls ecmp [**module** *slot* | **platform**]	Displays the MPLS forwarding statistics for equal-cost multipath (ECMP).
show forwarding mpls label *label* **stats** [**platform**]	Displays MPLS label forwarding statistics.
show mpls forwarding statistics [**interface** *type slot/port*]	Displays MPLS forwarding statistics.
show mpls switching labels *low-label-value* [*high-label-value*] [**detail**]	Displays the MPLS label switching statistics. The range for the label value is from 0 to 524286.

This example shows sample output for the **show forwarding adjacency mpls stats** command:

```
FEC             next-hop   interface  tx packets  tx bytes  Label info
--------------- ---------- ---------- ----------- --------- ----------
1.255.200.0/32  1.21.1.1   Po21       87388       10836236  POP 3
1.255.200.0/32  1.24.1.1   Po24       0           0         SWAP 2001
switch(config)#
switch(config)# show forwarding mpls drop-stats

Dropped packets : 73454
Dropped bytes : 9399304
```

This example shows sample output for the **show forwarding ipv6 adjacency mpls stats** command:

```
FEC                    next-hop        interface  tx packets  tx bytes  Label info
---------------------- --------------  ---------- ----------- --------- -----------
2000:1:255:201::1/128  2000:1.21.1.1   Po21       46604       5778896   POP 3
2000:1:255:201::1/128  2000:1:24:1::1  Po24       0           0         SWAP 3001
```

This example shows sample output for the **show forwarding mpls label 2000 stats** command:

```
--------+-----------+------------------+----------------+-------------+-------
Local   |Prefix     |FEC               |Next-Hop        |Interface    |Out
Label   |Table Id   |(Prefix/Tunnel id) |                |             |Label
--------+-----------+------------------+----------------+-------------+-------
2000    |0x1        |1.255.200.0/32     |1.21.1.1        |Po21         |Pop Label
 HH: 100008, Refcount: 1
Input Pkts : 77129               Input Bytes : 9872512
Output Pkts: 77223               Output Bytes: 9575652
```

This example shows sample output for the **show mpls forwarding statistics** command:

```
MPLS software forwarding stats summary:
    Packets/Bytes sent           : 0/0
    Packets/Bytes received       : 0/0
    Packets/Bytes forwarded      : 0/0
    Packets/Bytes originated     : 0/0
    Packets/Bytes consumed       : 0/0
    Packets/Bytes input dropped  : 0/0
    Packets/Bytes output dropped : 0/0
```

Clearing Static MPLS Statistics

To clear the static MPLS statistics, perform these tasks:

Command	Purpose
clear forwarding [**ipv6**] **adjacency mpls stats**	Clears the MPLS IPv4 or IPv6 adjacency statistics.
clear forwarding mpls drop-stats	Clears the MPLS forwarding packet drop statistics.
clear forwarding mpls stats	Clears the ingress MPLS forwarding statistics.
clear mpls forwarding statistics	Clears the MPLS forwarding statistics.
clear mpls switching label statistics [**interface** *type slot/port*]	Clears the MPLS switching label statistics.

Configuration Examples for Static MPLS

This example shows how to reserve labels for static assignment:

```
switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# mpls label range 17 99 static 100 10000
switch(config)# show mpls label range
Downstream Generic label region: Min/Max label: 17/99
Range for static labels: Min/Max Number: 100/10000
```

This example shows how to configure MPLS static label and IPv4 prefix binding in a top-of-rack configuration (swap configuration):

```
switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# interface ethernet 1/1
switch(config-if)# mpls ip forwarding
switch(config-if)# mpls static configuration
switch(config-mpls-static)# address-family ipv4 unicast
switch(config-mpls-static-af)# local-label 2000 prefix 1.255.200.0/32
switch(config-mpls-static-af-lbl)# next-hop auto-resolve out-label 2000
```

This example shows how to configure MPLS static label and IPv6 prefix binding in a top-of-rack configuration (swap configuration):

```
switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# interface ethernet 1/1
switch(config-if)# mpls ip forwarding
switch(config-if)# mpls static configuration
switch(config-mpls-static)# address-family ipv6 unicast
switch(config-mpls-static-af)# local-label 3001 prefix 2000:1:255:201::1/128
switch(config-mpls-static-af-lbl)# next-hop auto-resolve out-label 3001
```

This example shows how to configure MPLS static label and IPv4 prefix binding in an aggregator configuration (pop configuration):

```
switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# interface ethernet 1/1
switch(config-if)# mpls ip forwarding
switch(config-if)# mpls static configuration
switch(config-mpls-static)# address-family ipv4 unicast
switch(config-mpls-static-af)# local-label 2000 prefix 1.255.200.0/32
switch(config-mpls-static-af-lbl)# next-hop 1.31.1.1 out-label implicit-null
switch(config-mpls-static-af-lbl)# next-hop backup Po34 1.34.1.1 out-label 2000
```

This example shows how to configure MPLS static label and IPv6 prefix binding in an aggregator configuration (pop configuration):

```
switch# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
switch(config)# interface ethernet 1/1
switch(config-if)# mpls ip forwarding
switch(config-if)# mpls static configuration
switch(config-mpls-static)# address-family ipv6 unicast
switch(config-mpls-static-af)# local-label 3001 prefix 2000:1:255:201::1/128
switch(config-mpls-static-af-lbl)# next-hop 2000:1:31:1::1 out-label implicit-null
switch(config-mpls-static-af-lbl)# next-hop backup Po34 2000:1:34:1::1 out-label 3001
```

Additional References

Related Documents

Related Topic	Document Title
MPLS TCAM regions	See the *Using Templates to Configure ACL TCAM Region Sizes* section in the Cisco Nexus 9000 Series NX-OS Security Configuration Guide.