



MPLS OAM Commands

This module describes Multiprotocol Label Switching (MPLS) label switched path (LSP) verification commands. These commands provide a means to detect and diagnose data plane failures and are the first set of commands in the MPLS Operations, Administration, and Maintenance (OAM) solution.

For detailed information about MPLS concepts, configuration tasks, and examples, see .

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clear mpls oam counters

To clear MPLS OAM counters, use the **clear mpls oam counters** command in XR EXEC mode.

clear mpls oam counters {**global** | **interface** [{*type* *interface-path-id*}] | **packet**}

Syntax Description

global	Clears global counters.
interface	Clears counters on a specified interface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.
packet	Clears global packet counters.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
mpls-ldp	execute
mpls-static	execute

Examples

The following example shows how to clear all global MPLS OAM counters:

```
RP/0/RP0/CPU0:router# clear mpls oam counters global
```

echo disable-vendor-extension

To disable sending the vendor extension type length and value (TLV) in the echo request, use the **echo disable-vendor extension** command in MPLS OAM configuration mode. To return to the default behavior, use the **no** form of this command.

```
echo disable-vendor-extension
no echo disable-vendor-extension
```

Syntax Description This command has no arguments or keywords.

Command Default The default value is 4.

Command Modes MPLS OAM configuration mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	mpls-ldp	read, write
	mpls-static	read, write

Examples

The following example shows how to disable inclusion of the vendor extensions TLV in the echo requests:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router(config)# mpls oam
RP/0/RP0/CPU0:router(config-oam)# echo disable-vendor-extension
```

mpls oam

To enable MPLS OAM LSP verification, use the **mpls oam** command in XR Config mode. To return to the default behavior, use the **no** form of this command.

mpls oam
no mpls oam

Syntax Description This command has no arguments or keywords.

Command Default By default, MPLS OAM functionality is disabled.

Command Modes XR Config mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The **mpls oam** command and OAM functionality is described in the RFC 4379.

Task ID	Task ID	Operations
	mpls-ldp	read, write
	mpls-static	read, write

Examples

The following example shows how to enable MPLS OAM:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# mpls oam
RP/0/RP0/CPU0:router (config-oam)#
```

ping mpls ipv4

To check MPLS host reachability and network connectivity by specifying the destination type as a Label Distribution Protocol (LDP) IPv4 address, use the **ping mpls ipv4** command in XR EXEC mode.

```
ping mpls ipv4 address/mask [destination start-address end-address increment] [dsmap] [exp exp-bits]
[force-explicit-null] [interval min-send-delay] [output interface type interface-path-id [nexthop
nexthop-address]][pad pattern][repeat count] [reply {dscp dscp-value | reply mode{ipv4 | no-reply
| router-alert} | reply pad-tlv}] [size packet-size] [source source-address] [sweep min value max
value increment] [timeout timeout] [ttl value] [verbose] [fec-type {bgp | generic | ldp}]
```

Syntax Description

<i>address/mask</i>	Address prefix of the target and number of bits in the target address network mask.
destination <i>start address end address address increment</i>	(Optional) Specifies a network 127/8 address to be used as the destination address in the echo request packet. <i>start address</i> Start of the network address. <i>end address</i> Start of the ending network address. <i>address increment</i> Incremental value of the network address, which is expressed as a decimal number value or IP address.
dsmap	(Optional) Indicates that a downstream mapping (DSMAP) type length and value should be included in the LSP echo request.
exp <i>exp-bits</i>	(Optional) Specifies the MPLS experimental field value in the MPLS header for echo replies. Range is 0 to 7. Default is 0.
force-explicit-null	(Optional) Forces an unsolicited explicit null label to be added to the MPLS label stack and allows LSP ping to be used to detect LSP breakages at the penultimate hop.
interval <i>min-send-delay</i>	(Optional) Specifies a send interval, in milliseconds, between requests. Range is 0 to 3600000. Default is 0.
output interface	(Optional) Specifies the output interface where echo request packets are sent.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.

