

Implementing MPLS Transport Profile

This module describes how to implement MPLS transport profile (MPLS-TP) on the router. MPLS-TP supported by IETF enables the migration of transport networks to a packet-based network that efficiently scale to support packet services in a simple and cost-effective way. MPLS-TP combines the necessary existing capabilities of MPLS with additional minimal mechanisms in order that it can be used in a transport role.

MPLS transport profile enables you to create tunnels that provide the transport network service layer over which IP and MPLS traffic traverse.

Feature History for Implementing MPLS Transport Profile

Release	Modification
Release 4.2.0	This feature was introduced.

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Restrictions for MPLS-TP

- Penultimate hop popping is not supported. Only ultimate hop popping is supported, because label mappings are configured at the MPLS-TP endpoints.
- MPLS-TP links must be configured with IP addresses.
- IPv6 addressing is not supported.

L2VPN Restrictions

- Pseudowire ID Forward Equivalence Class (FEC) (type 128) is supported, but generalized ID FEC (type 129) is not supported.
- BFD over pseudowire is not supported. Static pseudowire OAM protocol is used to signal fault on static pseudowire placed over TP tunnels using pseudowire status.
- Only Ethernet pseudowire type is supported.

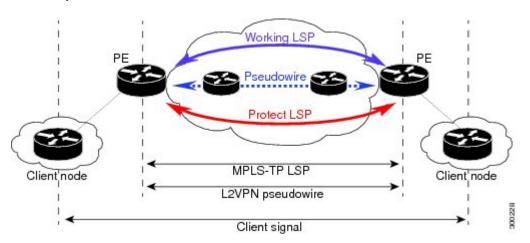
Information About Implementing MPLS Transport Profile

To implement MPLS-TP, you should understand these concepts:

MPLS Transport Profile

MPLS Transport Profile (TP) enables you to create tunnels that provide the transport network service layer over which IP and MPLS traffic traverse. MPLS-TP tunnels enable a transition from Synchronous Optical Networking (SONET) and Synchronous Digital Hierarchy (SDH) time-division multiplexing (TDM) technologies to packet switching, to support services with high bandwidth utilization and low cost. Transport networks are connection oriented, statically provisioned, and have long-lived connections. Transport networks usually avoid control protocols that change identifiers like labels. MPLS-TP tunnels provide this functionality through statically provisioned bidirectional label switched paths (LSPs). This figure shows the MPLS-TP tunnel:

Figure 1: MPLS Transport Profile Tunnel



MPLS-TP combines the necessary existing capabilities of MPLS with additional minimal mechanisms in order that it can be used in a transport role. You can set up MPLS-TP through a CLI or a network management system.

MPLS-TP tunnels have these characteristics:

- An MPLS-TP tunnel can be associated with working LSP, protect LSP, or both LSP
- Statically provisioned bidirectional MPLS-TP label switched paths (LSPs)
- Symmetric or asymmetric bandwidth reservation
- 1:1 path protection with revertive mode for MPLS-TP LSP with revertive mode for MPLS-TP LSP
- Use of Generic Alert Label (GAL) and Generic Associated Channel Header (G-ACH) to transport control packets; for example, BFD packets and pseudowire OAM packets
- BFD is used as a continuity check (CC) mechanism over MPLS-TP LSP
- Remote Defect Indication (RDI) based on BFD
- Fault OAM functions

These services are supported over MPLS-TP tunnels:

- Dynamic spoke pseudowire (for H-VPLS) over static MPLS-TP tunnels.
- Static spoke pseudowire (for H-VPLS) over static MPLS-TP tunnels.
- MS-PW services where static and dynamic pseudowire segments can be concatenated.
- MPLS ping and traceroute over MPLS TP LSP and PW.
- Static routes over MPLS-TP tunnels.
- Pseudowire redundancy for static pseudowire.
- VPWS using static or dynamic pseudowire pinned down to MPLS-TP tunnels.
- VPLS and H-VPLS using static or dynamic pseudowire pinned down to MPLS-TP tunnels.

Bidirectional LSPs

MPLS transport profile (MPLS-TP) LSPs are bidirectional and congruent where LSPs traverse the same path in both directions. An MPLS-TP tunnel can be associated with either working MPLS-TP LSP, protect MPLS-TP LSP, or both. The working LSP is the primary LSP backed up by the protect LSP. When a working LSP goes down, protect LSP is automatically activated. In order for an MPLS-TP tunnel to be operationally up, it must be configured with at least one LSP.

