



MPLS OAM Commands

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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 7.0.12	This command was introduced.

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

Task ID	Task ID	Operations
	mpls-te	execute
	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
```

echo revision

To set the echo packet revision, use the **echo revision** command in MPLS OAM configuration mode. To return to the default behavior, use the **no** form of this command.

echo revision {1 | 2 | 3 | 4}
no echo revision

Syntax Description	1 2 3 4 Draft revision number: <ul style="list-style-type: none"> • 1: RFC-ietf-mpls-lsp-ping-03 (initial) • 2: RFC-ietf-mpls-lsp-ping-03 (rev 1) • 3: RFC-ietf-mpls-lsp-ping-03 (rev 2) • 4: RFC-ietf-mpls-lsp-ping-09 (initial)
---------------------------	--

Command Default The default echo revision is 4 (in RFC 9).

Command Modes MPLS OAM configuration mode

Command History	Release	Modification
	Release 7.0.12	This command was introduced.

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

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

Examples

The following example shows how to set the echo packet default revision:

```
RP/0/RP0/CPU0:router# configure
RP/0/RP0/CPU0:router (config)# mpls oam
RP/0/RP0/CPU0:router (config-oam)# echo revision 1
```

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 7.0.12	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-te	read, write
	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**}] [**revision** *version*] [**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.
revision version	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none">• 1 RFC-ietf-mpls-lsp-ping-03 (initial)• 2 RFC-ietf-mpls-lsp-ping-03 (rev 1)• 3 RFC-ietf-mpls-lsp-ping-03 (rev 2)• 4 RFC-ietf-mpls-lsp-ping-09 (initial)
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 <i>source-address</i>	(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. bgp Use FEC type as BGP 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 7.0.12	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.

For detailed configuration information about the MPLS **ping** command, see *Cisco ASR 9000 Series Router Cisco IOS XR System Monitoring Configuration Guide for the CRS-1 Router Cisco XR 12000 Series Router*.

Task ID

Task ID Operations

mpls-te read,
write

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 140.140.140/32 verbose sweep 100 200 15 repeat 1

Sending 1, [100..200]-byte MPLS Echos to 140.140.140.140/32,
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 196.100.1.26, return code 3
! size 115, reply addr 196.100.1.26, return code 3
! size 130, reply addr 196.100.1.26, return code 3
! size 145, reply addr 196.100.1.26, return code 3
! size 160, reply addr 196.100.1.26, return code 3
! size 175, reply addr 196.100.1.26, return code 3
! size 190, reply addr 196.100.1.26, return code 3

Success rate is 100 percent (7/7), round-trip min/avg/max = 5/6/8 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 11.11.11.11/32 fec-type generic output interface
gigabitEthernet 0/0/0/3
nexthop 172.40.103.2 verbose
```

```
Sending 5, 100-byte MPLS Echos to 11.11.11.11/32,
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 11.101.11.11, return code 3
!      size 100, reply addr 11.101.11.11, return code 3
!      size 100, reply addr 11.101.11.11, return code 3
!      size 100, reply addr 11.101.11.11, return code 3
!      size 100, reply addr 11.101.11.11, return code 3
```

```
Success rate is 100 percent (5/5), round-trip min/avg/max = 3/4/6 ms
```

ping mpls traffic-eng

To specify the destination type as an MPLS-TE tunnel and tunnel interface, use the **ping mpls traffic-eng** command in XR EXEC mode.

```
ping mpls traffic-eng tunnel tunnel-ID [dsmap] [exp exp-bits] [force-explicit-null] [interval
min-send-delay] [pad pattern] [repeat count] [reply {dscp dscp-value | reply mode {ipv4 | no-reply
| router-alert} | reply pad-tlv}] [revision version] [size packet-size] [source source-address] [sweep
min-value max-value increment] [timeout timeout] [ttl value] [verbose]
```

Syntax Description		
tunnel <i>tunnel-ID</i>		Specifies the destination type as an MPLS traffic engineering (TE) tunnel and the tunnel interface number. The range for the tunnel interface number is from 0 to 65535.
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.
pad <i>pattern</i>		(Optional) Specifies the pad pattern for an echo request.
repeat <i>count</i>		(Optional) Specifies the number of times to resend a packet. Range is 1 to 2147483647. Default is 5.
reply dscp <i>dscp-value</i>		(Optional) Specifies the differentiated service codepoint value for an MPLS echo reply.
reply mode [ipv4 router-alert no-reply]		(Optional) 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		(Optional) Indicates that a pad TLV should be included.

revision <i>version</i>	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none"> • 1 draft-ietf-mpls-lsp-ping-03 (initial) • 2 draft-ietf-mpls-lsp-ping-03 (rev 1) • 3 draft-ietf-mpls-lsp-ping-03 (rev 2) • 4 draft-ietf-mpls-lsp-ping-09 (initial)
size <i>packet-size</i>	(Optional) Specifies the packet size or number of bytes in each MPLS echo request packet. Range is 100 to 17986. Default is 100.
source <i>source-address</i>	(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. <p>min-value</p> <p>Minimum or start size for an echo packet (range is 100 to 17986)</p> <p>max-value</p> <p>Maximum or end size for an echo packet(range is 100 to 17986)</p> <p>interval</p> <p>Number used to increment an echo packet size(range is 1 to 8993)</p>
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.