<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
nexthop	(Optional) Specifies the nextop as an IP address.
<i>nexthop-iaddress</i>	(Optional) IP address for the next hop.
pad pattern	(Optional) Specifies the pad pattern for an echo request.
repeat count	(Optional) Specifies the number of times to resend a packet. Range is 1 to 2147483647. Default is 5.
reply dscp dscp-value	Specifies the differentiated service codepoint value for an MPLS echo reply.
reply mode [ipv4 router-alert no-reply]	Specifies the reply mode for the echo request packet. no-reply Do not reply ipv4 Reply with an IPv4 UDP packet (this is the default) router-alert Reply with an IPv4 UDP packet with the IP router alert set
reply pad-tlv	Indicates that a pad TLV should be included.
size packet size	(Optional) Specifies the packet size or number of bytes in each MPLS echo request packet. Range is 100 to 17986. Default is 100.
source source-address	(Optional) Specifies the source address used in the echo request packet.

sweep <i>min value max value interval</i>	(Optional) Specifies a range of sizes for the echo packets sent. min value Minimum or start size for an echo packet (range is 100 to 17986) max value Maximum or end size for an echo packet (range is 100 to 17986) interval Number used to increment an echo packet size (range is 1 to 8993)
timeout <i>timeout</i>	(Optional) Specifies the timeout interval, in seconds. Range is 0 to 3600. Default is 2.
ttl <i>value</i>	(Optional) Specifies the TTL value to be used in the MPLS labels (range is 1 to 255).
verbose	(Optional) Enables verbose output information, including MPLS echo reply, sender address of the packet, and return codes.
fec-type	(Optional) Specifies FEC type to be used. generic Use FEC type as generic ldp Use FEC type as LDP

Command Default

exp *exp bits*: 0
interval *min-send-delay*: 0
repeat *count* : 5
reply-mode: IPv4
timeout *timeout* : 2

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

The **output interface** keyword specifies the output interface on which the MPLS echo request packets are sent. If the specified output interface is not part of the LSP, the packets are not transmitted.

In cases where the sweep keyword is used, values larger than the outgoing interface's MTU are not transmitted.

The **ping** command sends an echo request packet to an address, and then awaits a reply. Ping output can help you evaluate path-to-host reliability, delays over the path, and whether the host can be reached or is functioning.



Note The **ping mpls** command is not supported on optical LSPs. If an optical LSP is encountered along the LSP's path, it is treated as a physical interface.

Task ID

Task ID Operations

```
mpls-ldp read,
write
```

Examples

The following example shows the destination type as a label distribution protocol (LDP) prefix and specifies a range of sizes for the echo packets sent:

```
RP/0/RP0/CPU0:router# ping mpls ipv4 7.7.7.7/32 verbose sweep 100 200 15 repeat 1
```

```
  Sending 1, [100..200]-byte MPLS Echos to 7.7.7.7/32,
    timeout is 2 seconds, send interval is 0 msec:
```

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

Type escape sequence to abort.

```
!      size 100, reply addr 178.0.0.1, return code 3
!      size 115, reply addr 178.0.0.1, return code 3
!      size 130, reply addr 178.0.0.1, return code 3
!      size 145, reply addr 178.0.0.1, return code 3
!      size 160, reply addr 178.0.0.1, return code 3
!      size 175, reply addr 178.0.0.1, return code 3
!      size 190, reply addr 178.0.0.1, return code 3
```

Success rate is 100 percent (7/7), round-trip min/avg/max = 2/2/4 ms

The following example shows the destination type as a label distribution protocol (LDP) prefix and specifies FEC type as generic and verbose option:

```
RP/0/RP0/CPU0:router# ping mpls ipv4 7.7.7.7/32 fec-type generic output interface TenGigE
0/0/0/11 nexthop 79.1.0.2 verbose
```

```
  Sending 5, 100-byte MPLS Echos to 7.7.7.7/32,
    timeout is 2 seconds, send interval is 0 msec:
```

