

lane global-lecs-address

To specify a list of LECS addresses to use when the addresses cannot be obtained from the ILMI, use the **lane global-lecs-address** command in interface configuration mode. To remove an LECS address from the list, use the **no** form of this command.

lane global-lecs-address *address*

no lane global-lecs-address *address*

Syntax Description	<i>address</i>	Address of the LECS. You cannot use the well-known LECS address.
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Defaults No addresses are configured. The router obtains LECS addresses from the ILMI.

Command Modes Interface configuration

Command History	Release	Modification
	11.2	This command was introduced.

Usage Guidelines Use this command when your ATM switches do not support the ILMI list of LECS addresses and you want to configure Simple Server Redundancy. This command will simulate the list of LECS addresses, as if they had been obtained from the ILMI. Use this command with a different address for each LECS. The order they are used determines their priority. You should enter the addresses in the same order as you would on the ATM switch.



Note

You must configure the same list of addresses on each interface that contains a LANE entity.

If your switches do support ILMI, this command forces the router to use the addresses specified and will not use the ILMI to obtain the LECS addresses.

Since the well-known LECS address is always used as a last resort LECS address, you cannot use the address in this command.

lane le-arp

To add a static entry to the LE ARP table of the LANE client configured on the specified subinterface, use the **lane le-arp** command in interface configuration mode. To remove a static entry from the LE ARP table of the LANE client on the specified subinterface, use the **no** form of this command.

```
lane le-arp {mac-address | route-desc segment segment-number bridge bridge-number}
           atm-address
```

```
no lane le-arp {mac-address | route-desc segment segment-number bridge bridge-number}
           atm-address
```

Syntax Description		
<i>mac-address</i>		MAC address to bind to the specified ATM address.
route-desc segment <i>segment-number</i>		LANE segment number. The segment number ranges from 1 to 4095.
<i>bridge-number</i>		Bridge number that is contained in the route descriptor. The bridge number ranges from 1 to 15.
<i>atm-address</i>		ATM address.

Defaults No static address bindings are provided.

Command Modes Interface configuration

Command History	Release	Modification
	11.0	This command was introduced.

Usage Guidelines This command adds or removes a static entry binding a MAC address or segment number and bridge number to an ATM address. It does not add or remove dynamic entries. Removing the static entry for a specified ATM address from an LE ARP table does not release Data Direct VCCs established to that ATM address. However, clearing a static entry clears any fast-cache entries that were created from the MAC address-to-ATM address binding.

Static LE ARP entries are neither aged nor removed automatically.

To remove dynamic entries from the LE ARP table of the LANE client on the specified subinterface, use the **clear lane le-arp** command.

Examples The following example adds a static entry to the LE ARP table:

```
lane le-arp 0800.aa00.0101 47.000014155551212f.00.00.0800.200c.1001.01
```

The following example adds a static entry to the LE ARP table binding segment number 1, bridge number 1 to the ATM address:

```
lane le-arp route-desc segment 1 bridge 1 39.020304050607080910111213.00000CA05B41.01
```

Related Commands	Command	Description
	clear lane le-arp	Forces a LANE server to drop a client and allow the LANE configuration server to assign the client to another ELAN.

lane server-atm-address

To specify an ATM address—and thus override the automatic ATM address assignment—for the LANE server on the specified subinterface, use the **lane server-atm-address** command in interface configuration mode. To remove the ATM address previously specified for the LANE server on the specified subinterface and thus revert to the automatic address assignment, use the **no** form of this command.

lane server-atm-address *atm-address-template*

no server-atm-address [*atm-address-template*]

Syntax Description	<i>atm-address-template</i>	ATM address or a template in which wildcard characters are replaced by any nibble or group of nibbles of the prefix bytes, the ESI bytes, or the selector byte of the automatically assigned ATM address.
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Defaults	For the LANE server, the default is automatic address assignment; the LANE client finds the LANE server by consulting the configuration server.
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Command Modes	Interface configuration
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Command History	Release	Modification
	11.0	This command was introduced.

Usage Guidelines	<p>This command also instructs the LANE client configured on this subinterface to reach the LANE server by using the specified ATM address instead of the ATM address provided by the configuration server.</p> <p>When used on a selected subinterface, but with a different ATM address than was used previously, this command replaces the ATM address of the LANE server.</p>
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ATM Addresses

A LANE ATM address has the same syntax as an NSAP (but it is not a network-level address). It consists of the following:

- A 13-byte prefix that includes the following fields defined by the ATM Forum:
 - AFI (Authority and Format Identifier) field (1 byte)
 - DCC (Data Country Code) or ICD (International Code Designator) field (2 bytes)
 - DFI field (Domain Specific Part Format Identifier) (1 byte)
 - Administrative Authority field (3 bytes)
 - Reserved field (2 bytes)
 - Routing Domain field (2 bytes)
 - Area field (2 bytes)

- A 6-byte end-system identifier (ESI)
- A 1-byte selector field

Address Templates

LANE ATM address templates can use two types of wildcards: an asterisk (*) to match any single character (nibble), and an ellipsis (...) to match any number of leading, middle, or trailing characters. The values of the characters replaced by wildcards come from the automatically assigned ATM address.

In LANE, a *prefix template* explicitly matches the prefix, but uses wildcards for the ESI and selector fields. An *ESI template* explicitly matches the ESI field, but uses wildcards for the prefix and selector.

In our implementation of LANE, the prefix corresponds to the switch, the ESI corresponds to the ATM interface, and the Selector field corresponds to the specific subinterface of the interface.

For a discussion of Cisco's method of automatically assigning ATM addresses, refer to the "Configuring LAN Emulation" chapter of the *Cisco IOS Switching Services Configuration Guide*.