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 7.0.12	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 traffic-eng** 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-te	read, write
	mpls-ldp	read, write

Examples

The following example shows how to check connectivity by using the **ping mpls traffic-eng** command when a TE tunnel 10 is present. Return code, reply address, and packet size are displayed due to the **verbose** keyword.

```
RP/0/RP0/CPU0:router# ping mpls traffic-eng tunnel 10 repeat 1 verbose

Sending 1, 100-byte MPLS Echos to tunnel-te10,
      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, 'X' - unknown return code, 'x' - return code 0

Type escape sequence to abort.
!   size 100, reply addr 196.100.1.18, return code 3

Success rate is 100 percent (1/1), round-trip min/avg/max = 15/15/15 ms
```

ping mpls traffic-eng tunnel-te (P2P)

To specify the destination type as an MPLS-TE tunnel and tunnel interface, use the **ping mpls traffic-eng tunnel-te** command in XR EXEC mode.

```
ping mpls traffic-eng tunnel-te tunnel-ID {destination start-address end-address increment} [dsmap]
[exp exp-bits] [force-explicit-null] [interval min-send-delay] [lsp {active | path-protect}] [pad
pattern] [repeat count] [reply {dscp dscp-value | mode {ipv4 | no-reply | router-alert} | pad-tlv}]
[revision version] [size packet-size] [source source-address] [sweep min-value max-value increment]
[timeout timeout] [ttl value] [verbose]
```

Syntax Description		
tunnel-te <i>tunnel-ID</i>		Specifies the destination type as an MPLS traffic engineering (TE) tunnel and the tunnel interface number. The range for the tunnel interface number is 0 to 65535.
destination <i>start-address end-address increment</i>		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		Specifies a downstream mapping type length and value which 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.
lsp { active path-protect }		(Optional) Specifies the LSP to use.
pad <i>pattern</i>		(Optional) Specifies the pad pattern for an echo request.
repeat <i>count</i>		(Optional) Specifies the number of times to resend a packet. Range is 1 to 2147483647. Default is 5.
reply dscp <i>dscp-value</i>		(Optional) Specifies the differentiated service codepoint value for an MPLS echo reply.

mode [ipv4 router-alert no-reply]	(Optional) 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	(Optional) Indicates that a pad TLV should be included.
revision <i>version</i>	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none"> • 1 RFC-ietf-mpls-lsp-ping-03 (initial) • 2 RFC-ietf-mpls-lsp-ping-03 (rev 1) • 3 RFC-ietf-mpls-lsp-ping-03 (rev 2) • 4 RFC-ietf-mpls-lsp-ping-09 (initial)
size <i>packet-size</i>	(Optional) Specifies the packet size or number of bytes in each MPLS echo request packet. Range is 100 to 17986. Default is 100.
source <i>source-address</i>	(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.

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 7.0.12	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 waits for a reply. Ping output helps you evaluate path-to-host reliability, delays over the path. It also helps you determine whether the host is reachable or is functioning.

Task ID

Task ID	Operation
mpls-te	read, write
mpls-ldp	read, write

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.
	<p>Note Use the show interfaces command to see a list of all interfaces currently configured on the router.</p> <p>For more information about the syntax for the router, use the question mark (?) online help function.</p>

Command Default No default behavior or values

Command Modes XR EXEC mode

Command History	Release	Modification
	Release 7.0.12	This command was introduced.