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


'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.

```
!      size 100, reply addr 178.0.0.1, return code 3
!      size 100, reply addr 178.0.0.1, return code 3
!      size 100, reply addr 178.0.0.1, return code 3
!      size 100, reply addr 178.0.0.1, return code 3
!      size 100, reply addr 178.0.0.1, return code 3
```

Success rate is 100 percent (5/5), round-trip min/avg/max = 2/2/3 ms

show mpls oam

To display MPLS OAM information, use the **show mpls oam** command in XR EXEC mode.

show mpls oam {**client** | **counters** {**global** | **packet**} | **interface** *type interface-path-id*}

Syntax Description

client	Displays clients registered with LSPV server.
counters global	Displays LSP verification global counters.
counters packet	Displays LSP verification packet counters.
interface	Displays LSP verification information for a specific interface.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface.
Note	Use the show interfaces command to see a list of all interfaces currently configured on the router.
	For more information about the syntax for the router, use the question mark (?) online help function.

Command Default

No default behavior or values

Command Modes

XR EXEC mode

Command History

Release	Modification
Release 6.0	This command was introduced.

Usage Guidelines

No specific guidelines impact the use of this command.

Task ID

Task ID	Operations
mpls-ldp	read
mpls-static	read

Examples

The following example shows how to display MPLS OAM client information:

```
RP/0/RP0/CPU0:router# show mpls oam client
```

```
Client Process: l2vpn_mgr Node: 0/RP0/CPU0 Pid: 7200 Service: 3
Client Process: mpls_ldp Node: 0/RP0/CPU0 Pid: 7201 Service: 2
Client Process: bgp Node: 0/RP0/CPU0 Pid: 7488 Service: 5
```

This table describes the significant fields shown in the display.

Table 1: show mpls oam client Command Field Descriptions

Field	Description
Client Process	Process of client.

show mpls oam database

To display MPLS OAM database information, use the **show mpls oam database** command in XR EXEC mode.

show mpls oam database { **requests** | **tt-requests** } [**detail**] [**handle** *handle-value*]

Syntax Description	
requests	Displays request database
tt-requests	Displays tree trace request database
detail	(Optional) Displays displayed information.
handle	(Optional) Displays handle information.
<i>handle-value</i>	Generic handle value. Range is from 0 to 4294967295.

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines No specific guidelines impact the use of this command.

Task ID	Task ID	Operations
	mpls-ldp	read
	mpls-static	read

Examples

The following example shows how to display detailed MPLS OAM database information:

```
RP/0/RP0/CPU0:router# show mpls oam database request detail
```

traceroute mpls ipv4

To learn the routes that packets follow when traveling to their Label Distribution Protocol (LDP) IPv4 destination, use the **traceroute mpls** command in XR EXEC mode.

```
traceroute mpls ipv4address/mask [destination start-address end-address address-increment] [exp
exp-bits] [flags fec] [force-explicit-null] [output {interface type interface-path-id [nexthop
nexthop-address] | [nexthop nexthop-address}}] [reply {dscp dscp-value | reply mode {ipv4 |
router-alert}}] [source source-address] [timeout timeout] [ttl value] [verbose] [fec-type {bgp |
generic | ldp}]
```

Syntax Description	
<i>address/mask</i>	Specifies the destination type as a label distribution protocol (LDP) prefix. Address prefix of the target and number of bits in the target address network mask.
destination start-address end-address address-increment	Specifies a network 127 address to be used as the destination address in the echo request packet. start address Start of the network address. end address End of the network address. address increment Incremental value of the network address.
exp exp-bits	(Optional) Specifies the MPLS experimental field value in the MPLS header for echo replies. Range is 0 to 7. Default is 0.
flags fec	(Optional) Specifies that forwarding equivalent class (FEC) stack checking is to be performed at transit routers.
force-explicit-null	(Optional) Forces an unsolicited explicit null label to be added to the MPLS label stack and allows LSP ping to be used to detect LSP breakages at the penultimate hop.
output interface	(Optional) Specifies the output interface in which echo request packets are sent.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.
<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
nexthop	(Optional) Specifies the IP address for the next hop.