Examples

The following example uses an ESI template to specify the part of the ATM address corresponding to the interface; the remaining parts of the ATM address come from automatic assignment:

```
lane server-atm-address ...0800.200C.1001.**
```

The following example uses a prefix template to specify the part of the ATM address corresponding to the switch; the remaining part of the ATM address come from automatic assignment:

```
lane server-atm-address 45.000014155551212f.00.00...
```

Related Commands

Command	Description
lane server-bus	Enables a LANE server and a broadcast-and-unknown server on the specified subinterface with the ELAN ID.

lane server-bus

To enable a LANE server and a broadcast and unknown server (BUS) on the specified subinterface with the ELAN ID, use the **lane server-bus** command in interface configuration mode. To disable a LANE server and BUS on the specified subinterface, use the **no** form of this command.

```
lane server-bus {ethernet | tokenring} elan-name [elan-id id]
```

```
no lane server-bus {ethernet | tokenring} elan-name [elan-id id]
```

Syntax Description

ethernet	Identifies the emulated LAN attached to this subinterface as an Ethernet emulated LAN (ELAN).
tokenring	Identifies the emulated LAN attached to this subinterface as a Token Ring ELAN.
<i>elan-name</i>	Name of the ELAN. The maximum length of the name is 32 characters.
elan-id	(Optional) Identifies the ELAN.
<i>id</i>	(Optional) Specifies the ELAN ID of the LEC.

Defaults

No LAN type or emulated LAN name is provided.

Command Modes

Interface configuration

Command History

Release	Modification
11.0	This command was introduced.
12.0	This command was modified to support the elan-id keyword.

Usage Guidelines

The LANE server and the BUS are located on the same router.

If a **lane server-bus** command has already been used on the subinterface for a different emulated LAN, the server initiates termination procedures with all clients and comes up as the server for the new emulated LAN.

To participate in MPOA, a LEC must have an ELAN ID. This command enables the LEC to get the ELAN ID from the LES when the LEC bypasses the LECS phase.



Caution

If an ELAN ID is supplied, make sure that it corresponds to the same ELAN ID value specified in the LECS for the same ELAN.

The LEC can also obtain the ELAN ID from the LECS by using the **name elan-id** command.

Examples

The following example enables a LANE server and BUS for a Token Ring ELAN named MYELAN:

```
lane server-bus tokenring myelan
```

Related Commands

Command	Description
lane server-atm-address	Specifies an ATM address and thus overrides the automatic ATM address assignment for the LANE server on a specified subinterface.
name elan-id	Configures the ELAN ID of an ELAN in the LECS database to participate in MPOA.

list

To show all or part of the explicit path or paths, use the **list** command in IP explicit path subcommand mode.

list [*starting index number*]

Syntax Description	<i>starting index number</i>	(Optional) Displays the list starting at the entry index number. Valid range is 1 to 65535.
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Defaults	No default behavior or values.
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Command Modes	IP explicit path subcommand
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Examples The following example shows the explicit path starting at the index number 2.

```
list
Explicit Path name Joe:
  1:next-address 10.0.0.1
  2:next-address 10.0.0.2
list 2
Explicit Path name Joe:
  2:next-address 10.0.0.2
```

Related Commands	Command	Description
	append-after	Inserts a path entry after a specific index number.
	index	Inserts or modifies a path entry at a specific index.
	ip explicit-path	Enters the subcommand mode for IP explicit paths to create or modify the named path.
	next-address	Specifies the next IP address in the explicit path.
	show ip explicit-paths	Displays configured IP explicit paths.

maximum routes

To limit the maximum number of routes in a Virtual Private Network routing/forwarding instance (VRF) to prevent a provider edge (PE) router from importing too many routes, use the **maximum routes** command in VRF configuration mode. To remove the limit on the maximum number of routes allowed, use the **no** form of this command.

maximum routes *limit* {*warn threshold* | **warn-only**}

no maximum routes

Syntax Description		
<i>limit</i>		Specifies the maximum number of routes allowed in a VRF. You may select from 1 to 4,294,967,295 routes to be allowed in a VRF.
<i>warn threshold</i>		Generates a warning when the number of routes set by the <i>warn-threshold</i> argument is reached and rejects routes that exceed the maximum number set in the <i>limit</i> argument. The warning threshold is a percentage of the maximum number of routes specified in the <i>limit</i> argument, from 1 to 100.
warn-only		Issues a SYSLOG error message when the maximum number of routes allowed for a VRF exceeds the limit threshold. However, additional routes are still allowed.

Defaults No default behavior or values.

Command Modes VRF configuration mode

Command History	Release	Modification
	12.0(7)T	This command was introduced.

Usage Guidelines You can use the **maximum routes** command to monitor and limit the number of routes in a VRF on a PE router.

To limit the number of routes allowed in the VRF, use the **maximum routes** *limit* command with the *warn-threshold* argument. The *warn-threshold* argument generates a warning and does not allow the addition of routes to the VRF when the maximum number set by the *limit* argument is reached. The software generates a warning message everytime a route is added to a VRF when the VRF route count is above the warning threshold. The software also generates a route rejection notification when the maximum threshold is reached and everytime a route is rejected after the limit is reached.

To set a number of routes at which you receive a notification, but which does not limit the number of routes that can be imported into the VRF, use the **maximum routes** *limit* command with the **warn-only** keyword.

To use the **maximum routes** command, you must enter the VRF configuration submode.