MPLS-TP Path Protection

Path protection provides an end-to-end failure recovery mechanism (that is, full path protection) for MPLS-TP tunnels. MPLS-TP LSPs support 1:1 path protection. You can configure the working and protect LSPs as part of configuring the MPLS-TP tunnel. The working LSP is the primary LSP used to route traffic, while the protect LSP is a backup for a working LSP. If the working LSP fails, traffic is switched to the protect LSP until the working LSP is restored, at which time traffic forwarding reverts back to the working LSP (revertive mode).

Fault OAM Support

The fault OAM protocols and messages support the provisioning and maintenance of MPLS-TP tunnels and bidirectional LSPs:

Generic Associated Channel

Generic Associated Channel (G-ACh) is the control channel mechanism associated with MPLS LSPs in addition to MPLS pseudowire. The G-ACh Label (GAL) (Label 13) is a generic alert label to identify the presence of the G-ACh in the label packet. It is taken from the reserved MPLS label space.

G-ACh or GAL is used to support in-band OAMs of MPLS-TP LSPs and pseudowires. The OAM messages are used for fault management, connection verification, continuity check and other functions.

These messages are forwarded along the specified MPLS LSP:

- OAM Fault Management: Alarm Indication Signal (AIS), Link Down Indication (LDI), and Lock Report (LKR) messages (GAL with fault-OAM channel)
- OAM Connection Verification: Ping and traceroute messages (GAL with IP channel)

• BFD messages (GAL with BFD channel)

These messages are forwarded along the specified pseudowire:

- Static pseudowire OAM messages (static pseudowire status)
- Pseudowire ping and traceroute messages

• Fault Management: Alarm Indication Signal (AIS), Link Down Indication (LDI), and Lock Report (LKR) messages

LDI messages are generated at midpoint nodes when a failure is detected. The midpoint sends the LDI message to the endpoint that is reachable with the existing failure. The midpoint node also sends LKR messages to the reachable endpoint, when an interface is administratively down. AIS messages are not generated by Cisco platforms, but are processed if received. By default, the reception of LDI and LKR on the active LSP at an endpoint will cause a path protection switchover, while AIS will not.

• Fault Management: Emulated Protection Switching for LSP Lockout

You can implement a form of **Emulated Protection Switching** in support of LSP Lockout using customized fault messages. When a Cisco Lockout message is sent, it does not cause the LSP to be administratively down. The Cisco Lockout message causes a path protection switchover and prevents data traffic from using the LSP. The LSP's data path remains up so that BFD and other OAM messages can continue to traverse it. Maintenance of the LSP can take place such as reconfiguring or replacing a midpoint LSR. BFD state over LSP must be **up** and MPLS ping and traceroute can be used to verify the LSP connectivity, before the LSP is put back into service by removing the lockout. You cannot lockout working and protect LSPs simultaneously.

LSP ping and traceroute

For MPLS-TP connectivity verification, you can use **ping mpls traffic-eng tunnel-tp** and **traceroute mpls traffic-eng tunnel-tp** commands. You can specify that the echo requests be sent along the working LSP or the protect LSP. You can also specify that the echo request be sent on a locked out MPLS-TP tunnel LSP (either working or protect) if the working or protect LSP is explicitly specified.

Continuity Check through BFD

BFD session is automatically created on MPLS-TP LSPs with default parameters. You can override the default BFD parameters either through global commands or per-tunnel commands. Furthermore, you can optionally specify different BFD parameters for standby LSPs. For example, when an LSP is in standby, BFD hello messages can be sent at smaller frequency to reduce line-card CPU usage. However, when a standby LSP becomes active (for example, due to protection switching), nominal BFD parameters are used for that LSPs (for example, to run BFD hello messages at higher frequency).

MPLS-TP Links and Physical Interfaces

MPLS-TP link IDs may be assigned to physical interfaces only. Bundled interfaces and virtual interfaces are not supported for MPLS-TP link IDs.

The MPLS-TP link is used to create a level of indirection between the MPLS-TP tunnel and midpoint LSP configuration and the physical interface. The MPLS-TP **link-id** command is used to associate an MPLS-TP link ID with a physical interface and next-hop node address.

Multiple tunnels and LSPs may then refer to the MPLS-TP link to indicate they are traversing that interface. You can move the MPLS-TP link from one interface to another without reconfiguring all the MPLS-TP tunnels and LSPs that refer to the link.