<i>nexthop-address</i>	(Optional) IP address for the next hop.
reply dscp <i>dscp-value</i>	(Optional) Specifies the differentiated service codepoint value for an MPLS echo reply.
reply mode { ipv4 router-alert }	(Optional) Specifies the reply mode for the echo request packet. ipv4 Reply with IPv4 UDP packet (this is the default) router-alert Reply with IPv4 UDP packet with router alert
source <i>source-address</i>	(Optional) Specifies the source address used in the echo request packet.
timeout <i>timeoutt</i>	(Optional) Specifies the timeout interval, in seconds. Range is from 0 to 3600. Default is 2.
ttl <i>value</i>	(Optional) Specifies the maximum number of hops (range is 1 to 255).
verbose	(Optional) Enables verbose output information, including MPLS echo reply, sender address of the packet, and return codes.
fec-type	(Optional) Specifies FEC type to be used. bgp Use FEC type as BGP generic Use FEC type as generic ldp Use FEC type as LDP

Command Default
exp *exp-bits*: 0
reply mode: IPv4
timeout *timeout*: 2

Command Modes
 XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines



Note The **traceroute mpls** command is not supported on optical LSPs. If an optical LSP is encountered along the LSPs path, it is treated as a physical interface.

For detailed configuration information about MPLS LSP trace operations, see *System Monitoring Configuration Guide*.

Task ID	Task ID Operations
	mpls-ldp read, write

Examples

The following example shows how to trace a destination:

```
RP/0/RP0/CPU0:router# traceroute mpls ipv4 7.7.7.7/32 destination 127.0.0.10 127.0.0.15 1
```

```
Tracing MPLS Label Switched Path to 7.7.7.7/32, timeout is 2 seconds
```

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

```
Type escape sequence to abort.
```

```
Destination address 127.0.0.10
 0 79.4.0.1 MRU 1500 [Labels: 24008 Exp: 0]
L 1 79.4.0.2 MRU 1500 [Labels: implicit-null Exp: 0] 5 ms
! 2 178.0.0.1 4 ms
```

```
Destination address 127.0.0.11
 0 79.5.0.1 MRU 1500 [Labels: 24008 Exp: 0]
L 1 79.5.0.2 MRU 1500 [Labels: implicit-null Exp: 0] 3 ms
! 2 178.0.0.1 2 ms
```

```
Destination address 127.0.0.12
 0 79.1.0.1 MRU 1500 [Labels: 24008 Exp: 0]
L 1 79.1.0.2 MRU 1500 [Labels: implicit-null Exp: 0] 3 ms
! 2 178.0.0.1 2 ms
```

```
Destination address 127.0.0.13
 0 79.2.0.1 MRU 1500 [Labels: 24008 Exp: 0]
L 1 79.2.0.2 MRU 1500 [Labels: implicit-null Exp: 0] 3 ms
! 2 178.0.0.1 2 ms
```

```
Destination address 127.0.0.14
 0 79.4.0.1 MRU 1500 [Labels: 24008 Exp: 0]
L 1 79.4.0.2 MRU 1500 [Labels: implicit-null Exp: 0] 3 ms
! 2 178.0.0.1 2 ms
```

```
Destination address 127.0.0.15
 0 79.5.0.1 MRU 1500 [Labels: 24008 Exp: 0]
L 1 79.5.0.2 MRU 1500 [Labels: implicit-null Exp: 0] 3 ms
! 2 178.0.0.1 3 ms
```

The following example shows how to trace a destination with FEC type specified as generic and verbose option:

```
RP/0/RP0/CPU0:router# router#traceroute mpls ipv4 7.7.7.7/32 fec-type generic output interface TenGigE 0/0/0/11.1 nexthop 79.1.0.2 verbose
```

```
Tracing MPLS Label Switched Path to 7.7.7.7/32, timeout is 2 seconds
```