Examples

The following example shows how to set a limit threshold of VRF routes to 1000. When the number of routes for the VRF reaches 1000, the router issues a SYSLOG error message, but continues to accept new VRF routes.

```
Router(config)# ip vrf vrf1

Router(config-vrf)# rd 100:1

Router(config-vrf)# route-target import 100:1

Router(config-vrf)# maximum routes 1000 warn-only
```

The following example shows how to set the maximum number of VRF routes allowed to 1000 and set the warning threshold at 80 percent of the maximum. When the number of routes for the VRF reaches 800, the router issues a warning message. When the number of routes for the VRF reaches 1000, the router issues a SYSLOG error message and rejects any new routes.

```
Router(config)# ip vrf vrf2

Router(config-vrf)# rd 200:1

Router(config-vrf)# route-target import 200:1

Router(config-vrf)# maximum routes 1000 80
```

Related Commands

Command	Description
rd	Creates VRF routing and forwarding tables and specifies the default route distinguisher for a VPN.
route-target	Configures a VRF route target community for importing and exporting extended community attributes.
import map	Configures an import route map for a specified VRF for more control over routes imported into the VRF.

metric-style narrow

To configure a router to generate and accept old-style TLVs (TLV stands for type, length, and value object), use the **metric-style narrow** command in router configuration mode.

```
metric-style narrow [transition] {level-1 | level-2 | level-1-2}
```

Syntax Description	transition	(Optional) Instructs the router to use both old and new style TLVs.
	level-1	Enables this command on routing level 1.
	level-2	Enables this command on routing level 2.
	level-1-2	Enables this command on routing levels 1 and 2.

Defaults IS-IS traffic engineering extensions include new-style TLVs with wider metric fields than old-style TLVs. By default, the MPLS traffic engineering image generates old-style TLVs only. To do MPLS traffic engineering, a router needs to generate new-style TLVs.

Command Modes Router configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Examples The following command instructs the router to generate and accept old-style TLVs on router level 1.

```
metric-style narrow level-1
```

Related Commands	Command	Description
	metric-style wide	Configures a router to generate and accept only new-style TLVs.
	metric-style transition	Configures a router to generate and accept both old-style and new-style TLVs.

metric-style transition

To configure a router to generate and accept both old-style and new-style TLVs (TLV stands for type, length, and value object), use the **metric-style transition** command in router configuration mode.

metric-style transition {**level-1** | **level-2** | **level-1-2**}

Syntax Description

level-1	Enables this command on routing level 1.
level-2	Enables this command on routing level 2.
level-1-2	Enables this command on routing levels 1 and 2.

Defaults

IS-IS traffic engineering extensions include new-style TLVs with wider metric fields than old-style TLVs. By default, the MPLS traffic engineering image generates old-style TLVs only. To do MPLS traffic engineering, a router needs to generate new-style TLVs.

Command Modes

Router configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Examples

The following command configures a router to generate and accept both old-style and new-style TLVs on level 2.

```
metric-style transition level-2
```

Related Commands

Command	Description
metric-style narrow	Configures a router to generate and accept old-style TLVs.
metric-style wide	Configures a router to generate and accept only new-style TLVs.

metric-style wide

To configure a router to generate and accept only new-style TLVs (TLV stands for type, length, and value object), use the **metric-style wide** command in router configuration mode.

metric-style wide [**transition**] {**level-1** | **level-2** | **level-1-2**}

Syntax Description	transition	(Optional) Instructs the router to accept both old and new style TLVs.
	level -1	Enables this command on routing level 1.
	level-2	Enables this command on routing level 2.
	level-1-2	Enables this command on routing levels 1 and 2.

Defaults IS-IS traffic engineering extensions include new-style TLVs with wider metric fields than old-style TLVs. By default, the MPLS traffic engineering image generates old-style TLVs only. To do MPLS traffic engineering, a router needs to generate new-style TLVs.

Command Modes Router configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines If you enter the metric-wide style command, a router generates and accepts only new-style TLVs. Therefore, the router uses less memory and other resources rather than generating both old-style and new-style TLVs.

This style is appropriate for enabling MPLS traffic engineering across an entire network.



Note

This discussion of metric-styles and transition strategies is oriented towards traffic engineering deployment. Other commands and models may be appropriate if the new-style TLVs are desired for other reasons. For example, a network may require wider metrics, but may not use traffic engineering.

Examples The following command configures a router to generate and accept only new-style TLVs on level 1:

```
metric-style wide level-1
```

Related Commands

Command	Description
metric-style narrow	Configures a router to generate and accept old-style TLVs.
metric-style transition	Configures a router to generate and accept both old-style and new-style TLVs.

mls rp ip

To enable Multilayer Switching Protocol (MLSP), use the **mls rp ip** command in global configuration mode. MLSP is the protocol that runs between the switches and routers. To disable MLS, use the **no** form of this command.

mls rp ip

no mls rp ip

Syntax Description

There are no arguments or keywords for this command.

Defaults

The default is MLS disabled.

Command Modes

Global configuration

Command History

Release	Modification
11.3(3) WA4(4)	This command was introduced.

Usage Guidelines

Use this command to enable Multilayer Switching, either globally or on a specific interface.

Examples

The following example enables MLS:

```
mls rp ip
```

Related Commands

Command	Description
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp nde-address	Specifies a NetFlow Data Export address.
mls rp vlan-id	Assigns a VLAN ID.
mls rp vtp-domain	Selects the router interface to be Layer 3 switched and then adds that interface to a VTP domain.
show mls rp	Displays MLS details, including specifics for MLSP.
show mls rp vtp-domain	Displays MLS interfaces for a specific VTP domain.

mls rp ip multicast

To enable IP multicast Multilayer Switching (hardware switching) on an external or internal router in conjunction with Layer 3 switching hardware for the Catalyst 5000, use the **mls rp ip multicast** command in interface configuration mode. To disable IP multicast Multilayer Switching (MLS) on the interface or VLAN, use the **no** form of the command.

mls rp ip multicast

no mls rp ip multicast

Syntax Description This command has no arguments or keywords.

Defaults Enabled

Command Modes Interface configuration

Command History	Release	Modification
	12.0(5)T	This command was introduced.

Usage Guidelines This feature is available only on specific router platforms connected to a Catalyst 5000 switch. Use this feature to reduce multicast load on the router. The switch will perform the multicast packet replication and forwarding.

IP multicast MLS is enabled by default on an interface once IP multicast routing and PIM are enabled.