Link IDs must be unique on the router or node. For more information, see the *Configuring MPLS-TP Links* and *Physical Interfaces* section.

Tunnel LSPs

Tunnel LSPs, whether endpoint or midpoint, use the same identifying information. However, it is entered differently.

- A midpoint consists of a forward LSP and a reverse LSP. A MPLS-TP LSP mid point is identified by its name, and forward LSP, reverse LSP, or both are configured under a submode.
- At the midpoint, determining which end is source and which is destination is arbitrary. That is, if you are configuring a tunnel between your router and a coworker's router, then your router is the source. However, your coworker considers his or her router to be the source. At the midpoint, either router could be considered the source. At the midpoint, the forward direction is from source to destination, and the reverse direction is from destination to source. For more information, see the *Configuring MPLS-TP LSPs at Midpoints* section.
- At the midpoint, the LSP number does not assume default values, and hence must be explicitly configured.
- At the endpoint, the local information (source) either comes from the global node ID and global ID, or from locally configured information using the **source** command after you enter the **interface tunnel-tp** *number* command, where number is the local or source tunnel-number.
- At the endpoint, the remote information (destination) is configured using the **destination** command after you enter the **interface tunnel-tp** *number* command. The **destination** command includes the destination node ID, optionally the global ID, and optionally the destination tunnel number. If you do not specify the destination tunnel number, the source tunnel number is used.

MPLS-TP IP-less support

Generally, MPLS-TP functionality can be deployed with or without an IP address. However, the main motivation for the IP-less model is this: an LSR can be inserted into an MPLS-TP network without changing the configurations on adjacent LSRs. In the past Cisco IOS-XR MPLS-TP release, if an interface does not have a valid IP address, BFD packets cannot be transmitted over that link, and hence MPLS-TP LSP cannot be brought up on that link. In this release, the IP-less TP link operates only in a **point-to-point** mode.

This feature, therefore, makes the need for an IP address on a TP link optional. You may deploy LSRs running Cisco IOS-XR in MPLS-TP networks with or without an IP address. With such extra flexibility, LSRs running Cisco IOS-XR can be easily deployed not only with LSRs running IOS, but with LSRs from other vendors too.

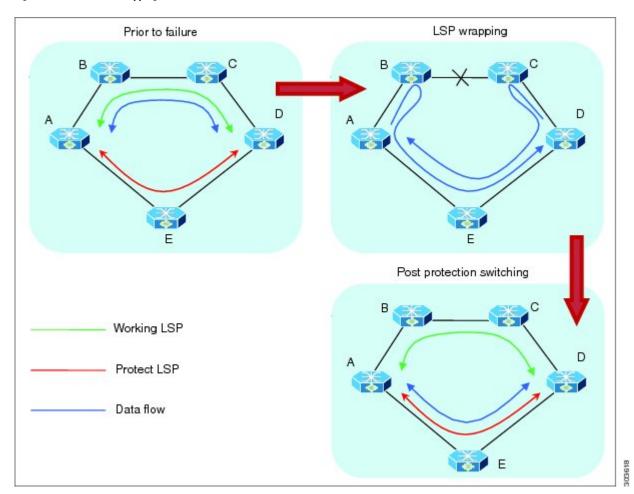
MPLS-TP LSP Wrapping

In the MPLS-TP LSP Wrapping protection scheme, a protected MPLS-TP tunnel is associated with a working LSP and protect LSP. This helps to prevent traffic loss as soon as a mid-point LSR detects a failure at physical layer rather than waiting for BFD to time-out. Also, a delay in activating protection switch due to mid-point failure does not further increase the traffic loss.

MPLS-TP LSP wrapping has to enabled only on the MID node. MPLS-TP LSP wrapping helps in detecting mid-link failure scenarios; other failures and failures on end node is detected by BFD timeout and TP-OAM message.

As shown in the figure below, when an LSR (e.g., Router B) detects a failure, it forwards the incoming traffic over an impacted LSP onto the reverse LSP, if it exists. The traffic re-directed into the reverse LSP is loopback traffic. Looping back traffic is carried out by the forwarding engine without control plane's involvement. The label stack of a loopback packet will be modified such that the source of the traffic identifies the packet.

Figure 2: MPLS-TP LSP Wrapping Mechanism



When the forwarding engine at an end-point recognizes a packet from loopback traffic, it sforwards the packet on protect LSP. As BFD packets over impacted LSPs are also looped-back, the end-point will drop such BFD packets so that BFD sessions over the impacted LSPs is timed-out and protection switching is activated. Optionally, when an end-point receives the first looped-back packet, it activates protection switching.