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

```
Type escape sequence to abort.
```

```
0 79.1.0.1 79.1.0.2 MRU 1500 [Labels: 24008 Exp: 0]  
L 1 79.1.0.2 178.0.0.1 MRU 1500 [Labels: implicit-null Exp: 0] 4 ms, ret code 8  
! 2 178.0.0.1 3 ms, ret code 3
```


traceroute mpls multipath

To discover all possible paths of an LSP between the ingress and egress routers, use the **traceroute mpls multipath** command in XR EXEC mode.

```
traceroute mpls multipath ipv4 address/mask [destination start-address/end-address ] [exp exp-bits]
[flags fec] [force-explicit-null] [hashkey ipv4 bitmap bit-size] [interval min-send-delay] [output
{interface type interface-path-id [nexthop nexthop-address] | [nexthop nexthop-address]}] [reply
{dscp dscp-value | reply mode{ipv4 | router-alert}}] [retry-count count] [source source-address]
[timeout timeout] [ttl value] [verbose] [fec-type {bgp | generic | ldp}]
```

Syntax Description	
ipv4	Specifies the destination type as a Label Distribution Protocol (LDP) IPv4 address.
<i>address/mask</i>	Address prefix of the target and number of bits in the target address network mask.
destination <i>start-address</i> <i>end-address</i>	(Optional) Specifies a network 127 address to be used as the destination address in the echo request packet. <i>start-address</i> Start of the network address. <i>end-address</i> End of the network address.
exp <i>exp-bits</i>	(Optional) Specifies the MPLS experimental field value in the MPLS header for echo replies. Range is 0 to 7. Default is 0.
flags fec	(Optional) Specifies that forwarding equivalent class (FEC) stack checking is to be performed at transit routers.
force-explicit-null	(Optional) Forces an unsolicited explicit null label to be added to the MPLS label stack and allows LSP ping to be used to detect LSP breakages at the penultimate hop.
hashkey ipv4 bitmap <i>bit-size</i>	(Optional) Allows user control of the hash key/multipath settings. Range is 0 to 256. The default is 32.
interval <i>min-send-delay</i>	(Optional) Specifies a send interval, in milliseconds, between requests. Range is 0 to 3600000. Default is 0.
output interface	(Optional) Specifies the output interface where echo request packets are sent.
<i>type</i>	Interface type. For more information, use the question mark (?) online help function.

<i>interface-path-id</i>	Physical interface or virtual interface. Note Use the show interfaces command to see a list of all interfaces currently configured on the router. For more information, use the question mark (?) online help function.
nexthop	(Optional) Specifies the IP address for the next hop.
<i>nexthop-address</i>	(Optional) IP address for the next hop.
reply dscp <i>dscp-value</i>	(Optional) Specifies the differentiated service codepoint value for an MPLS echo reply.
reply mode [ipv4 router-alert]	(Optional) Specifies the reply mode for the echo request packet. ipv4 Reply with IPv4 UDP packet (this is the default) router-alert Reply with IPv4 UDP packet with router alert
retry-count <i>count</i>	(Optional) Specifies the number of retry attempts during multipath LSP traceroute. A retry is attempted if an outstanding echo request <ul style="list-style-type: none"> times out waiting for the corresponding echo reply. fails to find a valid destination address set to exercise a specific outgoing path. Range is 0 to 10. Default is 3.
source <i>source-address</i>	(Optional) Specifies the source address used in the echo request packet.
timeout <i>timeout</i>	(Optional) Specifies the timeout interval, in seconds. Range is from 0 to 3600. Default is 2.
ttl <i>value</i>	(Optional) Specifies the maximum number of hops (range is 1 to 255).
verbose	(Optional) Enables verbose output information, including MPLS echo reply, sender address of the packet, and return codes.
fec-type	(Optional) Specifies FEC type to be used. bgp Use FEC type as BGP generic Use FEC type as generic ldp Use FEC type as LDP

Command Default**exp** *exp-bits* : 0**hashkey** **ipv4 bitmap** *bit-size*: 4

interval *min-send-delay*: 0

reply mode: IPv4

retry-count: 3

timeout *timeout* : 2

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 6.0	This command was introduced.