Examples The following example disables IP multicast MLS:

```
interface fastethernet1/0.1
no mls rp ip multicast
```

Related Commands	Command	Description
	mls rp ip multicast management-interface	Assigns a different interface (other than the default) to act as the management interface for MLSP.
	show ip mroute	Displays the contents of the IP multicast routing table.
	show mls rp interface	Displays hardware-switched multicast flow information about IP multicast MLS.

mls rp ip multicast management-interface

To assign a different interface (other than the default) to act as the management interface for Multilayer Switching Protocol (MLSP), use the **mls rp ip multicast management-interface** command in interface configuration mode. To restore the default interface as the management interface, use the **no** form of the command.

mls rp ip multicast management-interface

no mls rp ip multicast management-interface

Syntax Description

This command has no arguments or keywords.

Defaults

When IP multicast MLS is enabled, the subinterface (or VLAN interface) that has the lowest VLAN ID and is active (in the “up” state) is automatically selected as the management interface.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(5)T	This command was introduced.

Usage Guidelines

When you enable IP multicast MLS, the subinterface (or VLAN interface) that has the lowest VLAN ID and is active (in the “up” state) is automatically selected as the *management interface*. The one-hop protocol Multilayer Switching Protocol (MLSP) is used between a router and a switch to pass messages about hardware-switched flows. MLSP packets are sent and received on the management interface. Typically, the interface in VLAN 1 is chosen (if that interface exists). Only one management interface is allowed on a single trunk link.

In most cases, we recommend that the management interface be determined by default. However, you can optionally use this command to specify a different router interface or subinterface as the management interface. We recommend using a subinterface with minimal data traffic so that multicast MLSP packets can be transmitted and received more quickly.

If the user-configured management interface goes down, the router uses the default interface (the active interface with the lowest VLAN ID) until the user-configured interface comes up again.

Examples

The following example configures the Fast Ethernet interface as the management interface:

```
interface fastethernet1/0.1
 mls rp ip multicast management-interface
```

Related Commands

Command	Description
mls rp ip multicast	Enables IP multicast Multilayer Switching (hardware switching) on an external or internal router in conjunction with Layer 3 switching hardware for the Catalyst 5000 switch.

mls rp ipx (global)

To enable the router as an IPX Multilayer Switching Route Processor, use the **mls rp ipx** command in global configuration or interface configuration mode. To disable IPX MLS on the router, use the **no** form of this command.

mls rp ipx

no mls rp ipx

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Global configuration
Interface configuration

Command History	Release	Modification
	12.0(5)T	This command was introduced.

Usage Guidelines Multilayer Switching Protocol (MLSP) is the protocol that runs between the MLS-Switching Engine and the MLS-Route Processor.

Examples The following example enables IPX MLS on the Multilayer Switching-Route Processor:

```
mls rp ipx
```

Related Commands	Command	Description
	mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flow(s).
	mls rp management-interface	Designates an interface as the management interface for MLSP packets.
	mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
	mls rp vtp-domain	Assigns an MLS interface to a specific VTP domain on the Multilayer Switching-Route Processor.
	show mls rp interface	Displays IPX MLS details for the route processor, including specific information about the MLSP.
	show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
	show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

mls rp ipx (interface)

To enable IPX MLS on a router interface, use the **mls rp ipx** command in global configuration or interface configuration mode. To disable IPX MLS on a router interface, use the **no** form of this command.

mls rp ipx

no mls rp ipx

Syntax Description This command has no arguments or keywords.

Defaults No default behavior or values.

Command Modes Global configuration
Interface configuration

Command History	Release	Modification
	12.0(5)T	This command was introduced.

Usage Guidelines Multilayer Switching Protocol (MLSP) is the protocol that runs between the MLS-Switching Engine and the MLS-Route Processor.

Examples The following example enables IPX MLS on a router interface:
`mls rp ipx`

Related Commands	Command	Description
	mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flow(s).
	mls rp management-interface	Designates an interface as the management interface for MLSP packets.
	mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
	mls rp vtp-domain	Assigns an MLS interface to a specific VTP domain on the Multilayer Switching-Route Processor.
	show mls rp interface	Displays IPX MLS details for the route processor, including specific information about the MLSP.
	show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
	show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

mls rp locate ipx

To display information about all switches currently shortcutting for the specified IPX flow(s), use the **mls rp locate ipx** command in privileged EXEC mode.

mls rp locate ipx *destination-network.destination-node* [*source-network*]

Syntax Description

<i>destination-network.destination-node</i>	The destination network and destination node of IPX packet flows. The destination network consists of 1 to 8 hexadecimal numbers in the format xxxxxxxx. The destination node consists of 1 to 12 hexadecimal numbers in the format xxxx.xxxx.xxxx.
<i>source-network</i>	(Optional) The source network of the IPX flow. The source network consists of 1 to 8 hexadecimal numbers in the format yyyyyyyy.

Defaults

None

Command Modes

Privileged EXEC

Command History

Release	Modification
12.0(5)T	This command was introduced.

Examples

This example displays the switch that is shortcutting routed flows to the specified IPX flow:

```
mls rp locate ipx 30.0000.1111.2222
  locator response from switch id 0010.1400.601f
```

Related Commands

Command	Description
mls rp ipx (global)	Enables the router as an IPX Multilayer Switching Route Processor.
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
mls rp vtp-domain	Assigns an MLS interface to a specific VTP domain on the Multilayer Switching-Route Processor.
show mls rp interface	Displays IPX MLS details for the route processor, including specific information about the MLSP.
show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

mls rp management-interface

To specify an interface as the management interface, use the **mls rp management-interface** command in interface configuration mode. To remove an interface as the management interface, use the **no** form of the command.

mls rp management-interface

no mls rp management-interface

Syntax Description This command has no keywords or arguments.