A working LSP remains wrapped until protection switching is activated. Once activated, protect LSP will carry traffic as usual. When failure is removed and BFD session comes back up resulting in activation of working LSP.

How to Implement MPLS Transport Profile

MPLS Transport Profile (MPLS-TP) supported by IETF enables the migration of transport networks to a packet-based network that efficiently scale to support packet services in a simple and cost effective way.

These procedures are used to implement MPLS-TP:

Configuring the Node ID and Global ID

Perform this task to configure node ID and global ID on the router.

SUMMARY STEPS

- 1. configure
- 2. mpls traffic-eng
- **3**. tp
- 4. node-id node-id
- 5. global-id num
- 6. commit

	Command or Action	Purpose
Step 1	configure	
Step 2	mpls traffic-eng	Enters MPLS TE configuration mode.
	Example:	
	RP/0/RSP0/CPU0:router(config)# mpls traffic-eng	
Step 3	tp	Enters MPLS transport profile (TP) configuration mode.
	Example:	You can configure MPLS TP specific parameters for the router from this mode.
	RP/0/RSP0/CPU0:router(config-mpls-te)# mpls tp	
Step 4	node-id node-id	Specifies the default MPLS TP node ID, which is used as
	Example:	the default source node ID for all MPLS TP tunnels configured on the router.
	<pre>RP/0/RSP0/CPU0:router(config-mpls-te-tp)# node-id 10.0.0.1</pre>	Note The node ID is a 32-bit number represented in IPv4 address format, and can be optionally assigned to each node.
Step 5	global-id num	Specifies the default global ID used for all endpoints and
	Example:	midpoints. This command makes the node ID globally unique in a multi-provider tunnel. Otherwise, the node ID
RP/0/RSP0/0	RP/0/RSP0/CPU0:router(config-mpls-te-tp)# global-id	is only locally meaningful.

	Command or Action	Purpose	
		Note	The global ID is a 32-bit number, and can be assigned to each node.
Step 6	commit		

Configuring Pseudowire OAM Attributes

Perform this task to configure pseudowire OAM attributes.

SUMMARY STEPS

- 1. configure
- 2. 12vpn
- 3. pw-oam refresh transmit value
- 4. commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure	
Step 2	12vpn	Enters L2VPN configuration mode.
	Example:	
	RP/0/RSP0/CPU0:router(config)# 12vpn	
Step 3	pw-oam refresh transmit value	Specifies the OAM timeout refresh intervals.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-12vpn)# pw-oam refresh transmit 20</pre>	
Step 4	commit	

Configuring the Pseudowire Class

When you create the pseudowire class, you specify the parameters of the pseudowire, such as the use of the control word and preferred path.

SUMMARY STEPS

- 1. configure
- 2. 12vpn
- 3. pw-class name
- 4. encapsulation mpls
- 5. preferred-path interface tunnel-number

6. commit

DETAILED STEPS

	Command or Action	Purpose
Step 1	configure	
Step 2	l2vpn	Enters L2VPN configuration mode.
	Example:	
	RP/0/RSP0/CPU0:router(config)# 12vpn	
Step 3	pw-class name	Creates a pseudowire OAM class named foo and enters
	Example:	pseudowire OAM class configuration mode.
	RP/0/RSP0/CPU0:router(config-12vpn)# pw-class for	
Step 4	encapsulation mpls	Sets pseudowire encapsulation to MPLS.
	Example:	
	RP/0/RSP0/CPU0:router(config-12vpn-pwc)# encapsulation mpls	
Step 5	preferred-path interface tunnel-tp tunnel-number	Specifies TP tunnel interface 10 for the preferred-path.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-12vpn-pwc-mpls)# preferred-path interface tunnel-tp 10</pre>	
Step 6	commit	

Configuring the Pseudowire

Perform this task to configure the pseudowire.