Usage Guidelines The **hashkey ipv4 bitmap** keyword and *bit-size* value control how many addresses are encoded in the DSMAP multipath field. Larger values allow more coverage of equal cost multiple paths throughout the network, but with more processing at the head, mid, and tail routers.

Task ID	Task ID	Operations
	mpls-ldp	read, write

Examples

The following example shows how to specify the destination type as an LDP IPv4 prefix:

```
RP/0/RP0/CPU0:router# traceroute mpls multipath ipv4 7.7.7.7/32 verbose force-explicit-null
```

```
Starting LSP Path Discovery for 7.7.7.7/32
```

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

Type escape sequence to abort.

```
L!
Path 0 found,
output interface TenGigE0/0/0/11.1 nexthop 79.1.0.2
source 79.1.0.1 destination 127.0.0.0
0 79.1.0.1 79.1.0.2 MRU 1500 [Labels: 24008/explicit-null Exp: 0/0] multipaths 0
L 1 79.1.0.2 178.0.0.1 MRU 1500 [Labels: implicit-null/explicit-null Exp: 0/0] ret code 8
multipaths 1
! 2 178.0.0.1, ret code 3 multipaths 0
L!
Path 1 found,
output interface TenGigE0/0/0/11.2 nexthop 79.2.0.2
source 79.2.0.1 destination 127.0.0.0
0 79.2.0.1 79.2.0.2 MRU 1500 [Labels: 24008/explicit-null Exp: 0/0] multipaths 0
L 1 79.2.0.2 178.0.0.1 MRU 1500 [Labels: implicit-null/explicit-null Exp: 0/0] ret code 8
multipaths 1
! 2 178.0.0.1, ret code 3 multipaths 0
L!
```

```

Path 2 found,
  output interface TenGigE0/0/0/11.4 nexthop 79.4.0.2
  source 79.4.0.1 destination 127.0.0.0
    0 79.4.0.1 79.4.0.2 MRU 1500 [Labels: 24008/explicit-null Exp: 0/0] multipaths 0
L 1 79.4.0.2 178.0.0.1 MRU 1500 [Labels: implicit-null/explicit-null Exp: 0/0] ret code 8
multipaths 1
! 2 178.0.0.1, ret code 3 multipaths 0
L!
Path 3 found,
  output interface TenGigE0/0/0/11.5 nexthop 79.5.0.2
  source 79.5.0.1 destination 127.0.0.0
    0 79.5.0.1 79.5.0.2 MRU 1500 [Labels: 24008/explicit-null Exp: 0/0] multipaths 0
L 1 79.5.0.2 178.0.0.1 MRU 1500 [Labels: implicit-null/explicit-null Exp: 0/0] ret code 8
multipaths 1
! 2 178.0.0.1, ret code 3 multipaths 0

Paths (found/broken/unexplored) (4/0/0)
Echo Request (sent/fail) (8/0)
Echo Reply (received/timeout) (8/0)
Total Time Elapsed 44 ms

```

The following example shows how to specify the FEC type as LDP with verbose option:

```

RP/0/RP0/CPU0:router# tracert mpls multipath ipv4 7.7.7.7/32 fec-type ldp output interface
TenGigE 0/0/0/11 nexthop 79.1.0.2

```

```

Starting LSP Path Discovery for 7.7.7.7/32

```

```

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

```

```

Type escape sequence to abort.

```

```

L!
Path 0 found,
  output interface TenGigE0/0/0/11.1 nexthop 79.1.0.2
  source 79.1.0.1 destination 127.0.0.0
    0 79.1.0.1 79.1.0.2 MRU 1500 [Labels: 24008 Exp: 0] multipaths 0
L 1 79.1.0.2 178.0.0.1 MRU 1500 [Labels: implicit-null Exp: 0] ret code 8 multipaths 1
! 2 178.0.0.1, ret code 3 multipaths 0

Paths (found/broken/unexplored) (1/0/0)
Echo Request (sent/fail) (2/0)
Echo Reply (received/timeout) (2/0)
Total Time Elapsed 10 ms

```