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

Task ID	Task ID	Operations
	mpls-te	read
	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: 0/0/SP Pid: 418014
Client Process: te_control Node: 0/0/SP Pid: 639227
```

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 7.0.12	This command was introduced.

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

Task ID	Task ID	Operations
	mpls-te	read
	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}}] [revision version] [source source-address] [timeout timeout] [tfl 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 <i>start-address end-address address-increment</i>	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 <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.
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
revision <i>version</i>	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none"> • 1 RFC-ietf-mpls-lsp-ping-03 (initial) • 2 RFC-ietf-mpls-lsp-ping-03 (rev 1) • 3 RFC-ietf-mpls-lsp-ping-03 (rev 2) • 4 RFC-ietf-mpls-lsp-ping-09 (initial)
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 7.0.12	This command was introduced.

Usage Guidelines



Note The **tracert 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-te read,
write

mpls-ldp read,
write

Examples

The following example shows how to trace a destination:

```
RP/0/RP0/CPU0:router# tracert mpls ipv4 140.140.140.140/32  
destination 127.0.0.10 127.0.0.15 1
```

```
Tracing MPLS Label Switched Path to 140.140.140.140/32, 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

```
0 196.100.1.41 MRU 4470 [Labels: 19 Exp: 0]  
L 1 196.100.1.42 MRU 4470 [Labels: 86 Exp: 0] 360 ms  
2 196.100.1.50 MRU 4470 [Labels: implicit-null Exp: 0] 8 ms  
! 3 196.100.1.18 9 ms
```

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

```
RP/0/RP0/CPU0:router# tracert mpls ipv4 11.11.11.11/32 fec-type generic output interface  
gigabitEthernet 0/0/0/3  
nexthop 172.40.103.2 verbose
```

```
Tracing MPLS Label Switched Path to 11.11.11.11/32, 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.

```
0 172.40.103.1 172.40.103.2 MRU 1500 [Labels: 16038 Exp: 0]
L 1 172.40.103.2 173.101.103.1 MRU 1500 [Labels: 16037 Exp: 0] 6 ms, ret code 8
L 2 173.101.103.1 11.101.11.11 MRU 1500 [Labels: implicit-null Exp: 0] 4 ms, ret code 8
! 3 11.101.11.11 6 ms, ret code 3
```

tracertmpls multipath

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

```
tracertmpls multipath ipv4 address/mask [destination start-address/end-address address-increment]
[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] [revision version]
[source source-address] [timeout timeout] [tfl 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 end-address address-increment</i>	(Optional) 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 <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.
revision <i>version</i>	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none"> • 1 RFC-ietf-mpls-lsp-ping-03 (initial) • 2 RFC-ietf-mpls-lsp-ping-03 (rev 1) • 3 RFC-ietf-mpls-lsp-ping-03 (rev 2) • 4 RFC-ietf-mpls-lsp-ping-09 (initial)
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 7.0.12	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-te	read, write
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 multi ipv4 140.140.140.140/32 verbose force-explicit-null
```

```
Starting LSP Path Discovery for 140.140.140.140/32
```

```
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.

```
LL!
Path 0 found,
output interface POS0/2/0/3 source 196.100.1.61 destination 127.0.0.1
0 196.100.1.61 196.100.1.62 MRU 4470 [Labels: 18/explicit-null Exp: 0/0] multipaths 0
L 1 196.100.1.62 196.100.1.10 MRU 4470 [Labels: 17/explicit-null Exp: 0/0] ret code 8
multipaths 1
L 2 196.100.1.10 196.100.1.18 MRU 4470 [Labels: implicit-null/explicit-null Exp: 0/0] ret
code 8 multipaths 1
! 3 196.100.1.1018, ret code 3 multipaths 0
LL!
Path 1 found,
output interface GigabitEthernet0/3/0/0 source 196.100.1.5 destination 127.0.0.1
0 196.100.1.5 196.100.1.37 6 MRU 1500 [Labels: 18/explicit-null Exp: 0/0] multipaths 0
L 1 196.100.1.6 196.100.1.10 MRU 4470 [Labels: 17/explicit-null Exp: 0/0] ret code 8
multipaths 1
L 2 10196.0100.21.5 1010 196.0100.21.10 18 MRU 4470 [Labels: implicit-null/explicit-null
Exp: 0/0] ret code 8 multipaths 1
! 3 10196.0100.21.1018, ret code 3 multipaths 0

Paths (found/broken/unexplored) (2/0/0)
Echo Request (sent/fail) (6/0)
Echo Reply (received/timeout) (6/0)
Total Time Elapsed 80 ms
```

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

```
RP/0/RP0/CPU0:router# traceroute mpls multipath ipv4 11.11.11.11/32 fec-type ldp output
interface gigabitEthernet 0/0/0/3
nextthop 172.40.103.2 verbose
```

Starting LSP Path Discovery for 11.11.11.11/32

```
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.