SUMMARY STEPS

- 1. configure
- 2. interface type interface-path-id
- 3. pseudowire-class class-name
- 4. encapsulation mpls
- **5. preferred-path interface tunnel-tp** *tunnel-number*
- 6. commit

	Command or Action	Purpose
Step 1	configure	

	Command or Action	Purpose
Step 2	interface type interface-path-id	Enters MPLS transport protocol tunnel interface
	Example:	configuration mode.
	RP/0/RSP0/CPU0:router(config)# interface tunnel-tp 20	
Step 3	pseudowire-class class-name	Creates a pseudowire class and enters pseudowire class
	Example:	configuration mode.
	RP/0/RSP0/CPU0:router(config-if)# pseudowire-class foo	
Step 4	encapsulation mpls	Specifies the encapsulation type.
	Example:	
	RP/0/RSP0/CPU0:router# encapsulation mpls	
Step 5	preferred-path interface tunnel-tp tunnel-number	Specifies TP tunnel interface 10 for the preferred-path.
	Example:	Note When a PW class with tunnel-tp interface as a preferred path is defined, this specified class
	RP/0/RSP0/CPU0:router# preferred-path interface tunnel-tp 10	can be associated with any PW.
Step 6	commit	

Configuring the MPLS TP Tunnel

On the endpoint routers, create an MPLS TP tunnel and configure its parameters.

SUMMARY STEPS

- 1. configure
- 2. interface tunnel-tp number
- **3. description** *tunnel-desc*
- 4. bandwidth num
- **5. source** *source node-ID*
- **6. destination** destination node-ID [**global-id** destination global ID] **tunnel-id** destination tunnel ID]
- 7. working-lsp
- 8. in-label num
- **9. out-label** *mpls label* **out-link** *link ID*
- **10. Isp-number** *value*
- **11.** exit
- 12. protect-lsp
- 13. in-label num
- **14. out-label** *mpls label* **out-link** *link ID*
- **15. Isp-number** *value*

16. exit

17. commit

	Command or Action	Purpose
Step 1	configure	
Step 2	<pre>interface tunnel-tp number Example: RP/0/RSP0/CPU0:router(config) # interface tunnel-tr</pre>	Enters tunnel tp interface configuration mode. The range is from 0 to 65535.
Step 3	description tunnel-desc	Specifies a tunnel tp description.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-if)# description head-end tunnel</pre>	
Step 4	bandwidth num	Specifies the tunnel bandwidth in kbps. The range is from
	Example:	0 to 4294967295.
	RP/0/RSP0/CPU0:router(config-if)# tp bandwidth 1000	
Step 5	source source node-ID	Specifies the source node of the tunnel.
	Example:	
	RP/0/RSP0/CPU0:router(config-if)# source 10.0.0.1	
Step 6	destination destination node-ID [global-id destination global ID] tunnel-id destination tunnel ID]	Specifies the destination node of the tunnel.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-if)# destination 10.0.0.1 global-id 10 tunnel-id 2</pre>	
Step 7	working-lsp	Specifies a working LSP, also known as the primary LSP.
	Example:	This LSP is used to route traffic.
	RP/0/RSP0/CPU0:router(config-if)# working-lsp	
Step 8	in-label num	Specifies the in-label.
	Example:	
	RP/0/RSP0/CPU0:router(config-if-work)# in-label 111	

	Command or Action	Purpose
Step 9	out-label mpls label out-link link ID	Specifies the out-label.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-if-work)# out-label 111 out-link 10</pre>	
Step 10	lsp-number value	Specifies the LSP ID of the working LSP.
	Example:	
	RP/0/RSP0/CPU0:router(config-if-work)# 1sp-number 10	
Step 11	exit	Exits from working LSP interface configuration mode.
	Example:	
	RP/0/RSP0/CPU0:router(config-if-work)# exit	
Step 12	protect-lsp	Specifies a backup for a working LSP. If the working LSP
	Example:	fails, traffic is switched to the protect LSP until the working LSP is restored, at which time traffic forwarding
	RP/0/RSP0/CPU0:router(config-if)# protect-lsp	reverts back to the working LSP.
Step 13	in-label num	Specifies the in-label.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-if-protect)# in-label 113</pre>	
Step 14	out-label mpls label out-link link ID	Specifies the out-label and out-link.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-if-protect) # out-label 112 out-link 2</pre>	
Step 15	lsp-number value	Specifies the LSP ID of the protect LSP.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-if-protect) # lsp-number 10</pre>	
Step 16	exit	Exits from protect LSP interface configuration mode.
	Example:	
	RP/0/RSP0/CPU0:router(config-if-protect)# exit	
Step 17	commit	

Configuring MPLS-TP LSPs at Midpoint

Perform this task to configure the MPLS-TP LSPs at the midpoint router.



Note

When configuring the LSPs at the midpoint routers, make sure that the configuration does not reflect traffic back to the originating node.