Defaults None

Command Modes Interface configuration

Command History

Release	Modification
11.3(3) WA4(4)	This command was introduced.

Usage Guidelines

Multilayer Switching Protocol (MLSP) packets are sent and received through the management interface.

Select only one IPX Multilayer Switching interface connected to the switch. If you fail to select this interface, no connection between the Multilayer Switch (MLS) Route Processor and the Multilayer Switch Switching Engine will occur, and any routing updates or changes to access lists will not be reflected on the switch.

Examples

The following example selects a management interface:

```
mls rp management-interface
```

Related Commands

Command	Description
mls rp ipx (global)	Enables the router as an IPX Multilayer Switching Route Processor.
mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flow(s).
mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
mls rp vtp-domain	Assigns an MLS interface to a specific VTP domain on the Multilayer Switching-Route Processor.
show mls rp interface	Displays IPX MLS details for the route processor, including specific information about the MLSP.

Command	Description
show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

mls rp nde-address

To specify a NetFlow Data Export address, use the **mls rp nde-address** command in global configuration mode.

mls rp nde-address *ip-address*

Syntax Description	<i>ip-address</i>	NDE IP address.
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Command Modes	Global configuration
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Command History	Release	Modification
	11.3(3) WA4(4)	This command was introduced.

Usage Guidelines Use this command on an RP to specify the NetFlow Data Export address for a router. If you *do not* specify an NDE IP address for the MLS-RP, the MLS-RP automatically selects one of its interface's IP addresses and uses that IP address as its NDE IP address *and* its mls ip address.

Examples The following example sets the NDE address to 170.25.2.1:

```
mls rp nde-address 170.25.2.1
```

Related Commands	Command	Description
	mls rp ip	Enables MLSP.
	mls rp management-interface	Designates an interface as the management interface for MLSP packets.
	mls rp vlan-id	Assigns a VLAN ID.
	mls rp vtp-domain	Selects the router interface to be Layer 3 switched and then adds that interface to a VTP domain.
	show mls rp	Displays MLS details, including specifics for MLSP.
	show mls rp vtp-domain	Displays MLS interfaces for a specific VTP domain.

mls rp vlan-id

To assign a virtual LAN (VLAN) identification number to an IPX MLS interface, use the **mls rp vlan-id** command in interface configuration mode. To remove a VLAN identification number, use the **no** form of the command.

mls rp vlan-id *vlan-id-number*

no mls rp vlan-id *vlan-id-number*

Syntax Description	<i>vlan-id-number</i>	A VLAN identification number from 1 to 4096.
Defaults	None	
Command Modes	Interface configuration	
Command History	Release	Modification
	11.3(3) WA4(4)	This command was introduced.
Usage Guidelines	The assigned IPX MLS interface must be either an Ethernet or Fast Ethernet interface—both without subinterfaces.	
Examples	This example assigns a the VLAN identification number 23 to an IPX MLS interface: <pre>mls rp vlan-id 23</pre>	
Related Commands	Command	Description
	mls rp ipx (global)	Enables the router as an IPX Multilayer Switching Route Processor.
	mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flow(s).
	mls rp management-interface	Designates an interface as the management interface for MLSP packets.
	mls rp vtp-domain	Assigns an MLS interface to a specific VTP domain on the Multilayer Switching-Route Processor.
	show mls rp interface	Displays IPX MLS details for the route processor, including specific information about the MLSP.
	show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
	show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

mls rp vtp-domain

To assign a Multilayer Switching (MLS) interface to a specific Virtual Trunk Protocol (VTP) domain on the Multilayer Switching-Route Processor, use the **mls rp vtp-domain** command in interface configuration mode. To remove a VTP domain, use the **no** form of the command.

mls rp vtp-domain *domain-name*

no mls rp vtp-domain *domain-name*

Syntax Description

<i>domain-name</i>	The name of the Virtual Trunk Protocol (VTP) domain assigned to an MLS interface and its related switches.
--------------------	--

Defaults

The interface is assigned to the null domain.

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3) WA4(4)	This command was introduced.

Usage Guidelines

The assigned IPX MLS interface must be either an Ethernet or Fast Ethernet interface—both without subinterfaces.

Examples

This example assigns the MLS interface to the VTP domain called “engineering”:

```
mls rp vtp-domain engineering
```

Related Commands

Command	Description
mls rp ipx (global)	Enables the router as an IPX Multilayer Switching Route Processor.
mls rp locate ipx	Displays information about all switches currently shortcutting for the specified IPX flow(s).
mls rp management-interface	Designates an interface as the management interface for MLSP packets.
mls rp vlan-id	Assigns a VLAN identification number to an IPX MLS interface.
show mls rp interface	Displays IPX MLS details for the route processor, including specific information about the MLSP.
show mls rp ipx	Displays details for all IPX MLS interfaces on the IPX MLS router.
show mls rp vtp-domain	Displays IPX MLS interfaces for a specific VTP domain on the route processor.

mpls traffic-eng

To turn on flooding of MPLS traffic engineering link information into the indicated IS-IS level, use the **mpls traffic-eng** command in router configuration mode.

```
mpls traffic-eng isis-level {level-1 | level-2}
```

Syntax Description	level-1	Flood MPLS traffic engineering link information into IS-IS level 1.
	level-2	Flood MPLS traffic engineering link information into IS-IS level 2.

Defaults Flooding is disabled.

Command Modes Router configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines This command appears as part of the routing protocol tree and causes link resource information (for instance, bandwidth available) for appropriately configured links to be flooded in the IS-IS link state database.

Examples The following command turns on MPLS traffic engineering for IS-IS Level 1.

```
mpls traffic-eng isis-level level 1
```

Related Commands	Command	Description
	mpls traffic-eng router-id	Specifies the traffic engineering router identifier for the node to be the IP address associated with the given interface.

mpls traffic-eng area

To turn on MPLS traffic engineering for the indicated OSPF area on which MPLS-TE is enabled, use the **mpls traffic-eng area** command in router configuration mode.

mpls traffic-eng area *l-n*

Syntax Description

<i>l-n</i>	The OSPF area on which MPLS-TE is enabled.
------------	--

Defaults

No default behavior or values.