```
LL!
Path 0 found,
output interface GigabitEthernet0/0/0/3 nextthop 172.40.103.2
source 172.40.103.1 destination 127.0.0.0
0 172.40.103.1 172.40.103.2 MRU 1500 [Labels: 16038 Exp: 0] multipaths 0
L 1 172.40.103.2 173.101.103.1 MRU 1500 [Labels: 16037 Exp: 0] ret code 8 multipaths 1
L 2 173.101.103.1 11.101.11.11 MRU 1500 [Labels: implicit-null Exp: 0] ret code 8 multipaths
1
! 3 11.101.11.11, ret code 3 multipaths 0

Paths (found/broken/unexplored) (1/0/0)
Echo Request (sent/fail) (3/0)
Echo Reply (received/timeout) (3/0)
Total Time Elapsed 21 ms
```

tracertoute mpls traffic-eng

To specify the destination type as an MPLS traffic engineering (TE) tunnel, use the **tracertoute mpls traffic-eng** command in XR EXEC mode.

```
tracertoute mpls traffic-eng tunnel tunnel-ID [destination start-address end-address address-increment
increment-mask] [exp exp-bits] [flags fec] [force-explicit-null] [reply {dscp dscp-value | reply mode
{ipv4 | router-alert}}] [revision version] [source source-address] [timeout timeout] [ttl value]
[verbose]
```

Syntax Description

tunnel	Specifies the MPLS-TE tunnel type.
<i>tunnel-ID</i>	Tunnel interface.
destination <i>start-address end-address address-increment increment-mask</i>	(Optional) 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. increment-mask Incremental mask 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.
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

revision <i>version</i>	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none"> • 1 RFC-ietf-mpls-lsp-ping-03 (initial) • 2 RFC-ietf-mpls-lsp-ping-03 (rev 1) • 3 RFC-ietf-mpls-lsp-ping-03 (rev 2) • 4 RFC-ietf-mpls-lsp-ping-09 (initial)
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.

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

Command Modes
XR EXEC mode

Command History

Release	Modification
Release 7.0.12	This command was introduced.

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

Task ID

Task ID	Operation
mpls-te	read
mpls-ldp	read

The following example shows how to specify the destination as a MPLS-TE tunnel:

```
RP/0/RP0/CPU0:router# traceroute mpls traffic-eng tunnel 13

Tracing MPLS TE Label Switched Path on tunnel-te13, 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 0.0.0.0 11.0.0.1 MRU 1500 [Labels: 16003 Exp: 0]
```

```
L 1 192.168.200.2 192.168.170.1 MRU 1500 [Labels: implicit-null Exp: 0] 110 ms
! 2 192.168.170.1 0.0.0.0 MRU 0 [No Label] 169 ms
```

traceroute mpls traffic-eng tunnel-te (P2P)

To specify the destination type as an MPLS traffic engineering (TE) tunnel for a point-to-point connection, use the **traceroute mpls traffic-eng tunnel-te (P2P)** command in XR EXEC mode.

```
traceroute mpls traffic-eng tunnel-te tunnel-ID [destination start-address end-address
address-increment increment-mask] [exp exp-bits] [flags fec] [force-explicit-null] [reply {dscp
dscp-value | mode {ipv4 | router-alert}}] [revision version] [source source-address] [timeout
timeout] [ttl value] [verbose]
```

Syntax Description	
tunnel-te	Specifies the MPLS-TE tunnel type.
<i>tunnel-ID</i>	Tunnel interface.
destination <i>start-address end-address address-increment increment-mask</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. <i>address-increment</i> Incremental value of the network address. <i>increment-mask</i> Incremental mask 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.
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

revision <i>version</i>	(Optional) Specifies the Cisco extension TLV versioning field: <ul style="list-style-type: none"> • 1 RFC-ietf-mpls-lsp-ping-03 (initial) • 2 RFC-ietf-mpls-lsp-ping-03 (rev 1) • 3 RFC-ietf-mpls-lsp-ping-03 (rev 2) • 4 RFC-ietf-mpls-lsp-ping-09 (initial)
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.

Command Default

exp *exp-bits* : 0

reply-mode: IPv4

timeout *timeout* : 2

Command Modes XR EXEC mode

Command History

Release	Modification
Release 7.0.12	This command was introduced.

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

Task ID

Task ID	Operation
mpls-te	read
mpls-ldp	read

The following example shows how to specify the destination as a MPLS-TE tunnel:

```
RP/0/RP0/CPU0:router# traceroute mpls traffic-eng tunnel-te 13

Tracing MPLS TE Label Switched Path on tunnel-te13, 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 0.0.0.0 11.0.0.1 MRU 1500 [Labels: 16003 Exp: 0]
```



```
L 1 192.168.200.2 192.168.170.1 MRU 1500 [Labels: implicit-null Exp: 0] 110 ms
! 2 192.168.170.1 0.0.0.0 MRU 0 [No Label] 169 ms
```

■ `traceroute mpls traffic-eng tunnel-te (P2P)`