SUMMARY STEPS

- 1. configure
- 2. mpls traffic-eng
- 3. tp mid name
- 4. tunnel-name name
- 5. lsp-number value
- **6. source** *node -ID* **tunnel-id** *number*
- 7. destination node -ID tunnel-id number
- 8. commit

	Command or Action	Purpose
Step 1	configure	
Step 2	mpls traffic-eng	Enters MPLS TE configuration mode.
	Example:	
	RP/0/RSP0/CPU0:router(config)# mpls traffic-eng	
Step 3	tp mid name	Specifies the MPLS-TP tunnel mid-point identifier.
	Example:	
	RP/0/RSP0/CPU0:router(config-mpls-te)# tp mid foc	
Step 4	tunnel-name name	Specifies the name of the tunnel whose mid point is beir
	Example:	configured.
	<pre>RP/0/RSP0/CPU0:router(config-mpls-te-tp-mid) # tunnel-name midtunnel</pre>	
Step 5	lsp-number value	Specifies the LSP ID.
	Example:	
	RP/0/RSP0/CPU0:router(config-mpls-te-tp-mid)# lsp-number 10	
Step 6	source node -ID tunnel-id number	Specifies the source node ID and tunnel ID.
	Example:	

	Command or Action	Purpose
	RP/0/RSP0/CPU0:router(config-mpls-te-tp-mid-fwd)# source 10.0.0.1 tunnel-id 12	
Step 7	destination node -ID tunnel-id number	Specifies the destination node ID and tunnel ID.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-mpls-te-tp-mid-rev) # source 10.0.0.2 tunnel-id 12</pre>	
Step 8	commit	

Configuring MPLS-TP Links and Physical Interfaces

MPLS-TP link IDs may be assigned to physical interfaces only.



Note

Bundled interfaces and virtual interfaces are not supported for MPLS-TP link IDs.

SUMMARY STEPS

- 1. configure
- 2. mpls traffic-eng
- 3. interface type interface-path-id
- 4. link-id value next-hop address
- 5. commit

	Command or Action	Purpose
Step 1	configure	
Step 2	mpls traffic-eng	Enters MPLS TE configuration mode.
	Example:	
	<pre>RP/0/RSP0/CPU0:router(config-mpls-te)# mpls traffic-eng</pre>	
Step 3	interface type interface-path-id	Configures an interface type and path ID to be associated
	Example:	with a MPLS TE mode.
	RP/0/RSP0/CPU0:router(config-mpls-te)# interface POS 0/6/0/0	
Step 4	link-id value next-hop address	Configures an interface type and path ID to be associated
	Example:	with a MPLS TE mode.
	RP/0/RSP0/CPU0:router(config-mpls-te-if)# link-ic 22 next-hop 10.1.1.2	Note You must provide the next-hop IP address.

	Command or Action	Purpose	
		Note You can define a link ID once to use the same MPLS-TP lin different interface or next-hop configuration gets rejected. You remove the existing link ID cobefore using the same link ID interface or next-hop address.	k ID with address, the ou have to onfiguration with a different
Step 5	commit		

Configuring MPLS-TP LSP Wrapping

Perform this task to configure the MPLS-TP LSP wrapping.



Note

When configuring the LSPs at the midpoint routers, make sure that the configuration does not reflect traffic back to the originating node.

SUMMARY STEPS

- 1. configure
- 2. mpls traffic-eng
- 3. tp mid name
- 4. tunnel-name name
- 5. fast-protect
- 6. commit

	Command or Action	Purpose	
Step 1	configure		
Step 2	mpls traffic-eng	Enters MPLS TE configuration mode.	
	Example:		
	RP/0/RSP0/CPU0:router(config)# mpls traffic-eng		
Step 3	tp mid name	Specifies the MPLS-TP tunnel mid-point identifier.	
	Example:		
	<pre>RP/0/RSP0/CPU0:router(config-mpls-te)# tp mid midpt1</pre>		
Step 4	tunnel-name name	(Optional) Specifies the name of the tunnel whose mid point	
	Example:	is being configured.	

	Command or Action	Purpose
	<pre>RP/0/RSP0/CPU0:router(config-mpls-te-tp-mid)# tunnel-name midtunnel</pre>	
Step 5	fast-protect	Enables MPLS-TP LSP wrapping.
	Example:	
	RP/0/RSP0/CPU0:router(config-mpls-te-tp-mid)# fast-protect	
Step 6	commit	