Command Modes

Router configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Usage Guidelines

This command affects the operation of MPLS traffic engineering only if MPLS traffic engineering is enabled for that routing protocol instance.

Currently, only a single area may be enabled for traffic engineering.

Examples

The following example selects the OSPF area on which MPLS-TE is ran:

```
mpls traffic-eng area 0
```

mpls traffic-eng administrative-weight

To override the Internet Gateway Protocol's (IGP) administrative weight (cost) of the link, use the **mpls traffic-eng administrative-weight** command in interface configuration mode. To disable this feature, use the **no** form of this command.

```
mpls traffic-eng administrative-weight weight
```

```
no mpls traffic-eng administrative-weight weight
```

Syntax Description	<i>weight</i>	Cost of the link.
Defaults	Matches IGP cost	
Command Modes	Interface configuration	
Command History	Release	Modification
	12.0(5)S	This command was introduced.
Examples	The following example overrides the IGP's cost of the link and sets the cost to 20. <pre>mpls traffic-eng administrative-weight 20</pre>	
Related Commands	Command	Description
	mpls traffic-eng attribute-flags	Sets the user-specified attribute-flags for the interface.

mpls traffic-eng attribute-flags

To set the user-specified attribute-flags for the interface, use the **mpls traffic-eng attribute-flags** command in interface configuration mode. The interface is flooded globally so that it can be used as a tunnel headend path selection criterion. To disable this feature, use the **no** form of this command.

mpls traffic-eng attribute-flags *0x0-0xFFFFFFFF*

no mpls traffic-eng attribute flags *0x0-0xFFFFFFFF*

Syntax Description	<i>0x0-0xFFFFFFFF</i>	Represents 32 bits. This mask is compared with a tunnel's affinity bits during dynamic path selection.
---------------------------	-----------------------	--

Defaults	Default is 0x0.
-----------------	-----------------

Command Modes	Interface configuration
----------------------	-------------------------

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines	The purpose of this command is to assign attributes to a link in order to cause tunnels with matching attributes (as represented by their affinity bits) to prefer this link over others that do not match.
-------------------------	---

Examples	The following example sets the attribute flags: <pre>mpls traffic-eng attribute-flags 0x0101</pre>
-----------------	---

Related Commands	Command	Description
	mpls traffic-eng administrative-weight	Overrides the IGP administrative weight (cost) of the link.

mpls traffic-eng flooding thresholds

To set the reserved bandwidth thresholds of a link, use the **mpls traffic-eng flooding thresholds** command in interface configuration mode. If a bandwidth threshold is crossed, the bandwidth information for the link is immediately flooded throughout the network. To return to the default settings, use the **no** form of this command.

mpls traffic-eng flooding thresholds { **down** | **up** } *percent* [*percent...*]

no mpls traffic-eng flooding thresholds { **down** | **up** } *percent* [*percent...*]

Syntax Description		
	down	Sets the thresholds for decreased resource availability. The range is from 0 to 99 percent.
	up	Sets the thresholds for increased resource availability. The range is from 1 to 100 percent.
	<i>percent</i> [<i>percent</i>]	Specifies the bandwidth threshold level.

Defaults

The default for **down** is

100, 99, 98, 97, 96, 95, 90, 85, 80, 75, 60, 45, 30, 15.

The default for **up** is

15, 30, 45, 60, 75, 80, 85, 90, 95, 97, 98, 99, 100.

Command Modes

Interface configuration

Command History

Release	Modification
12.0(5)S	This command was introduced.

Usage Guidelines

When a threshold is crossed, MPLS traffic engineering link management advertises updated link information. Similarly, if no thresholds are crossed, changes may be flooded periodically unless periodic flooding has been disabled.

Examples

The following example sets the link's reserved bandwidth for decreased resource availability (down) and for increased resource availability (up) thresholds.

```
mpls traffic-eng flooding thresholds down 100 75 25
mpls traffic-eng flooding thresholds up 25 50 10
```

Related Commands	Command	Description
	mpls traffic-eng link timers periodic-flooding	Sets the length of the interval used for periodic flooding.
	show mpls traffic-eng link-management advertisements	Displays local link information currently being flooded by MPLS traffic engineering link management into the global traffic engineering topology.
	show mpls traffic-eng link-management bandwidth-allocation	Displays current local link information.

mpls traffic-eng link timers bandwidth-hold

To set the length of time that bandwidth is “held” for a RSVP PATH (Set Up) message while waiting for the corresponding RSVP RESV message to come back, use the **mpls traffic-eng link timers bandwidth-hold** command in global configuration mode.

mpls traffic-eng link timers bandwidth-hold *hold-time*

Syntax Description	<i>hold-time</i>	Sets the length of time that bandwidth can be held. The range is from 1 to 300 seconds.				
Defaults	15 seconds					
Command Modes	Global configuration					
Command History	<table border="1"> <thead> <tr> <th>Release</th> <th>Modification</th> </tr> </thead> <tbody> <tr> <td>12.0(5)S</td> <td>This command was introduced.</td> </tr> </tbody> </table>	Release	Modification	12.0(5)S	This command was introduced.	
Release	Modification					
12.0(5)S	This command was introduced.					
Examples	<p>The following example sets the length of time that bandwidth is held to 10 seconds.</p> <pre>mpls traffic-eng link-management timers bandwidth-hold 10</pre>					
Related Commands	<table border="1"> <thead> <tr> <th>Command</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>show mpls traffic-eng link-management bandwidth-allocation</td> <td>Displays current local link information.</td> </tr> </tbody> </table>	Command	Description	show mpls traffic-eng link-management bandwidth-allocation	Displays current local link information.	
Command	Description					
show mpls traffic-eng link-management bandwidth-allocation	Displays current local link information.					

mpls traffic-eng link timers periodic-flooding

To set the length of the interval used for periodic flooding, use the **mpls traffic-eng link timers periodic-flooding** command in global configuration mode.

mpls traffic-eng link timers periodic-flooding *interval*

Syntax Description	<i>interval</i>	Length of interval used for periodic flooding (in seconds). The range is from 0 to 3600. If you set this value to 0, you turn off periodic flooding. If you set this value anywhere in the range from 1 to 29, it is treated as 30.
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Defaults	3 minutes
-----------------	-----------

Command Modes	Global configuration
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines	<p>Use this command to set the interval for periodic flooding of TE topology information.</p> <p>Changes in the MPLS TE topology database are flooded by the link state Interior Gateway Protocol (IGP). Some changes, such as those to link status (up/down) or configured parameters, trigger immediate flooding. Other changes are considered less urgent and are flooded periodically. For example, changes to the amount of link bandwidth allocated to TE tunnels are flooded periodically unless the change causes the bandwidth to cross a configurable threshold.</p>
-------------------------	--

Examples	The following example sets the interval length for periodic flooding to advertise flooding changes to 120 seconds.
-----------------	--

```
mpls traffic-eng timers periodic-flooding 120
```

Related Commands	Command	Description
	mpls traffic-eng flooding thresholds	Sets the reserved bandwidth thresholds of a link.

mpls traffic-eng reoptimize timers frequency

To control the frequency at which tunnels with established LSPs are checked for better LSPs, use the **mpls traffic-eng reoptimize timers frequency** command in global configuration mode.

mpls traffic-eng reoptimize timers frequency *seconds*

Syntax Description	<i>seconds</i>	Sets the frequency of reoptimization, in seconds. A value of 0 disables reoptimization.
---------------------------	----------------	---

Defaults 3600 seconds (1 hour), with a range of 0 to 604800 seconds (1 week).

Command Modes Global configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines A device with traffic engineering tunnels periodically examines tunnels with established LSPs to see if better LSPs are available. If a better LSP seems to be available, the device attempts to signal the better LSP and, if successful, replaces the old and inferior LSP with the new and better LSP.

Examples The following example sets the reoptimization frequency to one day.

```
mpls traffic-eng reoptimize timers frequency 86400
```

mpls traffic-eng router-id

To specify the traffic engineering router identifier for the node that is to be the IP address associated with the given interface, use the **mpls traffic-eng router-id** command in router configuration mode.

mpls traffic-eng router-id *interface*

Syntax Description	<i>interface</i>	The MPLS TE router identifier is taken from the IP address of the supplied interface. This MPLS-TE router identifier should be configured as the tunnel destination for tunnels originating at other routers and terminating at this router. This interface should be a stable interface that will not go up and down, such as a loopback interface.
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Defaults	No default behavior or values.
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Command Modes	Router configuration
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Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines	This router identifier acts as a stable IP address for the traffic engineering configuration. This stable IP address is flooded to all nodes. For all traffic engineering tunnels originating at other nodes and ending at this node, the tunnel destination must be set to the destination node's traffic engineering router identifier, since that is the address the traffic engineering topology database at the tunnel head uses for its path calculation.
-------------------------	---

Related Commands	Command	Description
	mpls traffic-eng	Turns on flooding of MPLS traffic engineering link information into the indicated IS-IS level.

mpls traffic-eng tunnels (global)

To enable MPLS traffic engineering tunnel signalling on a device, use the **mpls traffic-eng tunnels** command in global configuration mode. To disable MPLS traffic engineering tunnel signalling on a device, use the **no** form of this command.

mpls traffic-eng tunnels

no mpls traffic-eng tunnels

Syntax Description This command has no arguments or keywords.

Defaults The feature is disabled.

Command Modes Global configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines Enables the MPLS traffic-engineering feature on a device. To use the feature, MPLS traffic engineering must also be enabled on the desired interfaces.

Examples The following command turns on the MPLS traffic engineering feature for a device:

```
mpls traffic-eng tunnels
```

Related Commands	Command	Description
	mpls traffic-eng tunnels (interface)	Enables MPLS traffic engineering tunnel signalling on an interface.

mpls traffic-eng tunnels (interface)

To enable MPLS traffic engineering tunnel signalling on an interface, assuming it is enabled for the device, use the **mpls traffic-eng tunnels** command in interface configuration mode. To disable MPLS traffic engineering tunnel signalling on an interface, use the **no** form of this command.

mpls traffic-eng tunnels

no mpls traffic-eng tunnels

Syntax Description This command has no arguments or keywords.

Defaults The feature is disabled on all interfaces.

Command Modes Interface configuration

Command History	Release	Modification
	12.0(5)S	This command was introduced.

Usage Guidelines Enables the MPLS traffic-engineering feature on the interface. To use the feature, MPLS traffic engineering must also be enabled on the device. An enabled interface has its resource information flooded into the appropriate IGP link state database, and accepts traffic engineering tunnel signalling requests.

Examples The following commands turns on MPLS traffic engineering on interface Ethernet0/0.

```
configure terminal
interface Ethernet0/0
mpls traffic-eng tunnels
```

Related Commands	Command	Description
	mpls traffic-eng tunnels (global)	Enables MPLS traffic engineering tunnel signalling on a device.

mpoa client config name

To define an MPC with a specified name, use the **mpoa client config name** command in global configuration mode. To delete the MPC, use the **no** form of this command.

mpoa client config name *mpc-name*

no mpoa client config name *mpc-name*

Syntax Description	<i>mpc-name</i>	Specifies the name of an MPC.
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Defaults	This command has no default setting.
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Command Modes	Global configuration
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Command History	Release	Modification
	11.3(3a)WA4(5)	This command was introduced.

Usage Guidelines	When you configure or create an MPC, you automatically enter the MPC configuration mode. From here, you can enter subcommands to define or change MPC variables specific only to this MPC. Note that the MPC is not functional until it is attached to a hardware interface.
-------------------------	--

Examples	The following example creates or modifies the MPC named ip_mpc:
-----------------	---

```
mpoa client config name ip_mpc
```

Related Commands	Command	Description
	atm-address	Overrides the control ATM address of an MPC or MPS.
	shortcut-frame-count	Specifies the maximum number of times a packet can be routed to the default router within shortcut-frame time before an MPOA resolution request is sent.
	shortcut-frame-time	Sets the shortcut-setup frame time (in seconds) for the MPC.

mpoa client name

To attach an MPC to a major ATM interface, use the **mpoa client name** command in interface configuration mode. To break the attachment, use the **no** form of this command.

mpoa client name *mpc-name*

no mpoa client name *mpc-name*

Syntax Description

<i>mpc-name</i>	Specifies the name of an MPC.
-----------------	-------------------------------

Defaults

No MPC is attached to an ATM interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.

Usage Guidelines

The **mpoa client name** command provides an interface to the MPC through which the MPC can set up and receive calls.

When you enter this command on a major interface that is up and operational, the named MPC becomes operational. Once the MPC is fully operational, it can register its ATM address.

Examples

The following example attaches the MPC ip_mpc to an interface:

```
interface atm 1/0
 mpoa client name ip_mpc
```

mpoa server config name

To define an MPS with the specified name, use the **mpoa server config name** command in global configuration mode. To delete an MPS, use the **no** form of this command.

mpoa server config name *mps-name*

no mpoa server config name *mps-name*

Syntax Description	<i>mps-name</i>	Name of the MPOA server.
---------------------------	-----------------	--------------------------

Defaults	No MPS is defined.	
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Command Modes	Global configuration	
----------------------	----------------------	--

Command History	Release	Modification
	11.3(3a)WA4(5)	This command was introduced.

Usage Guidelines	<p>This command defines an MPS with the specified name. The MPS does not actually start functioning until it is attached to a specific hardware interface. Once that attachment is complete, the MPS starts functioning. When you configure/create an MPS, you automatically enter the MPS configuration mode.</p> <p>You can define the MPS variables specific to an MPS only after that MPS has been defined with a specified name. After this command is entered, further commands can be used to change MPS variables that are specific only to this MPS.</p>
-------------------------	---

Examples	The following example defines the MPS named MYMPS:
-----------------	--

```
mpoa server config name MYMPS
```

mpoa server name

To attach an MPS to a major ATM interface, use the **mpoa server name** command in interface configuration mode. To break the attachment, use the **no** form of this command.

mpoa server name *mps-name*

no mpoa server name *mps-name*

Syntax Description

<i>mps-name</i>	Name of the MPOA server.
-----------------	--------------------------

Defaults

No MPS is attached to an ATM interface.

Command Modes

Interface configuration

Command History

Release	Modification
11.3(3a)WA4(5)	This command was introduced.

Usage Guidelines

This command attaches an MPS to a specific (major) interface. At this point, the MPS has the capability to obtain its auto-generated ATM address and an interface through which it can communicate to the neighboring MPOA devices. Only when an MPS is both defined globally and attached to an interface is it considered to be operational. Although multiple different servers may share the same hardware interface, an MPS can be attached to only a single interface at any one time. Note that the specified MPS must have already been defined when this command is entered.

Examples

The following example attaches the MPS named MYMPS to an ATM interface:

```
mpoa server name MYMPS
```

mpoa server name trigger ip-address

To originate an MPOA trigger for the specified IP address to the specified MPOA client from the specified MPS, use the **mpoa server name trigger ip-address** command in EXEC mode.

```
mpoa server name mps-name trigger ip-address ip address [mpc-address mpc-address]
```

Syntax Description		
<i>mps-name</i>		Specifies the name of the MPOA server.
<i>ip address</i>		Specifies the IP address.
mpc-address <i>mpc-address</i>	(Optional)	Specifies the MPOA client (MPC) address to which the trigger should be sent. If the address is not specified, a trigger will be sent to all clients.

Command Modes	
	EXEC

Command History	Release	Modification
	11.3(3a)WA4(5)	This command was introduced.

Usage Guidelines	
	This command sends an MPOA trigger for the specified IP address to the specified MPOA client from the specified MPOA server. If an MPOA client is not specified, it is triggered to all MPOA clients.

Examples	
	The following example sends an MPOA trigger for the specified IP address 128.9.0.7 to all known MPOA clients from the MPOA server named MYMPS:

```
mpoa server name MYMPS trigger ip-address 128.9.0.7
```

name elan-id

To configure the ELAN ID of an ELAN in the LECS database to participate in MPOA, use the **name elan-id** command in LANE database configuration mode. To disable the ELAN ID of an ELAN in the LECS database to participate in MPOA, use the **no** form of this command.

name *name* **elan-id** *id*

no name *name* **elan-id** *id*

Syntax Description

<i>name</i>	Specifies the name of the ELAN.
<i>id</i>	Specifies the identification number of the ELAN.

Defaults

No ELAN ID is configured.

Command Modes

LANE database configuration

Command History

Release	Modification
12.0	This command was introduced.

Usage Guidelines

To participate in MPOA, a LEC must have an ELAN ID. The LEC obtains the ELAN ID from the LECS. In case the LEC bypasses the LECS phase, the LEC can get the ELAN ID from the LES by using the **name elan-id** command.

Examples

The following example sets the ELAN ID to 10 for ELAN named MYELAN:

```
name MYELAN elan-id 10
```

Related Commands

Command	Description
lane server-bus	Enables a LANE server and a broadcast and unknown server on the specified subinterface with the ELAN ID.